

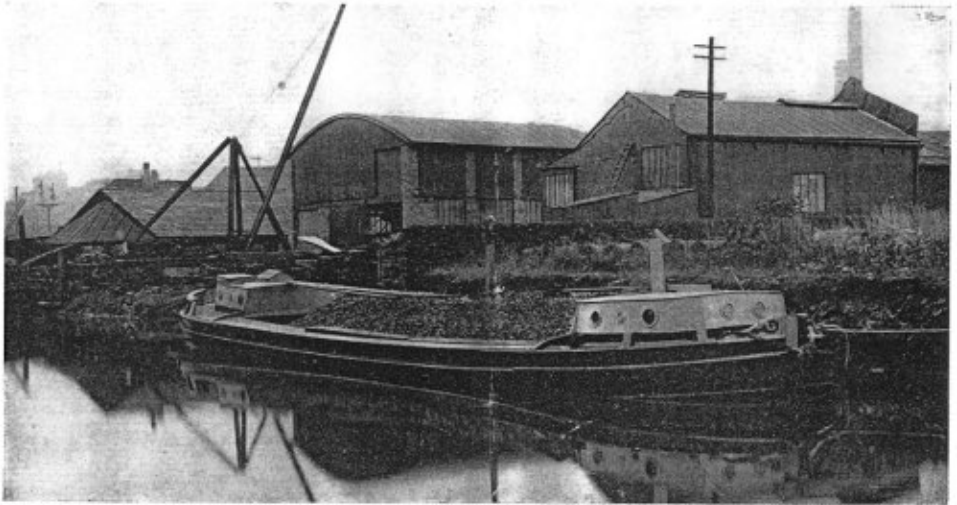
£2.00

WIDDOP

“INVINCIBLE”

SEMI-DIESEL

VERTICAL CRUDE OIL ENGINES FOR
MARINE AND INDUSTRIAL PURPOSES



Motor Barge "Theta," fitted with 30 h.p. Widdop "Invincible," in service on Leeds and Liverpool Canal.

H. WIDDOP & CO. LTD.

INVINCIBLE ENGINE WORKS

KEIGHLEY

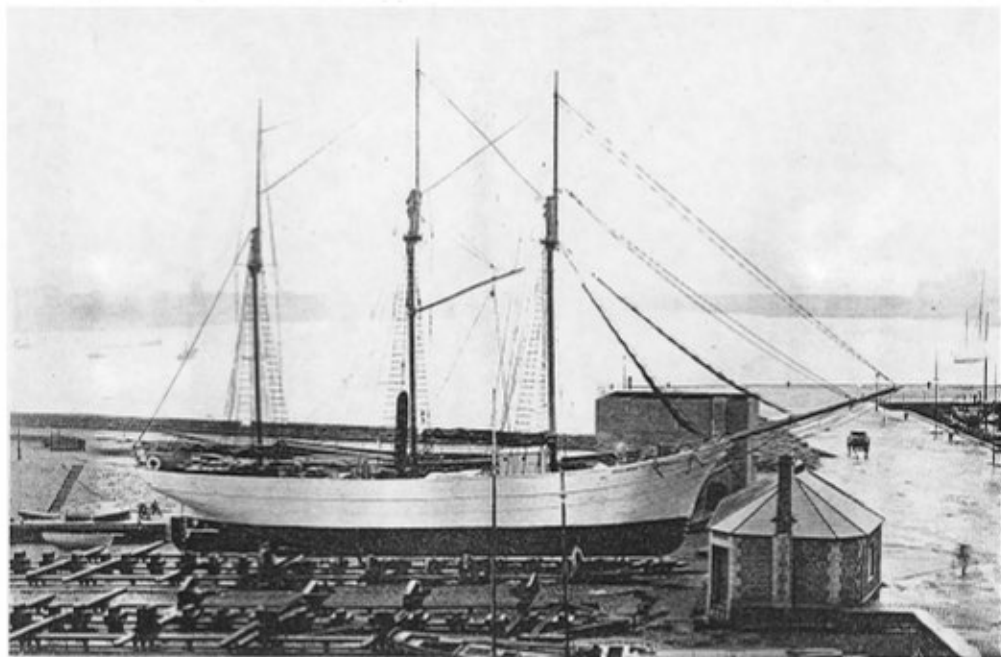
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Leeds & Liverpool Canal Society
www.llcs.org.uk



WIDDOP ENGINE INSTALLATION BEING CARRIED OUT IN M.V. "DIOLINDA."

Thirty Years' Experience

IN the design and manufacture of Internal Combustion Engines has influenced and guided the development of the latest WIDDOP CRUDE OIL ENGINE. Whilst retaining the features which have made the engine so successful in the past, the new models embody all that is best in modern engine practice. The object of the designer has been to produce a high-class power unit, giving results equal to the most expensive types, but free of complications, capable of being handled successfully by the non-technical owner, and within the reach, financially, of any reasonable purchaser. The information given in these pages is necessarily abbreviated, but we would be pleased to give help or advice, and any further details regarding our products, if intending purchasers will kindly communicate with us.

H. WIDDOP & CO. LTD.

General Description

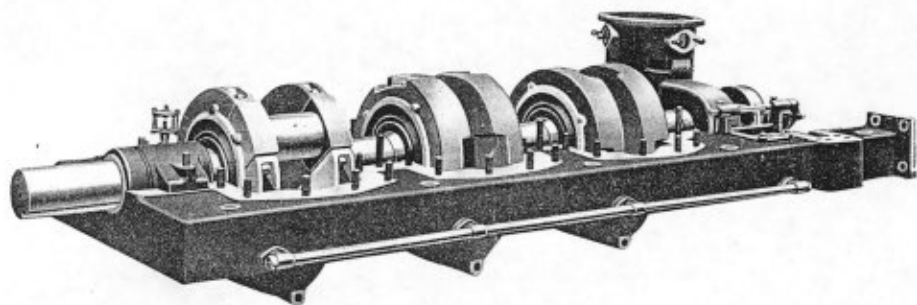
OPERATING CYCLE. The engine is of the medium compression type, operating on the two-cycle principle; the two-stroke cycle has one impulse per cylinder at every revolution of the flywheel, thus ensuring a perfectly steady turning movement. It is extremely simple and has no mechanically operated valves and gearing.

The cycle of operations, which takes place in each cylinder at every revolution of the crank, is briefly as follows :—

On the upstroke of the piston, air is drawn into the crank chamber through disc valves. When the piston reaches the top of its stroke the fuel charge is injected into the combustion chamber, where the heat of the dome instantly fires the charge of fuel and air, thus driving the piston downwards on its working stroke. Near the bottom of the stroke the piston uncovers a port in the cylinder through which the gases escape to the exhaust silencer. Continuing the downward stroke another port is uncovered and the air previously drawn into the crankcase, now compressed by the piston descending, rushes up into the cylinder to form, with the fuel oil, the explosive mixture for the next downstroke.

The path of the air is such that a scavenging action occurs, clearing the burnt gases out of the combustion chamber. The cool air from the crankcase passes through the piston, thus keeping the gudgeon pin and piston cool.

CRANKCASE AND ENGINE BED. The engine bed is in one piece and forms the bottom half of the crankcase. It is machined on the centre line the whole length and the main bearing



housings are also machined out at one operation so that exact alignment is assured. The main bearings are white metal lined. The lubrication is from a separate supply tank, attached to the engine, whence a pipe is taken to each bearing through a sight feed glass. The oil is collected from below the bearings and conveyed to a sump through a copper pipe running along the back of the engine base. This pipe can easily be removed, if necessary, for cleaning. From the sump the oil is pumped through a strainer back to the tank and used over and over again.

Drain taps are fitted in each crankcase sump to drain any waste oil from the crankpin bearings.

CRANKSHAFT. The crankshaft is machined from a solid forging of Siemens-Martin Open Hearth High Tensile Steel, ground all over to fine limits. Balance weights are fitted to each crank web and are *designed to form a complete circle*, thus reducing the volume of the air space and improving the scavenging and charging of the cylinders. Banjo oilers are fitted to each crankpin in a very rigid manner; holes are drilled through the side of crank webs to convey the oil to the centre of each crankpin bearing.

CYLINDER. The cylinder and liner are cast in one piece, of special cylinder metal, the mixture having been proved by many years' experience to have excellent wearing qualities.

The air and exhaust ports have diagonal webs with rounded corners, thus eliminating any possibility of straight line scores on the piston and rings.

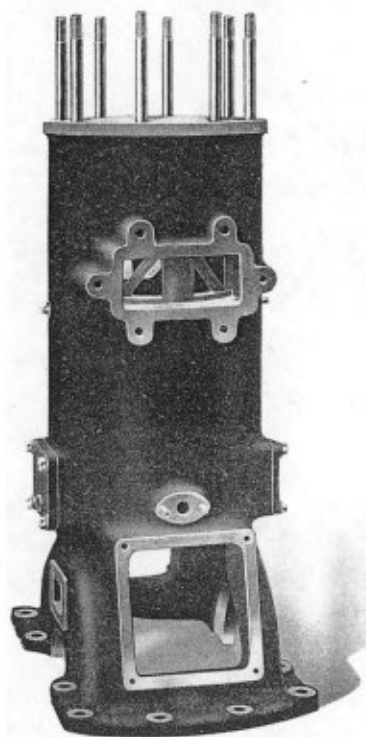
The cooling water jacket *extends the whole length of the cylinder*, thus keeping the engine remarkably cool and rendering efficient lubrication of the piston quite easy.

Large cleaning plates are fitted at the bottom of the water jacket, the water space being thus easy of access for periodical cleaning.

Particularly large air valve openings allow easy access to the big end bearings and for general inspection of the inside of crankcase.

A good sized coverplate, which carries the oil feed to the banjo oiler, is also provided, so that *the banjo can be cleaned without disturbing any other part of the engine*.

The cylinder is securely fitted down to the engine base, with which it forms a metal-to-metal joint. It is dowelled before the pressure ring faces are machined, thus ensuring *a perfect seal by the pressure rings*.



EXHAUST SILENCERS. Water-cooled exhaust silencers are fitted to the engines, specially designed to eliminate noise from the exhaust and to prevent back pressure in the cylinders. On the multi-cylinder units the exhaust system is utilised to assist the scavenging of combustion chambers and very excellent results are achieved by this method.

CYLINDER HEAD is entirely water-cooled, excepting a small ignition dome. It is secured to the cylinder by steel studs. The ignition dome forms a metal-to-metal joint with the cylinder head and is quite free to expand and contract, being simply held in position by a steel ring. Domes for extended periods of light running can be supplied if required. Compression relief cocks are fitted in all cylinder heads.

PISTONS are of close-grained cast iron designed to secure both lightness and strength. They are ground to limit gauges and fitted with rings of a suitable number to ensure gas-tight fit.

The gudgeon pin is hardened and ground and is held rigidly in position by steel screws.

Each piston is fitted with a scraper ring to prevent an excessive amount of lubricating oil reaching the combustion chamber, and to ensure the cylinder wearing evenly throughout its whole length.

