



Fulton's "Clermont" 1807
5 MILES AN HOUR

Union Marine Engines

Catalogue No. 10



The "Union" 1907
15 MILES AN HOUR

W. L. CORSON
Secretary

W. J. CASEY
President

Catalogue No. 20

of

“Union” Marine Engines

Made by

Union Gas Engine Company

Kennedy and Canal Streets

East Oakland, California

U. S. A.



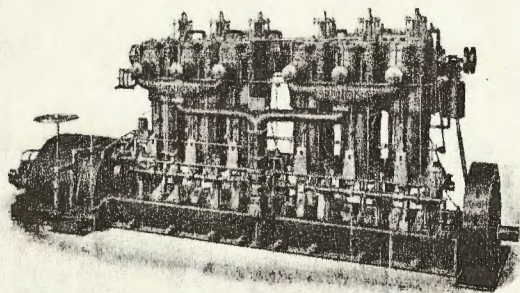
PHOTOGRAPHIC VIEW OF PLANT OF UNION GAS ENGINE CO., EAST OAKLAND, CAL.

Deep-water frontage, good wharfage facilities, and crane for installing engines.

1885

Catalogue No. 20

1907



In presenting this catalogue of Marine Engines and Electric Lighting Sets, it is aimed to show by illustrations made from photographs the superior design, type and mechanical construction of "Union" engines. The modern "Union" engine is the result of twenty-two years' experience, during which time it has established an international reputation for reliability, economy, simplicity and mechanical efficiency.

"Union" marine engines are to be found in all parts of the United States and Alaska, and in all the principal foreign countries. They are used by the U. S. Army and Navy, U. S. Lighthouse Establishment, U. S. Marine Hospital Service, and the governmental service of England, France, Germany, Japan, New Zealand, New South Wales, Queensland and Fiji.

Owing to the rapid growth of our business, we erected a new works at East Oakland, California, and had it about ready for occupancy at the time of the San Francisco disaster, April 18, 1906, which completely destroyed our works and contents in that city. We were able to save our drawings and patterns. Our Oakland shops have several times the capacity of the late San Francisco plant, and are completely equipped with new tools of the latest design and precision. Our line of tools of precision is not excelled by any gas engine factory in the United States. The new plant, new tools, new appliances and new equipment enable us to manufacture and deliver promptly a line of modern gas and oil engines with interchangeable parts, made of the best materials by skilled workmen, at prices which will compare favorably with those of other manufacturers of high-grade gas engines.

TYPE All "Union" engines are constructed on the four-cycle principle, and are built with one, two, three, four or six cylinders. We are building marine engines up to 350 HP. for business craft and pleasure boats.

ECONOMY The economy of the "Union" marine engine is well established. Fuel consumption is controlled by a sensitive governor, insuring the proper amount of carburetted mixture in proportion to the horse-power exerted, thereby giving the greatest economy of fuel consumption. The consumption of gasoline, benzine, naphtha or No. 1 distillate will vary from $\frac{1}{8}$ to $\frac{1}{10}$ gallon per horse-power hour, when the engine is developing its rated power.

FUEL ATTACHMENTS

Special attachments are furnished for running on kerosene, low-grade distillates, untreated distillates, alcohol and crude oil.

MATERIALS

Only the highest grade of materials are used, and such as have proven to be best adapted for standing the stresses and duties that are incident to hard service.

DESIGN AND WORKMANSHIP

In the design of all "Union" engines, the first consideration is to produce an absolutely reliable machine, that will start promptly when required and that will run steadily. Fuel economy, regulation and general mechanical efficiency are also considered. We employ skilled mechanics, modern tools and labor-saving devices, which, together with our superior facilities and system of inspection and administration, assure our customers that their engines will not fail them when they are most needed. By the use of jigs and templates with our system of manufacture, every part of our engines is mechanically perfect and interchangeable with "Union" engines of the same size and type. When completed the engines are carefully tested in a special building erected for that purpose, which is equipped with modern instruments of great exactness. The brake horse-power is determined, and other technical tests are conducted until the engine shows a perfect score. Our system of inspection and rigid tests under extreme conditions guarantees an engine that is as nearly perfect as can be constructed.

REPAIR PARTS Extra parts are always kept on hand.

SIMPLICITY

The ease with which "Union" marine engines may be started and cared for even by amateurs has contributed much to their popularity among launch owners who are their own engineers. Self-starters are supplied with all engines over 30 HP., if a whistle outfit is ordered with the engine; on engines of smaller power they are not necessary.

DURABILITY

The durability of "Union" marine engines is established by the fact that some of the first engines built by us in 1885 are still in service doing good work. The substantial, compact form of the "Union" engine, and the unusually large size of the wearing parts, made of selected materials, impress one at sight. It is safe to say that in guarding against any possible strains, the "Union" is not excelled by any other gas or oil engine.

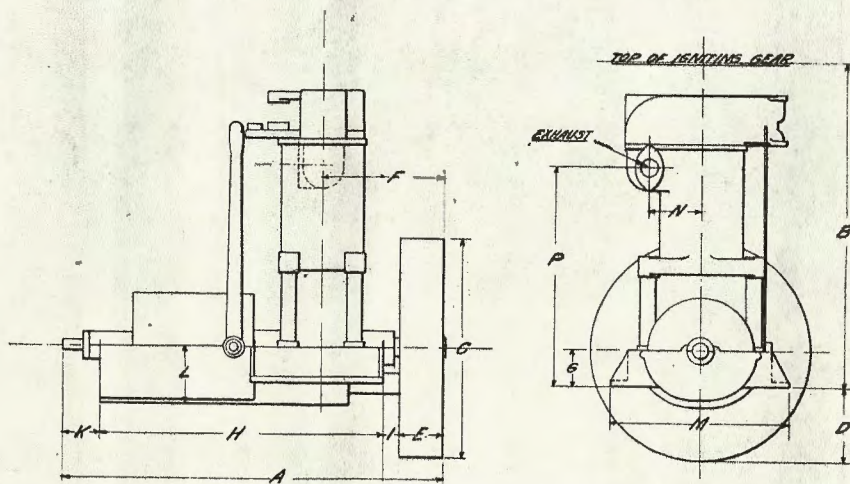
RELIABILITY

That "Union" engines are considered perfectly reliable is proved by the fact that they have been inspected, tested and approved by United States and foreign government inspectors, and the many repeat orders received from large users.

UNION GAS ENGINE COMPANY, EAST OAKLAND, CALIFORNIA

LIST OF SINGLE-CYLINDER "UNION" MARINE ENGINES

Of vertical, direct-connected type, fitted to run on gasoline, benzine, naphtha or distillate. Special fittings for kerosene or crude oil. Net weights of engines do not include propellers, shafting, tanks, etc.



HP.	A	B	C	D	E	F	G	H	I	K	L	M	N	P
4	36 $\frac{3}{4}$ "	30 $\frac{1}{2}$ "	20"	7"	4 $\frac{1}{2}$ "	12 $\frac{1}{8}$ "	3"	26 $\frac{1}{2}$ "	1 $\frac{3}{4}$ "	3 $\frac{3}{4}$ "	4 $\frac{1}{8}$ "	17"	13"	13 $\frac{1}{4}$ "
6	38 $\frac{3}{8}$ "	33 $\frac{1}{4}$ "	22"	7 $\frac{1}{2}$ "	4 $\frac{1}{2}$ "	12 $\frac{5}{8}$ "	3 $\frac{1}{2}$ "	28 $\frac{1}{2}$ "	1 $\frac{3}{4}$ "	3 $\frac{5}{8}$ "	5 $\frac{3}{4}$ "	18"	22"	5 $\frac{1}{4}$ "
Horse-Power	Bore in Inches		Stroke in Inches	Number of Revolutions per Minute		Diameter of Propeller	Diam. of Propeller Shaft	Diam. of Hole in Deadwood		Net Weight of Engine Only	Shipping Wt. Including Propel. Shafting, Box, etc			
4	5 $\frac{1}{4}$ "		5 $\frac{3}{4}$ "	400		16"	1"	1 $\frac{3}{8}$ "		680	1120			
6	5 $\frac{3}{4}$ "		6 $\frac{1}{2}$ "	400		20"	1"	1 $\frac{3}{8}$ "		850	1250			

This rod has a gear on its top end which meshes into a larger gear on the end of a screw that presses on the top bushing, thus facilitating the adjustment of the upper bearing and saving the necessity of taking out the piston to adjust the upper brasses, as in other makes of engines. The lower connecting rod brasses are positively lubricated by centrifugal ring oilers.



250 HP. 6-Cylinder Crank-shaft.

BEARINGS

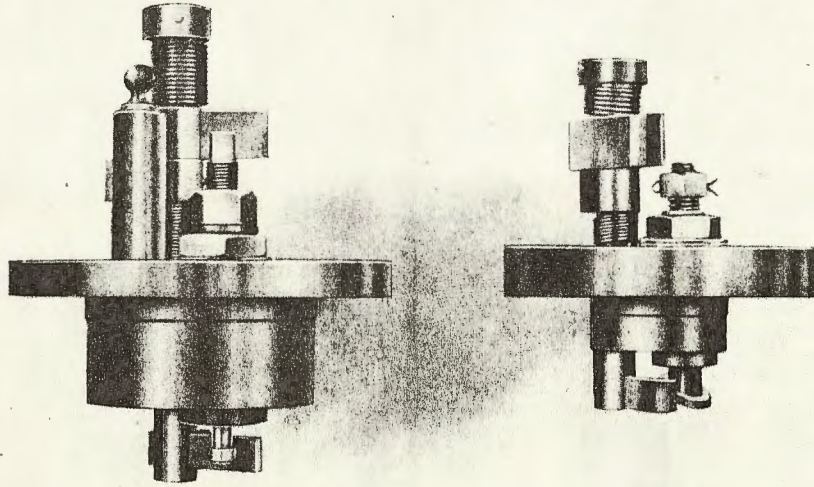
All the principal bearing parts are bushed with the best quality of white brass. These bushings add to the expense of construction, but are much superior to the cheap babbitt metal used in many other makes of engines. All shaft bearings are scraped to a perfect fit.

GEARS

The worm gears for driving the cam-shafts are keyed and shrunk on the crank-shaft, and run in an oil bath. They are made of forged steel without weld. Cast-iron gears are not used for this purpose on "Union" engines.

IGNITION

The igniters used are the well-known "hammer type," giving a strong contact and a large, hot spark. The electrodes are made of the best quality of steel, and are both in a plug which can be easily detached. One of the electrodes is a disc or washer on the end of a rod passing through an insulated plug; the other is a contact piece of flat steel on the end of a rod which is actuated mechanically from the outside. We have two forms of these igniters. In one type, the stationary electrode rod which screws through the insulated plug is fitted with a button or washer. Changing the points of contact is accomplished by turning the screw up or down. In the other type, the stationary rod has an inclined disc or washer. Changing the point of contact in this type is done by slightly turning the rod. Both of these igniters are covered by patents owned by this company. The time



Union Igniters.

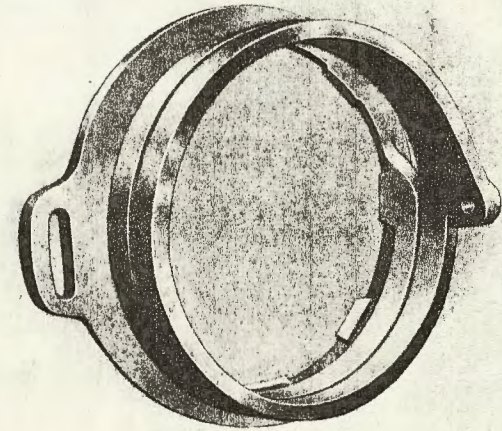
of ignition may be easily changed while the engine is in operation by the movement of a small lever, conveniently located. Improvements in these igniters have been made from time to time, until now it is generally conceded that no other form of igniter has so many valuable features. The hammer, or make-and-break ignition is the only method which can be used with all kinds of fuel with perfect surety, and which can always be relied upon to start the engine at a moment's notice. Any carbon or soot deposit can be easily removed by scraping the electrodes together without removing them from the engine. The igniters are placed over the inlet valve, and thus cooled by the fresh charge drawn over them as well as by the surrounding water jacket.

COIL BRAKES

One of the leading features of the latest types of "Union" marine engines is the coil brake, used for reversing. It consists of a casting made from an extra grade of bronze, having a high tensile strength, and works on the principle of a rope round a capstan, that is, the more strain you put on it, the tighter it holds; consequently a very light pressure on the reversing lever is sufficient to reverse the largest engine equipped with this coil.

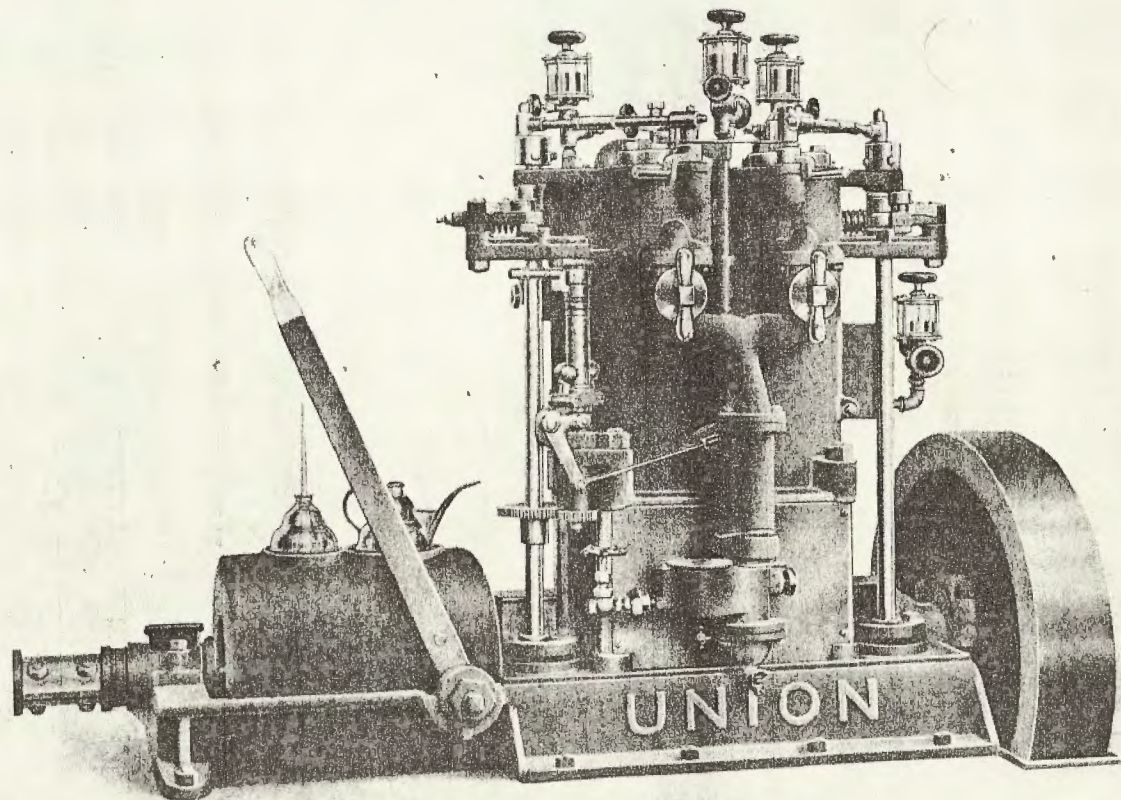
GOVERNOR

Two systems of governing are used on "Union" engines—the throttling governor, which regulates the amount of mixture drawn into the engine, and the type operating on the exhaust valve.



Coil Brake.

UNION GAS ENGINE COMPANY, EAST OAKLAND, CALIFORNIA



TYPE OF DOUBLE-CYLINDER "UNION" MARINE ENGINES

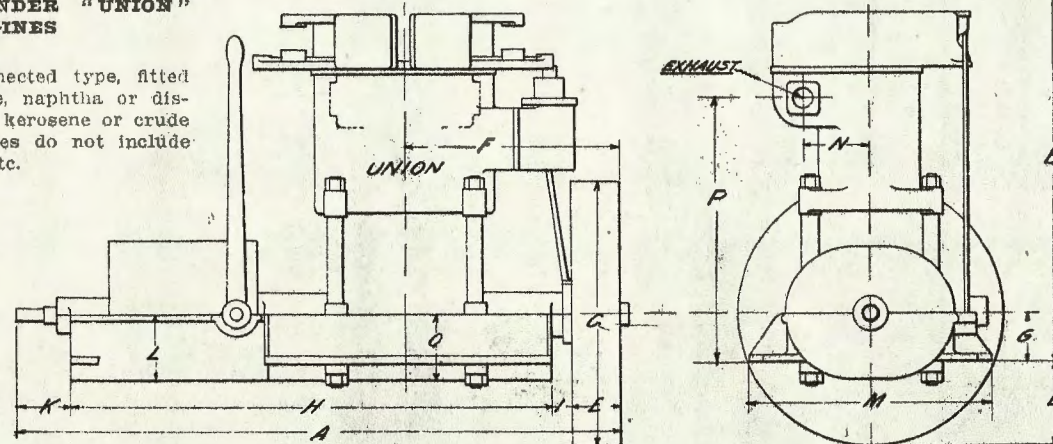
Fitted with our new vaporizer, latest pattern coil clutch, governor, speed controller and all of our recent improvements.

