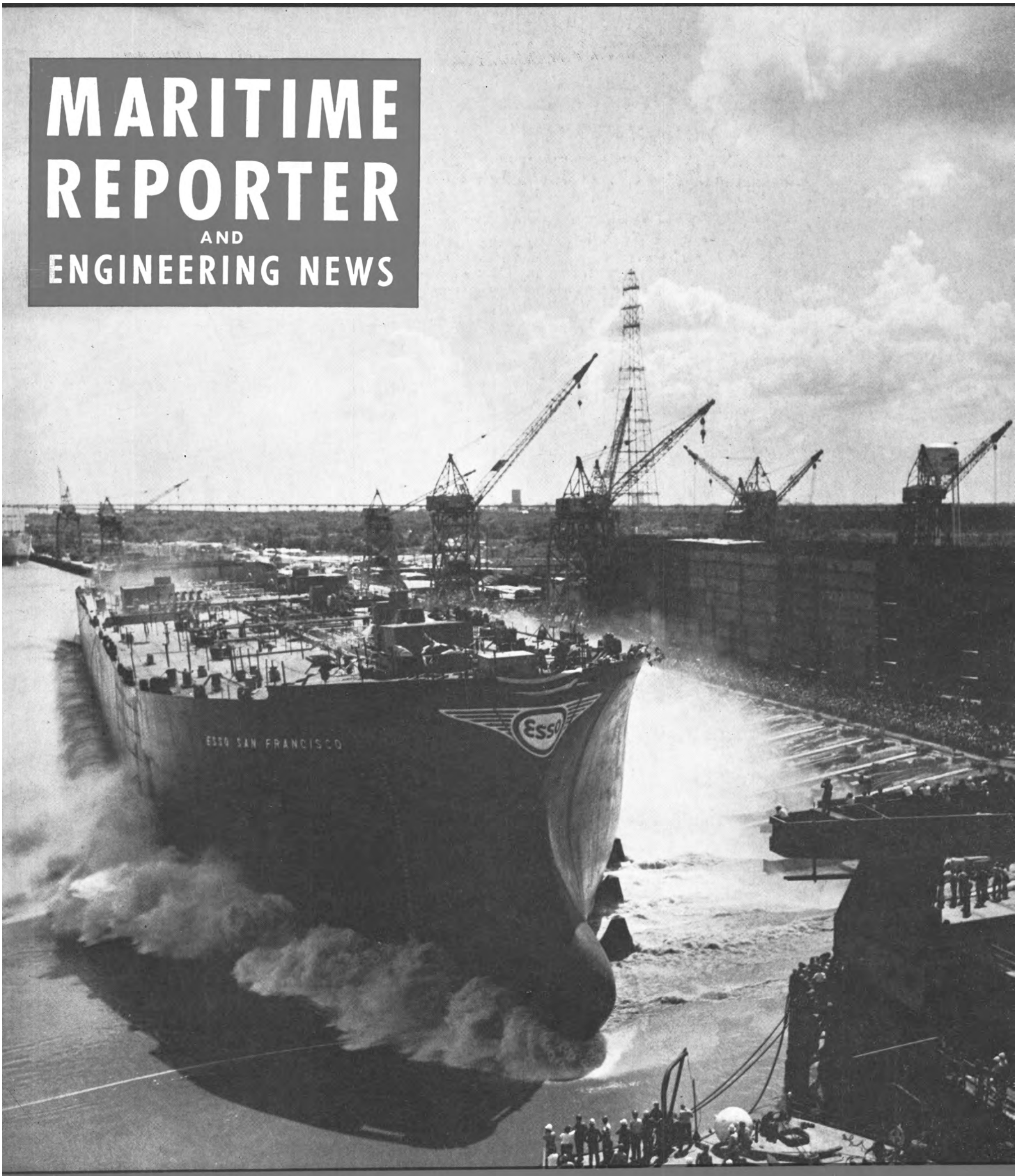
MARITIME
REPORTER
AND
ENGINEERING NEWS



Avondale Sets Worldwide Record By Side Launching 75,600-DWT Tanker

(SEE PAGE 6)

AUGUST 15, 1969

BAILITE® *PANELS...*

developed especially for refrigerated spaces

BAILITE is a sheathing of sandwich construction consisting of two layers of fiber glass reinforced plastic with a core of expanded steel. The method by which these materials are bonded together impart to Bailite the maximum in strength and long life.

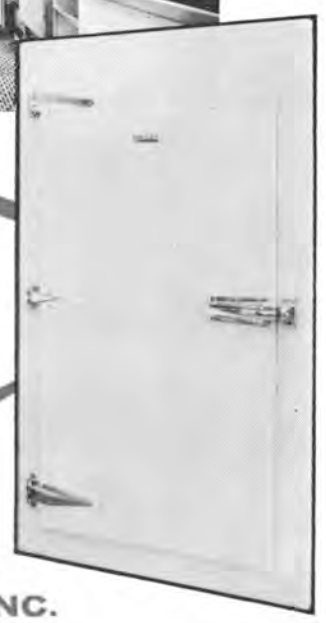
Bailite weighs only 18½ oz. per sq. ft. with a bright, gleaming white surface that never requires painting or any maintenance. It will not burn and its metal core makes it rat-proof, in accordance with the U.S. Public Health Dept. regulations.

Our crews handle the installation of Bailite whether it is aboard ship as a reefer cargo liner, or ashore in hospitals, hotels and institutions.

BAILEY *REINFORCED PLASTIC DOORS*

Though strong as steel, these doors are light weight. Because of this and their fabrication techniques, these doors are easily installed. The tensile strength ranges from 20,000 to 40,000 lbs. per square inch depending upon design.

Bailey Doors are of sandwich construction composed of reinforced laminates of glass fiber bonded with resin. The core of plastic foam insulation maintains a constant thermal value because it is impervious to moisture. Bailey marine plastic doors are non-corrosive and vermin resistant, approved as suitable for food and cargo storage areas.



REMEMBER...

Bailey not only furnishes the materials, entire units or replacement parts for all phases of refrigeration, air conditioning and insulation but handles the installation, modernization or repair as well.

BAILEY CARPENTER & INSULATION CO., INC.

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Holland-America Line Requesting Proposals For Two LASH Ships

Holland-America Line will ask bids from a number of shipyards for construction of two complete LASH ships. The vessels will be constructed according to technical detail as provided by Friede and Goldman, Inc. in New Orleans, the original designers of the LASH concept. The ships will be used in the U.S. Gulf/Europe trade. Holland-America also announced that the company is considering placing the ships in a consortium with other European shipping companies.

McDermott Building Tugboat For Foss

Foss Launch and Tug Co., Seattle, Wash., has ordered a twin-screw tugboat to be constructed by McDermott Shipyard, Morgan City, La. Designated Hull No. 162, the tug will measure 120 feet by 31 feet by 15 feet and be equipped with 3,000-total-bhp diesels.

FMC Approval Sought By Central Gulf For LASH Operation

Central Gulf Steamship Corporation has filed a five-year agreement for approval by the Federal Maritime Commission to establish a westbound operation from Europe, beginning in November, of its new lighter-aboard-ship (LASH) service.

Central Gulf, one of the non-subsidized liner companies under U.S. flag, will lease its foreign-built LASH-type ships to Eurogulf Lines Inc. which will conduct the at-first-monthly sailings and subsequently every 15-day service from United Kingdom, Eire, Scandinavian and Baltic ports, and the continent to the U.S. Atlantic and Gulf.

The initial monthly service, with a capacity of 73 barges holding up to 370 tons each, was expected to last eight or nine months until the second LASH ship is delivered, Central Gulf explained.

Contremar, S.A. of Belgium, will also participate in the venture.

Rockport Yacht To Build Six Trawlers

Continental Seafoods, Inc., Secaucus, N.J., has ordered six shrimp trawlers from Rockport Yacht & Supply Co., Rockport, Texas. Each vessel will be 72 feet by 22 feet by 12 feet and will be powered by a 340-bhp diesel engine.

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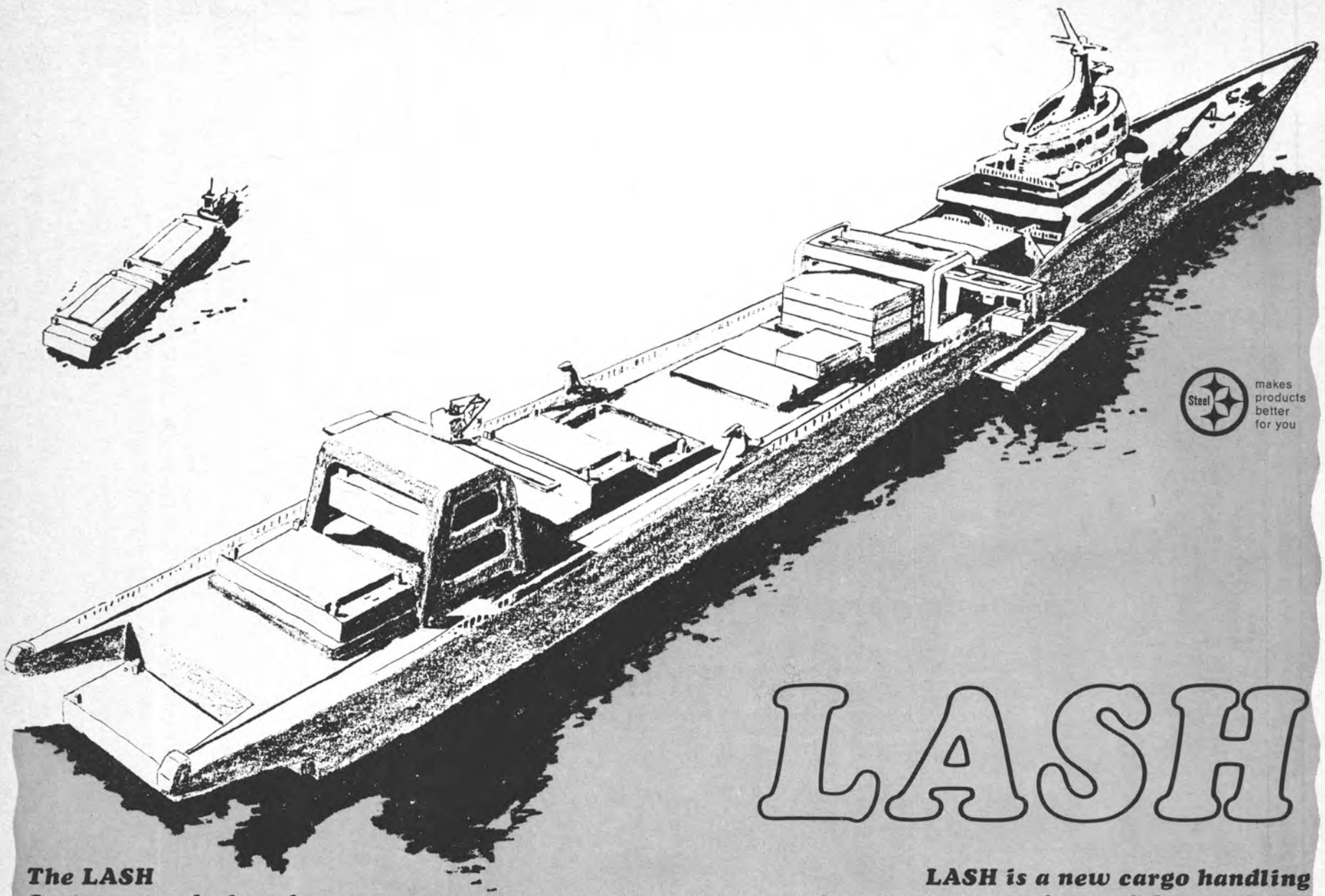

Steel makes products better for you

LASH

The LASH System was designed by the naval architectural firm of Friede & Goldman, Inc. Avondale Shipyards, Inc. is building eleven LASH vessels at their shipyard in New Orleans. Five of these new vessels will be placed into service by Prudential Lines.

LASH is a new cargo handling system, a new type of vessel. It stands for "Lighter Aboard Ship."

LASH is dramatically changing shipping concepts on every sea, in every port.

LASH is creating ports out of cities without major dock facilities, without harbors.

LASH is paring turnaround time to the bone.

Eleven modern LASH vessels are underway and will be built of a new heat-treated high-strength steel from Armco. A high-strength steel to put muscle into the huge well-type hull. A quenched and tempered steel to provide vital impact toughness. A steel that meets the exacting requirements of modern shipbuilding today. A modification of Armco QTC® Steel . . . ask us about it. It's one of the modern problem solving steels produced by Armco Steel Corporation, Department W-1189, P. O. Box 723, Houston, Texas 77001.

ARMCO STEEL ARMCO

Aerial view of Esso San Francisco sliding into the Mississippi River. Progress on the second tanker can be seen as it sits on the building blocks.

Avondale Sets Worldwide Record For Side Launchings

The Esso San Francisco

The largest ship in the world to be launched sideways, a 75,600-dwt tanker being built by Avondale Shipyards for Humble Oil & Refining Company, was christened recently at the builder's main yard in New Orleans. The latest addition to the Esso fleet, the Esso San Francisco, is the first of three such ships now under construction at Avondale. The "three sisters" will be the largest ships in the company's fleet serving the U.S. market.

The sponsor of the vessel was **Mrs. William W. Bryan,** wife of a senior vice-president of Humble Oil & Refining Company. Her matron of honor was her daughter-in-law, **Mrs. Robert H. Bryan.**

The Esso San Francisco has an overall length of 810 feet, a length between perpendiculars of 763 feet, a beam of 125 feet and a depth of 54½ feet. Its cargo of 650,440-barrels of oil is carried in 21 tanks. The ship has a one-boiler steam-turbine powerplant rated at 19,000 shp which will give a trial speed of 17.0 knots.

The size of the vessel is only one of the many features that will contribute significantly to the Esso San Francisco's efficient and economical operation. A centralized cargo-control system permits one man to supervise the loading or discharging of more than 600,000-barrels of petroleum in less than a day's time. Deck officers will control the main engines and navigate the ship from a modern and efficient wheelhouse. And, a 1,200-hp bow thruster will assist in maneuvering the 810-foot-long tanker and reduce docking time.

The crew's private accommodations are functionally designed for comfort—including carpeting, fluorescent lighting and air conditioning. Materials used in the rooms were selected for easy-to-clean features and economical maintenance.

The Esso San Francisco is the first ocean tanker in the Humble fleet, as well as the largest ship in the world, to be launched sideways. Delivery of the vessel, after final outfitting and sea trials, is scheduled for December.

The Humble Oil & Refining Company operates the largest privately owned fleet flying the stars and stripes. Its 21 tankers sail from Maine to Texas and from Alaska to California. Last year the ships delivered to various ports some 150,000,000-barrels of crude oil and petroleum products—a substantial share of the nation's energy requirements.

Beyond its size, the Humble fleet is one of the most modern and technologically advanced in design and equipment in the world today. The Esso San Francisco, for instance, is the fifth new ship built for Humble in this decade. Each ship is a product of the most current marine engineering and technology available.

Avondale Shipyards has more than 9,000 employees, and a backlog of contracts well in excess of $750-million.

According to Avondale president, **Henry Zac Carter,** the corporation has recently engaged in a $33-million expansion program calculated to make the shipyard one of the most modern and competitive in the world. Work is already complete on the project which involved the development of an additional 100-acres of land to receive a highly sophisticated plate handling and fabricating facility. Automatic handling and cutting equipment is being used in conjunction with a radically new method of ship construction. Now in operation, this "shipbuilding machine", financed entirely by Avondale, is designed to revolutionize domestic shipbuilding.

Esso San Francisco launching party, left to right: **Mrs. Robert H. Bryan,** matron of honor; **Mrs. William W. Bryan,** sponsor, and **Henry Zac Carter,** president of Avondale Shipyards.

Gladding-Hearn Pilot Boat Delivered To Portland, Me.

Gladding-Hearn Shipbuilding Corporation, Somerset, Mass., recently delivered a 65-foot pilot boarding boat to the Portland Pilots, Inc., Portland, Maine.

The new steel vessel will replace a schooner built in 1931 and signifies a change in boarding procedures as well as in equipment. Heretofore ships have been boarded from a dory. Now, pilots will climb the jacobs ladders directly from the deck of the new motor vessel. A key factor in the process is a rubber fender surrounding the hull at deck edge to provide resiliency between the ship and pilot boat. A large truck tire positioned to be just aft of the jacobs ladder serves as additional cushioning at the point of impact and as a spacer to protect the hanging ladder itself. With this technique, ships can be boarded at speeds up to 10 knots, permitting greater control of both vessels.

The Maine winter weather was a significant influence in the design of the new pilot boat. Sub zero temperatures, harbor ice, freezing spray, rough seas and fog have been designed against by a large diesel-oil-burning heating system providing circulating hot water heat throughout the enclosed part of the boat and a deck deicing system to melt snow and ice from walkways. The forward pilothouse windows are electrically heated and cleaned by air-powered windshield wipers, while aft fixed windows are thermopane to reduce heat loss. A Decca 326 radar provides the eyes for fog navigation and a Sea Slave loud hailer mounted on the radar mast provides a voice and ears for communication to the helmsman. The hull has a flared bow to keep spray to a minimum and a band of heavy steel spanning the waterline to resist the abrasion of harbor ice.

Instruments are centered in the pilothouse and besides the radar, loud hailer and Morse engine controls are included a VHF radio, an AM radio telephone, two depth finders (one flashing and one recording), wind speed anemometer, engine and generator alarms, deck defrosting switch and cabin temperature thermostat.

Below decks are berths for two crew members, a head and tile shower stall forward of the galley. In the after cabin are berths for four pilots, a hanging locker and a lounge area.

The Portland Pilot is designed to withstand rugged weather conditions experienced during winter months.

A teak grating with raised inboard handrails is fitted on the foredeck to provide a non-skid platform for boarding pilots.

Propulsion machinery consists of the Caterpillar D343 turbo-charged main engine rated 365 hp at 1,800 rpm with 3.5:1 reduction gear turning a 48-inch-by-36-inch three-bladed Federal Tru-Pitch propeller, through an Armco 17-4 PH stainless-steel shaft, turning in Johnson Rubber bearings.

Ships service electricity of 110/220 volts, a-c, single-phase, is provided by either of two 30-kw Kohler diesel generators.

Capt. **Charles Prior** (center), president of Portland Pilots Association thanks **Preston R. Gladding,** president of Gladding-Hearn Shipbuilding Corporation for a job well done. **Mrs. Prior,** who sponsored the boat, also shows her approval.

Upper Clyde Shipbuilders Name Douglas To Top Post

Upper Clyde Shipbuilders, Limited, Glasgow, Scotland has announced that **Kenneth Douglas,** formerly managing director of Austin & Pickersgill, Ltd., the Sunderland Shipbuilders, has been appointed managing director of Upper Clyde Shipbuilders.

Mr. **Douglas,** who is 48, was educated at Sunderland Technical School and served his apprenticeship at Sir James Laing & Sons, Ltd., of Sunderland. He was awarded a Bartram Scholarship and studied naval architecture at Sunderland Technical College for three years full-time and was awarded a diploma in naval architecture. He spent some time as technical officer at the Ship Division of National Physical Laboratory and in 1953-54 was a member of the management staff at Vickers Armstrong Naval Yard, Newcastle-upon-Tyne.

He was deputy shipyard manager when he left to take up an appointment in 1954 as director and general manager of William Gray & Co., Ltd., West Hartlepool. He left this company in 1958 to take up the appointment as managing director of Austin & Pickersgill, Ltd.

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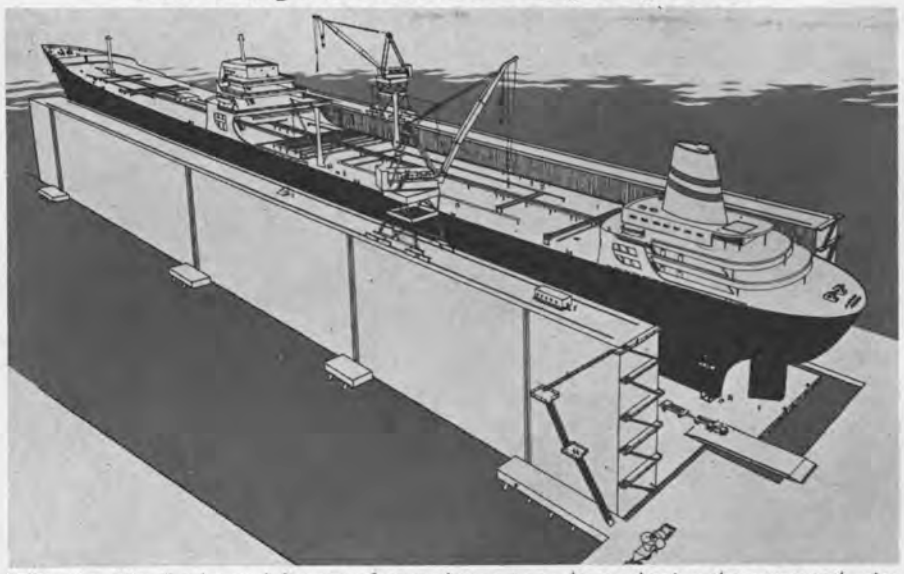
Bethlehem Sets Early 1970 Completion For Largest U.S. Floating Dry Dock



Lilliputian-like trucks and figures of men drawn to scale emphasize the mammoth size of the new all-steel floating dry dock now under construction at Bethlehem Steel Corporation's San Francisco shipyard.

The largest floating dry dock in the United States, designed to handle tankers ranging to approximately 150,000 dwt, is now under construction at Bethlehem Steel Corporation's San Francisco shipyard.

The new multi-million-dollar all-steel dry dock is scheduled for completion early in the spring of 1970. It will have an overall length of 900 feet and will have a clear width of 150 feet between wingwalls. It is designed for 37½ feet of water over the keel blocks and will have a lifting power of 65,000 tons.

The dock is being built in four quarter sections with the first section scheduled to be launched approximately October 1. The design calls for unit (continuous, nonsectionalized) construction with a watertight buoyancy chamber the full depth and length of the 800-foot-long pontoons. Wingwalls are 66 feet high and 18 feet wide with a watertight safety deck 7½ feet below the wingwall weather deck. This area provides space for pump motors, substation equipment, piping and other utilities. At full submergence, the safety deck will be below water and is protected against flooding by watertight compartmentation.

The four L-shaped quarter sections will each be 93 feet wide by 400 feet long when launched. After launch, the port and starboard forward quarter sections will be joined in the water by a special welding procedure. While this is being accomplished, construction will proceed on the last two quarter sections which, when similarly joined, will finally be welded end-to-end with the first two. Then the inboard and outboard aprons will be added to bring the overall length to 900 feet.

About 15,000-tons of Bethlehem steel shapes and plate will go into its all-welded construction. Of this, 2,300-tons of Mayari R high-strength steel is used in high stress or corrosion problem areas, with the remainder being ASTM A36. Plate thickness varies from 7/16 to 3/4 inch. Fabrication of this steel has been set up on a production line basis. A feature of the fabrication technique involves using a single pass, one side, automatic welding process to join the 7/16-inch, 40-foot-long plates into deck and bottom sections 50 feet wide.

The flooding and dewatering system consists of 40 ballast compartments. Each compartment is fitted with a motor-operated butterfly flooding valve, and a mixed-flow pump located on the safety deck. Flap valves are used as checks. Both the check and flooding valves are accessible from outside the dry dock for maintenance.

All pump motors and valves are operated from a console in a control room located at the weather deck. The console provides information on the position and operation of the valves as well as data from the water level indicators and the draft gauges. A complete intercom system is used to keep the dockmaster in contact with his crew.

In order to provide a flush surface on the pontoon deck, the keel block system which supports the drydocked vessel uses a combination of sand, wood and concrete blocks. These blocks can be preset by forklift trucks to reduce docking time.

Control of corrosion is provided by a four-part system. The system uses cathodic protection in the lower 10 feet of the pontoon compartments, polar oil in the upper portions, and cathodic protection on the outer underwater hull area with coal tar epoxy specified for the upper exterior areas.

Construction of four mooring dolphins and about 30,000-square-feet of high water approach platforms is scheduled. Both the platforms and the dolphins will be constructed of steel-reinforced concrete supported by steel piling. The heaviest of these pilings will be made of 24-inch-diameter concrete-filled pipe, 186 feet long, driven to support loads of 200 tons each.

On the top of each of the two wingwalls, a 60-ton-capacity traveling crane will be installed. Each crane will be equipped with a 90-foot boom with a 20-foot jib. With a spreader bar, the two cranes will be able to handle a load of 120 tons at the center line of the dry dock. Fourteen capstans will be used to handle the lines for positioning the ship in the dry dock.

The dry dock will be well serviced with all necessary utilities. Advanced types of mercury lighting will be used on the dry dock, including submersible floodlights in the wingwalls at the pontoon deck to provide night-time illumination of ship's bottoms.

Consideration has been given to the pollution problems of San Francisco Bay by the designing of a sewage disposal system into the dry dock which can accept discharges from ship scuppers and transport it into the yard's sewer system and then to the city's disposal plant. This is believed to be the first such system ever to be incorporated into a floating dry dock.

West Coast Firms Order Three Barges From Todd-Houston

Awards totaling approximately $3,500,000 for the construction of three large barges have been received from West Coast interests by the Houston Division of Todd Shipyards Corporation, according to General Manager **Arthur W. Stout Jr.**

Mr. **Stout's** Division also will share in the $25,000,000 award recently made to the Todd Corporation by United States Lines for the conversion of three Mariner-class cargo ships into containerized vessels. The Houston Division expects to build the hatch covers and do other miscellaneous fabrications for the lead conversion yards.

This container conversion work plus the three new barge construction contracts should keep the employment demand at Todd-Houston at current levels through the end of calendar year 1970.

Cunningham Named Marine Fuel Sales Manager For IPS

Ernest E. Cunningham Jr.

Ernest E. Cunningham Jr. has been named manager, marine fuel sales of Independent Petroleum Supply Company (IPS) according to **Edmond J. Dusesoi,** vice-president.

Mr. **Cunningham's** responsibilities include advancing IPS' worldwide bunkering interests and, in particular, supervising the sale of marine bunker fuels for The West Indies Oil Company, Limited (WIOC) at Antigua, West Indies.

IPS is a Natomas Company subsidiary handling petroleum transactions and tanker activities for the Natomas Group. This includes the buying and selling of petroleum crude and products and acting as petroleum and tanker brokers, both for affiliates and others.

The firm's New York office is at 277 Park Avenue and other offices are located in San Francisco and London.

Mongo Becomes V-P At T. J. Stevenson

Eugene S. Mongo has joined T. J. Stevenson & Co., Inc., of New York as vice-president, the steamship agency announced. Mr. **Mongo** who formerly served as vice-president of Jan C. Uiterwyk & Co., Inc., will now be concerned with the west coast of South America trade in which Stevenson acts as general agents for Peruvian State Line.

REPAIR DIVISION OF ASTILLEROS DE CADIZ, S.A. has maintained a high level of activity at the firm's Cadiz, Spain, yard. Shown in this recent photograph are the 103,700-dwt British tanker Bamford, the 97,350-dwt tanker Zaragoza of Cia. Espanola de Petroleos and the 40,290-dwt Norwegian tanker Jakinda being repaired at one time.

Aerojet Names Cox Manager Of Structures For SES Division

William T. Cox has been named manager of structures for Aerojet-General Corporation's Surface Effect Ships (SES) Division, El Monte, Calif.

Aerojet, a subsidiary of The General Tire & Rubber Company, established the SES Division in late 1968 to develop prototype model surface effect ships for military and commercial applications. These vehicles ride on a cushion of air and are capable of operation at high speeds over land and water. The division is working under a contract from JSESPO (Joint Surface Effect Ships Program Office), an agency of the Navy and the Maritime Administration, to develop a 100-ton craft capable of speeds upwards of 80 knots.

Mr. **Cox,** 18-year Aerojet engineering and administrative veteran and structures specialist, had been manager of the firm's Structural Products Division before joining the SES Division in 1968. Previously he was chief engineer for development of lightweight designs for metal and fiberglass rocket cases for Polaris, Minuteman and other missiles.

Before joining Aerojet in 1951, Mr. **Cox** was with the U.S. Navy Bureau of Aeronautics, first as engineering head of the structural design section for naval aircraft in Washington, D.C., and later in charge of the technical development of jet propulsion in Pasadena, Calif.

He is an engineering graduate of the University of Utah and earned his master's degree at the University of Illinois in 1933.

Jacksonville Shipyards Acquisition Completed By Fruehauf Corp.

Arnold P. McIlwain

The Fruehauf Corporation has announced the completion of the acquisition of the Jacksonville Shipyards, Inc., Jacksonville, Fla., for approximately $9,000,000.

The transaction was treated as a purchase of assets with April 1 the effective date of transfer.

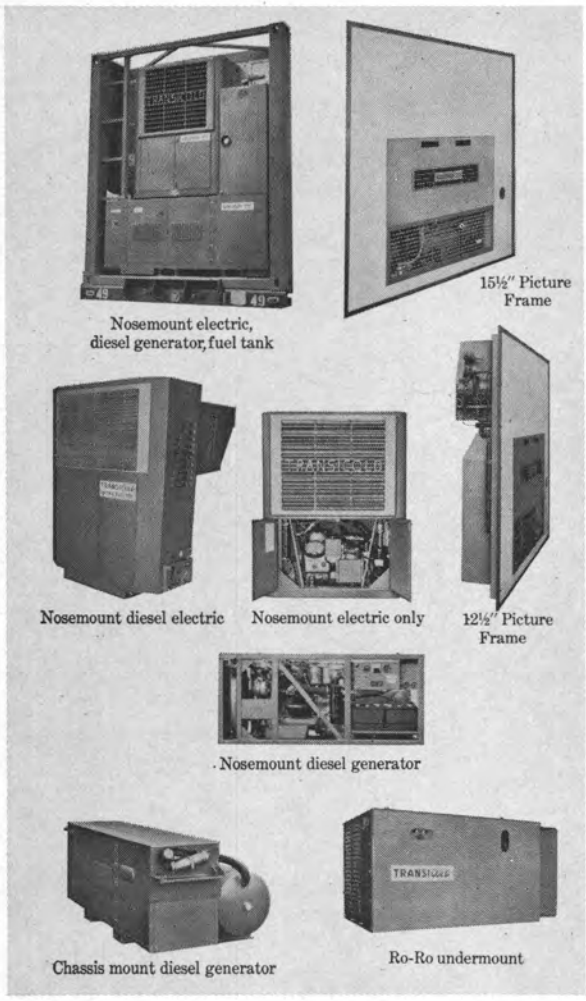
William E. Grace, Fruehauf president and chief executive officer, said the shipyard will be operated as a wholly owned subsidiary of Fruehauf with **Arnold P. McIlwain** as president and **John D. Schapiro** as chairman of the board. The present management of Jacksonville Shipyards will continue under the direction of vice-president **Leonhard Andersen.**

The announcement that Fruehauf had agreed to acquire Jacksonville Shipyards, with its annual sales of approximately $35,000,000 in service and repair work on oceangoing vessels and containerships, was made at the firm's annual meeting on May 1.

John D. Schapiro, speaking as chairman of the board of Maryland Shipbuilding & Drydock Company, subsidiary of Fruehauf Corporation, said that the Jacksonville Shipyards has six dry docks with maximum capacity of 20,000 tons, and presently employs approximately 2,500 people. He added that since joining Maryland Shipbuilding & Drydock Company in 1955 as chief accountant, Mr. **McIlwain** has served in the capacities of secretary and treasurer, and executive vice-president-finance and administration. On May 9, 1968, he was elected president and chief executive officer of the company.

Mr. **McIlwain** is a member of the board of directors of Maryland Shipbuilding & Drydock Company, Jacksonville Shipyards, Inc., North Arundel Hospital, Shipbuilders Council of America, member of the executive board and assistant treasurer of Baltimore Area Council-Boy Scouts of America, member of Propeller Club and The Society of Naval Architects and Marine Engineers. He also serves as a member of the advisory board of the Maryland National Bank, Glen Burnie Branch.

We have a container refrigeration program that just won't stop.



With three outstanding designs just announced (the all-electric 4012 Series and two new "picture frame" models), Transicold now has just about the most complete container refrigeration line in the business. Container refrigeration is nothing new at Transicold. We started producing these systems more than ten years ago and have countless units in service with leading ship and rail lines. This sea- and rail-going branch of the Transicold family is tough, with beefed-up components for extra heavy service... geared for the sea with special marine protection. Flatline models permit close alignment on shipboard... with maximum cube inside. And you won't wait for a customized model... we have units for just about any container need, available now on minimum delivery schedules. Equally important, Transicold knows the kind of service transport people must have... we've been a leading supplier to the truck and rail industries for 22 years. Sales and service are available throughout the U.S., and overseas, with five factory branches in strategic locations across the nation. Transicold seagoing refrigeration units are in service with carriers such as Seatrain, American Export Isbrandtsen Lines, Grace Line, Transamerican Trailer Transport, Australian West Pacific Line, William Holyman & Sons, Pty. Ltd., Commonwealth Railways, and Western Australian Government Rys.

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Esso International Names Cox President And Chairman, Peyton As Executive V-P

Donald M. Cox

Charles O. Peyton

Esso International Inc., worldwide marketing, supply and transportation affiliate of Standard Oil Company (New Jersey), has announced the election of **Donald M. Cox** as president and chairman of its executive committee and **Charles O. Peyton** as executive vice-president, both effective September 1. Mr. **Cox,** who has been executive vice-president of Esso International, succeeds **Glenn W. Poorman,** who is retiring.

Mr. **Cox** has served in a number of U.S. and European assignments with the Jersey Standard organization. He is an engineering graduate of Virginia Polytechnic Institute who started his career in 1943 as a process engineer at the Baton Rouge refinery of the former Esso Standard Oil Company.

In 1958, Mr. **Cox** was named general manager of that company's supply department, and in 1960, was appointed manager of supply and distribution for Humble Oil & Refining Company. In 1962 he was elected a director of Esso A.G., Jersey Standard's German affiliate and subsequently became a managing director of Esso Netherlands.

He joined Esso Europe Inc. in London in 1966 as vice-president and general manager, natural gas. In 1967, Mr. **Cox** joined Esso International Inc., and later that year was elected executive vice-president.

Mr. **Poorman,** a graduate of Dartmouth College and Massachusetts Institute of Technology, began his career as a chemist with the former Standard Oil Company of Louisiana. Subsequently he held a number of executive posts, becoming a director of Esso Standard in 1954 and vice-president in 1956. He joined Esso International in 1959 and was elected president in 1966.

Mr. **Peyton** has served as a vice-president and general manager of Esso International's supply and transportation department and tanker department. He was elected a director in 1966 and a senior vice-president earlier this year. A graduate of Louisiana State University, Mr. **Peyton** began his career in 1942 at the Baton Rouge refinery. He joined Esso International in 1961.

Mr. **Peyton** is a member of the board of managers of the American Bureau of Shipping and of the American Committee of Lloyds' Register of Shipping.