CONNECTING RODS are turned from solid forgings of Siemens-Martin Open Hearth High Tensile Steel. The crankpin bearings are gunmetal shells, white metal lined, and the gudgeon pin bushes are of high quality phosphor-bronze.

LUBRICATION. The method of lubricating main bearings on the larger engines is explained on page 3. All other parts of the engines are lubricated under pressure from a central pump with adjustable feeds. The arrangements for the twin cylinder (monobloc) type engines are described on page 12. Copper pipes with union nuts are fitted throughout the lubricating system, enabling them to be readily dismantled.

FUEL OIL SPRAYER. This is the simplest form of sprayer possible compatible with efficient pulverisation of the crude fuel oils on which the engines are designed to operate. The fuel issues from the sprayer in the form of a fine mist and may be ignited by means of a match held a short distance away.

FUEL STRAINER is of cast iron with inlet and outlet connections, and can be fixed in any convenient position. The lid is held in position by two studs and the gauze strainer can be easily lifted out.



GOVERNOR. This is our Patent Variable Admission type which controls the speed of the engine, under all loads, within very fine limits. It can be fixed at any desired speed from full speed to dead slow, the governor retaining complete control. The speed can be varied throughout the whole range, whilst the engine is running, by the massive hand-wheel fitted on top of governor casing.

The fuel pumps are mounted on the outside of the governor casing. They are accessible for adjustment whilst the engine is running, and can be easily removed, when necessary, for cleaning.

THE ARRANGEMENT IS SUCH THAT THE TIMING OF THE ENGINE CAN BE ADJUSTED TO SUIT LOCAL CONDITIONS AND THE PARTICULAR FUEL USED.

For Single Cylinder Engines governing arrangements vary somewhat from the above, but are described in the following pages.

REVERSE GEAR. On marine engines, a massive, well designed reversing gear is fitted. It is positive in action and one lever controls the three positions—"Ahead," "Neutral" and "Astern." The gear has ample bearing surfaces, is easily adjustable for wear, and silent in operation. Both reverse gear and speed controls are suitably designed for extension to a convenient operating position on deck if desired.

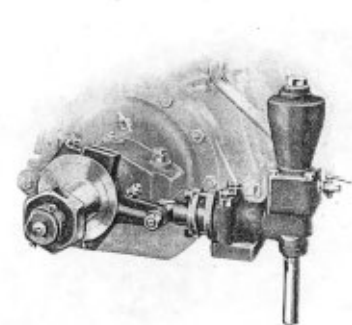
The three and four-cylinder engines are arranged for direct reversing by means of compressed air. The necessary gear is all fitted on the governor shaft, which is of adequate size and well supported by bearings.

A single master control lever for the fuel pumps is fitted, working on a multiple cam. To reverse the engine the pumps are put out of action by this lever, the reverse control lever is placed in the "Astern" position and the engine immediately reverses. The pumps are then brought into action again. To go "Ahead" the operation is similar, the reverse control lever being merely placed in the "Ahead" position. After use the reverse lever is returned to the "Neutral" position. It is interlocked with the pump control lever so that the reversing cams cannot be brought into operation until the fuel pumps are disengaged.

The whole governor reversing mechanism is driven from the crankshaft by large case-hardened steel gears.

With all direct reversing engines an auxiliary engine-driven compressor is supplied to ensure the supply of manœuvring air being maintained under all circumstances.

DIRECTION OF ROTATION. The engines are designed to allow of their being built Left or Right Handed as required. In twin-screw sets the controls, etc. of both engines are brought inwards, to allow of easy control by one man.



WATER CIRCULATING PUMP. All engines are fitted with a gunmetal circulating pump, and a duplicate, to act as *Bilge Pump* can be fitted if required. This would operate from the water pump eccentric and be attached to the opposite side of engine base. All pipe connections on the engine are of copper.

STERN GEAR. Standard Stern Gear consists of steel propeller shaft with couplings, wrought-iron stern tube with glands, and cast-iron propeller. This gear is also supplied in bronze if required.

ACCESSORIES AND SPARES. An adequate set of tools, etc., for use with the engine is supplied, also a number of spare parts, such as sprayers and pipes, springs, rubber joints, etc.

TESTING. Every engine, before leaving our Works, undergoes a prolonged bench test which can be witnessed by purchaser or his representative if desired.

INTERCHANGEABILITY. All WIDDOP Engines are built throughout to standard limits. All parts are drill-jigged and made to gauges, and are strictly interchangeable.

All parts are kept in stock and spares can usually be supplied by return.

All engines are built to Lloyd's requirements and can be surveyed by them on payment of the usual fees.

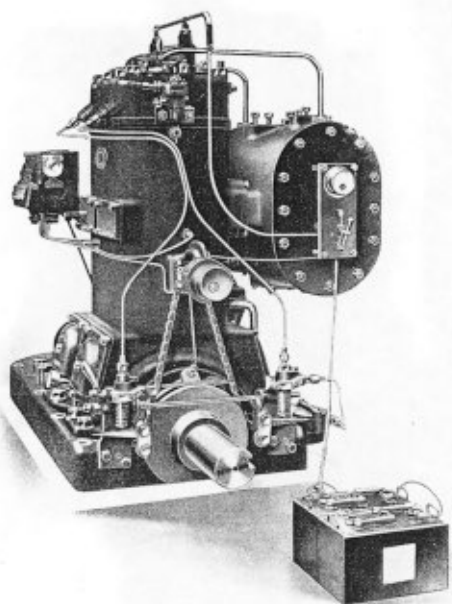
SELF-STARTER. Engines below 30 B.H.P. start so easily by hand that compressed air starters are not necessary. The 30, 60, and 80 B.H.P. sizes also start fairly easily by hand, but compressed air equipment is supplied with these and all larger sizes. The standard arrangement for starting involves the heating of the ignition domes for two or three minutes by means of fixed burners.

PATENT ELECTRIC STARTING EQUIPMENT. Where burners, cartridges, or any kind of naked flame is undesirable as, for instance, in petrol carrying craft, or where it is necessary to be able to start up from dead cold without any delay, we offer our new patented electric starting equipment, capable of *starting up the engines from cold in 15 seconds.* This equipment enables the "cold start" to be made without increasing the compression pressure, thus eliminating the difficulties and complications of the high compression engine.

The stresses in the engine parts are so low that the useful life of the engine is greatly prolonged.

After a considerable amount of experimental work and an investigation of the majority of electric ignition devices which have been previously produced, we took out a patent on the plug now described. The body of the plug, which is constructed of a special grade of steel, will withstand great heat and the electrical element retains its normal properties for a very considerable length of time. Should replacements become necessary after several months' constant use, the element can be replaced in a few seconds. The design, however, affords complete protection to the element when it is not actually required for ignition purposes. This is arranged by rotating the plug inside an outer casing, also made of the special heat resisting steel.

The illustration shows the plugs fitted in one of our 60 B.H.P. twin cylinder engines. They are placed in the cylinder heads, the current passing from a battery to the switchboard provided with a knife switch and ammeter. The heavy duty battery is charged from a generator mounted on the cylinder and driven from a pulley on the crankshaft. In the illustration the flywheel has been removed to show the arrangement.



This gear can be fitted to all sizes and is capable of starting the engine in 15 to 20 seconds from dead cold. On the 9 B.H.P. and 18 B.H.P. sizes the plug is modified owing to the small space available.

FUEL OILS. WIDDOP Engines are suitable for working on any good brand of Diesel Oil such as Diesoleum, Diesel Oil, Gasoleum or Shale Oil, Solar Oil, Russian Naphtha, Russian Crude Oil or Petroleum and similar oils. Our bench tests are carried out on Gas Oil or Tar Distillate, and the listed horse-powers are based on fuel oils of this class. For cleanliness and ease in handling we would recommend Gasoleum or other Gas Oil as an excellent fuel, particularly for the smaller engines. All the engines run equally well on Paraffin, Kerosene and other refined oils, without special adjustment.

The fuel oil must be free from impurities, preferably de-sulphurised, and should not contain more than 5 per cent. water; it should have a calorific value of about 19,000 B.T.U.'s per lb. (or 10,500 calories per kg.) and a specific gravity not exceeding .86.

We shall be pleased to advise on the suitability of any particular oil, and if a sample is sent to our works we will adjust the engine to the best working position.

LUBRICATING OIL. It is important that a good grade of lubricating oil should be used; the quality should be a heavy gas engine oil or an oil such as is used on water-cooled Motor Car engines.

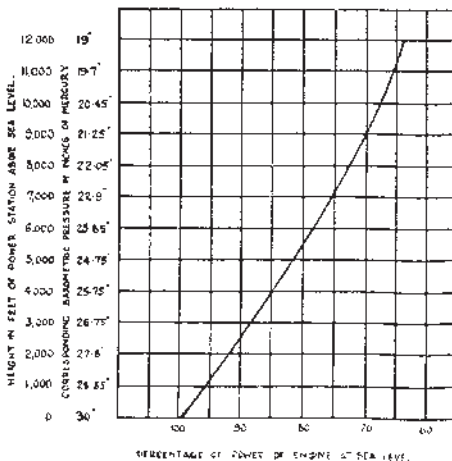
We have found the undermentioned well-known oils to be highly satisfactory.

Prices' Heavy Gas Engine Oil.
Prices' Motorine C.

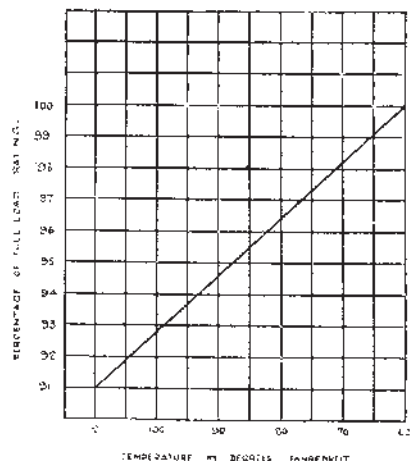
Wakefield's Castrol "C.W."
Stern's "Sternol W."

TEMPERATURE AND ALTITUDE CHARTS.

(Normal Engine Rating based on sea level.)

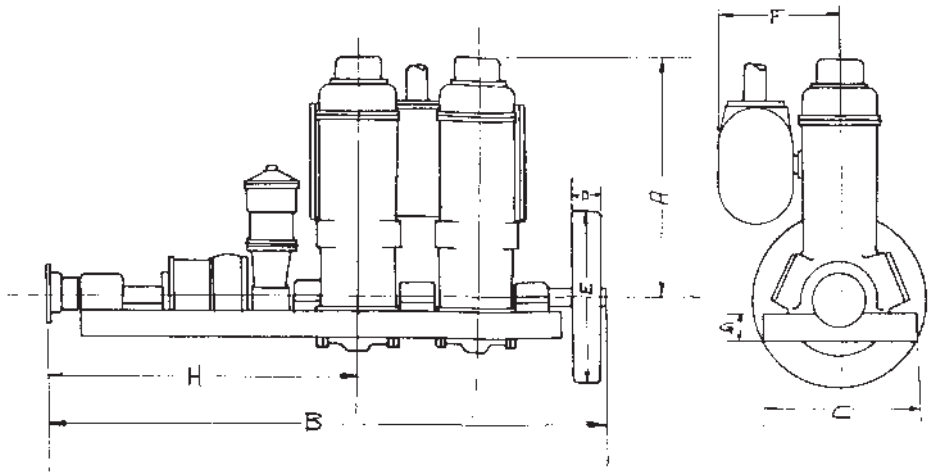


(Normal Engine Rating based on 60° Fahr.)