UNION GAS ENGINE COMPANY, EAST OAKLAND, CALIFORNIA

TOP OF LUBRICATORS

LIST OF DOUBLE-CYLINDER "UNION" MARINE ENGINES

Of the vertical, direct-connected type, fitted to run on gasoline, benzine, naphtha or distillate. Special fittings for kerosene or crude oil. Net weights of engines do not include propeller, shafting, tanks, etc.



HP.	A	B	C	D	E	F	G	H	I	K	L	M	N	O	P
6	43 1/8"	25"	20"	4"	3 3/8"	14 1/4"	2"	34 3/8"	1 1/2"	3 5/8"	4 3/8"	17"	8 1/2"	4 3/8"	18 1/4"
8	46 3/8"	38 1/2"	22"	6 1/8"	4"	16 1/4"	4 1/8"	37"	1 3/4"	3 5/8"	6"	20"	5"	5 1/4"	22 1/4"
10	54 3/8"	40 1/2"	24"	7 1/2"	4 1/2"	19 1/2"	4 1/8"	43 1/2"	1 3/4"	4 5/8"	6"	22"	6"	6"	24"
16	61 3/4"	45 3/4"	26"	8"	6"	22"	5"	48 3/4"	1 1/2"	5 1/8"	7 1/4"	26"	6"	6 5/8"	28"
20	68"	49 1/2"	32"	10 1/8"	7"	25"	5 1/2"	52 3/4"	2"	6 1/4"	8 1/4"	30"	7 1/4"	7 1/4"	30"
25	82"	58 1/2"	38"	12 1/2"	7"	29 3/4"	6 1/8"	61"	3 1/2"	10 1/2"	9 1/2"	34"	7 1/2"	8 3/8"	39"
30	78 1/2"	58"	38"	8 3/4"	10"	28 1/4"	10 1/4"	55"	3 3/4"	10 1/8"	10 1/4"	36"	15 1/4"	10 1/4"	49 1/2"
35	94"	61 3/8"	40"	8"	9"	31 3/4"	12"	67 5/8"	3 3/4"	13 5/8"	12"	40"	18 1/2"	12"	48"

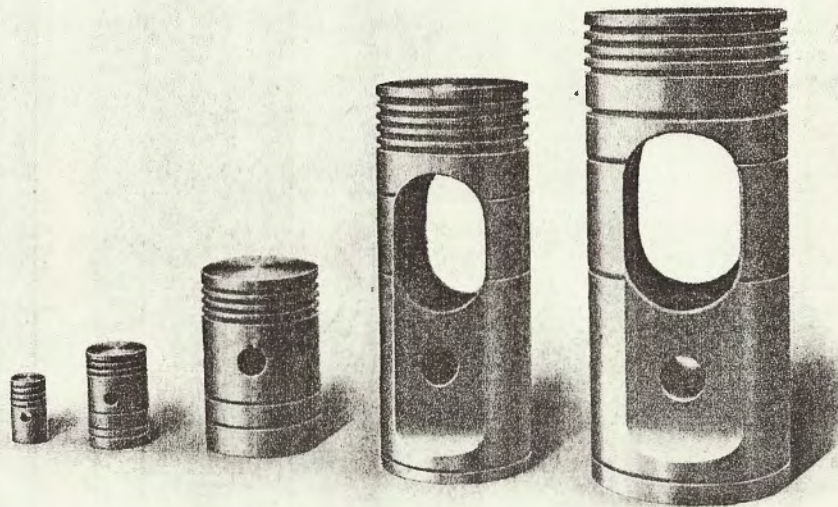
Horse-Power	Bore in Inches	Stroke in Inches	Number of Revolutions per Minute	Diameter of Propeller	Diam. of Propeller Shaft	Diam. of Hole in Deadwood	Net Weight of Engine Only	Shipping Wt. Including Propel. Shafting, Box, etc
6	4 1/4"	5"	600	18"	1"	1 5/8"	622	1025
8	5 1/4"	6"	500	21"	1 1/4"	2"	1140	1610
10	6"	6 1/2"	400	24"	1 1/2"	2"	1415	2025
16	6 3/4"	7 1/2"	400	26"	1 3/8"	2 1/8"	2085	2710
20	7 1/4"	8 1/2"	350	30"	1 3/4"	2 1/8"	2905	3885
25	8 1/4"	10 1/2"	300	34"	2 1/4"	3 1/8"	4147	5140
30	8 1/2"	10 1/2"	300	36"	2 1/4"	3 1/2"	4335	6010
35	9 3/4"	11"	280	38"	2 3/4"	4"	5840	7720

UNION GAS ENGINE COMPANY, EAST OAKLAND, CALIFORNIA

The vertical engines are fitted with the throttling governor, and the other type is furnished with horizontal engines only. The throttling or automatic governor is designed to furnish very steady power and does not subject the engine to the jar and vibration characteristic of the "hit-and-miss" type. The governor is exceedingly sensitive and has complete control of the speed of the engine and the consumption of fuel.

CONTROLLER

When specially ordered, engines are equipped with a controller, which enables the operator to instantly adjust the pressure on the governor springs and thus change the speed of the engine without stopping it or touching the throttles.



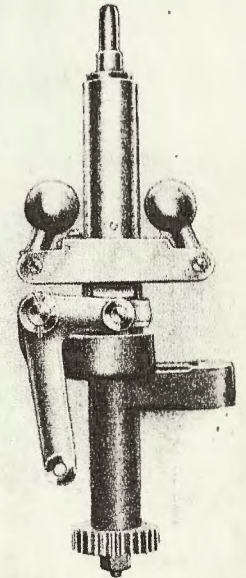
"Union" Pistons.

PISTONS AND CYLINDERS

The pistons of all "Union" engines are finished so as to insure a perfect fit in the cylinders, which are reamed to size in the most careful manner. Both pistons and cylinders are made of an extra grade of gray iron, of an especially fine grain and hard mixture.

PISTON RINGS

One of the features of "Union" engines is the quality of the piston rings. These rings are turned to a perfect circle, and are made eccentric inside. The cut is not



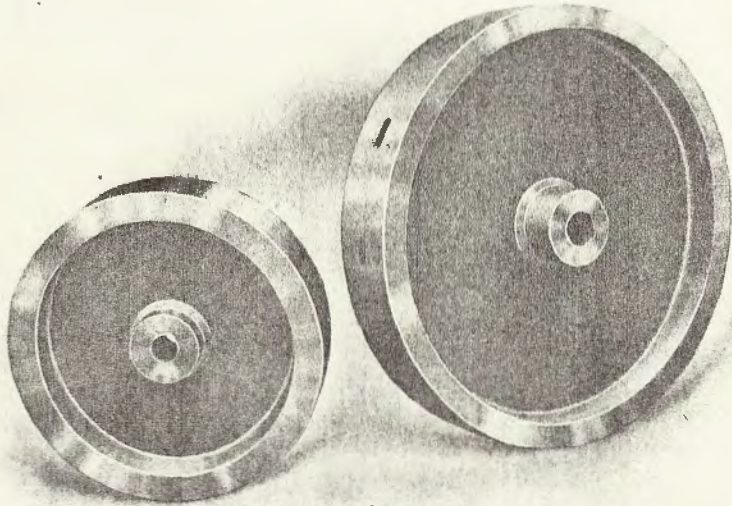
"Union" Governor.

UNION GAS ENGINE COMPANY, EAST OAKLAND, CALIFORNIA

made in the usual diagonal (\setminus) manner, but is machined in steps (\perp), to prevent escape of gases. The width of the rings is less than in competitive practice, reducing the friction to a minimum. The grooves in the rings, which is a special feature of "Union" engines, carry a generous supply of oil at all times.

**FLY-
WHEELS**

The fly-wheels furnished are of the simplest construction. They are made without spokes or other means of catching the arms or feet of the operator—a factor of safety to be considered when purchasing a marine engine.

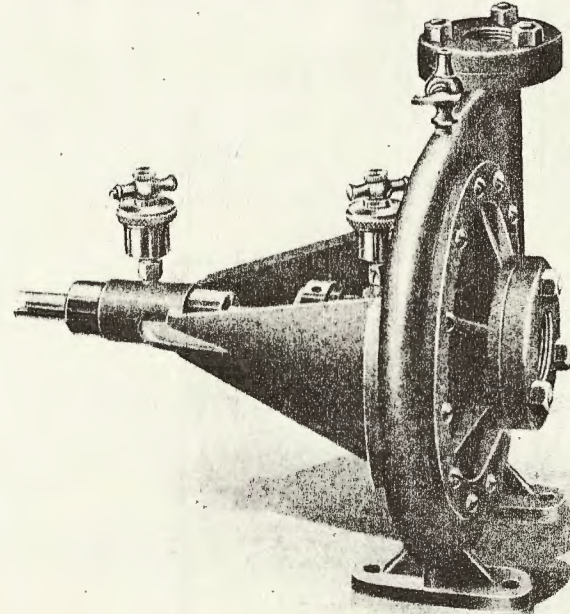


Fly-Wheels.

PUMPS

The circulating pumps used are designed for hard usage. The bearings and runners are made of phosphor-bronze, the rest of the pump being made of gun-metal.

"Union pumps are constructed with removable side-plates and



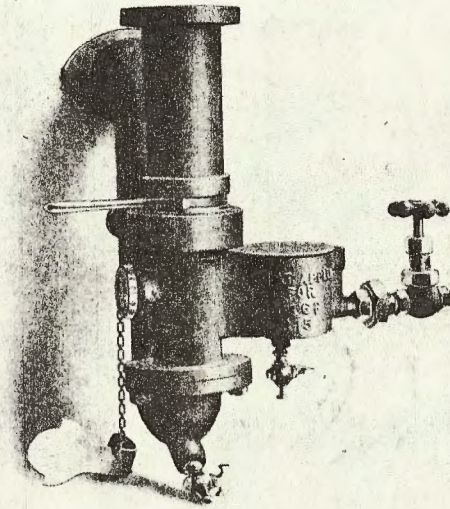
Pump.

bearings, making it possible to replace any worn parts with a minimum loss of time and at very slight cost compared with other makes, which, when worn, require the whole pump-body to be taken to a machine shop for repairs.

Finding it impossible to buy serviceable valves in the open market, we now manufacture all our own pump valves, which are of unusually large area and extra heavy construction.

FRICION CLUTCHES

"Union" engines are fitted with different styles of friction clutches, according to the size of the engines, and the work to be done. The smaller sizes are made of phosphor-bronze, whereas in nearly all other makes of engines cast iron is used for this purpose. The larger engines are fitted with clutches having renewable wearing faces, for which only the best Eastern maple is used.



"Union" Vaporizer.

use, being installed in large ships engaged in the lumber trade, passenger boats, oil barges, gunboats, water barges, tow-boats, etc.

In making up the design of the three-cylinder engine and multiples thereof, it was determined that the "Union" should

VAPORIZER

A strong point in favor of any mechanism is simplicity. The "Union" float-feed vaporizer can be taken to pieces with the fingers, without the use of tools, in a few seconds, and put together as quickly. The air, before being drawn into the vaporizer and combined with the gasoline or other fuel, is slightly heated, the result being a dry, warm, explosive gas, requiring a very small spark to ignite, and which is practically at the same degree of temperature in all weather. The action is entirely automatic. Any water forming in the vaporizer may be drawn off at once by means of a petcock, without stopping the engine. The vaporizer is provided with gasoline and air adjustments.

"UNION" THREE-CYLINDER MARINE ENGINES

"Union" three-cylinder marine engines are built in sizes from 20 HP. to 150 HP. Engines above this power are of the six-cylinder type. The demand for this type of engine for commercial and pleasure purposes has been so great during the last few years, that several hundred of the latest model are already in

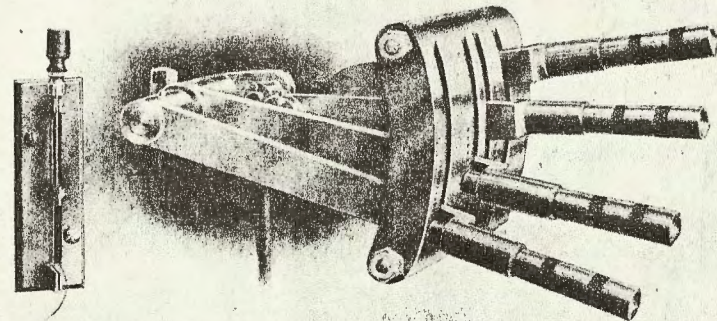
UNION GAS ENGINE COMPANY, EAST OAKLAND, CALIFORNIA

be free from the many objectionable features to be found in some of our competitors' engines. Accessibility to all the working parts was made the subject of special study. In addition to the factors of reliability and economy, which are the first consideration in all "Union" engines, that of accessibility was considered of next importance. A three or six-cylinder engine has necessarily more parts than a single or double-cylinder engine, calling for special study and experiment, so as to produce an engine which could be easily operated by any one. That we have been able to accomplish this is fully demonstrated by the large sales we have made and the enthusiasm of our customers who are using them.

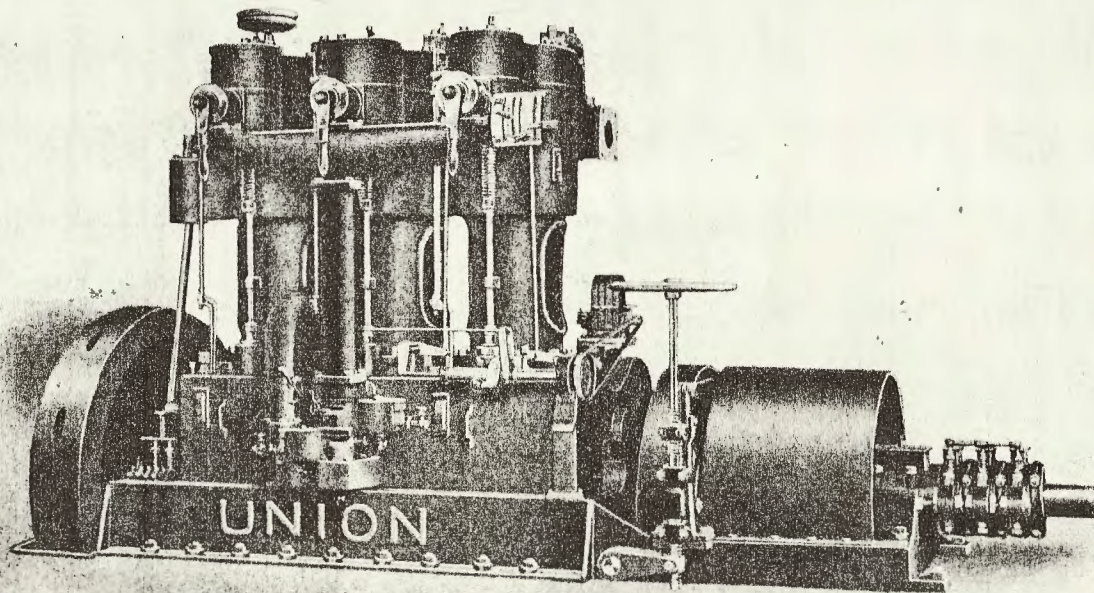
This engine is so constructed that the operator has all of the parts under perfect control from one point, and, standing at the reversing gear, may adjust time of ignition, relief valves, air and fuel feed and speed of engine. The cylinder heads may be removed without taking off any working parts of the engine, and the igniter plugs may be taken out by removing two nuts. Sight feed multiple oilers supply perfect lubrication to every part. Inlet and exhaust valves are of large area and are interchangeable one with the other.

By looking through this catalogue, prospective buyers will find illustrations showing applications of our three-cylinder engines to various purposes.

CONTROL One of the features of our three, four and six-cylinder "Union" engines in which we are away ahead of all other makes of gas or oil engines is in the control. The controlling levers and battery switch are brought to one place conveniently situated on the after cylinder, so that the man who is steering the boat can at the same time have complete control over the engine. This is a point very often lost sight of by engine builders, and, consequently, when making landings or handling a launch in crowded waters, the steersman may have to leave the wheel to adjust the speed of the engine, change the ignition or mixture, just at a time when it is imperative that he should be at the wheel. This cannot happen with our perfected control system, which on large size launches can also be carried to the pilot house when specially ordered.