Dart Containerline Appoints Two U.S. Vice Presidents

Henri X. Diercxsens

Capt. Andre Herssens

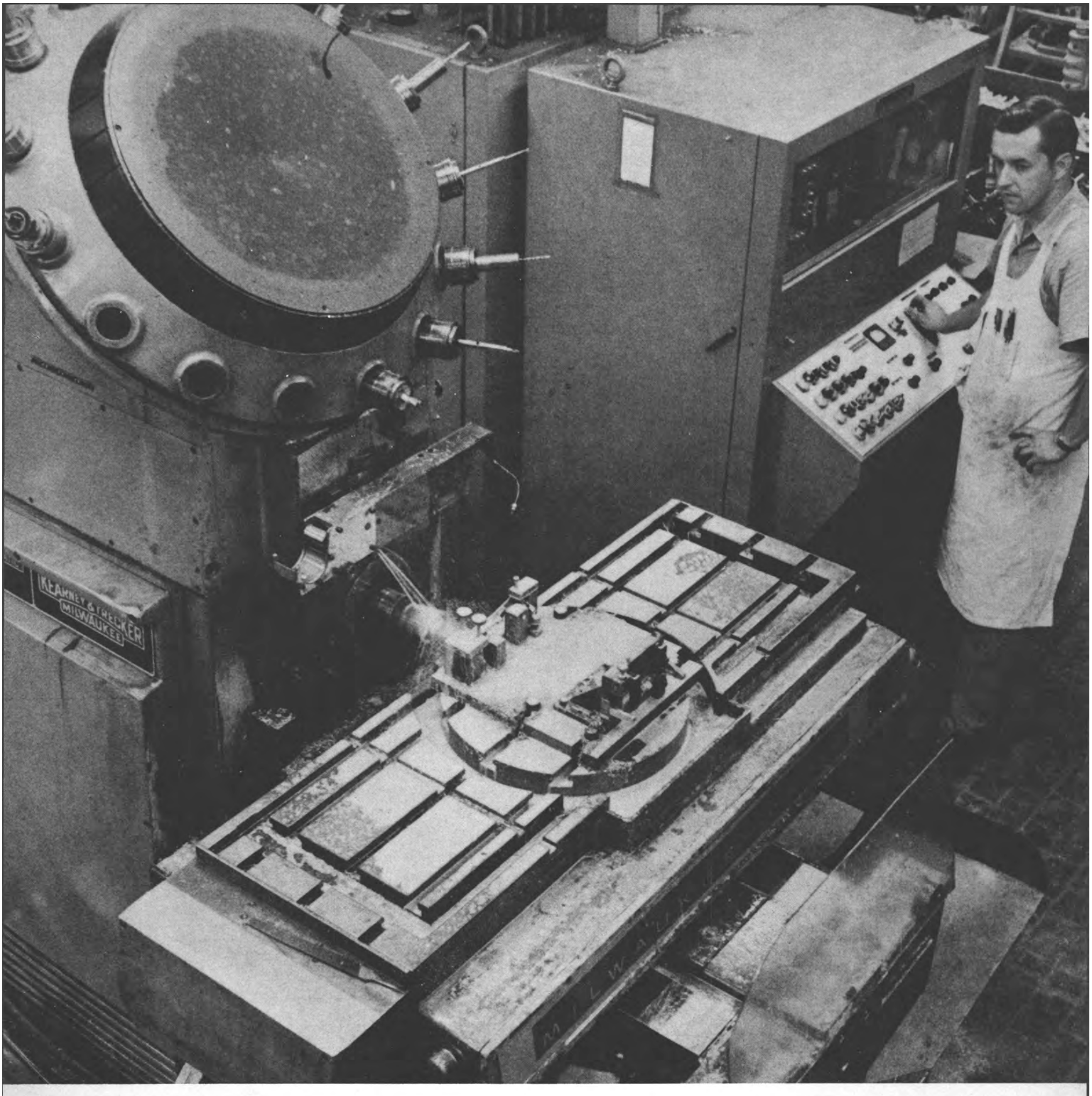
Jacques Leblanc, president of Dart Containerline Incorporated in the U.S.A., the joint venture of the Belgian Line, Clarke Traffic Services and Bristol City Line, has announced the following two executive appointments.

Henri X. Diercxsens has been appointed vice-president of container services and in this new position he will be responsible for the implementation and the coordination of intermodal transportation concept throughout the U.S.A. Mr. **Diercxsens** will also supervise all related traffic, claims and conference matters.

Mr. **Diercxsens** was born in Antwerp and obtained his masters degree in business administration from the Antwerp Business College. He attended the University of Wisconsin as a graduate exchange student. For several years Mr. **Diercxsens** was with Armement Deppe in Antwerp with the European Gulf Service of Deppe Line and he joined Belgian Line in New York in 1965.

Capt. **Andre Herssens** has been appointed vice-president of operations. He will be responsible for terminal operations in New York and Norfolk as well as of all container centers throughout the United States. He will also be responsible for the physical handling and maintenance of Dart equipment. Captain **Herssens** is in charge of the selection of inland carriers which handle Dart Containerline and all related equipment.

Captain **Herssens** was born in Ostend, Belgium. He attended the Naval Academy in Antwerp and prior to that received his education in England during World War II. His entire shipping career of over 20 years was spent with the Compagnie Maritime Belge in Antwerp and he joined Belgian Line in New York in 1967.



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BCM-1

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THE STRADLER

A Catamaran Hull Carries Specially Designed Barges Anywhere And Uses The Barges To Provide Buoyancy, Strength And Safety For Ship, Cargo And Crew

Artist's conception of the Stradler ship showing unique configuration with barges carried athwartship between the hulls.

A new concept in oceangoing cargo vessels is being model-tested at the Davidson Laboratory of Stevens Institute of Technology. Called "Stradler" (pronounced straddler), it has a uniquely designed catamaran hull that combines many new features. The Stradler was created and designed by **Frank Broes,** inventor and industrialist.

A unique feature of the concept is that the ship will transport a string of loaded barges anywhere in the world without requiring a crane or other lifting mechanism to lift them aboard the vessel. In fact, the barges while in transit become part of the ship, providing buoyancy, strength and safety.

The principle of the Stradler is that it transports the barges between the two hulls of the ship. The flat-bottom barges are floated into position between the two hulls through a bow door which is non-watertight and opens like the visor on a knight's helmet. Once inside the ship, the barges are lifted slightly by a hydraulic mechanism which brings each barge to a common draft and into position for locking to the catamaran hulls and the cross beams. In this position, the barges provide buoyancy, and strength to the entire combination.

At the end of the voyage, the barges are released, which allows the mothership to rise clear of them. The Stradler then proceeds ahead slowly and the barges are discharged out of the stern.

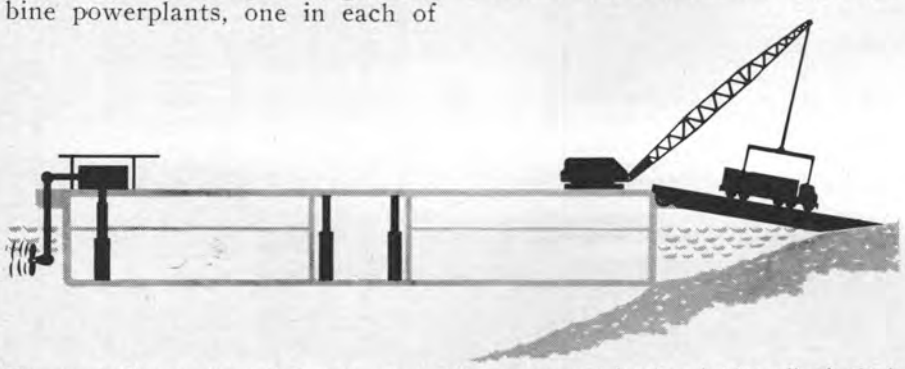
The basic concept being model-tested is a ship 1,160 feet long with an overall beam of 250 feet. It will carry ten 12,000-ton barges, each 200 feet long and 90 feet wide. The barges are carried with the long dimension running transversely to the ship.

Propulsion of the mothership will be provided by two gas-turbine powerplants, one in each of the catamaran hulls. These units will each develop 30,000 hp. It has been estimated that the total of 60,000 shp will give the loaded vessel a speed of about 22 knots.

Safety of the ship, cargo and crew has been given careful consideration. Each hull is subdivided into watertight compartments equal in number to the number of barges. Besides this subdivision, the ten-foot-wide cross members between the hulls are watertight, thus, with the ten barges there will be a total of 50 watertight tanks.

In an emergency, such as a fire in one of the barges, a release button on the bridge can be pushed, which will automatically release all the barges out of the stern. In this situation, the mothership will rise with the release of the load and proceed ahead, thus discharging all the barges. The Stradler can pick them up again, one at a time.

Being a ship designed for minimum turn-around time, the comfort of the crew has been given considerable thought. They will all be housed in the superstructure. The crew will be as few as possible, since all major operations will be automated. The quarters have been designed to attract reliable, older and experienced seamen. Each crew member will have his own apartment equipped with a galley. He will be allowed to have his wife accompany him since there will be no time for leave while in port.



The special barges have their own powerplant, crane and landing bridge all of which stow within the barge when not in use.

The concept envisions the loading and discharging of cargo in under-developed ports or where there are no facilities. Each barge will be equipped with a traveling crane to handle its own cargo. Further, each barge will have a 100-foot-long shore bridge so that unloading can be performed over-the-beach. The barges will be able to operate independently, since each barge will be equipped with its own propulsion plant, basically a recessed outboard-type unit. The crane, shore bridge and propulsion units all retract below the deck of the barge when not in use.

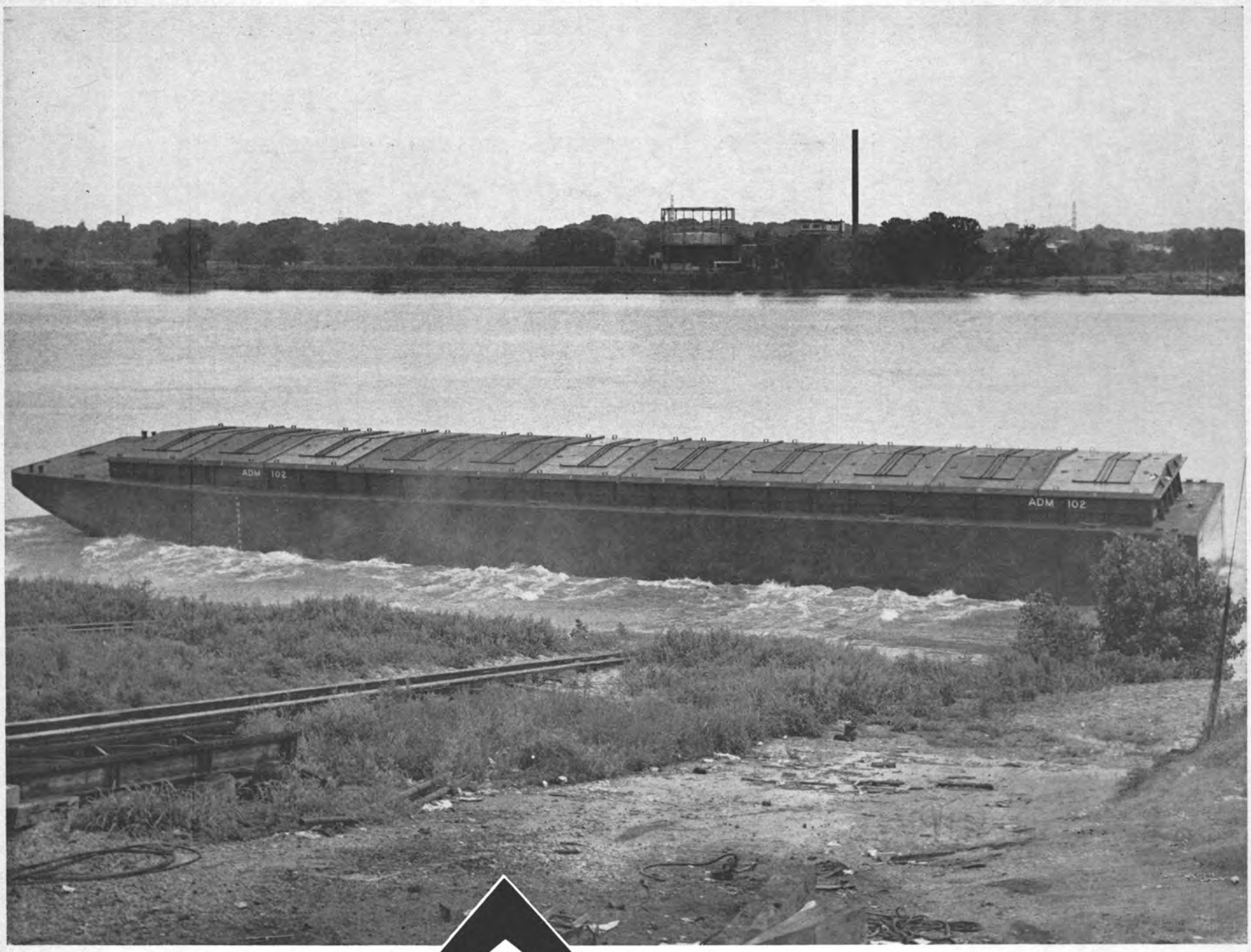
This type of ship would be readily adaptable to military operations. Its relatively shallow draft permits operation close to shore. The self-sufficiency of the barges eliminates the need for supporting vessels.

Consideration has been given to drydocking and construction of this vessel, since its extreme beam precludes existing facilities. The Stradler Ship Company has developed a new water hydraulic lift called the "Sea Lift Dock." The Sea Lift has been nicknamed the "Lifter" and it is a new concept used for floating ways or drydocks. Some of the features of the Lifter are that it will maintain uniform level regardless of how many tons may be placed upon it, providing, however, the tonnage does not exceed the capacity that the Lifter is designed to raise or lower. Also any change of tide will not affect the Lifter in maintaining a predetermined level.

Worldwide patents have been applied for by The Stradler Ship Company for the Sea Lift Dock and The Stradler Ship with all their new features.

The Stradler Ship Company intends to license, or charter these ships. With each ship there will be three trains of barges, ten barges per train, so that while one train is being transported, another train could be unloading, and the third train could be loading.

The Stradler Ship Company is a U.S. corporation with offices at One Park Avenue, New York City. The officers of the company are: **Bert Saunders,** president, formerly with Ingalls Shipbuilding Division of Litton Systems, Inc.; **Gordon Fleetwood,** senior vice-president; **John J. McCarthy,** secretary-treasurer; **Ann Mitrus,** assistant secretary; **Sol B. Fielding,** director, public relations and advertising; **W. T. Hough,** director, inventions and research; **Wm. F. Norton Jr.,** director and general counsel, and **Frank Broes,** director and board chairman.



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Archer Daniels Midland Company selected Jeffboat to design and build thirty new jumbo covered hopper barges. These vessels feature covers adapted for grain handling and are Jeffboat-rugged for years of heavy-duty service. Jeffboat is fully equipped and experienced to handle your special marine requirements, too—design, construction or repair. Call us. (812) 283-3551. Jeffersonville, Indiana 47130.

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Jackson Marine Commissions Oceangoing Tug Mister Chip

Halter-built tug Mister Chip leaving New Orleans for the Bahrein Island and her first assignment.

Jackson Marine Corporation recently held commissioning ceremonies in New Orleans, La., for the most recent addition to its fleet. Added to Jackson Marine's large fleet of supply vessels and tugs was the oceangoing tug Mister Chip, built by Halter Marine Services of New Orleans.

Hugh Jackson, president of Jackson Marine Corporation, headed a delegation of more than 200 business leaders and petroleum and marine industry executives who attended the christening of the new tug and a private reception at Antoine's restaurant.

The Mister Chip was named for the 10-year-old son of **Hugh W. Gordon,** senior vice-president of Brown & Root International.

The Mister Chip was christened at the foot of Canal Street by **Mrs. Sheryl Jackson,** wife of **Hugh Jackson.** Rear Adm. **Ross Bullard,** commander of the 8th U.S. Coast Guard District, New Orleans, was the principal speaker at the ceremonies.

Christening newest tug in Jackson Marine fleet, is **Mrs. Sheryl Jackson** (breaking bottle). On the left is Rear Adm. **Ross Bullard,** USCG, with **Mrs. Harold Halter.** On the right is **Hugh Jackson** (light suit) and **Harold Halter.**

The vessel departed New Orleans four days after the ceremonies for Bahrein Island to begin operation with the Brown & Root pipeline construction fleet. The first towing assignment for the new tug will be two Brown & Root pipelaying barges from Bahrein Island to Okinawa. The trip from New Orleans to Bahrein Island is expected to take 46 days.

Jackson Marine Corporation, Aransas Pass, Texas, organized in 1966, has eighteen 166-foot to 170-foot vessels in worldwide operation serving the offshore petroleum industry. Locations include the Persian Gulf, North Sea, Alaska and the Gulf of Mexico. The company is also engaged in marine consultation activities providing long-range feasibility studies on specific support applications for the marine and offshore industries. "Jackson Marine will invest approximately $5-million a year in capital expenditures over the next five years to increase the size of their fleet," said Mr. **Jackson.**

The Mister Chip is a standard Halmar 109-foot tug, a modification of the Halmar 110 class of tugs. It has a molded beam of 31 feet, a depth of 16 feet 4 inches and a design-loaded draft of 13 feet 6 inches. Gross tonnage is under 200.

The tug is powered by two Caterpillar D399 turbo-charged and after-cooled engines with a combined continuous rating of 2,250 hp. It carries Western 5:1 reverse/reduction gearing, Model 2618, and two 60-kw General Motors 671 diesel-driven a-c generators. The tug has a fuel capacity of 80,000 gallons and an estimated towing range at nine knots in excess of 6,000 nautical miles. Steering is Sperry electro-hydraulic from two control stations in the pilothouse and one control station on the aft deck. The tug has four-bladed propellers, 9-inch-diameter propeller shafts and 10-inch rudder stocks.

The tug has a rounded bow for pushing or nesting. The hull is of ½-inch steel plate incorporating a 1-inch extra-heavy sheer strake plate just below the main deck level for fendering. The stern area above and below waterline is reinforced with steel doubler plates to prevent wear from anchor handling.

Deck equipment includes a Skagit two-drum waterfall-type towing winch and special stern rollers for handling and moving anchors.

The Mister Chip has quarters for nine men and an all-electric galley, air conditioning throughout the vessel and the most modern navigational aids including radar, fathometer and single-sideband radios.

N.Y. & N.J. Dry Dock Assoc. Elects Four Officers

Ira S. Bushey, vice-president and general manager of the Shipyard Division of Ira S. Bushey and Sons, Inc., Brooklyn, N.Y., was elected president of the New York and New Jersey Dry Dock Association, at its annual meeting held recently. Mr. **Bushey** had previously served as vice-president of the Association.

Langdon S. Goddard, assistant to the president, Todd Shipyards Corporation, 1 Broadway, New York City, was elected vice-president of the Association.

Michael J. Gallagher, vice-president and general manager, Gallagher Bros. Repair Yard, Inc., Jersey City, N.J., was elected treasurer, and **T. R. Kennedy,** of the firm of Donovan, Donovan, Maloof & Walsh, 161 William Street, New York, counsel for the Association, was re-elected secretary.

Mr. **Bushey** has been employed by Bushey since 1955 except for service with the United States Marine Corps 1959 to 1960. He is a graduate of LaSalle Military Academy, Oakdale, N.Y. and Georgetown University, Washington, D.C.

TOWBOAT TAKING SHAPE—Shown being lifted into place is part of the forward hull section of the oceangoing towboat being built by Albina Engine and Machine Works for its parent company, the Dillingham Corporation. The vessel will be powered by two 1,333-hp Fairbanks Morse 38 D 8 1/8 diesel engines. The towboat will be 114 feet long and have a beam of 32 feet and a draft of 12 feet 9 inches. It will carry a crew of eight men. Hawaiian Tug and Barge Co., a Hawaiian-based division of Dillingham, will operate the unit in the Pacific basin. The towboat will have Trane air conditioning and heating, automatic pilot, Markey tow winch, two radar systems and Matthews hydraulic steering. It will be delivered to H. T. & B. in November.

Transworld Announces Four Key Appointments

The election of a chairman, president and two vice-presidents of Transworld Drilling Company and Transworld Drilling Company, Limited, were announced by **F. C. Love,** president, Kerr-McGee Corporation. The Transworld companies are wholly owned subsidiaries of Kerr-McGee Corporation.

George B. Parks, formerly president and chief executive officer of both Transworld companies, has been elected chairman of the board. He continues as chief executive officer of the Transworld companies and as group vice-president, drilling operations, of the parent company.

Grier D. Zimmerman, formerly vice-president of both Transworld companies, has been elected president.

Two Transworld executives, **Paul Romano,** formerly general manager of drilling operations, and **J. W. Greely,** formerly manager of engineering design and construction, have been elected vice-presidents of both subsidiary companies.

Mr. **Parks** joined Kerr-McGee in 1947. He served as division production superintendent, general production superintendent, manager of the production department and general manager of production and drilling. He was elected vice-president of production and drilling in 1956. Since that time he has held the offices of vice-president of oil and gas exploration, vice-president of oil and gas operations and was vice-president of the oil and gas division before becoming Transworld president.

Mr. **Zimmerman** joined Kerr-McGee in 1950 and has been a drilling rig roughneck, production engineer, chief engineer of the production department, toolpusher, manager of Gulf Coast offshore drilling and manager of Argentine drilling operations. In 1961, he became general manager of drilling operations and held that position until he became Transworld vice-president.

Mr. **Romano** came to the company in 1952 and has served as drilling engineer, drilling superintendent, manager of Argentine operations, manager of domestic offshore drilling operations and manager of drilling operations.

Mr. **Greely** joined Kerr-McGee in 1957 as marine superintendent of offshore drilling operations and has served as manager of domestic offshore-drilling operations and manager of engineering design and construction for Kerr-McGee prior to formation of the Transworld companies.

Transworld Drilling Company and Transworld Drilling Company, Limited, were formed in 1966 as wholly owned subsidiaries of Kerr-McGee Corporation to conduct domestic and international drilling operations, respectively.

Dredge Of German Design Ordered From PACECO By McCormack Sand Division

A contract to build the first twin-bucket clamshell dredge of German design for sand and gravel production in the U.S. has been awarded Paceco by William J. McCormack, Sand Division of Penn Industries, New York.

The huge dredge, scheduled for delivery at Plainsboro, N.J. by mid-1970, can be operated manually or on completely automatic digging cycles for which the operator is required only to start the first cycle.

When the dredge is put into operation, the two 7¾-cubic-yard capacity clamshell buckets will produce approximately 700-cubic-yards of material per hour. Equipment on the dredge will include two shaking and dewatering screens under which will be two sand screws to eliminate any sand loss. Two hydraulically operated tilting grids also will be included on the dredge.

Unlike conventional clamshell dredges, the buckets will operate in two oversized digging wells in the dredge hull. Power for the dredge will be supplied from shore through a 1,000-foot submersible cable. The excavated material will be transported to shore by a conveyor system.

Paceco, a division of Fruehauf Corporation, is under license from Mohr & Federhaff, Germany to build and market its line of clamshell dredges in the U.S.

World Tanker Tonnage At 133.6 Million DWT

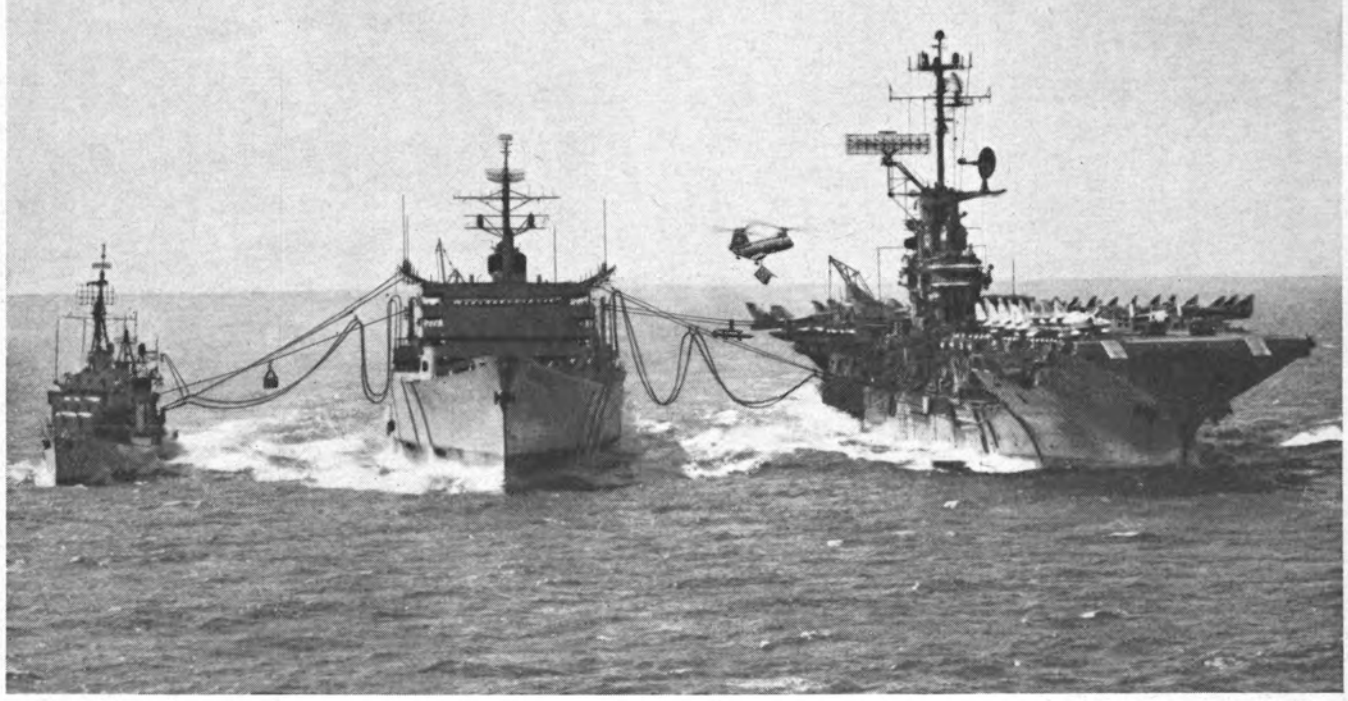
The London ship broker firm of Davies and Newman has reported that total world tanker capacity as of July 1 was 133,616,678 dwt. This figure includes only ships of 7,000 dwt and above.

The report showed that 71 vessels, totaling about 7,360,046 dwt, were delivered between January 1 and June 30 of this year. In the same period 47 ships of 718,500 dwt were scrapped, five tankers totaling 83,000 dwt were converted for other uses and two tankers totaling 32,500 dwt were total losses. Because of changes in the method of recording ships, a direct comparison with the previous report for the period ending December 31, 1968 is not possible.

Liberia has the largest fleet, totaling 33.4-million dwt. Following in order was Norway with 17.5-million dwt, Britain with 16.8-million dwt, Japan with 13.7-million dwt, and the United States with 7.2-million dwt.

Another interesting statistic was the age grouping. Tankers built before 1946 formed 3.4 percent of the world fleet, while 1946-1955 represents 13.4 percent, 1956-1965 just under 50 percent and 1966-1969 formed 33.3 percent.

World's first seagoing shopping centers.



The U.S. Navy tackled a problem: how to transfer at sea the high volume of cargo needed for effective fleet operation. Through competitive bidding, Western Gear obtained contracts to turn a concept into working hardware.

The resulting replenishment-at-sea system is unique in its function, and is a model of effective design and rugged construction. It meets the Navy requirement for complete control of loads at high speeds and in foul weather, day or night. Even missiles can be transferred at speeds up to 700 feet per minute, without exceeding 2 G's shock load.

This system is another outstanding example of one of Western's basic capabilities: we can move your object, of any size, fragile or volatile, from one place to another, quickly and surely.

Western Gear Corporation, Heavy Machinery Division, Everett, Washington 98201.

western
GEAR CORPORATION

Coastal Motor Tanker Esso Connecticut Christened —Has Twin Outboard Propulsion Drives And Five-Man Crew

Esso Connecticut maneuvering off Greenwich, Conn. prior to christening ceremonies.

Christening of the coastal motor tanker MV Esso Connecticut was held recently at the Showboat Motor Inn in Greenwich, Conn. The sponsor breaking the traditional bottle of champagne was **Mrs. L. J. Weigle** of Houston, Texas. Mr. **Weigle,** secretary of Humble Oil & Refining Company the owners of the vessel, escorted his wife.

The some 80 guests and Humble executives witnessing the event toured the vessel prior to the reception aboard the sternwheel replica, Mississippi River Showboat, moored just aft of the Esso Connecticut.

A unique feature of the vessel is its propulsion system. It has twin outboard Schottel propulsion drives, each powered by 850-hp Caterpillar diesel engines. They are capable of propelling the Esso Connecticut at a speed of 11 knots when its tanks are fully loaded with 30,000-barrels of cargo meeting American Petroleum Institute 60° clean product specifications.

Designed by the technical staff of the company's Marine Department, it will operate between Humble Oil's Bayway Refinery in Linden, N. J., and various marketing terminals along the East Coast. Principally, the Esso Connecticut will ply the waterways of greater New York harbor to Hackensack, N. J., Oceanside, N.Y., and New Haven, Conn. The 276-foot-long motor tanker is 55 feet wide and operates at a draft of 13 feet 6 inches.

Well-appointed, air-conditioned accommodations are provided for the comfort of her five-man crew, while the wheelhouse contains modern navigation and communications equipment.

The twin-screw outboard propulsion drives and their engines are remotely controlled from the pilothouse. The drive units afford the Esso Connecticut excellent maneuverability as they turn to steer the vessel at the direction of the helmsman, eliminating the need for rudders. A comprehensive monitoring system keeps the master informed if an abnormal operation occurs in the unattended engine room. A modern sewage-treatment plant, with retention facilities, is aboard in keeping with the company's "clean-waters" policy; while a segregated ballast facility also has been provided.

Three independent systems permit the simultaneous loading or unloading of three grades of product. Each system is equipped with a 3,250-barrel-per-hour vertical pump driven by a 230-hp diesel engine. The two hose-handling derricks, hydraulically operated, are designed to efficiently handle three hoses at once.

Stern view of new coastal tanker showing the recessed outboard propulsion drive units.

Addition of the MV Esso Connecticut brings Humble Oil & Refining Company's inland waterways fleet to 87 vessels. They have a combined capacity of some 1.4-million barrels or nearly 69-million gallons. This fleet, supplemented by charter equipment, delivers an average 16-million-gallons of crude oil and refined petroleum products daily, representing 12 percent of the inland waterborne movement of petroleum products in this country.

The motor tanker Esso Connecticut was constructed by Ingalls Iron Works in Decatur, Ala. It was designed to meet the high standards of the American Bureau of Shipping and is U.S. Coast Guard approved. She logged some 3,200 miles on her maiden voyage from Decatur to New York and the christening ceremonies in Greenwich, Conn.

Capt. **W. H. Larsson** presents bouquet of American beauty roses to sponsor, **Mrs. L. J. Weigle** of Houston, Texas at christening of his "mini" tanker, the Esso Connecticut. Participants in the ceremonies conducted by Humble Oil & Refining Company are, left to right: **T. J. Fuson,** general manager of Humble's Marine Department; **Mrs. Perry Davis Wood, Mrs. Weigle's** daughter and matron of honor at the ceremony; Mr. **Weigle,** secretary of the Humble corporation; **Mrs. Weigle;** Captain **Larsson,** and Capt. **T. M. Olsen,** alternate master of the Connecticut.

Moffitt To Make First Showing Of New Goodrich Products At Chicago Marine Exhibit

Water traffic floats and vinyl matting from B. F. Goodrich will be shown for the first time by Lucian Q. Moffitt, Inc., at the Marine Trades Exhibit and Conference in Chicago, September 18-21.

B. F. Goodrich Cutless marine bearings, with the exclusive "Water Wedge" design, also will be featured in the display.

The Lucian Q. Moffitt booth, number E-902, will be attended by **Robert Morrow** of the customer relations department.

The white plastic traffic floats, permanently buoyant and guaranteed not to waterlog, are available in a variety of shapes and sizes to meet a wide range of water-area marking needs.

The DeKorous runner matting, made of B. F. Goodrich Koroseal vinyl, is oil, grease, chemical, stain and flame resistant, and is available in five decorator colors.

Water Wedge design, an exclusive development on B. F. Goodrich Cutless bearings, permits water to flow between the shaft and bearing, lubricating both. The design prevents heat buildup and wear, and permits grit to be flushed away.

Lucian Q. Moffitt is the national and international distributor for Cutless bearings.

National Marine Orders Six Barges From St. Louis Ship— Two Towboats From Main Iron

St. Louis Ship, Division of Pott Industries, Inc., St. Louis, Mo., has been given an order for six barges by National Marine Service, Inc., also of St. Louis, for three of National's subsidiaries in the same city: Asphalt Barge Corp., the Intercity Barge Co. and N.M.S. Corp.

Asphalt Barge will own one, costing $264,-020; Intercity will own two priced at $528,330, and N.M.S. three totaling $792,495.

Each barge will measure 298 feet by 54 feet by 12 feet. They have been designated Hull Nos. 2664 through 2667, 2694 and 2695.

National Marine has ordered in addition two twin-screw towboats from Main Iron Works, Inc., Houma, La., for Asphalt Barge, at a price of $922,999. They will be powered by 1,350-total-bhp diesels.

Man In The Sea Symposium To Be Held In Washington

What progress has been made since SEALAB II in improving the capability of the diver to perform useful work in the sea? This important subject will be examined at a symposium, Progress Into The Sea, to be presented by the Marine Technology Society in Washington, D.C., October 20-22, 1969.

Sessions are scheduled in design of undersea facilities, diver assisting vehicles and simulators, support and logistics of underwater systems, cold-water operations and thermal problems, biomedical and operational problems, and underwater technology.

Co-sponsors of the symposium are the American Geophysical Union, the American Society of Civil Engineers, the American Society of Mechanical Engineers, and The Society of Naval Architects and Marine Engineers. The United States Navy is participating through its Deep Submergence Systems Project Office. The symposium will be held in the Statler Hilton Hotel.

Full information on the symposium may be obtained from Marine Technology Society, 1730 M Street N.W., Suite 412, Washington, D.C. 20036.

Port Everglades Shipyard And Merrill-Stevens Appoint Catharine N.Y. Representative

Alex M. Balfe, president of Port Everglades Shipyard, of Port Everglades, Fla., and Merrill-Stevens Dry Dock Company, of Miami, Fla., has announced the appointment of **Robert M. Catharine Jr.** as New York representative for these two affiliated companies.

Mr. **Catharine** is well-known in marine circles and maintains offices in Hoboken, N.J., and 11 Broadway, New York City. Formerly he was president of the Federal Paint Company, now part of the Celanese Corporation of America. Prior to that he was president of the Tidewater Dredging Corporation and manager of sales of Todd Shipyards Corporation.

The new Port Everglades Shipyard was completed in 1968 when the original Dade Drydock Corp., in operation since 1941 in Miami, was moved to the Port Everglades location. The yard, in addition to a new machine shop and other facilities, operates the largest Syncrolift in the world.

Merrill-Stevens Dry Dock Company, is the oldest combination yacht yard and repair facility in the south. In addition to yacht repair and service, Merrill-Stevens is the distributor for Vosper Mini-fin stabilizers in the eastern part of the United States and Mr. **Catharine** will represent the sales in the New York area.

American Export Requests Bids For Six Containerships

American Export Isbrandtsen Lines, Inc., New York, N.Y., has issued invitations to bid on the construction of six twin-screw containerships. The new ships will have an overall length of 818 feet 6 inches, a beam of 104 feet, a draft of 30 feet and a deadweight of 26,359 tons. They will be propelled by 60,000-shp twin-screw steam turbine propulsion machinery, giving the ships a speed of 25.5 knots. They will be capable of carrying 1,600 twenty-foot containers, including 140 refrigerated boxes. The Maritime Administration has classified this class of ship as MA Design C9-ST-86a.

Bid opening has been set for September 30. However, the bidding papers stipulate, "Issued with the approval of the Maritime Subsidy Board with the express understanding that no commitment of federal funds for the payment of construction differential subsidy has, as yet, been made."

American Export Isbrandtsen Lines have estimated the cost for the six ships to be $140-million. The new ships would replace 15 conventional ships in AEIL's fleet.

Barge Construction

Albina Engine & Machine Works, Inc., Portland, Ore., will build a 6,000-dwt bulk cargo barge for Dillingham Corp., Honolulu, Hawaii, of the following dimensions: 268 feet by 60 feet by 19 feet.

Bay Shipbuilding Corp., Sturgeon Bay, Wis., will construct a deck barge for the Great Lakes Dredge & Dock Co., Chicago, Ill. Designated Hull No. 703, it will be of 400 dwt and measure 70 feet by 43 feet 3 inches by 8 feet.

Gretna Machine & Iron Works, Inc., Harvey, La., has received an order from Seaboard Shipping Corp., New York City, to construct an oil barge, designated Hull No. 189. The barge is to have the following dimensions: 300 feet by 43 feet 3 inches by 19 feet 3 inches and will be of 4,500 dwt.

Gulf-Atlantic Towing Christens Gatco Florida Built By Southern Ship

The tugboat Gatco Florida in the port of New Orleans following christening ceremonies.

Southern Shipbuilding Corporation of Slidell, La., recently delivered a new tugboat to the Gulf-Atlantic Towing Company of Jacksonville, Fla. The 115-foot-long tug, the Gatco Florida, was delivered to the owner in New Orleans.

Following delivery, **Mrs. Claire Gray Scott,** daughter of Gulf-Atlantic's president **Harold Williams,** christened the $1,000,000 vessel.

