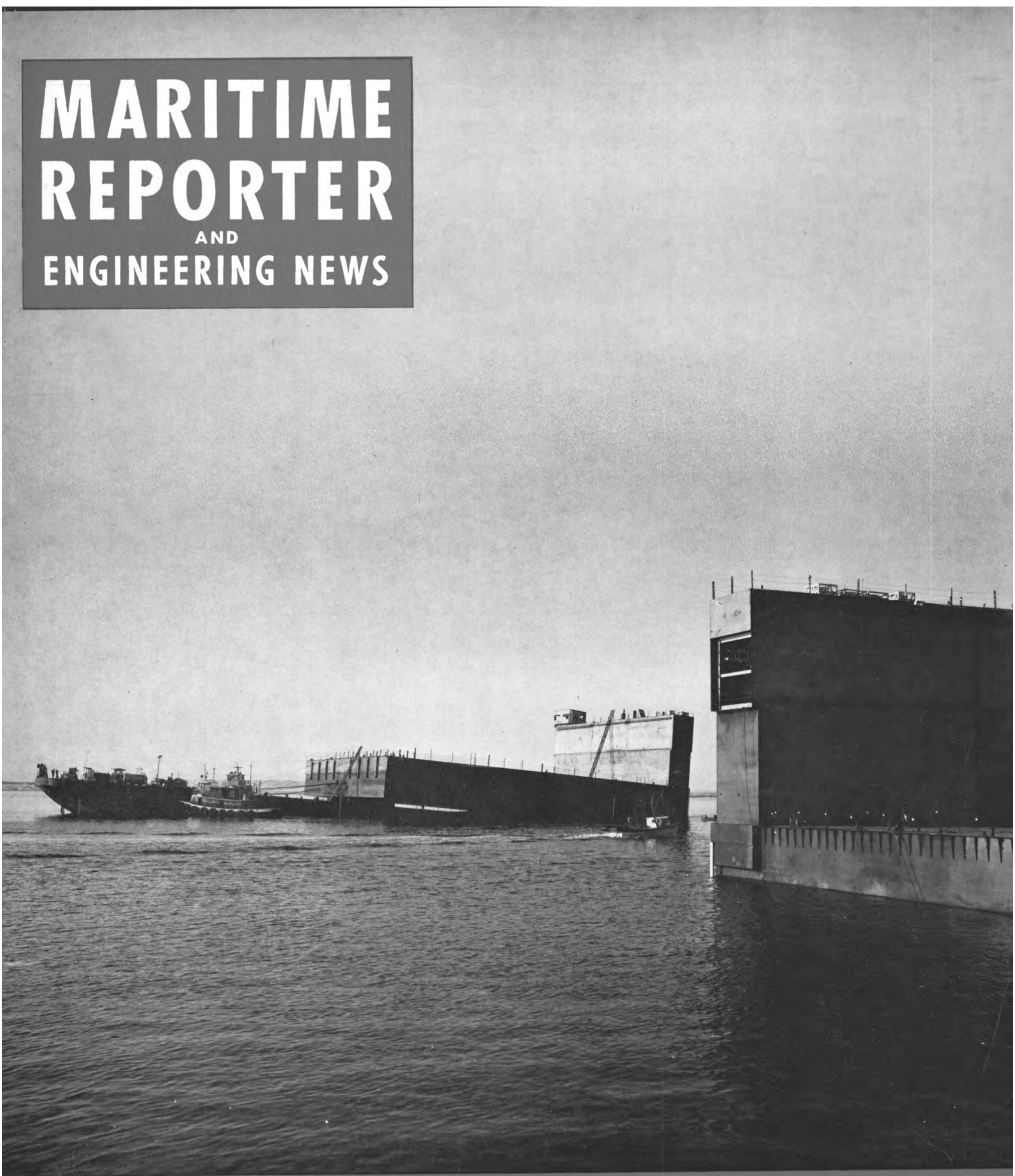
MARITIME
REPORTER
AND
ENGINEERING NEWS



Litton's "Shipyard Of The Future" Launches Sections Of Newbuilding Pontoon Launch —A Floating Drydock Designed By Crandall

(SEE PAGE 6)

FEBRUARY 15, 1971

BAILEY *can air condition*

A PRIVATE ROOM...

Self-contained, sea water cooled, thermostatically controlled units can be installed aboard ship quickly and inexpensively. These units, especially designed for marine use, are available in various sizes from 9,400 to 34,000 BTUs to fit your space requirements.

...A PUBLIC AREA...

These water-cooled units are single package air conditioners ideally suited for lounges, recreation and mess rooms. Equipped with cupro nickel condenser. High pressure cut-out shuts off unit when condenser water is blocked; prevents costly repair bills. Four-way, adjustable discharge grille provides controlled air distribution; eliminates drafts and cold spots. Available in 3, 5 and 7½ hp.

...OR AN ENTIRE SHIP

Each BAILEY Marine Pac is custom designed, engineered and manufactured to meet your specific needs. Although we do not stock "standard" units, our normal delivery is approximately one month. Installations on several hundred vessels in the past few years have ranged from 10 to 100 ton units. Bailetrol®, a Bailey exclusive and the heart of these central station systems, is an electronic control panel that features simple, automatic operation.

■ If you want to have your ship air conditioned "by degrees"...a room at a time, or have it done completely in the shortest possible time, consult BAILEY, the marine specialists in air conditioning and refrigeration.

BAILEY DISTRIBUTORS, INC.

Affiliated Companies

BAILEY REFRIGERATION CO., INC.
BAILEY CARPENTER & INSULATION CO., INC.
BAILEY JOINER CO., INC.

Offices and Warehouses

BROOKLYN, N.Y. 11231 • 74 Sullivan Street • 212/855-3958
WASHINGTON, D.C. 20006 • 1629 K Street, N.W. • 202/296-8217
NEW ORLEANS, LA. 70117 • 632 Alvar Street • 504/943-2461

Three mighty important ladies in New York Harbor affairs.

The one in the background needs no introduction. The two in front can introduce new speed and efficiency to your towing, docking, and undocking. They're the Jane McAllister and Grace McAllister, two of the newest supertugs in the Balanced Fleet. McAllister Brothers, Inc., Towing and Transportation, 17 Battery Place, New York, N. Y. Serving the ports of New York, Norfolk, Philadelphia, Montreal, Victoria, Vancouver, and San Juan, Puerto Rico.

Todd Launches Two Con Edison Barges

Todd Shipyards Corporation (Houston Division) has announced the launching of two 250-foot by 44-foot by 14-foot-6-inch single skin barges for Consolidated Edison Company of New York, Inc. These are the first two of a four-barge contract calling for fuel storage tank barges each having a 25,000-barrel capacity of No. 2 fuel oil. The keel for the third barge was laid on January 6, 1971.

After completion, the barges will be towed to New York Harbor for mooring at the Gowanus substation of Con Edison in Brooklyn, N.Y., for fueling gas turbine powered generators.

The vessels, to be named Clean Energy No. 1, Clean Energy No. 2, Clean Energy No. 3 and Clean Energy No. 4, will be equipped with steam coils capable of heating heavy distillate fuel oil with a pour point of 100 degrees Fahrenheit. Each barge will be equipped with three 400-gpm electric motor driven fuel oil pumps using shore-based power source.

Pancontinental Marine Appointed Agents For Eagle Engineering Co.

The appointment of Pancontinental Marine, Inc., 50 Broadway, New York, N.Y. 10004 as U.S. general agents for the ship repair company Eagle Engineering Co., Ltd., Singapore, has been announced by **J.R. Kirsten,** president of Pancontinental.

Eagle Engineering effects all types of ship repair works, day or night, at Singapore.

Two Barge Contracts Awarded To Levingston

The award of two contracts to the Levingston Shipbuilding Co., Orange, Texas, for the construction of two different types of barges has been announced.

The first contract is for an ocean-going tank barge for the Ingram Corp., Nashville, Tenn. The barge will be the largest built in the shipyard to date, and will be about 584 feet long with a breadth of 87 feet and a depth of about 38 feet, and it will feature four separate pumping systems.

The second contract is for an inland drilling barge for FOREX Overseas, Paris, France. The barge will measure 200 feet by 70 feet by 14 feet, with a raised deck of about 12 feet.

MARITIME REPORTER AND ENGINEERING NEWS

No. 4 Volume 33

107 EAST 31st STREET NEW YORK, N. Y. 10016

MUrray Hill 9-3266, 3267, 3268, 3269

ESTABLISHED 1939

Maritime Reporter/Engineering News is published the 1st and 15th of each month by Maritime Activity Reports, Inc., with executive, advertising and editorial offices at 107 East 31st Street, New York, N. Y. 10016; publishing office at 41 First Street, Hoboken, New Jersey 07030

Controlled Circulation postage paid at Hoboken, New Jersey 07030

Member BPA Business Publications Audit of Circulation, Inc.

Columbian Rope Appoints Tourtellot Marketing Vice Pres.

Carl T. Tourtellot Jr.

Carl T. Tourtellot Jr. has been named to the newly created position of vice president, marketing, for Columbian Rope Company of Auburn, N.Y.

Columbian is the nation's largest manufacturer of natural and synthetic fiber ropes. The appointment of Mr. **Tourtellot** to the new marketing position is, according to **Frank R. Metcalf,** president, "an indication of the aggressive posture that the company is taking in maintaining our leadership in the industry."

Mr. **Tourtellot** joins Columbian from the firm of Ernst and Ernst, where he was marketing and general management consultant. Mr. **Tourtellot** is a graduate of Dartmouth College and holds a master of business administration degree from the Harvard School of Business.

"**Carl** comes to Columbian with over 25 years of marketing and sales experience," Mr. **Metcalf** stated. "In his new position, **Carl** will contribute added impetus to our sales program."

R.G. Fritchie Named To Manage New Group At Bailey Meter Company

Robert G. Fritchie

Robert G. Fritchie has been appointed manager of the Applied Systems Group at Bailey Meter Company.

The newly-formed group is charged with the extension of Bailey's markets for computers.

Mr. **Fritchie** has eight years of marketing and process control experience. He has a bachelor of chemical engineering degree from Northeastern University and is a member of NSPE, TAPPI, AMA, and ISA.

A subsidiary of Babcock & Wilcox, Bailey Meter Company is a major source of computers, information systems, measuring and control instruments and control systems.

Vessel Operators Seek Construction Subsidies Under New Program

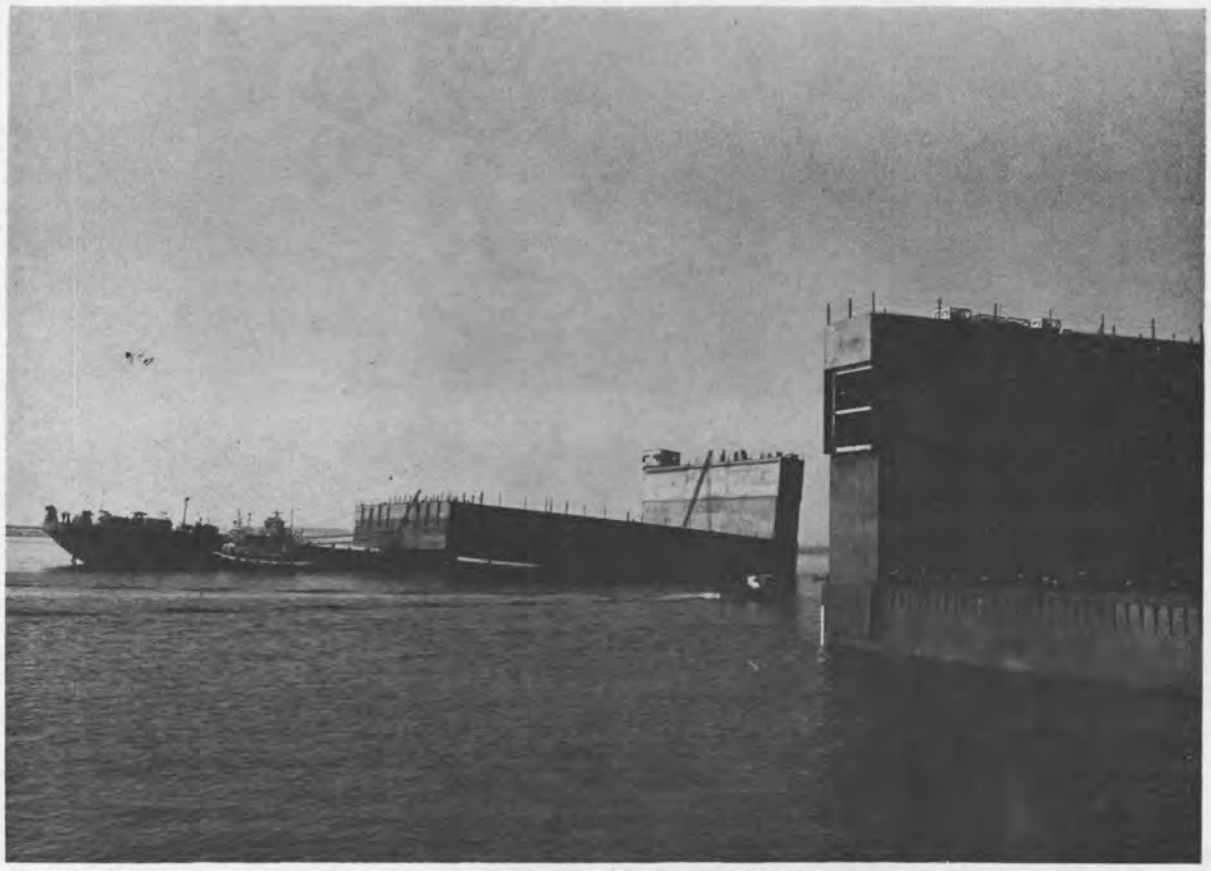
Applications for construction subsidies for ore/bulk/oil carriers to be built under the new maritime program have been submitted to MarAd. Among those that filed were the Energy Corporation of America, 245 East 63rd Street, New York. N.Y., for six vessels of 165,000-dwt; Amercargo, Inc., 17 Battery Place, New York, N.Y., filed for two vessels; Waterman Carriers, a subsidiary of Waterman Steamship Corp., 17 Rector Street, New York, N.Y., filed for two vessels; T.J. Stevenson and Co., Inc., 80 Broad Street, New York, N.Y., filed for an indeterminate number; Great Republic Transport, Inc., 21 West Street, New York, N.Y., filed for three vessels; Starboard Shipping Inc., 39 Broadway, New York, N.Y., filed for an indeterminate number, and Columbia Steamship Co., Portland, Ore., filed for two vessels. These operators filed for ships in the 77,000-dwt to 80,000-dwt range.

Design specifications for the proposed vessels have been submitted to the Maritime Administration by several firms including Bethlehem-Sparrows Point Shipyard, J.J. Henry Co., John J. McMullen Associates, Inc., National Steel and Shipbuilding Co., and Newport News Shipbuilding & Dry Dock Co.

Crandall Dry Dock Engineers, Inc. Designs

The Pontoon Launch At Pascagoula

First With A Removable Wing For Side Transfer And First To Be Submerged On A Grid, The New Floating Drydock At Litton's "Shipyard Of The Future," When Completed, Will Be Capable Of Launching Ships Up To 250,000 Dwt.



ON THE COVER: One section of the unusual pontoon launch, minus the removable wing, slides from the partly submerged barge in midstream as another section floats free in the foreground 500 yards from the assembly area.

More milestones have been reached in the construction of Litton Ship Systems Division at Pascagoula, Miss.—the "Shipyard of the Future" —with the launching of the first three sections of its pontoon launch, a floating drydock designed to lift ships weighing up to 57,000 long tons, when complete. The first ship, one for American President Lines, will be launched in April using the new system.

The task of moving these massive sections of steel from the shipyard construction site into the Pascagoula River channel was an engineering feat in itself. Every foot of the undertaking was observed by many of the engineers, naval architects and technicians who participated in engineering studies that preceded the actual launch.

The operation in which the giant pontoons were positioned in the channel, 500 yards from their point of origin in the assembly area, is a tribute to the engineering skill of the men behind the move.

Crandall Dry Dock Engineers, Inc. of Cambridge, Mass. designed the pontoon launch for Litton Ship Systems Division, and supplied the two mooring machines that propel it between its submerging berth and its transfer berth.

Litton Ship Systems Division's completely modern shipyard employs new shipbuilding concepts of fabrication, handling, and assembly of ship components, which are all brought together in an integration area adjacent to a waterfront bulkhead. The launching of the ship is the final function the floating drydock performs. The dock, of the Crandall sectional self-docking type with the wing on one side removable for transfer, is especially suited to the requirements.

Launching is accomplished from the yard, located 12 feet above sea level, to a floating attitude in the sea in three steps: (1) Moving the vessel by means of self-propelled transfer cars from land to the dock pontoon as the latter reposes on an underwater foundation; (2) Dewatering the dock for lift-off at high tide and moving it with its superimposed ship and cars from a shallow berth out to deep water, and (3) Sinking the dock to adequate draft for the vessel to float.

The dock has the ability to launch vessels up to 35,000 tons light displacement and will also make possible the retrieval of ships. A special feature of the transfer is that it moves vessels on and off sideways instead of lengthwise. Thus the wing along the inshore side, normally providing the rigidity and stability of the dock, is removable in 80-foot sections for the transfer operation.

Moving the completed dock to deep water is accomplished by two self-contained mooring machines and two spring line winches located on the inboard wing. Stability is provided by special compartmentation, which also gives more efficient dewatering by the 48 pumps, all located on the outshore side and powered by on-board generating equipment. Advantage will be taken of the self-docking feature of the drydock to launch succeeding sections.

When completed, the floating drydock will be 960-feet long and 212-feet wide overall, with 180 feet of clear width between wings. The pontoons are 24-feet deep for lift-off from the underwater foundation, resulting in the ship's bottom, when the dock is floating, being 17 feet above sea level. The 18,500 long tons of steel in the dock are used to give a buoyancy sufficient for lifting ships of about 250,000 tons deadweight, and structural strength permits a lineal loading of 60 tons per foot of dock length.

In this project, Crandall brought together its long experience in designing floating drydocks for clients in many parts of the world and techniques regularly used by the firm in providing hauling machinery for marine railway drydocks, its other specialty. This is the largest dock Crandall has designed, and is the first with this big a transfer, the first in existence with a removable wing, and the first to be submerged on a grid.

This concept of building vessels combines use of a horizontal shipbuilding area where both longitudinal and transverse movement of sections of ships is unimpaired and unconfined, with final transfer to the Crandall floating dock for a safe, carefully controlled immersion in the sea.

Massive launch pontoon sections move forward on rails from the construction site to the launching barge in the Pascagoula channel.

H.J. Luck Jr. Named To New Post At Mobil Oil

Henry J. Luck Jr.

Henry J. Luck Jr. has been named general manager of marine transportation for Mobil Oil Corporation.

Mr. **Luck** received a B.S. degree in marine engineering from the United States Merchant Marine Academy in 1948. He joined Mobil the next year in New York as a licensed officer on a Mobil ship.

He has held various positions in operations, marine sales, supply & distribution and planning. He became manager of crude and product sales (Western Hemisphere) in 1967, manager of the international product cargo sales and special ventures department in 1969, and manager of the marine sales department early in 1970.

Chantiers Awarded Esso Contract For 250,000-Dwt Tanker

Esso Tankers Inc., an affiliate of Standard Oil Company (New Jersey), has signed a contract with Chantiers de l'Atlantique for the construction of a 250,000-dwt tanker.

The tanker will be built at the CDA yard in St. Nazaire, France, for delivery in 1975.

The vessel will have the following characteristics: length, 1,141 feet; breadth, 170 feet; draft, 65 feet 10 inches, and speed, 16 knots.

The tanker will be propelled by a 32,000-shaft horsepower steam turbine and will join Esso's fleet in international tanker service.

Farrell Lines Elects George F. Lowman

James A. Farrell Jr., chairman of the board of Farrell Lines Incorporated, New York, N.Y., announced at a meeting recently the election of **George F. Lowman** as chairman of the executive committee of Farrell Lines. Mr. **Lowman** had been appointed a member of the board of directors January 1, 1967.

Mr. **Lowman** is a senior partner of the law firm of Cummings & Lockwood in Stamford, Conn., and is a graduate of Harvard College and Harvard Law School. He holds the commission of lieutenant colonel in the U.S. Army Reserve.

Farrell Lines is an American-flag steamship company with a fast, modern fleet serving the East, South, and West Coasts of Africa and Australia/New Zealand. Four new high-speed containerized vessels are presently being constructed for the line's Australian/New Zealand service.

Waukesha To Market Swedish Engines

Waukesha Motor Company, Waukesha, Wis., manufacturer of gas and diesel engines and energy systems, has announced a joint program with the Saab-Scania Company of Sodertalje, Sweden, in which the Wisconsin-based firm will become exclusive industrial sales and service representative for Scania diesel engines in the United States and Canada.

The line includes industrial diesel engines from 118 to 384 horsepower, marine diesel propulsion engines from 85 to 249 horsepower, and a line of diesel generator sets from 50 to 200 kilowatts. The latter will be marketed under the name Enginator (R), which is a Waukesha trade name.

The arrangement is mutually beneficial for several reasons, according to **Robert A. D'Amour**, president of the Waukesha Motor Company, since the 85 to 384 horsepower range of Scania engines fills out the Waukesha diesel line. At the present time, Mr. **D'Amour** said, the firm's VC Series high-speed diesel engines range from 300 to 1,100 horsepower, and the VHP Series engines operate from 500 to 1,750 horsepower for stationary applications. By filling out this important middle-range, the Scania engines have been accepted by Waukesha distributors in the United States and Canada as an extremely welcome addition to the line.

Navy Rescue Sub In Test Dive To 3,500 Ft.

Lockheed Missiles & Space Co., Sunnyvale, Calif., developer of the Navy's Deep Submergence Rescue Vehicle (DSRV-1), announced that the world's first rescue submarine had successfully completed a deep dive to her design depth with a two-hour journey to 3,500 feet. The dive brings DSRV a big step closer to the day when she will be ready to go anywhere in the world on brief notice to begin rescue operations for crewmen trapped in a submarine stranded on the ocean floor.

At the controls of DSRV for the deep dive were Lockheed test pilot **Richard Ross** and Lt. Comdr. **Pat Raetzman,** skipper of the submarine. Both reported the dive, which took place 15 miles off San Diego, had gone well.

"We're both happy with the way she's been handling on these test dives," said Commander **Raetzman.** "Response to controls is immediate, and the maneuverability is excellent. It's a good boat."

Accompanying pilot **Ross** and Commander **Raetzman** were Lockheed chief pilot **Larry A. Shumaker,** supervising pilot on the dive, and **John Purcell,** Navy certification officer. With the dive completed, the Navy can now certify the 50-foot DSRV for an operating depth of 3,500 feet.

The DSRV is the central element in a rescue system designed for worldwide quick response to submarine disasters. In addition to the rescue sub, a road vehicle designed especially to carry the sub, the DSRV crew, and assorted support gear can all be rushed anywhere in the world aboard three C-141 jet transports.

In a rescue emergency, the three aircraft would land at an airfield near a seaport close to the accident site. The DSRV and support equipment would move by highway to the harbor, where the rescue sub would be transferred to the aft deck of a nuclear attack submarine for the trip to the aceident site. The attack sub will be able to carry the DSRV submerged at a speed of 15 knots.

DSRV has been designed to mate with a stricken submarine at any angle up to 45 degrees. The ocean floor has plains, valleys and mountains much like those on land, so any stranded submarine could easily be lying at a severe angle. DSRV's operators control the boat through a computer-driven Integrated Control and Display (ICAD) system not unlike the system used on the Apollo spacecraft. Developed by the Massachusetts Institute of Technology, ICAD gives DSRV operators finger-tip control over main propulsion, vertical and horizontal thrusters, plus sonars, lights and TV cameras.

"We have to mate with a downed sub with a margin of error of less than a few inches," said Commander **Raetzman.** "With ICAD we'll be able to do that even though the stricken vessel is lying at a 45-degree angle in dirty water and in a strong current."

Commander **Raetzman** explained that besides ICAD, much of the success of DSRV is due to the many new materials and components which were developed for the program. The HY-140 steel used in the pressure hull was only a laboratory development prior to its use on DSRV. The streamlined fiberglass outer hull contains the largest pieces of bubble-free fiberglass ever manufactured.

The pressure hull is formed of three interconnecting spheres. The forward sphere holds the two operators, while the mid and aft spheres contain a third DSRV crewman and up to 24 rescuees. The transfer skirt, which must be sealed over the downed sub's escape hatch, is attached directly below the mid pressure hull sphere.

Commander **Raetzman** said DSRV will begin mating tests off San Clemente Island in a few weeks. At San Clemente, DSRV will mate with an adjustable test rig which will simulate a stranded submarine.

DSRV-1 was launched at the Lockheed Ocean Laboratory in San Diego on January 24, 1970. A second DSRV is nearing completion at the Lockheed plant in Sunnyvale. It will be launched in San Diego this year.

Navy Names R. Leopold To Ship Design Post

Reuven Leopold

Rear Adm. **Harry C. Mason,** Commander of the Naval Ship Engineering Center (NAVSEC), has announced the appointment of **Reuven Leopold** as the Technical Director of the Center's Ship Concept Design Division, effective April 15, 1971. In this capacity, Mr. **Leopold** will be responsible for preliminary designs of advanced concepts of surface ships, submarines and all other naval craft, as well as research and development related to the design of future naval vessels. Mr. **Leopold** will come to NAVSEC after four years with Litton Industries, most recently as director of the ship engineering and design department of Litton Ship Systems Division.

Mr. **Leopold** holds bachelor's and master's degrees in naval architecture and marine engineering and a marine mechanical engineer's degree, all from the Massachusetts Institute of Technology, Cambridge, Mass.

Port Of Oakland To Buy Seatrain Terminal

The Port of Oakland will purchase Seatrain Lines' 33-acre container terminal for $20 million and lease it back to Seatrain, in accordance with an agreement approved recently by the Oakland Board of Port Commissioners, it was announced by **William Walters,** president. To make the transaction, the port will issue certificates of indebtedness in the full amount of the purchase, Mr. **Walters** stated.

At an adjourned regular meeting, the board agreed to terminate the franchise arrangement in effect between the port and Seatrain, executed an agreement to acquire the terminal site and its improvements, and approved a lease and preferential assignment of the container complex back to the steamship company. The port certificates of indebtedness will be secured by the lease and guaranteed by Seatrain for the 25 or 30-year term of the certificates. Under terms of the lease Seatrain will pay the port an estimated $1.5 million annually.

The preferential assignment agreement gives Seatrain primary use of the terminal facilities, but allows either the port or Seatrain to assign the marine terminal area on a secondary basis to another steamship line. A portion of the parcel will be exclusively leased by Seatrain for office and container freight station facilities.

Located along the Oakland Estuary in the port's Middle Harbor area, the Seatrain terminal was the only major marine facility in Oakland not owned by the port. Port plans call for the development of a 52-acre parcel adjacent to the Seatrain site. When completed, the wharf there will be contiguous with Seatrain's existing wharf to produce four in-line quay-type berths served by four container cranes. To be known as Middle Harbor Terminal, the facility will be completed late this year. "Port ownership of the entire 85-acre complex will permit maximum utilization of the Middle Harbor facilities," Mr. **Walters** said.

According to Seatrain officials, the transaction will enable Seatrain to acquire the additional financial capacity necessary for the company's planned expansion of its facilities in Oakland.

Steamship Management Elects N.G. Kardaras

At the annual meeting of the stockholders of Steamship Management Corp., Capt. **N.G. Kardaras** was elected chairman of the board and president of the shipping concern and its subsidiaries.

Captain **Kardaras** previously held the position of executive vice president. The firm is located at 342 Madison Avenue, New York, N.Y.

Inherent Containership Design Problems

The Rapid Growth In Size Of Containerships Has Brought Forth Design Problems Not Encountered On Other Ship Types, Including Torsional Stresses And Unusual Vibrations.

W.J. Dorman and D.J. de Koff*

In this period of high activity in the construction of containerships, it is timely to tabulate some of the characteristics of the larger designs and to add a few notes describing some of the problems inherent in containership design.

The data tabulated, Table 1, have been taken from publications, plans, etc., and are believed to be correct. From this table, it is interesting to note that although there is a considerable variation in lengths, the beams vary relatively little. The design drafts are all about the same and are probably dictated by draft restrictions at the terminals. There also is no large variation in the scantling draft (except for Ship B) and this reflects the fact that a containership is a relatively shallow-draft ship due to its high volume-low density cargo.