"Union" Control.



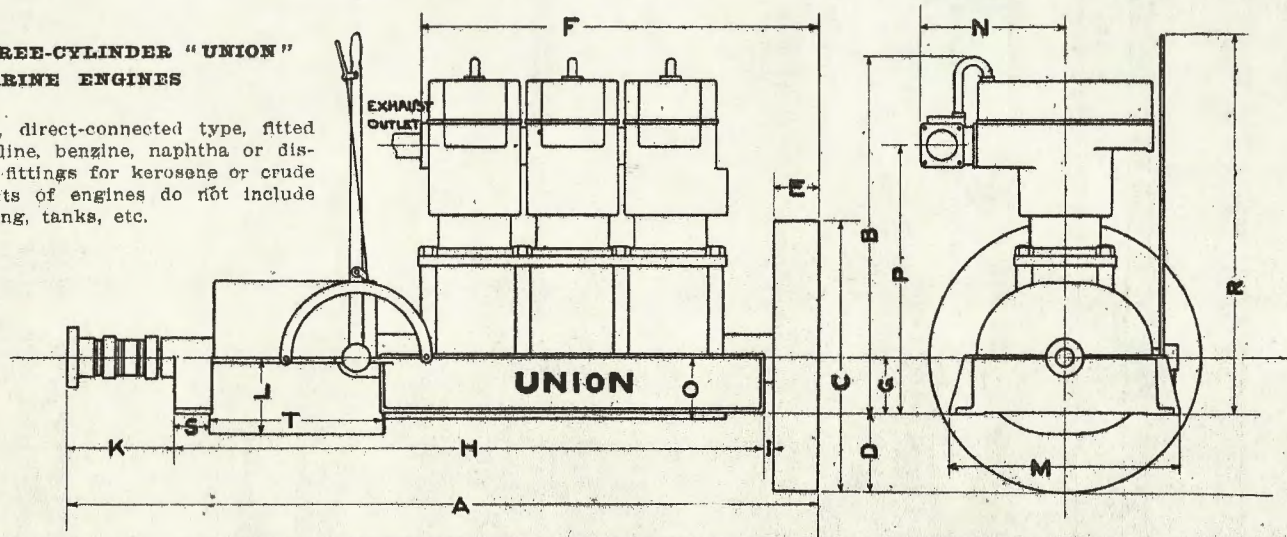
125 HP. THREE-CYLINDER "UNION" MARINE ENGINE, AS MADE FOR TWIN SCREWS (STARBOARD ENGINE)

The above is a type of three-cylinder "Union" engines, built in sizes from 85 HP. to 150 HP. Furnished with air pump, self-starter, governor, speed controller, float-feed vaporizer, adjustable ignition, and all of our latest improvements. The larger sizes of engines are fitted with crossheads and positive lubrication to the crosshead pins, which are exposed to view at all times.

The thrust collars are water-cooled and faced with white brass, and are also adjustable to take up wear. The inlet piping from the vaporizer to the cylinders is of special design in order to convey an equal amount of carburetted mixture to each cylinder. This is a very important feature of "Union" three, four and six-cylinder engines. In many competitive engines, owing to the faulty design of the inlet piping, some cylinders receive a richer mixture than others, thereby coating the electrodes with carbon or soot and causing short circuits and other troubles.

**LIST OF THREE-CYLINDER "UNION"
MARINE ENGINES**

Of the vertical, direct-connected type, fitted to run on gasoline, benzine, naphtha or distillate. Special fittings for kerosene or crude oil. Net weights of engines do not include propeller, shafting, tanks, etc.

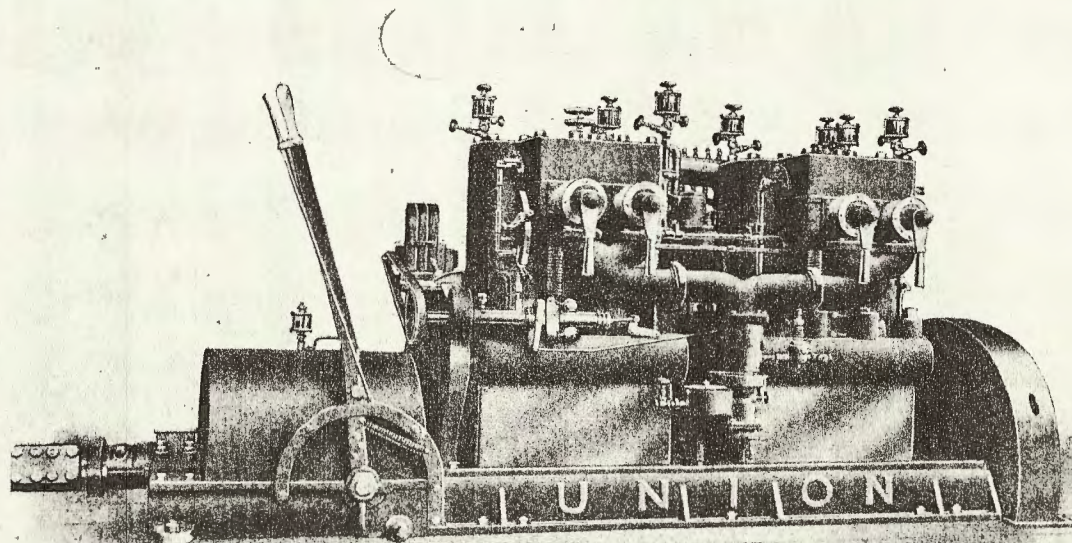


HP.	A	B	C	D	E	F	G	H	I	K	L	M	N	O	P	R	S	T
20	70 3/4"	31 3/4"	30"	11"	4"	41"	4"	60"	1 3/4"	5"	7"	24"	11 1/2"	6 1/4"	25 1/8"	34"		17 1/2"
35	82 3/4"	37 3/4"	32"	11"	5"	46 1/2"	5"	69"	1 1/4"	7 1/2"	9 1/4"	28"	14 1/4"	7"	30 1/4"	48"		21 1/4"
45	99 1/8"	38 1/2"	36"	10 1/2"	6"	52 1/2"	7 1/2"	78 1/2"	1"	13 3/8"	10 1/4"	31"	16 1/2"	8 1/4"	35 3/4"	50 1/2"		23 1/4"
55	109 3/8"	47 1/2"	40"	12"	7"	60"	8"	90 1/8"	3/4"	11 1/2"	13 3/8"	35"	20 1/4"	9 1/2"	38 1/4"	51"	*	27 5/8"
65	109 3/8"	50"	42"	13"	7"	60"	8"	90 1/8"	3/4"	11 1/2"	13 3/8"	37"	18 3/4"	9 1/2"	40 1/2"	51"	*	27 5/8"
85	134 1/4"	65"	48"	15"	8"	73"	9"	106 1/8"	1 1/2"	19 1/4"	14 1/2"	42"	33 1/2"	10 1/2"	61 1/4"	40"	*	38 1/8"
100	149"	74"	52"	15 7/8"	9"	80 1/2"	10 1/2"	118 1/4"	1 3/4"	19 1/2"	17"	48"	24 5/8"	11 1/2"	63 1/2"	42"	*	43 1/4"
125	162 3/8"	82 1/4"	56"	17"	9"	80 1/2"	11"	126 3/4"	1 3/4"	24 1/2"	18 1/4"	52"	26 1/8"	12 1/2"	70 1/4"	43"	*	45 3/8"
150	173 1/8"	92 3/4"	64"	20"	11"	100"	12"	136"	1"	25 1/4"	20 1/4"	58"	32 1/2"	14 1/8"	79 1/4"	43"	*	48 3/4"

Rated Horse-Power	Bore in Inches	Stroke in Inches	Number of Revolutions per Minute	Diameter of Propeller	Diam. of Propeller Shaft	Diam. of Hole in Deadwood	Net Weight of Engine Only	Shipping Wt. Including Propel. Shafting, Box, etc.
20	6"	6 1/2"	500	28"	1 3/4"	2 1/2"	2338	3288
35	7"	8"	450	30"	2"	3 1/8"	3665	5155
45	8"	9 1/2"	375	38"	2 1/4"	3 1/2"	5320	6640
55	8 3/4"	10"	350	40"	2 1/2"	4"	7720	9600
65	9 1/4"	11"	350	44"	2 1/2"	4"	8100	10500
85	10 1/2"	13"	330	50"	3"	5"	11800	15900
100	11 3/4"	13"	325	54"	3 1/2"	5 5/8"	15200	19610
125	13"	14 1/2"	280	60"	4"	6 3/4"	22100	31400
150	14"	17"	250	66"	5"	7 5/8"	26295	35500

*T extends to after end of engine bed

UNION GAS ENGINE COMPANY, EAST OAKLAND, CALIFORNIA



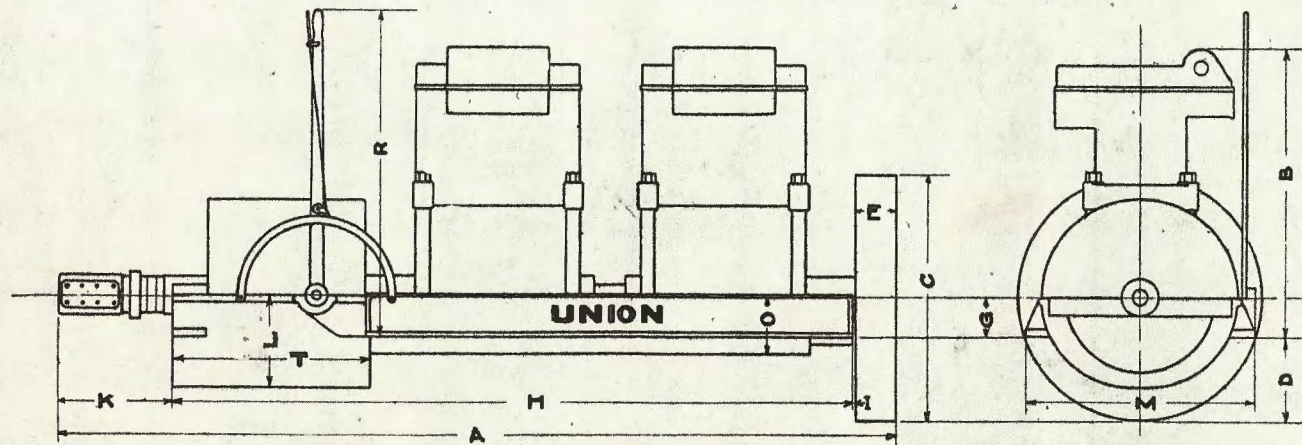
A TYPE OF 45 AND 100 HP. FOUR-CYLINDER "UNION" ENGINES

With governor, speed controller, adjustable ignition, self-starter, centrifugal circulating pump, air pump, magneto, multiple sight-feed oiler, centrifugal ring oilers, ball thrust bearings, float feed vaporizer, and all the latest improvements. "Union" four-cylinder engines, being intended principally for launch use, are made lighter than the commercial engines. They have proved very satisfactory, many of them having been in constant use for the past five years.

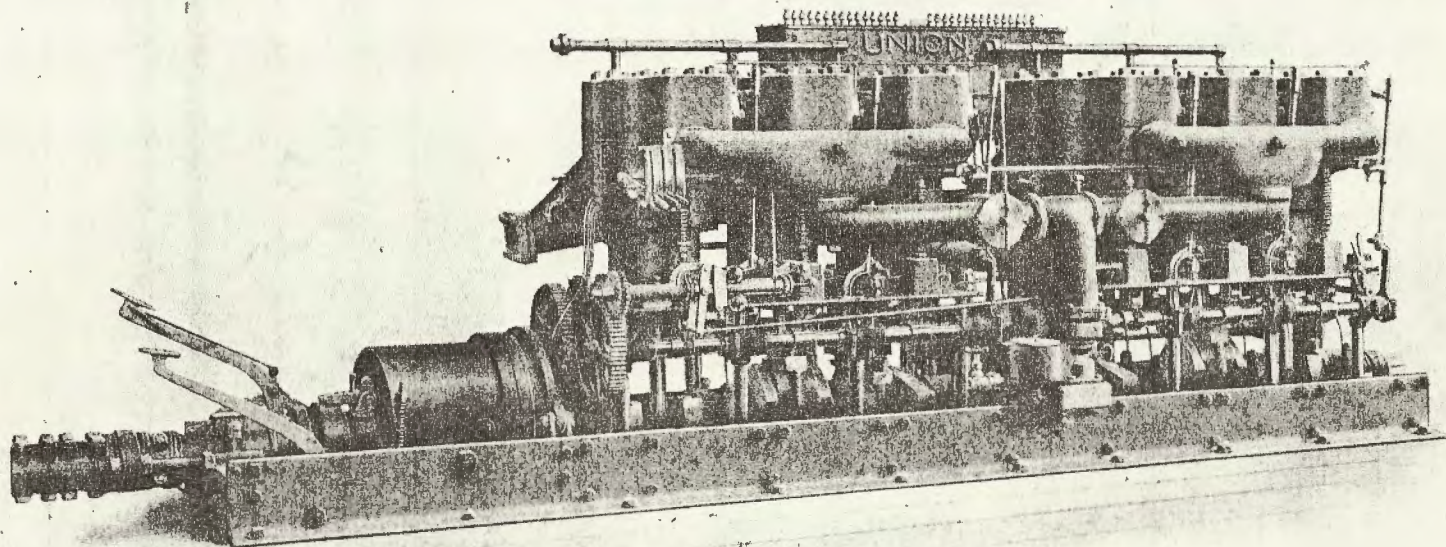
UNION GAS ENGINE COMPANY, EAST OAKLAND, CALIFORNIA

LIST OF FOUR-CYLINDER "UNION" MARINE ENGINES

Of the vertical, direct-connected type, fitted to run on gasoline, benzine, naphtha or distillate. Special fittings for kerosene or crude oil. Net weights of engines do not include propellers, shafting, tanks, etc.



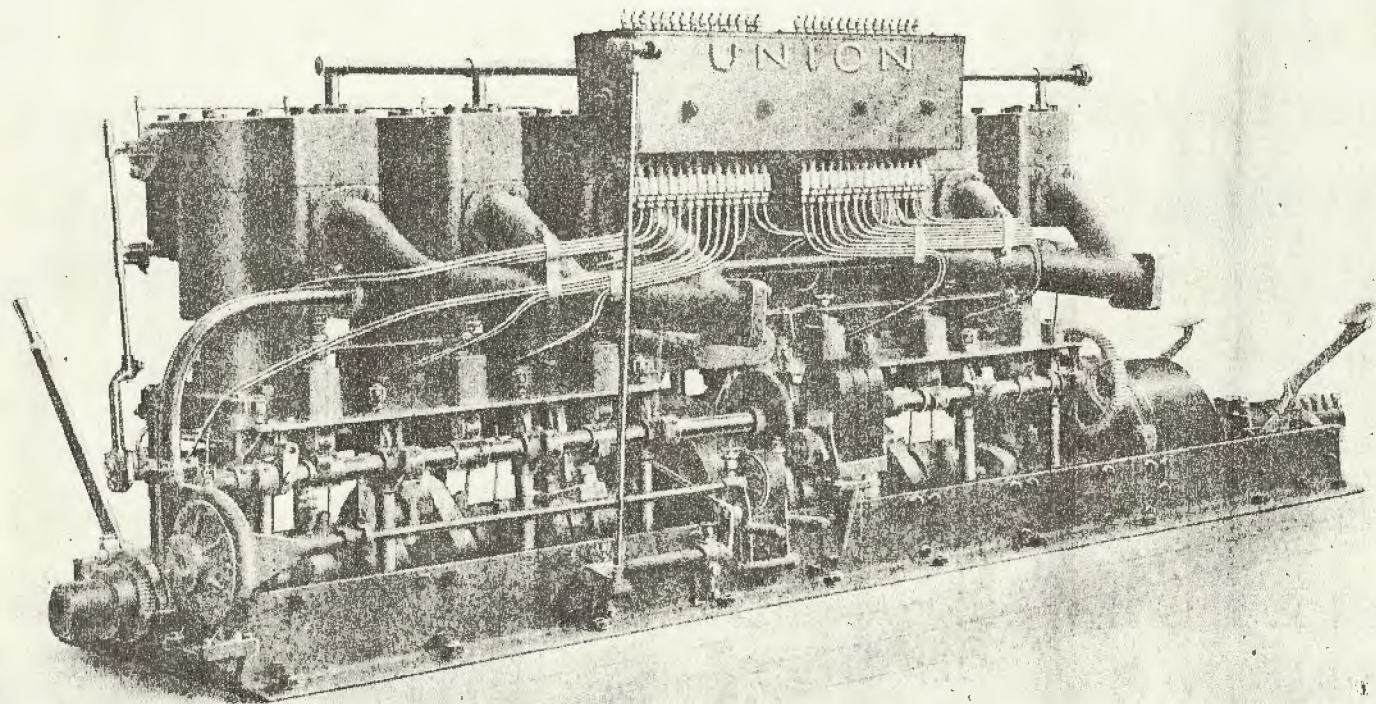
HP.	A	B	C	D	E	G	H	I	K	L	M	Q	T	R
45	7'-1 3/4"	2'-9 1/8"	2'-2"	9"	5"	4"	5'-10 1/8"	1 1/2"	8 3/4"	8 3/8"	2'-1"		22 3/8"	3'-5"
85	10'-2 1/2"	3'-6 1/4"	3'-0"	12"	6"	6"	8'-3 1/4"	3/4"	16 1/2"	13 3/8"	2'-8"	8 3/8"	24 3/4"	4'-0"
100	10'-2 1/8"	3'-8 1/8"	3'-2"	13"	6"	6"	8'-3 3/4"	3/4"	16 1/2"	13 3/8"	2'-8"	8 3/8"	2'-1 3/4"	4'-0"
Horse-Power	Bore in Inches		Stroke in Inches	Number of Revolutions per Minute		Diameter of Propeller		Diam. of Propeller Shaft		Diam. of Hole in Deadwood		Net Weight of Engine Only	Shipping Wt. Including Propel. Shafting, Box, etc.	
45	6 1/2"		7"	575		30"		1 3/8"		2 1/4"		2755	4180	
85	8 1/2"		9"	500		40"		2 1/8"		4 1/8"		6820	8750	
100	9"		9 1/8"	500		46"		2 1/8"		4"		7600	9500	



100 HP. SIX-CYLINDER "UNION" MARINE ENGINE (STARBOARD SIDE)

A type of six-cylinder "Union" marine engine for motor boats. "Union" control and mechanical force-feed oiler. The clutch is automatic, and of the multiple-disc type with safety gear, which prevents the reverse and go-ahead being thrown into gear at the same time. This engine was designed to supply the demand for a reliable, light engine for high-speed boats.