Widdop "Invincible" Marine Crude Oil Engines

POWERS AND PRINCIPAL DIMENSIONS



Type	No. of Cylinders	B.P.	r.p.m.	Bore in.	Stroke in.	A	B	C	D	E	F	G	H	Code Word
GM	1	10	500	7	7	2' 7 $\frac{1}{2}$ "	4' 0"	1' 8 $\frac{1}{2}$ "	5 $\frac{1}{2}$ "	2' 0"	1' 5 $\frac{1}{2}$ "	3 $\frac{1}{2}$ "	2' 8 $\frac{1}{2}$ "	CAMPA
EM	1	15	435	8 $\frac{1}{2}$	10	3' 8"	5' 5"	2' 1 $\frac{1}{2}$ "	6"	2' 2"	1' 9 $\frac{1}{2}$ "	4"	3' 2"	EBSRA
FM	1	30	350	10 $\frac{1}{2}$	12	3' 10"	5' 9 $\frac{1}{2}$ "	2' 6 $\frac{1}{2}$ "	6"	3' 0"	2' 1"	5"	3' 6"	FAUPA
GMT	2	20	500	7	7	2' 7 $\frac{1}{2}$ "	4' 10"	1' 8"	5 $\frac{1}{2}$ "	2' 0"	1' 6"	3 $\frac{1}{2}$ "	2' 8"	CIMDA
EMT	2	30	400	8 $\frac{1}{2}$	10	3' 6"	6' 0"	3' 1 $\frac{1}{2}$ "	8"	3' 2"	1' 9 $\frac{1}{2}$ "	4"	5' 1 $\frac{1}{2}$ "	MONKA
FMT	2	60	350	10 $\frac{1}{2}$	12	4' 4"	7' 2 $\frac{1}{2}$ "	2' 6 $\frac{1}{2}$ "	10"	2' 6"	2' 1 $\frac{1}{2}$ "	5 $\frac{1}{2}$ "	5' 11"	FICLA
GMT	2	80	320	12 $\frac{1}{2}$	14	5' 2"	11' 3"	2' 10"	7"	3' 4"	2' 5"	7"	6' 7 $\frac{1}{2}$ "	GIRCA
HMT	2	110	275	14	16	5' 8 $\frac{1}{2}$ "	12' 10 $\frac{1}{2}$ "	3' 4"	10"	3' 6"	2' 7 $\frac{1}{2}$ "	8"	7' 7"	HABCA
GM ₃	3	120	320	12 $\frac{1}{2}$	14	5' 2"	13' 3"	2' 10"	7"	3' 4"	2' 5"	7"	6' 6"	GENCA
HM ₃	3	165	275	14	16	5' 8 $\frac{1}{2}$ "	15' 2"	3' 4"	10"	3' 6"	2' 7 $\frac{1}{2}$ "	8"	7' 2"	HINRA
GM ₄	4	160	320	12 $\frac{1}{2}$	14	5' 2"	16' 2"	2' 10"	7"	3' 4"	2' 5"	7"	7' 4"	GERVA
HM ₄	4	220	275	14	16	5' 8 $\frac{1}{2}$ "	17' 1"	3' 4"	10"	3' 6"	2' 7 $\frac{1}{2}$ "	8"	7' 4"	HARKA

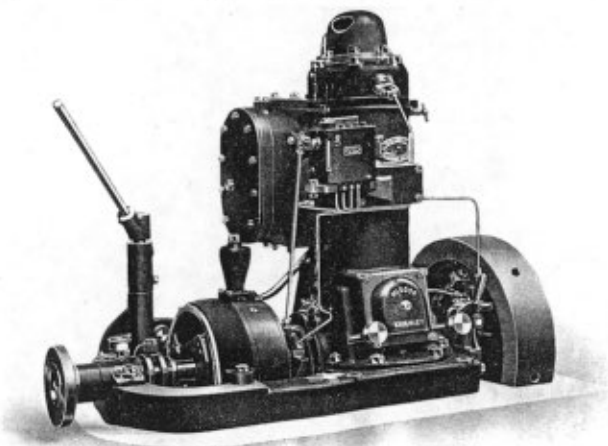
NOTE: THESE DIMENSIONS ARE APPROXIMATE ONLY AND MUST NOT BE WORKED TO. ACCURATE ARRANGEMENT DRAWINGS ARE SUPPLIED ON RECEIPT OF ORDER.

Widdop Marine Engines

APPROXIMATE SHIPPING DETAILS.

Type GM	Nett C. Q. LB.	Gross C. Q. LB.	Type EM	Nett C. Q. LB.	Gross C. Q. LB.
1 Case 5' 4" x 2' 6" x 4' 0"	15 2 0	18 0 0	1 Case 6' 0" x 2' 8" x 5' 1"	35 0 0	38 2 0
			1 Case 7' 0" x 1' 2" x 1' 4"	1 2 0	2 2 0
	15 2 0	18 0 0		36 2 0	41 0 0
FM			CMT		
1 Case 6' 4" x 3' 2" x 5' 2"	32 2 0	36 1 0	1 Case 5' 7" x 3' 4" x 4' 3"	23 2 14	27 2 0
1 Flywheel 3' 3" x 2' 3" x 10"	7 0 0	7 0 0	1 Air Receiver 4' 3" x 11" x 11"	1 0 16	1 0 16
1 Silencer 2' 2" x 2' 2" x 1' 7"	5 2 0	5 2 0		24 3 2	28 2 16
	45 0 0	48 3 0			
FMT			FMT		
1 Case 6' 7" x 3' 7" x 4' 10"	35 0 0	41 0 0	1 Case 5' 8" x 4' 0" x 5' 7"	62 0 0	72 0 0
	35 0 0	41 0 0		62 0 0	72 0 0
GMT			HMT		
1 Case 11' 1" x 5' 7" x 6' 7"	93 3 0	106 2 0	1 Case 13' 11" x 5' 3" x 7' 5"	132 0 0	147 0 0
Silencer 4' 0" x 2' 5" x 1' 7"	10 1 0	10 1 0	1 Flywheel 3' 6" x 3' 6" x 9 1/2"	19 1 0	19 1 0
Flywheel 3' 4" x 3' 4" x 7 1/2"	13 3 0	13 3 0	Silencer 4' 5" x 2' 2" x 3' 1"	14 0 0	14 0 0
Air Receiver 9' x 1' 1" x 1' 1"	3 1 14	3 1 14	Compressor 2' x 2' 1" x 2' 6"	2 3 0	2 3 0
	121 0 14	133 3 14		158 0 0	163 0 0
GM3			HM3		
1 Case 11' 5" x 3' 11" x 6' 7"	116 2 0	132 3 0	1 Case 12' 2" x 4' 6" x 7' 2"	162 2 0	180 2 0
1 Case 3' 9" x 3' 8" x 2' 3"	15 1 0	16 3 14	1 Case 4' 3" x 4' 2" x 2' 6"	18 0 0	20 0 0
1 Silencer 2' 1" x 2' 5" x 1' 8"	5 1 14	5 1 14	1 Silencer 2' 4" x 2' 4" x 1' 9"	7 0 0	7 0 0
1 Silencer 2' 1" x 2' 5" x 1' 8"	5 1 14	5 1 14	1 Silencer 2' 4" x 2' 4" x 1' 9"	7 0 0	7 0 0
1 Silencer 2' 1" x 2' 5" x 1' 8"	5 1 14	5 1 14	1 Silencer 2' 4" x 2' 4" x 1' 9"	7 0 0	7 0 0
1 Air Receiver 9' x 1' 1" x 1' 1"	3 1 14	3 1 14	1 Air Receiver 9' x 1' 1" x 1' 1"	3 1 14	3 1 14
1 Air Receiver 9' x 1' 1" x 1' 1"	3 1 14	3 1 14	1 Air Receiver 9' x 1' 1" x 1' 1"	3 1 14	3 1 14
1 Flywheel 3' 4" x 3' 4" x 7"	12 2 0	12 2 0	1 Flywheel 3' 6" x 3' 6" x 9 1/2"	19 1 0	19 1 0
1 Case (Auxiliary Compressor) 4' 6" x 3' 10" x 3' 9"	10 0 0	12 0 0	1 Case (Auxiliary Compressor) 4' 6" x 3' 10" x 3' 9"	10 0 0	12 0 0
	177 0 14	197 0 0		237 2 0	259 2 0
GM4			HM4		
1 Case 13' 11" x 3' 11" x 6' 7"	139 2 0	159 2 0	1 Case 12' 8" x 4' 6" x 7' 2"	195 0 0	220 0 0
1 Case 3' 9" x 3' 8" x 2' 3"	15 1 0	16 3 14	1 Case 4' 3" x 4' 2" x 2' 6"	18 0 0	20 0 0
1 Silencer 4' 0" x 2' 5" x 1' 7"	10 1 0	10 1 0	1 Silencer 4' 5" x 2' 2" x 3' 1"	14 0 0	14 0 0
1 Silencer 4' 0" x 2' 5" x 1' 7"	10 1 0	10 1 0	1 Silencer 4' 5" x 2' 2" x 3' 1"	14 0 0	14 0 0
1 Air Receiver 9' x 1' 1" x 1' 1"	3 1 14	3 1 14	1 Air Receiver 9' x 1' 1" x 1' 1"	3 1 14	3 1 14
1 Air Receiver 9' x 1' 1" x 1' 1"	3 1 14	3 1 14	1 Air Receiver 9' x 1' 1" x 1' 1"	3 1 14	3 1 14
1 Flywheel 3' 4" x 3' 4" x 7"	11 2 0	12 2 0	1 Flywheel 3' 6" x 3' 6" x 9 1/2"	19 1 0	19 1 0
1 Case (Auxiliary Compressor) 4' 6" x 3' 10" x 3' 9"	10 0 0	12 0 0	1 Case (Auxiliary Compressor) 4' 6" x 3' 10" x 3' 9"	12 0 0	14 0 0
	201 2 0	228 0 14		275 0 0	308 0 0

Widdop Single Cylinder Crude Oil Engines



THE single cylinder units have now been brought into line with the larger models. Roller bearings have been adopted and the upper half of crankcase and the cylinder are cast in one. Our standard reverse gear is fitted to all sizes, the engine base being extended to carry the gear and clutch, also the thrust bearing.