The 115-foot tug is powered by twin General Motors diesel engines developing 3,000 hp. The seagoing tug is capable of an 85,000-pound ahead pull at a speed of about nine knots. Free-running speed is 12 knots.

The Gatco Florida has a 32-foot beam and a design draft of 15.5 feet. Accommodations are provided for a crew of ten.

The pilothouse is fully equipped for oceangoing service with a DX navigator, radar and automatic pilot. It will be based in Jacksonville, Fla.

Christening the Gatco Florida in a shower of champagne is **Mrs. Claire Gray Scott,** of Jacksonville, Fla. Southern Shipbuilding Corporation president **Alain R. Seligman** assists the tug's sponsor.

Eastern Gas & Fuel Elects Fiore President Of Marine Subsidiaries

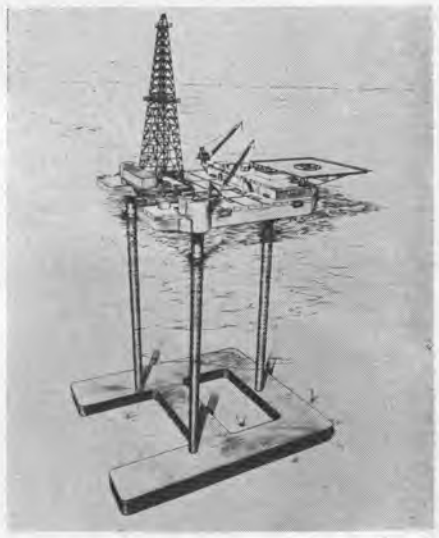
L. R. Fiore

L. R. Fiore, senior vice-president of Eastern Gas and Fuel Associates, Boston, Mass., heading its barge operations, has also been elected president and chief executive officer of Eastern's three marine subsidiaries: Atlantic Bulk Trading Corporation, Mystic Steamship Corporation and Boston Tow Boat Company.

Mr. **Fiore** succeeds **C. Russell Walton,** who is scheduled for retirement early in 1970 and has been elected vice-chairman of the three companies. Mr. **Walton,** also a senior vice-president of Eastern, continues as head of the company's coke operations and will in addition undertake special studies relating to pensions, insurance and health and welfare matters.

Mr. **Fiore** now is president of The Ohio River Company, Cincinnati, and its affiliated companies, Orgulf Transport Co. and Red Circle Transport Co., the three principal barge operations of Eastern headquartered in Cincinnati. Atlantic Bulk Trading Corporation operates three bulk cargo vessels in world trade, Mystic Steamship Corporation operates coastal barges on the East Coast, and Boston Tow Boat Company operates nine harbor tugboats in the Port of Boston and adjacent waters.

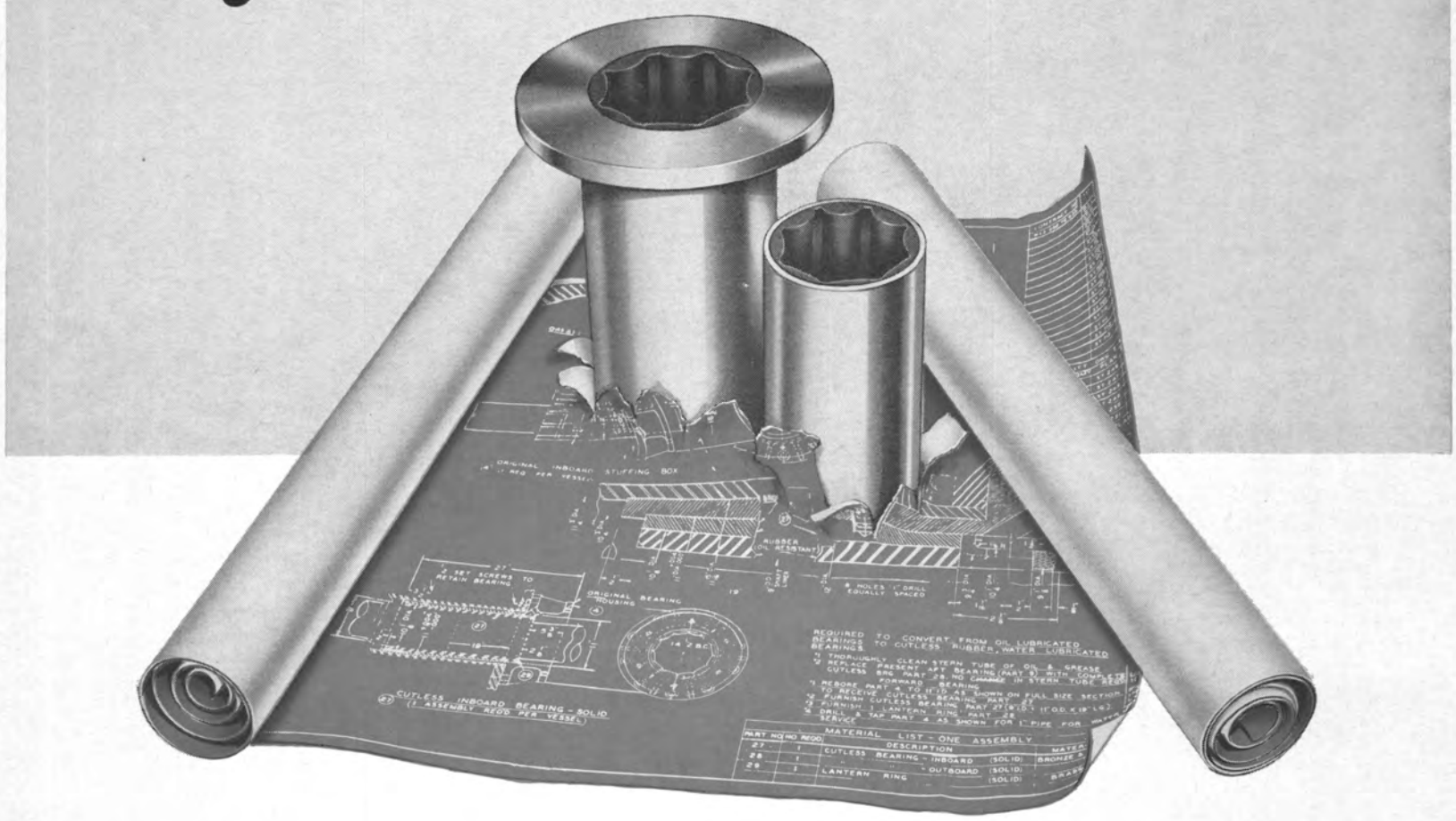
A native of New York City, Mr. **Fiore** has had an extensive business career associated with water transportation. He joined The Ohio River Company in 1956 as assistant to the president, subsequently became vice-president-operations, and was elected president in 1963. He is a graduate of New York State Maritime College, Hofstra College and the New York University Graduate School of Business. He served in the U.S. merchant marine, earning his master's license, and in the U.S. Navy, principally aboard battleships. He later retained his naval affiliation with the rank of captain in the U.S. Naval Reserve. After the war he taught ocean traffic management for four years at the U.S. Merchant Marine Academy, Kings Point, N.Y. Immediately prior to joining ORCO, he was for five years assistant to the commander at the military transportation service in New York.



FOR INDONESIAN WATERS — Sketch of the mat-supported, mobile offshore drilling platform, J. W. McLean, which Bethlehem Steel Corporation's Beaumont yard will deliver in Singapore next spring to the Reading & Bates Offshore Drilling Company. Designed to operate year-round at maximum water depth of 225 feet, the diesel-electric powered rig is similar to another platform now under construction for Reading & Bates at the Beaumont, Texas yard. Named the Milton G. Hulme, this rig will be delivered this fall and also will be used in Indonesian waters. The McLean will be assembled by a Singapore shipbuilding yard, which will do a major portion of the steel fabrication. Bethlehem will provide design and working plans, advisory engineering services, and much of the proprietary equipment and machinery. This type of contract enables Bethlehem to widen its services to customers who prefer to use the mat-supported type rig in distant seas but want to avoid long and costly tows. Main components of the rig are a steel mat, 210 feet by 170 feet by 10 feet; three cylindrical steel legs, 287 feet by 12 feet; the platform, 180 feet by 132 feet by 16 feet, which houses machinery, mud pits, fuel and water tanks, storage areas, air-conditioned living quarters and a heliport, and the skid unit, 46 feet by 46 feet by 16 feet.

Give us your marine bearing problem and

you've got it made



Our design engineers have accumulated over 6,000 problem-solving drawings to help you with your marine bearing problems. And if that isn't enough we will custom engineer a Cutless rubber bearing to suit the service environment. Either way you've got it made with Lucian Q. Moffitt, Inc.

To back up our 35 years of design engineering experience, we have the technical staff and facilities of the B.F.Goodrich Company. Together they form the largest, most experienced marine bearing staff in the industry. Try us out on your next bearing problem and find out for yourself.

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To go along with BFG Cutless bearings, we can also supply you with Daman Ceramaloy® coated shaft sleeves for maximum wear and durability.

We'd like to solve your marine bearing problem. We may have the answer already or we'll work with you and develop one. Drop a line to Lucian Q. Moffitt, Inc. You'll hear from us.

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Large Towboat And 1,000-Ton Derrick Barge Added to Ingram Corp.'s Worldwide Fleet

Ingram derrick barge No. 6, shown above, is the most modern offshore construction/pipelaying barge in the world.

Two of the largest vessels of their respective types in the world were christened recently in dual ceremonies in New Orleans, by Ingram Barge Company and Ingram Contractors, Inc.

The 1,000-ton combination derrick-lay barge, Ingram Derrick Barge No. 6, owned by Ingram Contractors, was christened by **Mrs. O. H. Ingram,** mother of **E. B.** and **F. B. Ingram,** chief executives of Ingram Corporation. The 6,600-hp river towboat, MV F. R. Bigelow, was christened by **Miss Eileen Bigelow,** daughter of the man for whom the boat was named and sister of **Mrs. Ingram.**

The F. R. Bigelow is 166 feet long and is powered by two General Motors 20-cylinder marine diesel engines that each develop 3,325 hp at 850 rpm. It is the largest and most powerful towboat in the Ingram Barge Company fleet, which consists of eight towboats, a tugboat and 77 cargo barges of all types.

Built by St. Louis Ship, a division of Pott Industries, the Bigelow is equipped with all of the latest technical advances in hull design, propulsion, auxiliary equipment, communications and living spaces.

A crew of 12 will man the new towboat, which went into service immediately after the christening ceremony.

Ingram Derrick Barge No. 6 is the largest, most modern derrick barge in the world. The Clyde Iron Works crane is capable of lifting 1,000 tons. The new barge is 401 feet long and 100 feet wide. The barge is capable of setting offshore petroleum platforms in any water depth now contemplated and can lay large-diameter pipelines in deep water with the most modern pipelaying equipment.

Derrick Barge No. 6 has comfortable, air-conditioned quarters for 160 men. It carries a complete machine shop; the most modern pipe-joining, laying and burying equipment; pile-driving equipment; complete communications facilities including closed-circuit television for monitoring the anchor hoists; a 50-foot diameter heliport, plus all other equipment and tools needed for the work for which she was designed. The barge was towed to its first assignment in the Gulf of Mexico immediately after the ceremonies.

Ingram Derrick Barge No. 6 joins five other major equipment spreads owned and operated by Ingram Contractors dispersed around the globe. It was built by France-Gironde Shipyard, Bordeaux, France.

Both vessels are classed by the American Bureau of Shipping.

Ingram Corporation, of which Ingram Barge Company and Ingram Contractors are subsidiaries, is a diversified organization whose interests and activities virtually circle the earth. It is engaged principally in offshore petroleum platform and marine pipeline construction and waterborne cargo transportation.

The corporation also has interests in international petroleum and petrochemical trading, construction materials, books and education, insurance, and executive search and psychological consulting.

The St. Louis Ship-built F. R. Bigelow entered service for the Ingram Barge Company immediately after christening ceremonies which were held in New Orleans.

Industry Film Shows U.S. Shipbuilding Gearing For Future

"Shipbuilding for the Seventies," a 26-minute color motion picture produced for the Shipbuilders Council of America has been previewed in Washington, D.C. and New York City.

Edwin M. Hood, president of the Council, advised that the purpose of the film was to acquaint people with the following specific points:

1. Shipbuilding in the context of seapower.

2. The technical progress made by American shipbuilders.

3. The industry's expansion and modernization to meet future shipbuilding requirements.

The film shows the modern methods and equipment being used in U.S. shipyards to speed up production and to reduce costs. It includes scenes taken at all major U.S. shipyards.

Mr. **Hood** stated that a 12½-minute version of the film, produced by Michael H. O'Connor Associates of New Orleans, was being prepared for use over television. He expects that 10-million people will have had an opportunity to view the film during the next 12 months.

Sun Ship Appoints Andrew J. Bozzelli

Andrew J. Bozzelli

Andrew J. Bozzelli was recently named assistant to the president at Sun Shipbuilding and Dry Dock Company. Mr. **Bozzelli** comes to his new post from Puerto Rico Sun Oil Company where he was vice-president and general manager.

Mr. **Bozzelli,** a graduate in mechanical engineering from Johns Hopkins University, joined Sun Oil in December, 1952 as a research engineer in the company's Automotive Laboratory. He was next assigned to the Product Development Department. In February, 1964, he was named market analyst in the Commercial Development Department and in January, 1966 he was promoted to manager of New Product Planning. In September of the same year Mr. **Bozzelli** was placed on special assignment to pursue the development of Sun Oil's Puerto Rican project. He was then named vice-president and general manager of Puerto Rico Sun Oil Company in June, 1968.

BETHLEHEM LAUNCHING—Mrs. Victor Oberschall, wife of the president of Penn Shipping Co. of New York City, holds a bouquet of roses just prior to christening the 37,250-dwt tanker SS Penn Champion at the Sparrows Point yard of Bethlehem Steel. With **Mrs. Oberschall** are, left to right, **George Daskalopoulos,** marine supervisor, Penn Shipping Co., **Daniel M. Mack-Forlist,** general manager of the yard, and representative **Edward A. Garmatz,** chairman of the Merchant Marine and Fisheries Committee. The Penn Champion will be delivered this fall and will be assigned to the carriage of petroleum products, primarily in the U.S. domestic trades.

"After 14,000 hours of service, the gears look good as new."

That's Paul Craig talking. He's vice president of Carroll Towing Company, Lake Providence, La.

The gears that he's talking about were made by Philadelphia Gear and are aboard the *William H. Craig,* a 3200 HP twin screw towboat that has had as many as 21 barges in tow in service between St. Louis and New Orleans. The boat was built by Marine Welding & Repair Works of Greenville, Miss.

The *Craig* is the first towboat on the Mississippi with hardened and ground single helical gears with a 300K factor rating. That's about twice the power loading capacity of any other towboat marine drive on the river today. And after 14,000 hours, you can't tell the gears from brand new gears about to be shipped from our plant.

Why were Philadelphia Gear marine drives chosen originally?

"The price was competitive and delivery was good," says Craig. But there was something else. "The service was good. The Philadelphia Gear organization seemed really interested in furnishing the gears."

One of the two Philadelphia Gear 23 HRMGH-F hardened and ground gear, flywheel mounted clutch units aboard the Wm. H. Craig.

That's a pretty fair summary of the way we feel about selling gears. Making a good product is a good start, and prompt delivery is even better. But you need something else too. Our "something else" is a Philadelphia Gear engineer who's willing to wrestle with the problem, design the drive to your requirements, and stick with the job until the boat's in service. Even then, he's on call if problems develop. And as the *William H. Craig* demonstrates, it's unlikely that any will.

For more information about Philadelphia Marine Drives, write to Dept. MR, Philadelphia Gear Corporation, King of Prussia, Pa. 19406.

PHILADELPHIA MARINE DRIVES

New Engine Bulletin From Cooper-Bessemer

A new 12-page bulletin presenting its line of LSV engines is now available from Cooper-Bessemer Company, a division of Cooper Industries, Inc.

The versatile V-type, four-cycle engine, available in 12, 16 and 20 cylinder sizes, covers a horsepower range from 3,400 to 7,750. These engines are manufactured to meet any fuel requirement—gas, diesel or dual-fuel—with equal reliability and dependability.

Applications for the LSV cover a wide range of services, i.e., generator drive, reciprocating or centrifugal compressor drive, pump drive or marine propulsion.

The bulletin presents in detail the economic advantages of the LSV along with many features which contribute to the engines' outstanding performance record.

Copies of the bulletin, Number 77-4, may be obtained by writing Cooper-Bessemer Company, Mount Vernon, Ohio 43050.

Cooper-Bessemer is one of the world's largest manufacturers of heavy-duty power and compression equipment including gas, diesel and dual-fuel engines; reciprocating or centrifugal compressors; gas turbines, and control systems.

Lykes-Youngstown To Supply Propulsion Control System For Submarine Rescue Ships

Lykes-Youngstown Corporation's Electronics Division has been awarded a contract to provide the propulsion control system for two of the U.S. Navy's new class of Submarine Rescue Ships. They are under construction at Alabama Dry Dock and Shipbuilding Company's plant in Mobile.

The Lykes system will enable an operator to control propulsion engine speed, propeller pitch, clutching and braking from a single control lever. Engine speed and propeller pitch will be automatically controlled over a wide power range to give the optimum revolution per minute to propeller pitch ratio. The control logic will be performed by solid state devices and integrated circuit modules.

Known as the ASR Class, the two naval vessels will have catamaran hulls and are scheduled for completion in 1970 and 1971. Each hull will be 251 feet long and have a beam of 26 feet. The well between the hulls will be 34 feet wide, giving the ASR a maximum beam of 86 feet. They will be equipped with four diesel engines producing 6,000 shp to twin propeller shafts, giving the ship a sustained speed of 15 knots.

R.J. Baumler And J.S. Pugh Named To President's Staff At Newport News Shipbuilding

R. J. Baumler

J. S. Pugh

Recent additions to the company president's staff at Newport News Shipbuilding and Dry Dock Company include **R. J. Baumler** and **J. S. Pugh,** according to **L. C. Ackerman,** shipyard president and chief executive officer. As an extension of the president's office, the staff positions are advisory and concerned with company planning and organization.

Mr. **Baumler** will concentrate on manufacturing and engineering and Mr. **Pugh** will be concerned with cost and control matters, the shipyard president announced.

Mr. **Baumler** joined the shipyard in 1955, and prior to his new appointment, was assistant superintendent of its machinery division. A 1952 graduate of the State University of New York's Maritime College with a BS degree in marine engineering, Mr. **Baumler** served as an engineering officer aboard U.S. Line's SS America until 1953. From then until 1955, he served as a Navy lieutenant aboard a destroyer escort.

He is former president of the Peninsula Engineers Club and a member of The Society of Naval Architects and Marine Engineers and the Propeller Club.

Mr. **Pugh,** a former U.S. Navy computer specialist, is a 1966 graduate of George Washington University's graduate financial management program. His Navy assignments included that as a specialist and systems analyst with the Naval Command Systems Support Activity in Washington, D.C., and as director of the management control and information center aboard the attack aircraft carrier John F. Kennedy. He resigned from the Navy with the rank of lieutenant commander.

A native of Kansas City, Mo., Mr. **Pugh** also is a graduate of the University of Missouri with a BS degree in mechanical engineering. He then was associated with Humble Oil Company before entering the Navy. During his military service from 1960 to 1969, he served as a pilot and computer systems specialist with overseas duty in the Far East, South America, the Mediterranean, Hawaii and Alaska.

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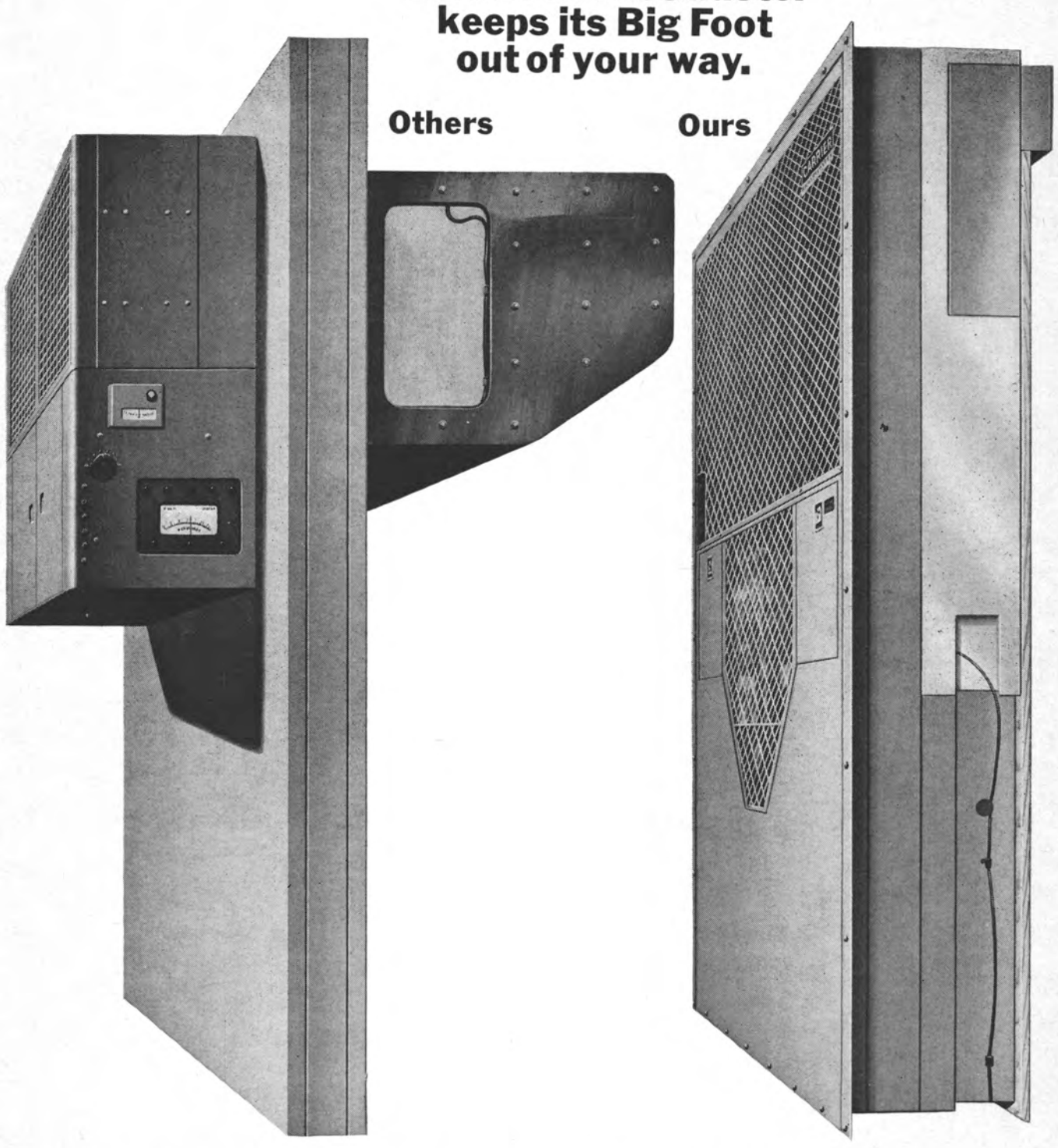

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Merrill-Stevens Named Distributor For Vosper —Expands To New York

The appointment of Merrill-Stevens Dry Dock Co. as sole distributors for the new Mini-fin Stabilizer in 31 eastern states augments a new sales expansion program for the Miami, Fla. company. Vosper Ltd., Portsmouth, England, announced the appointment of Merrill-Stevens at a Coral Reef Yacht Club luncheon gathering of leading naval architects and shipbuilders.

Closely following their appointment, Merrill-Stevens President **Alex Balfe** said that the company has "initially purchased $350,000 in Mini-fin equipment and we are opening a New York office for Merrill-Stevens at 11 Broadway, New York, N.Y., in a new sales expansion program aimed at the 31 eastern states in which we will distribute the Mini-fin Stabilizer."

Mr. **Balfe** likened the Mini-fin Stabilizer for yachts to shock absorbers for autos and said "yachts having Mini-fins will offer comfort and safety to those on board hitherto impossible to achieve, and many who were unable to enjoy themselves while cruising because of motion will now find a much more pleasant ride because of the Mini-fin."

Shell Oil Names White Manager Of Marine Sales Dept.

R. E. White

R. E. White has been named manager of Shell Oil Company's marine sales department, according to **L. M. Clark,** manager of the transportation sales department.

Mr. **White** is a graduate of the U.S. Maritime Academy at Kings Point and is a licensed marine engineer. He is a member of the Kings Point Alumni Association, the Propellor Club-Port of New York, the National Oil Fuel Institute, and the Chicago Oilmen's Club.

Mr. **White** joined Shell in 1955. His assignments have included railroad sales representative in Jacksonville, Fla., LP gas representative in Atlanta, area fuel-oil manager in St. Louis and assistant fuel-oil manager in Chicago.

Avondale Orders CG Cutter Gear Sets From Western Gear

Precision Products Division of Western Gear Corporation, Lynwood, Calif., has received a $1-million contract from Avondale Shipyards Inc., New Orleans, for the manufacture and test of reverse reduction gears to be used on two new Hamilton-class U.S. Coast Guard cutters.

Power source for the 378-foot, twin-screw vessels is a combination of diesel and gas turbine. The ships are powered by diesel engines during normal cruising, and by the turbine during high-speed runs. Both the diesel, rated at 3,600 hp, and the gas turbine, rated at 18,000 hp, drive into the Western Gear reduction unit. Power source changeover is accomplished through use of a special clutching system.

Western Gear has manufactured 18 gear-drives (nine shipsets) for use in the new Coast Guard cutters built to date by Avondale, and is also producing over 40 reverse-reduction drives, weighing approximately 100,000 pounds each, for a new class of U.S. Navy destroyer escorts.

Grafton To Build Twin-Screw Towboat

The Corps of Engineers, Louisville, Ky., has awarded a contract to Grafton Boat Co., Inc., Grafton, Ill., for the construction of a twin-screw towboat. The price of the contract was $362,860.

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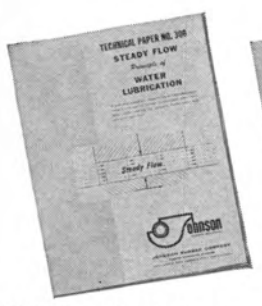

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A Low-Cost System For Ocean Transportation Of Iron Ore

"Marconaflo" Proves Successful

This New Method Of Handling Ores Will Make The Multi-Purpose Ship Of The Future A Tanker

A new low-cost system for ocean-transportation of iron ore which has revolutionary economic implications for the world's steelmakers and all raw material shipping has been announced by Marcona Corporation, San Francisco, Calif., prominent mining and transportation company.

C. W. Robinson, Marcona president, said use of the system, named "Marconaflo," in a successful July 3 delivery of 4,000-long-tons of Marcona superconcentrate iron ore from Peru to the new Portland, Ore., plant of Oregon Steel Mills demonstrates its commercial viability.

Marcona has recently concluded a contract calling for delivery of more than two-millions-tons of slurried iron-ore concentrate to Oregon Steel, an affiliate of Gilmore Steel Corporation of San Francisco.

C. W. Robinson
President, Marcona Corp.

Marconaflo, which permits loading and discharging of iron ores and other mineral concentrates in slurry form, makes it possible to transport these materials in large, high-economy tankers, rather than by traditional bulk carriers. An important element in this system is the method of slurrying cargo after it has hardened or compacted in the ship's hold.

Using Marconaflo, large tankers can now make deliveries anywhere in the world, lie offshore in deep water, and pump slurrified cargo into a pipeline, rather than relying on conventional port facilities that often cannot handle the big economical bulk carriers.

"Marconaflo reduces direct power and handling costs of loading and discharging iron-ore concentrates by as much as 90 percent from the cost of conventional ship unloading systems," Mr. **Robinson** said. "It is that reduction, coupled with the minimal facilities required for pipeline loading and discharging, which lends significance to the development of this system."

The new superconcentrate iron ore being produced at the San Nicholas Bay, Peru, facility of Marcona Mining Company has iron content of approximately 70 percent compared with standard concentrates of 65 percent iron or less.

"This new, higher concentration ore, coupled with the benefits of Marconaflo slurry delivery, will encourage development and construction of smaller, regional steel mills throughout the world," said Mr. **Robinson.**

"This type of mill will eliminate requirements for the high cost of a blast furnace and related facilities by using the direct reduction process in combination with an electric furnace and continuous casting. Held in storage tanks or ponds after delivery, the ore can be pelletized, subjected to direct reduction, then fed to electric furnaces for steel production."

The system also offers a significant advantage in reduced raw material transport costs for coastal plants refining and processing nonferrous minerals, such as copper, lead, zinc, manganese, and so forth.

"The need for greater economy and efficiency in handling ores and mineral concentrates was our basic reason for developing the new process," said Mr. **Robinson.** "It is now possible to gain such savings in the ocean transportation of these commodities that many marginal ore deposits will become economically attractive."

He predicted that use of Marconaflo will make the multi-purpose ship of the future a tanker, carrying petroleum products to one port, with return cargoes of slurried iron ore or other mineral concentrates. The tanker will be "the dry cargo vessel of tomorrow going to as much as 500,000 dwt without port limitations, since the entire cargo can be discharged in slurry form from offshore deep-water moorings."

Prior to development of the Marconaflo system, it was not practical to ship fine ore concentrates in slurry form due to their extremely dense compaction in transit. Shippers were compelled to use dry-bulk handling techniques, which meant loading from conventional docks, deeper dredging of harbors with increased ship size, and cumbersome, expensive dockside equipment.

In the Marconaflo process, ore concentrates are pumped aboard ship at approximately 75 percent solids. After settling, most of the water is drawn off, leaving a non-shifting cargo of over 92 percent solids, or less than 8 percent water —only slightly above the water content of conventional bulk concentrate shipments.

Thousands of tons of slurrified iron ore are pumped from the SS Oread into storage pond at Oregon Steel Mills. Slurried ore is reclaimed by the dredge on the pond.

On arrival, special high-pressure water jets developed by Marcona are employed in the ship's cargo holds to liquify the cargo for pumping ashore.

Research on the Marconaflo process has been conducted since 1966 at the company's San Francisco headquarters, with development carried out at the San Nicholas Bay, Peru, facility of Marcona Mining Company. Marcona Mining has extensive iron ore holdings in Peru and currently plans a $25-million expansion of its processing plants there.

In the experimental phase of Marconaflo, one hold of the company's SS Allen D. Christensen was modified for slurry handling. On June 8, 1968, that vessel discharged the world's first slurry shipment of iron ore at the Chiba Works of Kawasaki Steel Corporation, Japan—some 3,000-tons of ore. Renamed SS Oread, the same vessel made the July 3 delivery to Oregon Steel Mills.

Peruvian iron ore pouring into storage pond at Oregon Steel Mills.

Work is now underway at the Asano Dockyard of Nippon Kokan, Japan's only integrated shipbuilder-steelmaker, to convert Marcona's SS San Juan Merchant for transportation of slurry by the Marconaflo system. The vessel will then be the first carrier capable of transporting 50,000-tons of ore, slurry, or oil. Conversion is scheduled for completion by November of this year. Nippon Kokan built the original vessel for Marcona in 1959 as an ore/oil carrier. This vessel will be employed for delivery of ore concentrate under contract with Oregon Steel Mills.

Marcona is one of the world's largest mining and ocean transportation firms and is owned principally by Utah Construction & Mining Co. and Cyprus Mines Corporation. In 1968, the company shipped nearly 13.5-million-tons of iron ore from Peru and Australia. From 1952 to 1968, Marcona mined and shipped 70-million-tons of iron ore from Peru. The largest individual supplier of iron ore for Japan's steelmakers, the company supplied that nation with 11.8 million tons in 1968.

The Marcona-operated fleet includes 40 ships totaling more than 2.5-million deadweight tons, with three 130,000-dwt ore/oil carriers now under construction in Japan for delivery in late 1969 and early 1970. The company also ships large quantities of oil, coking coal, alumina, salt and other cargoes.

SECOND HYDRODYNE by

ST. LOUIS SHIP

FOR

The 6650 h.p., M/V F. R. Bigelow is the newest and largest towboat in the Ingram Barge Company fleet. Based on the performance of their first Hydrodyne towboat, the M/V O.H. Ingram, purchased four years earlier, Ingram *again* specified Hydrodyne, available exclusively from America's largest inland shipbuilding and repair firm. Call us at (314) 638-4000.

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First Derrick Barge With Twin-Hull Construction Built By Dutch Yard

A derrick barge, designed for operation in good and bad weather, was recently delivered to Santa Fe International Corporation by Van der Giessen-De Noord NV shipyard in Holland.

The outstanding feature of the barge is the highly mobile twin-hull design. In derrick barge and pipe-laying work, undue vessel motion normally introduces a measureable degree of functional inactivity. Through computer analysis and tank testing, in combination with experience gained through trial and error, Santa Fe's engineers learned how to overcome these motions for all but extremely severe sea conditions. The resulting configuration is such that patents have been applied for and are pending.

The principles involved to overcome motions are: changes in displacement by ballasting, changes in ballast distribution and changes in mooring-line tensions. To handle ballasting, eight oblong columns, each 46 feet long, are located between the hulls and the lower deck.

Each of the vessel's twin hulls is 400 feet long, 38 feet wide and 20 feet high. The total barge width is 106 feet. The lower deck is 43 feet above the keel and the main deck is 12 feet higher.

The I.H.C. crane, weighing 1,400 tons, has a swinging-load capacity of 500 tons and a fixed-load lift of 800 tons at 90-foot radius.

Two 325-kw gas turbines head up the power machinery list. Heat recovery boilers associated with the turbines supply steam that can be used to run the third power source, an 800-kw steam turbine. Three 340-hp boilers generate pile-driving steam and can also be used to drive the steam turbine and to provide steam to two 30,000 gallons per day evaporators. There are four two-drum hoists for handling the 20,000 pound Danforth anchors used for mooring.

Santa Fe's Choctaw can accommodate 200 men and be self-sustaining on offshore projects for 40 days.

The barge will be used by Santa Fe for all phases of offshore construction, including: erection of drilling platforms, laying underwater pipelines, construction of bridges, etc. For pipe-laying work, a detachable ramp is installed on the starboard side.

Gulf Oil Transfers J.E. May And D.P. Ash

John E. May, former vice-president of Ryukyuan representation and coordination for Pacific Gulf Oil Limited, has been named vice-president of transportation for Gulf Oil Company-Eastern Hemisphere in London.

D. P. Ash, whom Mr. **May** replaces, has been appointed to the staff of the worldwide coordinator of transportation in the Pittsburgh (Pa.) executive offices of the Corporation. He will serve as director of development and regional coordination.

A native of Great Britain, Mr. **May** joined Gulf in London in 1959. He held various managerial posts in transportation until his transfer to Pittsburgh in 1965 as a supervisor in the Transportation Department. He was named manager of transportation for Pacific Gulf Oil in Tokyo in 1967, and in the same year, vice-president of Ryukyuan representation and coordination.

Mr. **Ash** earned his AB degree in 1947 at Dartmouth College and his MBA at Dartmouth's Amos Tuck School of Business Administration in 1949. He joined Gulf's Transportation Department in Pittsburgh in 1952 and later held various managerial positions with Gulf and its transportation subsidiaries in New York, Naples and London before being named manager of transportation for Gulf Oil-Eastern Hemisphere in 1966. In 1967, he was given the additional responsibility of transportation representative for Gulf Oil Trading Company.

Mitsubishi Builds First Sulzer 9RND105 Diesel

Mitsubishi Heavy Industries, Ltd., Japan, has built and tested at its Kobe Shipyard & Engine Works a 34,200-hp Mitsubishi Sulzer 9RND105 type diesel engine. The engine is the first nine-cylinder RND105 type in the world. The engine will be installed in the 19,910-dwt containership Hakozaki Maru, capable of accommodating 1,000 containers, which is scheduled to be completed at the Kobe yard for Nippon Yusen Kaisha next month. This engine will give the 697-foot ship a service speed of 23.1 knots.

In June last year the Kobe yard completed an eight-cylinder RND105 diesel engine and installed it in the containership America Maru for Mitsui O.S.K. Lines. Another unit of 8RND105 type and the second unit of 9RND-105 type, both being built at the Kobe yard, are scheduled to be completed in April and June of next year.

As the RND105 engine is capable of developing up to 48,000 hp with 12 cylinders, it is expected that the engine can be used as main propulsion machinery for high-speed containerships as well as mammoth tankers, which have conventionally been equipped mostly with turbine engines.