*Mr. **Dorman,** manager, New York Office, and Mr. **de Koff,** project supervisor, J.J. Henry Co., Inc., New York, presented the paper condensed here before a recent meeting of the New York Metropolitan Section of The Society of Naval Architects and Marine Engineers.

It is difficult to find a basis for comparison of containerships. The actual cargo weight that can be carried depends on several factors such as weight distribution of the containers, ballast requirements to maintain adequate stability and ballast distribution to satisfy strength requirements. Therefore, the deadweight usually includes a considerable amount of ballast. Container capacities indicated in the table in 20-foot equivalents afford the best available means for comparison.

The rate of growth of containerships has been much higher than that of tankers in the past five years. The size and speed race is still going on. A recent Japanese publication reports that a new containership design is being developed. The proposed characteristics are 984 feet by 131 feet by 82 feet, with a draft of 39 feet, a capacity of 3,000 twenty-foot containers, 280,000 shp on three propellers, and a speed of 35 knots.

The design procedure for a containership is in many ways identical to that of any other ship type. However, there are certain problems peculiar to this design, such as the following:

Hull Depth and Freeboard

The depth of the hull is currently limited by the following considerations:

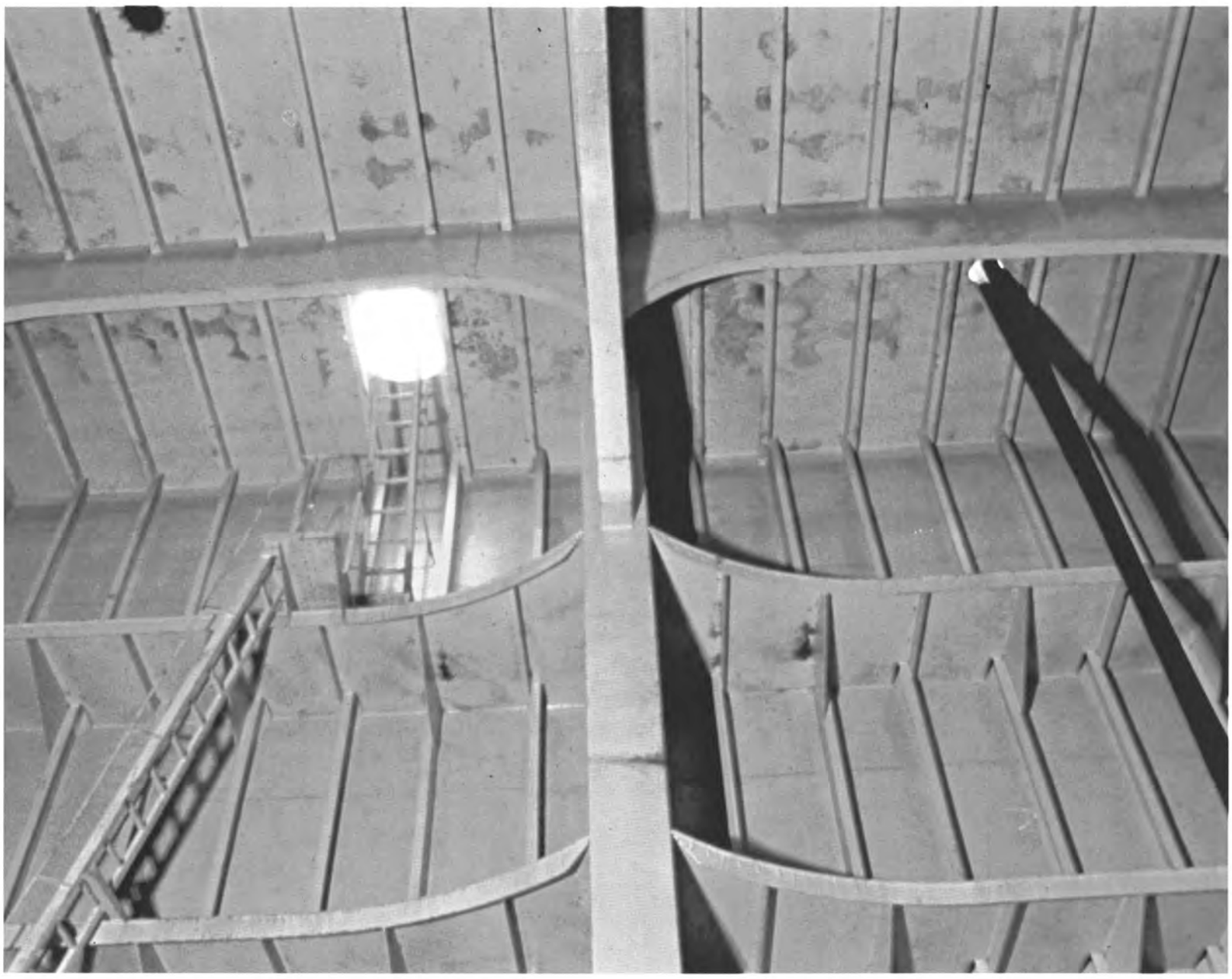
Structural—A very deep ship involves excessive vertical spans in the structure of the side shell and transverse bulkheads. Horizontal support for the sides can be provided by some partial decks and side stringers, but when such horizontal members must be introduced to support transverse bulkheads, the space requirements in a fore and aft direction become excessive. Scantlings for the side shell and transverse bulkhead support are based on classification-society rules which never contemplated ship designs where the freeboard is equal to or greater than the draft, and the topside horizontal strength is provided only by two decks about ten feet apart and the resultant hold space below the lower deck is extraordinarily deep. In other words, the bulkhead deck, as defined by the classification societies, is inordinately high, usually far higher than required for subdivision purposes. This complicates the design of longitudinal deck girders supporting the cargo hatches. These longitudinal deck girders are expected to help support the transverse bulkheads as tension members in the event of accidental flood-

(Continued on page 13)

Table 1—Characteristics of Recent Large Containership Designs.

	SHIP A	SHIP B	SHIP C	SHIP D	SHIP E	SHIP F	SHIP G
LOA	942'-0"	941-0"	818'-9"	798'-6"	745'-9"	719'-1"	712'-8"
LWL	900'-0"	880'-0"	779'-0"	753' (Appr.)	718'-6"	686' (Appr.)	688'-4"
LBP	880'-6"	862'-0"	759'-3"	734'-11"	700'-0"	675'-0"	675'-0"
Beam (Max. Molded)	105'-6"	105'-0"	104'-0"	100'-1"	100'-0"	95'-0"	95'-0"
Depth (Main Deck)	64'-0"/68'-6"	64'-0"	60'-0"	63'-0"	54'-0"	54'-0"	52'-3"
Draft: Design	30'-0"	32'-0"	30'-0"	32'-6"	30'-0"	30'-6"	32'-0"
Scantling	34'-0"	40'-0"	35'-0"	35'-0"	35'-0"	34'-0"	34'-6"
Displacement: Design Draft	42,700	44,600	38,750	36,500	35,950	32,550	35,500
Scantling Draft	50,200	59,500	46,950 (2)		43,300	38,742	40,048
Light Ship (Tons)	23,000	20,000	15,458		15,130	11,798	13,461
Fixed Ballast (Tons)	0	5,735	0		0	0	0
S.W. Ballast Capacity (Tons)	10,417	6,087	8,672		5,330	5,014	5,903
Fuel Oil Capacity (Tons)	5,488	2,728	6,194		3,085	6,900	4,932
Containers (20' Equiv.) (4)	1,968	2,294	1,698	1,698 (3)	1,300 (5)	1,222	1,223
Reefer Containers (included)	178	160	100		304 (1)	182	326 (1)
SHP (MCR) (Total)	120,000	80,000	60,000	60,000	32,450	32,426	28,400
Propeller RPM	135	130	110	135	140	110	134
Type Machinery	Stm. Turb.	Stm. Turb.	Stm. Turb.	Gas Turb.	Stm. Turb.	Stm. Turb.	Stm. Turb.
Steam Cycle	850PSI/950F	850PSI/900F	1450PSI/950F		896PSI/944F	900PSI/950F	930PSI/950F
Propeller: Number	2	2	2	2	1	1	1
Diameter (Ft.)	23.0	22.0	22.0	20.3	20.0	23.3	20.7
No. of Blades	5			4 (C.P.)	5	6	4
Speed: Trial (Des. Draft) (Kn.)	33.5	28.5 (2)	26.4	27 (2)	23.6	23.9	22.1
Elec. Power Generation (KW)	2x3000 (T.G.) 1x1500 (D.G.)	3x2500 (T.G.)	2x2500 (T.G.)		1x2000 (T.G.) 3x750 (D.G.)	2x2000 (T.G.)	2x1360 (T.G.)
Total Accommodations		39	36	27		41	47
Anti-Roll Tank	No	Yes	Yes		Yes	Yes	Yes
Bow Thruster	No	Yes	No	Yes	No	No	No
Hatch Width/Beam	.840	.795	.780	.820	.795	.772	.784

(1) Below deck (2) Estimated (3) Recent publication indicates 1920 (4) 8'-6" High (5) 8'-0" High, except for two tiers



Case history of an old salt.

This Devoe Devran® cargo/ballast coating system has been at sea for twelve years.

After continual use with a variety of cargoes, including space-age fuels, it looks nearly new. The dark spots are just discoloration — there is no corrosion. That's high performance system durability. Epoxy durability from the people who invented Epoxy.

Protect your vessels from corrosion and the resulting plate-replacement with Devoe Devran.

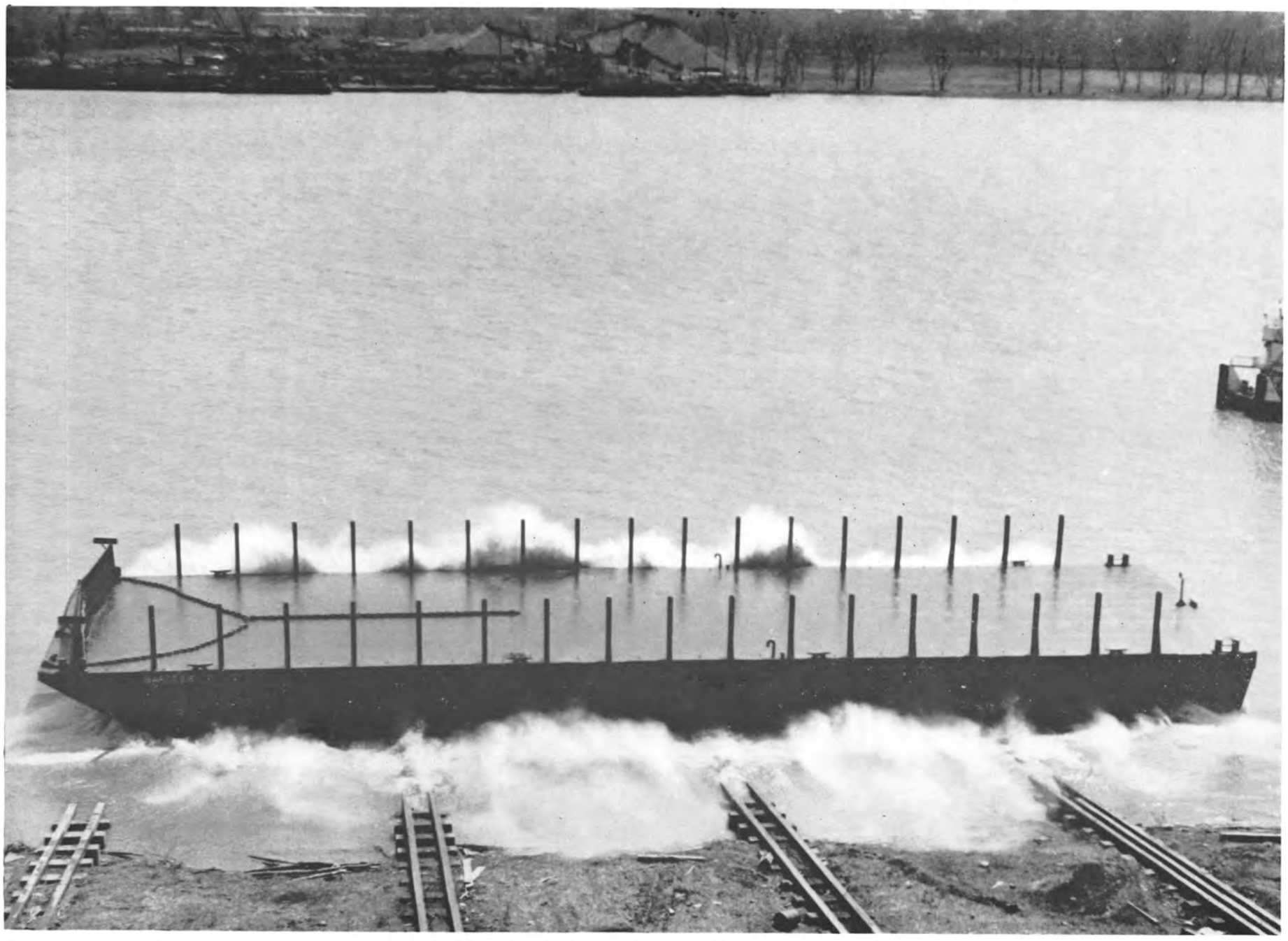
You increase your earning power both by lowering maintenance costs and by reducing tank cleanup time.

Devran cargo/ballast high performance coatings can be applied with conventional equipment, drying time is short, flash points are safely high.

There's a Devoe Marine specialist ready to advise you on the best system for your profitability, whatever your cargo, wherever in the world you want service. Write for the name of the Devoe Marine specialist in your area. **Devoe high performance coatings are dockside worldwide.**

DEVOE
MARINE
PAINTS & COATINGS
DEVOE & RAYNOLDS CO., INC.
Subsidiary of Celanese Coatings Company

Sales Offices: 414 Wilson Avenue, Newark, New Jersey 07105
500 Mandeville Street, New Orleans, Louisiana 70117 • 311 California Street, San Francisco, California 94104



CROWLEY

needed 12 ocean deck barges for arctic service

...they selected America's largest inland shipbuilder

Crowley Launch and Tugboat Co. of San Francisco selected Jeffboat to build twelve 200′ by 60′ deck barges for an important role in arctic oil activity. The barges were towed via the Panama Canal to the North Slope of Alaska where they joined a large fleet of service vessels. These shallow draft deck barges lightered cargo to shore from deeper draft ships forced by shallow water to anchor 17 miles offshore. A third of the barges served as sunken dock barges in the supply project. Rugged Jeffboat construction assures years of service and dependable performance. 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.

JEFFBOAT

Division of Texas Gas Transmission Corporation

Containership Design–

(Continued from page 10)

ing of a hold up to the bulkhead deck. They must ke kept as narrow as possible in the transverse dimension in order to avoid wasting valuable ship beam space. As a result, these girders are of little use in compression, and are often prevented from taking excessive compression loads by fitting suitable "slip" connections at their span ends. They are ignored in the hull girder section-modulus calculation as making no contribution to the overall strength of the vessel.

Container Strength—The depth of the ship determines the number of tiers of containers that can be stacked below deck. Current container design standards are based on the assumption that they are stacked to a maximum of six high. Increasing the number of tiers decreases the need for a high deck load and, therefore, affords better container protection and simplifies the lashing problem. However, it decreases the initial stability due to a rise in the KG of the light ship and also increases the loading-cycle time.

An increase in ship's capacity will require the stacking of containers more than six high in the holds. The use of reinforced containers for certain locations would appear the obvious answer. However, this places an additional constraint on the loading operation which may well render this economically not feasible. As an alternative, it may be practical to provide a system of intermediate hinged brackets over the lower five containers in a hold and have these brackets support an additional three or four tiers. Such a support system may be space consuming and may require remote control, but it can possibly be justified after suitable research.

Shoreside Handling Facilities—A very deep ship requires greater vertical movement of the containers. Time for this greater movement is a definite consideration. Increased hull depth as a characteristic of a "bigger" ship automatically involves increased beam as well as increased length. Our current knowledge of existing shoreside container-handling facilities indicates that a beam of 112 feet is the maximum that can be handled from one side of a containership, and such a facility only exists in a few of the major seaports.

Length and Beam—The length and beam of a containership is currently limited by the following considerations:

1. The constrictions of the Panama Canal have an impact on U.S.-flag shipping and the ships of other flags.
2. The large containership usually is required to enter a port where there are physical constraints.

Seaway Stresses

The forces acting on a very big containership are no different than those acting on a very big tanker. However, the structural resistance to these forces by the hull of the containership is much more difficult to achieve.

In longitudinal bending a tanker presents an evenly balanced hull girder with a full, solid deck and equivalent bottom shell. The containership has a stiff double bottom for the bottom flange of the hull girder, and this must be balanced as much as possible by two compact longitudinal box girders, with open hatchways totaling often more than 80 percent of the beam.

The containership, due to the arrangement of its structure, is at a disadvantage in torsion. Not only does it have to resist the same torsional moments as the tanker but due to the location of its shear center at or below the keel, the horizontal loads create, in addition to horizontal bending moments, additional torsion moments of considerable magnitude with attendant large warping stresses and deflections. The axial stresses due to warping cause a relative movement between the port and starboard sides which, except for the closed ends forward and aft, is resisted only by the transverse deck girders supporting the hatches. High stress concentrations may be expected at the connections of the transverse deck girder to the longitudinal box girder.

The determination of sea loads and stresses follow at first the conventional procedure, namely, the calculation of the still water bending moments and poising the ship at a heading of 180 degrees on a wave equal to the ship's length. Due to the fineness of the ship, one finds that the maximum allowable longitudinal bending stresses, instead of reaching a peak amidships, as on a tanker, are difficult to keep from exceeding the maximum over the midship half length. This is one of the reasons that this procedure of determining wave-induced stresses is not sufficient for a containership.

Although the longitudinal bending moments do not change appreciably due to a change of heading of say 20 to 30 degrees, the horizontal bending and torsion moments increase considerably and may cause stresses reaching a maximum at about the quarter length of the ship, superimposing some of their components on the longitudinal bending stress. So far, only static stresses have been considered. Thanks to the latest developments of the strip theory, it is now possible to determine, presumably with a fair degree of accuracy, the dynamic and hydrodynamic forces acting on the hull. By calculating these forces due to waves of varying direction and length, the short-term distribution of stresses may be determined by superposition. Subsequently, the short-term distributions obtained are superimposed with the aid of seaway statistics to one singular long-term frequency distribution. On the basis thereof is then determined the stress value that is on an average exceeded once during a given number of load cycles.

In addition to the stresses so analyzed, the high-speed containership may be subject to another phenomenon, namely, stress magnification due to wave-excited two-noded hull vibration. Although the ship speeds are still low enough so that the frequency of encounter of resonance occurs at the low energy part of the sea spectrum, the magnification still could be considerable. Unfortunately, the current state of the art does not permit a rigorous analysis.

Pictured at the meeting, held in the Seamen's Church Institute, left to right: (standing) **H.J. Karsch,** J.J. Henry Company; **Henry M. Tiedemann** and **Monroe Macpherson,** members of the Section's executive committee, and **Charles W. Wilson,** secretary-treasurer of the New York Metropolitan Section; (seated) **W.J. Dorman,** J.J. Henry Company, author; **Norman R. Farmer,** Section vice chairman; **Warren I. Signell,** chairman, and **Robert G. Mende,** national secretary of The Society of Naval Architects and Marine Engineers.

Stability

The large, fast containership has all the trim and stability problems inherent in other ship types and then some. The large sail area presented by the high freeboard and a high deck load of containers has a profound effect on the required GM. On the other hand, beam restrictions do not permit ample waterplane inertia. The result is a ship with a high KG and relatively low GM. Except for ballast conditions, the GM for various loading conditions varies in a rather narrow range since the weight of the fuel consumed is compensated for by taking on ballast water. Maximum flexibility dictates minimim use of fixed ballast. High speeds require large bunker capacity and the desirability of a clean ballast system usually makes it difficult to find adequate space for liquid ballast.

Another aspect of the high KG and relatively low GM is the large heel angle experienced by the ship when traveling at high speed caused by sudden large rudder angles. (These maneuvers can be quite dangerous, especially if the helmsman tries to correct the situtation by giving opposite rudder.)

Vibrations

Aside from any mechanical unbalance of the propulsion system, the propeller is the source of vibrations. The fact that, due to high power and low draft, most high-speed containerships are twin-screw is a blessing and at least reduces the propeller excitations due to wake inequality. It is unfortunate that little or no full-size experience is available for contra-rotating or overlapping propeller arrangements.

It has been determined that horizontal vibrations are more difficult to endure by the human body than vertical vibrations. Unfortunately, the containership response is much more susceptible to high horizontal vibrations due to its low torsional rigidity and considerable coupling of horizontal and torsional vibrations.

The torsional shaft vibrations generally pose no problems since in most containerships the shaft is fairly long and flexible, causing a resonance at low rpm and low power. The lateral and longitudinal shaft vibrations may be difficult to avoid. It is here that a decision must be made regarding the number of propeller blades so as to keep resonance away from the operating rpm. It is difficult to provide a thrust bearing and supporting foundation stiffness so as to place longitudinal shaft resonance above the operating rpm, particularly with propellers with a large number of blades. It is often necessary to accept this resonance within the operating range. In that case, it must be placed at the lowest possible rpm.

The high powers of modern containerships make it necessary to investigate vibration characteristics that a few years ago were scarcely considered. Not that these phenomena were not there but they were of no consequence. The constant increase in power will make it necessary to go into a more and more detailed vibration analysis.

Conclusions

We have briefly mentioned some of the problems that arise in the design of a containership and have shown some of the characteristics of the latest generation of containerships. The future expansion of containership terminals will most likely result in the design and construction of still larger ships and will require more problems to be solved.

Texaco Names Cole General Manager Marine Department

James A. Cole

Texaco Inc. has announced the appointment of **James A. Cole** as general manager of the marine department in New York. Mr. **Cole** succeeds **Leland A. Smith,** who has retired after 46 years of service in marine operations. It was also announced that **Eric F. Pointon** has been appointed managing director of Texaco Overseas Tankship Limited, a Texaco subsidiary, in London.

Mr. **Cole** was graduated from the U.S. Merchant Marine Academy in 1943 and received his bachelor of science degree in accounting from the New York University School of Commerce in 1949. He joined Texaco's affiliate, Caltex Petroleum Corporation, that same year and subsequently held several positions in marine operations at New York, London, and Bordeaux. In 1967, he was transferred to Texaco's marine department in New York as manager of chartering and traffic. In 1969, he was named deputy managing director of Texaco Overseas Tankship Limited in London and was named managing director there a year later.

Mr. **Pointon** attended the Prahan Technical School in Melbourne, Australia, and served as a deck officer for the merchant service. He joined Caltex Petroleum Corporation in 1950 and became an assistant marine superintendent in London in 1954. From 1956 until 1966 he held several managerial positions with the Caltex organization. Thereafter, he was transferred to Texaco Overseas Tankship Limited in London, as a manager of operations, and in May 1970, he was named deputy managing director.

Propeller Failure Analysis Discussed At SNAME Chesapeake Section Meeting

Pictured at the January 13 meeting, left to right: **R. Kiss,** Maritime Administration; **F. Everett Reed,** Littleton Research and Engineering Corporation; **F. Dashnaw,** Maritime Administration; **D. Strohmeier,** Bethlehem Steel Corporation; **P. Eisenberg,** Hydronautics, Inc., and **E. Scott Dillon,** Maritime Administration.

The fourth scheduled meeting of the Chesapeake Section of The Society of Naval Architects and Marine Engineers had one of the heaviest turnouts of the season. Over 120 members attended the technical sessions presented at the Walter Reed Officer's Club in Washington, D.C. Included among the guests was **Daniel D. Strohmeier,** vice president, Bethlehem Steel Corporation, Shipbuilding Division, and president of SNAME.

During the technical session, a joint paper titled "Propeller Strain Measurements and Vibration Measurements on the S.S. Michigan" was presented by **F.J. Dashnaw,** of the Maritime Administration, and **F. Everett Reed,** president, Littleton Research and Engineering Corporation. The S/S Michigan is a 24,000-shp general purpose cargo ship and one of five sister ships. The paper discusses the program undertaken to determine the cause of the propeller blade failures experienced on these ships and on other ships of the same basic design. The paper discussed in considerable detail the results of the program to acquire strain data on the propeller and corresponding hull vibration measurements that was undertaken by the States Steamship Company, American President Lines, American Bureau of Shipping and the Maritime Administration. **E. Scott Dillon** of the Maritime Administration acted as moderator for the technical session. Following the presentation of the paper, prepared discussions were offered by five of the attending members.

Norfolk Shipbuilding Appoints Fred Ganter

Frederick A. Ganter

Frederick A. Ganter has been appointed manager, New York office, for Norfolk Shipbuilding & Drydock Corporation.

Mr. **Ganter** has been active in the marine engineering and sales field for the past 20 years. He is a graduate of Maine Maritime Academy, class of '51.

Mr. **Ganter** is a member of The Society of Naval Architects and Marine Engineers and an associate member of The Society of Marine Port Engineers.

Norfolk Shipbuilding & Drydock Corporation maintains its offices at 17 Battery Place, New York, N.Y.

E.E. Rabe Promoted At Matson Terminals

Matson Terminals, Inc., San Francisco, Calif. has promoted **E.E. (Bud) Rabe** to the post of general superintendent in Portland, Ore., it was announced by **James P. Gray,** vice president and general manager.

Mr. **Rabe** has served with the company since 1949 and has been stevedore superintendent in Portland for the past three years.

MarAd Grants Approval For PFEL Purchase Of Matson Navigation Co.

Pacific Far East Line, Inc., San Francisco, Calif., has announced that Government approval has been given to purchase the Matson Navigation Company's South Pacific passenger and freight services.

Approval by the Maritime Administration concludes negotiations begun August 13, 1970, when both steamship companies announced that Pacific Far East Line was acquiring Matson's luxury liners S/S Mariposa and S/S Monterey, the freighter vessels S/S Sonoma and S/S Ventura, which ply the South Pacific trade route, and a shipyard contract for two containerships presently under construction in the Baltimore, Maryland yards of Bethlehem Steel.

Pacific Far East Line, which began business 24 years ago, has in recent years undertaken an aggressive program of fleet-building for its Far East freight service. Among other expansion, PFEL will place in service the first of six LASH (Lighter Aboard Ship) vessels next July. PFEL's commitment to the LASH program is approximately $100 million.

According to PFEL president **Leo C. Ross,** the acquisition of Matson's South Pacific trade route, cargoliners and luxury liners, will also include the transfer to PFEL of Matson passenger department employees to "assure a smooth transition without interruption of Matson's fine service."

Sam N. Mercer was appointed vice president of the new PFEL passenger division with responsibility for the two luxury liners. Mr. **Mercer** resigned his position as president of Discover America Travel Organization in Washington, D.C. to join PFEL. Previously, he was vice president of the passenger division of American President Lines in San Francisco, Calif.

Mr. **Mercer** said he felt particularly fortunate to return to the steamship industry with PFEL, and added: "We intend to continue the excellent first-class passenger services of the former Matson liners. The Monterey and Mariposa enjoy great reputations with passengers and travel agents, and I look forward to enhancing their services and acceptability with the trade."

The sister ships have luxurious accommodations for 336 passengers, and are fully air-conditioned. Both have gyrostabilizers, numerous lounge and recreation areas, a swimming pool, a movie theater, a library, and orchestra and night club entertainment. They are renowned for their continental cuisine.

The Matson passenger staff will be moving into new PFEL offices in March.

Maritime Management Institute To Hold Annual Forum Mar. 2-3 —Total Distribution Is Theme

The Fifth Annual Maritime Management Institute of the State University of New York Maritime College will be held on March 2-3, with the theme this year "Total Distribution Meets The Transportation Revolution," according to an announcement by Rear Adm. **Edward J. O'Donnell,** USN (ret.), president of the college. The two-day meeting will again be held in the Seamen's Church Institute, 15 State Street, New York City.

The 1971 Maritime Management Institute will deal with existing problems inherent in intermodal movement from source of origin to destination. It will also seek to forecast the future in this regard.

The first day's two sessions—morning and afternoon—will deal with present systems, their merits, faults, loopholes, and the changes which should be made in the interests of greater efficiency. The final day's meetings will be devoted to a "hard look at the future" and predictions of "tomorrow's transportation systems" by leaders from the various modes of the transport industry.

Rear Adm. **John Harllee,** USN (ret.), former Chairman of the Federal Maritime Commission, will serve as general chairman of this year's Institute. Its four-man steering committee is comprised of **Richard J. Long,** associate dean for continuing education, Maritime College chairman; **Peter J. Finnerty,** manager of administrative services, Sea-Land Service, Inc.; **William L. Hamm,** general secretary, Associated India, Pakistan, Ceylon, Burma Conferences, and **William H. Sembler,** professor of marine transportation, Maritime College. The keynote speaker will be **James F. Fanseen,** Vice Chairman, Federal Maritime Commission.