UNION GAS ENGINE COMPANY, EAST OAKLAND, CALIFORNIA



100 HP. SIX-CYLINDER "UNION" MARINE ENGINE (PORT SIDE)

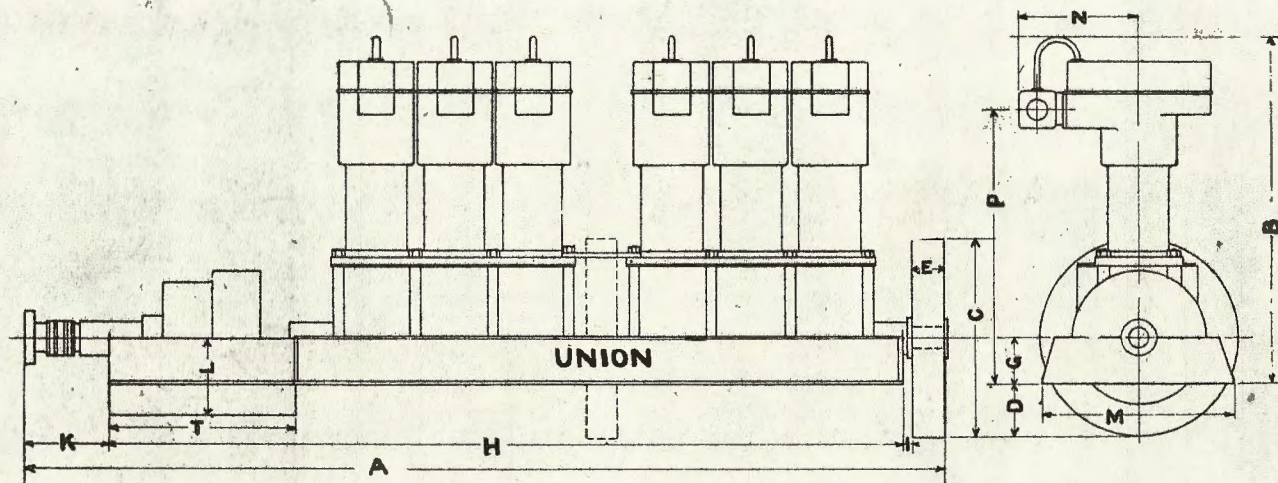
Showing the safety starting lever, which is so designed that, if the engineer forgets to retard the ignition and the engine should "kick back," the lever automatically releases itself.

The mechanical force-feed oiler shown has a separate pump-feed to each pipe leading to either cylinders or bearings, any one of which can be regulated to supply the proper amount of oil. The oil tank is fitted with glass gauge and strainer to arrest any foreign substances that might interfere with the working of the oil pumps.

UNION GAS ENGINE COMPANY, EAST OAKLAND, CALIFORNIA

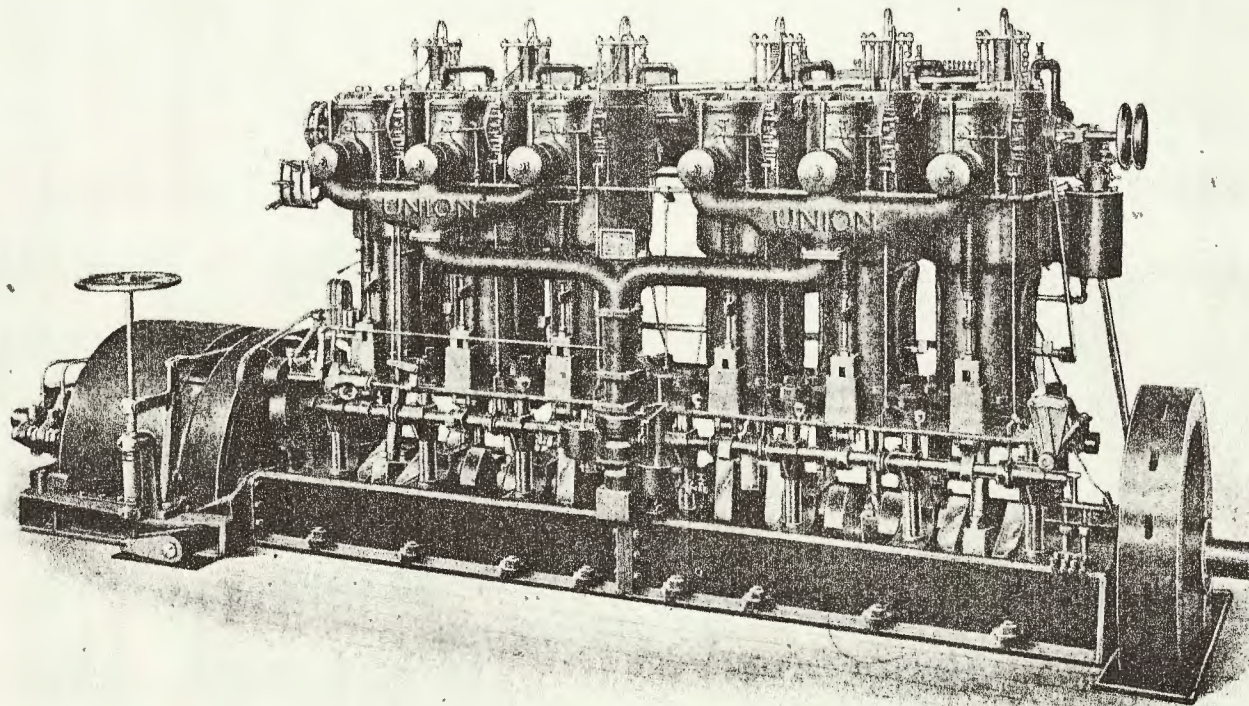
LIST OF SIX-CYLINDER "UNION" MARINE ENGINES

Of vertical, direct-connected type, fitted to run on gasoline, benzine, naphtha or distillate. Special fittings for kerosene or crude oil. Net weights of engines do not include propellers, shafting, tanks, etc.



HP.	A	B	C	D	E	G	H	I	K	L	M	N	P	T
100	11'-1 3/4"	2'-11 3/8"	18 1/2"	4 1/2"	5"	4 3/4"	9'-8 1/4"		14"	8 3/4"	2'-4 3/8"	14 3/16"	21"	2'-3"
250	19'-1"	6'-6 3/8"	4'-0"	13"	8"	11"	16'-1 3/8"	3"	2'-1 3/8"	21"	3'-4"	2'-6"	5'-8 1/8"	3'-11 3/4"
Horse-Power	Bore in Inches	Stroke in Inches	Number of Revolutions per Minute	Diameter of Propeller	Diam. of Propeller Shaft	Diam. of Hole in Deadwood	Net Weight of Engine Only	Shipping Wt. Including Propel. Shafting, Box, etc.						
100	7 1/4"	7 3/8"	600	38"	2 1/2"	3 1/2"	4420	5900						
250	13"	14"	300	60"	5"	7 3/8"	29110	35650						
350	15"	16"	260	72"	6"	8 3/8"	37500	45500						

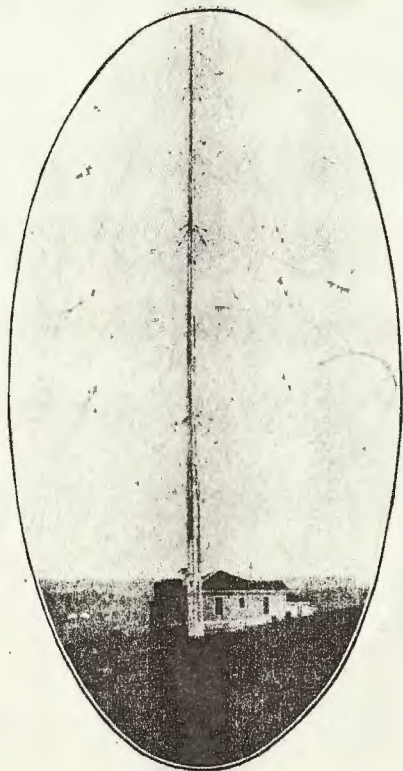
UNION GAS ENGINE COMPANY, EAST OAKLAND, CALIFORNIA



250 HP. SIX-CYLINDER "UNION" MARINE ENGINE

A type of commercial engines that we are building from 100 HP. to 350 HP. Note the crosshead guides and other new features. The best engine of the class ever designed by any builder. The U. S. Government ferry launch "Castro" is equipped with a 250 HP. engine of this type. Two 250 HP. twin-screw engines of this same type have been recently installed in the Standard Oil Company's new steel oil barge. These engines are fitted with water-cooled, balanced exhaust valves, manufactured under our own patents. The crosshead pins have positive oil feeds connected with the mechanical force-feed oil system that also supplies oil to all the cylinders and bearings under a positive pressure system, every oil pipe having its own pump, which starts with the engine.

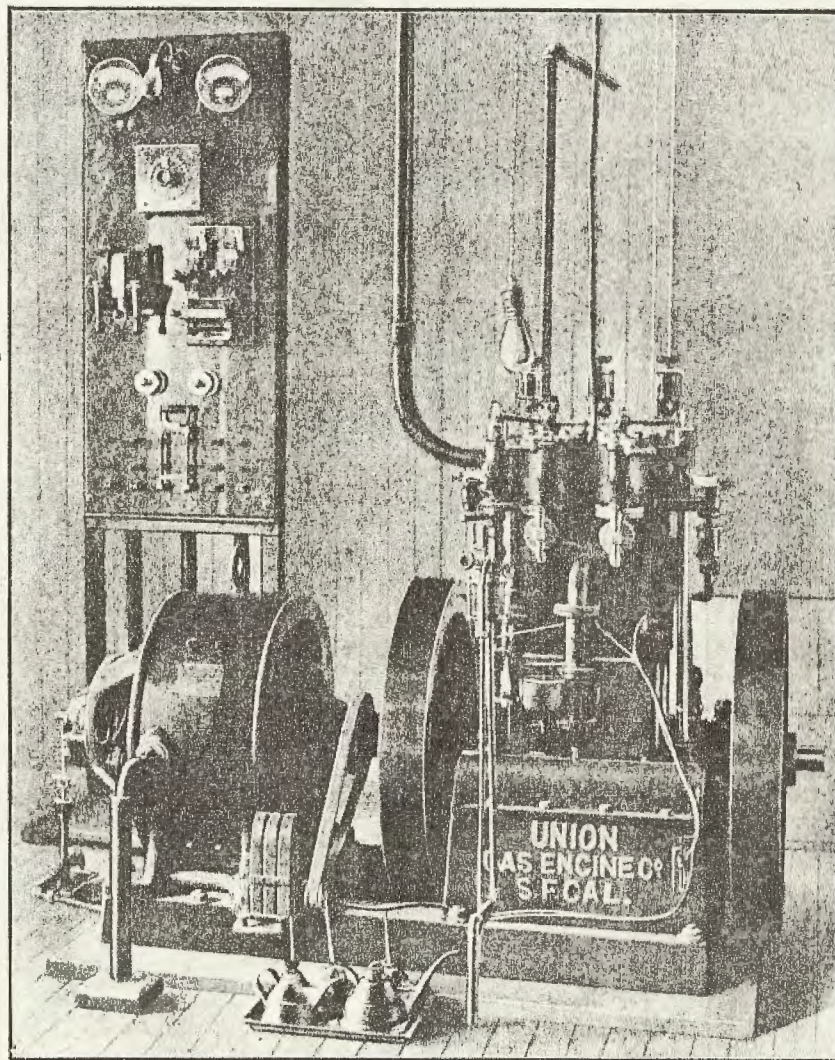
The thrust bearings are water cooled and of ample surface to meet government requirements. The crankshaft has removable and adjustable bearings, which can be renewed without removing the crankshaft or taking down the engine.



FT. ARGUELLO WIRELESS TELEGRAPH STATION

3 HP. "UNION" DOUBLE-CYLINDER VERTICAL ENGINE

Direct connected to a 3 K. W. generator—an ideal arrangement for lighting vessels, electric decorations, etc. A number of sets have been furnished the U. S. Navy Department for wireless telegraph stations. We are prepared to furnish electrical sets in any size units, either direct-connected, as this one, or with the generator driven by belt from engine.



UNION GAS ENGINE COMPANY, EAST OAKLAND, CALIFORNIA

GUARANTEE Every "Union" engine is guaranteed to be capable of developing the full brake power at which it is rated and for which it is sold, and we will furnish, free of charge at San Francisco or Oakland, duplicates of any parts found to be defective in material or workmanship, within one year from date of shipment, the defective parts to be sent us with charges prepaid, for our inspection.

TERMS Net cash, f. o. b. San Francisco or Oakland, Cal.; twenty-five per cent of purchase price to accompany the order, balance to be paid when engine is ready for shipment. On large contracts, payments are to be made as the work progresses. Our responsibility for loss or damage to goods ceases after shipping receipt or bill of lading from railroad, steamship or transportation company is signed "in good order." Shipments will be insured at consignee's expense, when final payment is subject to draft.

PRICES We shall be pleased to quote prices on application. In writing, please state the horse-power required and the service expected of the engine.

We are prepared to furnish full information and details for the installation of power and other mechanical equipment of launches, tug-boats, passenger vessels, freighters, barges, tunnel or shallow water boats, schooners, tenders, yachts, etc., and will be pleased to have intending purchasers correspond with us.

If power is wanted for any purpose not indicated in this catalogue, please write, giving full details, and we will submit proposals.

ACCESSORIES Unless otherwise specified, we send with each engine, from 2 HP. to 20 HP., inclusive: Copper oil tank and lead pipe to connect with engine vaporizer, Edison primary battery and heavy insulated water-proof wire, spark coil, switch, copper filling funnel, brass nipple and locknuts for exhaust, lubricators, wrenches, bronze propeller and nut, Tobin bronze tail shaft, steel intermediate shaft with iron couplings, bronze stern bearing, stuffing box and lag screws, brass seacock with brass strainer, bronze circulating pump, brass nipple and locknuts for water connections, oil can and filler, and brass deck plug.

Engines over 20 HP., up to and including 55 HP., have the same fittings, with the exception that the tail shaft is of steel with bronze casings at stern bearing and stuffing box.

The 45 HP. four-cylinder is furnished with tail shaft of solid Tobin bronze.

Marine engines of 55 HP. and over are fitted with magnetos and whistle outfits without additional charge. They are extra when furnished with engines of smaller power.

A brass circulating pump of the plunger type is furnished with all marine engines of the smaller sizes. With engines

UNION GAS ENGINE COMPANY, EAST OAKLAND, CALIFORNIA

of 25 horse-power and over we supply a brass centrifugal pump of a special design. It has renewable bearings and side plates, making it easy to effect repairs if needed. All piping connected with the pump is of brass.