The newly-completed unit will be delivered as an engine having a per-cylinder output of 3,800 hp, for a total of 34,200 hp. Designed to have a rated per-cylinder output of 4,000 hp, however, the new engine is marked 36,000 hp and 39,600 hp, representing 10 percent overload at trial operations at the shop. The 9RND105, a single-acting, 2-stroke cycle, crosshead, self-reversing, exhaust turbo-charged diesel engine, is 76 feet 3 inches long and has a height of 42 feet 4 inches.

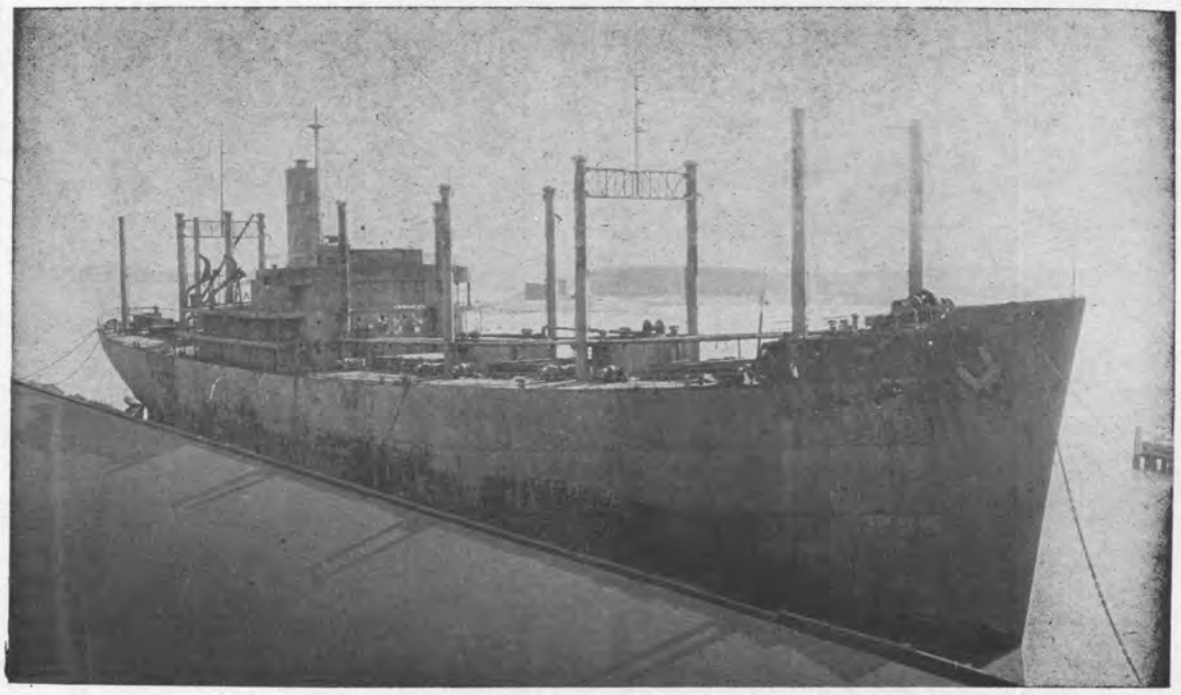
Reading & Bates To Acquire Associated Pipe Line From J. Ray McDermott

The managements of J. Ray McDermott & Co., Inc., New Orleans, and Reading & Bates Offshore Drilling Company, Tulsa, have announced an agreement in principle for the acquisition by Reading & Bates of all of the stock of McDermott's wholly owned subsidiary, Associated Pipe Line Contractors, Inc., Houston, in exchange for approximately 500,000 shares of Reading & Bates common stock. The agreement is subject to the approval of the board of directors and security holders of each company.

J. Ray McDermott & Co., Inc. is an international organization which provides specialized engineering and construction services for the production of oil and gas in offshore and marsh-land areas throughout the world. Associated Pipe Line Contractors, Inc. has been a wholly owned subsidiary of McDermott's since July, 1958. Associated, through its land, marine, hydrostatic test and double joint divisions, is principally engaged, throughout the United States, including Alaska, in the business of building and rehabilitating, on a contract basis, large diameter pipelines for use in connection with the transmission of petroleum, petroleum products, or natural gas. Reading & Bates is engaged in the business of operating contract offshore and onshore drilling rigs on a worldwide basis and in the production of oil and gas in the United States and Canada.

There would be no changes in Associated personnel and one McDermott director, yet to be named, would join the Reading & Bates board according to the agreement.

AP2/AP3 VICTORY C2/C3 NEW, US RECONDI



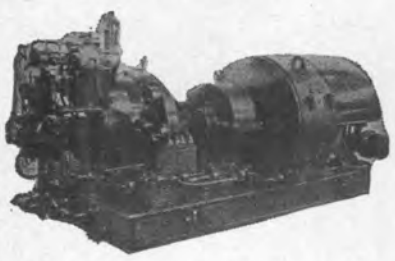
EQUIPMENT FROM MOORE DRYDOCK C-3 EX-MORMACSEA – HULL 197

MORMACSEA — Moore Hull 197 — some interchange with Federal Hull 198 — such as turbo generator sets. ALL EQUIPMENT AVAILABLE: 350 KW Turbo Generator sets—120/240 volts—Crocker-Wheeler generator driven by DeLaval turbine and gear—440#—740°TT—10,000 RPM/1200. Forced draft fans and motors—main circulators and motors—auxiliary circulators and motors—steering gear motors and pumps, etc.

KINGPOSTS — BOOMS — WINCHES — PROPELLER —TAIL SHAFT — 16" PORTLIGHTS

THIS IS JUST A PARTIAL LIST OF AVAILABLE MATERIAL!
INQUIRE ABOUT OTHER ITEMS YOU NEED

TURBO-GENERATORS



300 KW – From AP2 Ex-Medina Victory

TURBINE: Worthington-Moore—serial 7547 & 7548—440 lbs.—740°TT—28½" vacuum—type S4—5-stage—6097 RPM.GEAR: Type 14x7—6097/1200 RPM.GENERATOR: Crocker-Wheeler 102-HD—120/240 VDC—125 amps—40° rise—serial No. 973643 & 999795—compound wound. Armature flange 8¼" —B.C. 7"—12 holes. NEW ARMATURE AVAILABLE FOR THIS GENERATOR. SEE 3RD PAGE FOLLOWING.

300 KW – From AP3 Ex-Ridgefield Victory

TURBINE: Worthington-Moore type S4—5-stage—6097 RPM—740°TT—440#—serial No. 7108 & 7106. GEAR: 6097/1200—type 14x7—serial No. 7108—5.081:1 ratio. GENERATOR: Crocker-Wheeler 102-HD—300 KW—120/240 DC—6-pole—3-wire—stab. shunt—1200 RPM—type CCD—serial 973583. Suitable for units 7541 & 7543 and 7089 & 7188. WILL SELL ARMATURE SEPARATELY: 12-Hole flange—⅝" bolt holes—8.247" diam.—7" B.C. —flange & shaft 5".

300 KW Murray

TURBINE: G.E.—DORV—325M—440#—740°TT—5645 RPM. GEAR: S-192—5645/1200. GENERATOR: Ideal—120/240 VDC—1250 amps—stab. shunt.

300 KW GENERAL ELECTRIC

TURBINE: G.E.—DORV—325M—440#—740°TT—reduction gear S-192.GENERATOR: G.E. 120/240 VDC—1250 amps—stab. shunt.

TURN TO 3RD PAGE FOLLOWING FOR 300 KW SPARE ARMATURES

VICTORY AP3 TAILSHAFT

Isaacson Iron Works
Located Mobile

VICTORY AP3 RUDDER

Located Baltimore

VICTORY AP3 MAIN CIRCULATOR & MOTOR

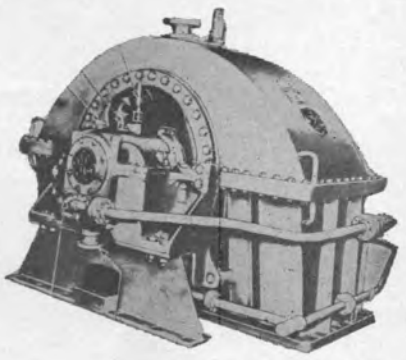
PUMP: 20 VCM—13,000 GPM—24.5 ft.—635 RPM. MOTOR: Reliance—100 HP—230 volts—360 amps—475/635 RPM — Lt. Compound — Frame 1050T — Vertical.

C3 PROPELLER BRONZE – 4-BLADE

21' 8" Diameter
21.669 Ft. Pitch
0.7 Radius

NEW AP2 VICTORY ENG

6600 HP Main Propulsi



G. E
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COMPLETE TURB

GENERAL ELECTRIC
Low Pressure Turbine $18,500
High Pressure Turbine $19,500

NEW THROTTLE VA
Schutte an

NEW H. P. AND L. P.
For General Electric and Allis-Chalme

ABS RECONDITIONED 66(

L. P. & H. P. MAIN PR(

FROM EX-MEDINA VICTORY—MARA
H.P. Turbine—complete—Serial 4A-1618–

FROM EX-SHEEPSHEAD BAY V
H.P. Turbine—complete—Serial 4A-2264–

AP2 V
WESTIN
M.
REDU
GE

Immedia
6000 SHP—
ion 5410—I
—AB No. 1
Ex-Medina V
1620.

VICTORY AP3 EVAPORATOR-DISTILLER

Bell & Gossett — complete with brine and evaporator feed pump and motor—distillate pump and motor.

KNOWN 'ROUND THE WORLD

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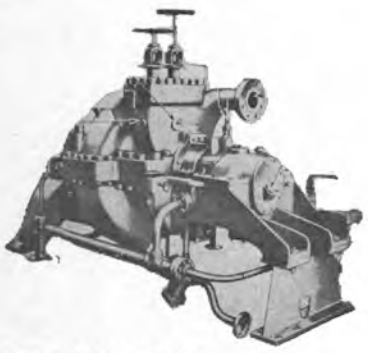
New York Office: 11 Br

ED AND TIONED MACHINERY & EQUIPMENT

NE ROOM EQUIPMENT

on HP & LP Turbines



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NE ASSEMBLIES

ALLIS-CHALMERS
Low Pressure Turbine $17,500
High Pressure Turbine $18,500

LVES – $6750.00
Koerting

URBINE BEARINGS
—labyrinth packing—diaphragms.

0 H.P. WESTINGHOUSE PULSION TURBINES

HULL 586—BUILDERS HULL 586
.P. Turbine—complete—serial 4A-1619.

CTORY—OFFICIAL NO. 81752
.P. Turbine—complete—serial 4A-2265.

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Delivery
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pinion 3907
9157 — from
ory serial 4A-

NEW H. P. & L. P. FLEXIBLE COUPLING
AP2—6000 H.P.

NEW SPARE BLADING FOR WESTINGHOUSE L. P. TURBINE
AP2—6000 H.P.

MISCELLANEOUS PUMPS & PUMP MOTORS

DE LAVAL VERTICAL ROTARY MAIN LUBE OIL PUMP

10/15 HP—230 VDC—250 GPM @ 43 lbs.—980/1750 RPM. MOTORS: G.E. or Reliance.

MAIN CIRCULATOR & MOTOR FOR AP2 VICTORY

Ingersoll-Rand 18VCM bronze pump—20" suction—18" discharge—vertical. Flanges opposite each other. Distance flange-to-flange 4'5". Suction bolt circle 25"—discharge bolt circle 22¾". Suction (20) ¼" holes—discharge (16) ¼" holes. PUMP WEIGHT: 5100 lbs. MOTOR: 5700 lbs.—Allis-Chalmers 75 HP—230 VDC—500/670 RPM—frame E-Bu-162—drawing No. 31099.

SPARE ARMATURE AVAILABLE FOR ALLIS-CHALMER MOTOR — WILL SELL PUMP MOTOR SEPARATELY.

INGERSOLL-RAND CONDENSATE PUMPS - MOTORS - TURBINES

AP3—2VHM—150 GPM—1650 RPM
AP2—2VHM—120 GPM

CHOICE OF TURBINE OR MOTOR DRIVES

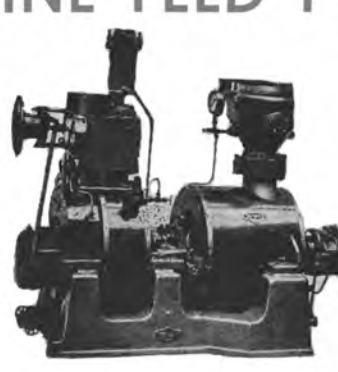
15 HP MOTORS: Reliance—G.E.—Crocker-Wheeler
TURBINES: Coppus type TF5 and Terry

INQUIRE ABOUT ANY UNLISTED ITEMS THAT YOU NEED

MARINE FEED PUMPS

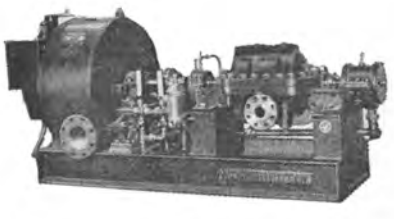
COFFIN MODEL F

Victory or T2, C3 etc.—control valve 1¼"—Form VI—constant pressure regulator—type C—150 HP—200 GPM—discharge pressure 575 PSI—7200 RPM—turbine 440 PSI 500°F—10 lb PSI exhaust pressure. Consumption 4280 lbs/hr—2 units available.



WEIR TURBINE DRIVEN FEED PUMPS TMFP7

PUMP: 7000 GPH—585 PSI—1380 ft head—5600 RPM. TURBINE: 480 PSIG—750°TT—exhaust 5 PSIG



MAIN FEED PUMPS

C2-S-J1—North Carolina—2 UQS-2—150 GPM @ 1465 T.D.H.—4000 RPM—115 H.P. Turbine. Form S2RM—Moore steam turbine—1½" steam inlet—440 lbs WP—750°F @ 10 lbs gauge. Water rate 26.8 lbs BHP/hr.

PACIFIC FEED PUMPS – TYPE JB – AP3 VICTORY

Horizontally split—diffuser type centrifugal. CAPACITY: 150 GPM @ 542 lbs or 1242' normal—185 GPM @ 600 lbs or 1418' max. Steam inlet 440 @ 507°TT—RPM 3740—water rate 35 lbs/HP—pumping temp. 240°. Total weight 1 unit 3100 lbs. OAL turbine & pump on base 8' 9⅜"—OAW about 2'.

VICTORY AP3 FORCED DRAFT FANS

Westinghouse—type 25—TD—18—19,000 C.F.M. at 10.7 inches static pressure.

SPECIAL FROM RIDGEFIELD VICTORY

G.E. HP & LP TURBINES & REDUCTION GEAR—8500 HP—9350 HP Oregon Shipbuilding Hull #1224—Instruction Book 16263

TURBINES: G.E.: L.P.—8-stage—3509 RPM—#62043 H.P.—8-stage—6159 RPM—#62042 REDUCTION GEAR: #75143—type MD-48-A—8500 HP—9350 max.—6159/3509/763/85 RPM. Maneuvering valve, operating cylinder, etc.

AIR COMPRESSORS

INGERSOLL-RAND

From C2-SAJ-1—Model 15B—type 40—5 x 5 and 4 x 4—60 C.F.M.—110 lbs.—15 H.P.—230 volts D.C.—55.7 amps.—1750 R.P.M.

SULLIVAN

AP3—7 x 4½ x 4½—60 C.F.M.—15 H.P.—230 volts.

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A

300 KW VICTORY SHIP & C-2 GENERATOR ARMATURES

CROCKER-WHEELER

New—as pictured above—with ABS certificate. From VC2-S-AP2 Ex-Medina Victory. For Crocker-Wheeler generator 102-HD-DP—type CCD—compound—serial 973-643; 999-795 and others in this group. Bearing shaft size commutator end—3½"; Flange size 8¼" OD; Bolt Circle 7", with 12 holes ½" diameter.

ALLIS-CHALMERS

120/240 volts DC—type MCW 21-11—1200 RPM—stab. shunt—148171 & 148173—from ex Stamford Victory—completely re-wound anuary 10, 1968—ABS—(1).

WESTINGHOUSE

120/240 volts DC—1250 amps—1200 RPM—stab. shunt—frame CB 208.4—Instruction Book 8301—51-S-20P-923 and 18-83H-313.

GENERAL ELECTRIC

120/240 volts DC—1250 amps—1200 RPM—stab. shunt—serial No. 2222725-2222807—In G.E. Instruction Book G.E.I. 16584.

C-2 ARMATURES

North Carolina C2-S-AJ-I—General Electric—120/240 volts DC—type MPC—stab. shunt.

T2-SEA-1 TANKER MAIN STEAM & AUXILIARY EQUIPMENT

B

MAIN TURBINE ROTORS

Large Turbine Rotors—Lynn
Large Turbine Rotors—Schenectady
Elliott Turbine Rotors—Fit G.E. small Schenectady turbine

C

G.E. MAIN PROPULSION GENERATOR REVOLVING FIELD

G.E. reconditioned—June 1967

D

G.E. MAIN GENERATOR STATORS

E

REWOUND WESTINGHOUSE MAIN PROPULSION GENERATOR REVOLVING FIELD

Was rewound for Gulf when removed from "Gulf Moon". Since that time, it has been re-checked in the Westinghouse Service Shop and balanced. ABS and ready to go. —December 18, 1968—certificate number 68-BA4831 — A-67B-JW — 12/18/68 Baltimore.

WRITE FOR COMPLETE INFORMATION

F

WESTINGHOUSE MAIN GENERATOR STATOR WITH OR WITHOUT COOLER

G

WESTINGHOUSE MAIN MOTOR FIELD COILS

COMPLETE SET

Westinghouse — universal type — newest design—80 pieces—one set.

H

T2 RUDDER

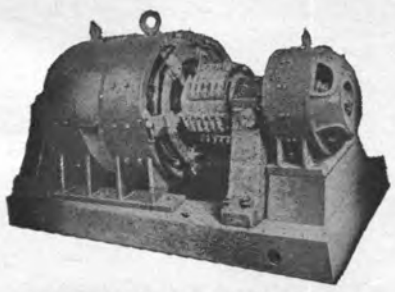
Reconditioned—ready to go.

T2 TAILSHAFTS

Reconditioned

PROPELLERS

T2 propellers



I

WESTINGHOUSE EXCITER SETS

110 KW—28 KW—5 KW available
110 KW—32.5 KW—5 KW available

J

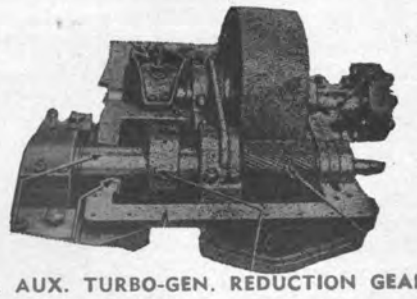
LORIMER

Emergency Generator Engine and Generator Parts

K

MAIN CIRCULATING PUMP MOTOR

125 HP—Westinghouse—Frame 876C—type CS—squirrel cage — 440/3/60 — 585 RPM. Reconditioned to ABS. Ready to go immediately.



L

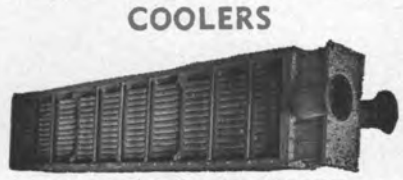
G.E. AUX. TURBO-GEN. REDUCTION GEARS

Bull gear & pinion. With ABS.

M

WESTINGHOUSE AUXILIARY GENERATOR REDUCTION GEARS AND BEARINGS

COOLERS



N

MAIN MOTOR AIR COOLER

Westinghouse—ABS—ready to ship

O

MAIN GENERATOR AIR COOLER

Westinghouse — reconditioned with ABS—ready to ship

P

G.E. MAIN GENERATOR COOLER
type G4—bronze heads—AL brass tubes

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THE BOSTON METALS CO.

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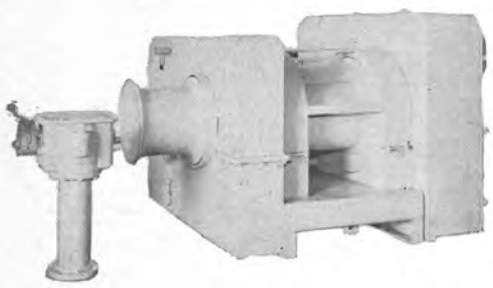
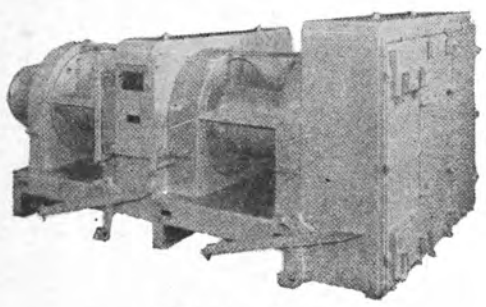
CARGO WINCHES, WINDLASSES & GENERATOR SETS

WINCHES



VICTORY TYPE UNIT WINCHES

50 HP—230 volts DC—Westinghouse, G.E. or Crocker-Wheeler. U-1, U-3 single speed—7450 lbs @ 223 FPM; U-2, U-5 double speed—19,000 lbs @ 96 FPM. We have both right and left hand. Send for flyer on these.



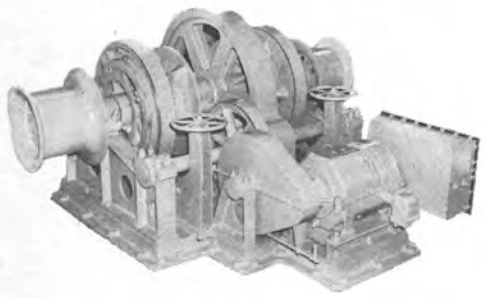
DOUBLE DRUM U-6 UNIT WINCHES

Double drum unit winch model U-6. DRUM: 16" diameter by 20" wide—with 28" flange. MOTOR: G.E. 50 HP — 230 volts — CDM — 1829 A.E.

AMERICAN ENGINEERING UNIT WINCHES

2 Full sets from "African Endeavor" and "African Enterprise." Winch duty: 7450 lbs at 223 FPM. MOTOR: G.E. 50 HP—230 volts DC—type CDM—1829 A.E.—181 amps—750 RPM.

WINDLASSES



NEW 2¼" McKIERNAN-TERRY

(2)—For 16,000 lb anchors—47½" center to center. 70 HP — 230 volt DC motors — with controls.

A.E.—2-7/16" WINDLASS

Made by American Engineering — from Ex-African "Enterprise" and "Endeavor". 65 HP —230 volts—234 amps.

HYDE #12 WINDLASS FOR 2 11/16" CHAIN

Built for Beth Quincy 29,000 ton class tankers. 12 x 14 wp 125-150 lbs—handle 16,500 lb anchors. Wildcat centers 4' 8". Completely reconditioned — new cylinders — new throttle valves—new piping.

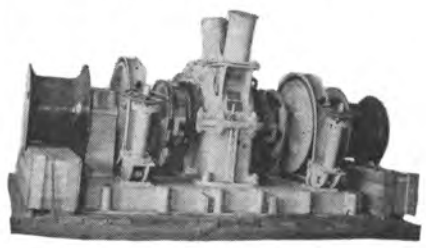
T-3 ANCHOR WINDLASS FOR 2⅜" CHAIN

American Engineering 13 x 14—handle two 13,000 lb anchors and 60 fathom chain at 35 FPM. Wildcat centers 6' 3".

T-2 WINDLASS FOR 2-5/16" CHAIN

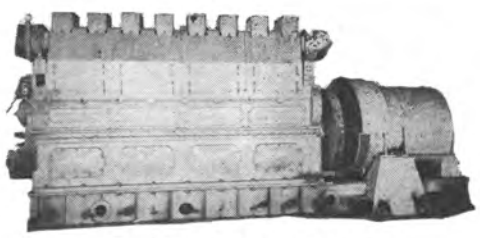
American Engineeirng type MALI-60-14—12 x 14—4' 8½" between wildcat centers.

UNUSED 1⅝" HEAVY DUTY LINK BELT WINDLASS



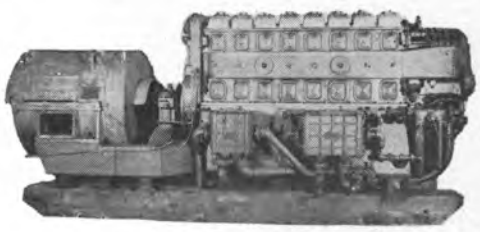
Below deck motor drive. Double Wildcat—driven by 50 HP—230 volt DC motor with vertical shaft and worm drive. Single speed—handles 7000 lb anchors and 60 fathoms of 1⅝" chain at 7 fathoms per minute. Wildcat centers 56". Complete with all controls and warping features. Total weight 27,500 lbs. With spares.

GENERATOR SETS



350 KW INGERSOLL-RAND DIESEL GENERATOR SETS

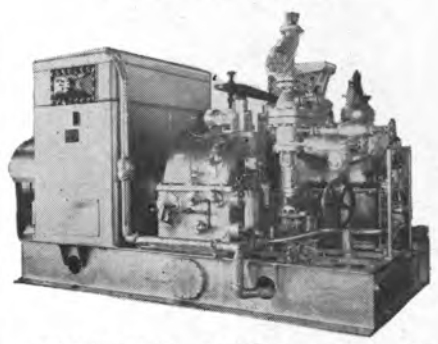
4 Available—engine type S—Ingersoll-Rand—1½ x 12—heat exchanger cooled—600 RPM. GENERATOR: General Electric—350 KW—120/240 volts DC—600 RPM. Complete with switchgear, coolers and air starting equipment.



290 KW DIESEL GENERATOR SET

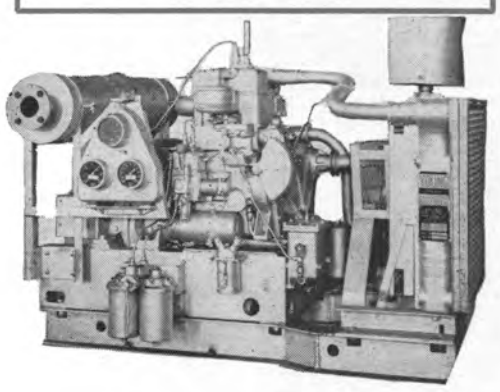
Westinghouse 290 KW generator—120/240 volts—1250 amps. ENGINE: GM 8-268A—6½ x 7—8 cylinder—1200 RPM.

G.E. 600 KW 440/3/60 TURBO GENERATORS



COMPLETELY RECONDITIONED BY G.E. SERVICE SHOPS WITH LLOYDS AND ABS CERTIFICATES

TURBINE: GE FN3-FN20 — condensing 6-stage — 525/565 lbs gauge. Super-heat 355/371 — 10033 RPM. GEAR: S-178—ratio 8.36:1—10033/1200. GENERATOR: 600 KW A.C.—type ATI—600 KW—750 KVA—450/3/60—1200 RPM—80% PF—totally enclosed—water cooled. EXCITER: 7½ KW—120 volts—62.5 amps—1200 RPM.



UNUSED 10 KW SUPERIOR DIESEL GENERATOR SETS

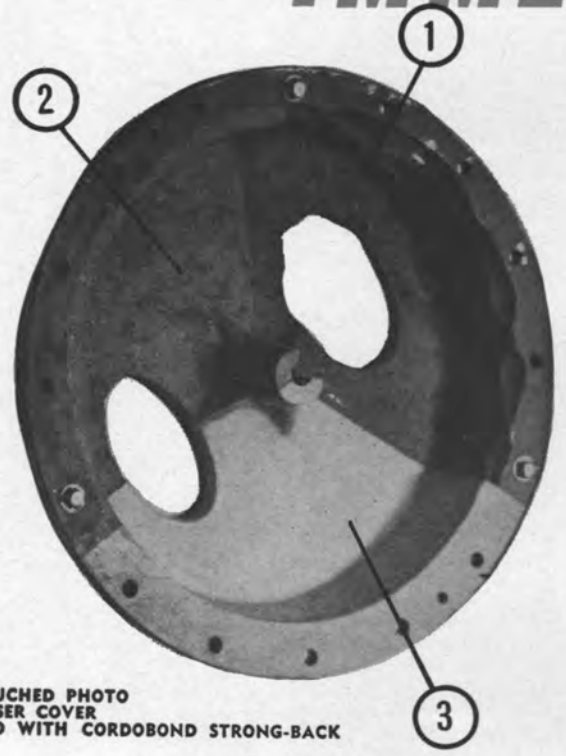
Radiator cooled units—120 volts DC—83.3 amps. ENGINE: Superior diesel model GAB-1—4½" bore—5¾" stroke—16 HP—equipped with Young radiator. Overall dimensions—57" high—57" wide—75" long.

EMERGENCY REPAIRS *IMMEDIATELY*

with

CORDOBOND®

STRONG-BACK METHOD



UNRETOUCHED PHOTO
CONDENSER COVER
REPAIRED WITH CORDOBOND STRONG-BACK

1. BEFORE **2. DETERIORATIONS FILLED WITH CORDOBOND STRONG-BACK PUTTY & LEVELING COMPOUND** **3. CORDOBOND STRONG-BACK RESIN REINFORCED WITH FIBREGLASS CLOTH**

® Reg. U. S. Pat. Off.

First proven under the most difficult conditions by the Navy, the Cordobond Strong-Back Method offers a fast and easy method of repair both aboard ship and ashore. Applied quickly by ship or maintenance personnel, Cordobond Strong-Back products are used extensively to repair:

SEA VALVES	PIPES	CONDENSER WATER BOXES
TANKS, BULKHEADS	DECKS	PUMPS
MACHINERY CASINGS	VENTS	DUCTS, ETC.

The Cordobond Strong-Back method provides a means of repairing piping systems carrying water, low pressure steam, oils, gasoline, alcohols, and many other liquids at temperatures up to 250°F at pressures up to 250 psi. Under emergency conditions, patches have been successful with pressures over 500 psi.

Complete in itself and requiring no special tools or fire, the Cordobond Strong-Back method owes its success to a new self-curing resin combined with special fibreglass materials. These provide a repair that has high tensile strength and strong adhesion to most surfaces. The process has wide application, is fast, versatile and economical.

The Cordobond Strong-Back components, when used according to directions, will repair anything from a pin hole to a complete break with a patch of great strength that clings tenaciously and lastingly.

Cordobond Strong-Back repair kits for effecting emergency repairs by ship personnel, have been furnished to thousands of navy and merchant vessels of all types and sizes.

Cordobond Strong-Back, furnished by Hubeva, is also used extensively in refineries, power and chemical plants, breweries, factories, etc.

TRAINED APPLICATORS AVAILABLE FOR REPAIRS OR INSTRUCTION

FOR COMPLETE INFORMATION, CONTACT

CORDOBOND STRONG-BACK PRODUCTS

Standard Resin • Leveling Compound • Strong-Back Putty • Strong-Back Sealer • Steel Putty • Cordobond • Repair Kits

THE LEADER IN PLASTICS FOR THE MARINE INDUSTRY

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SOUTH AFRICA Durban, Capetown

*ALL HUBEVA AGENTS HAVE TRAINED PERSONNEL TO APPLY, INSTRUCT OR ADVISE IN THE APPLICATION OF CORDOBOND STRONG-BACK MATERIALS

Tustumena Returns To Alaska Ferry Service A Better Ship After Jumboizing By Bethlehem

MV Tustumena, her modifications completed, passes under the San Francisco-Oakland Bay Bridge on her way to Alaska after leaving Bethlehem's San Francisco shipyard.

The new jumboized MV Tustumena has recently returned to service for the Alaska State Ferry System after having been modified and enlarged by the Bethlehem Steel Corporation, Shipyard Division, San Francisco. Now she is much larger, faster, more seakindly, and maneuverable than she had been previously.

The enlarged ferry will ply the waters between Kodiak Island, Seward, Homer and Anchorage, Alaska.

Philip F. Spaulding and Associates, original designer of the ship which was built by the Christy Corporation at Sturgeon Bay, Wis. in 1964, has in the redesign virtually created a new vessel with the addition of a 56-foot midsection.

The overall length of the Tustumena is now 296 feet and the maximum draft is 16 feet 4 inches. Passenger lounge accommodations were increased from 116 to 138. Vehicular capacity was increased from 40 to 59 vehicles, and passengers' sleeping accommodations were increased from 42 to 58. All of this was accomplished with no sacrifice in efficiency, or service.

Speed was increased from 14.1 knots to 14.6 knots due to a reduction in the speed length ratio brought about by the vessel's increased length. In spite of the increased parasitic drag of the fin stabilizers and the bow thruster, the speed was gained with no change in the diesel propulsion engines. The addition of the fin stabilizers and bow thruster have contributed to smooth riding characteristics and a greater maneuverability of the vessel.

Philip F. Spaulding, the designer, said that extensive model tests were conducted by General Dynamics/Convair Corporation at their San Diego tank to predict performance and justify the overall undertaking.

The Tustumena plies the waters of the Gulf of Alaska and Schilikof Strait where the tidal range is 32 feet. The violent, short, steep confused seas combined with the vessel's original short length and broad beam caused the Tustumena to roll and wallow badly.

Through outstanding work of the model testing and the addition of activated fin stabilizers, both the pitch and the roll characteristics of the vessel were completely modified. By adding 56 feet to the length, the vessel was 'tuned' to be out of phase with expected wave frequency. The original generous flair and easy 'vee' sections forward combined with the new additional length now gives the vessel an easy pitching motion at sea and completely dry foredeck. All of this together with an effective roll reduction of 87 percent brought about by the fin stabilizers make the Tustumena completely acceptable to the most squeamish stomachs.

For greater passenger comfort in the new solarium, the height of the stack was increased by three feet. The solarium is heated electrically.

Great attention was paid to the interior decoration to see that the designs for the new deck covering, lining, ceiling and trim and the furniture and fixtures were all compatible with and blended in to the original ship's interior.

A solarium or protected promenade was added on the house top in order to improve the vessel's passenger amenities. The solarium is provided with infrared heating to ward off the chill of the northern latitudes.

The original diesel generator sets were removed and replaced with two 450-kw Waukesha Enginators (diesel-driven generators) of greater capacity in order to accommodate the greater electrical load caused by the additional hotel load, the added Carrier reefer machinery, the Pacific Mark X fin stabilizers manufactured by Pacific Products Inc., and the Bird-Johnson KaMeWa bow thruster.

The Tustumena's Pacific Mark X stabilizers are of the horizontal, swing-out oscillating fin type.

The remote location of the vessel's route demanded increased capacity for ship storeroom and refrigerated stores. The new midsection provides an ideal location for these storage spaces. In addition, a new ship's laundry is provided for the convenience of the crew. A dumbwaiter was installed from the storeroom to the main fore and aft passage way to service the galley.

The unusual elevator and turntable assembly at the stern was originally designed in such a manner that the Tustumena could land at any conventional pier, accommodate herself to a 32-foot tidal range, and load or discharge any legal over-the-highway vehicle. The elevator can handle trailers up to 40-feet long and 40-tons in weight at a one minute time cycle.

Experience has shown that the Tustumena is the life line to Kodiak. In order to provide a greater versatility to the vessel's operation, the conversion created a large open deck space forward of the observation lounge. This space will be utilized for deck loads of contractor's equipment or other oversized vehicles which cannot be handled by the elevator. No cargo gear has been provided forward, therefore shore-based gear must be used to service this space. A Markey Machinery Company warping winch was added to aid in docking.

The greatest satisfaction to the designer and builder came when the vessel was placed in operation, everything worked as planned, and the master stated she is "fantastic."

Carrier Appoints Wylie District Representative

J. David Wylie

J. David Wylie has been appointed district representative in Washington, D.C. for marine, transportation and military equipment produced by Carrier Air Conditioning Company, according to **William LaGrange,** special products group sales manager.

Mr. **Wylie** is a graduate of the United States Merchant Marine Academy and served in the U.S. Navy before joining the Carrier marine department in 1956. Prior to his current assignment he specialized in Syracuse sales and engineering projects involving refrigeration and air conditioning for ships, containers, and rail transportation.

Dillingham Initiates New Pacific Service

A new steamship service between San Francisco, Honolulu and Guam has been initiated by the Dillingham Corp., according to **Rae F. Watts,** San Francisco port director.

Dillingham has chartered the C-2 cargo vessel Surfer for the service which began July 8 when the ship sailed from Pier 80, Army Street Terminal. The Surfer, under a five-year charter, calls at San Francisco every six weeks.