The Maritime Management Institute is held annually under the sponsorship of the Maritime College's Office for Continuing Education, and it provides a forum for discussion and exploration of a subject of topical interest and importance to the transportation field. Its four sessions—morning and afternoon each day—bring together large numbers of leaders of the various facets of the transportation industry, along with officials of the several Government agencies also involved.

Full information on the 1971 Maritime Management Institute may be obtained by mail or telephone from the Office for Continuing Education, Maritime College, Fort Schuyler, Bronx, N.Y. 10465, (212) 892-3000.

226,500-Dwt Tanker Ordered From IHI

IHI (Ishikawajima-Harima Heavy Industries Co., Ltd.) of Japan was recently awarded an order for a 226,500-dwt tanker by World-Wide (Shipping) Ltd., Hong Kong.

The 226,500 tonner will be of 118,000 gross tons. The approximate measurements are 984 feet in length, 164 feet in breadth, 88½ feet in depth, and 68 feet draft. The vessel will be powered by a 33,000-shp IHI turbine developing a speed of 16 knots.

The contract price is about 10,500 million yen (approximately $29.4 million) of which 30 percent will be paid by the time of delivery and the remainder in installments over seven years. Payments will be made on a yen basis.

To be built at the IHI Yokohama Shipyard, the tanker will be delivered in March 1974. With this new order, IHI has received orders for a total of 11 ships, or 700,000 dwt from the shipowner.

Bethlehem Beaumont Yard Appoints Four To Key Posts

Four new appointments at Bethlehem Steel Corporation's Beaumont, Texas, shipyard have been announced by **J.O. Crooke,** general manager.

William T. Faucett has been promoted to administrative assistant to the general manager. He will be succeeded as chief estimator by **Gabriel M. Krepper. John E. Gordon Sr.** has been named estimator supervisor and will be in charge of ship repair estimating and negotiations. **Charles R. Bloyd** has been appointed assistant foreman of the electrical department.

Mr. **Faucett** began his career with the Beaumont shipyard prior to World War II. In 1953 he was appointed assistant chief estimator, and in 1960 he became chief estimator. He has also served in special assignments, including contract negotiations with the Singapore Government for Bethlehem's partnership in the Singapore shipyard. An alumnus of Lamar College, he is a registered professional engineer.

Mr. **Krepper** joined the shipyard in 1937 and has since served as a draftsman, draftsman supervisor, ship superintendent, estimator and assistant chief estimator. He developed an underwater-joining method for ships that are too large to launch as a single unit. The method is used at Bethlehem's San Francisco and Beaumont yards. He is also a co-inventor of a pile jacking apparatus which has been used in mobile drilling platforms.

Mr. **Gordon** first joined Bethlehem in 1941. He has worked at the corporation's Baltimore and Beaumont yards since, except for three years when he worked for another Beaumont-area yard. A native of Baltimore, he graduated from Calvert Hall College and attended Johns Hopkins University.

Mr. **Bloyd** is a native of Fairbury, Neb., where he graduated from high school in 1936. He served in the U.S. Navy from 1936 to 1940 and then began in the Beaumont yard electrical department. He became an electrical department supervisor in 1952.

Seaway Container Opens Norfolk Plant

Seaway Container Corp. of America announced that it has opened its plant in Norfolk and that it is now in production, supplying steel containers to steamship companies and agencies and to the trucking and railroad industries.

ASTILLEROS DELIVERY: The official sea trials for the new 24,000-dwt oil tanker Postrover were recently carried out by the Matagorda Shipyard of the Astilleros Espanoles, S.A. group. The approximate measurements of this vessel are length overall, 558 feet, a breadth of 79.23 feet, a depth of 42 feet and a draft of 32.15 feet. Propulsion equipment consists of an AESA Sulzer 6RD76 type diesel engine of 10,200 bhp. This vessel features remote control of the cargo system as well as remote control and alarm support for the main and auxiliary engines. Cabins and lounges are air-conditioned. Owners of the vessel are Elder Dempster Lines, Ltd. and the Peninsular and Oriental Steam Navigation Co. Attending the sea trials for the firm of George G. Sharp, Inc., naval architects of New York City, were **K.M. Shauer, J. McDougall** and **T. Benton.**

Nuclear Sub Christened At Gen'l Dynamics/Electric Boat —Has 12-Year-Old Sponsor

Twelve-year-old **Mary Conover Warner** of Washington, D.C., youngest sponsor of a nuclear submarine, christens the USS Archerfish at the Electric Boat Division of General Dynamics, Groton, Conn. The sponsor's father, **John W. Warner,** Under Secretary of the Navy, said "there can be no generation gap in America when it comes to national defense." Watching, left to right, are Under Secretary **Warner, Joseph D. Pierce,** a vice president of General Dynamics, and **David S. Lewis, Jr.,** chairman of General Dynamics.

A 12-year-old girl christened the 4,200-ton nuclear-powered attack submarine Archerfish and heard her father warn that "when it comes to national defense, there can be no generation gap in America."

Under Secretary of the Navy **John W. Warner** told his daughter **Mary,** and those of her generation, that "this ship will protect you only if you protect it."

In ceremonies at the Electric Boat Division of General Dynamics, Under Secretary **Warner** declared that "the Russians possess the largest submarine force in the world," and "I hope, **Mary,** that some day your generation may never have to question how our nation prepared for that threat."

Addressing a large audience which included more than a dozen admirals, many of them distinguished submarine officers, Under Secretary **Warner** pointed out that two-thirds of the officers and men on active duty in the Navy have not yet reached their 25th birthday. In another 5 to 6 years, he said, referring to his daughter, "members of her age group will be among the crew of Archerfish. More startling . . . should be the fact that as Archerfish approaches the twilight of her active service, she will be manned by a crew not yet born."

"One of America's most priceless assets is the idealism which motivates its young people," he continued, but advised that "now you should gain an awareness of the responsibilities you must soon shoulder."

Under Secretary **Warner** is a graduate of Washington and Lee University and the University of Virginia Law School. He served with the Navy during World War II and with the Marine Corps during the Korean Conflict.

The keel for the 4,200-ton Archerfish was laid June 19, 1969, by **Mrs. James F. Calvert,** wife of Vice Admiral **Calvert,** Superintendent of the Naval Academy. Named for a World War II submarine which sank or damaged 92,750 tons of enemy shipping during World War II, Archerfish will have a complement of 12 officers and 95 men. The prospective commanding officer is Comdr. **Ralph G. Bird,** a native of Dearborn, Mich.

GE And French Firm Sign Agreement To Produce Geared Marine Steam Turbines

The General Electric Company and Construction Navales et Industrielles de la Mediterranee (CNIM), Paris, France, have entered into a manufacturing associate agreement for the production in France of geared marine steam turbines.

David S. Bennett, general manager of GE's marine turbine and gear department in Lynn, Mass., and **A. Herlicq,** president of CNIM, announced the signing of an agreement under which CNIM will build marine steam turbines to General Electric designs in France.

Mr. **Bennett** said the agreement was made to meet the increasing demand for marine steam propulsion equipment throughout the world. He pointed out that most of the supertankers and large containerships now being built or on order will be propelled by steam turbines.

Mr. **Bennett** indicated that the agreement should prove equally beneficial to both CNIM and General Electric, since well over one-third of the total steam propulsion systems installed worldwide in 1969 were General Electric marine steam turbines.

This is the seventh manufacturing agreement General Electric has established with overseas firms. Under these agreements, GE manufactures the rotating parts of the marine steam turbine, including the high-pressure rotor assembly and low-pressure rotating assembly, and gear rotating parts, while the manufacturing associate produces the stationary parts, and assembles and tests the completed unit.

CNIM is a leading shipbuilder with shipyards in La Seyne, France, and a major French manufacturer of mechanical machinery as well.

New Grain Trimming System Announced By Algonquin International

A new way of trimming free-flowing dry bulk cargoes has been developed by G.T.R. Campbell (International) Ltd. of Montreal, Canada, and London, England, for the Algonquin International Organisation.

The system has been developed in consultation with the Canadian Government, Department of Transport, under the direction of Capt. **J.L. MacAngus** and Capt. **R.D. Conners,** and the U.S. National Cargo Bureau, through Capt. **S.F. Sammis,** and with their valuable assistance.

As with many useful inventions, this, the Canadian Grain Trimming System, is a simple solution to the problem of distributing free-flowing cargoes to those parts of the ship's cargo hold which are made inaccessible by overhanging decks. The system removes the drudgery of hand trimming and eliminates shifting boards. It also needs no special structural arrangements, such as sloping wing tanks, and takes advantage of the natural rolling and pitching movement of the ship, whereby effective additional trimming occurs. An owner engaged in the grain trade and carrying high cubic cargoes, such as barley, can increase the cargo carrying capacity substantially through increased use of the underdeck cubic by the adoption of the system.

In recent years, almost all single deck bulk carriers have been constructed with sloping upper wing tanks in order to obtain self-trimming for such cargoes. Such a structural arrangement reduces the effectiveness of the steel and thereby increases construction costs of such vessels. The maintenance and repair costs of such ships is also increased. The shape within the cargo holds also causes difficult and broken stowage with many other cargoes. It is therefore in the interests of both the shipbuilder and shipowner to avoid the use of sloping wing tanks in the ship's construction whenever possible.

With the present trend to build very large ships—where the steel saving from the use of rectangular wing tank construction is substantial, and the improved girder strength of such construction is required—this new trimming system which permits the use of rectangular wing tanks will be welcomed by the industry.

The free surface effect and expansion trunk arrangements in OBO ships are improved when rectangular wing tank construction is applied. The Canadian Grain Trimming System will therefore also make a useful contribution in this type of ship.

Statistics compiled from the broad cross section of bulk carriers establish that such vessels utilize their grain self-trimming features on the average of 22 percent of the ship's life. It is only free-flowing cargoes, such as grain cargo, which require this self-trimming feature, and in all other trades the sloping wing tanks are a disadvantage. However, most bulk carriers must be built with self trimming for grain because of the predominance of the grain trade. This new system is therefore a natural development.

When ships of the same dimension are compared, it will be found that the vessel constructed with rectangular wing tanks will obtain between five percent and nine percent more usable underdeck cargo cubic than those having sloping wing tanks. For example, the 21,500 tons deadweight Fortune-type vessel incorporates rectangular wing tanks and applies the Canadian Grain Trimming System. This ship has almost 100,000 cubic feet more underdeck cargo space than any of the other similar size ships presently on the market and constructed with sloping wing tanks. This is apparently one of the factors which has influenced those prominent shipowners who have placed orders for a total of 16 Fortune vessels.

In the development of the system, large scale model tests have been conducted by the designers in cooperation with Ishikawajima Harima Heavy Industries Co. Ltd. of Tokyo, Japan, in order to establish the various constants applicable to the various design parameters. The system has been installed in a recently delivered Freedom type vessel, from which actual performance data has been recorded with a grain cargo transported from the U.S. West Coast to Japan.

The 1960 SOLAS rules and IMCO recommendations governing the carriage of grain cargoes already envisage the more efficient use of the ship's structure in the safe transportation of grain in bulk. The Canadian Grain Trimming System is a step toward supplementing the action of this active international organization. The principles applied in the system are such that it is possible to establish the ship's stability with a given cargo of grain or similar cargo, precisely.

For further information, contact The Algonquin International Organisation, 455 Craig Street West, Montreal, P.Q., Canada.

D.S. Walker Promoted At Boston Towboat

David S. Walker

Eastern Gas and Fuel Associates has announced the appointment of **David S. Walker** as manager of its Boston Towboat Company subsidiary.

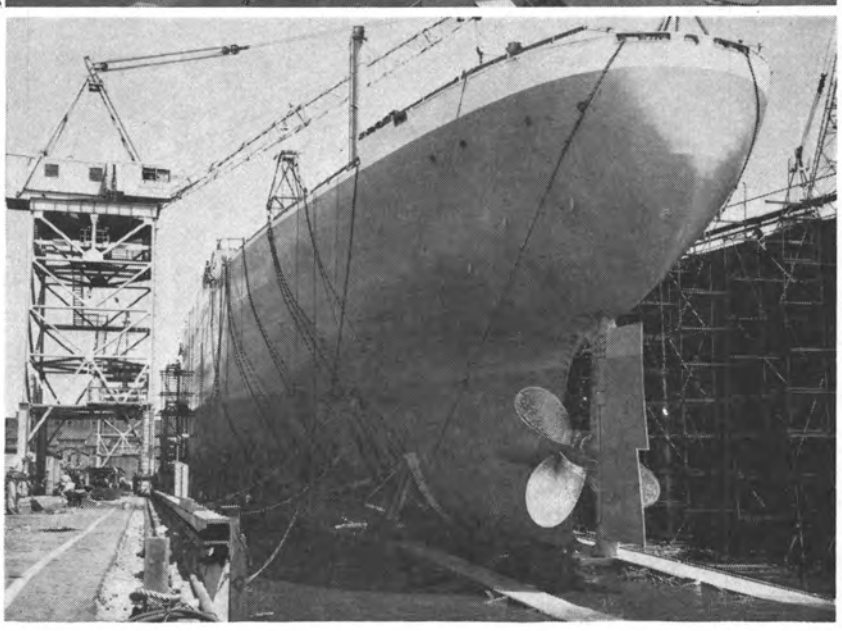
Mr. **Walker,** who has been associated with Eastern for 34 years, has been assistant manager of towboat operations since 1965. He is a member of the Foreign Commerce Club and a vice president of the Propeller Club, Port of Boston.

A U.S. Navy veteran, Mr. **Walker** attended Burdett College and Bentley College.

ALL-ALUMINUM: Weighing 165 tons, the 78-foot Bill Angus shrimp trawler recently underwent its first sea trials. The all-aluminum vessel is the first of five to be built by Lantana Boatyard, Lantana, Fla. Operating speed is 10 knots, and it is designed to stay at sea for as long as 70 days. While the Lantana 78 is small in size, she is big in capacity. Her fish holds will accommodate 600 boxes of shrimp. A total of 65,000 pounds of aluminum plate and structural members was supplied by Reynolds Metals Company for construction of the ship.

If you want your ships tied up here

instead of here



you'll use WIDE SPECTRUM.

Fouling by "grass" can cost you plenty. In increased hull resistance. In loss of vessel speed. In heavy fuel costs. In drydock tie-ups. That's why smart owners insist on "WIDE SPECTRUM", the antifouling by International Red Hand Marine Coatings. "WIDE SPECTRUM" has been designed, developed and proved in service. It works where conventional antifoulings won't. In harbors where fresh water mixes into the sea and salinities are low and often accompanied by sewage effluents. Yet, it offers superior protection at sea. It gives freedom from fouling, maintains corrosion control and eliminates drydocking for periods of up to two years. Let us tell you how. Contact our nearest office, today.

International Red Hand Marine Coatings

A Division of International Paint Company, Inc.

World's Largest Marine Paint Makers/21 West Street, New York, N.Y./S. Linden Ave., S. San Francisco/3915 Louisa St., New Orleans

Computer Time/Sharing Is Feature Of SNAME Hawaii Section Meeting

Author **Robert Armstrong,** left, with SNAME chairman **Dave Kearton.** Mr. **Armstrong** is in the Scientific Section, Design Division, Pearl Harbor Naval Shipyard. Mr. **Kearton** has recently retired from Dillington Shipyard Hawaii.

The Hawaii Section of The Society of Naval Architects and Marine Engineers gathered on the evening of December 13, 1970, at the Ala Moana Banquet Hall to hear a paper presentation entitled "High-Speed, Low-Cost Hydrostatics." The paper's author, **Robert Armstrong,** is employed as a naval architect in the Scientific Section of Design Division at Pearl Harbor Naval Shipyard. Mr. **Armstrong** also operates a small craft design firm in his spare time.

The paper presentation described the use of a time/sharing computer system and selected programs to solve time-consuming hull characteristics calculations. The computer system used, the Hewlett-Packard 2000A System, and the use of "BASIC" computer language was briefly described, followed by a detailed account of several computer programs including the principles utilized in solving the hydrostatic problems.

Mr. **Armstrong** completed his presentation by putting his computer programs to the test by actually running several on a remote teletype terminal installed in the banquet hall and connected by a regular telephone to a computer in Honolulu. The real proof of the economics of the use of the programs and system came when the computer bill for all the runs for the evening came to a grand total of $2.70.

D.T. Abbott Promoted By Columbian Bronze

Douglas T. Abbott has been named to the newly-created position of executive vice president of Columbian Bronze Corporation, a division of Walter Kidde & Company, Inc., it was announced by **Bernard N. Ames,** Kidde senior vice president in charge of marine and maritime operations and president of Columbian.

Mr. **Abbott** had been vice president and general manager of Columbian Bronze. He has been with the company since 1943, and has served as chief engineer and vice president in charge of engineering and sales.

Mr. **Abbott** is a mechanical engineering graduate of Pratt Institute and a licensed professional engineer in New York. He is also a member of The Society of Naval Architects and Marine Engineers.

Columbian Bronze, based in Freeport, Long Island, N.Y., manufactures marine electronic equipment and ship and boat propellers.

Kidde is a diversified company with principal operations in safety, security and protection products and services. Headquartered in Clifton, N.J., Kidde operates more than 130 manufacturing plants and other facilities worldwide.

Foster Kinney Joins Sky Climber, Inc.

Foster T. Kinney has been named manager of product planning and development of Sky Climber, Inc., a subsidiary of Western Gear Corporation, Gardena, Calif.

Mr. **Kinney,** who holds an M.B.A. degree from the Stanford University Business School and a B.A. degree in government from Cornell University, will manage development of new products, make acquisition studies, and conduct surveys of internal company capabilities. He will report to **Howard J. Feichtmann,** marketing manager. Mr. **Kinney** was formerly associated in marketing and planning activities with Mobil Chemical Company and Amercoat Corporation.

Sky Climber manufactures powered swing stages and hoists for the commercial building industry, power generating plants, marine construction, pulp and paper plants, petroleum refineries, and aircraft maintenance firms. Sales are international.

Sohio Promotes James A. Waters

James A. Waters, supervisor of market research and planning in the new business and commercial development department of the Standard Oil Company, Cleveland, Ohio, has been promoted to manager of market research and new business development.

Mr. **Waters** has degrees in arts and letters, chemical engineering and business administration from Notre Dame and Case-Western Reserve Universities. He joined Sohio in 1965 and has since held a number of positions in the sales and commercial development areas.

Himoff Maritime Names R. Bruns Vice President

Rainer Bruns

Samuel K. Mittleman, president of Himoff Maritime Enterprises Ltd., New York, N.Y., announced the decision of the board of directors to appoint **Rainer Bruns** to the new post of vice president and general manager.

Mr. **Bruns** has been with the company since its inception. He has been employed in various positions in the shipping industry throughout his business career. Mr. **Bruns** is a native of Hamburg, Germany, and was educated at various colleges and universities in Hamburg, Los Angeles, and New York. He is currently a resident of New York City.

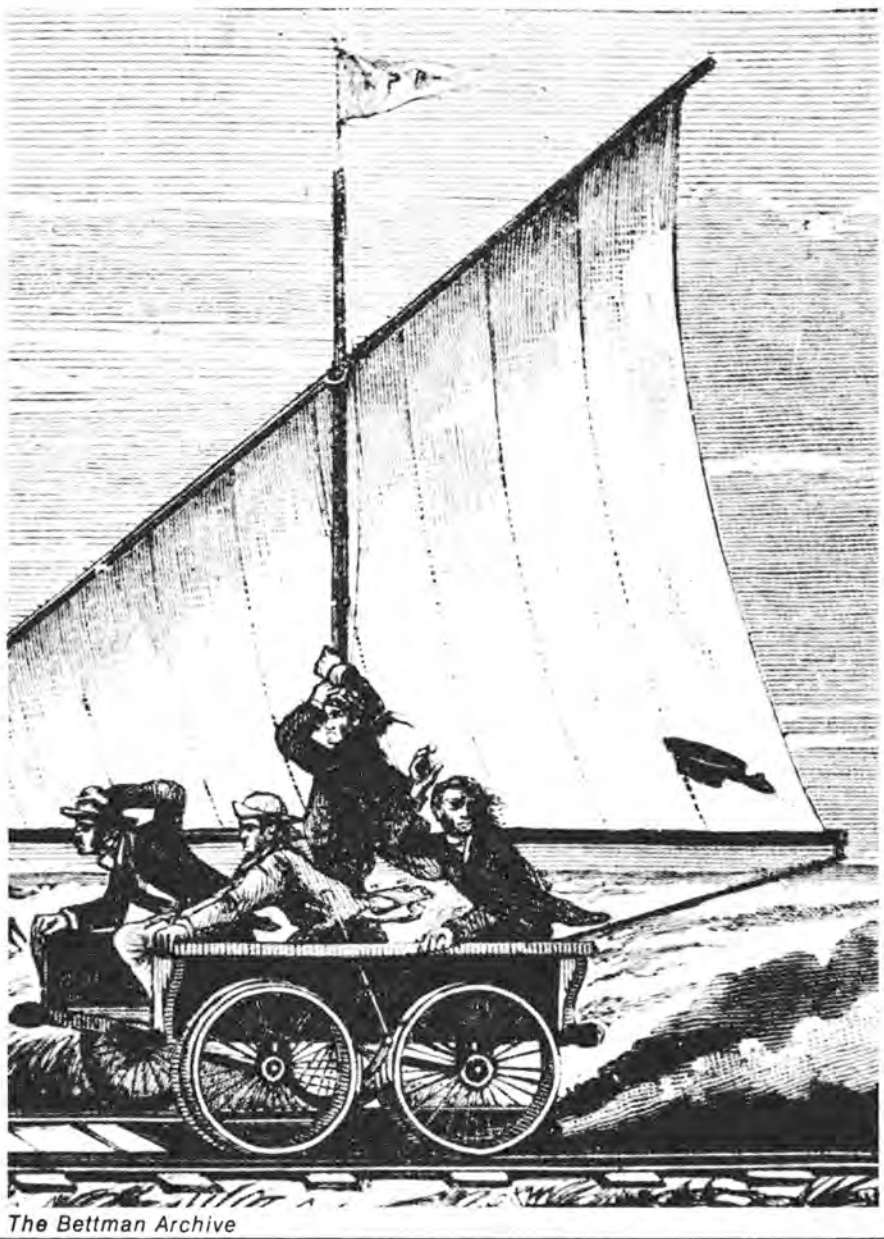
Himoff Maritime Enterprises Ltd. are steamship operators and agents engaged in worldwide maritime trades, as well as joint owners and general agents for Navibel Lines and Eurama S.A., Antwerp, Belgium. Navibel Lines serves the Great Lakes and U.S. North Atlantic ports from Europe.

They are also operators of Port Claremont Terminal, Jersey City, N.J., which has been particularly designed for the handling of steel and other heavy cargoes.

NEW K-LINE CONTAINER-CAR TERMINAL: This is how the new K-Line combined container and car terminal at the Port of Long Beach, Calif. will look when completed late this year. Kerr Steamship Company recently transferred its preferential assignment agreement covering the combined container and car terminal, now under construction on Pier J, to Kawasaki Kisen Kaisha, Ltd., one of Japan's leading shiplines. K-Line has been a port tenant for over 20 years, while Kerr has been their agent here since 1952. Their fleet of more than 300 vessels operate on 32 routes. Due for completion late this year, the up-to-80-acre facility represents an additional investment of over $10-million by the Port of Long Beach. When fully operational, the terminal will be the second largest leased to a single tenant on the West Coast, according to **K. Kitatani,** K-Line general manager, Pacific Coast. Mr. **Kitatani** noted that **K. Abe,** formerly general manager of K-Line's container division in Tokyo, will be general manager of the new terminal. **Masao Kamijo** is being transferred from Chicago as district manager.

Even the most unconventional marine designers specify...

INCOLOY alloy 825 for exhaust systems



The Bettman Archive

This 19th century land-ship was typical of the many unconventional designs from that period.

When they do, they prevent the awkward problem of regularly repairing and replacing corroded exhaust systems. Also avoiding expensive labor, materials, and downtime.

INCOLOY* nickel-iron-chromium alloy 825 prevents that kind of trouble. We developed it specifically for use in aggressively corrosive environments.

INCOLOY alloy 825 has exceptional resistance to corrosion by seawater, and sulfuric acid condensate. It's also resistant to chloride-ion stress-corrosion cracking and intergranular attack. Even under the higher operating temperatures of a dry exhaust system, it keeps its strength and ductility.

Amazingly, with all these properties and capabilities, it costs less than many competitive materials. INCOLOY alloy 825 has proven itself in many tough marine applications. See what it will do for you. Write for our booklet, "INCOLOY alloy 825."

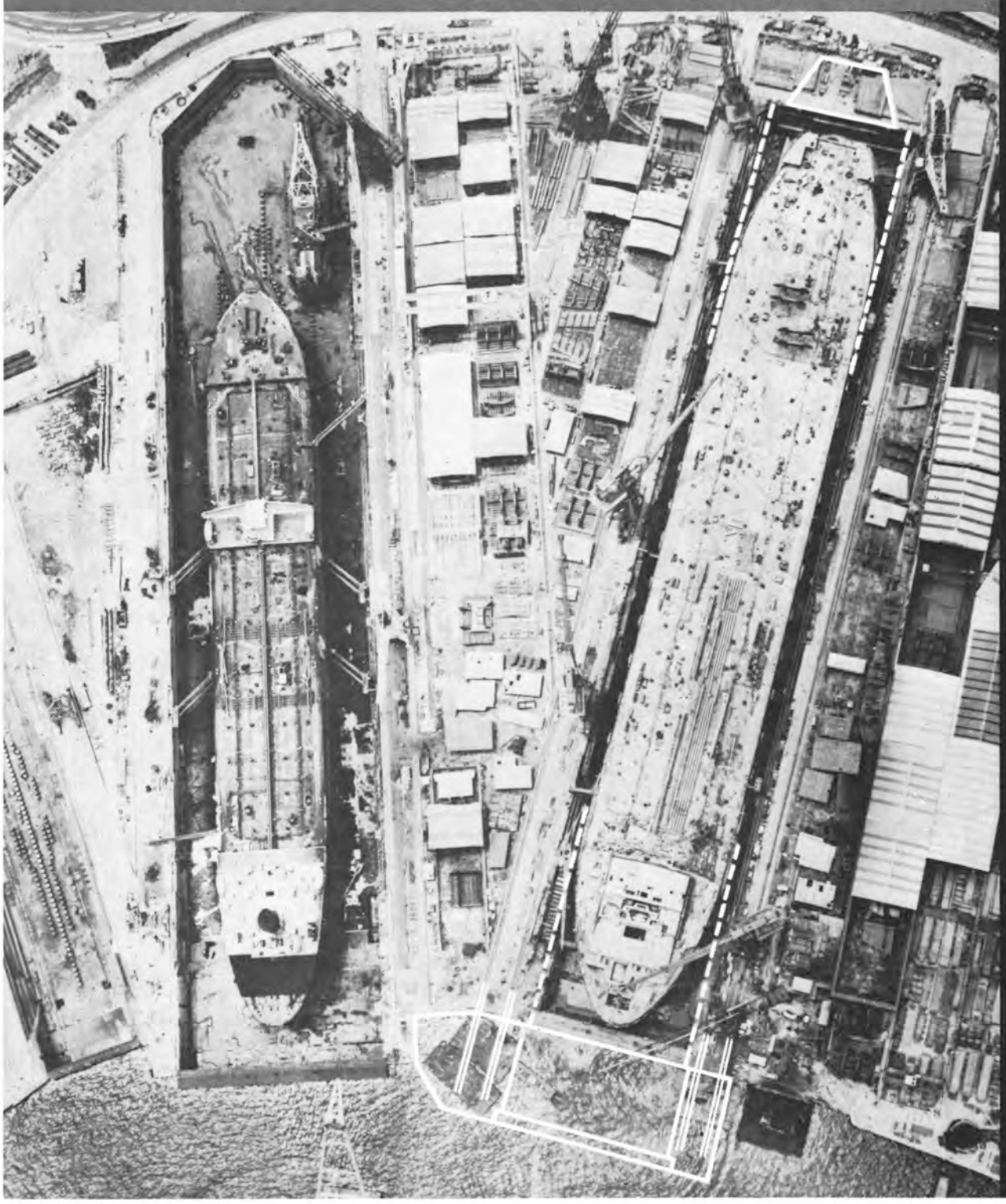
By the way, it works in conventional exhaust systems, too.