WIDDOP-ENGINE M.V. "WELCOME."

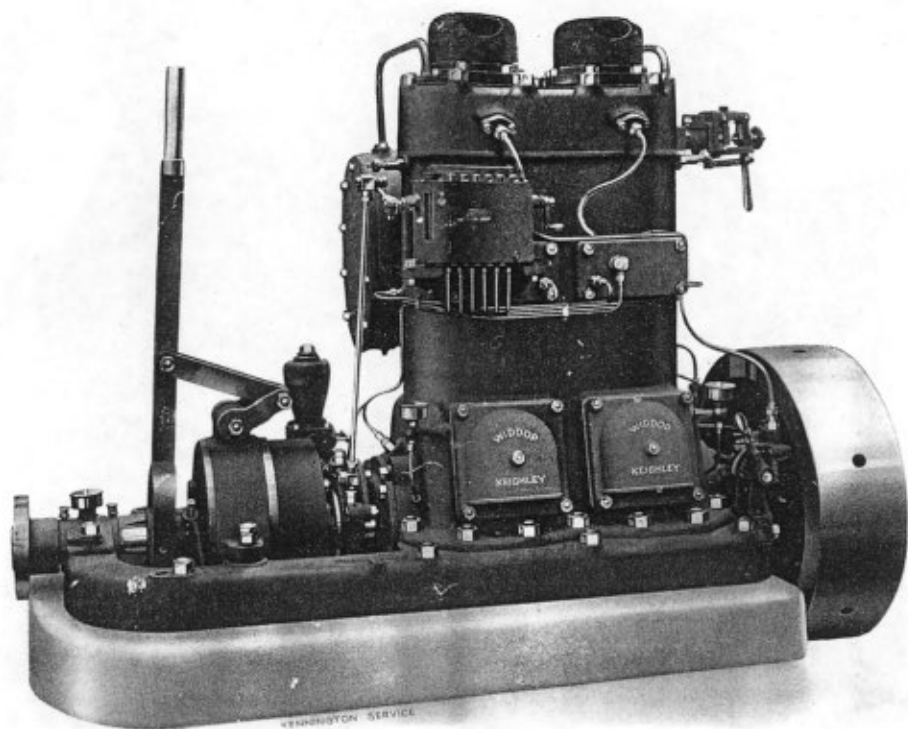
These sets are specially suitable for installation in barges, small ketches, schooners, etc. To be able to sail against adverse tides and calms, to be able to dispense with the assistance of tugs and to gain increased speed are economies which no owner can disregard, particularly when such economies can be made at a very slight cost.

The following letter, received some time after the writers had installed a WIDDOP Single cylinder marine set, is typical of many other letters we receive. The owners of this engine have just ordered another WIDDOP Set for their new barge :—

"You will probably remember that about eighteen months ago you fitted a 15 H.P. WIDDOP ENGINE in the new barge built by Messrs. P. K. Harris, of Appledore. This barge has been in constant daily service ever since, and the men in charge of the barge are ordinary bargemen who previously had no knowledge or experience of engines. They have had no trouble of any sort with the engine, and there has been practically no repair bill. We are very pleased with the performance of this little engine, and you probably will be interested to have these few lines from us.

The Devon Trading Co. Ltd.

Widdop Monobloc Type Twin Cylinder Crude Oil Marine Engines



THESE engines, whilst embodying the essential characteristics of all WIDDOP models, have been specially designed for those types of craft where compactness and vibrationless running are essential. The monobloc design, together with perfect balancing of the reciprocating parts, eliminates vibration.

Heavy duty roller bearings are employed as journals, thus reducing frictional losses to a minimum and ensuring easy starting. The bearings require only a little grease for lubrication, and during the eight years we have been fitting them not one single bearing has had to be replaced or even repaired. All other parts are lubricated under pressure from a central feed pump.

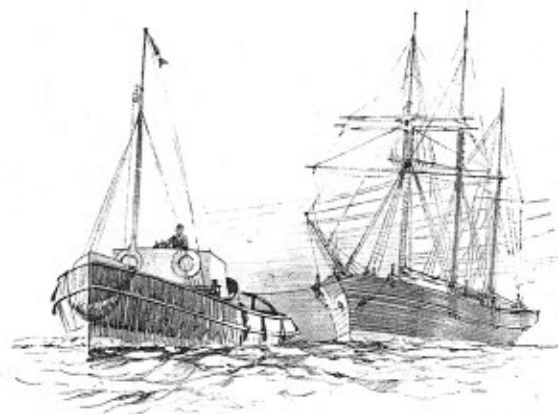
The Engine, reverse gear, clutch and thrust bearing, are all mounted on one rigid cast-iron base-plate, making the neatest and most compact multi-cylinder crude oil power unit obtainable.

Whilst essentially a high-class marine engine, the design is robust; bearing surfaces are particularly large, lubrication system efficient and reliable, and all parts are easy of access.

These models have demonstrated their ability to undertake satisfactorily heavy continuous work, such as prolonged running in seagoing pleasure craft, barges, tugs, tankers, freight-carrying and fishing vessels.

WIDDOP ENGINED TUG. The towing power developed by these engines is remarkable. Correctly designed propellers are essential for these installations; our experience in propeller design and general layout of the machinery is always at your service.

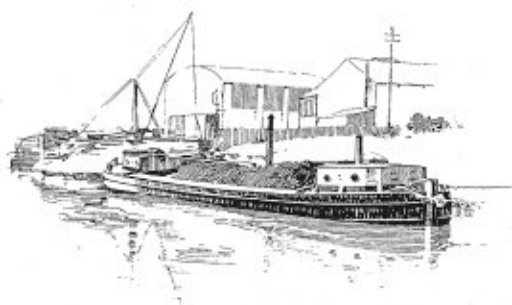
Our latest electric starter enables the engines to be started up in 15 to 20 seconds from dead cold, thus making the tug or other vessel available for instant service.



LAUNCH-TUG. Specially designed for operating in tropical waters; fitted with WIDDOP 30 B.H.P. monobloc engine, which is suitable for all climates without special adjustment. In this case the launch is a standard type, for which we have supplied no less than 30 engines to the one customer.



The twin-cylinder type monobloc engine is ideal for canal barge installations. It is robust and capable of standing up to the arduous work of these craft, but occupies only the same space as a single cylinder unit of equal power. The illustration shows this point very well—the largest possible cargo space being available. Naturally the lack of vibration due to the twin-cylinder engine being fitted, lengthens the life of the hull enormously and renders life aboard much more comfortable.



This photo of petrol-carrying barge "Tony" was taken on the conclusion of a very successful 900 miles maiden voyage from Thorne to Liverpool by sea. A WIDDOP 60 B.H.P. twin-cylinder monobloc engine is fitted, and as no naked light is permissible, electric starting equipment is provided.

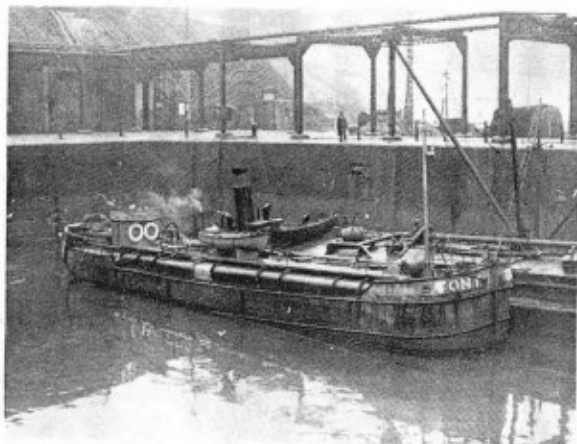
The following were received by us on completion of the voyage :—

From the owner :—

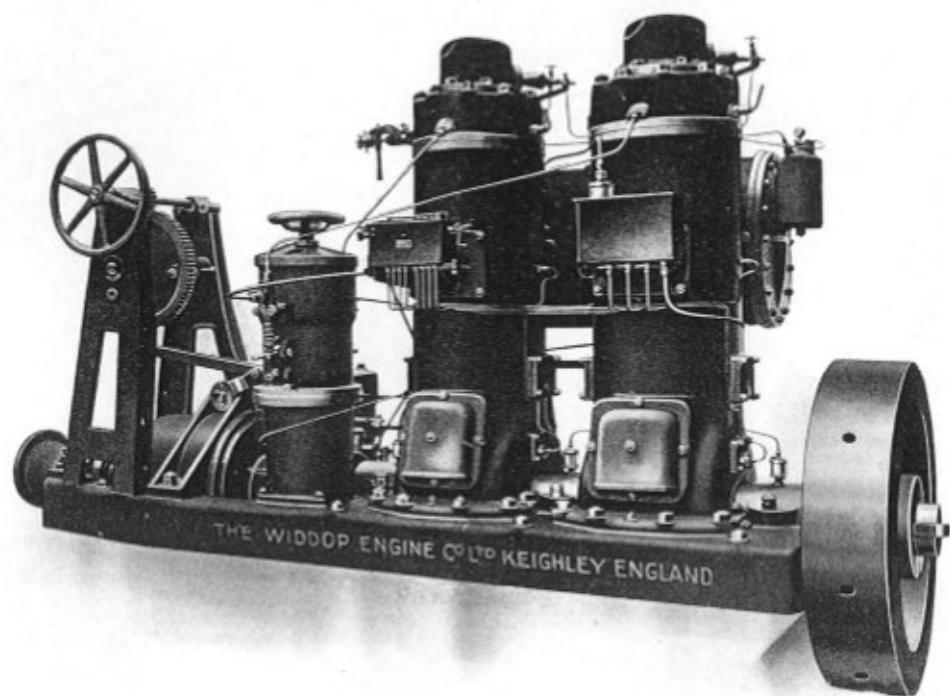
"We are pleased to say the engine stood the test very well and under the very bad weather conditions we think it is an excellent recommendation for you."

From the builder :—

"We have just read the article which appeared in the *Motor Boat*. It speaks well—and deservedly so—of the engine."



Widdop Twin Cylinder Crude Oil Marine Engines



ILLUSTRATING TYPES GMT AND HMT.

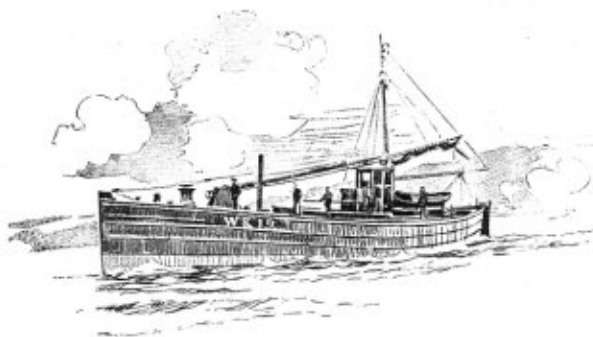
THE 80 B.H.P. and 120 B.H.P. models illustrated above are of particularly massive design, being principally intended for commercial craft where extreme reliability is essential. The reverse gear and all controls are simple, and are easily and quickly operated.