Burton Shipyard Building Oil-Well Supply Boat For Dearborn Marine

Dearborn Marine, Inc., Detroit, Mich., has ordered a twin-screw offshore oil-well supply boat from Burton Shipyard, Inc., Port Arthur, Texas. Equipped with 1,700-total-bhp diesel machinery, the boat will be 165 feet by 38 feet by 13 feet. It is a duplicate of another ordered earlier this year and has been designated Hull No. 461.

NKK Uses Computers For Preliminary Design Of Four Supertankers

To meet the increasing tide of worldwide demand for large tankers and offset costs of operating giant ships, a computer-designed, 250,000-dwt tanker with high economy performance levels has been developed by Nippon Kokan, Japan's only integrated shipbuilder-steelmaker.

Hiroo Ikematsu, NKK's New York naval architect, said the new design will be applied to four tankers slated for construction at the company's $42-million Tsu Yard in central Japan. Two of the four vessels are 250,000 deadweight tonners for Canadian Pacific (Bermuda); the others are 256,000-dwt ships for Anders Jahre A/S of Norway.

NKK reports the new standard design vessel is one of the most economical supertankers in existence. It incorporates such computer-designed features as: optimum size and arrangement of tanks which can be loaded and unloaded at two ports with two types of crude oil; a piping system to reduce loading and unloading time; high efficiency vessel performance when empty and loaded, and increased maneuverability to compensate for vessel size.

The NKK tanker requires a crew of 45 to 50; is about 1,109 feet 3 inches long overall; has a molded breadth of about 169 feet 11 inches; depth molded to the upper deck amidship of about 87 feet 7 inches; maximum draft, extreme of about 68 feet 7 inches.

Gross tonnage is about 128,000; deadweight tonnage—about 256,000. The steam turbine engine will have a service output of 31,000 shp and vessel cruising speed is about 15.6 knots.

Mr. **Ikematsu** said that when the diesel engine selection is made, all main particulars will be subject to minor changes.

The company's fully-integrated computer system for ship designing was used in the model experiment, performance testing, and initial design phases of the new supertanker's development.

In the initial planning phase, general specifications identified by NKK engineers and particular requirements of Canadian Pacific and Anders Jahre were applied to the characteristics of a standard-type tanker which had been previously fed into the Shipbuilding Division computer, an IBM 360/75. Calculations were then begun of various data for the new design including draft, trim, dimensions, stability, displacement, deadweight, and longitudinal strength factors such as bending moment and shearing force.

Following this procedure, initial drawings were automatically prepared by Numericon and Panac units, computer controlled equipment made by Muto Kogyo Co. Ltd. and Essi Kinzmatic of Japan. Each design included slight alterations of configuration. The system enabled NKK to evaluate multiple initial designs each accompanied by detailed computer-prepared explanations, statistics, and recommendations for optimum design.

After the new type tanker initial design was selected, complete plans were drafted by each section of NKK's basic ship design department.

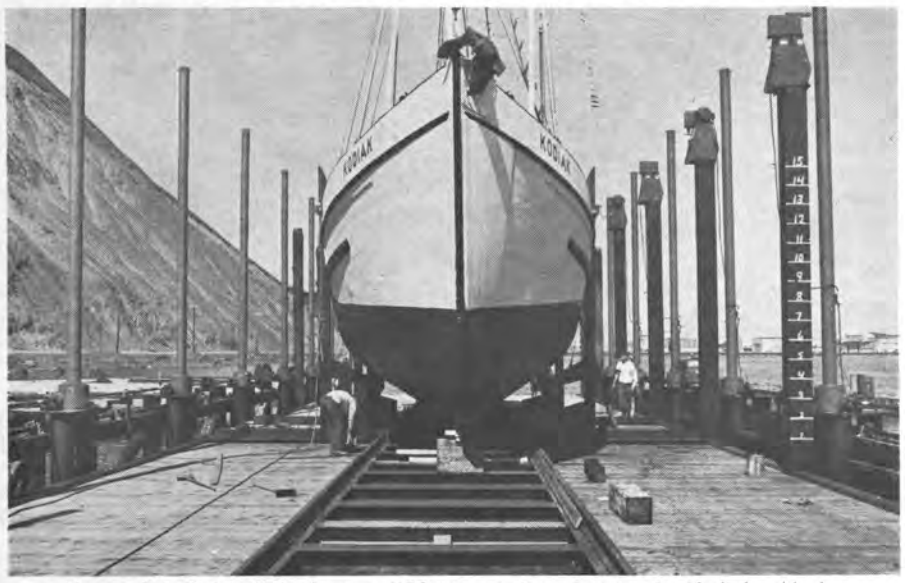
Alden Electronic Issues Publication Describing Graphic Recording

Alden Electronic & Impulse Recording Equipment Company, Inc., Washington Street, Westboro, Mass., has announced the availability of their recent 16-page publication entitled "Instant Graphic Recording News." The publication is available free on a first come first serve basis until the supply is exhausted.

This issue features articles on the new Oceans International SUB-SCOPE System which utilizes the Alden Ocean Sonic Recorder, a short news story on a survey of the Colorado River in which recording penetration exceeded 130 feet, short articles on three oceanographic survey recorders, and an article on a new side scan sonar from Kline Associates.

Alden Electronic is a leading developer of facsimile equipment for marine, oceanology, space aeronautics, industrial and government applications.

Martinolich Provides Western Alaska With 700-Ton Capacity Marine Elevator



Martinolich Shipbuilding's new 700-ton marine elevator in Kodiak, Alaska.

Martinolich Shipbuilding Corp. of Tacoma, Wash., recently put into operation at its Kodiak, Alaska yard a new marine elevator. Measuring 140 feet by 34 feet, the facility can lift 700 tons. The platform can be lowered to 15 feet below the water level on an average high tide.

The elevator is operated by eight screws on each side, 20 feet apart. Each screw is 24 feet 7 inches long and is capable of lifting 75 tons. The elevator has a vertical speed of 6-inches per minute. The 4½-inch diameter stainless steel screws were cut by the Philadelphia Gear Company. The beams between the screws are designed to lift 100 tons each.

Synchronized posts, operated by electric winches, center the vessel exactly in the middle of the platform and hold the vessel on an even keel until it has been landed. Automatically adjusted bilge blocks fit any vessel. The platform has rails on 10-foot centers which make it possible to move vessels along the platform.

Anthony C. Martinolich, president of the firm, stated that this installation provides western Alaska with one of the finest facilities and practically the only one in that territory.

R.D. Vechorik Rejoins Cairo Marine Services

Cairo Marine Services, Inc. has announced that **Richard D. Vechorik** has rejoined the firm's staff and will represent the firm as vice-president and chief resident surveyor at Greenville, Miss.

Mr. **Vechorik** was born and educated in St. Louis, and was with an electric firm in that city for 14 years. Part of this time was spent as a draftsman and loftsman and he later served as plant manager. He joined Cairo Marine's staff at Cairo, Ill., in 1963, remaining until the spring of 1968, when he joined the staff of the American Bureau of Shipping.

Fluor Ocean Services Names P. F. Stolpman Manager Of Purchasing

Paul F. Stolpman has been appointed manager of purchasing for Fluor Ocean Services, Inc., Houston, Texas, offshore engineering and construction division of Fluor Corp.

Prior to being assigned to his new position, Mr. **Stolpman** was purchasing supervisor for Fluor's Houston Division. He joined Fluor five years ago as senior buyer.

Mr. **Stolpman** has over 30 years experience in international procurement of refinery, petrochemical, pipeline and oil field equipment supplies, negotiation of marine transportation contracts and handling of customs clearance.

Fluor Ocean Services engages in offshore engineering and construction activities throughout the world. The company maintains offices in Athens, Greece; Anchorage, Alaska, and Washington, D.C. Domestically the company's operating affiliates include Aquatic Contractors in New Orleans; Ryan Contracting in Santa Barbara, Calif., and the New Orleans Construction Division.

Blue Water Marine Issues New Bulletin On Towing Bridles

A single-page bulletin available from Blue Water Marine Supply, Inc., 1000 Broadway at Channelside, Houston, Texas 77012, describes the firm's make-up of towing bridles with breaking strengths through 1,500,000 pounds. Among special features cited is that studless, non-detachable end links and specially constructed safety shackles utilizing an extra cotter pin are standard components to provide extra measures of safety. The diagrammatical presentation shows all components including optional nylon rope linkage and the bulletin states that the towing bridles are furnished with or without A.B.S. certificates.

Port of Long Beach Promotes T.J. Thorley To General Manager

Tom J. Thorley has been promoted to general manager of the Port of Long Beach, Calif. He succeeds **Charles L. Vickers** who retired on June 30 after 11 years as general manager and 44 with the port. Mr. **Thorley** was previously assistant general manager.

Raymond F. Berbower has been named to the post of assistant general manager. For the past 10 years he has served as assistant chief harbor engineer.

The port also announced the assignment of **Dean Petersen** to the position of traffic manager. Mr. **Petersen,** for the past 20 years, has been with the Union Pacific Railroad as district director of UP's international trade office.

Demetrion Joins ONA In Key Post As Firm Enters Shipping Field

Overseas National Airways, which is building a cruise ship and has options on two more, has appointed a former Home Line executive, **James S. Demetrion,** as assistant to the president for maritime affairs.

The appointment was announced by **G. F. Steedman Hinckley,** president of Overseas National.

Mr. **Demetrion** has been with the Home Lines since 1962, most recently as assistant manager-passenger sales-U.S.A. and assistant to the director. Earlier, he had worked for the Incres Line, Holland-America Line and Overseas Charter and Shipping Co.

The keel will be laid for ONA's first cruise ship in Amsterdam this November. The ship is scheduled for delivery in early 1971. Overseas National, which plans to operate the vessel in the Caribbean in the winter and the Mediterranean in summer on fly-and-cruise vacations, is seeking Civil Aeronautics Board approval to create a maritime subsidiary.

ONA, a supplemental airline with a fleet of 21 all turbine-powered aircraft, operates commercial charter flights domestically, into the Caribbean and across the Atlantic and has authority to fly military charter flights worldwide. In addition to its shipping venture, the airline has also created a hotel subsidiary.

Todd-CEA Elects Millard E. Prowler V-P And General Mgr.

Millard E. Prowler

Millard E. Prowler has been elected vice-president and general manager of Todd-CEA, Inc., 120 Park Avenue, New York, N.Y. 10017, a subsidiary of Combustion Equipment Associates, Inc., **William H. Bohn,** president, recently announced.

Mr. **Prowler,** formerly sales manager, will direct the activities of all departments of Todd including marine, combustion systems and TIFA products. The company is a major manufacturer of marine and oceanographic equipment, automatic energy systems for industry and marine installations and municipal health products.

Mr. **Prowler,** a former marine engineer, joined the Todd Shipyards Corporation in 1939 as trial and guarantee engineer for ships fitted with Todd equipment. During World War II he was an engineering officer in the merchant marine and returned to Todd Shipyards at the conclusion of hostilities.

He served in various capacities in estimating and selling and became general manager of Thermo Products, Inc., a Todd Shipyards' subsidiary which conducted experimental work in combustion systems and combustion chambers. Later he became a sales engineer and original equipment sales manager for Todd combustion equipment.

Since Todd-CEA, Inc. was acquired by Combustion Equipment Associates early this year he has been sales manager of the subsidiary.

Johnson Product Sheet Lists Rubber Bearings

A new two-page, two-color product sheet on Duramax "490" nonmetallic rubber bearings, for impact service in rudder steering systems, is now available from Johnson Rubber Company, Marine Division, Middlefield, Ohio 44062. It describes the rigidity with resiliency benefits of Duramax bearings, lists comprehensive specification data including dimensions and journal sizes, and details prices.

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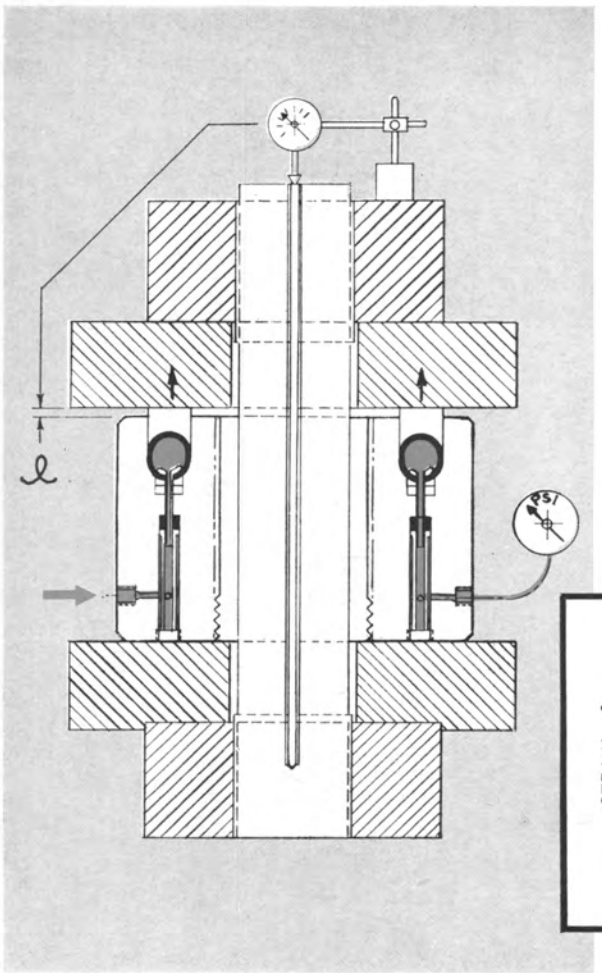
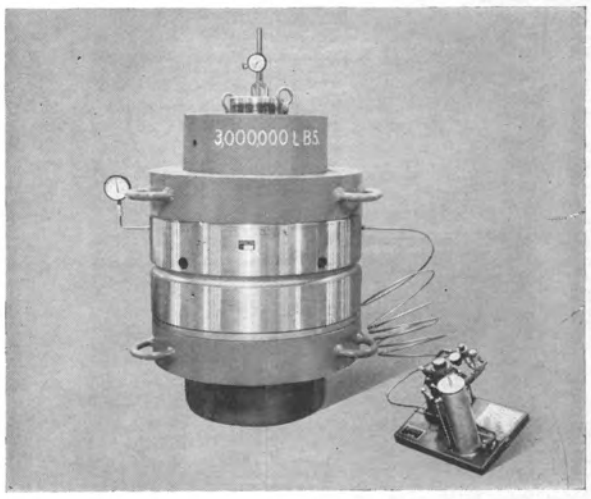
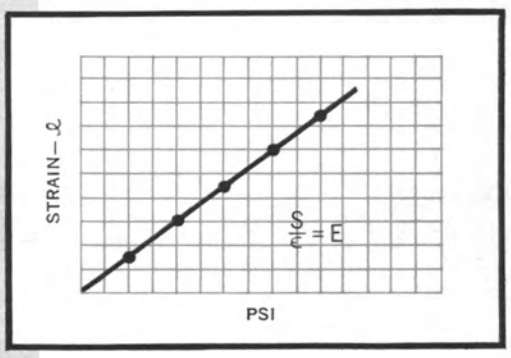
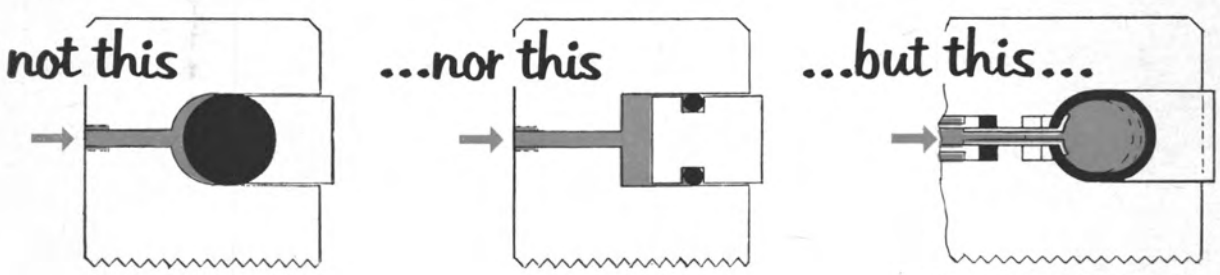




Testing a large Pilgrim Nut





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GE Seminar Reviews State-Of-The-Art For Gas Turbines

More than 60 technical papers were presented to a record number of attendees during the five days of General Electric's Gas Turbine Department Sixth Annual Gas Turbine State-of-the-Art Engineering Seminar held recently in Saratoga Springs, N.Y. The papers, presented during 65 sessions by engineers from GE's Schenectady, N.Y., Gas Turbine Department and related GE departments, covered the thermodynamic performance, mechanical design, installation and maintenance, and application and economics of GE heavy-duty industrial gas turbines.

The State-of-the-Art Engineering Seminar is presented annually by the GE Gas Turbine Department, and is attended by GE gas turbine customers from all parts of the free world. Its purpose is to acquaint Gas Turbine Department customers, prominent educators, and selected other GE personnel with the state-of-the-art of the design, manufacture, and application of heavy-duty gas turbines.

The seminar is divided into an initial three days of intensive group sessions on the overall gas turbine design, construction, control and characteristics and then subdivided into four separate groups for the final two days of meetings. These four groups, each meeting concurrently, represent the Gas Turbine Department's major heavy-duty gas turbine markets in the pipeline, process, electric utility, and marine industries. They permit an in depth focus on specific industry economics and applications. Also included during the seminar is a tour of the Gas Turbine Department engineering and manufacturing facilities in Schenectady.

Whitman Ridgway, general manager of the GE Gas Turbine Department, views the record number of customers assembled during the recent banquet of the 6th Annual Gas Turbine State-of-the-Art Seminar. Mr. **Ridgway** was host of the week-long affair.

Commenting on the records set by this year's State-of-the-Art Seminar, **Whitman Ridgway,** general manager of the Gas Turbine Department, declared, "This is the largest group of customers ever to attend a Gas Turbine Department State-of-the-Art Engineering Seminar. But this is not surprising since every year our department grows considerably and our operating experience increases manyfold and it is a natural extension of this growth that our seminar, where we tell our gas-turbine story, should also become larger. With our entrance into the marine market earlier this year, we are now making gas turbines to power four major fields — pipeline, process, electric utility, and marine—and as a result, I expect our growth will continue to evolve at an increased rate."

Mr. **Ridgway** was speaking to more than 300 customers and guests during the seminar banquet. The banquet is the social culmination of the week-long program.

Also speaking during the evening affair was **Clement E. Sutton Jr.,** vice-president and general manager of GE's Industrial and Marine Turbine Division. Mr. **Sutton** outlined the future of the industrial world in his talk. He urged that everyone involved with industry must learn to "tell it like it is" and strive to solve today's pressing social and economic problems. Only then, he said, would industry continue to grow. He added that for the next five years, while these problems are being solved, industry throughout the United States is on the verge of the most exciting ride in history and ". . . gas turbines will play a major role in this historical journey."

International Marine And Shipping Conference Discusses

Ship Types Of The Future

The International Marine & Shipping Conference (IMAS 69) held in London in June, covered a wide range of subjects. Naval architecture, marine engineering, cargo handling, shipbuilding practices, communications and materials were some of the broad categories. A total of 78 technical papers were presented during the eight days of meetings. These papers were prepared by worldwide authorities from many countries.

The Institute of Marine Engineers organized IMAS 69 in collaboration with the Royal Institution of Naval Architects and with assistance from the Chamber of Shipping of the United Kingdom and the British Shipping Federation Ltd.

The theme of one of the sessions was "Ship Types of the Future." The tone for this part of the proceedings was set by **E. C. B. Corlett** of Burness, Corlett and Partners Ltd. when he delivered the introductory paper at a plenary session. Four other papers dealing with specific design proposals were given later at what was called a "specialist session."

Mr. **Corlett** based his remarks on the thesis that there is an economic need to reduce the content of human effort in the production and transport of commodities and manufactured goods. The speaker noted that this economic fact has led to the increasing size of operating units, the handling of bulk loads wherever possible and applying this principle to break-bulk cargo, automation of shipboard functions and improving engineering efficiency.

The author classed containers as bulk cargo and showed how most cargoes could be packaged so that they would fall into the bulk-cargo class. He said, "It is instructive to consider the hypothesis that most forms of sea transport are tending towards bulk carriage. Tankers have always been bulk carriers, but compared with a quarter of a century ago, many commodities then carried largely by general-purpose ships are now the prerogative of specialized bulkers.

"The same advantages apply as with tankers. The use of automated mechanical handling is possible and justified with large bulk carriers and, as far as the ship itself is concerned, the same crewing, structural weight and propulsion advantages apply as with tankers. However, the need for a number of relatively smaller ships must continue for many years as it is these ships which must serve underdeveloped countries."

Mr. **Corlett** said that the main difference between the container bulk ship and the tanker or ore bulk ships "lies in the light nature of the container bulk cargo and in its value. As a result, it is both necessary and possible that the ships should be of high speed. A differential of perhaps six knots above that of the older forms of bulk carrier is likely to be common and differentials of up to perhaps nine knots may be contemplated during the next ten years."

The author delved into other types of ships which could develop along bulk handling lines such as cable ships, lumber carriers and even fishing vessels.

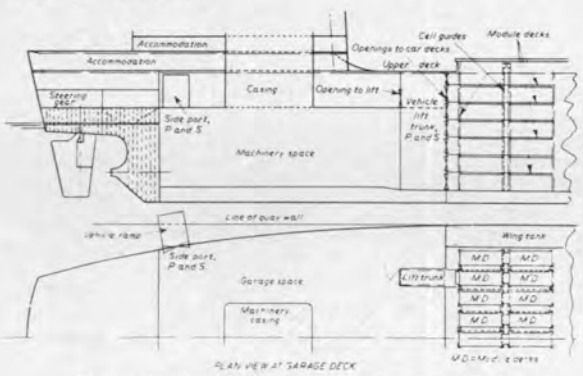

Figure 1—Modular decks in containerships.

Another area Mr. **Corlett** covered was the car delivery ship. He felt that convertible tonnage is desirable and a slightly modified cellular containership could serve both purposes. Figure 1 shows such a ship. Access is made through the stern to lifts or ramps to various levels of the cellular holds arranged to carry cars by the simple expedient of loading modular platforms into the vertical cells.

Barge-Carrying Vessels

"Barge-Carrying Vessels for Flexible Loading" was the title of a paper presented by **J. J. Asper, R. Damary** and **M. Kummerman** of the Battelle Institute, Geneva, Switzerland. The basis for this paper was given in the introduction, which states: "Until now, most proposals in barge carrying have been aimed at inter-continental and long-distance European traffic, with the barges often being associated in some way with inland waterways. For such applications, flexibility of loading is not of prime importance since loading time is in any case a small proportion of the total, and further speed-up is of little importance. Furthermore, for inter-continental traffic a large proportion of the barges is likely to be unloaded and loaded in a given terminal port. If now, by way of contrast, barge carrying is thought of in a different context, viz. on a 'circular' route with, say, 10-20 equally spaced stops near ports, none of which could be called terminal, the idea of flexibility in loading takes on a new significance."

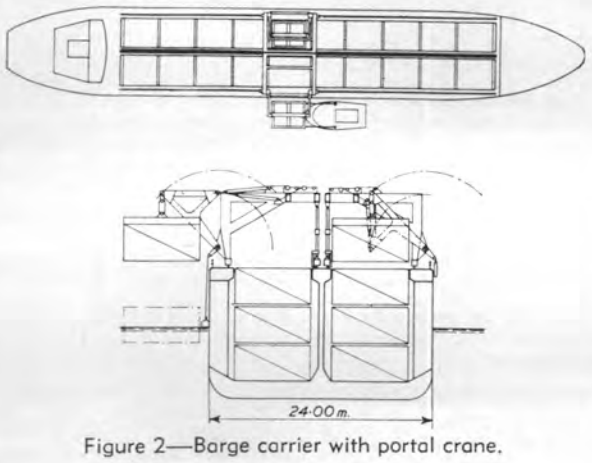

Figure 2—Barge carrier with portal crane.

In order to obtain this flexibility, the authors set forth four different means of barge handling. These proposals make use of portal cranes, floodable compartments, elevating platforms combined with horizontal translation and direct barge flotation.

The portal crane design, Figure 2, employs the use of two cranes in tandem or a list compensator so that the barges can be loaded from alongside the ship. The cranes can traverse the full length of the cargo section.

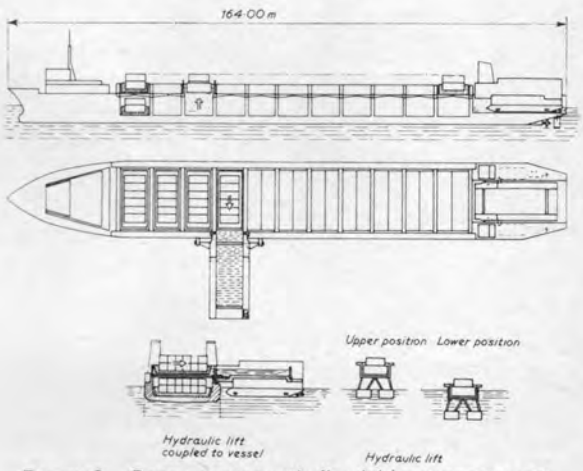

Figure 3—Barge carrier with floodable compartments.

The floodable compartment concept, Figure 3, consists of a single-hulled vessel and two layers of barges for a flexibility rate of 50 percent. The vessel has a hold made up of separate compartments which extends above the main deck. The port sidewall above the main deck of each compartment can be lowered to allow access for the barges. It is leaktight when closed. The lower part of each compartment can be closed off by two leaktight flaps, which hold the upper barge. The separate element or hydraulic lift is an integral part of the vessel and is carried in the stern of the ship.

The elevating platform concept has elevators at each end of the specially shaped vessel. The ship is double hulled, with two main decks between the hulls forming with the latter a tunnel sufficiently large for a barge to pass right through. At two positions along the tunnel are fitted elevating platforms guided by the hull walls. In the raised position the platforms are integral with one of the two decks. They are able to descend into the water and take up barges to one of the two decks. Barges are moved laterally or longitudinally to one of eight positions around the platform.

In the direct barge flotation, Figure 4, the barges are floated directly on to the deck while the carrier vessel is settled in the water. The

(Continued on page 52)

Ship Types

(Continued from page 50)

vessel is raised by creating an air cushion between the sidewalls and the front and rear curtains.

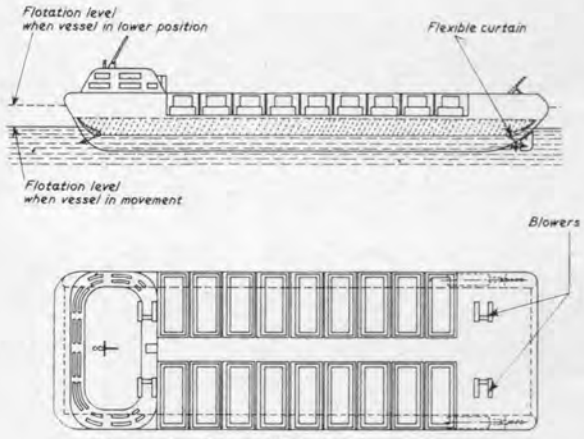

Figure 4—Direct flotation barge carrier.

The authors concluded their paper by stating: "It has been the aim of this paper not to present proven designs, but to indicate possible developments and, above all, to underline a principle need in barge carrying, namely that of combining loading flexibility with rapidity and simplicity."

A Twin-Hulled Ship

"The Technical Feasibility of Straddle—A Twin-Hulled Carrier Ship with Separable Cargo Units" was presented by **T. R. Farrell,** New York office, Lloyd's Register of Shipping.

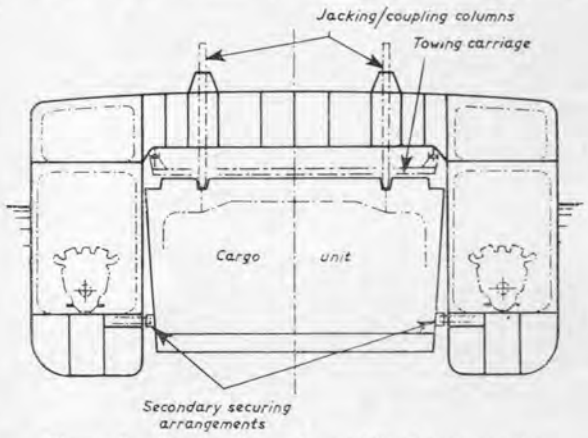

Figure 5—Section through straddler barge carrier.

The author described the proposed concept, Figure 5, as having a twin-hulled configuration extending from the stern through about nine-tenths of the ship's length. The bow is of single-hull form. Four cargo units can be located in the well between the hulls. The cargo units are towed into the carrier through the stern, upright jacking columns are coupled to the decks of the cargo units, the levels of the cargo units are adjusted by vertical jacking, and finally horizontal securing devices are extended from the well sides to engage in sockets on the cargo units.

Mr. **Farrell** said that in preparing the ship for loading, the forward tanks would be ballasted to achieve an even trim and minimum list.

This paper also discusses strength, stability, freeboard, safety, resistance, propulsion and steering. Mr. **Farrell** concludes that: "From the investigation carried out, the accommodation and transport of cargo units in the center well of a twin-hulled carrier ship is technically feasible. The optimum arrangement would be one in which the keels of the stowed cargo units are about 15 percent of the cargo unit draft above the carrier keel, resulting in jacking, trim, resistance and rolling characteristics which are or could be made acceptable."

Compoundable Ship

"The Compoundable Ship" by **E. Iozza** from Italy, describes a ship made up of a craft which is called the "pusher" and of one or more craft called "barges," which are to be pushed by the former. In the context of this paper it could be an 80,000-dwt tanker, a 40,000-dwt bulk carrier or a 10,000-dwt containership pushing a barge with a deadweight almost equal to its own.

The paper describes in detail the coupling system, Figure 6. Referring to the illustration, the pusher bow has: a cylinder (1) with its axis normal to the longitudinal centerplane, and two movable structures (2), port and starboard, which transmit the propulsive thrust to the barge.

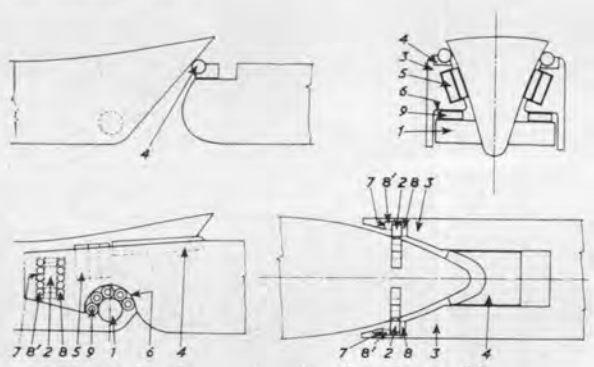

Figure 6—Connection of pusher ship and barge.

The stern of the barge is shaped to receive the bow of the pusher, consisting of two rearwardly extending beams (3), the inner sides of which slope inward so as to more or less match the bow contours of the pusher. These beams have: suitable semi-cylindrical recesses (6) of such a diameter as will allow them to encompass the cylinder (1) with suitable clearance; suitable recesses (7) to embrace the movable structure (2) of the pusher, a movable structure (4) in the connecting zone at deck level, and two movable structures (5) arranged on the port and starboard inside plating. Elastic contact is provided by rubber muffs (8) and (9).

The coupling maneuver is accomplished in three phases. First, both the pusher and the barge are put in a down by the bow trim. With both craft so trimmed, the pusher is made to advance with its bow between the beams on the stern of the barge until the cylinder on the pusher bow is below the recesses in these beams. In the second phase, the pusher and barge change their trims so that both craft go down by the stern. During this operation, the pusher cylinder penetrates into the barge cylindrical recesses and comes in contact with the rubber muffs. These become elastically deformed and the pusher bow begins to support part of the weight of the barge. In the third phase, all the moveable structures are maneuvered into the outside positions so that they meet with the respective surfaces on the other craft. At this point the pusher's trim is altered so that the pusher goes down by the bow.

Mr. **Iozza** discusses in detail course keeping and directional stability, bending moments on the coupling and in the crafts and formulates the problems that must be considered in model testing.

Ship Shapes

The final paper of this group was presented by **J. A. H. Paffett,** superintendent, Ship Division, British National Physical Laboratory. Mr. **Paffett's** paper was entitled "Trends in Ship Shapes." The paper deals only with those surfaces where the ship meets the sea.

Mr. **Paffett** described studies being carried on by N.P.L. These studies have concentrated on large full forms. Initial results have shown that the wavemaking component of resistance is small, 10 percent or less of the whole. The remainder is not all skin friction. A much larger fraction than might have been expected is attributable to "viscous pressure resistance," a term which includes drag due to eddy and vortex generation, as well as the component known to aerodynamicists as "form drag."

Study of the viscous pressure resistance of model tanker hulls has begun to throw light on the complex phenomena contributing to this resistance. It has shown that the bulbous or ram bow which has been fitted on many ships reduces drag at ballast draft by virtue of its influence upon the viscous pressure resistance and not upon wavemaking; in fact, fitting a ram bow can actually increase a tanker's wave resistance, according to the author. He further stated that "following up this discovery, N.P.L. has developed a completely bulbless bow form which gives hydrodynamic benefits greater than the fashionable bulbs, and is effective at both ballast and load drafts. It can reasonably be expected that the inconvenient and expensive bulbs will disappear from the tanker fleets in the future."

Turning to the stern end of the ship, Mr. **Paffett** stated that it has always been known that bluff sterns were liable to experience "separation of flow," a troublesome phenomenon which is difficult to predict theoretically. He stated: "The work on viscous pressure resistance has shown that separation is probably more widespread than had hitherto been thought. Separation is not confined to the stern, and in model tests has been observed forward—notably on one of the current bulbous bows. Separation not only increases drag, but can also cause vibration and steering difficulties by interfering with the flow to the propeller and rudder. Closer attention to separation suppression by careful control of the stern lines can be expected to improve steering and reduce vibration in single-shaft ships. In extremely full ships there may be the need for recourse to auxiliary devices, such as vortex-generating vanes or aft-facing water jets, for suppressing separation."

Mr. **Paffett** then discussed the developments taking place in fast cargoliners. He said: "Here the growth has been mainly in speed rather than in size. The designer's basic problem of getting the maximum volume of cargo into the finest possible hull has been complicated by a new factor—the adoption of containers. Not only are containers voluminous, but they are rectangular as well and will only stow efficiently in a rectangular hold . . . Square-cornered holds do not mix well with finely sloping waterlines and short parallel midbodies."

The author suggested two solutions—the bulb and the bulge. The bulbous bow comes into its own in this condition. The addition of displacement low down forward can largely offset the increase in wave drag associated with the excessive fullness of the main hull. He said that this function of the bulb is well understood and bulbous forms can be expected to become increasingly common in ships designed for speeds above 20 knots.

He described the bulge as being less attractive. To fit a bulge, the lower corners at the ends of the cargo hold are allowed to project through the ship's skin, being faired in with streamlined housings. N.P.L. reports that tank tests have shown that moderate bulges of this nature can be designed to produce negligible increases in resistance.

In conclusion, Mr. **Paffett** stated: "The changes taking place in shape design are not likely, singly or collectively, to achieve spectacular sudden advances in ship performance. The picture is not one of impending breakthroughs but rather of quiet and steady improvement in performance, safety and comfort."

ONR Awards M. Rosenblatt & Son T-AGOR-16 Consultation Contract

Model of catamaran oceanographic research ship being built at Todd Shipyards-Seattle.

The Office of Naval Research has awarded M. Rosenblatt & Son, Inc., naval architects and marine engineers of New York and San Francisco, a contract to provide services as User Design Agent for the new oceanographic research vessel T-AGOR 16 presently under construction by Todd Shipyards in Seattle.

This 246-foot, 3,000-ton displacement prototype vessel designed by M. Rosenblatt & Son, Inc. for the Naval Ship Engineering Center will be the Navy's first large catamaran oceanographic research ship.

The inherent characteristics of the catamaran—broader beam and improved stability as compared to a conventional ship—were exploited by the naval architect to provide extensive laboratory facilities and the large, unobstructed, stable deck required for the conduct of certain scientific programs. Relatively heavy objects, such as small submersibles, can be handled through a well located amidships in the area of least motion.

Upper Mississippi Names O'Daniels

Upper Mississippi Towing Corporation has announced the transfer of **Ray O'Daniels** from St. Louis to its corporate offices in Minneapolis, where he will serve as operations superintendent. Mr. **O'Daniels** joined the company in 1956 as an engineer on one of its towboats. Since 1962 he has been located in St. Louis, assisting with operations of company equipment.