Huntington Alloy Products Division, The International Nickel Company, Inc., Huntington, West Virginia 25720.

*Registered trademark of The International Nickel Company, Inc.

HUNTINGTON ALLOYS

IT'S BIG ENOUGH



Expansion of SASEBO's present No. 4 dock of 220,000 DWT shipbuilding capacity to 380,000DWT was started on September 17, 1970 to cope with the growing demands for huge tankers.

The dock will be expanded 60.2m in length and 5.7m in width without hampering the construction of 210,000 DWT standard tankers underway. And when completed, it will be 400m long and 57m wide and it's BIG ENOUGH for accommodating huge tankers.

Expansion of the dock to 400m in length will enable construction of stern part of the next tanker at the same time to increase efficiency and production of the dock. Initial operation of the enlarged dock will start in 1972 with the construction of 250,000 DWT tanker.

Sasebo Heavy Industries Co., Ltd.

HEAD OFFICE: Tokyo, Japan Telex: TK4245 "SSKDOCK"
Cable Address: SASEBODOCK TOKYO Phone: 211-3631

SASEBO SHIPYARD: Nagasaki, Japan Telex: 7428-19 "SASEBODOCK SAS"

OVERSEAS OFFICES:

NEW YORK OFFICE: 11, Broadway, New York, N.Y., 10004, U.S.A. **Telex: 421675 "SASEBO NEWYORK" USA** Cable Address: SASEBODOCK NEWYORK **LONDON OFFICE:** Bishopsgate House, 80 Bishopsgate, London, E.C.2.N, 4AU. England **Telex: 25591 "SASEBODOCK LDN" UK** Cable Address: SASEBODOCK LONDONEC2 **HONG KONG OFFICE:** Hang Chong Bldg., Queen's Road, Central, Hong Kong Cable Address: SASEBODOCK HONGKONG **OSLO AGENT:** NIELS EBBESEN & CO. Fr. Nansens Plass 8, Oslo 1, Norway **Telex: 16675 "EBBES N"** Cable Address: EBBES **STOCKHOLM AGENT:** ARNE LARSSON & CO. A.-B. Banergatan 37 P.O.B 27007, 10251 Stockholm 27 **Telex: 1513 "FRDSHIP S"** Cable Address: FRIENDSHIP

Newport News Names Via To New Duties

G. Guy Via Jr.

L.C. Ackerman, president of Newport News Shipbuilding and Dry Dock Company, Newport News, Va., has announced the appointment of **G. Guy Via Jr.** to the newly-created position of manager of marketing for commercial ships. Mr. **Via** has been manager of the ship repair sales department since August 1969.

"We are consolidating our present ship repair sales organization with our recently-established market development division," Mr. **Ackerman** said, "as a further step in our stated objective to capture the lead in all facets of the commercial ship market."

Mr. **Via,** who will report to director of market development **Joseph D. Deal Jr.,** will continue management of ship repair sales in addition to his new marketing responsibility.

Mr. **Via** joined Newport News in 1947 as an estimator in ship repair after graduating from the University of Michigan with a degree in naval architecture and marine engineering. In January 1966, he was named assistant manager of the department.

A naval officer during World War II, Mr. **Via** served three years in the Pacific on the destroyer Smith (DD-378), the last 15 months as chief engineer. He was engineering inspector on the staff of Commander Destroyers Atlantic Fleet when the war ended in 1945.

A native of Newport News, Mr. **Via** is a member of The Society of Naval Architects and Marine Engineers, National Defense Transportation Association, and the American Society of Naval Engineers. He served as president of the Newport News Propeller Club in 1962-63. Currently, Mr. **Via** is a member of the board of directors of the Newport News Savings and Loan Association and chairman of the administrative board of Trinity United Methodist Church.

Holland-America Line To Acquire Interest In Westours, Inc.

Holland-America Line has announced that, subject to approval of American and Dutch authorities involved, the company will acquire a majority interest in Westours, Inc., Seattle, Wash. A provisional agreement has been reached by Holland-America officials and **Charles B. West,** president and partial owner of Westours, Inc. The management of Westours, Inc. will continue under Mr. **West.**

Westours, Inc. is a leading American tour operator involved in the organization and marketing of packaged tours and in the operation of tours and cruises. The company owns several cruise vessels and hotels and a fleet of touring buses.

Since 1946, Westours, Inc. has offered cruise tours from the U.S. West Coast to Alaska. Last year, the company developed a new cruise area in the Pacific and is currently offering cruise tours from Tahiti and the Fiji Islands on the cruise ships Pacific Star and West Star.

German Shipyard To Enter Large Ship Field

Blohm & Voss, the third largest West German shipyard, with approximately 7,000 employees and a present output of about $140-million, plans to turn to large-sized shipbuilding. The announcement was made by the board of directors in Hamburg during the recent discussion of the annual report. The shipyard has an outstanding reputation in the building of special-purpose vessels.

The present volume of orders is approximately $205-million. This includes two large container vessels for Hapag-Lloyd's East Asia service, a special-purpose vessel for cars, and a general cargo/bulk vessel of the Pioneer type.

According to the Blohm & Voss management, it will turn to large-sized shipbuilding in the future because of the substantial economies that can be achieved. In their drydock Elbe 17, Blohm & Voss have the capacity for building bulk carriers and tankers up to 235,000 tons and can guarantee short delivery.

Wall Rope Offers Specification Chart

A new rope specifications wall chart is offered by Wall Rope Works. Tensile strengths and weights per 100 feet are given for a complete range of rope sizes from 3/16-inch diameter (5/8-inch circumference) to 4-inch diameter (12-inch circumference). Both diameter and circumference are listed for all sizes.

The chart permits easy comparison of tensile strengths and weights per 100 feet for all sizes of the following rope types: Manila, Polypropylene, Poly-plus, Poly-cron, Nylon, Dacron, LST Mooring Line, LST Work Boat, and Super-8-Braid. Wall Rope Works is located in Beverly, N.J. 08010.

Rudder Club To Honor Teddy Gleason Of ILA

Thomas W. Gleason

Thomas W. Gleason, president of the International Longshoremen's Association, AFL-CIO, will be guest of honor and principal speaker at The Rudder Club's Seventh Annual International Maritime Night Dinner, on Wednesday evening, March 10, which will be held this year in the main ballroom of the Statler-Hilton Hotel, New York, N.Y., it was announced by **James L. Bailey,** of Wedemann & Godknecht, commodore of the club.

Executives of American and foreign flag steamship lines serving the Port of New York/New Jersey, will also be honored that evening for their tremendous contributions and untiring efforts in making this port, which is the hub of international trade, the world's greatest for world trade.

Thomas J. Giardino, traffic manager of the Marchessini Lines, will be general chairman of the affair.

The cost per guest is set at $15 each, which includes gratuity. Requests for tickets and reservations should be made to **Anthony D'Ambrosio** (Atlantic Coast Industries, UL 8-8910) or **Robert J. Hannon** (Marchessini Steamship Lines, WH 3-7550). Checks should be payable to Rudder Club, Inc., 518-26 Columbia Street, Brooklyn, N.Y.

SOCIETY OF MARINE PORT ENGINEERS: A general membership meeting and dinner was held on January 20, 1971, by The Society of Marine Port Engineers, New York, N.Y., Inc., at the Commuters Cafe and Restaurant, New York City. After dinner, the meeting was called to order and ballots received for the election of officers. **Thomas M. Finnican,** vice president of Marjet International, Inc., presented a paper entitled "Reasons For Boiler Slag And Corrosion Problems in High Pressure Marine Boilers And A New Approach To Their Alleviation." Shown above with the Society banner in the background are, left to right: **Jack MacDougall,** president, Marjet International, Inc.; **John Antonetz,** manager of technical services, marine sales department of Texaco, Inc.; **Matthew E. Carroll,** sponsor of the paper and member of the board of directors; **Thomas M. Finnican,** vice president of Marjet International, Inc., who presented the paper; **John C. Fox Jr.,** president of the Society; **Edward English,** chairman, entertainment and program committee, and **Joseph Thelgie,** chairman of the board of directors.

Company In Aerospace Field Enters Maritime Industry —Lands $8 Million Contract

At this time of the big dip in aerospace activities, one Louisiana electronics company is using its aerospace experience to successfully diversify into the offshore drilling and shipboard automation business.

The firm is Technical Associates (TA), a nine-year-old New Orleans electronics company whose managerial and engineering staff averages 28 years in age. Most are Tulane University graduates.

Having recently landed an $8-million plus contract from Litton Industries to engineer and fabricate complete shipboard automation systems for nine Navy amphibious assault vessels, TA officials are quite enthusiastic about the future. TA's overall backlog in orders is now in excess of $10 million.

TA president **Melvin Goldstein** commented: "The Litton contract is the most significant contract awarded to TA. With this award we believe TA ranks in the top five U.S. companies designing and manufacturing propulsion automation systems and control consoles for the maritime industry."

The company started in 1961 and built specialized electronics instrumentation for local medical research teams. Four years later, TA was selected by the Boeing Company to design and manufacture an airborne signal conditioning unit for the Saturn SI-C booster. Other aerospace contracts followed with NASA, the U.S. Navy, and the C5-A transport program. During this period, TA developed an internal capability for the most major processes critical to the design and production of advanced systems.

As a result, TA is equipped with a production printed circuit shop, machine shop, computer facility, and numeric control equipment for automatic panel fabrication—rare for such a small company.

Since 1965, the company has grown at the rate of 50 percent a year, and in 1971 that rate will double. TA, in getting out of the aerospace industry with few bruises, now markets a line of supervisory control equipment for the oil and gas production companies and for public utilities.

"We have developed and fabricated equipment which enables oil men to operate the controls of an oil drilling or production platform, not from a site in the Gulf, but from an office in downtown New Orleans," said **Frank Chamberlain,** TA's contract administrator.

Pollution-conscious U.S. offshore oil producers and stricter regulations by the U.S. Department of the Interior will cause offshore operators to depend more on automated control of their remote production platforms. The DATAC 949 System, marketed by the Reiss Corporation, a TA subsidiary, is designed to permit continuous scanning of all valves as often as every 30 seconds and to monitor and control the positioning of production and shut-in valves on remote platforms.

Two years ago TA began applying state-of-the-art technology to the problems of marine automation systems.

TA subsequently made its mark with complete responsibility for the propulsion automation systems for 11 LASH barge-carrying ships, three high-endurance Coast Guard cutters and the nine LHA Navy ships. TA thinks its future is bright.

The Nixon Administration has made a commitment to modernize the merchant fleet by building 30 new ships a year over the next 10 years.

Further, the Navy is now receiving funds for modernization of the fleet. Programs now in process represent over a three-billion expenditure with a significant portion allocated for modern automation equipment.

"If our experience means anything, I suppose you can say that TA is an example of a small electronics company which is using its aerospace know-how to good advantage in promising new fields," Mr. **Chamberlain** observed.

TA is part of the growing Louisiana-based electronics industries. Collective sales for Louisiana's electronics industries in 1970 is expected to hit $130 million, aided in part by worker training grants ranging up to $150 per worker and 10 years of local tax exemption. The incentives are provided by the Louisiana Department of Commerce and Industry, the state agency in charge of attracting new industry.

Two Jackson Marine Tugs Under Construction At Halter —120 Foot Sedco Tug Delivered

Profile view of the new 120-foot ocean tug Betty, built by Halter Marine Services, Inc., New Orleans, for Southeastern Drilling Company, Houston. Betty is the first in a new series of tugs designed and built by Halter. The tug is powered by two 16-cylinder GM EMD 645E2 diesels that develop a total of 4,200 horsepower. The Betty will be used by Sedco for towing pipelaying and derrick barges.

The second 120-foot oceangoing tug in a new class of vessels being built by Halter Marine Services, Inc., New Orleans, La., is nearing completion at the New Orleans shipyards of the company. The new tug is the Mr. Robert, and it is being built for Jackson Marine Corporation, Aransas Pass, Texas.

Jackson Marine Corporation is an operator of offshore support vessels for the petroleum industry. The addition of the Mr. Robert to the company's fleet of vessels in worldwide operation is part of a $5 million per year capital expansion program.

Halter Marine Services, Inc., is one of the world's largest builders of tugs, crewboats, supply vessels, and special marine equipment for the offshore petroleum industry. Vessels in the Jackson Marine fleet built by Halter include the Eastern Moon and Western Moon, 166-foot offshore supply vessels; the Mr. Lou, Captain Jac, and Mister Mike, 100-foot tugs; and the Mister Chip, a 109-foot tug.

The Mr. Robert will be powered by two Alco diesels with two four-blade 132-inch stainless steel propellers.

Also under construction at the Moss Point, Miss., shipyards of Halter Marine Services is a 182-foot tug/supply vessel for Jackson Marine Corporation.

Halter also recently delivered the tug Betty, first of a new class of Halmar vessels, to Southeast Drilling Company, Houston.

The new 120-foot tug will be used by Sedco for towing pipelaying and derrick barges. It is powered by two 16-cylinder General Motors EMD 645E2 diesel engines that develop a total of 4,200 horsepower. The tug is equipped with Lufkin gears, two four-blade 120-inch diameter stainless steel propellers, a Skagit double-drum towing and anchoring handling winch, Smatco stern rollers for handling anchors, and a Halter Marine anchor windlass.

The Betty is 120-feet overall, with a 34-foot beam and a 16-foot draft. It has a 126,000-gallon fuel oil capacity, quarters for 14, and is under 200 gross tons. The new tug is classed American Bureau of Shipping for Full Ocean Service.

G.W. Wintz Elected President Of WSA

George W. Wintz, vice president and general manager of Willamette Iron & Steel Co., Portland, Ore., was elected president of Western Shipbuilding Association at the organization's annual directors meeting.

The full slate of officers elected to serve during 1971 is as follows: **Robert E. Mayer,** chairman of the board; **G.W. Wintz,** president; **Thomas A. Rotell,** first vice president; **E.J. Glenn,** assistant to the president, and **Bernard W. Evans,** executive secretary-treasurer.

Area vice presidents are: Seattle-Puget Sound Area—**J.A. Byington, Malcolm E. McLaren** and **Carl R. Meurk**; Portland-Columbia River Area—**Arthur E. Farr** and **Henry P. McCarthy**; San Francisco Bay Area— **W.C. Brigham, Thomas B. Crowley, William Ferguson** and **John D. Reilly**; Los Angeles-Long Beach Area—**A.J. Maloney, Carl M. Lippincott** and **John E. Marriner**; San Diego Area—**Robert F. Bennett** and **O.J. Hall**; and Western Pacific Area—**Richard Kuwada.**

The election of WSA directors as conducted by mail ballot resulted in election of the entire slate of 17 directors that was proposed by the nominating committee.

Guest speaker at the WSA annual meeting in San Francisco was **Thomas J. Patterson,** Western Region Director of the Maritime Administration, U.S. Department of Commerce.

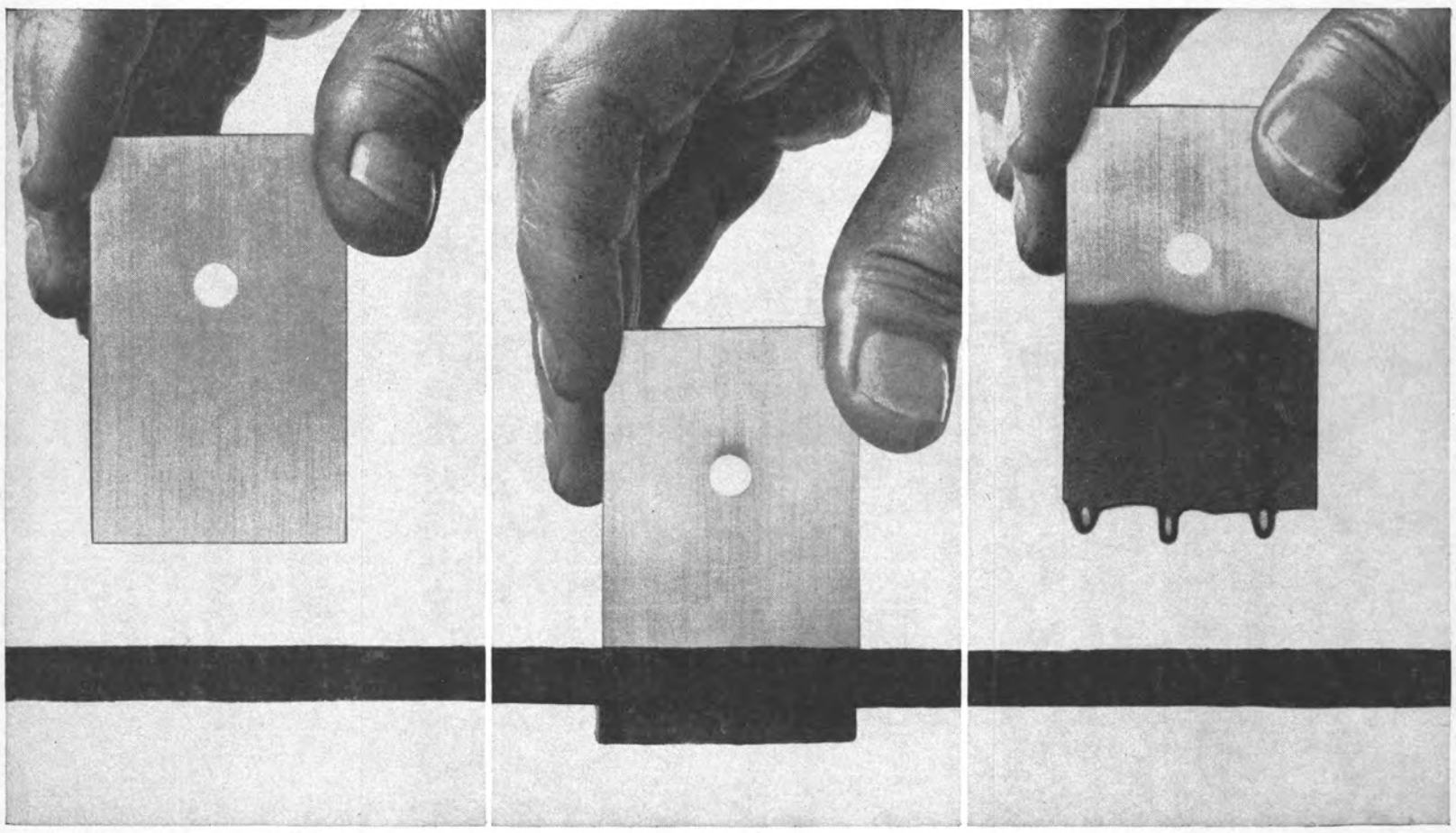
C-E Controls Forms Canadian Subsidiary

Combustion Engineering, Inc., Windsor, Conn. has announced the formation of a Canadian subsidiary of its C-E Controls Division. Designated Optimum Controls of Canada, Ltd., the new group is engaged in the design, manufacture, and sale of electrical and electronic control equipment and systems for industrial, marine, and paper mill boilers.

Marketing C-E Controls' entire line of burner and boiler controls and instrumentation, its offices and manufacturing facilities are located at 2395 Cawthra Road, Mississauga, Ontario.

Bruce Pendergast was named vice president and general manager of the subsidiary. He reports to **J.F. McMahon,** manager of C-E Controls' Optimum Division in Windsor, Conn.

Because Mother Nature works cheap, you can save up to 75% in rust prevention costs.



COST COMPARISON CHART			
TYPE PROTECTION	SQ. FEET	APPROX. COST INCLUDING INSTALLATION AND/ OR APPLICATION	COST PER SQ. FOOT
ANODES	300,000	$ 39,300	$.131
ZINC COATING	300,000	$240,000	$.80
FLUID COATING A	300,000	$ 16,800	$.056
FLUID COATING B	300,000	$ 15,600	$.052
FLOATCOAT	300,000	$7,654	$.026

You don't apply Floatcoat.

The ballast water does.

Floatcoat floats on the surface of the ballast water.

Each time you raise or lower the ballast water level, you automatically apply a new coat of rust-proofing.

No surface escapes Floatcoat.

Not even hidden corners or pockets.

To keep ballast tanks, cofferdams, and rudder interiors really rust-free, remember this: you float, we coat.

Ask your local Texaco Marine Engineer about it.

Or send for the free booklet: "Texaco Floatcoat."

Write: Texaco, Inc., International Marine Sales Dept., 135 East 42nd Street, New York, New York 10017.

TEXACO
WORLD WIDE
MARINE FUELS AND LUBRICANTS

40-Acre Terminal In New York Harbor Opened By Universal

A 40-acre, $15.3-million "ocean terminal for all cargoes" was opened on January 14 by Universal Terminal & Stevedoring Corp. in the Port Newark section of the sprawling bistate New York Harbor. Universal's terminal is part of the 3,822 feet of berthing space and 110 acres of land, construction of which was begun by the Port Authority late in 1969 and which is scheduled for final completion late in 1972.

Located on the northern bank of Elizabeth Channel in the heart of a network of intermodal transportation links, the Universal facility is designed for swift and efficient handling of the wide range of cargoes and vessels now in use and due to come into service shortly.

"It will accommodate a combination of unitized and palletized ships as well as the newest and largest containerships and barge carrying vessels of the present and the future," said **James J. Dickman,** president of Universal Terminal, at dedication ceremonies.

Keyed to multi-form cargo operations, the terminal has been planned for high-speed, flexible transfer of ocean freight between ships and the multitude of rail and highway links adjacent to the waterfront site developed by the Port of New York Authority.

This new Universal facility can handle three ocean vessels simultaneously along the 2,058 lineal feet of bulkheading in the channel; provide the most advanced and fastest cargo transfer between ships and shore with two giant container cranes—each of the $1-million cranes can lift 50 tons of cargo and set it back some 150 feet beyond water's edge; offer storage space for more than 2,000 intermodal cargo containers on paved, secure, and easily accessible upland areas; offer truck platform, tailgate height, with dock leveling devices at each truck position; position containers on chassis with a fleet of specially designed yard hustlers; handle containerized, palletized, unitized or breakbulk cargo in an 800-foot-long shed with a covered area of some 230,000 square feet, and provide advanced technologic security of all cargo and high speed electronic processing of documents.

The facility includes a terminal entry complex served by eight gates, each equipped with 60-ton truck scales. It also includes installation of rail trackage to the distribution shed for direct stripping and stuffing of railroad freight as well as trackage to shipside berths for loading or discharge of containers on flatcars. In addition, a maintenance garage for inspection and minor repair of container equipment and for servicing mechanical equipment has been completed along with a 10,000-square-foot terminal headquarters.

This terminal could be expanded in the immediate future to handle five ships at 3,822 feet of bulkheading supported by 110 acres. Equipped with additional cranes, modern cargo handling equipment and additional sheddage, the five-berth, 3,822-foot wharf and 110 acres of upland could handle up to 10,000 cargo containers simultaneously.

Universal Terminal & Stevedoring Corp. is a subsidiary of Bush Universal, and it is one of the largest and oldest ship-cargo-handling companies in the Port of New York. Formed more than 30 years ago, its operations presently embrace 15 separate areas in Brooklyn and two other facilities in Port Newark, in addition to its new multimillion-dollar terminal.

Mr. **Dickman** and Bush Universal board chairman **Donald J. Matthews** stressed the theme of efficiency and flexibility of the terminal in brief comments to a gathering of several hundred guests at the ceremonies.

Mr. **Dickman,** who pointed to the terminal as a multimillion-dollar investment in the future of the Port of New York by Universal Stevedoring, said that the construction design was patterned to provide the lowest possible cost to customers.

Universal's Port Newark facility is listed officially as Shed 220 by the Port of New York Authority.

Hempel Marine Paints Appoints Olander VP

Finn Olander

J.C. **Hempel,** president of Hempel's Marine Paints of Copenhagen, Denmark, recently announced the appointment of **Finn Olander** as executive vice president and general manager. Mr. **Olander** will direct the company's operations from their headquarters at 25 Broadway, New York, N.Y.

Mr. **Olander** was formerly general manager of the company's operation in Japan. He has had extensive experience in the field of marine and industrial coatings, specializing in application of conventional and exotic coatings for new construction. He has been with the Hempel organization since 1956, when he joined the firm at its international headquarters in Copenhagen.

KNOWN 'ROUND THE WORLD

THE BOSTON METALS CO.

313 E. BALTIMORE ST. • BALTIMORE 2, MD.

Main Office: LExington 9-1900 • Marine Dept.: ELgin 5-5050

TURBO GENERATOR SETS

1

WESTINGHOUSE 440/3/60 200 KW UNIT

GENERATOR: Westinghouse 200 KW—250 KVA—450/3/60—1200 RPM—80% PF—with 40 KW—120 VDC on same shaft. GEAR: 9989/1200 RPM—double helical. TURBINE: Westinghouse—540 PSI—superheat 322°F. Test 930 PSI 800°TT. Also operates 615 PSI—850°TT.

2

700 KW NON-CONDENSING MARINE TURBO GENERATOR SET

TURBINE: DRV-318-MRI — 850# — 850°TT — 24 pounds back pressure—10938 RPM. GEAR—Type S—432 — 10932/1200 RPM. GENERATOR: 700 KW — 440/3/60—1200 RPM.

3

75 KW 120 VDC GENERAL ELECTRIC TURBO GENERATOR SET

TURBINE: 225 lb W.P.—150° superheat—15 lbs back pressure—4962 RPM. GEAR—4962—1800 RPM. GENERATOR: compound—75 KW—120 VDC—651 amps—1800 RPM.

4

WESTINGHOUSE 60 KW 120 VDC M-20-EH

120 VDC—1800 RPM. TURBINE: M-20-EH—20 lbs—dry & saturated—25" vacuum. 7283 RPM. GEAR: 7283/1800. GENERATOR: 60 KW—120 VDC—500 amps—SK—stab. shunt wound.

5

300 KW WORTHINGTON-MOORE CROCKER-WHEELER UNITS

AP2 Ex-Medina Victory units. Worthington-Moore turbine—440 lbs—740°TT—28½" vac.—type S4—5-stage—6097 RPM—serial 7547 & 7548. GEAR: 14x7—6097/1200. GENERATOR: Crocker-Wheeler 300 KW 120/240 DC—1250 amps—type 102-H—compound—973643—999759—armature flange 8¼"—bolt circle 7"—12 holes. Also new armature in stock (weighs 1840 lbs). Also have 2 units—generator 102 HP—300 KW—120/240—stab. shunt—1200 RPM.

6

VICTORY 300 KW WESTINGHOUSE TURBO GENERATOR SET

440# — 740°F — 5930 RPM — 2A-9794-15-16-17—coupling non-recessed on steam end of pinion—5¾". GENERATOR: Westinghouse 300 KW—120/240 DC—1250 amps—1200 RPM—C.B. 208.4.

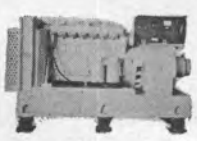
7

1000 KW G.E. TURBO GENERATOR—READY TO GO—WITH A.B.S.

TURBINE: Type FSN—eight stage—9268 RPM—525 lbs—825°TT or 590 PSI & 0° superheat. Turbine serial No. 53729. GEAR: Serial 54804 — 9268/3600. GENERATOR: Serial 5596572 — 1000 KW—450 volt 3-phase 60 cycle—3600 RPM—0.8 PF—type ATB—2-pole—complete with air cooler. EXCITER: EDF — 10.2 KW — 120 volts—4-pole — 3600 RPM—direct connected. UNIT JUST COMPLETELY OVERHAULED & IN EXCELLENT CONDITION—READY TO INSTALL.

DIESEL GENERATOR SETS

8



G.M. 6-71 DIESEL GENERATOR SET

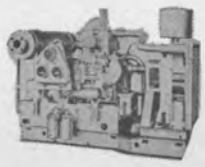
60 KW — 440/3/60 — 1200 RPM—with switchgear.

9

350 KW 120/240 VDC DIESEL GENERATOR SET

Ingersoll-Rand—heavy duty type S engine—8 cyl.—505 HP—10½ x 12. GENERATOR: G.E. 350 KW—120/240—600 RPM—switchgear. Good condition—as removed from Grace Line ships.

10



NEW—UNUSED 10 KW SUPERIOR GAB-2 DIESEL GEN.

4½ x 5¾—BHP 16—RPM 1200—radiator cooled. GENERATOR: Delco 10 KW 120 VDC—83.3 amps—75" OAL—57" OAW—57" OAH. **$1695.**

TURBINE ROTORS

11

WESTINGHOUSE H.P. ROTOR FOR AP2 VICTORY

Reconditioned — balanced—with ABS. Serial 4A-2079—type B—19 stage reaction blades. Excellent — just out of shop.