All marine engines are sent outfitted with under-water discharge of exhaust, unless otherwise ordered.

**WHISTLE
OUTFIT**

Consists of a brass whistle, galvanized iron air tank, pressure gauge, safety valve, check valves and air pump. On engines of 5 HP. and over the air pump is attached to forward side of cylinder and is driven by an eccentric on the crank-shaft. Smaller engines have separate brass barrel pumps. When furnished with engines of less than 55 horse-power, an additional price will be charged for the whistle outfit.

IN GENERAL

Our aim has been, as a matter of business principle, to increase the scope, capacity and durability of our engines; to put into the hands of our customers the highest grade of machine; to make the price as reasonable as large sales, labor-saving machinery and economical manufacturing facilities can produce. In short, the engines included in our line of stationary and marine type are the lowest in price, quality considered, of any in the market; they are the best we know how to make, and we feel justified in asserting that there are none better.

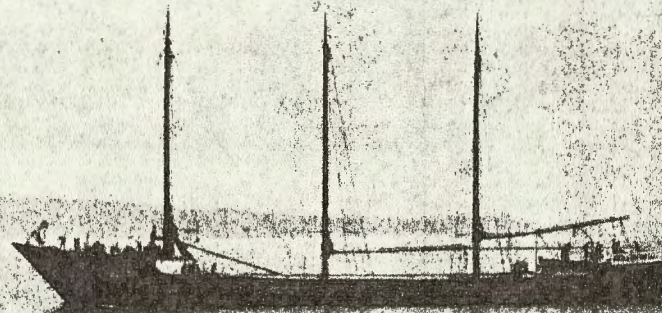
As improvements are constantly being made, engines sent out may vary somewhat from the photographs herein shown.

We shall be pleased to instruct purchasers how to handle our engines, and if they will call at our works we will do so free of charge. If necessary to send a man for that purpose, a charge will be made for his time and expenses. With every engine a book of instructions is furnished, and this generally serves every purpose, as many "Union" engines, owing to their simplicity, have been set up and operated by parties who never saw them before.

The plates shown on the following pages are photographic reproductions of some of the craft in which we have placed "Union" engines.

Of the several thousand craft in which our engines are being used, we have chosen only a few for illustration in this catalogue to indicate the variety of service and type of boats to which this power has been applied.

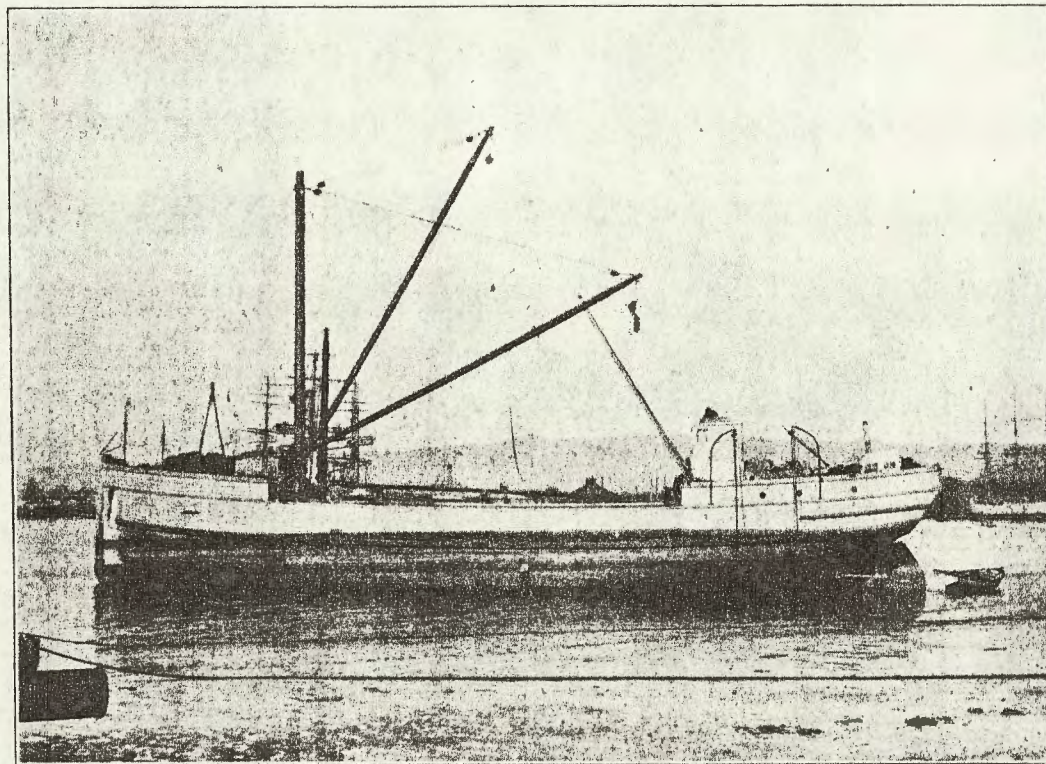
UNION GAS ENGINE COMPANY, EAST OAKLAND, CALIFORNIA



"SOTOYOME"

Equipped with twin-screw "Union" three-cylinder engines of 300 HP. and a 5 HP. "Union" electric light engine, fitted to run on crude oil or untreated distillate. Length, 170 feet; beam, 36 feet, 11 inches; tonnage, 503; carrying capacity, 750,000 feet lumber. Property of Albion Lumber Company, San Francisco, Cal.

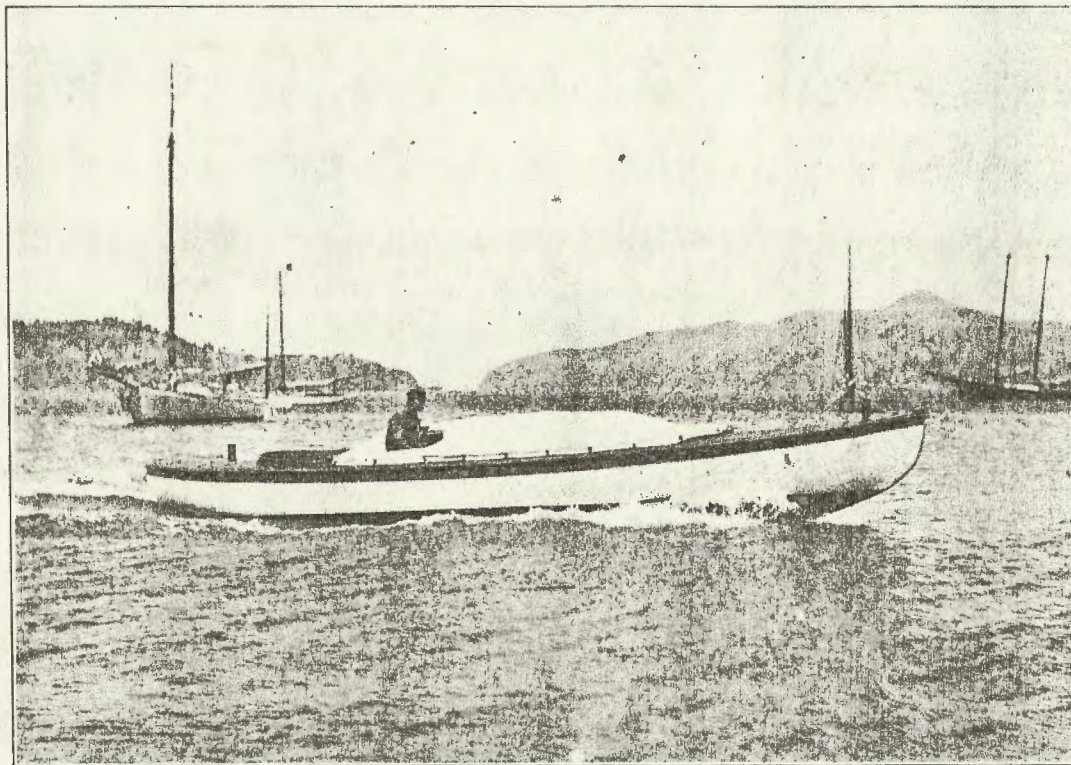
UNION GAS ENGINE COMPANY, EAST OAKLAND, CALIFORNIA



"TOFO"

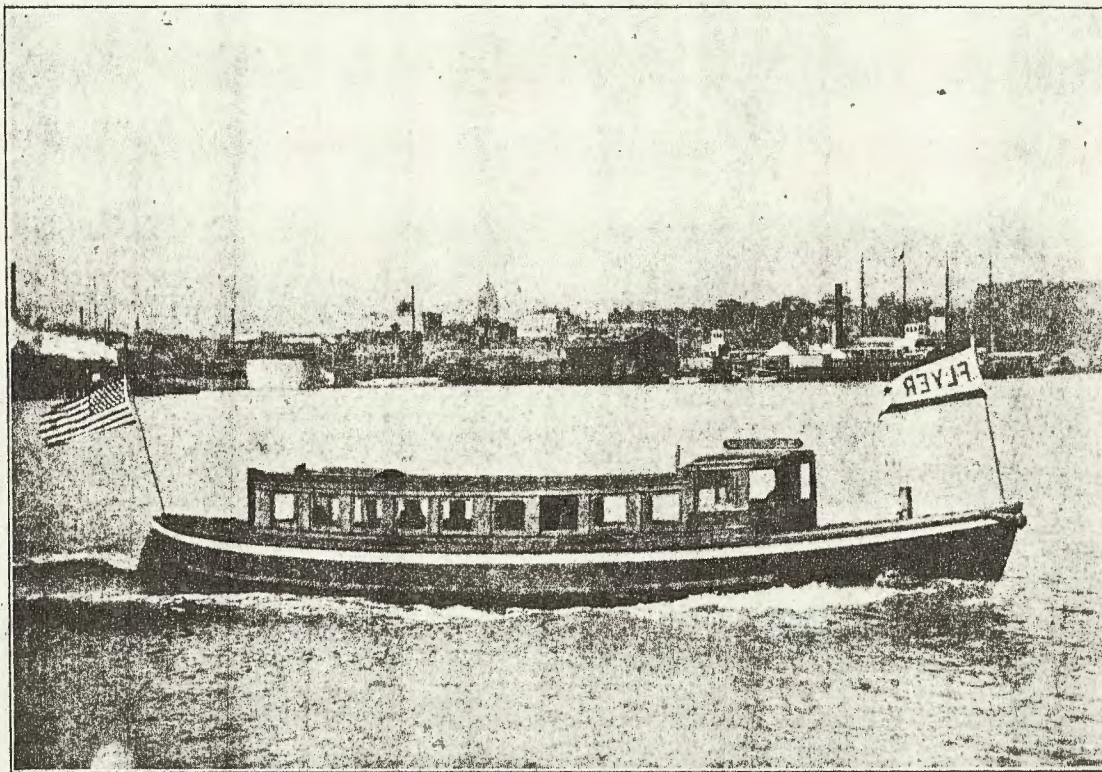
Gravel and sand dredge. Fitted with 180 HP. twin-screw "Union" marine engines. Property of Bay Development Company, San Francisco.

UNION GAS ENGINE COMPANY, EAST OAKLAND, CALIFORNIA



One of two mail boats, each 29 ft. 6 in. x 5 ft. 6 in. 10 HP. "Union" engine. Property of Northern Commercial Company. Used on Yukon River, Alaska, carrying U. S. mail on 600-Mile Route.

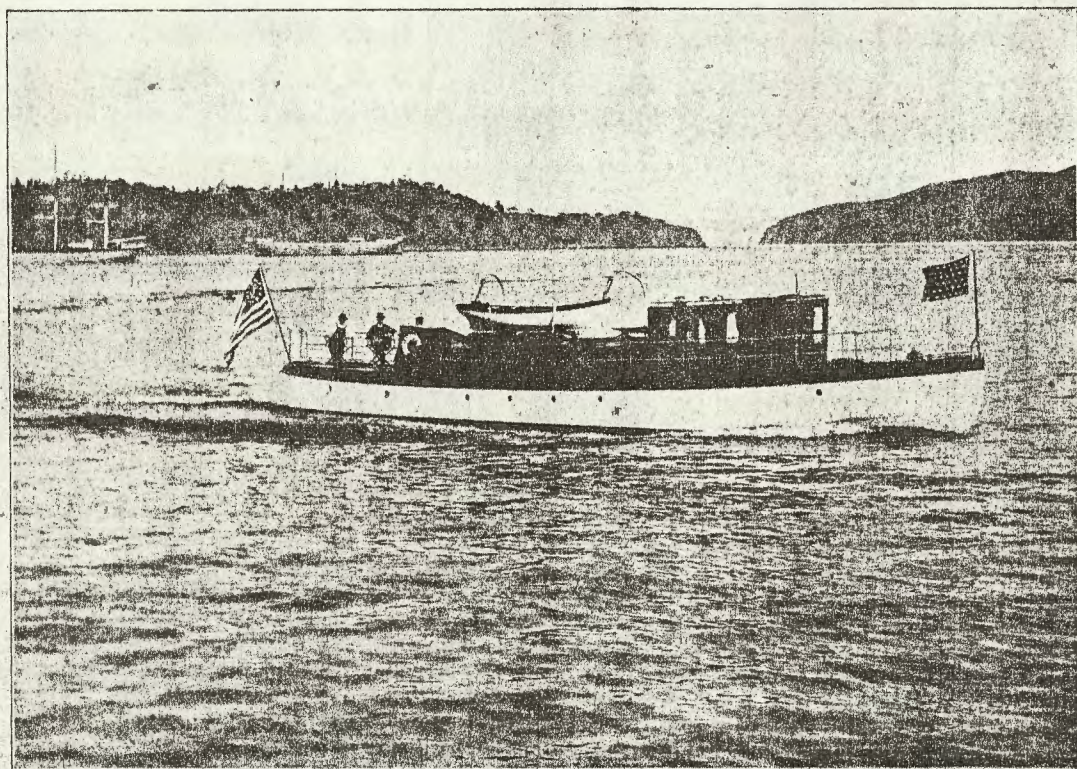
UNION GAS ENGINE COMPANY, EAST OAKLAND, CALIFORNIA



"FLYER"

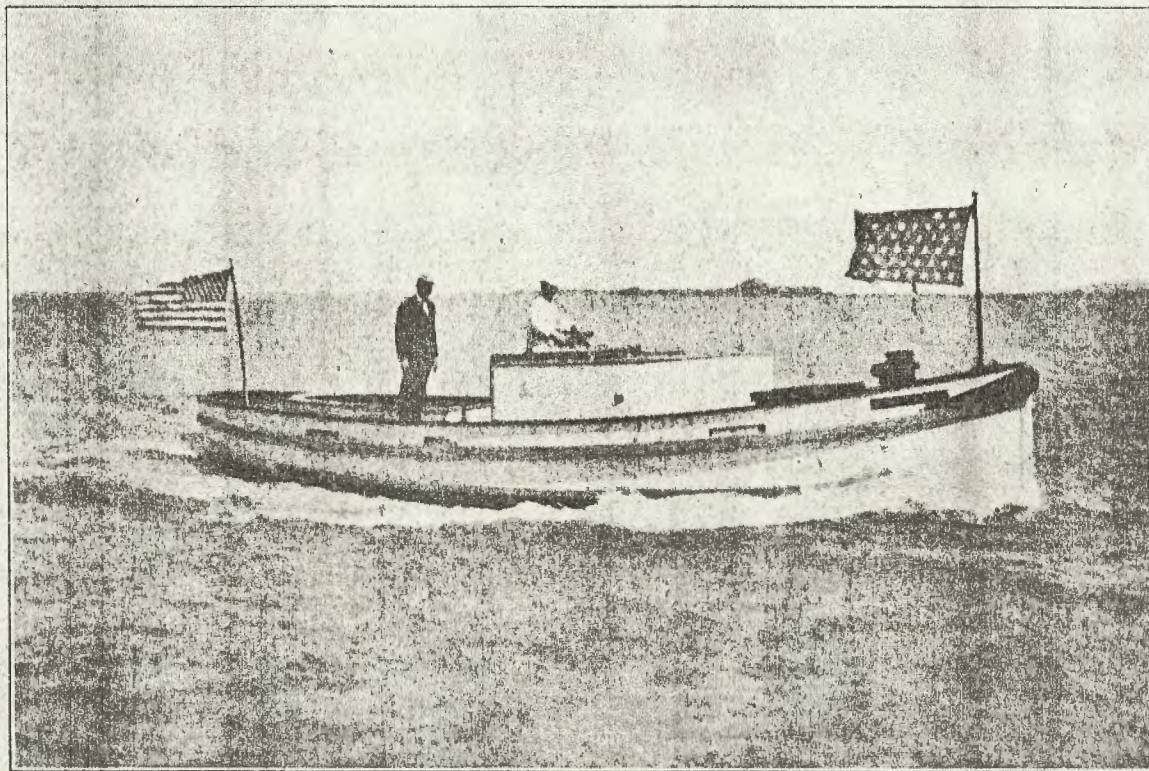
50 ft. x 11 ft. 85 HP. four-cylinder "Union" engine. Property of Standard Oil Company, San Francisco.