On these engines and all larger sizes, "flow and return" lubrication of main bearings is introduced; the system is described on page 3 and the working can be traced from the above illustration, the special oil container being mounted on the forward cylinder.

This type of engine has proved itself the ideal power unit for a great variety of vessels, and has demonstrated its reliability and economical working to all its users. Amongst the many vessels in which installations have been made may be mentioned coasters, and large sea-going sailing ships, schooners, sea-going barges, harbour tugs, water-carrying vessels, dredgers, lighters, fishing drifters and the heavier class of launches.



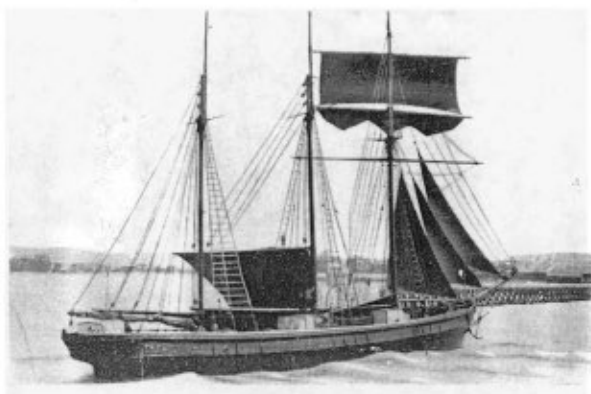
WIDDOP-ENGINED "BRODER," A SPECIAL TYPE OF DREDGING CRAFT BUILT FOR THE OUSE DRAINAGE BOARD FOR KEEPING CLEAR THE RIVER FAIRWAYS.



FISHING DRIFTER "SCALESBURN" OF WICK,
FITTED WITH 100 B.H.P. TWIN-CYLINDER WIDDOP ENGINE.

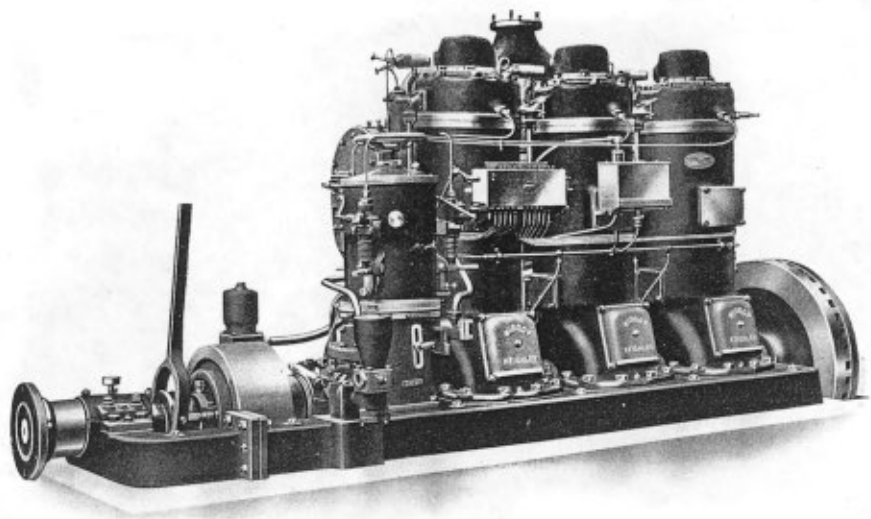
This is a type of craft in which WIDDOP ENGINES have proved extremely successful. The radius of action of the Scottish fishing vessels is remarkable and the long continuous runs made by them necessitate a thoroughly reliable engine, whilst the actual duties of fishing require more than ordinary flexibility. These requirements are filled most satisfactorily by the engine illustrated on the opposite page.

One of the large number of coasting vessels fitted with WIDDOP crude oil engines. Whilst primarily fitted in many of the vessels as auxiliary power only, the engines are often called on for prolonged running, particularly under adverse weather conditions. The WIDDOP engine is designed to respond satisfactorily to such calls, and is the last word in RELIABILITY.



"UNCLE NED" FITTED WITH WIDDOP 100 B.H.P. ENGINE.

Widdop Multi-Cylinder Crude Oil Marine Engines



ILLUSTRATING TYPES GM3, HM3, GM4, HM4.

THE GM3 size engine can be arranged for direct reversing, or fitted with mechanical reverse gear. All larger sizes are fitted with direct reversing equipment only. This equipment is described in detail on page 6. The ease and certainty of action of this equipment makes the engine fully as flexible as a steam engine. The saving over steam driven craft is of vital importance in these days of keen competition. One man can easily handle a pair of these engines and there are no standby losses, no banking of fires, no "getting up steam" and no steam pipe troubles. The consumption of fuel starts only when the engine is started and stops when the engine stops.

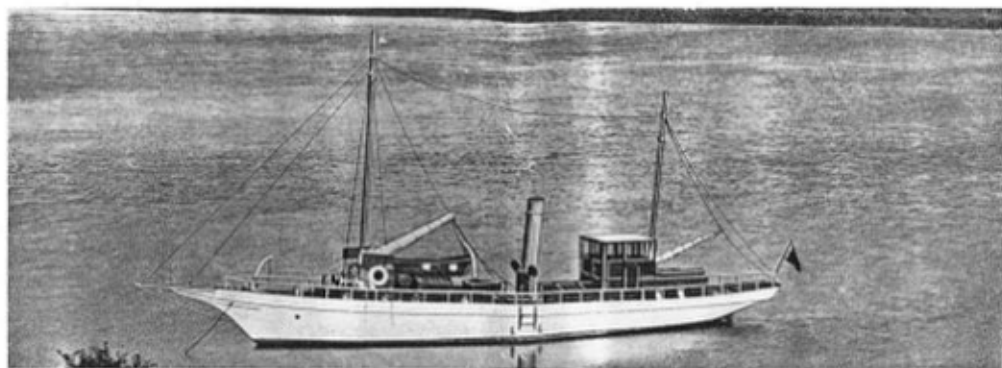
The speed control gives a range from approximately 10 per cent. over normal down to "Dead Slow." A steel plate clutch is fitted for free running.

By careful design and accurate balancing of the reciprocating parts, vibration is eliminated and the only noise in connection with the working of the engine is the slight hiss of the air intake.

For the convenience of overseas customers, the after part of engine base, with thrust bearing and clutch, is cast separately, and carefully machined and dowelled in position. This portion is shipped in a separate case, thus lowering the weight and measurements of the large case considerably.

Where a thoroughly reliable and high-class engine is required the WIDDOP multi-cylinder type cannot be beaten.

For details of auxiliary air compressor, see page 18.



WIDDOP-ENGINED M.Y. "ROMANCE."

For full-powered or auxiliary-powered yachts the WIDDOP MULTI-CYLINDER ENGINE is ideal. It will start at a few seconds' notice, is entirely dependable and easy to handle. It manoeuvres like a steam engine, costs one-fifth as much to run, occupies one-third the space of a steam installation, and has a vastly increased radius of action.

The Rt. Hon. The Earl of Kilmorey writes of his WIDDOP Installation:—

"The two engines you installed in my boat in the autumn of 1922 have done very well indeed and given every satisfaction."



M.S. "WOOLBYRNE" with 200 B.H.P. WIDDOP ENGINES. This vessel sails between London and the Belgian and other ports with the regularity of an ocean liner.

LAUNCH of the "TAMCO" for the Pacific Steam Navigation Co., at the shipyard of Messrs. Harland & Wolff.

This vessel is fitted with 100 B.H.P. WIDDOP propelling engines, 18 B.H.P. windlass and 8 B.H.P. water cargo pump. All the engines operating on heavy oil.

The owners report:—"The speed and manoeuvring trials were entirely satisfactory throughout, as were also the tests carried out with the pumping and other machinery."



LAUNCH OF TUG AND WATER BOAT, NOW WORKING AT VALPARAISO.

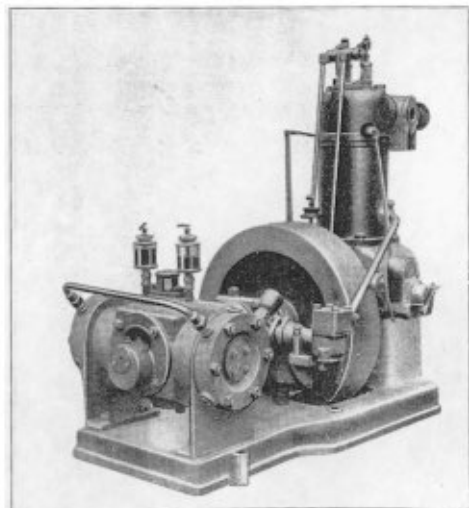


60 B.H.P. PASSENGER LAUNCH "ARUN" FOR MESSRS. ELDER DEMPSTER & CO.

WIDDOP ENGINED vessels are operating in all parts of the world. Recent news of a small tug in New Zealand informed us that:—"Some time ago one of the captain's sailing vessels arrived outside the port of Opotiki and could not make port. Several launches having 50 and 70 B.H.P. engines made an endeavour to bring the vessel in, but it was not until a launch fitted with a 30 B.H.P. WIDDOP ENGINE came along that they could get the vessel harboured."

Even the small WIDDOP models are capable of undertaking very arduous duties, as witness the following report from Ireland:—

"The motor schooner 'J. T. & S.' is, we venture to say, the most successful motor vessel yet built for the coasting trade, as there has never been the slightest hitch with either the vessel or the engine (a 70 B.H.P. WIDDOP). On one of her voyages from Portland to Dublin, carrying 280 tons of building stone, she saved a Norwegian steamer of 1,500 tons, with tailshaft broken, 20 miles off the Eddystone, and successfully towed her into Plymouth Sound after 14 hours' hard towing."



With our large direct-reversing engines an auxiliary engine-driven compressor unit is supplied. The illustration shows a WIDDOP 8 B.H.P. 4-stroke paraffin engine direct-coupled to a two-stage water-cooled air compressor. If preferred, one of our crude oil engines is used, in which case the auxiliaries operate on the same fuel as the main engines.

Widdop "Invincible" Marine Oil Engines

OUR STANDARD EQUIPMENT INCLUDES

ENGINE : complete with flywheel, governor, reversing and speed controls, all pipes on engine in copper, lubrication system complete, fuel pumps and sprayers.

CIRCULATING WATER PUMP : This is fitted as standard on every engine. It is a plunger type pump of gunmetal, operated by an eccentric on the engine crankshaft.

WATER PIPING : The pipes on the engine are of copper; where outboard lengths are supplied by us these are in galvanised wrought iron unless specified otherwise.

SILENCERS : Are of cast iron of ample capacity, cooled by engine circulating water.

EXHAUST PIPES : Supplied to order. These are in wrought iron unless specified otherwise.

FUEL TANK : Supplied to order to suit customers' requirements. Usually made in galvanised steel with riveted seams.

DECK PLATE : Our standard deck plate is of brass.

SEA COCK : This is of gunmetal, easily fitted and of ample size.