12

SPECIAL!

ATTENTION—OWNERS OF SUN-BUILT C-4 HULLS

GE LP ROTOR—77943 GE HP ROTOR—77942

These rotors will interchange on all Sun C-4 vessels.

13

AUXILIARY GENERATOR ROTORS

DOW—325—T-2 Tanker Aux. Generator.

14

LARGE G.E. ROTOR FOR T-2 TANKER

Turbine serial 77418 — reconditioned, with certificate. Schenectady.

15

ALLIS-CHALMERS ROTOR

Typical serial No. 3067—will interchange with most 250 KW & 300 KW Allis-Chalmers as installed on Victory's and C-3 vessels.

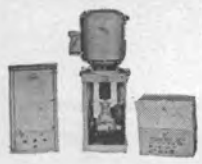
PUMPS

16

VICTORY AP2 MAIN CIRCULATOR

Ingersoll-Rand — 18 VCM—20" x 18"—10,500—10 lbs. MOTOR: 75 HP—Allis-Chalmers—230 VDC—670 RPM. Spare unused armature. Motor frame F.B.V.—162.

17



NEW BLACKMER FUEL OIL TRANSFER PUMP

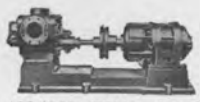
Rotary—50 GPM—50 lbs.—2"—5 HP—440/3/60—with starter & spares.

18

UNUSED BLACKMER VERTICAL ROTARY PUMP

4"—100 GPM—100 PSI—15 HP — 440/3/60 — gear head.

19



KINNEY MOLASSES PUMP

430/215 GPM—size 8x8—pressure 60 lbs.—142/280 RPM. Motor RPM 875/1750. Falk 6.25:1 reducer. G.E. 30/15 HP motor.

20

R-2418 WATEROUS CARGO PUMP

Bronze—14"—top discharge—capacity 2500 GPM—20 PSI. Bilge service—oil service—2400 GPM—75 PSI. Reduction gear. ENGINE: Cummins JN-130M—6 cylinder—4⅛ x 5—130 HP—air starting.

21

UNUSED BOILER FEED PUMP

Worthington Triplex—36.5 GPM—590 PSI—variable stroke—2¾ x 5—P_2—S_2—R_2 vessels. 40 HP—230 VDC—1800/2400 RPM.

22

UNUSED SIZE 4 BUFFALO FEED PUMPS

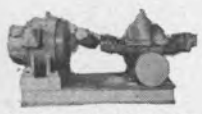
Terry Turbine—BM—273 HP—550 RPM—exhaust 15 lbs—590 PSI—superheat 0°—425 GPM Buffalo Pump—discharge pressure 750 lbs.—5" x 4"—built for USN DD destroyers.

23

COFFIN MODEL F BOILER FEED PUMP—VICTORY OR T2

Control valve 1¼"—Form V1—constant pressure regulator — type C — 150 HP—200 GPM at 575 lbs discharge pressure. 7200 RPM—440 PSI—500°TT.

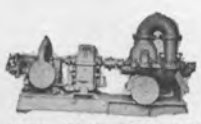
24



UNUSED WARREN BRONZE PUMP

1175 GPM—11.1 lbs.—8" x 8". MOTOR: Reliance 10 HP—115 VDC—850—RPM—76 amps.

25



2 BRONZE I.R. 10GT CARGO PUMPS—14x12

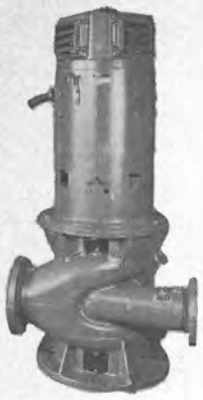
4400 GPM—280' head—3500 GPM—350' or 4000 barrels/hr. IR-10GT—14 x 12—1750 RPM—driven by Elliott 2DRY turbine—400 HP—400 PSIG—500°TT—10 lbs. back pressure—4550 RPM. Gear: 4550/1750. Good condition.

26

NEW WORTHINGTON VERTICAL SUBMERSIBLE BILGE PUMP

For emergency use on passenger ships, etc. PUMP: JAS—264 GPM—171' head—two 6" inlets—one 5" outlet. Motor: 40 HP—230 VDC—149 amps.

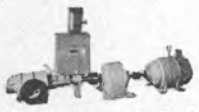
27



NEW—UNUSED BRONZE VERTICAL LST BALLAST PUMP

1500 GPM—56' head or 25 lbs. — 8" suction — 6" discharge. MOTOR: Century 30 HP—230 VDC—110 amps—1750 RPM — 40°T rise — stab. shunt—BB drip proof —controls available.

28



EXCELSIOR MOLASSES PUMP—SIZE 5½"

6" Suction and discharge—210 GPM—45 PSI—125 RPM. MOTOR: 10 HP—230 VDC—Frame 67—with gear.

29

BRONZE 14x14x12 CARGO STRIPPING PUMPS

700 GPM @ 100 lbs. Ex-T2 Tanker pump. Also available in steel.

30

T-2 TANKER BILGE, BALLAST AND FIRE PUMP

Bronze — 10x7x10 — vertical duplex. Steam pressure 150 lbs. gauge — exhaust pressure 10# gauge—discharge pressure 100# gauge —300 G.P.M.

WINCHES AND WINDLASSES

31

AH&D SINGLE SPEED WINCHES

7250 lbs. @ 220 FPM—50 HP—230 VDC—with control. $1750 as is.

32

VICTORY UNIT WINCHES

50 HP—230 VDC—U-1, U-2, U-4, U-5—reconditioned.

33

MODEL U-6 DOUBLE DRUM WINCHES WITH GYPSIES

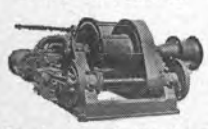
50 HP—230 VDC—reconditioned.

34

WATERMAN STEAM DECK WINCH COMPOUND GEARED

Compound-geared "Valle Type"—9½ x 10. 7000 lbs.—185 FPM—single geared. 12,800 lbs. 101 FPM —compound geared.

35



WATERMAN STEAM DECK WINCH—SINGLE GEARED

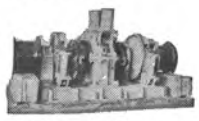
Single-geared "Valle Type"—9½ x 10—10,720 lbs. @ 238 F.P.M.

36

HYDE NO. 7 WINDLASS

1¾" Chain—Wildcat centers 3'3"—Handles 3000 lb. anchors. MOTOR: 8.7/35 HP—440/3/60—1800/450 RPM.

37



NEW—UNUSED LINK BELT WINDLASS

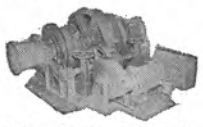
1⅝" and 7000 lb. anchors. 56" Centers—50 HP—230 VDC—spares.

38

IDEAL WINDLASS—UNUSED

1-5/16" Chain—36" Centers—15 HP—115 VDC—1750 RPM—6000 lb. line pull.

39



UNUSED 70 HP McKIERNAN-TERRY WINDLASSES

2¾" Chain and two 10640 lb. anchor & 30 fathoms chain @ 30 FPM. 70 HP—230 volts—shunt DC motors—233 amps—550 RPM—55°C rise. Wildcat centers 47½". Base 9'5" wide x 11' long. Weight 36,000 lbs.

40

3-TON CLYDE DOUBLE DRUM WINCH

3-Ton double drum winch—10 HP—115 VDC—declutchable drums—with controls. Drum is 16" in diameter and 28" wide. Winch OAW 10'2"—OAL 8'1".

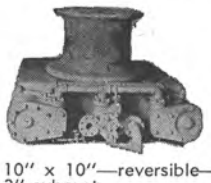
MISCELLANEOUS

41

UNUSED DOCK CAPSTAN

15 HP—220/440/3/60—3000 lbs @ 100 FPM. Gypsy 8"—waterproof box—floorplate.

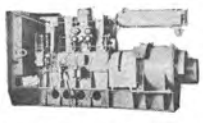
42



HYDE 30" DOCK CAPSTAN

10" x 10"—reversible—W.P. 125 lbs—2½" steam—3" exhaust.

43



LORIMER 75 KW 120/240 D.C. DIESEL GENERATOR SET

Lorimer engine FN—5 cylinder—7.5 bore—9.5 stroke —720 RPM—radiator cooled. GENERATOR: Ideal type DD—75 KW—120/240 VDC—720 RPM—313 amps—frame 350-27. CAN ALSO OFFER SAME GENERATOR WITH 75 KW 440/120/3/60 A.C. Emergency sets from T-2 tankers.

44

DOUBLE INPUT—SINGLE OUTPUT DIESEL REDUCTION GEARS

Farrell-Birmingham—3200 SHP. Reduction gear: 1.81:1—handles two 1600 HP diesels @ 720 RPM. With hydraulic couplings & Fawick clutch. Port and starboard.

45

VICTORY AP2—WESTINGHOUSE MAIN PROPULSION GEAR

6000 SHP—Serial 4A-1620—Medina Victory.

46

INGERSOLL-RAND MODEL 40 AIR COMPRESSOR

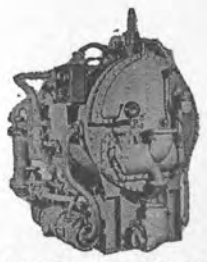
Two stage—135 CFM—7" x 6¼" x 5"—110 lbs.—870 RPM—inner cooler. MOTOR: Allis-Chalmers 40 HP — 230 VDC — 145 amps — 1750 RPM — Model EB121.

47

DeLAVAL PURIFIERS

Model 55-13—225 GPM. MOTOR: L.A.—Frame 224—2 HP—230 VDC—1750 RPM. Oil inlet & outlet 1"—water discharge 1½". Also available A.C. 440/3/60.

48



GRISCOM-RUSSEL EVAPORATOR

12,000 evap.—230 VDC pumps or 440 A.C. pumps. Complete with Weir automatic water valve.

49

UNUSED 1135 SQ. FT. C.H. WHEELER CONDENSER

20" Ex. inlet—⅝" Cu-Ni tubes—with or without air ejector.

50

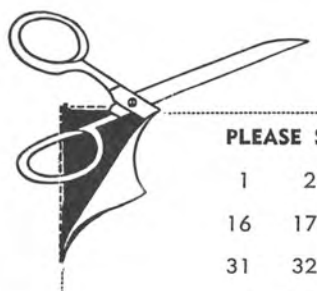
UNUSED 20 KW SWITCHBOARD

20 KW 120 volt switchboard for two generators in parallel with distribution.

51

1 PAIR OF 300 HP UNION DIESEL ENGINES

Port and starboard—model 06—300 HP at 350 RPM —4 cycle—direct reversible—11 x 15—overhauled 1966—in good condition. Just in from Navy.



PLEASE SEND INFORMATION ON THE FOLLOWING: (Please circle items) 2/15/71

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
46	47	48	49	50	51									

NAME..... COMPANY.....

ADDRESS..... POSITION..... PHONE.....

CITY..... ZONE..... STATE.....

Robert Bush To Head New AML Subsidiary

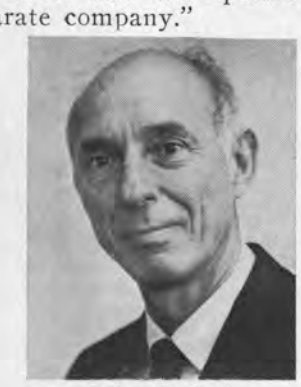
Stevedoring and terminal operations on Puget Sound and the Columbia River, formerly handled by American Mail Line Ltd.'s stevedoring and terminal operations department, was transferred to a new and wholly-owned subsidiary of American Mail Line Ltd.—Western Stevedoring & Terminal Corporation.

Robert D. Bush will be president of the new firm. Mr. **Bush** will retain his position as vice president, freight services, for the parent company.

The new firm is headquartered at Seattle's Pier 28 in office space leased from AML. Columbia River operations, to be headed by **J.F. Nicholson,** currently AML's district operation manager, will be centered at Terminal No. 1 in Portland, Ore.

According to Mr. **Bush,** the change from a department within AML to a separate company was needed because of the continuing demand for increased specialization within stevedoring and terminal operations functions as a result of containerized cargo movement.

Mr. **Bush** stated: "Here at AML, we have as much or more experience in containerized cargo movement as anyone in the Pacific Northwest. The expertise we have gathered from our pioneering efforts in this field to the present will enable us to provide a useful service to other shipowners as well as to AML. And to give the best possible service to everyone, it is advisable that we operate as a separate company."



Robert D. Bush

Western Stevedoring & Terminal Corp. already has agreements to serve as contract stevedore and terminal operator for the Johnson Line and Prudential-Grace Lines, according to Mr. **Bush.**

Western Stevedoring & Terminal Corp. will begin operations with transferred equipment from AML totaling $700,000 depreciated value. In addition, the parent company will provide a substantial investment for working capital. All of AML's present stevedoring and terminal operations staff will be transferred to Western Stevedoring & Terminal Corp. In all, the new company will employ 27 salaried personnel—20 in the Puget Sound area, and seven in the Columbia River area.

Mr. **Bush** joined AML 22 years ago when the stevedoring and terminal operations department was formed in 1948. After a short leave of absence, during which he served in the Korean War, he returned to AML as executive assistant to former president **Worth B. Fowler,** who was at that time executive vice president. Mr. **Bush** served as director of administration and assistant vice president before assuming the vice presidency for freight services, his current title.

Mr. **Bush,** as president of Western Stevedoring & Terminal Corp., brings to the new company a wealth of background and knowledge of the shipping industry. His father retired from American Mail Line Ltd. in 1959 as vice president of finance, after having been with the firm since its founding in 1940.

MarAd Publishes Container Guidelines

The Maritime Administration has available a study containing extensive guidelines for the deck stowage of containers.

A summary of the suggested guidelines—directed to ship design, ship operations, and container operations—covers more than five pages of the report prepared for MarAd by J.J. Henry Co. Inc.

The guidelines cover reduction in ship motion, protection of containers from sea impact, securing and locating containers on deck, and the security of cargo itself inside the container.

"YOU MAKE MONEY WITH...

PUSH

...AND OUR 3 HYDRODYNE TOWBOATS GIVE UP TO 20% MORE PUSH, WITH TERRIFIC STEERING ABILITY"

says Ray Eckstein, President of Wisconsin Barge Line, Inc., (right). Shown with Mr. Eckstein is Vince Tranchita, Vice President of Wisconsin Barge.

"Our latest towboat, the 5,000 h.p. M/V Rose Tranchita, was built by St. Louis Ship from the same blueprints drawn for our M/V Kathryn Eckstein, and later used for the M/V Penny of Cassville. We didn't change a thing. I've questioned our Regular Pilots and the Trip Pilots about HYDRODYNE performance, and to quote one: 'These are 3 terrific shovin' towboats. They steer and hold a tow right up to the buoy line.' All unanimously agree that the 3 St. Louis Ship Hydrodyne towboats have TERRIFIC PUSHING and STEERING ABILITY, and after all, *that's what makes you money!*"

As a result of the outstanding performance of the above 3 towboats, a 4th Hydrodyne of 6,650 h.p. was ordered by Wisconsin Barge Line. St. Louis Ship's exclusive

Hydrodyne concept embodies the optimum in hull lines, nozzle and propeller design, and rudder configuration. St. Louis Ship has built more than twice as many towboats as its next largest competitor. Call us at (314) 638-4000. Maybe we can help *you!*

ST. LOUIS SHIP
DIVISION OF POTT INDUSTRIES INC.
611 EAST MARCEAU STREET, ST. LOUIS, MO. 63111

New York, Chicago, Kansas City, New Orleans, Memphis, Minneapolis, Houston and Mobile.

Bulk Shipment Of Potash Sent To Hawaii In Containers

A bulk shipment of 138 tons of potash transported from the Port of Oakland recently bound for Hawaii normally would have aroused little curiosity. But the fact that the bulk product was moved for the first time in containers made the shipment revolutionary.

Traditionally, bulk commodities like potash have been considered economical for shipment only in extremely large quantities and have been transported primarily by barges or bulk ships. But a new business along the Oakland waterfront may be a force in changing that theory. In July, **Don Vandeberg** founded Bulk Transfer Inc. near Port of Oakland marine terminals facilities and announced that the company would provide the intermodal service of transferring rail or truck bulk shipments into ocean containers.

While a small number of concerns in several other U.S. port cities handle a limited number of commodities in a like manner, Mr. **Vandeberg's** company is believed to be the nation's only firm transferring a wide range of products.

The company can move 60 tons per hour of any dry flowable product from hopper equipment into freight vans. Other services offered by the firm include arranging for container drayage, fumigation and agricultural inspection.

Shipping bulk goods in vans has several advantages, but simply stated it "offers the protection of the container package, yet allows the economics of bulk handling," Mr. **Vandeberg** says. The recent shipment of potash provides a good example.

Normally, the product would arrive at a port from Kaiser Chemical facilities in Wendover, Utah, be off-loaded from a truck or rail car and loaded by mechanical bulk handling equipment aboard a barge. Upon reaching Hawaii, bulk handling equipment would again be needed to discharge the potash before it could be put into a truck for movement to its ultimate inland destination.

Previous to Mr. **Vandeberg's** system, the only available alternative method was to bag the product and ship it in the same manner one would any general cargo, but at a higher, non-bulk rate. Containerization eliminates several costly steps in either operation.

When the potash arrived at Bulk Transfer, equipment rapidly moved it from rail cars into containers. The vans were trucked the short distance to the Oakland docks, where giant cranes loaded them aboard the Matson containership Hawaiian Enterprise. Similar cranes were used to discharge the vans upon the ship's arrival in Honolulu. The potash remained in the same container for the entire journey from Mr. **Vandeberg's** facility to Hawaii distributors.

"Because of containerization, handling costs at the destination end are virtually eliminated and distribution costs are reduced sharply," Mr. **Vandeberg** says.

"Our system allows companies to operate with a minimum of inventory because they no longer need to ship large lots to qualify for bulk rate status," he says. "And as container space increases in the shipping industry, rates quoted on bulk commodities in vans is becoming quite competitive with 'bulk aboard ship' rates."

Mr. **Vandeberg** sees a bright future for his new operation. He feels that a wide range of bulk commodities will be shipped more frequently in containers. High-value ores, specialty clays and a host of agricultural products are all well-suited for containerization, he feels.

"I think there has been a need for this system ever since the container age began," Mr. **Vandeberg** says. "People are just beginning to realize how versatile a container can be."

$34.5 Million Plan For Alaska Ferries

Governor **William A. Egan** of Alaska recently announced plans for the construction of three ferryboats for a total cost of $25.5 million. Included in the program is an ocean-going ferry about 405 feet in length at an estimated cost of $17.5 million, plus two small 235-foot ferries with a total cost of $8 million.

At the same time, a plan to lengthen the Malaspina class boats at a cost of $9 million and to sell the Norwegian-built Wickersham, was disclosed.

FOUR MORE FOR AFRICA: Four Equity standard 32-foot single-screw water taxis are shown just prior to being loaded on board M/V Afrika for shipment to Warri, Nigeria. The vessels were built by Equitable Equipment Co., Inc., New Orleans shipbuilder, for the account of Shell/British Petroleum in Nigeria which owns and operates more than 20 Equity 32 footers in Nigeria alone. The boats are powered with a GM 8 V71 N diesel engine and have an operating speed of 25 miles per hour. They are also available in twin screw models.

Todd Shipyard Ingenuity Prevents River Pollution

The M/V Thalassoporos, a 600-foot vessel of foreign registry, recently arrived at New Orleans to unload its cargo of coal. The ship had been aground off Nassau, suffering considerable damage.

Captain **Christos,** master of the ship, was advised by Todd Shipyards' New Orleans Division that the damaged ship could be drydocked without causing pollution to the river, but that the leaking diesel oil could not be saved. The captain was further advised that in the two days needed to clear the ship's cargo, Todd would prepare the drydock for the ship and the oil spillage.

Divers' examination of the underwater hull revealed a 185-foot gash running aft from the bow, with ruptures, split seams and other damage extending over 90 percent of the ship's bottom. Ruptured bottom tanks contained some 500 barrels of diesel fuel which was trapped in the tanks by water pressure.

At the Todd yard, work crews busily sealed drains and scuppers in the drydock's deck and lower wingwalls and built husky barricades at both open deck level ends of the dock. Sluice gates were installed on the down river end to permit continual drainage of unpolluted water. After the vessel entered the lowered drydock, a floating oil control boom was rigged in place. A barge with oil recovery pumping equipment was moored in place, and the vessel was lifted slowly high and dry as the oil, spilling from the ruptured tanks, was pumped out from behind the temporary bulkheads where it had been trapped. These precautions proved highly effective in that leakage into the Mississippi River was infinitesimal, thus sparing the river from another spill. The mess on the deck of the drydock was cleaned with dispersants and other chemicals, then pumped into the waiting barge for final disposal.

Temporary steel reinforced 4-foot bulkheads were erected and sealed prior to damaged vessel's arrival to prevent leakage from each end of drydock at Todd New Orleans.

Effective use and careful monitoring of sealed barricade and slickbar floating oil boom aid the containment and removal of oil, preventing pollution of the Mississippi.

Entrapped oil from the vessel's tanks and oil water is chemically treated as it is pumped from the barricaded drydock to the disposal barge.

BJ Introduces Pneumatic Monitoring & Signal System For Unattended Engines

A new, completely automatic warning and protection system which monitors and warns or shuts down an unattended engine in the event of a malfunction, has been announced by Byron Jackson Inc., (subsidiary of Borg-Warner Corporation), Long Beach, Calif., according to **E.C. Kendall,** special products manager.

Especially designed to provide fail-safe operation, the new BJ system differs from most protection devices in that it is pneumatically powered. It is not subject to vibrational failure.

Offering wide flexibility, the new signal system can be used for any combination of individual or simultaneous monitoring of: (1) low engine oil pressure; (2) high engine temperature; or (3) loss of engine coolant. It can also monitor low oil pressure of the equipment driven by the engine (compressor, generator, etc.). In the event of any of these conditions, a continuous, highly audible whistle warning is sounded until the malfunction is corrected or the engine shut down. The whistle can be located either at the engine or at any convenient remote location.

The system can also be programmed to close the fuel valve, automatically stopping the engine under these same abnormal conditions, in addition to the audible warning. It is ideal for all engines—diesel, gasoline or natural gas.

The new BJ warning system is particularly well suited for use on unattended engines in applications such as water-flood pumps and remote process pumps in the petroleum industry, for marine pumping units, drilling mud pumps, air compressors, pipeline pumps, drilling rigs and generator sets. It can also be modified to suit the special needs of many other prime movers and accessories.

As a part of the fail-safe design of this new system, the engine cannot be started without first manually suppressing the system by holding in a button during start of the engine. Once the oil pressure is up, the system takes over automatically to monitor the engine's vital functions.

For more complete information contact: **E.C. Kendall,** Byron Jackson Service Equipment Company, P.O. Box 2250, Long Beach, Calif. 90801.

PAD Line Names Three To New Posts

The appointment of three members of the Pacific Australia Direct Line to new posts in the organization has been announced by General Steamship Corp., Ltd., representatives of the line since its inception in 1921.

Named general manager of the PAD Line department was **W.A. Lusse,** who had been manager of the department. **Daulton Mann Jr.,** who has been with General Steamship since 1968, was named PAD Line marketing manager, and **Nils Ingemansson** was named manager of PAD Line operations. Mr. **Ingemansson** had been planning cargo handling operations for the new ro/ro ships soon to be introduced in the Pacific Coast/Australia trade this year.

M. Rosenblatt & Son Names Capt. Stark VP

Capt. Robert B. Stark

The appointment of Capt. **Robert B. Stark** as vice president, M. Rosenblatt & Son, Inc., was announced by **Lester Rosenblatt,** president of this prominent firm of naval architects and marine engineers with offices on the East and West Coasts and representation abroad.

Captain **Stark,** who joined M. Rosenblatt & Son, Inc. after completing 26 years of naval service as an engineering specialist, has been executive assistant to the president since 1968. For three years prior to his retirement, Captain **Stark** was professor of naval construction at the Massachusetts Institute of Technology, where he taught courses in naval architecture and marine engineering.

Since joining M. Rosenblatt & Son, Inc., Captain **Stark** has been closely associated with numerous of the firm's design projects, including conceptual design and parametric analysis of a new class of amphibious assault landing ships for the United States Navy, several ocean engineering and oceanographic ship projects, and the design of a new class of high-speed containerships.

Captain **Stark** is a graduate of the U.S. Naval Academy and obtained an M.S. degree in naval construction and engineering from MIT in 1948. He is a member of The Society of Naval Architects and Marine Engineers, the Society of Naval Engineers, the Society of Sigma Xi, and Tau Beta Pi.

Corrosion Dynamics Announces Appointment Of Capt. Lichtenberg

Capt. R.J. Lichtenberg

Kenneth A. Westphal, vice president of Corrosion Dynamics, Inc., Roselle, N.J., has announced the appointment of Capt. **Ronald J. Lichtenberg** as sales representative.

Captain **Lichtenberg** is a graduate of the Maritime College at Fort Schuyler, N.Y., class of 1963. His seagoing experience since graduation has been with States Marine-Isthmian Lines both ashore and afloat.

Corrosion Dynamics is one of the world's leading suppliers of marine rust and scale removal equipment, including Arnessen Electric and Pneumatic Chipping Hammers, Large Area Deck Scalers, and Safety Clutch Handles for Arnessen Chipping Hammers.

Grafton Boat Names Arthur R. Parsons

Arthur R. Parsons

Arthur R. Parsons has been named marketing executive by Grafton Boat Company, Grafton, Ill., it was announced by **Edward D. Fry Jr.,** president of the company.

Mr. **Parsons** retired recently as vice chairman of the board of Pott Industries, Inc., and previously was president of St. Louis Shipbuilding and Steel Company, St. Louis, Mo. In his new position he will be responsible for Grafton's sales, marketing and related activities. His experience includes 38 years in the marine industry. He has served that industry and other civic and charitable organizations in various capacities.

Mr. **Parsons** is a member of The Society of Naval Architects and Marine Engineers, a member of the technical committee of the American Bureau of Shipping, a member of the Presidents Council of St. Louis University, a past director of the Chamber of Commerce of the City of St. Louis, a member of the lay advisory board of Alexian Brothers Hospital, national vice president of The Propeller Club of the United States, past president of The Propeller Club, and regional vice president of American Waterways Operators.

The addition of Mr. **Parsons** adds strength and experience to the Grafton Boat Company on the management level, according to **Robert G. Fournie,** vice president of Continental Boiler & Sheet Iron Works, St. Louis, Mo., which acquired the Grafton firm less than a year ago. Mr. **Fournie** also serves as chairman of the board of Grafton Boat Company.

G.H. Thomas Promoted At IRD Mechanalysis

E.G. Hart, president of IRD Mechanalysis, Inc., Columbus, Ohio, announces the appointment of **Glen H. Thomas** as executive vice president and chief operational officer.

Over the past 15 years, Mr. **Thomas** has served as chief engineer, vice president of engineering and vice president-general manager, which has prepared him for this top operational office involving both domestic and international company business.

A graduate in electrical engineering from Ohio State University, Mr. **Thomas** has a vast range of experience in the design and product development of instruments for advanced vibration and sound analysis studies. He also participated in the design of balancing instruments for the Telstar, Tiros and Relay, as well as many lesser known satellites.

Mr. **Thomas** is a member of the International Standards Organization and American National Standards Institute and serves as chairman of the subcommittee responsible for the development of field balancing standards for both groups.

OH BUOY!: Shipshapely **Linda Kaye Hartz** poses with the new line of floats for waterways, harbors and swimming areas from Borg-Warner's Safety Guide Products Department. Twenty-one-year-old **Linda,** a senior at the University of Louisville, is perched atop a capstan on board the Belle of Louisville. She's holding a 12-inch spherical float which, like all Safety Guide buoys and floats, has a tough Cycolac ABS plastic shell. Rigid urethane foam filling makes the floats virtually unsinkable. For further information about the complete line of Safety Guide buoys and floats for marking and mooring, write P.O. Box 248, Scottsburg, Ind. 47170.

Waterman Steamship Seeks Subsidy For LASH Type Vessels

The Maritime Administration has disclosed that the Waterman Steamship Corporation has applied for a construction subsidy to help build three 38,500-dwt LASH (Lighter Aboard Ship) type vessels for its U.S. Atlantic and Gulf to the Red Sea, Persian Gulf and Indian Ocean service. The company earlier applied for an operating subsidy.

The vessels are intended to carry 71 barges each with cargo space of 17,000 cubic feet. These are the first LASH type ships for which subsidy is being sought under the new long-range program to rebuild the merchant marine over the next decade.