Mr. **O'Daniels** served in the U.S. Navy submarine service in World War II, and prior to joining Upper Mississippi Towing was a diesel engine erection engineer for Fairbanks Morse. In his new position he will assist in management of the company's operations throughout the inland waterways.

Avondale Innovations Pay Big Dividends

Avondale Shipyards, Inc. has received the largest award made by the Maritime Administration for value-engineering proposals. In conjunction with the construction of 11 Lighter-Aboard-Ship (LASH) vessels, Avondale submitted and had accepted more than $1.7-million in such cost-reduction proposals.

The cost savings will accrue from 10 value-engineering proposals involving use of lighter, high-strength steel, elimination of cross-flooding ducts and more economical methods of routing electrical cable through bulkheads and decks. For these innovations, Avondale will receive 50 percent of the cost savings.

WEBB ALUMNI HOMECOMING honored Dean **Thomas M. Curran,** who retired after serving 40 years on the Webb faculty. Shown above are the officers of the Alumni Association with Adm. **W. A. Brockett,** USN (ret.), president of Webb Institute and Dean **Curran.** From left to right are: **V. W. Bethge,** secretary-treasurer; **R. G. Mende,** first vice-president; Admiral **Brockett;** Dean **Curran; T. H. Bond,** president; **D. L. Caldera,** second vice-president, and **R. B. Hulla,** fifth member of the executive comm.

Johnson Rubber Co. Appoints Christensen Oslo Representative

Harald Christensen

Harald Christensen, Oslo, Norway, has been appointed to represent the Marine Division of The Johnson Rubber Company, Middlefield, Ohio, U.S.A.

He will be responsible for establishing distribution to the shipbuilding industry for Johnson's Marine Division products in underwater propulsion systems components that include rubber propeller-shaft bearings, demountable bearings, torque-journal hub propellers, and stuffing boxes for commercial vessels and workboats.

Founded in 1952 by Mr. **Christensen,** his firm presently serves as representative for British steel works and manufacturers of ship equipment.

Dravo Deck Fittings Described in Bulletin

A complete assortment of welded and cast deck fittings for barges, towboats and tugs is highlighted in a new four-page bulletin issued by Dravo Corporation, Pittsburgh, Pa.

The bulletin lists dimensions and stock numbers for a wide variety of fittings for all normal requirements. Dravo also will design and manufacture fittings for special applications.

For a copy of the bulletin, No. 69MAR01, write Marine Sales Department, Engineering Works Division, Dravo Corporation, Pittsburgh, Pa. 15225.

Capt. Rose Appointed Port Captain By Ayers

Capt. Harris H. Rose

Capt. **William M. Ayers,** president of Ayers Steamship Company, Inc., 1803 International Trade Mart, New Orleans, La., has announced the appointment of Capt. **Harris H. Rose** as port captain for their operations with headquarters in New Orleans.

Captain **Rose** is a native of Honduras and has resided in New Orleans for the past 30 years. During most of this time he served as master of vessels for Delta Steamship Lines, Inc., and Bloomfield Steamship Co., Inc., serving worldwide ports.

Captain **Rose** has been active in the Masters, Mates and Pilots Association, and is a member of the Propeller Club of the Port of New Orleans.

Ayers Steamship Co., Inc. acts as Gulf general agents for the Maritime Company of the Philippines, Ocean-Wide Shipping Co., Ltd., and Gallen Lines, and as United States general agents for Transmaritima Boliviana, S.A.

J. Denizkurt Joins C.J. Thibodeaux & Co.

Josh Denizkurt has joined the New York staff of C. J. Thibodeaux and Co., 60 East 42nd Street it was announced by **Robert T. Stiff,** general manager of the local office. Mr. **Denizkurt** was most recently with Esso International Inc., in tanker chartering and operations.

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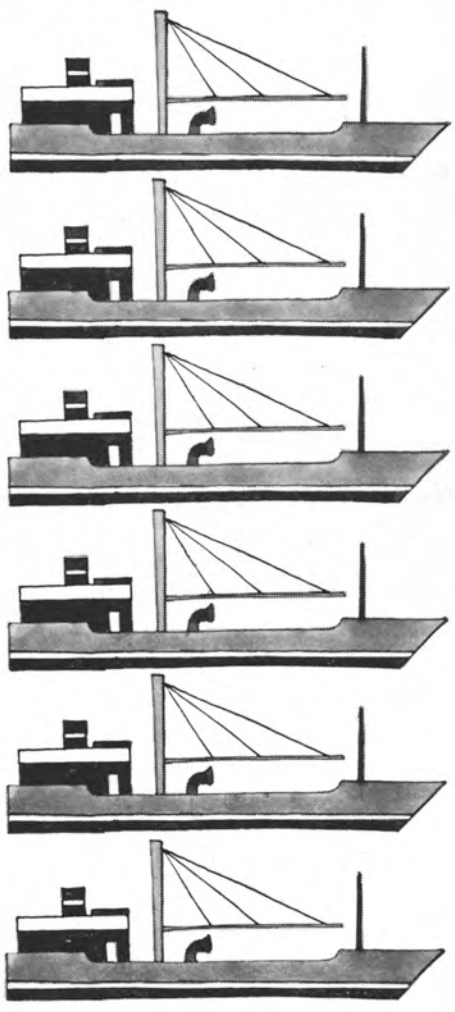

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Josef Nilsson AB.	Sweden & Finland.	854-10080 Stockholm.	23-15-20
The Maritime Agency Ltd.	Denmark.	855-5845 Copenhagen.	(01) 15-1504
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Automated Equity Tug With Special Equipment Joins Red Star Towing Company's Fleet

Newest addition to Red Star fleet leaves New Orleans for delivery in New York.

Equitable Equipment Company, Inc., New Orleans shipbuilder, has delivered a new automated Caterpillar-powered 95-foot ocean and harbor tug to the Red Star Towing Company for harbor operations in New York City. The vessel is the Red Star, constructed at Equitable Equipment's Madisonville, La., shipyard.

The Red Star departed New Orleans on May 29, 1969, and arrived in New York harbor on June 5. Command of the Red Star was given to her regular crew on June 6, and operations began immediately—65 days from date of order—a remarkable performance in view of the extensive modifications to the standard Equity tug and the installation of special equipment by the shipbuilder.

The automation system aboard the tug consists of a control console and two annunciation panels in the pilothouse and a master control console in the upper engine room. Together with sensors, this equipment furnishes audio and video monitoring of some 40 odd engine- and ship-control stations.

Other special equipment installed aboard the Red Star includes Fawick Airflex 20VC600 brakes for each propeller shaft (the pneumatic propulsion control system was modified to provide for the brakes to be actuated and propeller shafts stopped before reversal), a counterweighted collapsible mast, and a 20-hp New England Trawler capstan controlled from a remote station.

The tug is built to American Bureau of Shipping Class. Red Star Towing rates it 2,100 hp.

The Red Star is the second Equity standard built for Red Star Towing Company for operations in major harbors on the East Coast. The first tug was the New Haven, an Equity 85-foot automated vessel.

Puget Sound Tug & Barge Elects L.L. Collar President —Describes Expansion Plans

Leo L. Collar, former executive vice-president of Puget Sound Tug & Barge Company, has been elected president of the Seattle, Wash. water transportation firm. He succeeds **John H. Lee,** who has moved up to chairman of the board.

Mr. **Collar** at the same time announced that a rapid expansion program now under way by Alaska Hydro-Train, a division of Puget Sound Tug & Barge Company, will bring the firm's capacity for transporting freight in the Alaska trade to an unprecedented high of over one-million-tons per year by late 1970.

The Hydro-Train system, which features modern, low-cost transportation of freight between Alaska and the "lower 48" states through the Seattle gateway, has proved to be the most popular method of transportation to the north ever since the time of its establishment in 1963.

According to Mr. **Collar,** contracts have been placed and construction on eight new Hydro-Trains and four high speed tugboats are already underway at the San Francisco, Calif. yard of Bethlehem Steel Corporation; the Houston, Texas yard of Todd Shipyards Corporation; Gunderson Bros. Engineering Corp., Portland, Ore., and McDermott Shipyard, Morgan City, La.

Mr. **Collar** said, "This massive equipment building program is being put into effect because of the need for transportation to the Arctic Slope of Alaska, and this investment in the future of transportation systems to Alaska is being made with the help of revenues derived from transportation of oil companies' supplies and equipment vitally necessary to development of the Prudhoe Bay oil fields and pipeline. The huge sums of money being spent by major oil companies in Alaska will leave a permanent mark on the transportation costs to Alaska for many years into the future."

Four of the new Hydro-Trains, largest vessels of this type ever built, will each measure 400 feet long and 100 feet wide and have a carrying capacity of 64 rail cars on each voyage. The other four will measure 400 feet long and 76 feet wide with a capacity for carrying 48 rail cars per trip over the floating railroad that Alaska Hydro-Train has established between Seattle and Alaska.

By next summer Puget Sound Tug & Barge Company will take delivery of four new tugboats, sisterships of the firm's present Sea Swift and Sea Flyer, most powerful vessels of this type on the Pacific Coast, boasting 7,000 hp each.

By late next year the Hydro-Train fleet will number ten—400-foot by 76-foot vessels, four —400-foot by 100-foot vessels, and six—250-foot by 76-foot vessels at which time Hydro-Train capacity for handling loaded railroad cars in the Alaska trade will reach 22,000 cars per year.

where the action is

LAST YEAR, Bethlehem's Sparrows Point Shipyard delivered more commercial ship tonnage than any other American yard: nearly 114,000 dwt.

THIS YEAR, Sparrows Point has delivered—or has on order to deliver—about 210,000 dwt of commercial ship tonnage, nearly double last year's performance.

NEXT YEAR—in the midst of this continuing activity—the yard plans to complete a massive shipbuilding basin for the construction of ships over 1,000 feet long and with capacities greater than 200,000 dwt. As part of a huge, multi-million-dollar building program now underway here, the basin (dotted outline in photo) will complement the yard's five existing major launching ways. This program also includes a new sand-blasting and painting building, and a new panel shop, the key to a new system for speeding up the fabrication and handling of ship subassemblies.

Today and tomorrow, you'll find a strong part of this nation's shipbuilding effort being carried out at Bethlehem's Sparrows Point Shipyard. Here is where the action is; and we're at your service.

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Six Key Posts Filled At General Dynamics

Six men have been named to key management positions at the General Dynamics Quincy, Mass. shipyard.

Lewis Emmerich, formerly manager of manufacturing, was named manager of special projects.

Conrad Kunze, formerly manager of industrial engineering, was appointed director of operations.

Richard H. Brown, formerly chief of work assignments, was named Mr. **Kunze's** successor as manager of industrial engineering.

Jerome H. Goldberg, formerly manager of nuclear construction, was appointed manager of the Lykes Sea Barge Clipper Ship Program.

Walter H. Lord, formerly chief of nuclear testing, was named manager of nuclear construction and quality control.

Henry S. Ryder, formerly chief marine enneer for propulsion systems in the DD 963 Program, was appointed manager of facilities.

Mr. **Emmerich** joined General Dynamics in 1958 and for the first six years with the corporation specialized in aerospace programs, including development of the Atlas ICBM and the manned flight effort, Project Mercury.

In 1964 he was selected to head the Apollo Instrumentation Ships Program. Under his direction, three ships were prepared at Quincy to serve as ocean stations for tracking and communicating with spacecraft during manned missions to the moon. After successful completion of the program, Mr. **Emmerich** was appointed manager of manufacturing.

He is a Purdue University graduate and has studied at the University of California at Los Angeles and Massachusetts Institute of Technology.

Lewis Emmerich

Conrad Kunze

Mr. **Kunze** has served with General Dynamics at both the corporate headquarters and divisional levels since first joining the company in 1960. He was assistant to the executive vice-president and later operations manager at the Convair division in San Diego, Calif., before becoming corporate director of industrial engineering in 1964.

Prior to coming to Quincy, Mr. **Kunze** was manager of program control at the Electric Boat division, Groton, Conn. A native of California, he studied at Stanford University.

Mr. **Brown** joined the Electric Boat division as a senior planner in 1963. Two years later he came to the Quincy shipyard as chief of planning and scheduling-submarines and was named chief of work assignments in 1968. He holds a degree in industrial management from Northeastern University.

Mr. **Goldberg** graduated from the United States Merchant Marine Academy and served two years in the United States Navy before joining the shipyard in 1955.

He earned his master's degree in nuclear engineering from MIT and subsequently headed the shield design and later the systems and procedures groups during USS Bainbridge construction. He was named chief of nuclear reactor plant engineering in 1962.

Mr. **Lord** joined the shipyard in 1958 as a test engineer and was later promoted through supervisory positions to become chief test engineer for construction of the nuclear-powered submarine USS Greenling. In 1965 he became chief of nuclear testing.

A 1953 graduate of Maine Maritime Academy, Mr. **Lord** sailed with the Farrell Lines and served with the United States Navy as an engineering officer before coming to Quincy.

Mr. **Ryder's** past 10 years of managerial and engineering experiences were preceded by 20 years of engineering duty officer's assignments in the United States Navy.

Prior to joining the Quincy division's DD 963 Program (preparation of a proposal to build advanced destroyers for the United States Navy), Mr. **Ryder** was a project chief engineer with Lockheed Shipbuilding and Construction and manager of plant engineering and plant maintenance at the General Electric facility in Lynn, Mass.

He is a graduate of Pennsylvania State University and holds master's degrees from the United States Naval Post Graduate School and Boston University.

Bauer Dredging Names E.J. Balez President

Ernest J. Balez Jr. has been named president and chief executive officer of Bauer Dredging Company, Inc., Owensboro, Ky., it was announced by **W. M. Elmer,** chairman of the board of Texas Gas Transmission Corporation. Bauer Dredging is part of the Offshore Marine and Dredging Services division of Texas Gas.

Formerly president and chairman of the board of Standard Dredging Corporation, Mr. **Balez** joined Bauer in January of this year. A native of Galveston, Texas, Mr. **Balez** joined Standard Dredging in 1945, was elected a vice-president in 1960 and to the company's board of directors in 1964. He was named president of Standard in 1966, and became chairman of its board in 1967.

At the same time, Mr. **Elmer** announced the election of Col. **Everett A. Hansen** to the newly created position of senior vice-president. Colonel **Hansen** joined Bauer Dredging Company in 1960 as vice-president of engineering, following a distinguished career with the U.S. Army Corps of Engineers. Colonel **Hansen** has served as interim president of Bauer Dredging since the retirement of **William H. Bauer,** the firm's founder, president and board chairman, in 1968.

A graduate of Oregon State College, Colonel **Hansen** holds a master's degree in civil engineering from the University of Illinois and is a member of several professional and business associations.

German Shipyards Lead U.S. In Containership Orders

West Germany has more full and partial containerships on order or under construction than the United States. This condition was shown in a statistical report recently released by the Maritime Administration covering worldwide construction of containerships.

The construction of full containerships shows an interesting comparison. As of December 31, 1968, the United States' shipyards had 27 ships on order with a total deadweight of 546,000 tons, while German shipyards had 34 ships of 374,340 dwt. These figures show that the average, new full containership in the United States has a deadweight of 20,224 tons against only 11,010 tons for the average German ship.

The largest full containership on order has a deadweight of 43,000 tons and is being built in Japan. Germany's largest ship has a deadweight of 33,190 tons and the largest in the U.S. is of 27,000 dwt. All new containerships over 10,000 dwt have been designed for speeds ranging between 20 and 23 knots except the large Japanese ship which will have a speed of 18 knots.

With respect to partial containerships, the report showed that the United States had 11 ships under construction and Germany had 44 ships on order.

The United Kingdom fell into third place in both categories—10 full containerships and eight partial containerships on order.

For 1968, the report noted that five full containerships were delivered by U.S. shipyards, seven by German shipyards, six by Japanese yards and five by U.K. yards.

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SNAME British Columbia Area Schedules September Meeting On Canada's Maritime Future

The future of shipping and naval architecture in Canada is the theme of The Society of Naval Architects and Marine Engineers fall meeting to be held at Harrison, B.C., September 26 to 28.

In keeping with the theme, one of Canada's leading naval architects, **W. A. German,** will present a paper followed by a Canadian and American discusser. "Pisces" the highly successful mini-submarine developed in Vancouver, B.C., by International Hydrodynamics Co. Ltd., will be on display for convention delegates.

Jacques Heyrman, chairman of the British Columbia area, has arranged a program opening with a convivial western barbecue Friday evening and moving into the technical session Saturday morning. An afternoon of varied outdoor activities should leave everyone ready for another social evening highlighted by a significant dinner address by a member of the federal government.

Harrison Hot Springs Hotel, 70 miles from Vancouver, B.C., has been modernized to be even more luxurious than before with the hot springs, golf and many other activities available as always. Families and guests are welcome by The Society of Naval Architects and Marine Engineers.

Further information on registration can be obtained from **Dennis R. Case** at 6011 Eagleridge Drive, West Vancouver, B.C.

Oceanography Association Elects Barrow President

Dr. **Thomas D. Barrow,** a leading spokesman of the offshore petroleum industry, has been elected president of the National Oceanography Association for 1969-70, succeeding **John H. Clotworthy** of Miami.

Dr. **Barrow,** a senior vice-president and director of Humble Oil & Refining Company, Houston, Texas, becomes the association's second chief official. Mr. **Clotworthy,** president of Oceans General Inc., of Miami and Washington, D.C. has served as association president since its organization in 1966. Current membership consists of about 500 corporate members and 1,300 individuals.

A graduate of the University of Texas in 1945 with a degree in petroleum engineering, Dr. **Barrow** took his graduate work in geology. He obtained an MA degree from Texas in 1948 and completed his doctoral work at Stanford University in 1953.

He joined Humble in 1951 as a junior geologist and after service in California, Houston and New Orleans, he went with Esso Exploration Inc., an affiliate of Standard Oil Company (New Jersey) in 1964 as a director and executive vice-president. He returned to Humble the following year as a member of the board of directors and two years later was named to his present post as senior vice-president.

A member and research trustee of the American Association of Petroleum Geologists, Dr. **Barrow** also holds memberships in the American Association for the Advancement of Science, the American Geophysical Society and the American Society for Oceanography.

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9 Cylinders, 1600 HP,
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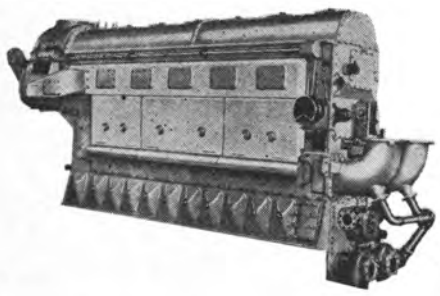

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Westinghouse	250 KW
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PUMP: All bronze body & rotors. Shaft and gears of Hi Tensile steel. Suction and discharge 14". Top discharge—side suction. CAPACITY: Bilge service 2500 GPM @ 20 PSI @ 71 HP. Oil service 2400 GPM @ 75 PSI @ 130 HP. Gear input at top (12 o'clock). Length of pump and gear: 75⅜" long by 51" wide. ENGINE: Cummins diesel model JN-130-M—6 cyl.—4⅛ x 5—130 HP @ 2500 RPM with power takeoff. Weight 2080 lbs.—reduction gear ratio 10.059:1—air starting but can be converted to electric starting. Typical serial No. 5289.

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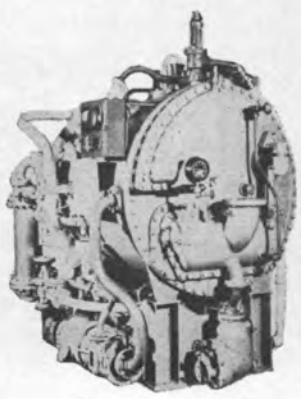

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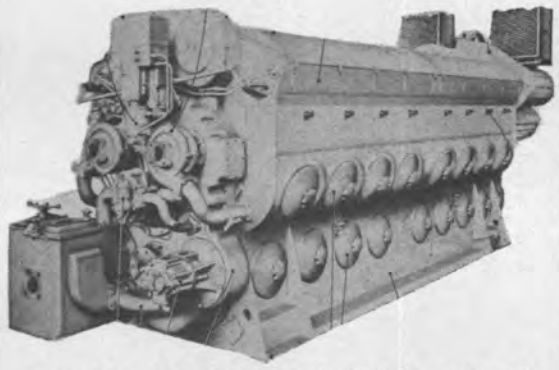

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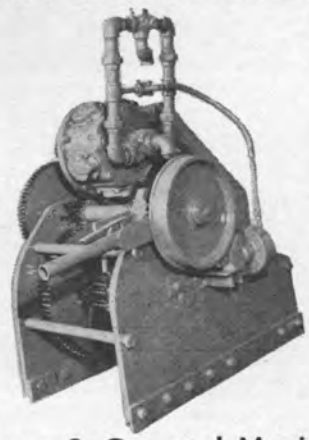

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Winch duty 11,000 lbs. @ 39 FPM. Drum capacity 115 ft. of 1" wire. Drum size—11". Air motor mfg by Gardner-Denver—type MKB-A—reversible —11.5 HP @ 100 lbs. pressure. 1" Pipe connections for air. Typical serial No. 458307. Just removed from unmanned barge. Good operating condition. 7 Units, with motors, available.

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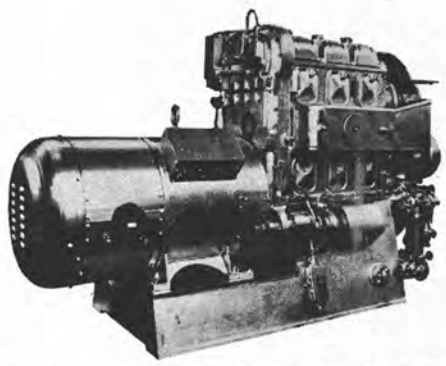
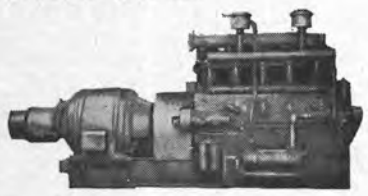
SUPERIOR, 10 KW, 120 Volts DC.
HERCULES, D0OC, 10 KW, 120 DC, Radiator cooled.
CATERPILLAR, radiator cooled, 15 KW, 120/240 Volts DC.
FAIRBANKS-MORSE, radiator cooled, 25 KW Continental Generator, 120/208/3/60.
Hercules DJXC, 25 KW, 120 DC.
GM 3-71, 30 KW, 120 DC.
Cummins A1, 30 KW, 120 DC.
MURPHY, Model ME 66, radiator cooled, 75 KW, 120/240 Volts DC.
CATERPILLAR DIESEL ENGINE, Model D17000, 167 HP, 900 RPM, with Louis-Allis Generator, 85 KW, 220/3/60.
LORIMER, F5SS, 75 KW, 120/240 DC, radiator cooled.
COOPER-BESSEMER, JS-5, 250 KW, 240 DC.



LORIMER 100 KW
450/3/60 Volts DC.



BUDA 6DHG691, 60 KW, 120 Volts DC.

GM-3-268A, 100 KW, 240/120 Volts DC.

SUPERIOR GBD-8, 100 KW, 240/120 Volts DC.

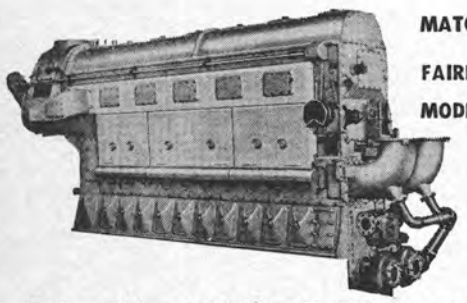
SUPERIOR, Model IDB-8, 100 KW, 450/3/60.

GENERAL MOTORS Model 3-268A, 152 BHP, 1200 RPM, with 100 KW Generators, 450 volts AC, 3 phase, 60 cycles.

GM 8-268A, radiator cooled, air start with Westinghouse Generator, 250 KW, 440/3/60, complete with switchboard.

GENERAL MOTORS DIESEL ENGINES, Model 8-278, with 500 KW Generators, 115/230 DC.

MARINE DIESEL ENGINES



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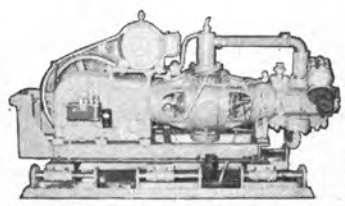
FAIRBANKS-MORSE
MODEL 38D8-⅛
1 Port;
1 Starboard

Used condition, 1800 HP, 800 RPM, 2 cycle, 8½" bore, 10" stroke, Air Start. Complete with Westinghouse Reduction Gears, 2.216:1 ratio—with hydraulic coupling.

4—COOPER-BESSEMER, MODEL LS-8-DR
1300 HP, 277 RPM, direct reversing, turbo charged.

HYDRAULIC PUMPS (STEERING)
Hele Shaw, Type JLP 12, 1000 PSI, 850 RPM. Northern radial piston. Size 5430, 44 GPM, 1500 PSI, 850 RPM.

AIR COMPRESSORS



JOY CLASS WG82

JOY Air Compressors Class WG82, 2-stage rated 100 CFM at 300 PSI, water cooled, size 7" x 3⅜" x 7" Typical Shop #75652, with Reliance motor, 30 HP, 220/440/AC/3/60.

WORTHINGTON, 60 CFM, 110 PSI, with 15 HP Motor, 440/3/60.
WORTHINGTON, 60 CFM, 15 HP, 230 DC.
INGERSOLL-RAND, 150 CFM, 600 PSI, Model 75, with Westinghouse Motors, 75 HP, 230 DC.
INGERSOLL-RAND, 194 CFM, 110 PSI, 40 HP, 230 DC.
INGERSOLL-RAND, 50 CFM, 600 PSI, Model 30, with Westinghouse Motors, 15 HP, 230 DC.
CHICAGO-PNEUMATIC, 161 CFM, 100 PSI, 40 HP, 230 DC.
WESTINGHOUSE Air Brake, 246 CFM, 140 PSI, with 50 HP Motors, 440/3/60.
WORTHINGTON, 175 CFM, 125 PSI, with 50 HP Motors, 440/3/60.

STEAM AIR COMPRESSORS
Westinghouse Air Brake Company, Size 9½ x 9 x 10 Vertical.

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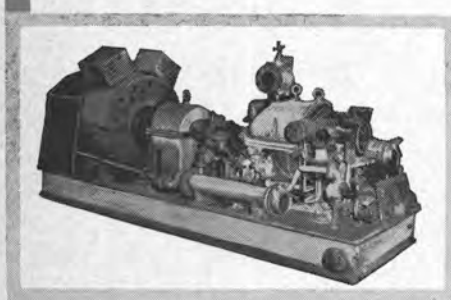
FARREL-BIRMINGHAM, as orig. used on two 1375 HP electric motors, in submarine, 2 pinions, single output gear, Pinion RPM 1302, Gear RPM 280; ratio 4.65:1.

WESTINGHOUSE, 2.216:1 ratio, with hydraulic coupling; as used with 1800 HP, 800 RPM Fairbanks-Morse engine—Starboard.

FALK REDUCTION GEARS . . . Port and Starboard, interchangeable with T-3 Tanker Gears, Falk No. 148-300. Also interchangeable with Falk Gears on A051 Class Tankers (14 ships). Also on A097 to A0100 Tankers. Gears are available as complete assemblies and/or rotating elements in sets. Gears offered with a current inspection report of condition by a representative of Falk Corporation.



ALLIS-CHALMERS, 440 PSI, 740 F, with Allis-Chalmers Generators, 300 KW, 120/240 DC.

DE-LAVAL Turbines, 450 PSI, 750° F, with Crocker-Wheeler Generators, 300 KW, 120/240 DC.

TURBINE GENERATORS

JOSHUA HENDY Turbines, 300 PSI, temperature 550° F with Westinghouse Generators, 300 KW, 120/240 Volts, DC.

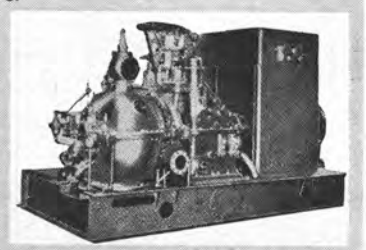
WORTHINGTON Turbines, Form S-4, 440 PSI, 740° F, driving on same comman shaft a 250 KW Generator, 440/3/60, and a 90 KW Generator, 125 Volts DC.

WORTHINGTON Turbines, Form S-4, 440 PSI, 740° F, with Crocker-Wheeler Generators, 300 KW, 120/240 Volts DC.

GENERAL ELECTRIC Turbine, Type FN3-FN24, Steam 265#G., Serial 54110, with G.E. Generator, 750 KW, 440/3/60, Frame 985 Y, Serial 580447.

JOSHUA HENDY Turbines, with Westinghouse Generators, 150 KW, 120 volts DC.

TERRY TURBINES, type TM5, 440 PSI, 750° F, with Crocker-Wheeler Generators, 300 KW, 120/240 DC.



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26" x 48"—4 dog type $ 60.00 ea.
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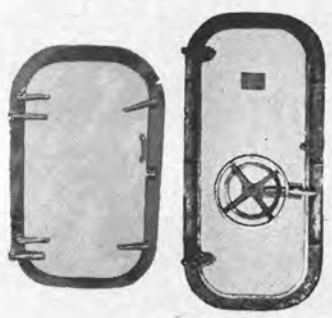

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Phone or mail required specifications.

AC PUMPS—Horizontal Centrifugal

2—Goulds, 2000 GPM, 470' head, Size 8x10, with Westinghouse Motors, 350 HP, 2300/3/60.

1—Ingersoll-Rand, 3000 GPM, 250' head, Size 8ALV, with Westinghouse Motor, 250 HP, 2200/3/60, 1775 RPM.

1—Worthington, 400 GPM, 150 PSI, 5½" suction, 3½" discharge, with G.E. Motor, 75 HP, 440/3/60, 3550 RPM.

2—Goulds, 300 GPM, 336' head, 3" suction, 2" discharge, with G.E. Motors, 50 HP, 440/3/60, 3550 RPM.

7—J.C. Carter, 365 GPM, 250' head, stainless steel, 3" suction, 3" discharge, with 220/440/3/60 Motors, 25 H.P.

8—Worthington, 200 GPM, 100 PSI, 3½" suction, 3" discharge, with wagner motors, 25 HP, 440/3/60.

6—326 GPM, 138' head, C.I. pump housing, 3" suction, 3" discharge, with Westinghouse Motors, 20 HP, 220/440/3/60, 1755 RPM.

6—682 GPM, 60' TDH, C.I. pump housing, 5" suction, 5" discharge, with Westinghouse Motors, 15 HP, 220/440/3/60, 1700 RPM.

2—Worthington, 80 GPM, 60 PSI, 2½" suction, 2" discharge, with G.E. Motors, 8 HP, 440/3/60, 3450 RPM.

3—Worthington, 650 GPM, 9 PSI, 6" suction, 6" discharge, with Star Motors, 6 HP, 440/3/60.

1—Worthington, 175 GPM, 20 PSI, 3½" suction, 3" discharge, with G.E. Motor, 3.74 HP, 440/3/60, 3450 RPM.

4—Worthington, 60 GPM, 22 PSI, 3½" suction, 2" discharge, with G.E. Motors, 3 HP, 440/3/60, 3450 RPM.

3—Allis-Chalmers, 35 GPM, 100' head, 2" suction, 1½" discharge, with Allis-Chalmers Motors, 3 HP, 440/3/60, 3500 RPM.

1—Allis-Chalmers, 65 GPM, 80' head, 1½" suction, 1½" discharge, with Allis-Chalmers Motor, 3 HP, 220/440/3/60, 3500 RPM.

2—Worthington, 13 GPM, 51 PSI, 1½" suction, 1½" discharge, with G.E. Motors, 2.64 HP, 440/3/60, 3490 RPM.

1—Worthington, 75 GPM, 22', 3" suction, 2½" discharge, with G.E. motor, 1.9 HP, 440/3/60, 3450 RPM.

5—Worthington, 30 GPM, 30 PSI, 1½" suction, 1½" discharge, with G.E. Motors, 1.75 HP, 440/3/60.

14—Warren, 6 GPM, 36 PSI, 1¼" suction, 1" discharge, with G.E. Motors, 1.25 HP, 440/3/60, 3450 RPM.

AC PUMPS—Vertical Centrifugal

6—Worthington, 275 GPM, 56.6 PSI, 8½" suction, 3½" discharge, with G.E. Motors, 22.9 HP, 440/3/60, 1180 RPM.

4—Worthington, 490 GPM, 35 PSI, 7" suction, 4½" discharge, with G.E. Motors, 19.6 HP, 440/3/60, 1175 RPM.

6—Chicago Pump Co., submersible, 400 GPM, 6 # suction, 30 # discharge pressure, with Wagner Motors, 15 HP, 440/3/60, 1740 RPM.

6—Dayton-Dowd, 1160 RPM, 15 PSI, 10" suction, 8" discharge, with Wagner Motors, 10 HP, 440/3/60.

4—Worthington, 100 GPM, 40 PSI, 5" suction, 3" discharge, with G.E. Motors, 7.37 HP, 440/3/60, 1750 RPM.

4—Warren, 135 GPM, 35 PSI, 6" suction, 3" discharge, with G.E. Motors, 6 HP, 440/3/60.

1—Worthington, 35 GPM, 62.4 PSI, 3" suction, 2" discharge, with G.E. Motors, 5.83 HP, 440/3/60, 1150 RPM.

7—Allis-Chalmers, 68 GPM, 114' head, Type SSV-C, 3" suction, 1½" discharge, with Wagner Motors, 7½ HP, 440/3/60, 1750 RPM.

3—Worthington, 350 GPM, 11.1 PSI, 10" suction, 3½" discharge, with G.E. Motors, 5 HP, 440/3/60, 1150 RPM.

12—Allis-Chalmers, 10 GPM, Size 2"x2½", with Wagner Motors, 3 HP, 440/3/60, 3600 RPM.

AC PUMPS—Horizontal Rotary

4—Warren, 197 GPM, 175 PSI, with Electro Dynamics Motors, 30 HP, 440/3/60, 1750 RPM.

2—Northern, 10 GPM, 350 PSI, 3" suction, 2" discharge, 200 RPM, with G.E. geared Motors, 5 HP, 440/3/60.

3—DeLaval, 25 GPM, 50 PSI, with G.E. Motors, 1.8 HP, 440/3/60.

AC PUMPS—Vertical Rotary

2—DeLaval, 550 GPM, 50 PSI, with G.E. Motors, 27.4 HP, 440/3/60, 1180 RPM.

7—Quimby, Size 2½, 10/6 GPM, 350 PSI, 2½" suction, 1½" discharge, with Wagner Motors, 6/3 HP, 440/3/60, 1160/865 RPM.

8—Blackmer, 50 GPM, 35 PSI, 420 RPM, with G.E. geared Motors, 2 HP, 440/3/60, 1750 RPM.

DC PUMPS—Horizontal Centrifugal

6—Worthington, Size 8L1, 2100 GPM, 138.5 TDM, with Westinghouse Motors, 100 HP, 230 DC, 1310/1750 RPM.

6—Worthington, Size 12 LA1, 4000 GPM, 67.3 TDM, with Westinghouse Motors, 100 HP, 230 DC, 1310/1750 RPM.

6—Worthington, Size 3UB1, 400 GPM, 280' head, with Westinghouse Motor, 50 HP, 230 DC, 1310/1750 RPM.

2—Weil, 400 GPM, 100 PSI, with 40 HP Motors, 230 DC.

6—Worthington, Size 4L1, 400 GPM, 83' head, with Westinghouse Motors, 15 HP, 230 DC, 1225/1750 RPM.

1—Aldrich, 8" suction, 6" discharge, with G.E. Motor, 12/25 HP, 115 DC.

3—Warren, 1175 GPM, 11.2 PSI, with Reliance Motors, 10 HP, 230 DC.

4—Gardner-Denver, 900 GPM, 30' head, with Crocker-Wheeler Motors, 10 HP, 230 DC.

1—Westco, 100 GPM, 100 PSI, 2" suction, 2" discharge, with 10 HP Imperial Motor, 115 DC.

DC PUMPS—Horizontal Centrifugal

2—Yeomans, 135 GPM, 3" suction, 115' head, 3" discharge, with Kimble Motor, 10 HP, 230 Volts DC.