WEED STRAINER : Perforated brass strainer plate for ship's side. Mud boxes to Lloyd's requirements are supplied with larger engines.

STARTING EQUIPMENT : Suitable compressed air equipment is supplied with 30 B.H.P. and all sizes above this power. Full details of this equipment are given on page 7.

STERN GEAR : Standard Stern gear includes mild steel propeller shaft and couplings, wrought-iron stern tube with glands, and cast-iron propeller. All bronze gear can be supplied, if specially ordered, at an extra cost.

REVERSE GEAR : Suitable reversing gear is supplied as per details on page 6.

INSTALLATION : Where installation is carried out by us we can supply one or more skilled engineers, at our discretion, purchaser or shipbuilder to provide all rough labour, lifting tackle, power and light, carry out all shipwrights', joiners', or smiths' work in connection with the installation, also the bed and supports for the engine, and auxiliaries, and bore all holes.

ACCESSORIES.

Oil Can.

Oil Feeder,
(for large installations).

Complete set of
Spanners.

Adjustable wrench.

Blow lamp for each
cylinder

Instruction Card.



M.S. "BESSIE CLARK" FITTED WITH WIDDOP MONDLOC ENGINES.

SPARES.

Dome for each
Cylinder.

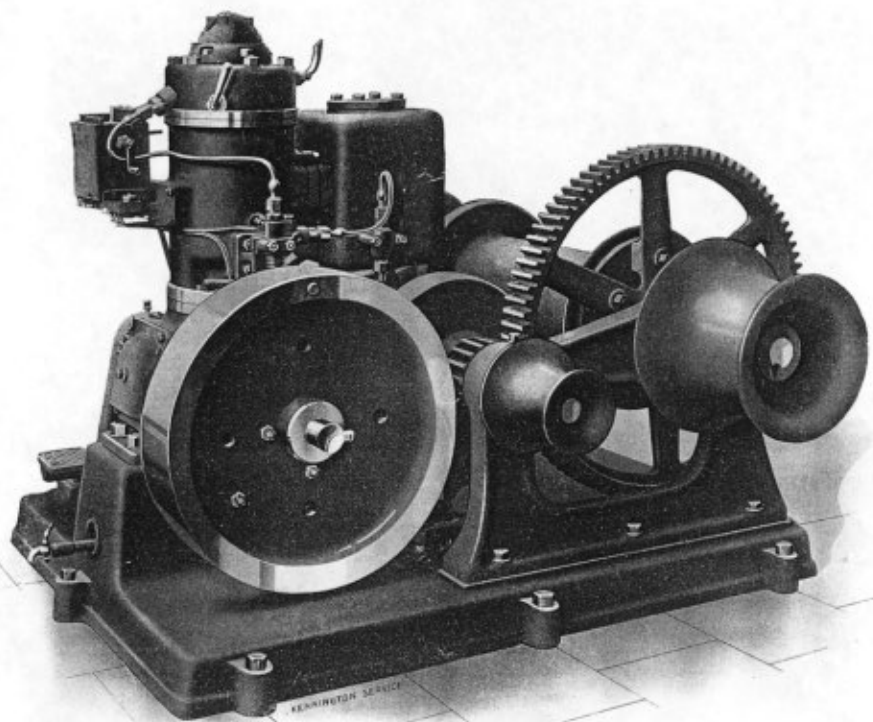
1 Sprayer and pipe
for each cylinder

1 Piston ring for
each cylinder.

Complete set of
Springs.

Set of minor spares
etc.

Widdop "Invincible" Crude Oil Motor Deck Winches



LIFTING CAPACITY—30 CWT. AT 80 FEET PER MINUTE.

Larger sizes to meet requirements.

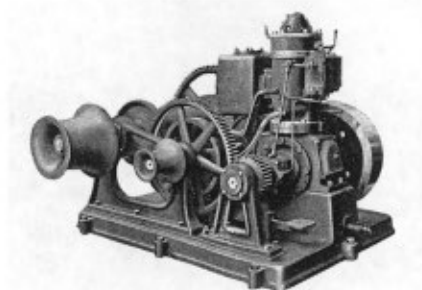
THE "WIDDOP INVINCIBLE" Motor Deck Winch is a self-contained unit, operating on the same fuel as the main propelling machinery. It is driven by a WIDDOP crude oil engine, and our intimate knowledge of the conditions under which these winches are used has enabled us to produce a design which gives a maximum of efficiency, combined with simplicity and economical running.

The winches can be modified to suit requirements—gipsy wheels can be fitted, or standard cable holders.

Whilst primarily designed for marine duties, the winches are easily adaptable for land duties and many of them are now being used for hoists, contractors and builders' winches.

They are of robust design, built of good class material and will stand up to any reasonable work.

Special Features of Standard Crude Oil Winch



THE WINCH is fitted with one winding drum and four warping drums, if required.

THE CONTROL. One man or boy can easily control the winch. The clutch and brake are operated by means of a hand lever, which gives the three positions—"Hoist," "Neutral" and "Brake." Underneath this lever is a foot-operated lever for quickly reversing the winding drum.

EFFICIENCY is high, due to the fact that heavy duty ball bearings are used freely throughout.

THE ENGINE is of our standard semi-diesel type, designed to operate on crude oil.

THE GOVERNOR is of our Patent Centrifugal ring type, which gives complete control under all conditions, the speed variation from full load to no load, and *vice versa*, being under 3 per cent.

COOLING. Standard gunmetal plunger type water circulating pump is fitted on the engine, suitable for pumping from the sea, or other suitable supply.

FUEL TANK. Service Fuel Tank is mounted on a special bracket on the engine.

The following are the principal details of the 30 cwt. Winch.

MAIN DIMENSIONS.

Size of Engine	10 B.H.P.
Number of Cylinders	1
Revolutions per minute	500
Bore and Stroke	7 in. x 7 in.
Length overall	5 ft. 4 in.
Width overall..	5 ft. 9 in.
Height overall	4 ft. 1 in.

SHIPPING DIMENSIONS.

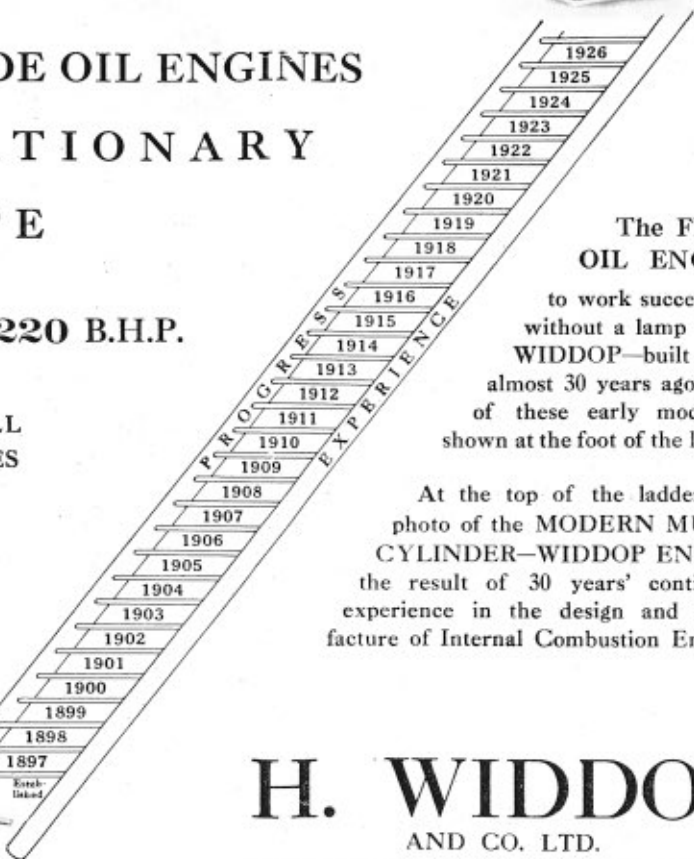
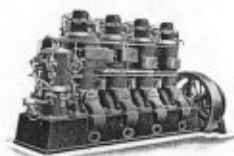
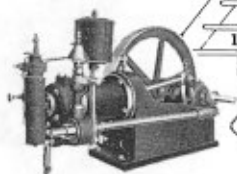
1 case	..	6 ft. 3 in. x 5 ft. 10 in. x 4 ft. 8 in.
Approximate net weight	..	36 cwt.
Approximate gross weight	..	42 cwt.
Code Word	SEMIDECK

WIDDOP

CRUDE OIL ENGINES
STATIONARY
TYPE

10 to 220 B.H.P.

FOR ALL
PURPOSES



The FIRST
OIL ENGINE

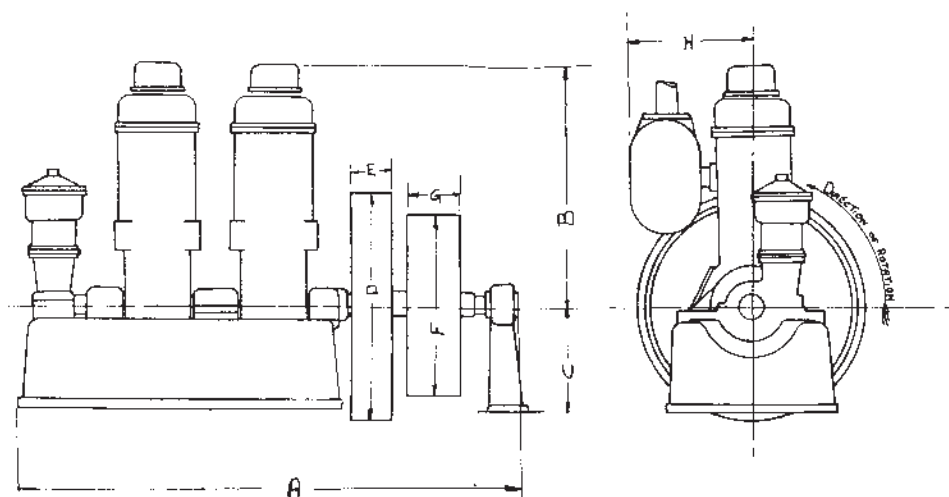
to work successfully
without a lamp was a
WIDDOP—built by us
almost 30 years ago. One
of these early models is
shown at the foot of the ladder.

At the top of the ladder is a
photo of the MODERN MULTI-
CYLINDER—WIDDOP ENGINE
the result of 30 years' continuous
experience in the design and manu-
facture of Internal Combustion Engines.

H. WIDDOP
AND CO. LTD.
KEIGHLEY, ENGLAND

Widdop "Invincible" Stationary Crude Oil Engines

POWERS AND PRINCIPAL DIMENSIONS.