UNION GAS ENGINE COMPANY, EAST OAKLAND, CALIFORNIA



"IDLEWILD"

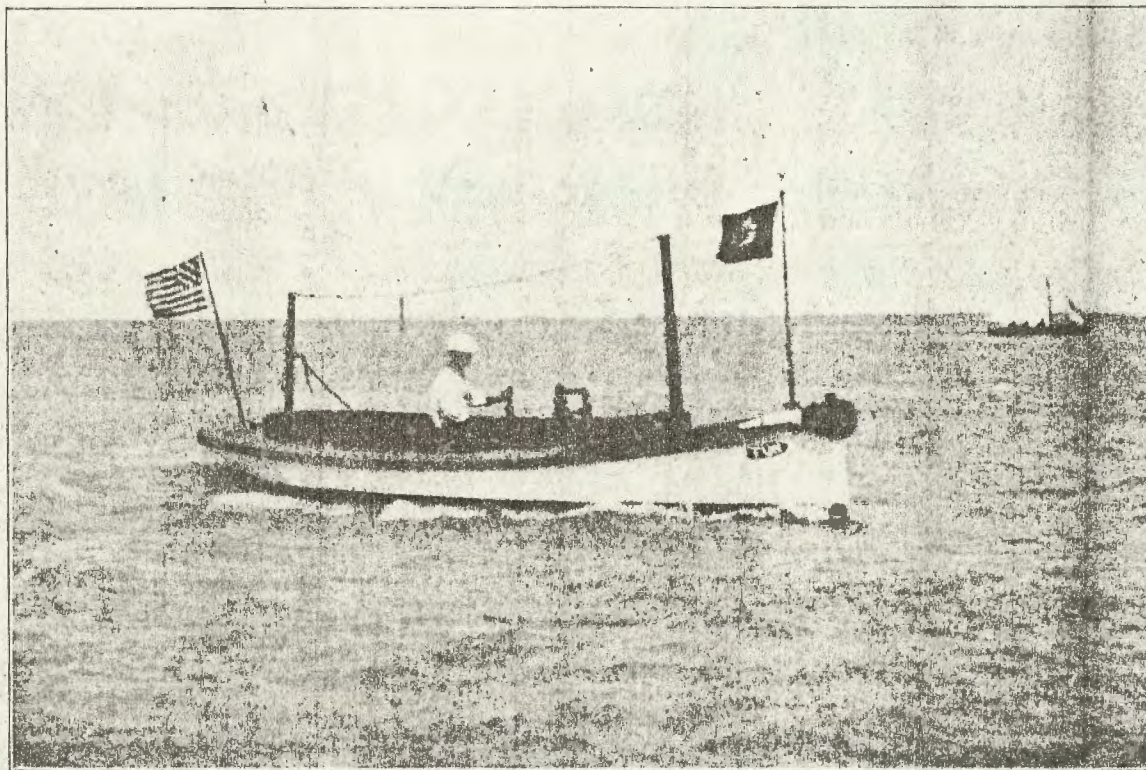
50 ft. x 10 ft. Fitted with an 85 HP. four-cylinder "Union" engine. Property of Mr. C. F. Kohl, San Francisco, Cal.
In use on Lake Tahoe.



"BROTHERS"

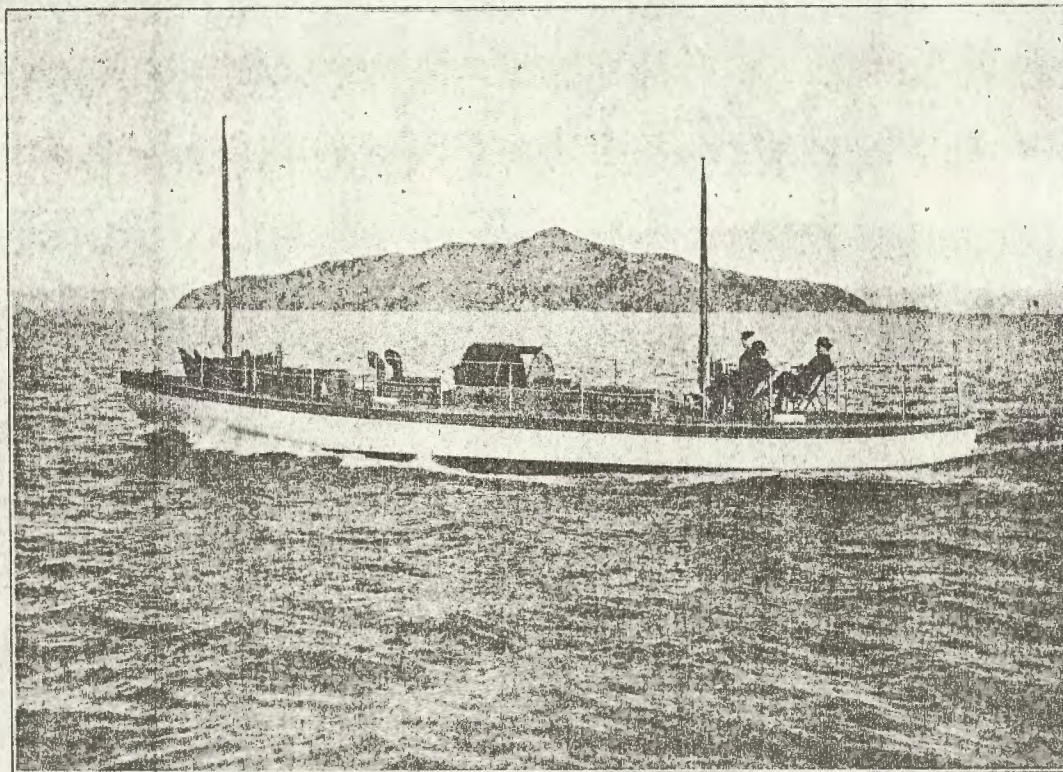
36 ft. long, 10 ft. beam. Fitted with a 25 HP. double-cylinder "Union" engine. Owned by Young Bros., Honolulu.

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"FUN"

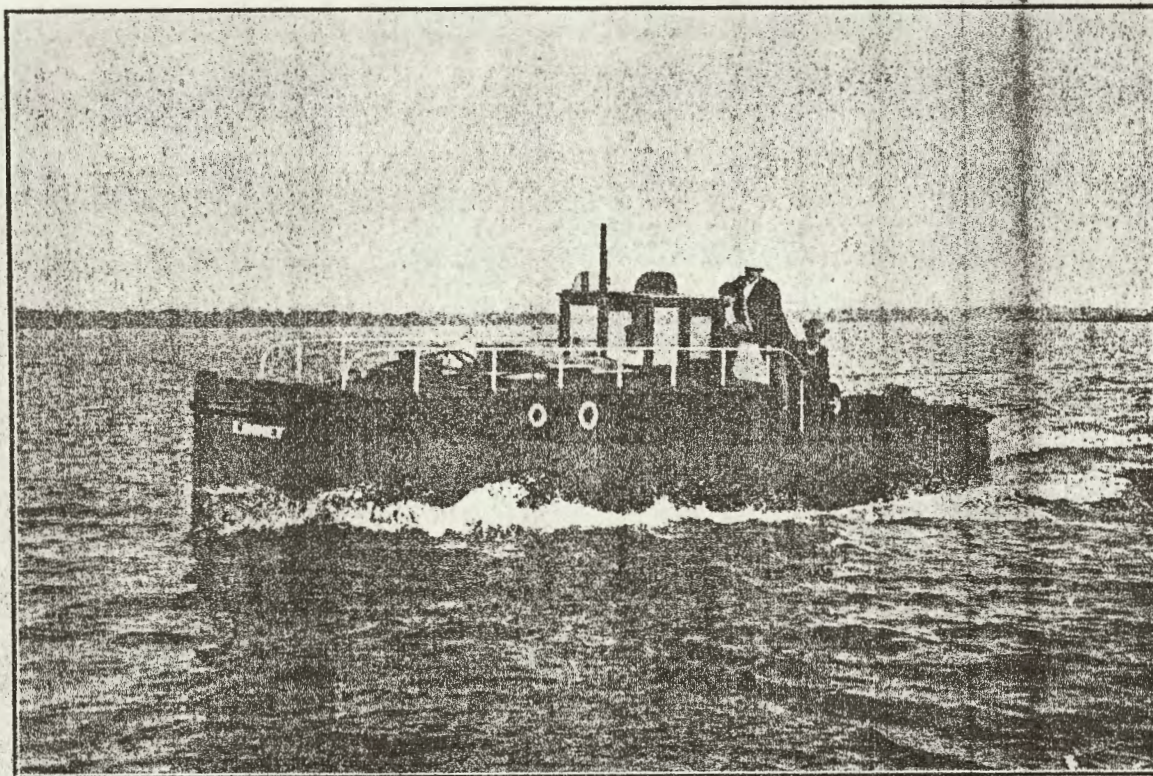
23 ft. long. Fitted with an 8 HP. double-cylinder "Union" engine. This launch carried the Pacific Commercial cable from the cable-ship "Silvertown" to the Honolulu shore. Property of Young Bros., Honolulu, H. T.



"OLIVE"

47 ft. x 8 ft. 3 in. Equipped with a 45 HP. four-cylinder "Union" engine. Property of Mr. Carlton Wall, Alameda, Cal.

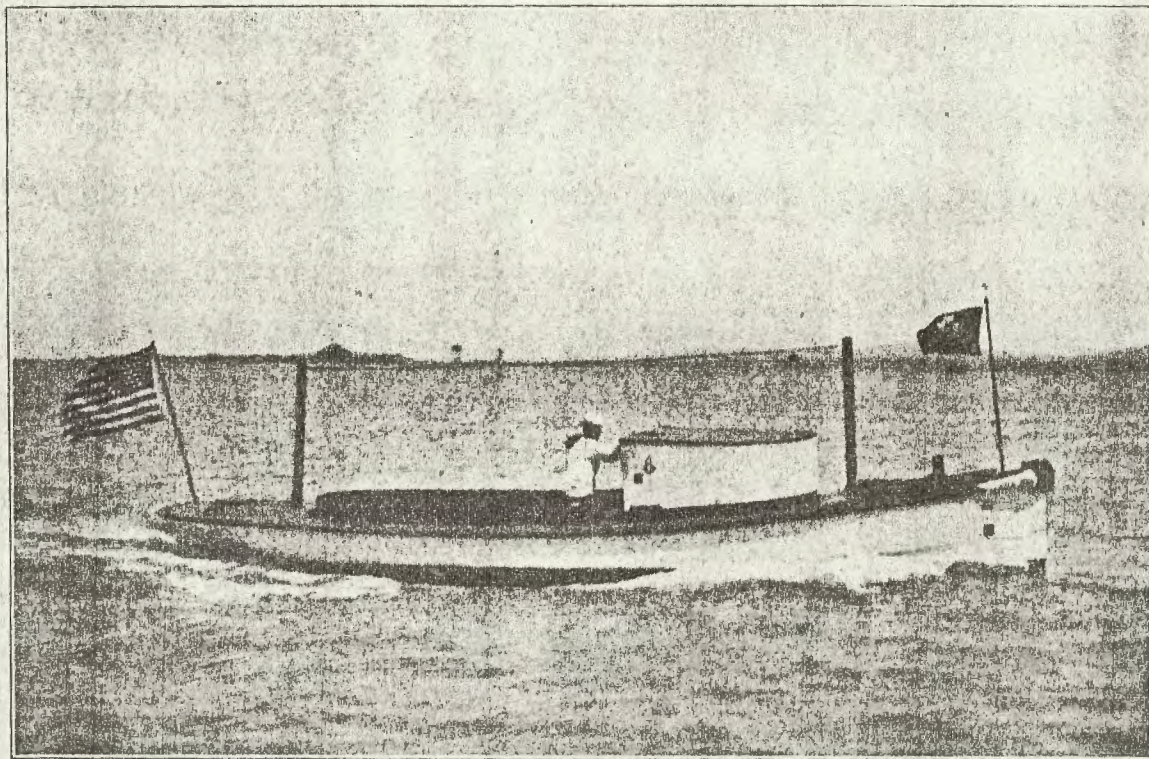
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"LINNET"

40-ft. towing launch. Owned by Swan River Shipping Company, Perth, West Australia. Fitted with a 25 HP. double-cylinder "Union" engine. Speed, with towing propeller, 8½ knots per hour.

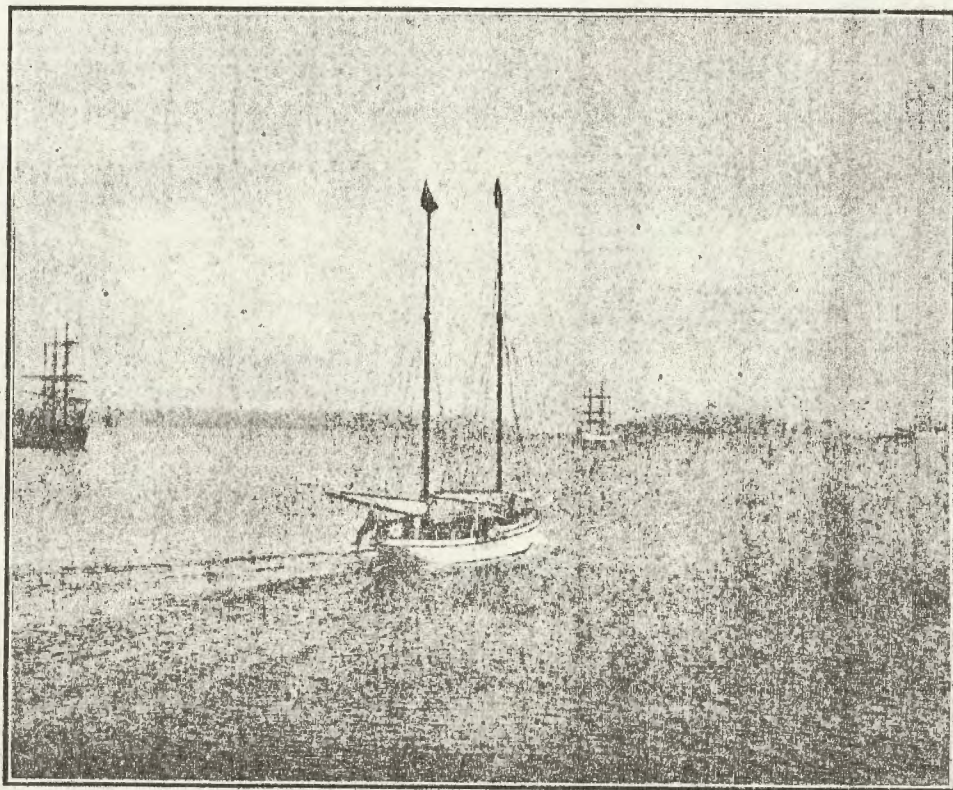
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"P. D. Q."