Kelvin Hughes Names Griffith Marine For New York City Area

Kelvin Hughes Division of Smiths Industries, Inc., announces the appointment of Griffith Marine Navigation, Inc., as its New York City area dealer and authorized service depot. Griffith Marine is located at 79 Fourth Street, New Rochelle, N.Y. 10801.

Kelvin Hughes, from its new U.S. headquarters in Woburn, Mass., and through its wide network of dealers, is a supplier of well-known marine electronics equipment, including radar, echo sounders, VHF and SSB radiotelephone equipment.

W.J. Mellin Named VP At Hydroplex Corp.

Capt. William J. Mellin

Capt. **William J. Mellin** has been appointed vice president and elected to the board of directors of Hydroplex Corporation, Stamford, Conn., it was announced recently by **Henry S. Koster,** chairman of the executive committee. The company designs, builds and sells hydrofoils and is the largest operator of these vessels in the United States.

Captain **Mellin** will be in charge of hydrofoil operations at Hydroplex. He has been associated with the company since 1966 as vice president. Hydroplex operates Florida Hydrofoils Inc. in Miami, Fla., and Golden Arrow Hydrofoils in San Juan, Puerto Rico and the Virgin Islands.

In his new post, Captain **Mellin** will head the company's efforts to develop hydrofoils for commercial use. The hydrofoil is known primarily in passenger transportation, particularly in Europe, but recent developments have made the hydrofoil suitable for such activities as offshore drilling, the rapidly growing field of containerized cargo shipping and coastal patrol work.

Captain **Mellin** has been chiefly responsible for developing many of the recent improvements in the hydrofoil, such as increased power, noise reduction, and general seakeeping ability. He operated the first hydrofoil approved by the U.S. Coast Guard in 1963 and has had broad commercial sea experience since his graduation from the New York State Maritime College, Fort Schuyler, N.Y., in 1941.

In one post, he was sea trial captain and foreign business representative for John J. McMullen Associates, Inc., naval architects. Captain **Mellin** is a member of the Council of American Master Mariners.

Tug Contract Awarded To Main Iron Works

Sabine Towing & Transportation Co., Inc., Port Arthur, Texas, has awarded a contract for the construction of a 7,000-horsepower tug to Main Iron Works, Inc., Houma, La. The tug is to be used with a large oceangoing tank barge of 28,000 dwt under construction at Bethlehem Steel Company's Beaumont, Texas yard.

Two Promoted By C-E Marine Division

Combustion Engineering, Inc., Windsor, Conn., has appointed **Thomas E. Matthews** as senior project engineer and **Richard F. Moxim** as assistant manager of service and erection, both in C-E's Marine Division.

Mr. **Matthews** reports to **L.E. Triggs,** chief engineer, and has project engineering responsibility for both domestic and international C-E marine boiler contracts. Mr. **Moxim,** reporting to **D.H. Robertson,** manager of the service and erection department, is responsible for various administrative duties involving erection and service of C-E's marine boilers and burner systems.

Holder of a B.S. degree in marine engineering from the State University of New York Maritime College, Mr. **Matthews** also has a U.S. Coast Guard third assistant engineer's license. He joined C-E in 1965 as a marine test engineer and was appointed design engineer in 1965 and project engineer in 1968.

Mr. **Moxim** sailed for American Export Lines upon earning a B.S. degree in marine engineering from the U.S. Merchant Marine Academy, and later joined the Naval Boiler and Turbine Laboratory as a project engineer. Subsequently, he was a sales engineer for the Branson Instrument Co., a post he held until coming to C-E's Marine Division in 1968 as a controls engineer. Mr. **Moxim** is a former member of the U.S. Naval Reserve, and holds a U.S. Coast Guard license as a third assistant engineer.

Kockums Delivers First Of 17 Giant Tankers

The 255,000-dwt tanker Jade, the biggest ship built so far in Sweden, was recently delivered to Compagnie Navale des Petroles, Paris, France, by Kockums shipyard in Malmo. The tanker is the first in a series of 17 sister ships on order at this yard.

The ship, which will be the largest unit in the French merchant navy, has the following approximate measurements: length, 1,115 feet; breadth, 170 feet, and draft, 65.6 feet. The propulsion machinery is a Kockum-Stal-Laval turbine plant of 32,000 bhp for a speed of 15.7 knots. The tanker's cargo capacity is over two-million barrels. Theoretically, full cargo can be discharged in 27 hours.

After delivery of the Jade, Cie Navale des Petroles will be France's biggest shipping company, with a fleet of 16 tankers aggregating 1.3 million tons deadweight, plus chartered tonnage. The present fleet is entirely French built, except the 33,000-ton motor tanker Butmah, which was delivered from Kockums in 1957.

Mara Made Partner At Roland Marine

George Mara has been made a partner of Roland Marine, Inc., New York based naval architectural and marine engineering company, according to **Adolph von Zedlitz,** president.

Mr. **Mara,** who was previously chief of the hull division of Bethlehem Steel Sparrows Point shipyard, joined Roland in October 1969, and was appointed vice president in June 1970.

Roland Marine, Inc. currently act as consultants to a number of shipowners in connection with the design and construction of various OBOs, ore/oil carriers and containerships.

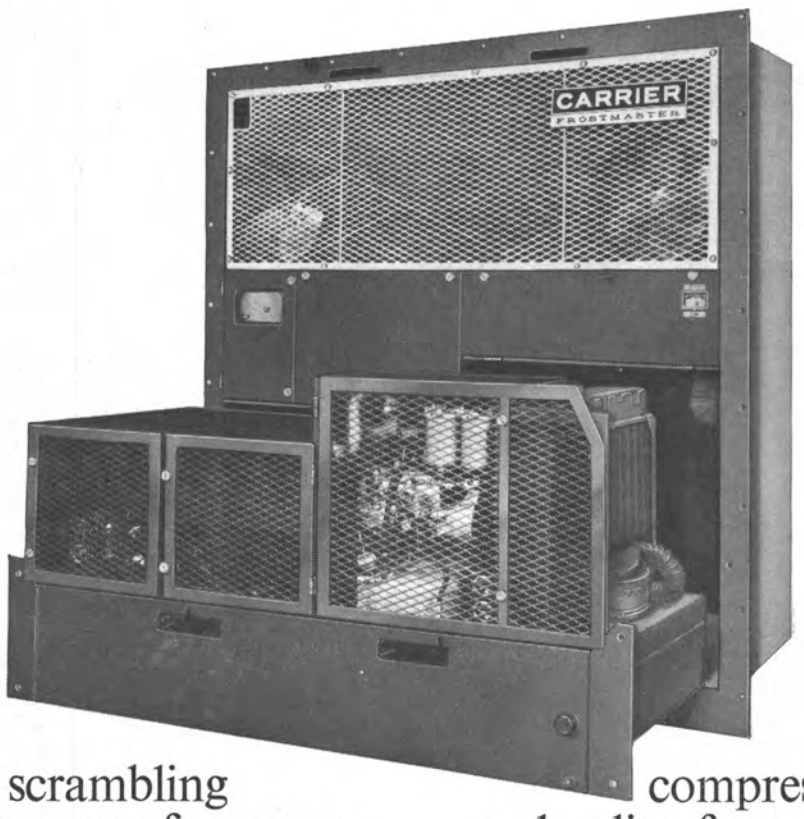
S.J. Weeks Named VP By United Fruit

Samuel J. Weeks has been named a vice president of United Fruit Company Division, United Brands Company, Boston, Mass. He will be responsible for distribution planning and long-term ship charters in the division's banana operations.

Mr. **Weeks** has been vice president-transportation of Sovereign Fruit Company, Miami, Fla., an independent banana enterprise set up in 1968 by United Fruit. Previously, he was associated with Standard Fruit and Steamship and Alcoa Steamship in transportation management.

Mr. **Weeks** attended Tulane University and during World War II served in the United States Navy, retiring with the rank of commander.

This refrigerated wall packs its own power.



Forget scrambling around for power for your refrigerated container. This new Carrier-Transicold unit carries its own like nothing else. A 230-volt diesel generator set.

Like many of our units, this one also becomes the front end of your container (and saves installation costs). Comes factory-charged with refrigerant and oil. Includes the long-life Carrier 6D compressor. And an automatic close-limit thermostat controls refrigeration, electric heating, and evaporator defrost. Also available with compressor cylinder unloading for capacity control.

Service is no trouble, either. The generator set has forklift pockets, so you can slide it out for easy maintenance. And up-front access makes the rest of the unit just as easy to get at —without removing your cargo.

For the only refrigerated wall with its own power, call or write us. Carrier-Transicold Company, Carrier Parkway, Syracuse, N.Y. 13201.

Carrier TRANSICOLD

MarAd Awards $200,000 Propulsion Research Contract

Booz-Allen Applied Research, Inc. of Bethesda, Md., has been awarded a contract by the Maritime Administration for a study of future marine propulsion research needs, Assistant Secretary of Commerce for Maritime Affairs **Andrew E. Gibson** announced.

The project's objective, according to Mr. **Gibson,** is to develop technical and economic data to aid in identifying potential benefits, costs, and other information which will ultimately lead to development of advanced marine propulsion units.

Assisting Booz-Allen in the nine-month undertaking, which is estimated to cost over $200,000, will be J.J. Henry Co., Inc. of New York City, and United Nuclear Corporation of Elmsford, N.Y.

The study will concentrate on defining future worldwide vessel requirements and the economic advantages made possible through improved propulsion systems. All types of ships, except combatant naval vessels, will be considered in the study, which will cover a wide-range of power needs from under 10,000 to over 100,000 horsepower.

Swedish Shipbuilders Report Record Backlog

Order books in the Swedish shipbuilding industry totaled about 120 vessels aggregating 12.5 million deadweight tons, or 6.7 million gross tons, at the end of 1970, the highest figure on record according to a 1970 survey by the Swedish Shipyards Association. The value of the contracts was approximately $1,550,000,000, three-quarters of which was for export.

New orders were placed during the year for 35 ships aggregating 2.75 million deadweight tons, or 5.1 million gross tons, and were the next highest on record. Of the contracts, about 10 were for tankers of about 250,000 deadweight tons or more. A considerable number of orders were for large bulk freighters and OBO ships.

Launchings during 1970 totaled 40 ships aggregating 1.70 million gross tons (3.27 million deadweight tons) compared with 50 ships totaling 1.30 million gross tons in 1969. Deliveries totaled 41 ships aggregating 1.55 million gross tons (2.98 million deadweight tons). The comparative figures for 1969 were 52 ships totaling 1.27 million gross tons. A 14,177-ton floating dock, with a lifting capacity of 27,000 tons, was also delivered during the year.

Handbook Available For Port Of Baltimore

A new edition of the biennial handbook for the Port of Baltimore is being distributed by the Maryland Port Authority. The 128-page volume is divided into four sections, covering the background of Maryland's waterborne commerce, statistical data, a directory of services, and advertising.

Copies may be obtained on request from the Maryland Port Authority at Pier 2, Pratt Street, Baltimore, Md.

GROWING FLEET of Pittsburgh-based Ohio Barge Line, Inc., has been further expanded with the launching of the company's third 5,000-hp towboat by Dravo Corporation, Pittsburgh, Pa. The Steel Forwarder splashed into the Ohio River from Dravo's Neville Island boatyard to join the Steel Courier, identical sister-vessel launched several weeks ago. The 168-by-40-by-11-foot craft are the seventh and eighth towboats designed and built by Dravo for Ohio Barge Line in the past five years. Both of the new vessels are powered by twin 2,500-hp marine turbocharged engines driving through reverse-reduction gears. Ohio Barge Line is one of the largest haulers of iron and steel articles on the inland waterways. Operating on the Ohio-Mississippi River System and the Gulf Intracoastal waterway, the company also transports large quantities of dry bulk and liquid commodities.

5,000-Dwt Stern Trawler Delivered By Hitachi Zosen

Oceangoing stern trawler Rikuzen Maru shown leaving on maiden voyage for test operations in the East China Sea. The 5,000-dwt vessel from Hitachi Zosen then proceeded to the Bering Sea for its first full-scale trawling operations.

Hitachi Zosen have announced the delivery of a 5,000-dwt stern trawler, the Rikuzen Maru, by their Mukaishima Shipyard. Delivery ceremonies were attended by **Otoharu Kajiyama,** president of Hokoku Marine Products, the new owner.

The Rikuzen Maru entered full-scale trawling operations in the Bering Sea after having completed test operations in the East China Sea.

The vessel is a large stern trawler for operations on the open seas. It is provided with trawl fishing devices, quick freezing plant, refrigerated holds, fish meal plant, fish meal holds, and fish oil tanks. She is of the flush deck type with forecastle to keep deck working space open. The engine room is compact and is located aft for maximum fish hold capacity. Approximate dimensions are length overall 357.4 feet, breadth 55.8 feet, and depth 35.1 feet. The capacity (bale) of the fish hold is about 85,000 cubic feet, of the fish meal hold about 31,500 cubic feet, and of the fish oil tanks about 9,670 cubic feet. The capacity of the fish meal plant is 125 tons per day. Propulsion is by a Hitachi B&W type 12M42CF diesel engine developing 5,810 bhp for a trial speed of over 16 knots. The complement is 130 persons, and the ship's classification is Nippon Kaiji Kyokai NS* (trawler) MNS* & RMC*.

Hitachi Zosen is a division of Hitachi Shipbuilding & Engineering Co., Ltd. with head offices in Osaka, Japan.

New Essomarine Terminal For Bunkering In Singapore

The new Essomarine bunkering terminal on Chawan Island in Singapore is reported to be the most modern facility in Southeast Asia.

The terminal offers 24-hour-a-day berthing for ships up to 80,000 dwt when loaded, and 120,000 tonners when light. All fuel grades are available at pumping rates that exceed a thousand tons an hour. Chawan has four berths, each equipped for stern loading as well as conventional bunkering.

The facility adjoins a new 80,000-barrel-a-day Esso refinery. Undersea pipelines from an offshore mooring keep the bunkering berths clear of tankers supplying the refinery.

Potable water is available at Chawan, and a full line of Essomarine lubricants is stocked. Esso continues to supply fuel by pipeline at the Keppel harbor wharves and by barge at the anchorages.

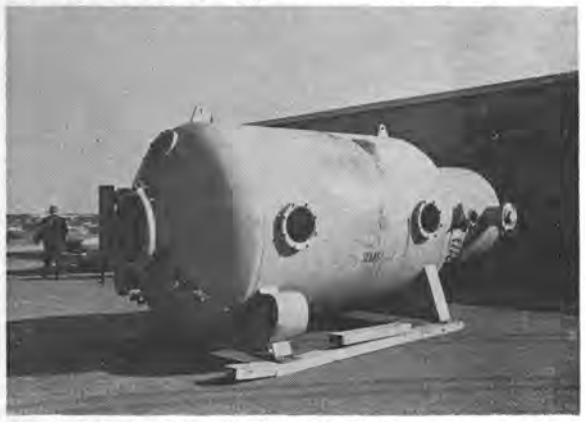
More details about the new terminal are given in a folder called "Bunkeresso Singapore," available from Essomarine representatives worldwide.

Engineering Societies To Hold Joint Meeting

The 47th Annual Joint Convention of the Virginia Engineering and Technical Societies will be held at the Chamberline Hotel, Old Point Comfort, Fort Monroe, Va., June 17-19, 1971.

Inquiries may be addressed to P.O. Box 946, Norfolk, Va. 23501.

Marine Laboratory Building Contributed By Kelso Marine



Hyperbaric chamber used in Tektite II program awaits placement inside 12,000-square-foot building at Kelso Industrial District. Use of the building space was contributed by Kelso Marine, Inc.

A 12,000-square-foot air-conditioned building in the Kelso Industrial District at Galveston Island on the Texas Gulf Coast now houses a laboratory of the South's most ambitious research program. The announcement was made by Col. **Robert W. Martindale,** deputy director for administration of the Marine Biomedical Institute, jointly sponsored by the University of Texas Medical Branch in Galveston and Texas A. & M. University.

Colonel **Martindale** said the one-story building was contributed for indefinite use by Kelso Marine, Inc. Laboratory equipment includes the hyperbaric (high pressure) chamber recently procured for the institute through a National Science Foundation grant. The chamber, which can house four persons, will be used by the institute in its man-in-the-sea program.

The new laboratory facility is located in the center of the 70-acre Kelso Industrial District which is adjacent to Kelso Marine. The yard fronts Galveston Bay and the Intracoastal Canal at Mile 355. Kelso Marine, a subsidiary of C. Brewer, Ltd. of Hawaii, is one of the nation's most modern barge building and repair yards. Recent Kelso projects include construction of oceangoing superbarges up to 480 feet long, as well as conventional size vessels for shoreline and inland use.

Rai Kelso, president of the marine complex, commented that he expects the research facilities of the Marine Biomedical Institute to make unique and significant contributions to the national and international ocean programs.

"OK, OK, WHO'S THE FLOWER CHILD?"

MONTHLY MARINE SPECIALS

FOR SALE

A. **STEEL DIESEL TUG**—90x24x13.
Rebuilt 1968. 1200 HP. Price $120,000

B. **STEEL DIESEL TUG**—80x23x9.6.
Built 1941. 650 HP. Price $30,000

C. **STEEL DECK BARGE** (Sand & Gravel)—
120x38x10.9. Built 1960. Price $30,000

D. **2 WELDED STEEL TUG HULLS**
(Ready for diesel conversion)—
100x25x12. Built 1944. Price $15,000 each

E. **ALL STEEL COVERED DECK BARGE**—
92x30x9.6. Built 1949. Price $15,000

F. **STEEL DECK BARGE**—
90x30x9.5. Built 1949. Price $12,500

MOWBRAY'S
TUG & BARGE
SALES CORP.
21 WEST ST. NEW YORK N. Y. 10006
TELEPHONE (212) 422-2067

FOR SALE OR LEASE
M/V TROPIC HAVEN

150' x 27' x 11'
Single Screw Cat D-397
Speed 10 Knots DWT—690
Class: Bureau Veritas
Type: Coastal Freighter
Refitted to Handle 23-20 containers
Price: $85,000.00

TROPICAL SHIPPING CO. LTD.
Port of Palm Beach **Phone (305) 844-0281**

FOR SALE LST HULL

Superstructure, machinery, shaft, rudders, wheels removed. Until recently used as a floating dock and wharf in fresh water. Price $32,000.00. May consider charter.

Box 1016 Maritime Reporter/Engineering News
107 East 31 Street New York, N.Y. 10016

TURBINES

ROTORS DIAPHRAGMS
GOVERNORS REDUCTION GEARS
MISC. PARTS

With A.B.S. Certificates

G.E. DORV 325	525 KW
G.E. DORV 325	300 KW
G.E. DS 60	300 KW
Worthington	300 KW
De Laval	300 KW
Hendy (Terry Design)	300 KW
Westinghouse (Victory type)	300 KW
Westinghouse	250 KW
Worthington	150 KW
Westinghouse CA 20	100 HP
G.E. Main Turbine Rotor T2	6000 HP
G.E. HP & LP Turbine C2	6000 HP
G.E. HP & LP Turbine	8500 HP
Westinghouse Turbine & Gear C4, C3 Some AP3	8500 HP

Complete Inventory List Free Upon Request

NICOLAI JOFFE CORPORATION
San Francisco Branch
P. O. Box 2445 445 Littlefield Ave.
South San Francisco, California
Phone (415) 761-0993

For Sale or Charter Seagoing Tugs—Ships-Barges 210' Big Tug, 3600 HP, 40' Beam 18' Draft; Tug 125' 1600 HP; Tug 74' 1200 HP; At Hawaii Tanker 1000 Tons Surplus perfect $90,000.00; Barge Seagoing 153' X 36' with Deckhouse and Repair Shop, Overhead Crane $25,000.00; Barge Seagoing 261' X 49' Two story house for Barracks and shop $90,000.00; At New Orleans Tanker 2000 Tons Twin Screw Coils and Pumps $25,000.00; Bulk Carriers 4500 DWT $125,000.00. Ocean Service Corp., 1177 Brickell Ave., Miami, Fla. Phone 358-3262.

Tailshafts

C-3 with ABS
C-4-S-A1 with ABS
T-2 with ABS
C-1-A with ABS
C-2, C-1-B

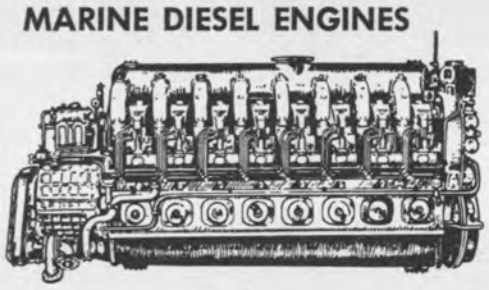
In stock
Ready to ship
Priced to sell

Call Collect Area Code (213) 775-3321

National Metal AND STEEL CORP.
691 New Dock Street, Terminal Island, Calif. 90731
Telex: TWX 213 548-0990

POWER UP
BECAUSE THE
DIESEL PRICE IS DOWN

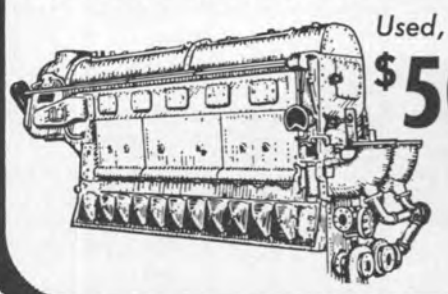
2–General Motors
MARINE DIESEL ENGINES



2–G.M. Model 16-278, 16 Cylinders, 1600 H.P., 750 RPM Used, Very Good **$3950 ea.**

6 –Fairbanks-Morse
MARINE DIESEL ENGINES

Model 38D8 - ⅛, 10 Cylinders, 1600 H.P., 720 RPM, 8½" Bore, 10" Stroke, Air Start. Condition:



Used, Very Good
$5000 ea.

Contact: Ralph Ingram

ZIDELL EXPLORATIONS, INC.
3121 S.W. Moody • Portland, Ore. 97201
Phone: 503/228-8691
Telex: 36-701

"Alice M. Lawrence"
(Portland, Me.)

Set of (10)
8x10 rare photos
of 7-6-5-4 masted

"Grand Yankee Sailing Schooners", Largest in the world, built from 1890-1920, under full sail. Excellent for home, office or gifts, along with history of each. $30. Postpaid, or ($3.50) ea. Postpaid. Larger size mounted photos. Prices on request. 10 day service. Satisfaction guaranteed. Send remittance with order. **Abe Rapaport Marine Equipment. 6110 Fairbrook St., Long Beach, Calif. 90815. Phone: (213) 430-2538 or (213) 596-7320.**

ANCHORS
Specially Priced

Unused 6,000 lbs. Navy Stockless.

One $450.00, ten or more $395.00 ea.

Loaded on conveyance Portsmouth, Va.

Also other sizes and anchor chain.

AL EPSTEIN, INC.
MOST ANYTHING IN MARINE SUPPLIES
JA 5-5526 or JA 2-5141 — P.O. Box 51569
1226 St. Thomas St., New Orleans, Louisiana 70150

BARGES ON THE SPOT

FOR CHARTER

Hopper Barges

175' x 26' Open — 195' x 35' Open

Spud Barges

100' x 48' — 110' x 30'

Offshore Barges

120' x 32' — 120' x 40' — 120' x 45'
140' x 34' — 160' x 50'

Oil Barges

7,000 to 10,000 Bbl.

Also available: various deck barges

FOR SALE

110' x 30' x 7' Inland Deck Barge

McDONOUGH MARINE SERVICE

P. O. BOX 26206
NEW ORLEANS, LOUISIANA 70126/504-949-7586
BRANCH OFFICE: P. O. BOX 233 CHANNELVIEW, TEXAS 77530
PHONE HOUSTON 713-622-9977

EX L.C.M. CARGO OR TRAILER CARRIER

224' x 36' x 8'6—Built 1944 Dravo—Class 100 A-1 Lloyd's 196 Tons Net—1 Deck 4150 Sq. Ft. Carries 9-40 Ft Trailers or 36 x 8' x 8' x 20 containers. Now operating, but available. Panamanian Registry. Asking $125,000.00.

Box 115 Maritime Reporter/Engineering News
107 East 31 Street New York, N.Y. 10016

PROPELLERS, TAILSHAFTS, RUDDERS

PROPELLERS

AP3—Victory—with ABS—located Baltimore.
C-1MAV-1 — with ABS—located Beaumont, Texas

TAILSHAFTS

C-3—reconditioned—with ABS—located Baltimore
C-1MAV-1—with ABS—located Beaumont, Texas

RUDDERS

C-1MAV-1—new—unused
VICTORY—reconditioned
T-2 As removed from vessel. Good. Subject to your survey.

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

New Watertight Doors

IMMEDIATE DELIVERY

6-Dog right and left hand hinged steel doors — with frames. Built and tested to A.B.S. specifications.

SIZES:

26" x 48" 26" x 57"
26" x 60" 26" x 66"
30" x 60"

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

NEW UNIVERSAL CHOCKS

6 Rollers—2 horizontal—4 vertical. For fairleads in all directions; inboard & outboard. Strong construction, easy to maintain. Fulfills all requirements of St. Lawrence Seaway, etc. Excellent for container ships. 5½" rollers for vessels to 20,000 tons. For vessels from 20,000 to 150,000 tons, series L with 7 5/8" rollers. OAH 30"—OAL 30"—OAW 17"

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

T-2 WINDLASSES AND MOORING & HOSE HANDLING WINCHES

T-2 WINDLASSES $9750
AH&D Model S-505—for 2 5/16" chain. Engine 12x14.

T-2 WINCHES $1850
Hunt Tool Co.—mooring winches with outriggers —8¼x10.

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

WORTHINGTON 16"x14"x18"

VERTICAL DUPLEX STRIPPING PUMP

1400 G.P.M. at 110 P.S.I. —suction lift 11.5 feet—steam back pressure 15 pounds. 14" Suction—10" Discharge—2½" Steam—4" Exhaust. Overall Width 6'8"—Overall Height 9' 1½" — Depth 3'9½" — Weight approximately 10,000 pounds.

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

Motor Generator Sets

GENERATOR

MFR.	HP	VOLTS	RPM	TYPE	AMPS
Ideal Elec.	150	230	1200	D-28	534
Ideal Elec.	150	230	1200	D-28	534
Ideal Elec.	40	230	1800	D	145
U. S. Elec.	150	440	1200	SC	198
Reliance	93.6	115	1750	TDC	690
Burke	20	230	1880	M6115	79.6
(W)	3.5	230	1780	CC212.30B	13.8
(W)	3.5	220/440	1750	CC212.31B	10.45.2
Holtzer	2	115	1460	MG133	14
Gen. Elec.	85	440	1765	5K505Y5	108
Gen. Elec.	85	440	1765	5K505Y5	108
Ideal Elec.	40	115	1800	D	290
Ideal Elec.	40	115	1800	D	290

MOTOR

MFR.	KW	VOLTS	RPM	AMPS
Ideal Elec.	100	450	1200	160
Ideal Elec.	100	450	1200	160
Ideal Elec.	25	450	1800	40
Delco	100	120/240	1200	417
Reliance	62.8	230	1750	273
Burke	25 KVA	120	1880	120
(W)	1.4	2000	1780	0.7
(W)	1.4	2000	1750	0.7
Holtzer	190	24	1460	70
Gen. Elec.	60	110	1765	545
Gen. Elec.	60	110	1765	545
Ideal Elec.	25	450	1800	40
Ideal Elec.	25	450	1800	40

National Metal AND STEEL CORP.

691 New Dock Street, Terminal Island, California 90731 Area Code (213) 775-3321 Telex: TWX 213 548-0990

DeLAVAL BRONZE CIRCULATING PUMP

5"x5"—540 GPM @ 15 lbs. DRIVE MOTOR: Allis-Chalmers 7½ HP—440/3/60—1740 RPM—type ARZV —Frame 284V.

$339

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

KINNEY VERTICAL ROTARY PUMP

Fuel oil transfer pump — 2" x 2" — 875 RPM—20 GPM—20 lb head—for diesel fuel. MOTOR: GE 440/3/60—3.7 amps—2 HP—type K. Dimensions of unit: 42" high x 20" wide.

$269

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

1000 CFM AXIAL FLOW FANS

NEW—UNUSED

A1A4W5—built for US Navy —mfg by Buffalo Forge. ¾ HP—440 volts AC—3-phase — 60 cycle — 3450 RPM—1.0 amps—spraptite—frame 182N—built 1958, Unusued — condition excellent. All standard A1AW4 measurements.