2—Warren, size 5, 600 GPM, with Electro-Dynamics Motors, 8/4.5 HP, 230 Volts DC.

1—Warren, 5" suction, 4" discharge, with Reliance Motor, 7½ HP, 115 Volts DC.

1—Dayton-Dowd, 3" suction, 2½" discharge, with Crocker-Wheeler Motor, 5 HP, 120 DC.

1—Ingersoll-Rand, Model A, 45 GPM, 125' head, with G.E. Motor, 5 HP, 115 Volts DC.

3—Ingersoll-Rand, Size 1MVR, 50 GPM, with Electro-Dynamics Motors, 3.9 HP, 230 DC.

1—Fairbanks-Morse, 250 GPM, 13' head, with Fairbanks-Morse Motor, 3.72 HP, 230 Volts DC.

2—Worthington, 150 GPM, 22 PSI, 3½" suction, 3" discharge, with Diehl Motors, 3.47 HP, 230 Volts DC.

DC PUMPS—Horizontal Centrifugal

1—Yeomans, 40 GPM, 75' head, 1½" suction, 1" discharge, with Master Motor, 2 HP, 230 Volts DC.

2—Westco, 20 GPM, 50 PSI, with Century Motors, 1½ HP, 120 Volts DC.

2—Worthington, 60 GPM, 23.7 PSI, 2½" suction, 2" discharge, with Diehl Motors, 1.43 HP, 230 Volts DC.

7—Warren, 4 GPM, 38 PSI, 1½" suction, 1" discharge, with Century Motor (4-230 DC, 3-115 DC), 1.25 HP.

DC PUMPS—Vertical Centrifugal

2—Buffalo, Size 3 SAV, 400 GPM, 125 TDH, with Electro-Dynamic Motors, 50 HP, 230 Volts DC, 1350/1800 RPM.

1—Gardner-Denver, 1500 GPM, 56' head, 8" suction, 6" discharge, with Century Motor, 30 HP, 230 Volts DC, 1750 RPM.

1—Ingersoll-Rand, Size 18VCM, 8500 GPM, with Electro-Dynamic Motor, 20/40 HP, 230 Volts DC, 410/545 RPM.

2—Worthington, 16" LAS-2, 5600 GPM, 10 PSI, with G.E. Motor, 20/40 HP, 230 Volts DC, 540/720 RPM.

1—Ingersoll-Rand, 10" suction, 10" discharge, 1050/2000 GPM, with G.E. Motor, 20 HP, 230 Volts DC, 805/1150 RPM.

1—Worthington, 340 GPM, 33.6' 6" suction, 3" discharge, with G.E. Motor, 15 HP, 230 Volts DC.

1—Ingersoll-Rand, 1050 GPM, ... 5" suction, 5" discharge, with Crocker-Wheeler Motor, 15 HP, 230 Volts DC. 1150 RPM.

2—Ingersoll-Rand, 450 GPM, 15' head, 4" suction, 3" discharge, with G.E. Motors, 10/15 HP, 230 Volts DC, 1300/1750 RPM.

1—Allis-Chalmers, 750 GPM, 30.3' head, 5" suction, 5" discharge, with Star Motor, 10 HP, 230 Volts DC, 1750 RPM.

2—Buffalo, Size 3SLV, 425 GPM, 35 TDH, with Electro Dynamic Motors, 7½/15 HP, 230 Volts DC, 1310/1750 RPM.

3—Ingersoll-Rand, Size 1VHM, 18 GPM, 75 PSI, 3¼" suction, 1½" discharge, with G.E. Motors, 7½ HP, 230 Volts DC.

1—Worthington, 175 GPM, 50 PSI, 4" suction, with G.E. Motor, 7½ HP, 230 Volts DC.

2—Ingersoll-Rand, Size ..... 8 VCM, 1400 GPM, with Electro Dynamic Motors, 5/10 HP, 230 Volts DC, 950 RPM.

2—Ingersoll-Rand, Size 1½ VBM, 70 GPM, with Electro Dynamic Motors, 5/10 HP, 230 Volts DC, 1500/2000 RPM.

2—Ingersoll-Rand, Size 1MVR, 20 GPM, with Electro Dynamic Motors, 3/1.5 HP, 230 Volts DC, 1950/2600 RPM.

2—Worthington, 8" LS-1, 1400 GPM, 10 PSI, with G.E. Motors, 5/10 HP, 230 Volts DC, 875/1200 RPM.

2—Worthington, Type 1½ UZS-3, 20 GPM, 75 PSI, with G.E. Motors, 5 HP, 230 Volts DC, 1800 RPM.

2—Weil, 20 GPM, 40 PSI, 1½" suction, 1¼" discharge, with G.E. Motors, 3 HP, 230 Volts DC.

DC PUMPS—Horizontal Rotary

3—Worthington, Size 5GES, 400 GPM, 50 PSI, with Westinghouse Motors, 20 HP, 230 Volts DC, 1750 RPM.

1—DeLaval, 15 GPM, 350 PSI, 2½" suction, 2½" discharge, with Diehl Motor, 10 HP, 230 Volts DC.

2—Viking, Type EKK, 60 GPM, 70 PSI, 2" suction, 2" discharge, with Diehl Motors, 5 HP, 230 Volts DC.

3—National Transit, 50 GPM, 50 PSI, 3" suction, 2½" discharge, 3 HP, 230 Volts

DC PUMPS—Vertical Rotary

6—Quimby, Size 5, 400 GPM, 60 PSI, 6" suction, 5" discharge, with Westinghouse Motors, 30 HP, 230 Volts DC.

1—DeLaval, IMO, 250 GPM, 40 PSI, with G.E. Motor, 15/20 HP, 230 Volts DC, 1310/1750 RPM.

3—Worthington, Model 4GRVS, 225 GPM, 35 PSI, with G.E. Motors, 15/20 HP, 230 Volts DC.

4—Worthington, Model 4GRVS, 175 GPM, 50 PSI, with G.E. Motors, 7½/10 HP, 230 Volts DC.

1—Quimby, Size 4, 175 GPM, with Electro Dynamic Motor, 7.5/10 HP, 230 Volts DC, 865/1150 RPM.

2—Worthington, Type 3GRVS, 90 GPM, 75 PSI, 2¾" suction, 2½" discharge, with Diehl Motors, 7½ HP, 230 Volts DC.

1—Quimby, Size 2, 8 GPM, with Electro Dynamic Motor, 2/5 HP, 230 Volts DC, 575/1150 RPM.

2—Worthington, Type 2GRVS, 7 GPM, 400 PSI, with G.E. Motors, 2½/5 HP, 230 Volts DC, 900/1800 RPM.

BOILER FEED PUMPS — TURBINE & ELECTRIC

4—Worthington, Vertical type, single acting, triplex, constant speed, size 2¼ x 4, 47 GPM, 525 PSI, with G.E. Motors, 20 HP, 230 Volts DC.

2—Worthington, 5" UFD, 460 GPM, 750 PSI, 5" suction, 5" discharge, driven by Sturtevant Steam Turbine, Size CC-22', Type 21, 2½" steam inlet, 5½" exhaust.

2—Aldrich Pump Co. Triplex, Vertical, Size 2½ x 4, 65 GPM, 575 PSI, with G.E. Motors, 25 HP, 230 Volts DC.

2—Ingersoll-Rand, 165 GPM, 575 PSI, with turbine drives.

TURBINE DRIVEN PUMPS — Various

2—Worthington, Size 20-LAL-18, Main Condenser, Centrifugal, 10500, 27' head, Vertical, with Whiton Turbines, 95 HP.

1—Ingersoll-Rand, Size 5UV, Centrifugal, Horizontal, 1200 GPM, 225' head, 6" suction, 5" discharge, with Elliot Turbine, 84.3 HP.

1—Worthington, Fire, Flushing & Emergency Bilge, Centrifugal, Horizontal, Rating—Fire: 500 GPM, 150 PSI, Flushing: 1000 GPM, 60 PSI, Bilge: 750 GPM, 25 PSI, 5½" suction, 4½" discharge, with Whiton Turbines, 72.9 HP.

1—DeLaval, Fuel Oil Transfer, Vertical, Rotary, 250 GPM, 150 PSI, 7" suction, 6" discharge, with DeLaval Turbine, 35 BHP.

8—Goulds Main Circulating, Vertical, Centrifugal, 3700 GPM, 13 PSI, Size 12", with Elliot Turbines, 30 HP.

1—DeLaval Fuel Oil Service, Vertical, Rotary, 50 GPM, 350 PSI, 3½" suction, 3½" discharge, with DeLaval Turbines, 14.4 HP.

4—DeLaval—IMO, L.O. Service, Vertical, Rotary, 300 GPM, 45 PSI, 6" suction, 6" discharge, with DeLaval Turbines, 14.1 HP.

8—Allis-Chalmers, Type SSC-V, 68 GPM, 114' head, 3" suction, 1½" discharge, with Carling Turbines, 7½ HP, 1750 RPM.

2—Warren, 85 GPM, 60 PSI, For Lube Oil Service, Turbine Driven.

2 — Warren, Main Circulating, 3500 GPM, 13.5 PSI, Turbine Driven.

STOCKLESS ANCHORS

USED, GOOD QUALITY . . . SAVE!

3,000 pound size
8,000 pound size
10,000 pound size

ANCHORS.. Unused, surplus 3000 # size Danforth

ANCHOR CHAIN . . . Used, good, with or without test certificate . . .
1 1/2" size
1 3/8" size
2 1/16" size
2 1/4" size

ANCHOR WINDLASS

1—LIDGERWOOD horizontal Anchor Windlass, double wildcat—for 2 1/16" Chain, double gypsy, with 50 motors, 230 volts DC, complete with controls.

1—Horizontal, of German Mfg., double wildcat—for use with 3" anchor chain, double gypsy with 230 VDC motor, complete with electrical control equipment.

American Engineering, horizontal, double 2⅛" Chain, 65 HP, 230 DC, complete.

7—American Hoist and Derrick Company, horizontal, double wildcat—for 2¼" chain double gypsy, 70 HP, 230 Volts DC, with electric controls.

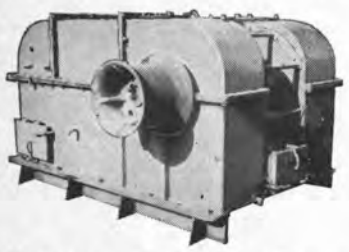
3—Hesse-Ersted, horizontal, double wildcat, 2⅛" chain, 60 HP, 230 DC.

1—Hyde Horizontal Anchor Windlass double wildcat—for use with 2⅛" Anchor Chain, and with General Motors Electric Motor, 60 HP, 230 volts DC, 560/1700 RPM, Type CDM 18831 AE. Complete with Contractor Panel, Resistors, and Master Switch.

ANCHOR WINCHES

2—Jaeger, single drum—capacity approximately 900′ of 1½" wire rope, double gypsy, with 35 HP Motors, 230 Volts DC, complete with electricals.

UNIWINCHES



LAKESHORE UNWINCHES, with Allis-Chalmers Motors, 50 HP, 230 Volts DC, complete with Control Equipment.

Single speed, double drum, 7450 # at 220 FPM.
Single speed, single drum, 7450 # at 220 FPM.
Two speed, single drum, 7450 # at 220 FPM, 14400 # at 105 FPM.

HYDRAULIC CYLINDERS

3000 PSI

Bore	Stroke	Rod Diameter	Overall retracted length	Action
10"	12"	3.75"	45½"	double
10"	26"	3.75"	58½"	single
2"	8"	1½"	20"	double
2.5"	15"	1.12"	25½"	double
3"	8"	1.37"	15½"	double
6"	8′	4"	144"	double
13"	9′7"	5½"	14′	double

STEERING STANDS

Brass Steering Stands. Complete with angle indicator on top, used, 11" base diameter by 35½" high, and with 42" overall, 8-spoke brass steering wheel.

$195.00 each

CAPSTAN WINDLASSES

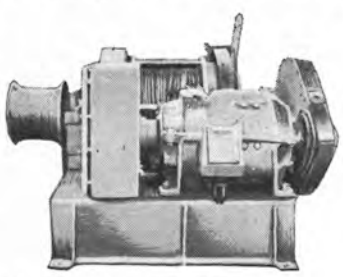
Model CWP-3, Vertical 24" Planetary Capstan Windlasses, Single Wildcat — using 1¼" Anchor Chain, Single Gypsy with 20 HP motor, 230 volts DC, complete with Contactor Panel, Master Switch, and Resistors.

3—Hesse-Ersted Vertical, Single Wildcat—for 1⅜" Anchor Chain, single gypsy, with HP General Electric Motor, 230 Volts DC, complete with Controller equipment.

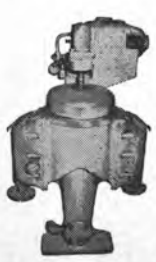
Hyde, Vertical, Single Wildcat, for 1⅛" Anchor Chain, single gypsy, with 20/5 HP Motor, 440/3/60.

McKiernan — Terry, Single Wildcat — for ¾" chain, Single Gypsy, with underdeck drive with Star Motor, 7½ HP, 115 DC, with Electrical control equipment.

CARGO WINCHES



American Hoist and Derrick Company Winches with Westinghouse Motors, 50 HP, 230 Volts DC, complete with Contactor Panels, Master Switches, and Resistors.
Type 66—single speed, single drum.
Type 67—two speed, single drum.



CENTRIFUGES

Sharples Purifiers—For Diesel Service or for Lube Oil Service.

150 GPH—440 AC, 230 DC
350 GPH—230 DC
600 GPH—230 DC

FAIRLEADS

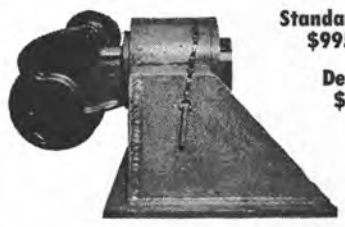
Designed and Manufactured by ZIDELL EXPLORATIONS, INC.

To Give You These Features:

One size fairlead with universal type sheave to accommodate wire rope sizes 1" up to and including 2".

Self Aligning, Swivel Type Head.

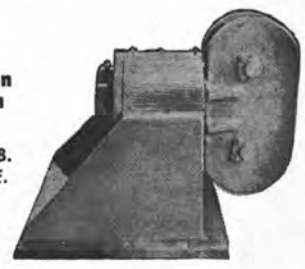
Dependable and Ruggedly built to perform consistently year after year with minimum maintenance.



Standard Design $995 each

Deluxe Design $1250 each

Model Design $1350 each



PRICES ARE F.O.B. PORTLAND, ORE.

SPECIAL ITEMS

COUPLINGS

(Flexible Couplings between Turbines and Reducing Gear)

1—Set from C3-S1-A3 Vessel
1—Set from C2-S-B1 (Moore built)
1—Set from AP2 Victory Ship

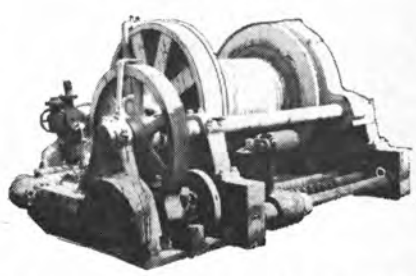
PROPELLERS

From C3-S1-A3 Vessel
From C2-S1-B1 Vessel
From AP2 Victory Ship
From Liberty Ships and LST Vessels

PROPELLER SHAFTS

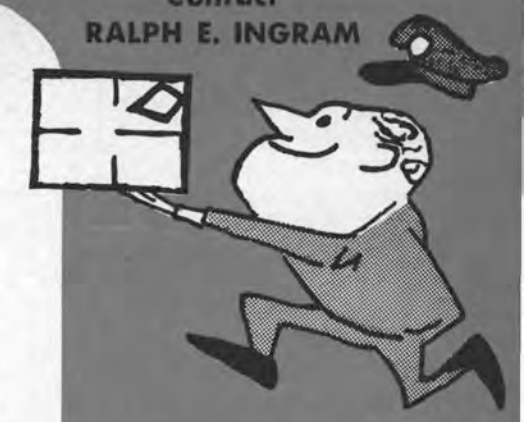
From C3-S1-A3 Vessel
From C2-S-B1 Vessel (Moore built)
From C2-SU Vessel
From Liberty Ships and LST Vessels

STEAM TOWING WINCH



Single drum, capacity 2000′ of 2" wire rope, cylinder size 9" bore by 10" stroke.

Contact
RALPH E. INGRAM



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AXIAL FLOW FANS

Rebuilt—Guaranteed

LaDel, STURTEVANT etc.

In 440 AC, in 115 DC, and in 230 DC, and in sizes 1 HP through 20 HP. Completely reconditioned.

EXAMPLE LISTING:

Size A¼	@ $160 each
Size A½	@ $185 each
Size A1	@ $215 each
Size A2	@ $290 each
Size A3	@ $350 each
Size A4	@ $410 each
Size A5	@ $500 each
Size A6	@ $550 each
Size A8	@ $630 each
Size A10	@ $695 each
Size A12	@ $750 each
Size A16	@ $900 each

PRICES ARE F.O.B. PORTLAND, OREGON

SPERRY GYRO COMPASSES

SPERRY MARK 14, Model 1 Gyro Compasses, used, good, complete with Master Compass, with Binnacle, Amplifier panel, control panel, carbon pile voltage regulator, motor generator set, alarm panel, repeater panel, and repeaters with mounts.

Machinery and EQUIPMENT

as removed from

S.S. "JAMES O'HARA"

(AP-179) C3-S1-A3

NOW . . . Also dismantling identical companion ship . . .

The S.S. "FREDERICK FUNSTON"

for Immediate Sale!

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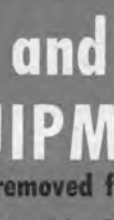

CARGO HOISTER BLOCKS

5 ton rated, steel, as removed from surplus Liberty Ships. Manufactured by Young, Draper, etc. 12" or 14" sizes, your choice

$34.50 each

$39.50 each with pull test certificates.

HP TURBINE, Allis-Chalmers, Impulse Reaction type, 5003 RPM, 740° F, 440 PSI, Serial #1737.

LP TURBINE, Allis-Chalmers, Straight Reaction, Type, 4289 RPM, 740° F, 440 PSI, Serial #1738.

2 — TURBINE GENERATORS, Allis-Chalmers, Turbines: Impulse Condensing Type, 740° F, 440 PSI, 8000 RPM, Generators: 300 KW, 240 Volts DC, 2 wire, 1200 RPM.

CARGO WINCHES
2—Jaeger, 2 drum, 2 speed, 50 HP, 230 DC.
2—Parkersburg, 2 drum, 1 speed, 50 HP, 230 DC.
2—O.C.S., 2 drum, 1 speed 50 HP, 230 DC.
2—Vulcan, 1 drum, 2 speed, 50 HP, 230 DC.
2—American Hoist & Derrick, 1 speed, 1 drum, 50 HP, 230 DC.

SALT WATER EVAPORATOR, Davis, Size 36-17, rated 2500 lbs. per hour.

MAKE UP FEED EVAPORATOR, Davis, Size 26-8, rated 1500 lbs. per hour.

LAKESHORE TOPPING WINCHES, single speed, capacity 10,000 # at 67 FPM, 5 HP, 230 DC.

ANCHOR WINDLASS, Markey, Type CWA-4, horizontal, double wildcat—for 2 5/16" anchor chain, 70 HP, 230 DC.

MAIN CONDENSER, Allis- Chalmers, 7800 sq. ft. cooling service, 2 pass, horizontal.

LUBE OIL PURIFIER, Sharples, Type M-34-W-22U43, 350 GPH, 230 Volts DC Motors.

FUEL OIL STANDBY PUMP, Worthington, horizontal duplex, Size 5½" x 3" x 6", 13 GPM, 410 PSI.

GENERAL SERVICE PUMP, Worthington, vertical simplex, Size 12 x 14 x 18, 600 GPM, 50 PSI.

BOILER FEED PUMP, Worthington Auxiliary, vertical simplex, Size 11 x 7 x 24, 120 GPM, 550 PSI.

FRESH WATER PUMPS, 2—Worthington, Size 4x6, horizontal duplex, 100 GPM, 80 PSI, 7½ HP, 230 DC.

BALLAST PUMP, Allis-Chalmers, Type SGV, Size 5 x 5, double suction, vertical centrifugal, 600 GPM, 30 PSI, 20 HP, 230 DC.

SUBMERSIBLE BILGE PUMPS, 2—Worthington, 5", vertical centrifugal, 600 GPM, 30 PSI, 20 HP, 230 DC.

BILGE PUMP, Allis-Chalmers, Size 5 x 5, Type SGV, double suction, vertical centrifugal, 600 GPM, 30 PSI, 20 HP, 230 DC.

EVAPORATOR TUBE NEST DRAIN PUMPS, 2—Allis-Chalmers, Type SS-LH, horizontal, Size 2½ x 2, 17 GPM, 127' head, 5 HP, 230 DC.

MAIN CONDENSATE PUMPS, 2—Allis-Chalmers, Type CF-2V, vertical volute, Size 6 x 3½, 170 GPM, 208' head, 20 HP, 230 DC.

DISTILLER CONDENSATE PUMPS, 2 — Allis-Chalmers, Type SS-L, horizontal centrifugal, Size 4 x 2, 45 GPM, 2 HP, 230 DC.

AUXILIARY CONDENSATE PUMPS, 2—Allis-Chalmers, Type CF-2V, vertical volute, Size 2½ x 1½, 30 GPM, 208' head, 7½ HP, 230 DC.

DIESEL OIL PUMP, Viking, Type ZKK, gear type, Size 3 x 2½, 40 GPM, 30 PSI, 2 HP, 230 DC.

DISTILLER FRESH WATER DISTRIBUTION PUMPS, 2—Allis-Chalmers, Type SS-DH, horizontal centrifugal, Size 2½ x 2, 55 GPM, 51' head, 2 HP, 230 DC.

FIRE PUMPS, 2—Allis-Chalmers, Type B2-V, vertical centrifugal, Size 4 x 3, 400 GPM, 280' head, 50 HP, 230 DC.

MAIN FEED PUMP, Terry Turbine, Type ZS-1, 124 HP, with Ingersoll-Rand horizontal pump, Size 4 x 3½, 4 stage, 250 GPM, 1340' head.

STEERING GEAR PUMP, Waterbury, Size 5, Type K, with Westinghouse Motor, 55 HP, 230 Volts DC.

LUBE OIL SERVICE PUMPS, 2—Quimby, vertical screw, Size 5, 400 GPM, 48 PSI, 6 x 5, 25 HP, 230 DC.

FUEL OIL TRANSFER PUMP, Quimby, vertical screw, Size 4D, 225 GPM, 50 PSI, 15 HP, 230 DC.

FUEL OIL SERVICE PUMP, Quimby, vertical screw, Size 2½, 20 GPM, 400 PSI, 2½ x 1½, 10 HP, 230 DC.

ICE WATER CIRCULATING PUMP, Allis-Chalmers, Type SS-RH, 10 GPM, 81' head, 1" x ¾", vertical volute, 1 HP, 230 DC.

HOT WATER CIRCULATING PUMP, Allis-Chalmers, Type SS-HH, 35 GPM, 70' head, 1¼ x 1¼, vertical volute, 2 HP, 230 DC.

REFRIGERATION CONDENSER CIRCULATING PUMPS, 2—Allis-Chalmers, Type SJK, 180 GPM, 81' head, 2½ x 2, horizontal volute, 7½ HP, 230 DC.

MAIN CONDENSER CIRCULATING PUMP, Allis-Chalmers, Type LS-V, 12,550 GPM, 20' head, 20 x 20, vertical volute, 100 HP, 230 DC.

AUXILIARY DISTILLER CIRCULATING PUMPS, 2—Allis-Chalmers, Type SG, 650 GPM, 29' head, 5 x 5, horizontal volute, 7½ HP, 230 DC.

AUXILIARY CONDENSER CIRCULATING PUMPS, 2—Allis-Chalmers, Type SE-V, 2820 GPM, 29.2' head, 12 x 12, vertical volute, 40 HP, 230 DC.

FORCED DRAFT BLOWERS, 2—American Blower, Sirocco capacity 17560 CFM, 5½ SP, 75 HP, 230 DC.

LIFEBOAT DAVITS, 2—sets, Welin, gravity trackway type, Size 135, capacity 21,500#.

FORGED STEEL LINE SHAFTING

Excellent buys on used—good shafting for re-machining to your requirements:

All items flanged

6—Sections 19" diameter, 23'—11" long,
1—Section 19" diameter, 23'—8" long,
3—Sections 19" diameter, 22'—10" long,
12—Sections 19" diameter, 22'—6" long,
6—Sections 14⅛" diameter, 26'—6" long,
2—Sections 14⅛" diameter, 18'—6" long,
2—Sections 14⅛" diameter, 13'—9" long,
39—Sections 13½" diameter, 22'—0" long,
15—Sections 13½" diameter, 14'—0" long,

OVERHAULED—TESTED

SALT WATER EVAPORATORS

Used, Davis Engineering or equal, with ABS and/or Coast Guard certification. 5 sizes available:

SIZE 48-23 **SIZE 26-8**
SIZE 36-17 **SIZE 20-5**
SIZE 36-14

PROMPT QUOTATIONS & DELIVERY

MACHINERY AND EQUIPMENT FROM C2-S-B1 SHIPS

TURBINES, High Pressure and Low Pressure, manufactured by G.E., develop 6,000 HP (2 sets Available)

REDUCTION GEARS, G.E., 6,000 HP, RPM 6072-4048-882-92 (2 available)

MAIN CONDENSERS, Worthington, 5500 sq. ft. (2)

LUBE OIL PURIFIERS, De Laval, Model 55-13, 2 HP, 230 DC.

MAIN FEED PUMP, Worthington, Size 4 x 6, 35/50 HP, 230 DC (2)

AUXILIARY FEED PUMP, Worthington, steam, Size 11 x 7 x 24 (2)

PORT FEED PUMP, Worthington, steam, Size 9½ x 6 x 24 (2)

MAIN CIRCULATING PUMP, Allis-Chalmers, Size 18 x 18, Type SEV, 8500 GPM, 20.2' head, with 60 HP motor, 230 DC (1)

AUXILIARY CIRCULATING PUMP, Worthington, Size 8LS-1, 1240 GPM, 24.6' head, 10 HP, 230 DC (6)

MAIN CONDENSATE PUMP, Worthington, Size 2½-UZ-1, 120 GPM, 208 TDH, 15 HP, 230 DC (6)

AUXILIARY CIRCULATING PUMP, Worthington, Size 1½-UZS-3, 20 GPM, 208 TDH, 5 HP, 230 DC (6)

LUBE OIL SERVICE PUMP, De Laval-Imo, 250 GPM, 40 PSI, 15 HP, 230 DC (2)

LUBE OIL SERVICE STANDBY PUMP, Worthington, steam, Size 5½ x 2¾ x 6 (2)

FUEL OIL TRANSFER PUMP, De Laval, 225 GPM, 50 PSI, 15 HP, 230 DC (2)

FIRE PUMP, Worthington, Size 3-UBS-1, 400 GPM, 280' head, 50 HP, 230 DC (2)

STANDBY FIRE PUMP, Worthington, Steam, Size 12 x 11 x 18 (2)

BILGE PUMP, Worthington, Size 5LS-1, 415 GPM, 78.5 TDM, 20 HP, 230 DC (2)

BALLAST PUMP, Worthington, Size 5LS-1, 415 GPM, 78.5 TDM, 20 HP, 230 DC (2)

GENERAL SERVICE PUMP, Worthington, Steam, Size 10 x 11 x 18 (2)

SANITARY PUMP, Worthington, Size 2½ x 2, 2HP, 230 DC (4)

DRINKING WATER PUMPS, Size 2⅛ x 2, ¾ HP, 230 DC (4)

VACUUM PRIMING PUMPS, size MD537, 1½HP, 230 DC (4)

FORCED DRAFT FAN, Size 3½ AHS, 7880/5970 CFM, S.P.—6.2/14 with G.E. motors 5/25 HP, 230 DC, 1910/3120 RPM (7)

STEERING GEAR WATERBURY PUMP, Type A, Size 5, with 20 HP G.E. motor, 230 DC (4)

1 Only
ORTON WHIRLEY CRANE

Lifting Rate: 25 tons @ 50 Ft. Radius @ 50 to 60 FPM.—
Boom: 80′ to headblock (with 10′ whip)
Whip: 10 tons @ 125 FPM—2 part line
Track Centers: 20′—Engine: Cummins HBIS 601, 180 HP supercharged, elec. start—
Motors: Each leg (4 tot.) 7½ HP, 230 DC.—
Power: Diesel electric (DC)

ELECTRIC MOTORS

230 VOLT D.C. MOTORS

1—250 HP, G.E., Type CY, Form HJ, Model 24G, 1200 RPM Horizontal, 2 B.B., Shunt Wd.

2—220 HP, G.E., Type CDM—1348S, Form HA, Model 25G 339, 1800 RPM, Stab. Sh. Wd. Horizontal, 2 B.B.

6—100 HP, Westinghouse, Type SK, FR. 163, Style 1B4631, 1150 RPM, Shunt Wd. Horizontal, 2 B.B.

2—55 HP, Electro-Dynamic, FR 25-SL, 550 RPM, Compound Wound, Single Ball Bearing. Originally for high pressure Air Compressor.

6—50 HP, Westinghouse, 600 RPM, Compd. Wd., Type CK, FR 9, Horizontal 2 B.B.

1—40 HP, Allis-Chalmers, 1750 RPM, Compound Wound, Horizontal, 2 B.B.

1—40 HP, G.E., Type CDM, FR 95, Model 35A1663, 1800 RPM, Compound Wound, Horizontal, 2 B.B.

1—18/25 HP, Electro-Dynamic, 1225/1750 RPM, Compd. Wd., FR. 7½ S, Horizontal, 2 B.B.

6—15 HP, Allis-Chalmers, 1225/1750 RPM, Stab. Sh. Wd., Type EB90, Horizontal, 2 B.B.

2—10 HP, Allis-Chalmers, 1225/1750 RPM, Compd. Wd., Type EB80, Horizontal, 2 B.B.

4—9.3 HP, Westinghouse, 640/852 RPM, Type SK, FR. 93.

120 VOLT D.C. MOTORS

1—304 HP, Westinghouse, 900 R.P.M., Shunt Wound, Horizontal, Pedestal Bearing.

3—25 HP, G.E., Type CDM, 1200 R.P.M., Horizontal, 2 B.B., unused. Removed from M.G. Sets.

20—7½ HP, Westinghouse Type SR, FR 43, Stab. Sh. Wd., 1750 RPM,.

STEERING GEAR MOTORS

2—General Electric, 30 HP, 230 V, DC, 600 RPM, Stab. Sh. Wd., Type CDM, Fields Continuous Duty, Armature 1 Hr.

1—Westinghouse, 35 HP, 230 V, DC, 850 RPM, Stab. Sh. Wd., Type SK, Fr. 123, Fields Continuous Duty, Armature 1 Hr.

SHIP'S LIGHTING M-G SETS

230 V, DC/115 V, DC. Ship's Lighting M.G. Sets for C3-S1-A-3 150 K.W. and Moore built C2 100 K.W.

SPECIAL D.C. GENERATORS

3—Unused, G.E., 15 KW, 100 A, 15 V, Type CDM, 1200 RPM, 2 B.B., D.P. Generators.

MOTOR-GENERATOR SETS
Unused Surplus in Original Boxes

Janette M-G Sets. Input: 1.75 HP, 230 V, DC, 7.2 Amperes, 1800 RPM. Output: 1-KVA (.85 KW), 115/1/60, 4 ball bearing, with speed regulator, and with noise filters. Navy Type CJM-21151, continuous duty. Net weight 435 #, Dimensions 44" L, 19½ W, 18⅝" H. Instruction book and parts list included.

Also Radio, Radar & Electronic Equipment.
Motor-Generator Sets. Let us have your inquiries.

D.C. MARINE CONTROLLERS

1—Cutler-Hammer, 250 HP, 230 V, DC, No. 232 793A14.
2—General Electric, 225 HP, 230 V, DC, CR 5430-B32D.
6—Westinghouse, 100 HP, 230 V, DC, Type 8585A SO-1B4636.
1—Cutler-Hammer, Unused, 50 HP, 230 V, DC, No. C280981A290, Contactor Panel for Stern Anchor Haulage Winch. Many others from ¼ HP & up—115 and 230 V.

ROTOTROLS

15—Westinghouse Rotorols, driven by 5 HP, 440 V, 3 phase, 60 cycle, 1700 RPM, AC Motors.

D.C. TRANSFER PANEL

Cutler-Hammer, 3-pole, 300 A, 120/240 V, DC, Bul. 6007, No. B870102A2.

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For C-3-S1-A3 Auxiliaries . . . Send for List A-1. Many others — Let us have your inquiries.

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Westinghouse Propulsion Control Switchboards as used on S-4 Vessels. AC and DC Switchboards. Let us know of your requirements.

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2 and 3 Pole Air Breakers, 2 and 3 Pole Molded Case Navy Type Breakers. 2 and 3 Pole Trip Elements for Molded Case Breakers.

Need 3 Wire 120/240 Volts DC for Shore Power? Motor-Generator Sets and Engine Driven Units from 15 KW to 500 KW . . . Let us quote.

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2—500 KW, 120/240 V, Westinghouse FR. CB813.7, 750 RPM, 2 Pedestal Bearing, with Balance Coils. Removed from GM 8-278 Engines.

2—250 KW, 120/240 V, Westinghouse, 1200 RPM, Single Pedestal Bearings. Balance Coils not available, Type 12S18P107PH, removed from Turbines.

2—150 KW, 120 V, G.E., Type CDM-1348-S, Form HA, Model 25G 340, 1800 RPM, Compound Wound, Horizontal 2 B.B.

1—150, 120 V, GE, Type CDM, Form AA, Model 24G, 1200 RPM, Compound Wound, Horizontal, 2 B.B.

6—100 KW, 120/240 V, Westinghouse, Type SK, FR. 143.8, 1800 RPM, Single Ball Bearings. Balance Coils available.

3—100 KW, 120/240 V, Delco, 1200 RPM, Single Bushed Bearings, with Balance Coils. Removed from Superior GDB-8 Engines.

1—100 KW, 120/240 V, Allis-Chalmers, 1200 RPM, Single Sleeve Bearing, Shunt Wound, Type 4-14-45-13, removed from GM 3-268A Engine.

10—90/165 KW, Westinghouse, 125/400 Volt, Type SK, FR. 185, Shunt Wound, separately excited (120 V), 1200 RPM, Horizontal, 2 B.B.

4—75 KW, 120 V, G.E., Type CDM-1234, Mod. 24GA71, 1200 RPM, 2 Ball Bearing, Tapered Shaft. Removed from Motor-Generator Sets.

6—60 KW, 120 V, Westinghouse, Type SK, FR 143, Style 3B2855-PH, 1800 RPM, 1 B.B. Removed from Turbines.

6—60 KW, 120 V, Westinghouse, Type SK, FR. 153-L, Style 1B4632, 1200 RPM, Compound Wound, Horizontal, 2 B.B.

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From 250 Watts to 500 KW in 115 Volt, 230 Volt and 120/240 Volt, 3 Wire DC. Any drive including Synchronous Motor. Let us have your inquiries.

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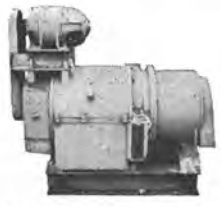


MANY SMALLER UNITS IN STOCK

230 VOLTS D.C. TO A.C.

Hertner. Input: 230 V, DC, 24A. Output: 3.5 KVA, 440 V, 60 cy., 3Ø.
Hertner. Input: 230 V, DC, 28A. Output: 5 KVA, PF .85, 115 V, 60 cy., Ø1.
Continental. Input: 230 V, DC, 28A. Output: 7.5 KVA, 3.5 KW, 120 V, 1Ø, 60 cy., 62.5A.
Century. Input: 10 HP, 230 V, DC. Output: 7.5 KVA, 3.75 KW, 120/1/60.
Bogue. Input: 230 V, DC, 57A, 15 HP. Output: 10 KVA, PF .8, 120 V, 60 cy., 1Ø.
Fidelity. Input: 15 HP, 230 V, DC. Output: 12.5 KVA, 10 KW, 120/1/60.
Bogue Electric. Input: 15 HP, 230 V, DC. Output: 12.5 KVA, 10 KW, 120/1/60.
Burke Electric. Input: 20 HP, 230 V, DC. Output: 25 KVA, 12.5 KW, 120/1/60.
General Elec. Input: 25 HP, 230 V, DC. Output: 18.75 KVA, 15 KW, 120/1/60.
Star Kimble. Input: 30 HP, 230 V, DC. Output: 25 KVA, 20 KW, 120/1/60.
Ideal. Input: 40 HP, 230 V, DC. Output: 31.3 KVA, 25 KW, 450/3/60.
Star Elec. Input: 40 HP, 230 V, DC. Output: 33.4 KVA, 25 KW, 450/3/60.
General Elec. Input: 230 V, DC, 40 HP. Output: 25 KW, 480 V, 60 cy, 3Ø, 24A, 1800 RPM.
Star Elec. Input: 125 HP, 240 V, DC. Output: 93.75 KVA, 75 KW, 450/3/60.