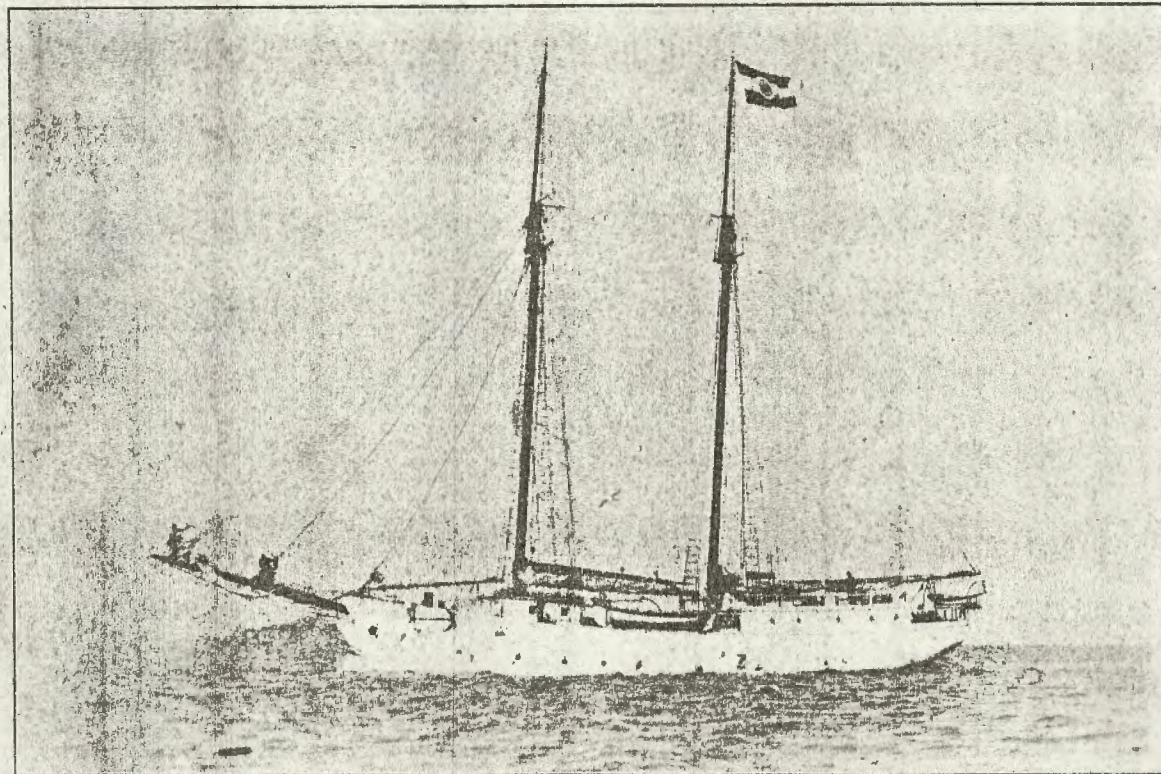
30 ft. x 7 ft. 6 in. Fitted with a 15 HP. double-cylinder "Union" engine. Used as a lighthouse tender by the United States Engineer Department, Honolulu, H. I.

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"MAPLE LEAP"

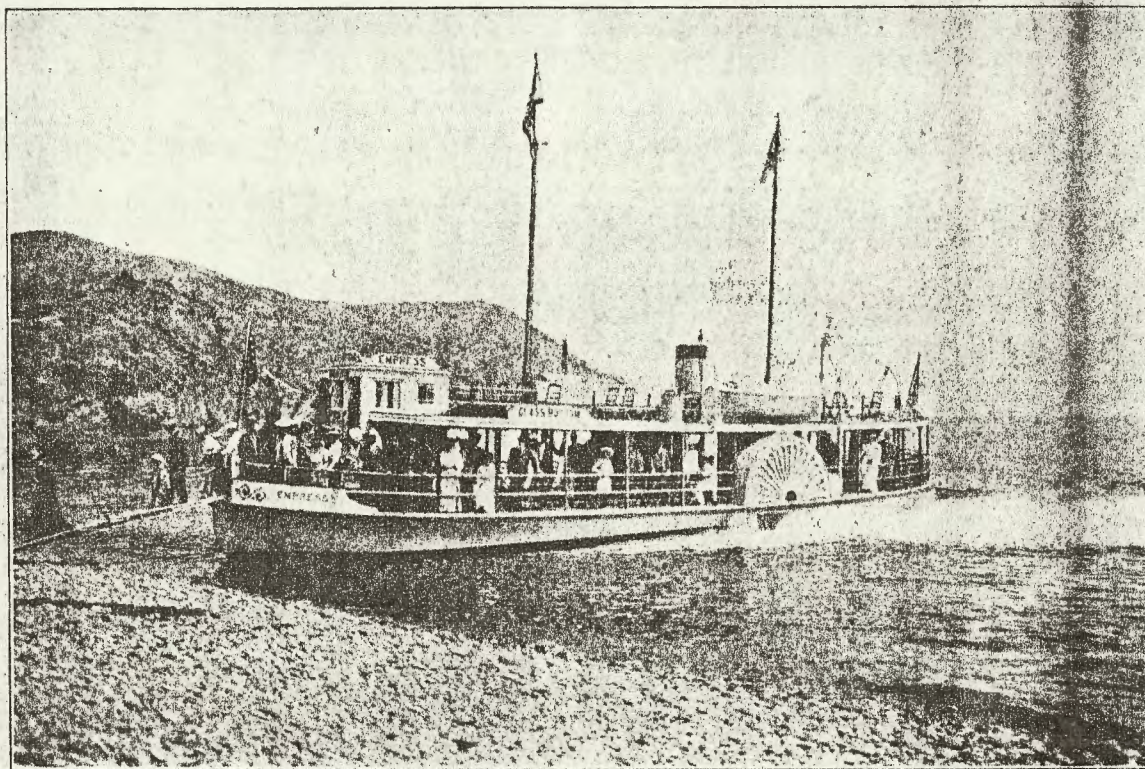
Owned by Alexander MacLaren, of Buckingham, Quebec. Length over all, 69 ft.; water line, 52 ft.; beam, 14 ft.; draught, 8 ft. Equipped with a 15 HP. four-cylinder "Union" engine. Speed, 7½ knots.



SCHOONER "PONAPE"

Property of the German Government. Used in the South Sea Islands. Equipped with a 125 HP. three-cylinder "Union" marine engine and a 3 HP. electric light engine, which are fitted to run on kerosene, distillate or gasoline.

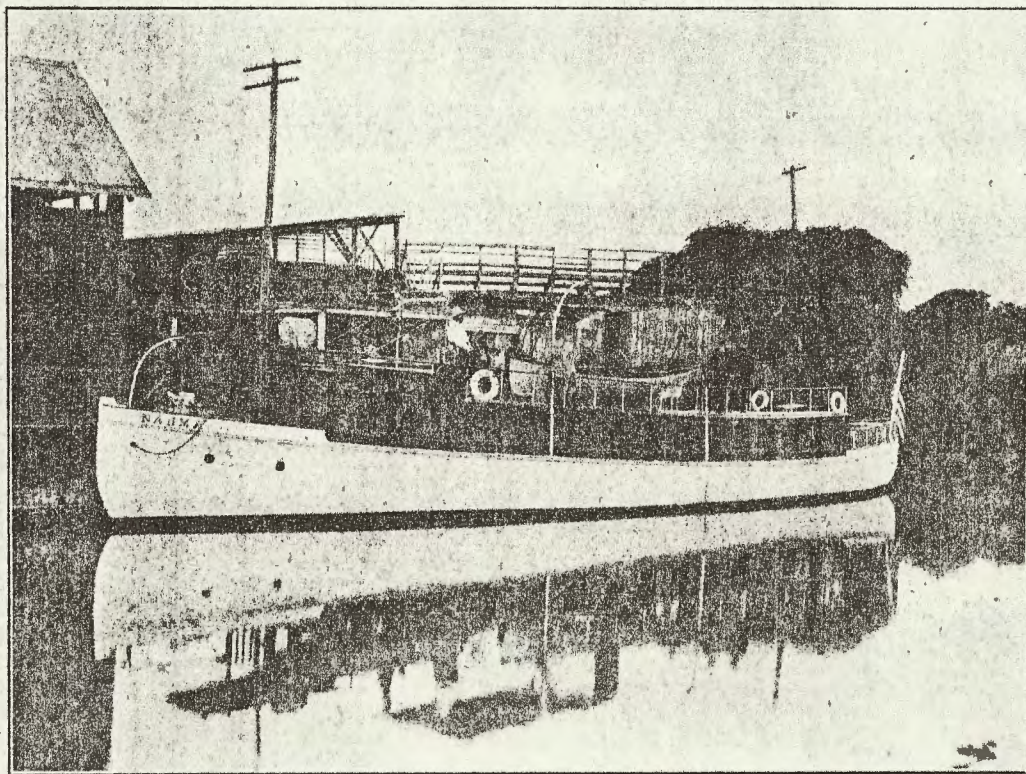
UNION GAS ENGINE COMPANY, EAST OAKLAND, CALIFORNIA



"EMPRESS"

Glass-bottom launch, fitted with a 65 HP. three-cylinder "Union" marine engine and an 8 HP. "Union" electric light engine. Owned by the Meteor Boat Company, Avalon, Cal. This is the largest glass-bottom launch in the world. The Meteor Boat Company owns a fleet of glass-bottom launches equipped with "Union" engines.

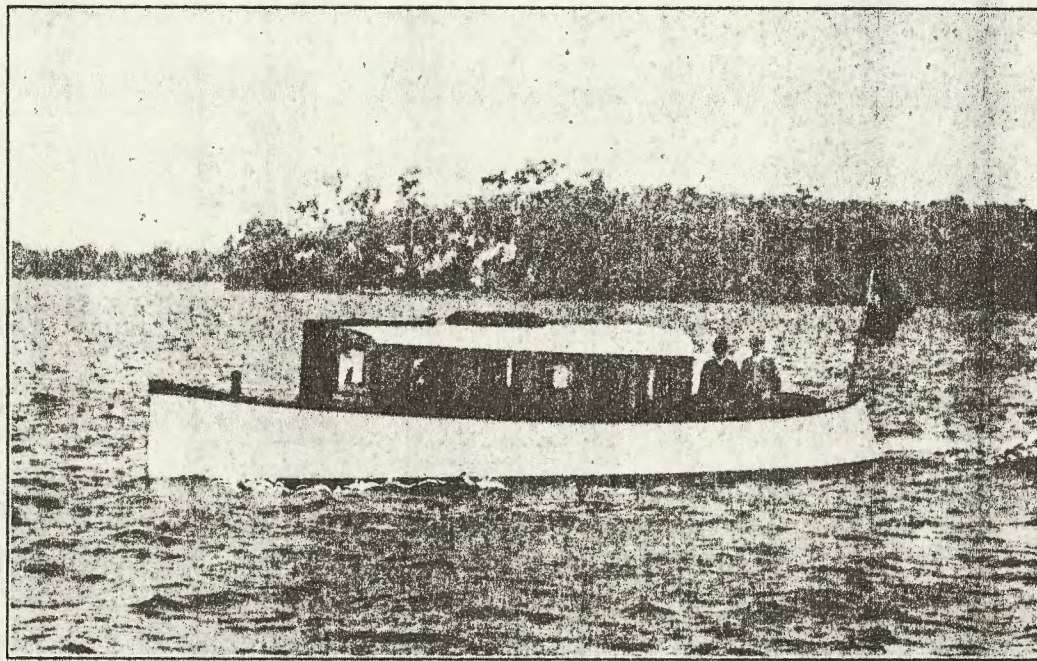
UNION GAS ENGINE COMPANY, EAST OAKLAND, CALIFORNIA



"NAHMA"

Length, 72 ft.; beam, 13 ft.; draft, 4½ ft. Fitted with a 65 HP. double-cylinder "Union" marine engine. Purchased by the U. S. Navy Department for the Louisiana Naval Reserves.

UNION GAS ENGINE COMPANY, EAST OAKLAND, CALIFORNIA



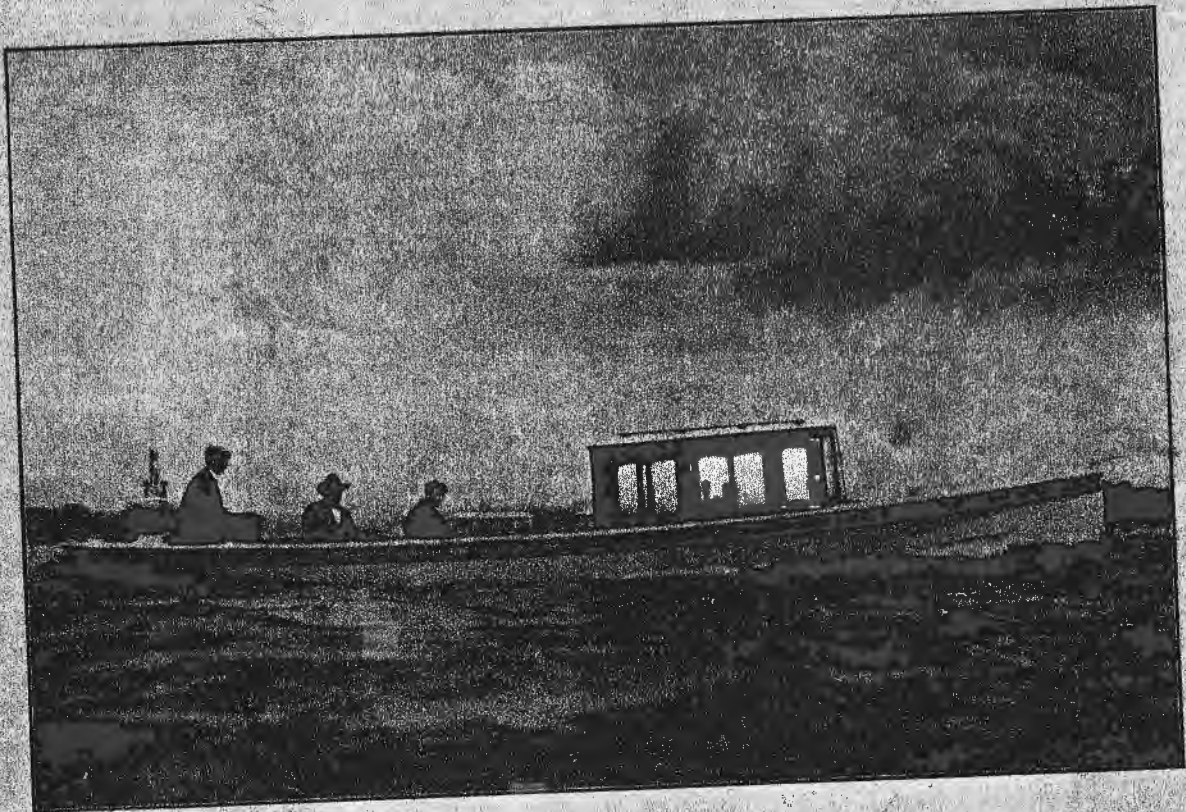
"VISTA"

Owned by T. A. Hill, Perth, West Australia. Length, 38 ft.; beam, 7 ft. 6 in. Fitted with a 10 H.P. double-cylinder "Union" marine engine.



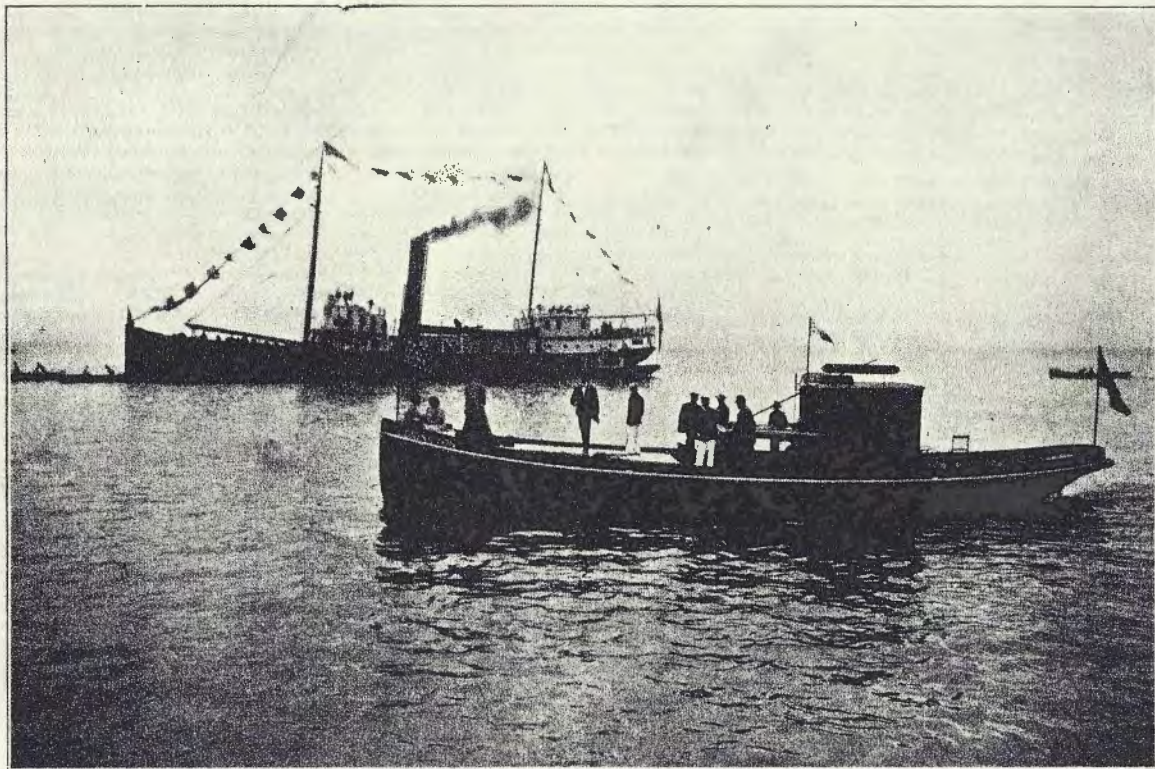
"BEAVER"

Length, 47 ft.; beam, 11 ft.; draught, 3 ft. 6 in.; length of cabin, 32 ft. Speed, $11\frac{1}{2}$ miles per hour. Fitted with a 25 HP. double-cylinder "Union" engine. Property of A. N. Edwards, Vancouver, B. C.