$366.66 EACH

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

UNUSED 100KW SUPERIOR DIESEL GEN. SET

GENERATOR: 120/240 VDC—417 amps—stab. shunt—1200 RPM. DIESEL: Superior GBD-8—8 cyl.—5½x7.

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

8" DODGE-TIMKEN THRUST BEARINGS

Self-aligning thrust bearings. Can handle 3000 HP and a thrust load of 35,000 lbs. Has ample capacity for normal existing radial load.

$475

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

BUDA DIESEL GEN. SET 60KW-120 V.D.C.

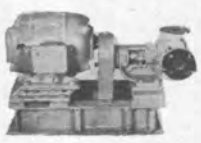
GENERATOR: Westinghouse 60 KW — 120 VDC — 500 amps—1200 RPM. DIESEL: BUDA 6 cyl. 6DCE - 844 — Bosch injection. Practically new condition.

$1850

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

VIKING LUBE OIL PUMP



For thrust bearings, motor bearings, etc. 5 GPM @ 25 PSI—680 RPM — 1¼" suction — 1" discharge. MOTOR: Howell Electric Co.—¾ HP type K—1150 RPM — 440/3/60 — frame 204. BASE: 23" long—10½" wide.

$9750

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

New-Unused 10KW G.E. GENERATORS

Generator ends only. Single bearing — 120 volts DC — 83.3 amps—1450 RPM—type CDM.

$389

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

New Troy Enberg Liberty Ship Gen. Sets

20 KW—120 volts DC—400 RPM—marine type drip-proof. Direct connected generator set with 6" x 7" bore & stroke. Type E-Plug Piston & valve—vertical self-oiling auto. steam engine. Design pressure 220 lbs—10 lbs back pressure. Complete with #62310 rheostat—wiring diagram—wrenches—terminal box & spare parts. Dry wt. 5040; shipping wt. 6300 lbs.

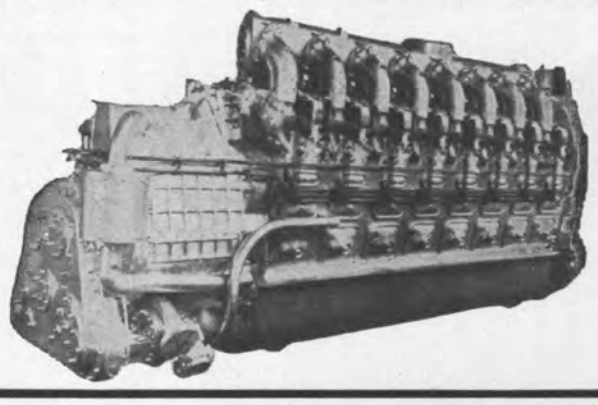
$695

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

FINAL CLEARANCE

G.M. 16-278A DIESEL ENGINES



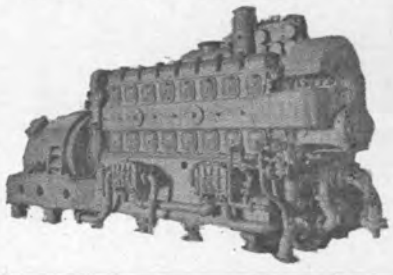
30 TO CHOOSE FROM!
Complete – Clean – And in very good condition

AS REMOVED FROM U. S. NAVAL VESSELS

1700 H.P. @ 750 R.P.M.
YOUR THOROUGH INSPECTION INVITED

NOW! $6750 F.O.B. BALTIMORE

G.M. 8-268A 200 KW A.C. DIESEL SETS



As-Is- While They Last at This Price

Engine: 6½" bore x 7" stroke — 1200 — driving 200 KW Westinghouse generator: 440 volts — 3-phase — 60-cycle — 321 amps — 80% power factor at 1200 RPM.

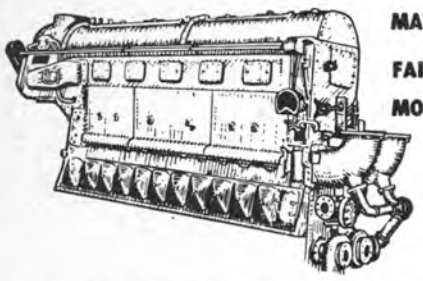
WITH 200 KW WESTINGHOUSE GENERATORS. YOUR THOROUGH INSPECTION IS INVITED.

NOW! $2750 F.O.B. BALTIMORE

THE BOSTON METALS CO.

313 E. Baltimore Street (301) 539-1900 or 355-5050 Baltimore, Md. 21202

MARINE DIESEL ENGINES



MATCHED PAIR . . .

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, Class WG82, 2-stage rated 100 CFM at 300 PSI, water cooled, size 7"x3⅜"x7" with Reliance motor, 30 HP, 220/440/AC/3/60.

INGERSOLL-RAND, 50 CFM, 150 PSI, 20 HP, 440/3/60
INGERSOLL-RAND, 150 CFM, 600 PSI, Model 75, with Westinghouse Motors, 75 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.

WATERTIGHT DOORS

As removed from reserve "mothballed" vessels. Huge inventory of practically all sizes and types ready for immediate delivery . . . and more on the way. These doors have the frame trimmed and are suitable for re-use. Doors are available in 4, 6, 8 and 10 dog types; many are "Quick-acting-wheel controlled."

Save over new replacement costs as shown in the **"Typical Price"** listing below . . .
26" x 48"—4 dog type $ 60.00 ea.
26" x 66"—6 dog type $100.00 ea.
26" x 66"—Quick Acting $175.00 ea..

USED, GOOD STEEL
"QUICK-ACTING WHEEL TYPE" and DOG TYPE

Other sizes and prices quoted on request.

REDUCTION GEARS . . .

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, 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.

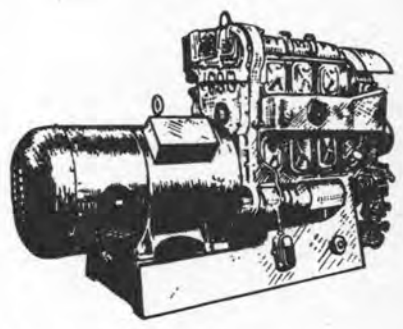
RED HOT BUYS from ZIDELL EXPLORATIONS, INC.

MARINE EQUIPMENT

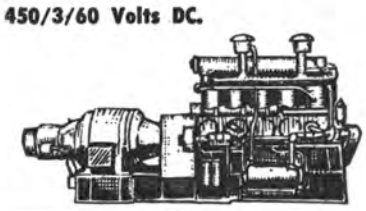
(503) 228-8691
3121 S.W. Moody
Portland, Ore. 97201
Telex: 36-701

MARINE DIESEL GENERATORS

SUPERIOR, 10 KW, 120 Volts DC.
HERCULES, D00C, 10 KW, 120 DC, Radiator cooled.
CATERPILLAR, radiator cooled, 15 KW, 120/240 Volts DC.
GM 4-71, 60 KW, 220/440 AC.
HERCULES DJXC, 25 KW, 120 DC.
CUMMINS A1, 30 KW, 120 DC.
MURPHY, Model ME 66, radiator cooled, 75 KW, 120/240 Volts DC.
CATERPILLAR DIESEL ENGINE, D13000, 85 KW, 220 AC.
LORIMER, F5SS, 75 KW, 120/240 DC, radiator cooled.
COOPER-BESSEMER, JS-5, 250 KW, 240 DC.
FAIRBANKS-MORSE, 38E5¼, 300 KW, 260/345 DC.
GM 8-268, 300 KW, 260/345 DC.

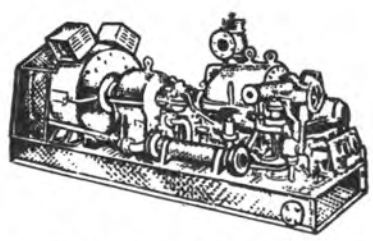


LORIMER 100 KW
450/3/60 Volts DC.



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.

TURBINE GENERATORS



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.

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 common shaft a 250 KW Generator, 440/3/60, and a 90 KW Generator, 125 Volts DC.

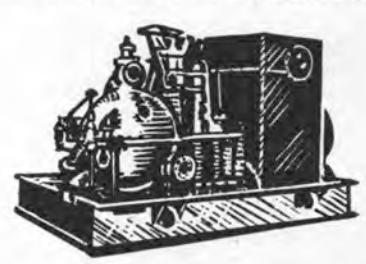
WORTHINGTON Turbines, Form S-4, 440 PSI, 740° F, with Crocker-Wheeler Generators, 300 KW, 120/240 Volts DC.

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.

GENERAL ELECTRIC, DORV 325, 300 KW, 440/3/60.

GE DORV Turbines, with GE Generators, 200 KW, 440/3/60.

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



TURN PAGE . . . more buys!

BEST BUYS!

A.C. & D.C.

MARINE PUMPS

Contact
Ralph E. Ingram
(503) 228-8691
Telex: 36-701

ZIDELL
EXPLORATIONS, INC.
3121 S.W. Moody
Portland, Ore. 97201

AC PUMPS—Horizontal Centrifugal

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

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

4—Worthington, size 3UBI, 400 GPM, 280' head, 50 HP, 440 AC.

1—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.

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.

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.

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

2—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 G: 60 PSI, For Lube Oil Service, Turbine D. n.

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

AC PUMPS—Vertical Centrifugal

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.

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.

1—Westco, 100 GPM, 100 PSI, 2" suction, 2" discharge, with 10 HP Imperial Motor, M15 DC.

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.

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

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

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.

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

STOCKLESS ANCHORS

USED, GOOD QUALITY . . . SAVE!

2,000 pound size
3,000 pound size
8,000 pound size

ANCHOR CHAIN . . .

Used, good, with or without test certificate . . .

1" size
1 1/8" size
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.

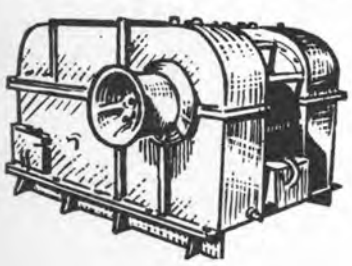
3—Hesse-Ersted, horizontal, double wildcat, 2⅛" chain, 60 HP, 230 DC.

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



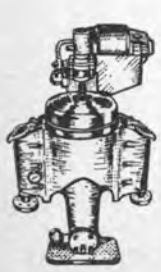
LAKESHORE UNWINCHES, with Allis-Chalmers Motors, 50 HP, 230 Volts DC, complete with Control Equipment.

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.

CENTRIFUGES

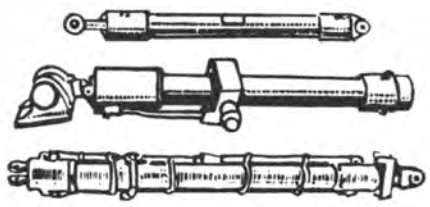


Sharples Purifiers—For Diesel Service or for Lube Oil Service.

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

ALSO: De Laval, Size 65N131, 1½ HP, 440 AC.

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.

$225 each

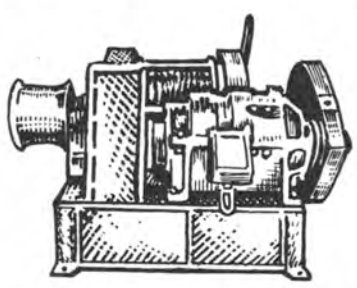
CAPSTAN WINDLASSES

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.

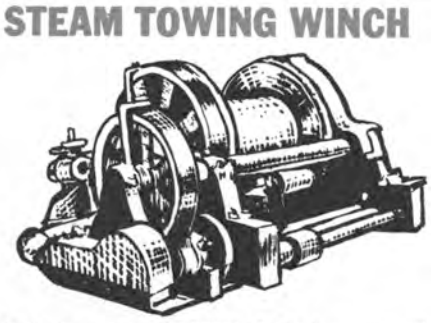
CARGO WINCHES



American Hoist and Derrick Company Winches with Westinghouse Motors, 50 HP, 230 Volts DC, complete with Contractor Panels, Master Switches, and Resistors.

Type 66—single speed, single drum.
Type 67—two speed, single drum.

STEAM TOWING WINCH



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

Contact Ralph E. Ingram

IMMEDIATE DELIVERY

on all your needs!

ZIDELL EXPLORATIONS, INC.

(503) 228-8691
3121 S.W. Moody
Portland, Ore. 97201
Telex: 36-701

FAIRLEADS

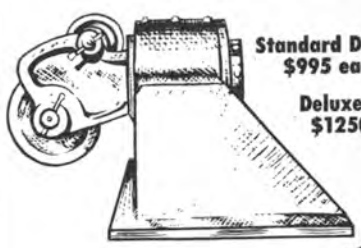
Designed and Manufactured by ZIDELL EXPLORATIONS, INC.

To Give You These Features:

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

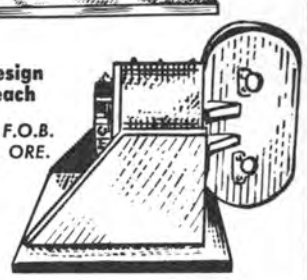
Self Aligning, Swivel Type Head.

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



Standard Design $995 each

Deluxe Design $1250 each

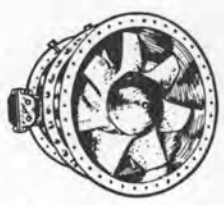


Model Design $1350 each

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

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	Size A5
Size A½	Size A6
Size A1	Size A8
Size A2	Size A10
Size A3	Size A12
Size A4	Size A16

SPECIAL ITEMS

COUPLINGS

(Flexible Couplings betwen 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 AP2 Victory
From C2-S1-B1 Vessel
From Liberty Ships and LST Vessels

PROPELLER SHAFTS

From C3-S1-A3 Vessel
From C2-S-B1 Vessel (Moore built)
From AP2 Victory
From Liberty Ships

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.

Contact
Ralph E. Ingram
(503) 228-8691
Telex: 36-701

Machinery and Equipment

as removed from
S.S. JAMES O'HARA
(AP-179) C3-S1-A3
and **S.S. FREDERICK FUNSTON**

ZIDELL
EXPLORATIONS, INC.

3121 S.W. Moody
Portland, Ore. 97201

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)

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)

Also Machinery and Equipment from VC2-S-AP2 VICTORY SHIPS

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.

We have Bull Gear and matching Pinions for C3 FALK REDUCTION GEARS

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.

CARGO WINCHES

Jaeger, 2 drum, 2 speed, 50 HP, 230 DC.

Parkersburg, 2 drum, 1 speed, 50 HP, 230 DC.

O.C.S., 2 drum, 1 speed 50 HP, 230 DC.

Vulcan, 1 drum, 2 speed, 50 HP, 230 DC.

American Hoist & Derrick, 1 speed, 1 drum, 50 HP, 230 DC.

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.

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, 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, 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, —American Blower, Sirocco capacity 17560 CFM, 5½ SP, 75 HP, 230 DC.

FORGED STEEL LINE SHAFTING

ZIDELL has some Excellent Buys on used—Good Shafting, as shown listed below, for Re-Machining to your specific requirements.

9 Pieces Hollow, 2¼" Wall, 9" Diam, 23'-11" L.

SECTIONS LISTED BELOW ARE SOLID STEEL

11 Sections Flanged, 8⅛" Diam., 16'-6¼" Long
6 Sections Flanged, 8¾" Diam., 27'-4" Long
6 Sections Flanged, 19" Diameter, 23'-11" Long
1 Section Flanged, 19" Diameter, 23'-8" Long
3 Sections Flanged, 19" Diameter, 22'-10" Long
12 Sections Flanged, 19" Diameter, 22'-6" Long
6 Sections Flanged, 14⅛" Diam., 26'-6" Long
2 Sections Flanged, 14⅛" Diam., 18'-6" Long
2 Sections Flanged, 14⅛" Diam., 13'-9" Long
39 Sections Flanged, 13½" Diam., 22'-0" Long
9 Sections Flanged, 15¼" Diam., 12'-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

M.G. SETS

115 VOLTS D.C. TO 115 VOLT SINGLE PHASE A.C.

NEW JANETTE 1 KVA SETS

INPUT: 2 HP 115 volts DC—3.5 amps.—1800 RPM. OUTPUT: 1 KVA—120 volts single phase A.C.—.8 PF—40°C rise.

UNUSED SURPLUS 1 KVA SETS

INPUT: 1.75 HP—115 volts DC—17 amps—1800 RPM. OUTPUT: 1 KVA—115 volts—8.7 amps—60 cycle single phase—0.9 PF. Unit is self excited and will carry load immediately on starting. Regulation ± 5%. Complete with magnetic starter & spare parts. Units designed and built to rigid Navy specs. SIZE: 19.5" long—26.5" wide—16" high. Weight 285 lbs. SPARES: 85 lbs. CONTROLS: 20" x 15" x 10"—75 lbs.

$289.50

LOUIS ALLIS MG SETS
JUST RECEIVED—UNUSED

INPUT: 10 HP—115 volts DC — 78 amps — 1800 RPM. OUTPUT: 5 KW—115 volts single phase A.C. 4-bearing —with 10 HP 115 volt D.C. magnetic starter.

FIRST TIME IN A LONG TIME THAT 5 KW UNITS ARE ON THE MARKET

230 VOLT D.C. INPUT—115 VOLT SINGLE PHASE OUTPUT

NEW—UNUSED MG SETS

Mfg. by KATO Electric Co. INPUT: 25 HP—115 volts DC—160 amps—1800 RPM. OUTPUT: 12.5 KVA—120 volts single phase. Westinghouse magnetic controller. 36"x20"x18½".

FIDELITY ELECTRIC MG SETS

INPUT: 30 HP—230 volts DC 120 amps 1800 RPM. OUTPUT: 20 KW—25 KVA—120 volts AC 208 amps—single phase. Excellent condition.

UNUSED CONTINENTAL MG SET

INPUT: 7½ HP 230 volts DC 36 amps 1800 RPM. OUTPUT: 5 KW 10 KVA 120 volts single phase 60 cycles AC.

25 KW MG SETS
115 DC to 440/3/60 A.C.

INPUT: 40 HP—115 volts DC—290 amps—1800 RPM. OUTPUT: 31.5 KVA—25 KW—440/3/60. Complete with motor and generator control.

INQUIRE ABOUT MANY MORE SIZES NOT LISTED HERE

THE BOSTON METALS COMPANY
313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

14" ALL-BRONZE PORTLIGHTS
with deadlights

THE BOSTON METALS COMPANY
313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

UNUSED BITTS

Single bitts—6" diameter—24½" long—8" wide. Not shown is 90° bracket. While they last.
BUY IN QUANTITY
$19.95 EACH

THE BOSTON METALS COMPANY
313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

PROPULSION SHAFTING

Ex-Tank Lighter Craft — 2" diameter — 66⅝" OAL.—bronze coated throughout —threaded, tapered keyway. Ex-Tanker Lighter part No. M-10151. 100 available.

$6.95 EACH

THE BOSTON METALS COMPANY
313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

HIGH PRESSURE STARTING AIR TANKS

600 lb working pressure—1200 lb test pressure—16½" diameter—7' 3" overall length.

$269.50

THE BOSTON METALS COMPANY
313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

DIESEL FIRE & GENERAL SERVICE PUMP
500 PSI @ 100 lbs—with self-priming attachment

Mfg by John Reiner & Co.—DP-60 —diesel engine 4 cyl. Continental—electric starting — 42 HP — 1800 RPM. PUPM: 500 GPM—100 PSI—4" suction—4" discharge. Unused.

THE BOSTON METALS COMPANY
313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

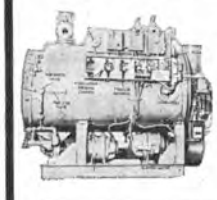
UNUSED 10x9x12 VERTICAL SIMPLEX FUEL OIL TRANSFER PUMPS

Furnished on some T2 tankers. 160 GPM Bunker C—viscosity 70 to 700 SSF 122°F @ 100 lbs discharge press. WP steam 150# —exhaust 10#. 1¼" Steam inlet—1½" exhaust. 4" pump suction—3½" discharge.

$1250

THE BOSTON METALS COMPANY
313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

CYCLOTHERM SELF-CONTAINED AUX. BOILERS



Oil burning 0 2500 lbs/hr. Design pressure 125 lbs—WP 100 lbs—2-pass. Complete with self-contained motor-driven blower 5HP—440/3/60—Fuel Oil Service pump 3 HP—440/3/60. Burner is pressure atomizing type.

$795.00 each
YOUR INSPECTION INVITED

THE BOSTON METALS COMPANY
313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

HAZARDOUS DUTY DEEP WELL PUMP

4x4—for cargo oil, water, gasoline, bilge, etc. MOTOR: Westinghouse—U.L. approved for hazardous duty—3 H.P.—220/440/3/60—3450 R.P.M. —9 foot shaft. 300 G.P.M. @ 60'—4 units available.

$447.50 each

THE BOSTON METALS COMPANY
313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

UNUSED 10KW SUPERIOR DIESEL GEN. SETS

GENERATOR: Delco 10-KW — 120 volts DC — 83.3 amps—1200 RPM. ENGINE: Superior diesel — 2 cylinder — 4½ x 5¾—15 HP—heat exchanger cooled.

PRICED TO SELL! While They Last

ONLY 9 UNITS LEFT

$1395

THE BOSTON METALS COMPANY
313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

UNUSED AURORA PUMP

300 GPM—37' head—5 HP—120 volts DC Centrifugal Pump. Bronze — size 5x4 — flanged. MOTOR: Reliance—super T.D.C. Electric Motor—5 HP—120 VDC — 36.8 amps — 1750 RPM — Frame L216A—with control by Cutler-Hammer. Excellent condition. Latest USN surplus.

$877.77

THE BOSTON METALS COMPANY
313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

UNUSED 500 KW 120/240 VOLT D.C. BALDWIN/ALLIS CHALMERS DIESEL GENERATOR SET

ENGINE: Baldwin-DeLaverne 725 HP—12-2/3"x15½"—8 cyl.—500 RPM — air starting. Dry weight 54050 lbs. GENERATOR: Allis-Chalmers 500 KW—120/240 V.D.C.—500 RPM — 550 RPM overspeed. 60°C rise—class B insulation—3-wire—25% unbalance—2083 amps —stab. shunt—open—drip-proof—self-ventilated—8 poles.

THE BOSTON METALS COMPANY
313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

MODEL O-2-D M&T UNITS RECONDITIONED

Hydraulic starting, steering, raising & lowering tailfin. CONDITION: Navy reconditioned 1965—fully checked out by us. Will demonstrate running. Weight about 9500 lbs. PROPELLOR: 48" x 24" —3-blade.

THE BOSTON METALS COMPANY
313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

Guaranteed ready to use

The items advertised on this page are ready for your use. Most have been completely reconditioned, many are ABS certified, all have been carefully inspected to assure their serviceability. If it's listed here, you can depend on it . . . today . . . when you need it. Call Jeff Feder for fast answers on your replacement needs.

C3 RUDDER
Reconditioned with A.B.S. Certificate
Ingalls Hull #267

STEERING UNIT PUMPS
Hele-Shaw Pump, Size 11P12, RPM 850
Pressure 1000, Westinghouse Motor
Type CS 440 Volt, 35 HP 880 RPM
49 Amps, 3 Phase 60 Cyl.

TOPPING WINCHES
Lakeshore Type T Model 5D
Single Speed, General Electric 5 HP,
Model 5AR254960, 440/3/60,
1100 RPM

CARGO WINCHES
Single Drum, Single Speed,
General Electric, COM-1830-AEY,
230 Volt DC Motor

GENERATOR SETS
General Electric, 440 Volt AC/230 Volt DC, G.E. Model 6PC2096A1,
Motor Type K, Frame 405S, 1770 RPM

FUEL OIL PUMPS
Quimby Pump, Size 2½, RPM 1150,
GPM 15, Press 325, General Electric,
Model 5KF364PPI, 440 Volt 7½/3¾ HP,
1160/580 RPM

C-4 S1A TURBINE
Bethlehem 17,500 SHP
Low Pressure, Complete
Falk Reduction Gear, 17,500 Shaft HP,
102 RPM Output, Complete with spares

GENERAL ELECTRIC
Rebuilt Starter Boxes, 440 Volts,
From 2 HP to 50 HP

MAIN CONDENSATE PUMPS
Ingersoll Rand, Type 2 VHM, 180 GPM,
Westinghouse Motor, 440 Volts 25 HP,
1750 RPM 32-5 Amps

T-2 NEW • UNUSED
General Electric, 6000 HP, AC Motor
New-unused, Type TSM-HL-80,
Synchronous Type, 2300 Volts, 60 Cycles, 3 Phase, 1160 Amps 90 RPM

MAIN PROPULSION TURBINE ROTORS
Reconditioned with A.B.S. Certificate

C-2 SB1 BRONZE PROPELLER

C-2 SB1 RUDDERS

5, 10 AND 30 TON BOOMS

CARGO WINCHES
Nine pair, Single Drum, Single Speed,
General Electric, COM-1830-AEY,
230 Volt DC Motor

GENERAL ELECTRIC 300 KW. DC
TURBO GENERATOR
Generators: 300 KW DC, 120/240 Volts, 1200 RPM, 1250 Amps, Type MPC, Model 24G869, 3 Wire, Compound Wound
Turbines: Type DS 60-25, 5636 RPM, 440 PSI, 40 F.
Reduction Gears: Ratio: 5636/1200 RPM
Completely rebuilt, A.B.S. Certificate

GENERATOR SETS
General Electric, Seven Each,
440 Volt AC/230 Volt DC,
G.E. Model 6PC2096A1, Motor Type K,
Frame 405S, 1770 RPM

CIRCULATING PUMPS
Warren Main, Type 24 MFP,
18,000 GPM, 690 RPM, 16 Foot TDH,
Vertical with 150/38 HP
440/3/60 Motor with Spare Parts

Call Collect Area Code (213) 775-3321

National Metal AND STEEL CORP.

691 New Dock Street, Terminal Island, California 90731
Area Code (213) 775-3321 Telex: TWX 213 548-0990

CONDENSATE PUMP
Warren Main, Type 4-2CVP-10,
325 GPM, 50 RPM, 180 Foot TDH,
Vertical with 25 HP, 440/3/60 Motor

SUPERHEATER HEADERS
For Port-Boiler, CE Type V2M (two each)
For Starboard-Boiler,
CE Type V2M (two each)

BOILER HEADERS
For Port-Boiler, CE Type V2M
(three each)
For Starboard-Boiler (three each)

TURBINES
Dorv 325/525 KW, G.E. 325/300 KW
Worthington 300 KW
Main Turbine Rotor for T-2 (6000 HP)

ANCHOR WINDLASS
Manufactured by Webster Brinkley Co. Model WNE-5 Vertical Type $2^{3}/_{16}$" Die Lock Chain. Two Wildcats. Two Capstans
Electric Powered 75 HP 230 Volt DC Motor with controls and motor brakes
Capstans designed for 10" circumference rope 90 FPM under load of 20,000 lbs
Each wildcat and capstan can be operated simultaneously or separately
Electrical and Mechanical spares included

Fairbanks Morse Model 38D 1/8 1600 HP diesel engines with common Farrell-Birmingham gear 2.677:(270 RPM). Complete with all accessories, including heat exchangers, air compressors, air tanks, mufflers, filters, strainers, etc. Bearings and auxiliary generator sets also available
Few hours since engines fully rebuilt at cost of approximately $125,000
Engine logs available

BUYERS DIRECTORY

AIR CONDITIONING AND REFRIGERATION—REPAIR & INSTALLATION
Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231
Carrier Air Conditioning Co., Carrier Parkway, Syracuse, N.Y. 13201
Union Carbide Corp., Linde Div., 270 Park Ave., N.Y., N.Y. 10017

ANCHORS AND ANCHOR CHAINS
Baldt Anchor, Chain & Forge, P.O. Box 350, Chester, Pa. 19016
Lockstadt Co., Inc., 179 West 5th St., Bayonne, N.J. 07002

BEARINGS
BJ Marine Bearings, a Borg-Warner Industry, P.O. Box 2709, Terminal Annex, Los Angeles, Calif. 90054
Glacier Metal Co. Ltd., Alperton, Wembley, Middlesex, England.
Johnson Rubber Co., Marine Division, Middlefield, Ohio 44062
Lucian Q. Moffitt, Inc., P.O. Box 1415, Akron, Ohio 44309
Waukesha Bearings Corp., P.O. Box 798, Waukesha, Wis. 53186

BOILERS
Babcock & Wilcox Co., 161 E. 42nd Street, New York, N.Y. 10017
Combustion Engineering, Inc., Windsor, Connecticut 06095

BOW THRUSTERS
Murray & Tregurtha, Inc., 2 Hancock St., Quincy, Mass. 02171

BUNKERING SERVICE
Gulf Oil Trading Co., 1290 Ave. of the Americas, N.Y. 10019
Independent Petroleum Supply Co., 1345 Ave. of Americas, New York, N.Y. 10019
Refineria Panama, S. A. 277 Park Ave., New York, N.Y. 10017
The West Indies Oil Co., Ltd., St. John's Antigua, W. I.