Type	No. of Cylinders	B.H.P.	R.P.M.	Bore	Stroke	A	B	C	D	E	F	G	H	Code Word
				in.	in.									
GS	1	10	500	7	7	3' 3"	2' 7"	1' 1"	2' 0"	5 1/2"	1' 3"	8"	1' 5 1/2"	CAMUZ
FS	1	15	425	8 1/2	10	5' 6"	3' 8"	1' 1 3/4"	3' 8"	6"	1' 8"	10"	1' 8"	EBSAZ
FS	1	30	400	10 1/2	12	5' 9"	3' 10"	1' 4"	4' 2"	7"	2' 0"	10"	2' 1 1/2"	FANAZ
GS	1	40	320	12 1/2	14	6' 6"	5' 2"	1' 6"	4' 4"	10"	3' 0"	1' 0"	2' 5"	GINAZ
HS	1	55	275	14	16	7' 6"	5' 8 3/4"	1' 6"	5' 6"	1' 0"	3' 0"	1' 0"	2' 7 1/2"	HOTAZ
GST	2	20	500	7	7	5' 1 1/2"	2' 7 1/2"	1' 0"	3' 0"	5"	1' 6"	10"	1' 6"	CIHAZ
EST	2	30	400	8 1/2	10	5' 8 1/4"	3' 6"	1' 2"	3' 8"	6"	2' 0"	10"	1' 9"	MORAZ
FST	2	60	350	10 1/2	12	6' 9"	4' 4"	1' 2"	4' 2"	7"	3' 0"	1' 0"	2' 1 1/2"	FELAZ
GST	2	80	320	12 1/2	14	9' 11"	5' 2"	1' 6"	4' 4"	10"	3' 4"	1' 1"	2' 5"	GIRAZ
HST	2	110	275	14	16	11' 0"	5' 3 3/4"	1' 6"	5' 6"	1' 0"	4' 6"	1' 5"	2' 7 1/2"	HIBAZ
GS ₃	3	120	320	12 1/2	14	12' 9"	5' 2"	1' 6"	4' 4"	10"	3' 4"	1' 3"	2' 5"	GOMAZ
HS ₃	3	165	275	14	16	14' 5"	5' 8 3/4"	1' 6"	5' 6"	1' 0"	4' 6"	1' 6"	2' 7 1/2"	HENAZ
GS ₄	4	160	320	12 1/2	14	15' 0"	5' 2"	1' 6"	4' 4"	10"	3' 4"	1' 4"	2' 5"	GEPAZ
HS ₄	4	220	275	14	16	17' 5"	5' 3 3/4"	1' 6"	5' 6"	1' 0"	4' 6"	2' 1"	2' 7 1/2"	HUDAZ

NOTE: THESE DIMENSIONS ARE APPROXIMATE ONLY AND MUST NOT BE WORKED TO. ACCURATE ARRANGEMENT DRAWINGS ARE SENT ON RECEIPT OF ORDER.

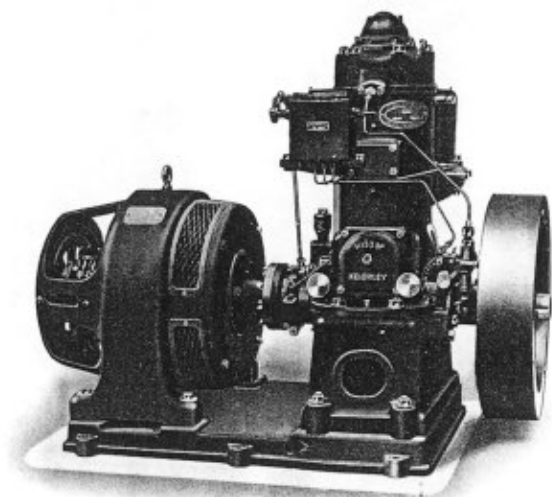
Widdop Stationary Engines

APPROXIMATE SHIPPING DETAILS

TYPE CS	Nett C. Q. LB.	Gross C. Q. LB.	TYPE ES	Nett C. Q. LB.	Gross C. Q. LB.
1 Case 3' 9" x 2' 7" x 3' 11"	11 2 0	13 3 0	1 Case 3' 10" x 3' 5" x 4' 6"	21 3 0	25 0 0
			1 Flywheel 3' 8" x 3' 8" x 8"	5 2 0	5 2 0
	11 2 0	13 3 0		27 1 0	30 2 0
FS			GS		
1 Case 6' 1" x 3' 2" x 5' 8"	23 0 0	26 2 0	1 Case 6' 10" x 4' 2" x 6' 8"	50 0 0	56 0 0
1 Flywheel 4' 2" x 4' 2" x 6½"	7 0 0	7 0 0	1 Flywheel 4' 4" x 4' 4" x 11"	18 2 0	18 2 0
Exhaust Silencer 2' 2" x 2' 0" x 1' 6"	5 2 0	5 2 0	1 Exhaust Silencer 1' 10" x 2' 3" x 1' 9"	5 2 14	5 2 14
	35 2 0	39 0 0		74 0 14	80 0 14
HS			GST		
1 Case 7' 10" x 4' 9" x 7' 9"	80 0 0	88 0 0	1 Case 5' 1" x 2' 10" x 4' 0"	23 0 0	26 0 0
1 Flywheel 3' 6" x 5' 6" x 12"	40 0 0	40 0 0	1 Flywheel 3' 0" x 3' 0" x 5"	4 0 0	4 0 0
1 Silencer 2' 4" x 2' 4" x 1' 9"	7 0 0	7 0 0		27 0 0	30 0 0
	127 0 0	135 0 0			
EST			EST		
1 Case 6' 0" x 3' 6" x 5' 0"	27 0 0	31 0 0	1 Case 7' 9" x 4' 4" x 6' 0"	57 0 14	63 0 0
1 Flywheel 3' 8" x 3' 8" x 6"	6 0 0	6 0 0	1 Flywheel 4' 1" x 4' 1" x 9"	14 2 0	14 2 0
	33 0 0	37 0 0		71 2 14	77 2 0
GST			HST		
1 Case 10' 9" x 4' 2" x 6' 8"	90 0 0	100 0 0	1 Case 11' 3" x 4' 9" x 7' 9"	121 0 0	135 0 0
1 Flywheel 4' 4" x 4' 4" x 11"	18 2 0	18 2 0	1 Flywheel 5' 6" x 5' 6" x 12"	40 0 0	40 0 0
Exhaust Silencer 4' 0" x 2' 4" x 1' 8"	10 0 0	10 0 0	Exhaust Silencer 4' 5" x 2' 4" x 1' 9"	14 0 0	14 0 0
	118 2 0	128 2 0		175 0 0	189 0 0
GS3			HS3		
1 Case 13' 3" x 4' 2" x 6' 10"	120 0 0	130 0 0	1 Case 15' 0" x 4' 9" x 7' 9"	155 0 0	171 0 0
1 Flywheel 4' 4" x 4' 4" x 11"	18 2 0	18 2 0	1 Flywheel 5' 6" x 5' 6" x 12"	40 0 0	40 0 0
3 Exhaust Silencers (each 1' 10" x 2' 3" x 1' 9")	17 0 0	17 0 0	3 Exhaust Silencers (each 2' 4" x 2' 4" x 1' 9")	21 0 0	21 0 0
1 Air Receiver 9' x 1' 1" x 1' 1"	3 1 14	3 1 14	1 Air Receiver 9' x 1' 1" x 1' 1"	3 1 14	3 1 14
	158 3 14	168 3 14		210 1 14	235 1 14
GS4			HS4		
1 Case 15' 5½" x 4' 2" x 6' 10"	160 0 0	177 0 0	1 Case 18' 0" x 4' 9" x 7' 9"	193 0 0	211 0 0
1 Flywheel 4' 4" x 4' 4" x 11"	18 2 0	18 2 0	1 Flywheel 5' 6" x 5' 6" x 12"	40 0 0	40 0 0
1 Silencer 4' 0" x 2' 4" x 1' 8"	10 0 0	10 0 0	1 Silencer 4' 5" x 2' 4" x 1' 9"	14 0 0	14 0 0
1 Silencer 4' 0" x 2' 4" x 1' 8"	10 0 0	10 0 0	1 Silencer 4' 5" x 2' 4" x 1' 9"	14 0 0	14 0 0
1 Air Receiver 5' 2½" x 2' 1½" x 2' 1½"	6 3 0	6 3 0	1 Air Receiver 5' 2½" x 2' 1½" x 2' 1½"	6 3 0	6 3 0
	205 1 0	222 1 0		267 3 0	285 3 0

NOTE: TOLLAGE ARE NOT INCLUDED IN THE ABOVE DETAILS.

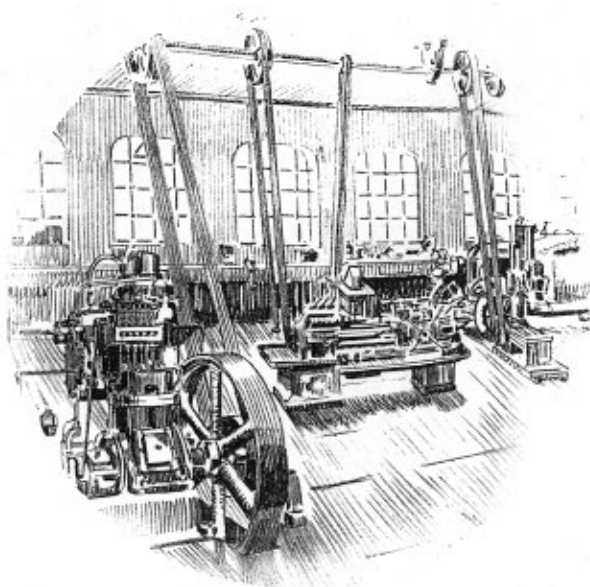
Widdop Crude Oil Engines



DIRECT-COUPLED ELECTRICITY GENERATING SET.
ILLUSTRATING SINGLE CYLINDER STATIONARY TYPE.

OUR range of Single Cylinder Engines has recently been redesigned to bring them in line with the developments in the larger sizes. It will be noticed from the illustration that the cylinder and upper half of the crankcase are now cast in one, thus eliminating the joint which was necessary when two castings were employed.

Another improvement is the utilising of heavy duty roller bearings for the 10 B.H.P., 15 B.H.P., and 25 B.H.P. sizes. These bearings have been used by us for eight years with unqualified success in our twin cylinder engines up to 50 B.H.P., and the adoption of them for the single cylinder type has resulted in greatly increased efficiency and remarkable ease in starting. This can be understood, of course, as the roller bearings reduce the frictional loss of power in addition to entirely eliminating wearing troubles. There is no longer any necessity for "taking up bearings," "Re-metalling bearings," "Putting in new bushes," etc., etc. They are troubles of the past if you install a WIDDOP new type engine. On the 10 B.H.P. size the outer bearing is dispensed with and pulley fitted at opposite end of crank to flywheel.



The ideal engine for small workshops, weaving sheds, grinding and milling plant, pumping machinery, air compressors, operating hoists and winches, contractors' and builders' work, farm and estate duties, etc.

The WIDDOP Patent Variable Admission Governor automatically varies the quantity of fuel injected to suit the exact load on the engine. It is also sufficiently sensitive to keep the engine speed constant under varying loads.