"KARA"

33 ft. x 7 ft. 9 in. Fitted with a 10 HP. "Union" engine. Property of Mr. A. A. Thomson, Sydney, New South Wales.



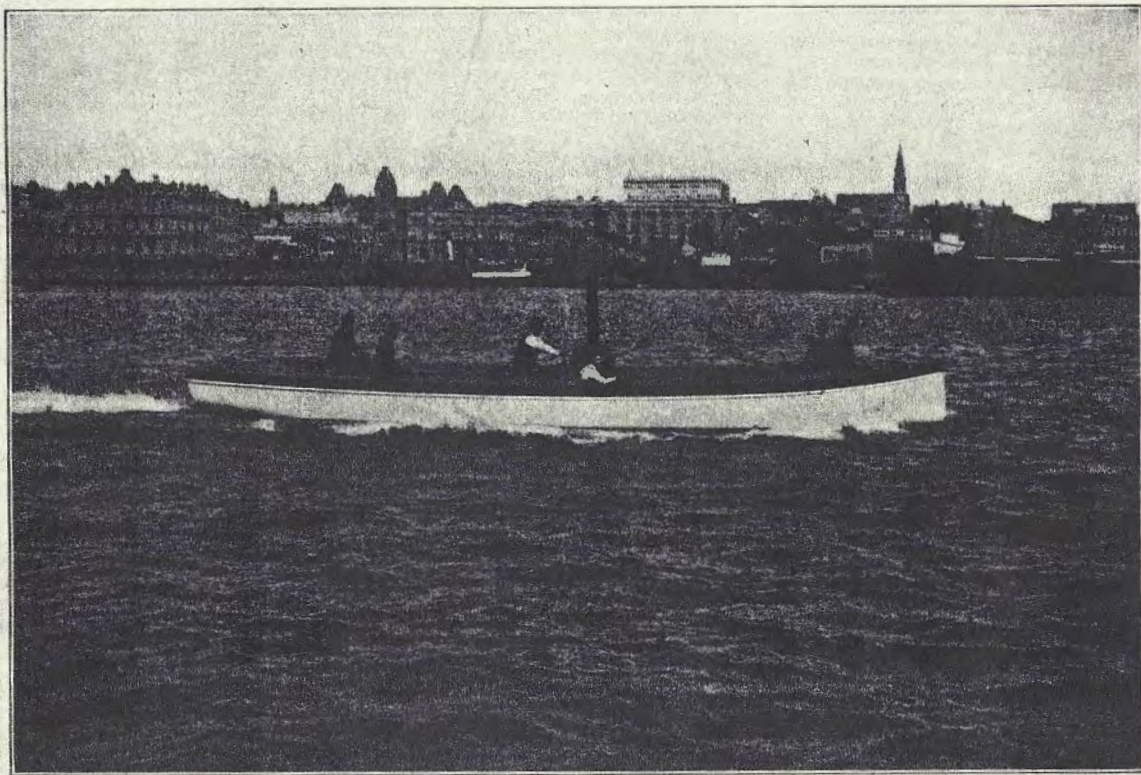
"LEXINGTON"

Owned by J. G. Megler & Company, salmon packers, Brookfield, Washington. Launch is used as a cannery tender. Length, 44 ft.; beam, 11 ft. Fitted with a 35 HP. three-cylinder "Union" marine engine.



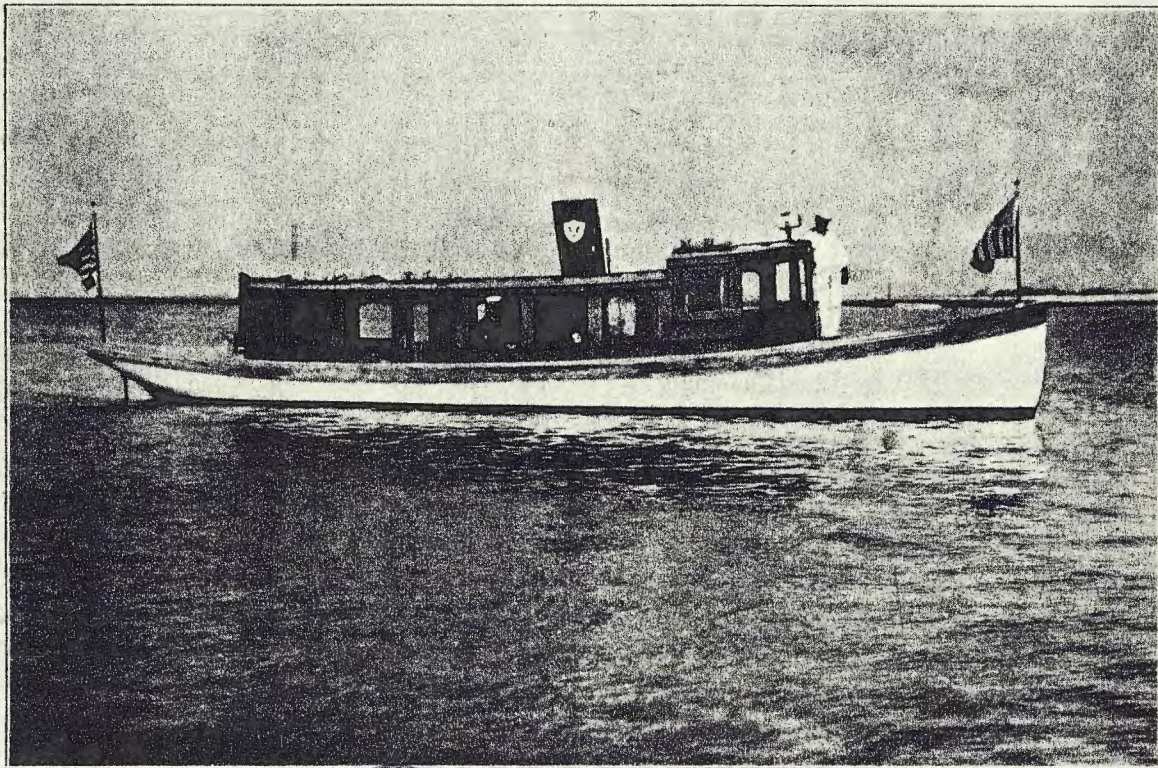
"MUNK"

18 ft. x 4 ft. 2 HP. "Union" engine. Property of Mr. G. F. Lewis, Belvedere, Cal.



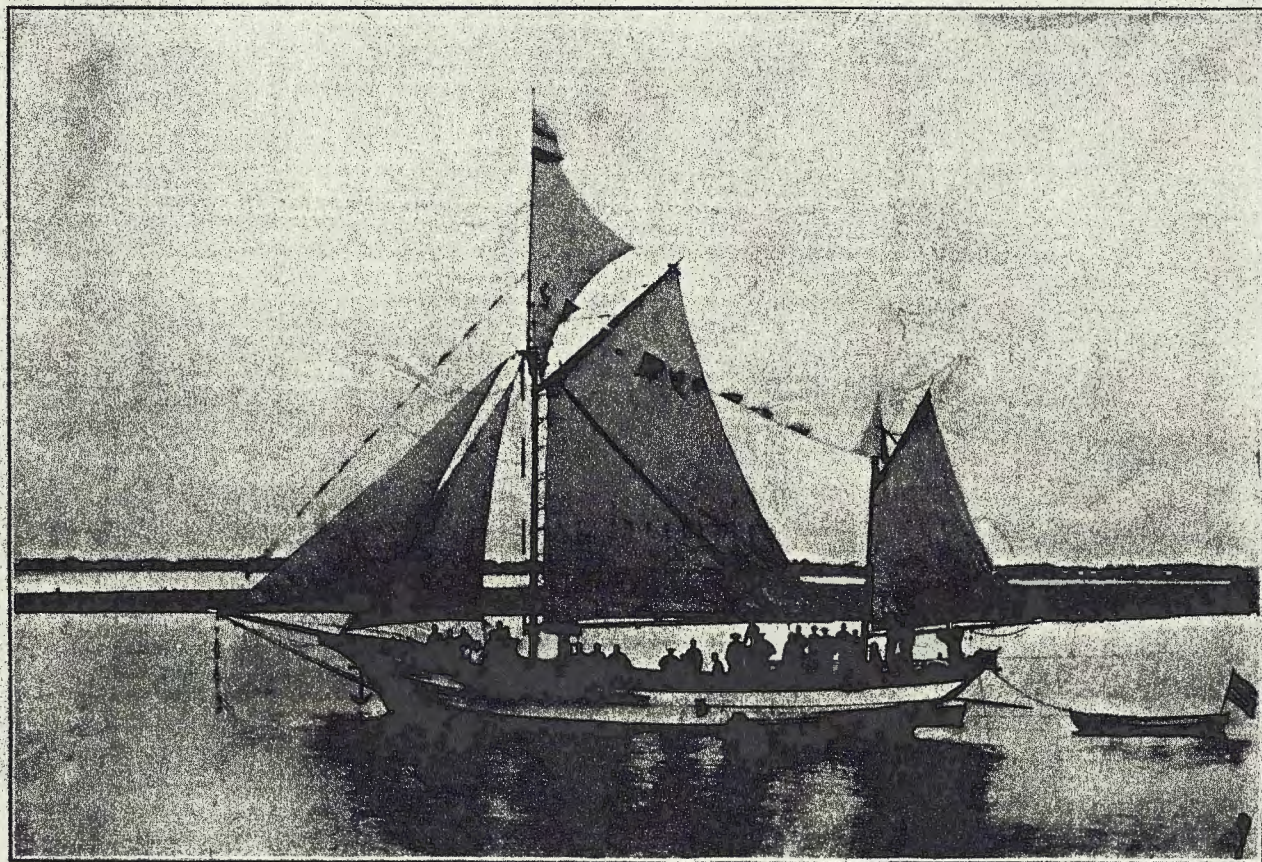
"AORERE"

Tunnel launch. Property of the Wanganui Settlers' S. B. Co., Wanganui, N. Z. 42 ft. x 8 ft.; draught, 9 in. Speed, 8 knots. Fitted with a 15 HP. "Union" engine, which drives a 24-in. propeller in 9 in. of water.



"WATERWITCH"

Property of Young Bros., Honolulu. 45 ft. x 4 ft. 40 HP. "Union" engine. Used by the United States Custom House and Immigration Service.



"FUJI MARU"

56 ft. long; 12 ft. 6 in. beam; 6 ft. deep. Built by the Japanese government in 1905, to demonstrate to the people of that country the advantage of power over sail or oars in fishing at sea. Equipped with a 25 HP. double-cylinder "Union" kerosene engine. The Japanese government used 57 "Union" marine engines in the transport service during their recent war with Russia.

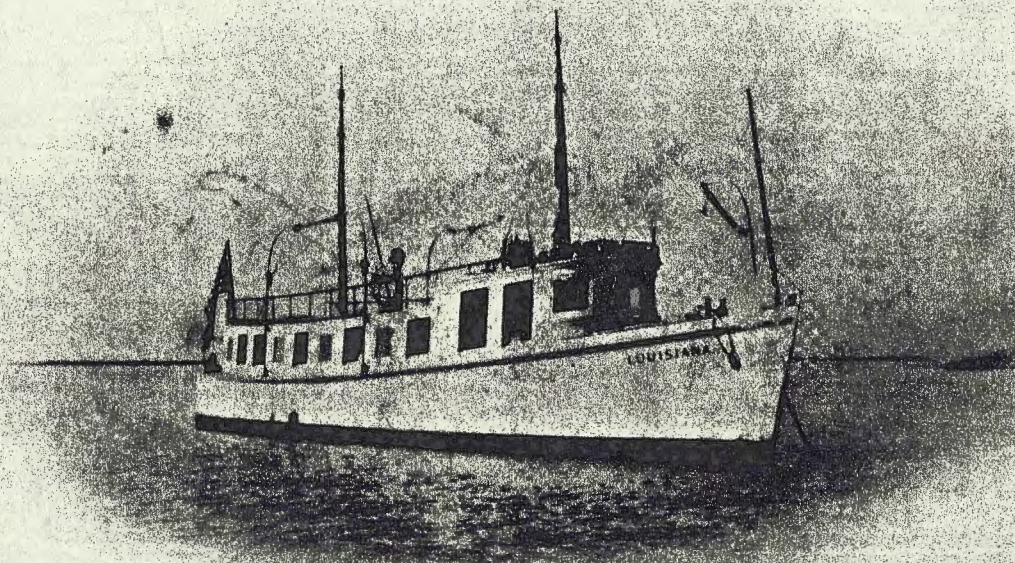
UNION GAS ENGINE COMPANY, EAST OAKLAND, CALIFORNIA



"TUK-WIL-LA"

40 ft. long; 7 ft. wide. 45 HP. "Union" three-cylinder marine engine. Property of Mr. O. O. Denny, Seattle, Wash.

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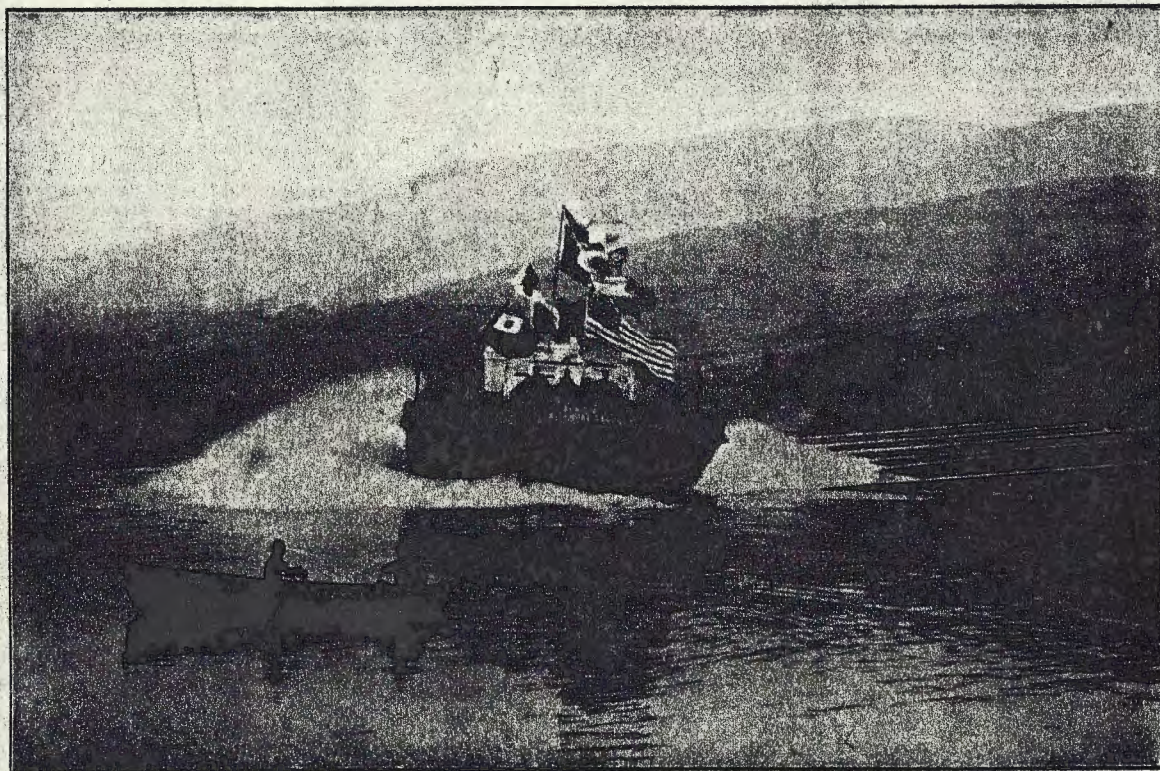


"LOUISIANA"
Property of Louisiana State Oyster Commission. Equipped with 40 HP. "Union" double-cylinder twin-screw engines.



WATER BARGE No. 16

Owned by United States Navy Department. Capacity, 100,000 gallons. Length, 120 ft.; breadth, 23 ft. 6 in.; depth, 12 ft. Propelled by a 125 HP. three-cylinder "Union" marine engine. Equipped with an 8 HP. "Union" double-cylinder engine geared to a 4-inch volute pump, having a capacity of 450 gallons per minute.



LAUNCHING OF BARGE "BENICIA"

Property of Standard Oil Co. Equipped with: twin-screw 250 HP. "Union" three-cylinder engines and a 25 HP. double-cylinder "Union" engine, which drives a rotary oil pump, a 5x5 fire and bilge pump, and a 15 K. W. generator.