BURNERS—Oil
Todd Products, Div. of Todd Shipyards Corp., Brooklyn, N.Y. 11231

CABLE ELECTRIC MARINE
L. F. Gaubert & Co., 700 So. Broad St., New Orleans, La. 70150

CLUTCHES, GEARS & BRAKES
Amarillo Gear Co., 517 No. Polk St., Amarillo, Texas 79105
Fawick Airflex Div. Power Transmission Systems, 9919 Clinton Rd., Cleveland, Ohio 44111
Wichita Clutch Co., Inc., Wichita Falls, Texas 76307

COATINGS—Protective
Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 328 Hanley Industrial Court, St. Louis, Mo. 63144
Enjay Chemical Company, 60 West 49th St., New York, N.Y. 10020
Farboil Company, 90 West St., N.Y., N.Y. 10006
Intercoastal Corp., 2320 Edgewater Ave., Baltimore, Md. 21222
Patterson-Sargent, P.O. Box 494, New Brunswick, N. J.
Porter Paint Co., Louisville, Ky. 40201
Spee-Flo Co., 4631 Winfield Rd., Houston, Texas 77039

CONTAINERS—CONTAINER HANDLING SYSTEMS
Ameron Corrosion Control Div., Brea, Calif. 92621
Lighter Aboard Ship, Inc., 225 Baronne St., New Orleans, La. 70112
Paceco, Div. Fruehauf Corp., P.O. Drawer E, Alameda, Calif. 94501
RPC Corp., Marine Sales, 200 Park Ave., New York, N.Y. 10017
Star Iron & Steel Co., 326 Alexander Ave., Tacoma, Wash. 98421
York Trailer Ltd., Corby, Northants, England

CONTAINER LASHINGS & COMPONENTS
American Engineered Products Co., Box 74, McKees Rocks, Pa. 15136
W. W. Patterson Co., 830 Brocket St., Pittsburgh, Pa. 15233
Pro Par Div. Fruehauf Corp., 10940 Harper Ave., Detroit, Mich. 48232
Seasafe Transport AB, Torstenssonsgatan 3, S 114 56 Stockholm, Sweden

CONTROL SYSTEMS
Galbraith-Pilot Marine Corp., 600 Fourth Ave., Brooklyn, N.Y. 11215
General Electric Industry Control Dept., Salem, Virginia
Henschel Corporation, 14 Cedar St., Amesbury, Mass. 01913
Kongsberg Systems, Inc., 10 De Angelo Dr., Bedford, Mass. 01703
Sperry Marine Systems Div., Charlottesville, Va., 22901, Division of Sperry Rand Corp.

CORROSION CONTROL
Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 328 Hanley Industrial Court, St. Louis, Mo. 63144
Corrosion Dynamics, 1100 Walnut St., Roselle, N.J. 07203
Intercoastal Corp., 2320 Edgewater Ave., Baltimore, Md. 21222
Radiator Specialty Co., 1400 Independence Blvd., Charlotte, N.C. 28205

CRANES—HOISTS—DERRICKS—WHIRLEYS
ASEA Marine, Rep. in U.S.A. by Stal-Laval, Inc., 400 Executive Blvd., Elmsford, N.Y. 10523
Duchess Baker Mfg. Co., Superior, Wis.
Hoffman Rigging & Crane Service, 560 Cortlandt St., Belleville, N.J. 07109
Kocks Pittsburgh Corp., Four Gateway Center, Pittsburgh, Pa. 15222
Lidgerwood Mfg. Co., (Superior Lidgerwood Mundy Corp.), 1010 Third Ave., New York, N.Y. 10021
M.A.N. Moschinenfabrik Augsburg-Nurnberg AG, Werk Augsburg, West Germany
Paceco, Div. Fruehauf Corp., P.O. Drawer E, Alameda, Calif. 94501
Hensen-Rotterdam, P.O. Box 5040, Rotterdam, Holland
Star Iron & Steel Co., 326 Alexander Ave., Tacoma, Wash. 98401

DECK COVERS (METAL)
Lockstad Co., Inc., 179 W. 5th Street, Bayonne, New Jersey 07002
Marine Moisture Control Co., 449 Sheridan Blvd., Inwood, N.Y. 11696
Pyrate Mfg. Co., Inc., 222-17 Northern Blvd., Bayside, N.Y. 11361

DECK MACHINERY—Cargo Handling Equipment
ASEA Marine, Rep. in U.S.A. by Stal-Laval, Inc., 400 Executive Blvd., Elmsford, N.Y. 10523
Blackburn Marine Equipment, 6105 England St., Houston, Tex. 77021
Duchess Baker Mfg. Co., Superior, Wis.
Lidgerwood Mfg. Co., (Superior Lidgerwood Mundy Corp.), 1010 Third Ave., New York, N.Y. 10021
Markey Machinery Co., Inc., 79 S. Horton St., Seattle, Wash. 98134
Nashville Bridge Co., P.O. Box 239, Nashville, Tenn. 37202
Red Fox Machine & Supply Co., P.O. Drawer 640, New Iberia, La. 70560
A. G. Weser, Seebeckwerft, 2850 Bremerhaven 1, Germany
Western Gear Corp., Heavy Machinery Div., Everett, Wash. 98201

DIESEL ACCESSORIES
Golten Marine Co., Inc., 160 Van Brunt St., Brooklyn, N.Y. 11231
Kiene Diesel Accessories, Inc., P.O. Box 216, Franklin Park, Ill. 60131

DIESEL ENGINES
Bruce GM Diesel, Inc., 180 Route #17 S. at Interstate 80, Lodi, N.J. 07644
Caterpillar Tractor Co., Industrial Div., 100 N.E. Adams St., Peoria, Ill. 61602
Colt Industries Inc., Power Systems Div., Beloit, Wisc. 53511
Electro-Motive Division General Motors, La Grange, Illinois 60525
Fiat, Turin, Italy, U.S.A. 375 Park Ave., New York, N.Y. 10022
Golten Marine Co., Inc., 160 Van Brunt St., Brooklyn, N.Y. 11231
M.A.N. Maschinenfabrik Augsburg-Nurnberg AG, Werk Augsburg, West Germany.
Nohab, Trollhattan, Sweden.

DIESEL ENGINE MUFFLERS
Marine Products & Engrg. Co., 20 Vesey St., New York, N.Y. 10007

DOORS—Watertight—Bulkhead
Overbeke-Kain Co., 209 Aurora Rd., Bedford, Ohio 44014
Walz & Krenzer, Inc., 20 Vesey St., New York, N.Y. 10007

ELECTRICAL EQUIPMENT
Arnessen Electric Co., Inc., 335 Bond St., Brooklyn, N.Y.
Galbraith-Pilot Marine Corp., 600 4th Ave., Brooklyn, N.Y. 11215
L. F. Gaubert & Co., 700 So. Broad St., New Orleans, La. 70150
Merrin Electric, 162 Chambers St., New York, N.Y. 10007
Oceanic Electrical Mfg. Co., Inc., 148 Perry Street, N.Y. 10004

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
hi-shear Corp., 2600 Skypark Drive, Torrance, Calif. 90509
Nashville Bridge Co., P.O. Box 239, Nashville, Tenn. 37202
Robvon Backing Ring Co., 675 Garden St., Elizabeth, N.J. 07207

FLOATING EQUIPMENT—Steel—Aluminum Pontoons
Dravo Corporation, Neville Island, Pittsburgh 25, Pa.

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, N.Y. 10591

HYDRAULICS
Bird Johnson Co., 883 Main St., Walpole, Mass. 02081
Vickers, M&O Div., Troy, Mich. 48084

INSULATION—Marine
Bailey Carpenter & Insulation Co.,Inc.,74SullivanSt.,Brklyn,N.Y.11231

LININGS
Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 328 Hanley Industrial Court, St. Louis, Mo. 63144

MACHINE SHOP—TROUBLE SERVICE
Golten Marine Co., Inc., 160 Van Brunt St., Brooklyn, N.Y. 11231

MACHINERY MONITORS
IRD Mechanalysis, Inc., 6150 Huntley Rd., Columbus, Ohio 43229

MARINE DRIVES—GEARS
Hydro Drive Corp., 4420 - 14th Ave. N.W., Seattle, Wash. 98107
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
Dynel Electronics Corp., 75 Maxess Road, Melville, N.Y. 11746
Edo Western Corp., 2645 So. 2nd St., W. Salt Lake City, Utah 84115
ITT Decca Marine, Inc., 386 Park Ave. South, New York, N.Y. 10016
ITT Mackay Marine, 133 Terminal Ave., Clark, N.J. 07066
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
Sperry Marine Systems Div., Charlottesville, Va. 22901, Division of Sperry Rand Corp.
Tracor, Inc., 6500 Tracor Lane, Austin, Texas 78721

MARINE EQUIPMENT
Adsco Div., 34 Milburn St., Buffalo, N.Y. 14212
Beaver Tool & Machine Co., P.O. Box 94717, 525 S.E. 29th St., Oklahoma City, Okla. 73109
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
Chas. Lowe Co., 6340 Christie Ave., Emeryville, Calif. 94608
Merrin Electric, 162 Chambers St., New York, N.Y. 10007
Pacific Coast Eng. Co., P.O. Drawer E, Alameda, Calif. 94506
Stow Mfg. Co., 225 Shear St., Binghamton, N.Y. 13902
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

MARINE INSURANCE
Adams & Porter, Cotton Exchange Bldg., Houston, Texas
Midland Insurance Co., 29 Broadway, New York, N.Y. 10006

MARINE LIGHTS
Natale Machy. & Tool Co., Box 95, Carlstadt, N.J. 07022

MARINE PROPULSION
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
General Electric Co., Gas Turbine Dept., Schenectady, N.Y. 12305
Murray & Tregurtha, Inc., 2 Hancock St., Quincy, Mass. 02171
Port Electric Turbine Div., 155-157 Perry St., New York 10014
Stal-Laval, Inc., 400 Executive Blvd., Elmsford, N.Y. 10523
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
ITT Decca Marine, Inc., 386 Park Ave. South, New York, N.Y. 10016
ITT Mackay Marine, 133 Terminal Ave., Clark, N.J. 07066
E. F. Johnson Corp. Waseca, Minn. 56093
Paul J. Plishner, 45 West 45 St., New York, N.Y. 10036
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
Breit Engrg. Inc., 441 Gravier St., New Orleans, La. 70130
Coast Engineering Co., 711 W. 21st St., Norfolk, Va. 23517
Commercial Radio Sound Corp., 652 First Avenue, N.Y., N.Y. 10016
Crandall Dry Dock Engrs., Inc., 238 Main St., Cambridge, Mass. 02142
Cushing & Nordstrom, 50 Trinity Place, New York, N.Y. 10006
Design Associates, Inc., 3308 Tulane Ave., New Orleans, La. 70119
Designers & Planners, Inc., 114 Fifth Ave., New York, N.Y. 10011
M. Mack Earle, 103 Mellor Ave., Baltimore, Md. 21228
Christopher J. Foster, 17 Battery Place, New York, N.Y. 10004 14 Vanderventer Ave., Port Washington, N.Y. 11050
Friede and Goldman, Inc., 225 Baronne St., New Orleans, La. 70112
Gibbs & Cox, Inc., 21 West St., New York, N.Y. 10006
John W. Gilbert Associates, Inc., 58 Commercial Wharf, Boston, Mass. 02110
Morris Guralnick, Associates, Inc., 583 Market St., San Francisco, Calif. 94105
J. J. Henry Co., Inc., 90 West St., New York, N.Y. 10006
L. K. Homyer, Box 408, Corona Del Mar, California 92625
C. T. Iliariucci & Associates, Tourism Pier #3, San Juan, Porto Rico 00902
James S. Krogen, 1460 Brickell Ave., Miami, Fla. 33131
Littleton Research and Engrg. Corp., 95 Russell St., Littleton, Mass. 01460
Robert H. Macy, P.O. Box 758, Pascagoula, Miss. 39567
Marine Applications Co., Inc., P.O. Box 167, Mineola, N.Y. 11502
Marine Consultants & Designers, Inc., 308 Investment Insurance Bldg., Corner E. 6th St. & Rockwell Ave., Cleveland, Ohio 44114
Marine Design Inc., 1180 Ave. of Americas, N.Y., N.Y. 10036
Marine Design Associates, P.O. Box 2674, Palm Beach, Florida
Maritech, Inc., 38 Union Sq., Somerville, Mass. 02143
Rudolph F. Matzer & Associates, Inc., 13891 Atlantic Blvd., Jacksonville, Fla. 32225
John J. McMullen Associates, Inc., 110 Wall St., N.Y., N.Y. 10005
George E. Meese, 194 Acton Rd., Annapolis, Md. 21403
Metritape, Inc., 77 Commonwealth Ave., West Concord, Mass. 01782
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., 8970 S.W. 87th Ct., Miami, Florida 33156
Philip L. Rhodes, Inc., 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.
George G. Sharp, Inc., 100 Church St., New York, N.Y. 10007
T. W. Speetgens, 156 West 8th Ave., Vancouver 10, Canada
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
H. Newton Whittelsey, 17 Battery Pl., New York, N.Y. 10004
Alan Winkley, 6420 Colby St., Oakland, Calif. 94618

OIL PURIFIERS—Repair
Peck Equipment Co., 3500 Elm Avenue, Portsmouth, Virginia 23704

OILS—Marine—Additives
Esso International Inc., 15 West 51 St., New York, N.Y. 10019
Ethyl Corp. Marine Div. Perolin Co., New York, N.Y. 10001
Gulf Oil Trading Co., 1290 Ave. of Americas, New York, N.Y. 10019
Humble Oil & Refining Co., Humble Building, Houston, Texas 77002
Mobil Oil Corp., 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
Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 328 Hanley Industrial Court, St. Louis, Mo. 63144
Devoe & Raynolds, Subsidiary Celanese Coats Co., 224 E. Broadway, Louisville, Ky. 40201
Enjay Chemical Co., 60 West 49th St., New York, N.Y. 10020
Farboil Company, 90 West St., New York, N.Y. 10006
Intercoastal Corp., 2320 Edgewater Ave., Baltimore, Md. 21222
International Paint Co., 21 West St., New York, N.Y. 10006
Mobil Chemical Company, Metuchen, N.J. 08840
Patterson-Sargent, P.O. Box 494, New Brunswick, N. J.
Woolsey Marine Industries Inc., 201 E. 42nd St., New York, N.Y. 10017

PETROLEUM SUPPLIES
Independent Petroleum Supply Co., 1345 Ave. of Americas, New York, N.Y. 10019
Refineria Panama, S. A. 277 Park Ave., New York, N.Y. 10017
Shell Oil Co., 50 W. 50 St., New York, N.Y. 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
Ameron Corrosion Control Div., Brea, Calif. 92621
Hubeva Marine Plastics, Inc., 390 Hamilton Ave., Bklyn, N.Y. 11231
Philadelphia Resins Co., 20 Commerce Dr., Montgomeryville, Pa. 18936
Rotocast Plastic Products, Inc., 6700 N.W. 36th Ave., Miami, Florida 33147

POLLUTION CONTROL
Enjay Chemical Co., 60 West 49th St., New York, N.Y. 10020
Hemisphere Marine Chemicals Co., Inc., 300 Main St., Orange, N.J.

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
Coolidge Propeller Co., 1608 Fairview Ave. E., Seattle, Wash. 98102
Federal Propellers, 1501 Buchanan Ave. S.W., Grand Rapids, Mich. 49502
Ferguson Propeller, 1132 Clinton St., Hoboken, N.J. 07030

PUMPS
Coffin Turbo Pump/FMC Corp. 326 So. Dean St., Englewood, N.J. 97631
Colt Industries, Inc., Fairbanks Morse Pump & Electric Div., 3601 Kansas Ave., Kansas City, Kansas 66110
Goulds Pumps, Seneca Falls, N.Y. 13148
Worthington Corporation, Harrison, New Jersey 07029

RATCHETS
American Engineered Products Co., Box 74, McKees Rocks, Pa. 15136

REFRIGERATION—Refrigerant Valves
Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231
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
Columbian Rope Co., 309 Genesee St., Auburn, N.Y. 13022
Jackson Rope Corp., 9th & Oley, Reading, Pa. 19604
Samson Cordage Works, 470 Atlantic Ave., Boston, Mass. 02210
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
Yokohama Rubber Co. Ltd., P.O. Box 46, Shiba, Tokyo 105, Japan

RUDDER ANGLE INDICATORS
Electric Tachometer Corp., 68th & Upland Street, Phila., Pa. 19142
Galbraith-Pilot Marine Corp., 600 Fourth Ave., Brooklyn, N.Y. 11215
Hose McCann Telephone Co., Inc., 524 W. 23rd St., N.Y. 10011
Sperry Marine Systems Div., Charlottesville, Va., 22901, Division of Sperry Rand Corp.

SCAFFOLDING
Patent Scaffolding Co., 11-11 - 34th Ave., Long Island City, N.Y. 11106

SEALS
Golten Marine Co., Inc., 160 Van Brunt St., Brooklyn, N.Y. 11231
Syntron, Div. FMC Corp., 398 Lexington Ave., Homer City, Pa. 15748

SEARCHLIGHTS
Portable Light ITT, 67 Passaic Ave., Kearny, N.J. 07032
Snelson Oilfield Lighting Co., 1201 E. Doggett St., Fort Worth, Texas 76104

SEWAGE DISPOSAL
Seapax, Inc., 3645 Warrensville Center Rd., Cleveland, Ohio 44122
Youngstown Welding & Engineering Co., 3708 Oakwood Ave., Youngstown, Ohio 44509

SHAFT REVOLUTION INDICATOR EQUIP.
Electric Tachometer Corp., 68th & Upland Sts., Phila., Pa. 19142

SHIPBREAKING—Salvage
The Boston Metals Co., 313 E. Baltimore St., 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
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 STEEL
Aluminum Co. of America, 1501 Alcoa Bldg., Pittsburgh, Pa. 15219
Armco Steel Corp., 703 Curtis St., Middletown, Ohio 45042
Bethlehem Steel Corp., 25 Broadway, New York, N.Y. 10004
Huntington Alloy Products, Div. International Nickel Co., Inc., Huntington, W. Va. 25720

SHIPBUILDING—Repairs, Maintenance, Drydocking
Armco Steel Corp., 703 Curtis St., Middletown, Ohio 45042
Astilleros Espanoles, S.A. Zurbano, 70, Madrid 10, Spain
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans La. 70150
Beliard Murdoch S. A., Kattendijkdok Westkaai 21, Antwerp, Belgium
Bethlehem Steel Corp., Shipbuilding, 25 Broadway, N.Y., N.Y. 10004
Blount Marine Corp., P.O. Box 360, Warren, Rhode Island 02885
Conrad Industries, P.O. Box 790, Morgan City, La. 70380
Detyens Shipyards, Inc., Route 2, Box 180, Mt. Pleasant, So. Carolina 29464
Dillingham Corp., P.O. Box 3288, Honolulu, Hawaii 96801
Dravo Corporation, Neville Island, Pittsburgh 25, Pa.
Equitable Equipment Co., Inc., P.O. Box 8001, New Orleans, La. 70122
General Dynamics, Electric Boat Division, 99M Eastern Point Road, Groton, Conn. 06340
General Dynamics, Quincy Division, Quincy, Mass. 02169
Gotaverken American Corp., 39 Broadway, New York, N.Y. 10006
Grafton Boat Co., Inc., Grafton, Ill. 62037
Graignard Shipyards, P.O. Box 829 Colbert, Marseilles, France.
Gunderson Bros. Engrg. Corp., 4700 N.W. Front St., Portland, Oregon 97208
Halter Marine Services, Inc., Route 6, Box 287H, New Orleans, La. 70126
Harbor Boat Building Co., 258 Cannery St., Terminal Island, Calif.
Havre de Grace, Havre de Grace, Md.
Hillman Barge & Construction Co., Grant Bldg., Pittsburgh 19, Pa.
Hitachi Shipbuilding Co.,25 Nakanoshima2-chomeKitaku,Osaka-Japan
Industrial Steel & Mach. Works, Inc., P.O. Box 2217, Gulfport, Miss. 39501
Ishikawajima-Harima Heavy Industries Co., Ltd., 15 William St., New York, N.Y. 10005
Jacksonville Shipyards, 644 E. Bay St., Jacksonville, Fla. 32203
Jeffboat, Inc., Jeffersonville, Ind. 47130
Kawasaki Dockyard Co., 8 Kaigan-dori, Ikuta-ku, Kobe, Japan
Kelso Marine, Inc., P.O. Box 268, Galveston, Texas 77550
Kockums Malmo, Fack, Malmo, Sweden
Levingston Shipbuilding Co., P.O. Box 968, Orange, Texas 77630
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
Marine Industries, Ltd., 1405 Peel St., Montreal 2, Quebec
Matton Shipyard Co., Inc., P.O. Box 428, Cohoes, New York 12047
Melville Shipping & Towing, Ltd., P.O. Box 722, Port of Spain, Trinidad, W.I.
Mitsui Shipbuilding & Eng. Co., Ltd., Nihonbashi-Muromachi, Chuo-ku, Tokyo, Japan
Nashville Bridge Co., P.O. Box 239, Nashville, Tenn. 37202
National Steel & Shipbuilding Corp., San Diego, Calif. 92112
Newport News Shipbuilding and Dry Dock Co., Newport News, Va.
Nippon Kokan Kabushiki Kaisha, 2, 1-chome, Otemachi, Chivoda-ku, Tokyo, Japan
Northwest Marine Iron Works., P.O. Box 3109, Swan Island, Portland, Oregon 97208
Nuclear Service & Construction Co., Inc., 9296 Warwick Blvd., Newport News, Va. 23607
O.A.R.N. (officine Allestimento e Riparazioni Navi) Genoa, Italy
Paceco, Div. Fruehauf Corp., P.O. Drawer E, Alameda, Calif. 94501
Pearlson Engineering Co., Inc., 8970 S.W. 87th Ct., Miami, Fla. 33156
Perth Amboy Dry Dock Co., Perth Amboy, N.J. 08862
Rodermond Industries, Foot of Henderson St., Jersey City, N.J. 07302
St. Louis Shipbuilding—Federal Barge, Inc.
611 East Marceau, St. Louis, Mo. 63111
Sasebo Heavy Industries Co., Ltd., New Ohtemachi Bldg., Chiyoda-ku, Tokyo, Japan
Sumitomo Shipbuilding & Machy. Co., Ltd. 2-1 Ohtemachi 2-chome, Chiyoda-ku, Tokyo, Japan
Teledyne Sewart Seacraft, P.O. Box 108, Berwick, La. 70342
Todd Shipyards Corp., 1 Broadway, New York, N.Y. 10004
Transportation Technology, Inc., 3210 Conflans Rd., Irving, Texas 75060
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 MODEL BASIN
Arctec, Inc., 2834 Belair Drive, Bowie, Md. 20715
Hydronautics, Incorporated, Laurel, Maryland 20810

SHIP ROUTING
Bendix Commercial Services Corporation, Owings Mills, Md. 21117
Weather Routing, Inc., 90 Broad Street, New York, N.Y. 10004

SHIP STABILIZERS
Duchess Baker Mfg. Co., Superior, Wis.
Lidgerwood Mfg. Co., (Superior Lidgerwood Mundy Corp.), 1010 Third Ave., New York, N.Y. 10021
Maritech, Inc., 38 Union Sq., Somerville, Mass. 02143
John J. McMullen Associates, Inc., 110 Wall St., N.Y., N.Y. 10005
Sperry Marine Systems Div., Charlottesville, Va., 22901, Division of Sperry Rand Corp.

STEAM GENERATING EQUIPMENT
Combustion Engineering, Inc., Windsor, Connecticut 06095

STEVEDORING
Luckenbach Steamship Co., 120 Wall Street, New York, N.Y. 10004
M. J. Rudolph Corp., 8 Sackett St., Brooklyn, N.Y. 11231

SWITCHBOARDS
Hose McCann Telephone Co., Inc., 524 West 23 St., N.Y., N.Y. 10011

TANK CLEANING MACHINES
Pyrate Sales, Inc., 222-17 Northern Blvd., Bayside, N.Y. 11361

TOWING—Lighterage, Transportations, Barge Chartering
American Waterways, 1250 Connecticut Ave., Washington, D.C. 20036
M. J. Batty & Co., P.O. Box 2316, Singapore, 1
Bay-Houston Towing Co., 805 World Trade Bldg., Houston, Texas 77002
Curtis Bay Towing Co., Mercantile Bldg., Baltimore, Md. 21202
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. 10004
Jackson Marine Corp., P.O. Box 1087, Aransas Pass, Texas 78336
McAllister Bros., Inc., 17 Battery Pl., New York, N.Y. 10004
McDonough Marine Service, P.O. Box 26206, New Orleans, La.
P. F. Martin, Inc., Mail Bldg., 325 Chestnut St., Philadelphia, Pa.
Moran Towing & Transportation Co., Inc., 17 Battery Place, New York, N.Y. 10004
L. Smit & Co., 11 Broadway, New York, N.Y. 10004
Suderman & Young Towing Co., 329 World Trade Center, Houston, Texas 77002
M. & J. Tracy, Inc., 1 Broadway, New York, N.Y. 10004
Turecamo Coastal and Harbor Towing Corp., 1752 Shore Parkway, Brooklyn, N.Y. 11214

VALVES AND FITTINGS—Hydraulic—Safety Flanges
Empire Machinery & Supply Co., 3550 Virginia Beach Blvd., Norfolk, Va. 23501
Hubeva Marine Plastics-Lining, 435 Hamilton Ave., Brooklyn, N.Y. 11231
Hydrasearch Co., Inc., Riva Rd., Annapolis, Md. 21401
Marine Moisture Control Co., 449 Sheridan Blvd., Inwood, N.Y. 11696
Mechanical Marine Co., 45-15 37th St., Long Island City, N.Y. 11101

WINCHES
Skagit Corp., Box 151, Sedro Woolley, Wash. 98284

WIRE ROPE
Armco Steel Corp., 703 Curtis St., Middletown, Ohio 45042
Bethlehem Steel Corp., Bethlehem, Pa. 18018
Don R. Hinderliter, Inc., 1240 No. Howard, Tulsa, Okla. 74104
United States Steel Corp., P.O. Box 86, Pittsburgh, Pa. 15230

ZINC
Smith & McCrorken, 153 Franklin St., New York, N.Y. 10013

BFG Cutless® Bearings *never touch a drop!*

No need to. They're water lubricated. So they can't possibly pollute our waterways like leaky oil lubricated stern tube and strut bearings.

That's a major Cutless benefit today—and it always has been.

There are many others, too. Such as maximum performance and longer service with more efficiency and greater economy. Even when they must operate in already contaminated waters, Cutless Rubber Bearing performance and service are not affected by oils, greases or common chemicals.

And some thoughtful, cost-conscious operators save even more by having us reline flanged Cutless Bearings with new rubber when they need it. Which isn't very often.

Now you can be a good environmental citizen and still get the bearing that works better and lasts longer .

B.F.Goodrich
CUTLESS BEARINGS

LUCIAN MOFFITT, INC.

NATIONAL and INTERNATIONAL DISTRIBUTORS
P.O. Box 1415, AKRON, OHIO 44309

tock,tick,tock,
tick,tock,tick,
tock,tick,tock,
tick,tock,tick,
tock,tick,tock,
tick,tock,tick,
tock,tick,tock,
tick,tock,tick.

When you switch to Mobilgard 445, it's a lot longer between changes.

Mobilgard® 445 is making everybody involved with marine engines happy—except maybe filter manufacturers. Specifically designed for medium-speed diesels in tow-boat service, Mobilgard 445 has stretched oil filter life to the maximum allowed by current filter materials.

And that's not all. In repeated tests, Mobilgard 445 has completely eliminated the need to clean oil coolers between major overhauls. And overhaul intervals themselves can be extended by months.

Finally, Mobilgard 445 doesn't need to be drained *between* overhauls—and tests show that it keeps the engine cleaner than competitive oils that are drained regularly. And as you know from your own experience, cleaner engines last longer—a *lot* longer.

Mobil Oil Corporation, 150 E. 42nd Street, New York, N.Y. 10017.

Mobil®

Marine Fuels • Marine Lubricants
Worldwide Marine Service