115 VOLTS D.C. TO A.C.

Marathon. Input: 1 HP, 115 V, DC. Output: .500 KVA, .425 KW, 115/1/60.
Bludworth. Input: .75 HP, 115 V, DC. Output: .500 KVA, .450 KW, 115/1/60.
Elec. Spec. Input: 1 HP, 90/130 V, DC. Output: .500 KVA, .500 KW, 115/1/60.
Century. Input: 1.5 HP, 115 V, DC. Output: .750 KVA, .600 KW, 102/1/60.
Janette. Input: 13 Amp, 115 V, DC. Output: 1 KVA, 110/1/60.
Elect. Prod. Input: 1.5 HP, 115 V, DC. Output: 1 KVA, 115/1/60.
Allis-Chalmers. Input: 14 Amp, 115 V, DC. Output: 1.250 KVA, 1 KW, 115/1/60.
Cont. Elect. Input: 6 HP, 115 V, DC. Output: 2.9 KW, 440/3/60.
Louis Allis. Input: 10 HP, 105/130 V, DC. Output: 7.5 KVA, 440/3/60.
Cont. Elect. Input: 12 HP, 120 V, DC. Output: 7.5 KVA, 440/3/60.
Star Elect. Input: 12½ HP, 115 V, DC, 1800 RPM. Output: 7½ KW, 120 V, 60 Cy.
Ideal. Input: 40 HP, 115 V, DC. Output: 31.3 KVA, 25 KW, 450/3/60.
Continental. Input: 50 HP, 115 V, DC. Output: 50 KVA, 25 KW, 120/3/60.
Burke. Input: 20 HP, 115 V, DC. Output: 25 KVA, 12½ KW, 120/1/60.
RCA. Input: 4 HP, 105/130 V, DC. Output: 2.22 KVA, 2 KW, 120/1/60.

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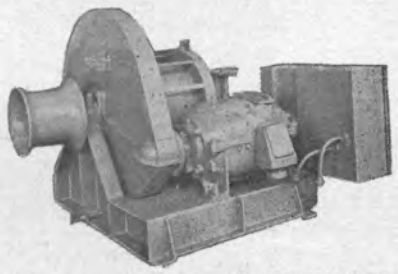

(16) single gear—single drum—7200 lbs. @ 125 FPM. MOTOR: 35 HP—230 VDC—480 RPM—compound—½ hour duty. Electric Brake and all controls.

$1150.00 Each

(4) Double geared—heavy lift. 12,000 lbs. @ 70 FPM; 7800 lbs. @ 125 FPM; 7200 lbs. @ 125 FPM. MOTOR: 35 HP—230 VDC—½ hour duty—Electric brake and all controls.

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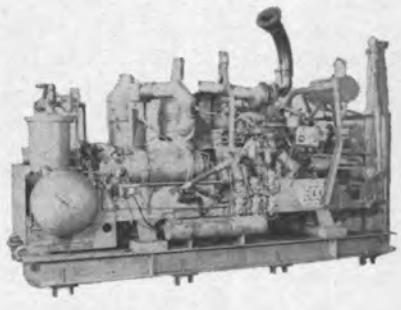
GARDNER-DENVER ROTA-SCREW ROTARY AIR COMPRESSOR



FOR AUTOMATIC REMOTE OPERATION OF UNMANNED BARGE, SHORE LOCATIONS etc.

Model SP-600-DB—mfg by Gardner-Denver—600 CFM @ 100 lbs. Full load 1800 RPM—no load 1100 RPM. Water cooled. Engine is Caterpiller D-333—4½ x 5½—with electric starting. 6-Cyl.—turbo-charged. NOTE: This unit was used to remotely operate an anchor windlass on an unmanned barge. It has all automatic 24 volt electrically controlled air valves for low oil alarm, water temperature, shut down and starting service, and can be left for long periods of time unmanned. Complete with large air receiver, it was made by Elliott-Brandt—W.P. is 150 lbs.—test 500 lbs.—shell ¼"—heads ⅜"—radius of head 36". Dimensions: approx. 14'6" long—by 42".

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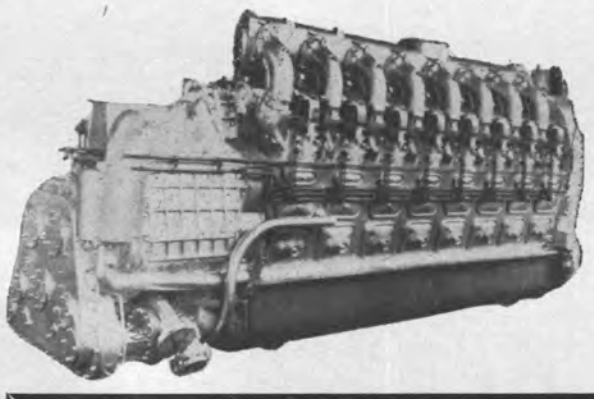
DIESEL WAREHOUSE CLEARANCE

GENERAL MOTORS



16-278A DIESELS

1700 HP @ 750 RPM

Large Quantity to Move

COMPLETE INSPECTION INVITED

ALSO AVAILABLE

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500 HP @ 1200 RPM—3/60/440—with all accessories

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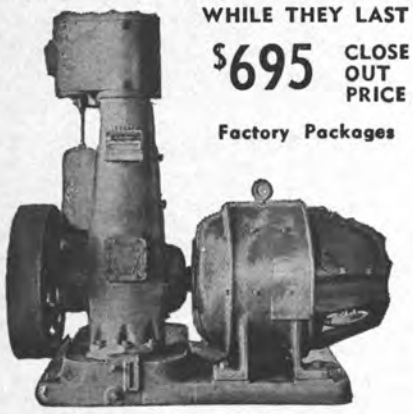
NEW-UNUSED LIBERTY SHIP
Troy-Enberg 20 KW Generators

WHILE THEY LAST

$695 CLOSE OUT PRICE

Factory Packages



120 volts DC—400 RPM—drip-proof marine type. 2-Wire direct connected set. Reciprocating 6 x 7 type E vertical self-oiling steam engine—plug & piston valve—220 lbs PSI—80 lbs. BP.

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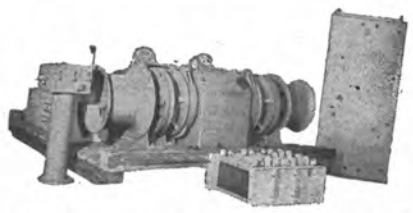
NEW - UNUSED
1-5/16 ANCHOR WINDLASS



Made by Ideal Electric Co.—with spares. Double wildcat—1-5/16"—15 HP—115 volts DC—1750 RPM—all controls—two outboard gypsies. Wildcats 36" between centers—6000 lb line pull @ 50 FPM. DIMENSIONS: O.A. width over gypsies—84"; OA length 81". Will sell windlass without power if desired.

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DIMENSIONS:
9' 5¾" wide over winch heads
5' 10½" wide on bedplate
4' 1" deep over bedplate
6' 5" overall—brake pedal, etc.
2" steam—2½" exhaust.
Drums 16" diameter—20" wide—33 13/16" over flanges. Rebuilt by U.S.N. equal to new.

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NEW ALLIS-CHALMERS
WINCH CONTROL PANELS

(7) 50 HP—230 volts DC—right hand—mfg by Allis-Chalmers. Resistors, control and brake. Dwg EK9231—U.S.M.C.—820-2—1404 ALT.

(6) As above, but left hand units.

$1195 each

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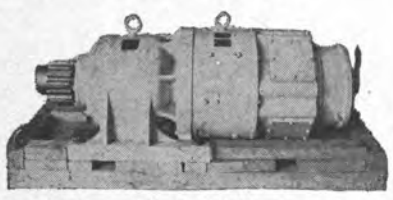
NEW 20 HP 230 VOLT D.C.

GEARHEAD MOTORS

30 R.P.M. OUTPUT



Star Electric Co.—20 HP—230 VDC—73 amps—1200 R.P.M.—compound wound—1 hr. duty—55° rise—with reduction gear 41.2:1—type 5R3165.

$1450.00 EACH

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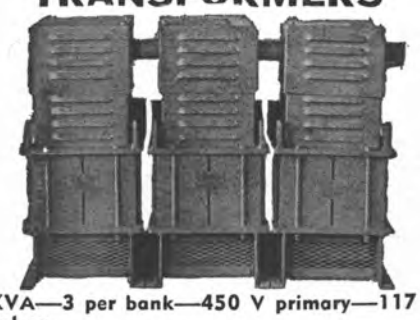

15 KVA—3 per bank—450 V primary—117 volt secondary.

$190.00 PER BANK

Also inquire about other sizes: 10 KVA/20 KVA/25 KVA/37 KVA

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16000 C.F.M. — 115	5000 C.F.M. — 115 (explosion-proof)
12000 C.F.M. — 115	4000 C.F.M. — 115

RECONDITIONED — 440 V.A.C.

A1A4W5 to A16A4W5—with starter—440/3/60

1000 C.F.M.	6000 C.F.M.
2000 C.F.M.	8000 C.F.M.
3000 C.F.M.	10000 C.F.M.
4000 C.F.M.	16000 C.F.M.

LARGE AXIAL FLOW FANS
30000 C.F.M.

A304W5—25 HP—440/3/60, 30000 C.F.M. @ 3" static; 40000 CFM @ 1" static. I.D. 44¼"

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ELECTRICAL EQUIPMENT
Arnessen Marine Systems, Inc., 335 Bond St., Brooklyn, N.Y.
L. F. Gaubert & Co., 700 So. Broad St., New Orleans, La. 70150
Oceanic Electrical Mfg. Co., Inc., 148 Perry Street, N.Y. 10004
Owesen & Co., Inc., 315 Notre Dame, New Orleans, La. 70130
Pauluhn Electric Mfg. Co., Inc., 422 Broome St., New York 10013

EVAPORATORS
Aqua-Chem, Inc., 225 N. Grand Ave., Waukesha, Wis. 53186
Bethlehem Steel Corp., Shipbuilding, 25 B'way, N.Y., N.Y. 10004
Mechanical Equipment Co., Inc., 861 Carondelet St., New Orleans, La. 70130

FITTINGS & HARDWARE
Kerotest Mfg., Corp., 2516 Liberty Ave., Pittsburgh, Pa. 15222
Nashville Bridge Co., P.O. Box 239, Nashville, Tenn. 37202

FLOATING EQUIPMENT—Steel—Aluminum Pontoons
Dravo Corporation, Neville Island, Pittsburgh 25, Pa.

FUEL RECOVERY
Tretolite Div., Petrolite Corp., 369 Marshall Ave., St. Louis, Mo. 63119

GALLEY RANGES
Elisha Webb & Son Co., 136 So. Front St., Philadelphia, Pa. 19106

HEAT EXCHANGES
Aqua-Chem. Inc., 225 N. Grand Ave., Waukesha, Wis. 53186

HEATERS—Ship
Todd Products, Div. of Todd Shipyards Corp., Brooklyn, N.Y. 11231
Valad Elec. Heating Co., 71 Cortlandt St., Tarrytown, New York

HYDRAULICS
Bond Hydraulics Equipment Service Inc., 9264 Kennedy Blvd., North Bergen, N.J. 07047
Vickers, Marine & Ordnance Division, P.O. Box 302, Troy, Mich. 48084

INSULATION—Marine
Bailey Carpenter & Insulation Co.,Inc.,74SullivanSt.,Brklyn,N.Y.11231
Johns-Manville, Box 290-T, New York, N.Y. 10016
Reef Industries, Inc., P.O. Box 23221, New Orleans, La. 70123

MACHINE SHOP—TROUBLE SERVICE
Golten Marine Co., Inc., 160 Van Brunt St., Brooklyn, N.Y. 11231
Metal Finishers, Inc., (Mecrome Division), 3125 Brinkerhoff Road, Kansas City, Kansas 66115

MARINE DRIVES—GEARS
Philadelphia Gear Corp., Schuylkill Expressway, King of Prussia, Pa. 19406
Western Gear Corp., Industrial Products Div., P.O. Box 126, Belmont, Calif. 94003

MARINE NAVIGATION EQUIPMENT & AIDS
American Hydromath Co., 2020 Jericho Tpke, New Hyde Park, N.Y. 11040
Decca Radar, Inc., 386 Park Ave. So., New York, N.Y. 10016
Electronics Concepts Inc., (Div. of Automatic Sprinkler Corp. of America) P. O. Box 813, Charlottesville, Va. 22902
Fisher Research Laboratory, 1890 Embaracadero Road, Palo Alto, California 94303
Griffith Marine Electronics, Inc., 79 Fourth Street, New Rochelle, N. Y. 10801
Kaar Electronics Corp., 2250 Charleston Road, Mountain View, Calif. 94041
Marquardt Corp., 16555 Saticoy St., Van Nuys, Calif. 91406
National Marine Service, 1750 So. Brentwood Blvd., St. Louis, Mo.
Radiomarine Corp., 20 Bridge Avenue, Red Bank, N.J. 07701
RCA Service Co., A Division of RCA, Marine Communications and Navigation Equipment Service, Bldg. CHIC-225, Camden, N.J. 08101
Safety Guide Prod. Div. Borg Warner, P.O. Box 248, Scottsburg, Indiana 47170
Sperry Marine Systems Div., Charlottesville, Va. 22901, Division of Sperry Rand Corp.

MARINE EQUIPMENT
Beaver Tool & Machine Co., P.O. Box 94717, 525 S.E. 29th St., Oklahoma City, Okla. 73109
Brazos Engineering, a div. of Metallic Bldg. Co., 4625 Holmes Road, Box 14240, Houston, Texas 77021
Gadelius, K. K., P.O. Box 802, Kobe Port, 651-01 Japan
Gulf Coast Marine, Inc., P.O. Box 52987, Houston, Texas 77052
H & H Engineering Co., 430 So. Navajo, Denver, Colo. 80223
Nicolai Joffe Corp., P.O. Box 2445, 445 Littlefield Ave., So. San Francisco, Calif. 94080
Kearfott Marine (Div. of The Singer Co.) 21 West St., New York, N.Y. 10006
Pacific Coast Eng. Co., P.O. Drawer E, Alameda, Calif. 94506
Sky Climber Inc., 17311 So. Main Street, Gardena, Calif. 90247
Vokes Filter Div. (Cardwell Machine Co.), Cardwell and Castlewood Rd., Richmond, Va. 23221

MARINE FURNITURE
Bailey Joiner Co., 115 King Street, Brooklyn, N.Y. 11231
Rex Cabinet & Linoleum Co., 531 23rd St., Union City, N.J. 07087

MARINE INSURANCE
Adams & Porter, Cotton Exchange Bldg., Houston, Texas

MARINE PROPULSION
The Buehler Corp., 9000 Precision Drive, Indianapolis, Ind. 46236
Combustion Engineering, Inc., Windsor, Connecticut 06095
De Laval Turbine, Inc., 853 Nottingham Way, Trenton, N.J. 08602
Foster Wheeler Corp., 666 Fifth Ave., New York, N.Y. 10019
Mathers Controls, Inc., 902 N.W. Ballard Way, Seattle, Wash. 98107
Murray & Tregurtha, Inc., 2 Hancock St., Quincy, Mass. 02171
Port Electric Turbine Div., 155-157 Perry St., New York 10014
Stal-Laval, Inc., 147 E. 50th St., New York, N.Y. 10022
Western Gear Corp., Precision Products Div., P.O. Box 190, Lynwood, Calif. 90262

MARINE RADIO COMMUNICATIONS EQUIPMENT
Collins Radio Co., M/S 416-118, Dallas, Texas 75207
Hose McCann Telephone Co., Inc., 524 W. 23rd St., N.Y. 10011
Kaar Electronics Corp., 2250 Charleston Road, Mountain View, Calif. 94041
Motorola Communications & Electronics, Inc., 4935 W. LeMoyne Ave., Chicago, Ill. 60651
Radiomarine Corp., 20 Bridge Avenue, Red Bank, N.J. 07701
Raytheon Marine Products Operation, 213 East Grand Avenue, South San Francisco, California 94080
RCA Service Co., A Division of RCA, Marine Communications and Navigation Equipment Service, Bldg. CHIC-225, Camden, N.J. 08101

NAVAL ARCHITECTS AND MARINE ENGINEERS
BG Marine Services, Div. of Genge Industries, Inc., 4419 Van Nuys Blvd., Sherman Oaks, Calif. 91403
Coast Engineering Co., 711 West 21 St., Norfolk, Va. 23517
Commercial Radio Sound Corp., 652 First Avenue, N.Y., N.Y. 10016
Crandall Dry Dock Engineers, Inc., 238 Main St., Cambridge 42, Mass.
Cushing & Nordstrom, 50 Trinity Place, New York, N.Y. 10006
Design Associates, Inc., 3308 Tulane Ave., New Orleans, La. 70119
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Friede and Goldman, Inc., 225 Baronne St., New Orleans, La. 70112
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John J. McMullen Associates, Inc., 17 Battery Pl., New York, N.Y.
George E. Meese, 194 Acton Rd., Annapolis, Md. 21403
Robert Moore Corp., 350 Main St., Port Washington, N.Y. 11050
Gunnar Nelson, 2185 Lemoine Ave., Ft. Lee, N.J. 07024
Pearlson Engineering Co., Inc., 2825 Oak Ave., Miami, Florida 33133
Research & Design Corp., 17 Battery Place, Suite 1227 New York, N.Y. 10004
Philip L. Rhodes, 369 Lexington Ave., New York, N.Y. 10017
M. Rosenblatt & Son, Inc., 350 Broadway, New York, N.Y. 10013 and 45 Second St., San Francisco, Calif.

Sanders & Thomas, Inc., 1st-Federal Bldg., Pottstown, Pa. 19464
George G. Sharp, Inc., 100 Church St., New York, N.Y. 10007
George Slifer, 1422 Lakewood Rd., Jacksonville, Fla. 32207
Philip F. Spaulding & Associates, 65 Marion St., Seattle, Wash. 98104
R. A. Stearn, Inc., 100 Iowa St., Sturgeon Bay, Wisc. 54235
Richard R. Taubler, 44 Court St., Brooklyn, N.Y. 11201
H. M. Tiedemann & Co., Inc., 74 Trinity Pl., New York, N.Y. 10006

OIL PURIFIERS—Repair
Norse Electric Mfg. Co., Inc., 57-59 Commerce St., Bklyn, N.Y. 11230
Peck Equipment Co., 3500 Elm Avenue, Portsmouth, Virginia 23704

OILS—Marine—Additives
Esso International Inc., Esso Bldg., 15 West 51 St., New York, N.Y.
Gulf Oil Trading Co., 1290 Ave. of the Americas, New York, N.Y.
Mobil Oil Co., Inc., 26 Broadway, New York, N.Y. 10004
Refineria Panama, S. A., 277 Park Ave., New York, N.Y. 10017
Shell Oil Co., 50 W. 50 St., New York 10020
Texaco, Inc., 135 E. 42nd St., New York, N.Y. 10017

PAINT—Marine—Protective Coatings
Amercoat Corp., 201 N. Berry St., Brea, Calif. 92621
Devoe & Raynolds Co., Inc., Marine Division, Newark, N.J. 07105
Enjay Chemical Co., 60 West 49th St., New York, N.Y. 10020
International Paint Co., 21 West St., New York, N.Y. 10006
Mobil Chemical Company, Metuchen, N.J. 08840

PETROLEUM SUPPLIES
Independent Petroleum Supply Co., 277 Park Ave., New York 10017
Refineria Panama, S. A. 277 Park Ave., New York, N.Y. 10017
Shell Oil Co., W. 50 St., New York 10020
Texaco, Inc., 135 E. 42nd St., New York, N.Y. 10017
The West Indies Oil Co., Ltd. St. John's, Antigua, W. I.

PLASTICS—Marine Applications
Atlas Minerals & Chemical Div., ESB, Inc., Mertztown, Pa. 19539
Hubeva Marine Plastics, Inc., 390 Hamilton Ave., Bklyn, N.Y. 11231
Philadelphia Resins Co., 20 Commerce Dr., Montgomeryville, Pa. 18936

POLLUTION CONTROL
Enjay Chemical Co., 60 West 49th St., New York, N.Y. 10020

PROPELLERS—New and Reconditioned
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans, La. 70150
Bethlehem Steel Corp., Shipbuilding, 25 Broadway, N.Y., N.Y. 10004
Bird-Johnson Co., 883 Main Street, Walpole, Mass. 02081
Escher Wyss, G.M.B.H., 798 Ravensburg, Germany

PUMPS
Colt Industries, Inc., Fairbanks Morse Pump & Electric Div., 3601 Kansas Ave., Kansas City. Kansas 66110
De Laval Turbine, Inc., 853 Nottingham Way, Trenton, N.J. 08602
Goulds Pumps, Seneca Falls, N.Y. 13148

RATCHETS
American Forge & Mfg. Co., McKees Rocks, Pa. 15136
W. W. Patterson Co., 830 Broket St., Pittsburgh, Pa. 15233

REFRIGERATION—Refrigerant Valves
Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231
Frigitemp Corp., 329 Herzl St., Brooklyn, N.Y. 11212
York Corp., Grantley Road, York, Pa. 17405

ROPE—Manila—Nylon—Hawsers—Wire
American Mfg. Co., Inc., Noble & West Sts., Brooklyn, N.Y. 11222
Cating Rope Co., 309 Genesee St., Auburn, N.Y. 13022
Jackson Rope Corp., 9th & Oley, Reading, Pa. 19604
Tubbs Cordage Company, P.O. Box #709, Orange, Calif. 92669
Wall Rope Works, Inc., Beverly, N. J. 08010

RUBBER PRODUCTS—Dock Fenders, Hose, Life Preservers
Hughes Bros., Inc., 17 Battery Pl., New York, N.Y. 10004

RUDDER ANGLE INDICATORS
Electric Tachometer Corp., 68th & Upland Street, Phila., Pa. 19142
Hose McCann Telephone Co., Inc., 524 W. 23rd St., N.Y. 10011
Sperry Marine Systems Div., Charlottesville, Va., 22901, Division of Sperry Rand Corp.

SEALS
Golten Marine Co., Inc., 160 Van Brunt St., Brooklyn, N.Y. 11231
Syntron, a division of FMC Corp., 398 Lexington Ave., Homer City, Pa. 15748

SEARCHLIGHTS
Portable Light Co., Inc., 67 Passaic Ave., Kearny, N.J. 07032
Snelson Oilfield Lighting Co., 1201 E. Daggett St., Forth Worth, Texas 76104

SEWAGE DISPOSAL
Youngstown Welding & Engineering Co., 3708 Oakwood Ave., Youngstown, Ohio 44509

SHIPBREAKING—Salvage
The Boston Metals Co., 313 E. Baltimore, Md. 21202
National Metal & Steel Corp., 1251 New Dock St., Terminal Island, Cal. 90731
Northern Metal Co., Minor & Bleigh Sts., Philadelphia, Pa. 19136
Peck Equipment Co., 3500 Elm Ave., Portsmouth, Va. 23704
Zidell Explorations, Inc., 3121 S. W. Moody St., Portland, Ore. 97201

SHIP BROKERS
Gulf Coast Marine, Inc., P.O. Box 52987, Houston, Texas 77052
Hughes Bros., Inc., 17 Battery Pl., New York, N.Y. 10004
Mowbray's Tug and Barge Sales Corp., 21 West St., N.Y., N.Y. 10006
Oaksmith Boat Sales, Inc., Fisherman's Terminal, Seattle, Wash. 98119

SHIPBUILDING—Repairs, Maintenance, Drydocking
Albina Engine & Machine Works, 2100 N. Albina Ave., Portland, Ore. 97227
Armco Steel Corp., 703 Curtis St., Middletown, Ohio 45042
Astilleros de Cadiz, S.A., Zurhono 72, Madrid 10, Spain
Atlantic Gulf & Pacific Co. of Manila Inc., 45 Muelle De La Industria, Manila
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans, La. 70150
Barbour Boat Works, Inc., P.O. Box 1069, New Bern, N.C. 28560
Bender Ship Repair, Inc., 265 So. Water St., Mobile, Ala. 36602
Bethlehem Steel Corp., Shipbuilding, 25 Broadway, N.Y., N.Y. 10004
Blount Marine Corp., P.O. Box 360, Warren, Rhode Island 02885
Brewer Dry Dock Co., Mariners Harbor, Staten Island, N.Y.
Conrad Industries, P.O. Box 790, Morgan City, La. 70380
Dillingham Corp., P.O. Box 3288, Honolulu, Hawaii 96801
Dravo Corporation, Neville Island, Pittsburgh 25, Pa.
Equitable Equipment Co., Inc., 410 Camp St., New Orleans, La. 70130
Furness-Smiths Dock (Trinidad) Ltd., P.O. Box 893, Chaguaramas Dockyard, Port Chaguaramas, Trinidad, West Indies.
Gotaverken American Corp., 39 Broadway, New York 6, N.Y.
Groignard Shipyards, P.O. Box 829 Colbert, Marseilles, France.
Halifax Shipyards, Ltd., P.O. Box 640, Halifax, Nova Scotia, Canada
Halter Marine Services, Inc., Route 6, Box 287H, New Orleans, La. 70126
Hillman Barge & Construction Co., Grant Bldg., Pittsburgh 19, Pa.
Hitachi Shipbuilding Co.,25 Nakanoshima2-chomeKitaku,Osaka-Japan
Ishikawajima-Harima Heavy Industries Co., Ltd., 50 Broad Street New York, N.Y. 10004
Jacksonville Shipyards, 644 E. Bay St., Jacksonville, Fla.
Jeffboat, Inc., Jeffersonville, Ind. 47130
Kawasaki Dockyard Co., 8 Kaigan-dori, Ikuta-ku, Kobe, Japan
LISNAVE, P.O. Box 2138, Lisbon, Portugual
Litton Industries, 9920 W. Jefferson Blvd., Culver City, Calif. 90230
Lockheed Shipbuilding and Construction Co., 2929 16th Avenue, S.W., Seattle, Wash. 98134
Lone Star Marine Salvage Co., 7200 S. Harbor Drive, Houston, Texas 77001
Maryland Shipbuilding & Drydock Co., P.O. Box 537, Baltimore, Maryland 21203
Matton Shipyard Co., Inc., P.O. Box 428, Cohoes, New York 12047
Mitsui Shipbuilding & Eng. Co., Ltd., Nihonbashi-Muromachi, Chuo-ku, Tokyo, Japan
Nashville Bridge Co., P.O. Box 239, Nashville 1, Tenn.
National Steel & Shipbuilding Corp., San Diego 12, Cal.
Newport News Shipbuilding and Dry Dock Co., Newport News, Va.
Nippon Kokan Kabushiki Kaisha, 2, 1-chome, Otemachi, Chivoda-ku, Tokyo, Japan
O.A.R.N. (officine Allestimento e Riparazioni Navi) Genoa, Italy
Pacific Coast Engineering Co., P.O. Drawer 6, Alameda, Calif. 94506
Pearlson Engineering Co., Inc., 8970 S.W. 87th Ct., Miami, Fla. 33156
Perth Amboy Dry Dock Co., Perth Amboy, N.J.
Puerto Rico Drydock and Marine Terminals, Inc., P.O. Box 2209, San Juan, Puerto Rico 00903
Rodermond Industries, Foot of Henderson St., Jersey City, N.J. 07302
L. Rodriquez Shipyard, 24 Molo Norimberga, Messina, Italy.
St. Louis Shipbuilding—Federal Barge, Inc. 611 East Marceau, St. Louis 11, Mo.
Sasebo Heavy Industries Co., Ltd., New Ohtemachi Bldg., Chiyoda-ku, Tokyo, Japan
Southern Shipbuilding Corp., P.O. Box 1089, Slidell, La. 70458
Tampa Ship Repair & Dry Dock Co., Inc., P.O. Box 1277, Tampa, Florida 33601
Terrin Agency, Inc., 17 Battery Place, New York, N.Y. 10004
Todd Shipyards Corp., 1 Broadway, New York City
Vare Corp., Equipment Systems Div., 516 Sylvan Ave., Englewood Cliffs, N.J. 07632
Vickers Ltd., 222 London Rd., St. Albans, Herts, England
Wyatt Industries Inc., Port Houston Shipyard Div., P.O. Box 3052, Houston, Texas 77001
Zigler Shipyards Inc., P.O. Box 492, Jennings, Louisiana 70546

SHIP MODELS
Boucher-Lewis Precision Models, Inc., 36 E. 12 St., N.Y., N.Y. 10003

SHIP STABILIZERS
Lidgerwood Mfg. Co., (Superior Lidgerwood Mundy Corp.), 7 Dey Street, New York, N.Y. 10007
John J. McMullen Associates, Inc., 17 Battery Pl., N.Y., N.Y. 10004
Sperry Marine Systems Div., Charlottesville, Va., 22901, Division of Sperry Rand Corp.

STEAM GENERATING EQUIPMENT
Combustion Engineering, Inc., Windsor, Connecticut 06095

STEVEDORING
M. P. Howlett, Inc., 415 32nd St., Union City, N.J.
Luckenbach Steamship Co., 120 Wall St., New York 5, N.Y.

SWITCHBOARDS
Hose McCann Telephone Co., Inc., 524 23rd St., N.Y. 10011

SYNTHETICS
E. I. Dupont De Nemours & Co., Inc., Textile Fibers Dept., Wilmington, Delaware

TOWING—Lighterage, Transportations, Barge Chartering
Bay-Houston Towing Co., 805 World Trade Bldg., Houston, Texas 77002
Curtis Bay Towing Co., Mercantile Bldg., Baltimore 2, Md.
G & H Towing Company, 509 Texas Building, Galveston, Texas 77550
Henry Gillen's Sons Lighterage, 140 Cedar St., New York, N.Y. 10006
James Hughes, Inc., 17 Battery Pl., New York, N.Y.
Intra-Coastal Towing & Trans. Co., P.O. Box 7533, Houston, Texas 77007
Jackson Marine Corp., P.O. Box 1087, Aransas Pass, Texas 78336
McAllister Bros., Inc., 17 Battery Pl., New York, N.Y.
McDonough Marine Service, P.O. Box 26206, New Orleans, La.
P. F. Martin, Inc., Mall Bldg., 325 Chestnut St., Philadelphia, Pa.
Moran Towing & Transportation Co., Inc., 17 Battery Place, N.Y.
Nickerson Marine Towing Co., 1670 Southeast 17th Street, Ft. Lauderdale, Fla. 33316
Red Star Towing & Transportation Co., 500 Fifth Ave., N.Y. 10036
L. Smit & Co., 11 Broadway, New York 4, N.Y.
Suderman & Young Towing Co., 329 World Trade Center, Houston, Texas 77002
M. & J. Tracy, Inc., 1 Broadway, New York, N.Y.
Turecamo Coastal and Harbor Towing Corp., 1752 Shore Parkway, Brooklyn, N.Y.
Vancouver Tug Boat Co., Ltd., 10 Pemberton Ave., No. Vancouver, B.C., Canada

VALVES AND FITTINGS—Hydraulic—Safety Flanges
Hooper Valve & Engineering Corp., 24th St. & Virginia Ave., Newport News, Va.
Hubeva Marine Plastics-Lining, 435 Hamilton Ave., Brooklyn 31, N.Y.
Hydrasearch Co., Inc., Riva Rd., Annapolis, Md. 21401
Marine Moisture Control Co., 39 Redfern Ave., Inwood 96, L.I., N.Y.
Mechanical Marine Company, 45-15 37th St., Long Island City, N.Y.
Todd Products, Div. of Todd Shipyards Corp., Halleck St., Brooklyn, N.Y. 11231

WEATHER ROUTING
Weather Routing, Inc., 90 Broad St., New York 4, N.Y.

WIRE ROPE
Armco Steel Corp., 703 Curtis St., Middletown, Ohio 45042
Bethlehem Steel Corp., Bethlehem, Pa. 18018
DiMattina Supply Co., 59-61 Seabring St., Brooklyn, N.Y. 11231
United States Steel Corp., P.O. Box 86, Pittsburgh, Pa. 15230

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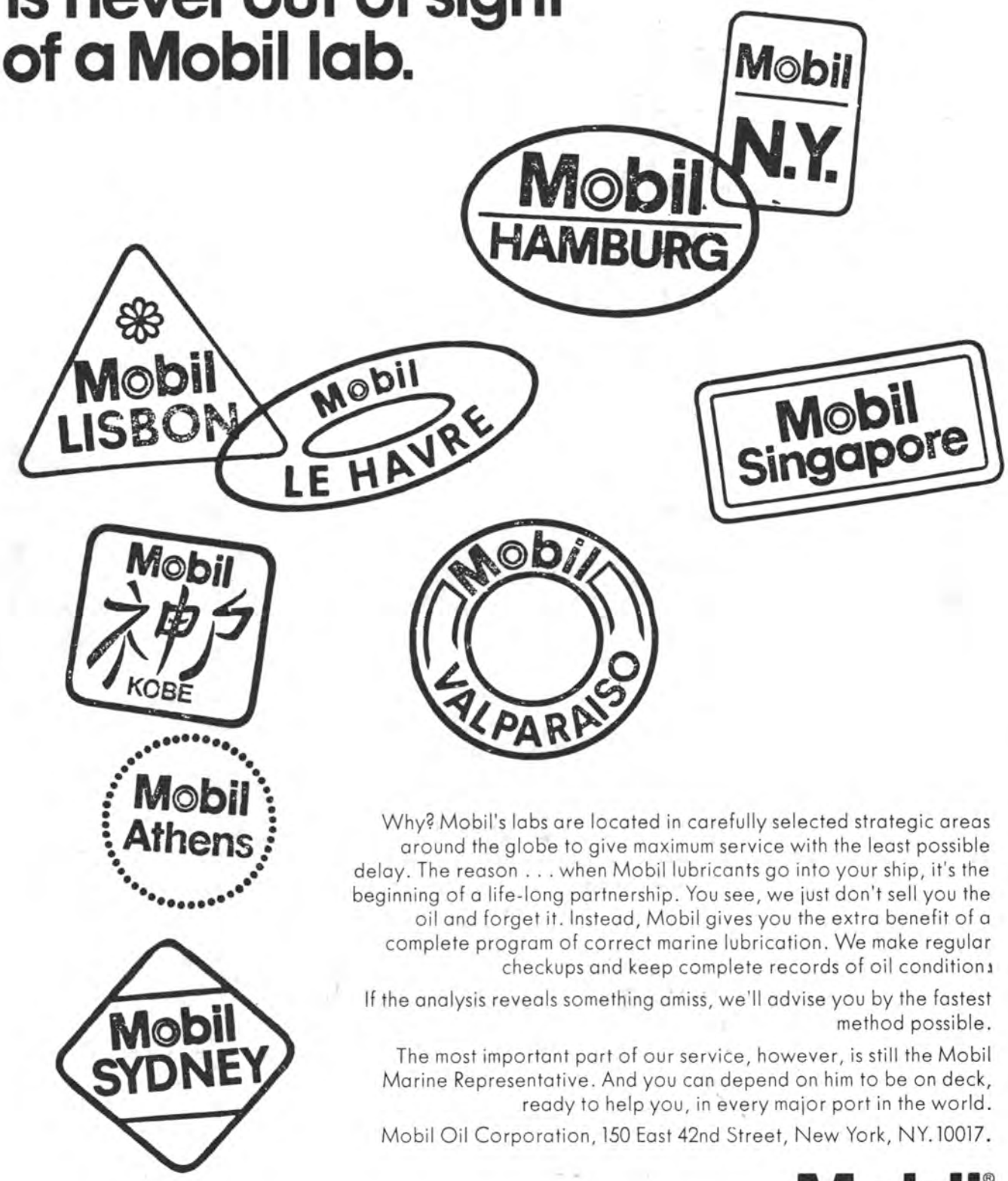

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