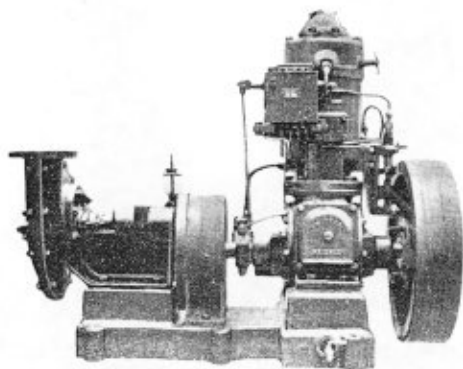
This type of engine, using cheap crude fuel oil is the most economical power unit of the day.

The illustration given below represents one of our 10 B.H.P. engines driving through gearing a 100 ton per hour water pump for use on board the P.S.N. Co.'s water boat TEMUCO. The engine is the usual type, operating on crude oil as for the larger engines.

The gears are totally enclosed, working in an oil bath, supported by substantial bearings.

For waterworks and other places where self-contained units are required for dealing with water in large quantities, these sets cannot be improved on.

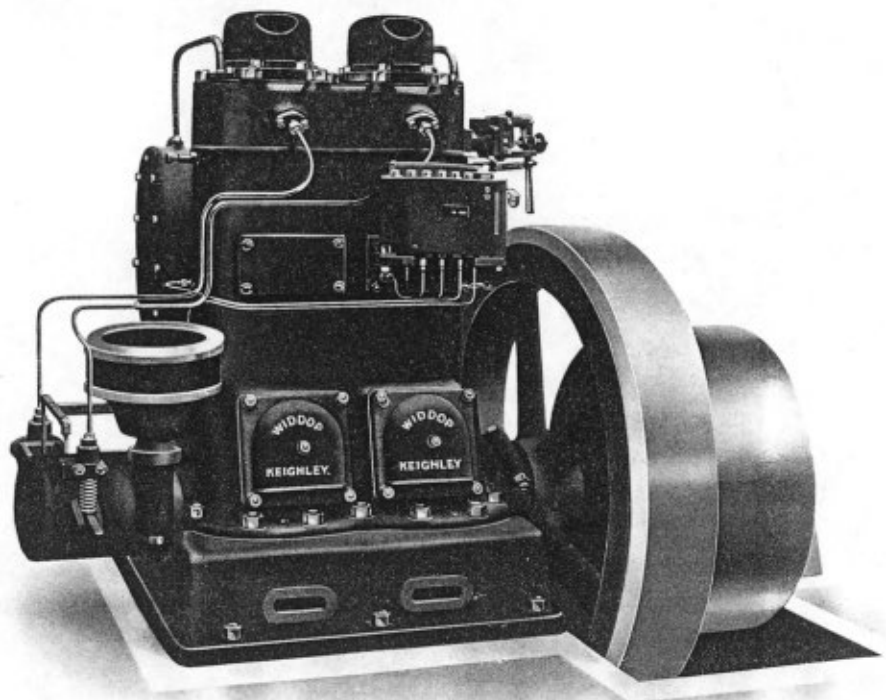
A wide range of pumping duties can be carried out by similarly arranged sets, such as pumping fuel oil, petrol, paraffin, sewage, molasses, suds, china clay, etc.



Arranged for all powers up to 220 B.H.P.

For driving through gears, by belt, or direct coupled.

Widdop Crude Oil Engines



ILLUSTRATING TWIN-CYLINDER MONOBLOC ENGINES—20, 30 AND 60 H.P.

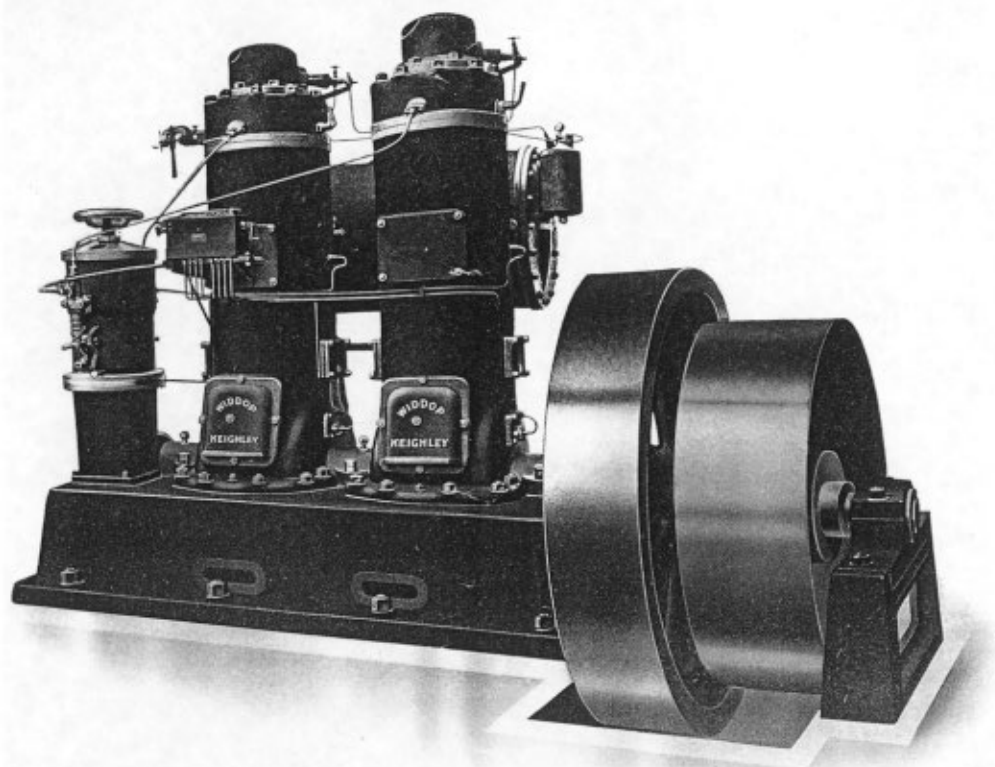
ON this type of engine we did the pioneer work with roller bearings adapted for crude oil engine practice. The first engine was put into commission eight years ago, since when hundreds of others have been sold. During the whole of that time we have not had a single complaint of any description relative to the bearings, nor has one bearing been repaired, adjusted or replaced. As a record of the elimination of bearing trouble we claim this cannot be beaten, and probably cannot be equalled.

The object of the designer of this engine has been to supply the demand for a high-class crude oil engine for general purposes, and particularly for those users who have limited floor space. Reference to the dimension table on page 23 will give details of space occupied by the monobloc engines, types CST, EST and FST, being 20, 30 and 60 B.H.P. respectively.

For direct coupling to Electric Generators these engines cannot be surpassed. Even in so small a size as 20 B.H.P. we can offer a twin-cylinder crude oil engine. The space occupied is approximately the same as for a single cylinder engine and the cast-iron base can be extended to carry the electrical machine.

The governor is specially designed for this purpose, the maximum normal variation, full load to no load, not exceeding 3 per cent.

Twin Cylinder WIDDOP Crude Oil Engines



ILLUSTRATING 60T AND 105T SIZE.

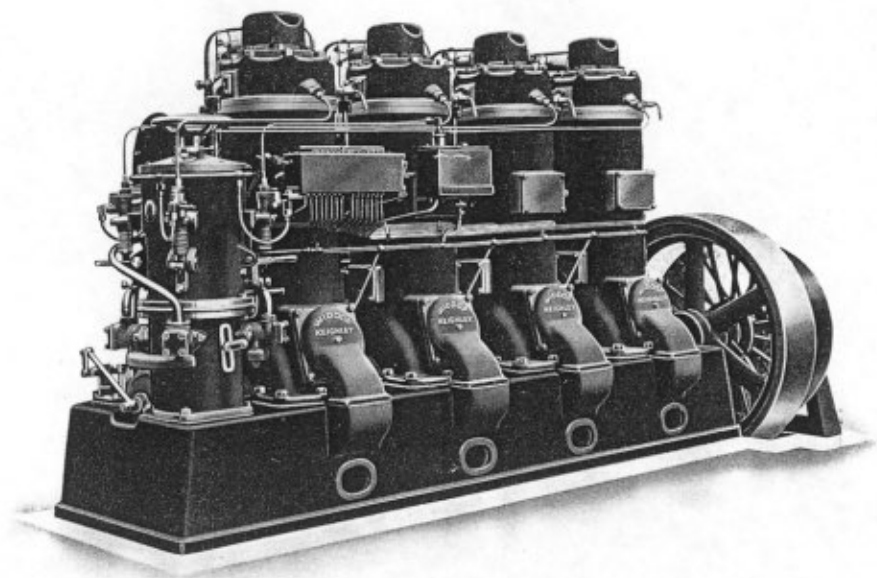
THE two-cycle engine is universally recognised as being the ideal power unit for electricity generating plant. The degree of cyclic irregularity of the two-cylinder unit is equal to that of a four cylinder, four-stroke cycle engine. The constant hard service required of generating plant necessitates an engine of robust design and liberal power rating. The illustration shows our stationary type, which, it will be seen, is an adaptation of our marine model mounted on a strong cast-iron base. As the engines are built to Lloyd's requirements for engines for open sea service, purchasers have the best possible guarantee of both design and quality of materials used.

The above is from a photograph of the engine installed to drive the generating plant at The Electricity Works, Braunton, Devonshire. The purchasers wrote us recently "It has been running every day since Sept. 10th, 1924 (date of installation) doing all the work of the station, and gives every satisfaction."

WIDDOP

Four-Cylinder Crude Oil Engine

Installed at the Bennett Mines, Sese kinika, Ontario



ILLUSTRATING THREE AND FOUR-CYLINDER TYPES.

FOR larger power units up to 220 B.H.P., for every class of work, the multi-cylinder WIDDOP Engine is highly suitable. It is of massive proportions, liberally rated, capable of standing up to the heaviest duties, yet its variable admission governor, mounted in ball bearings and using ball bearing eccentrics, is so sensitive that it will deal instantly with variations of load—great or small.

The starting gear, which is embodied in the governor, is instant and positive in action. It is automatic, all that is necessary being to turn on the compressed air and depress the starting handle, when the engine starts instantly in the right direction.

Probably the most important feature is the low compression; this being approximately 200 lb. per square inch—a remarkable low figure for modern practice.

The working stresses in the engine are proportionately low and the useful life of the engine is thus prolonged indefinitely. The wear and tear is negligible and the cost of upkeep, repairs, etc., is very small. There are no cams and valves to wear away, with consequent loss of efficiency and, given reasonable care, the engines are good for twice the usual life of the high compression type engine.

The following notes were sent to us by the purchaser of the four-cylinder engine illustrated on page 29, after the engine had been installed and put to work :-

"I have just returned from Sesekinika and am pleased to report that I had absolutely no difficulty in starting the engine. Even after it was connected up to a 750 ft. air compressor there was no trouble in starting. At first I used 200 lb. starting air pressure, but found she started equally well with 100 lb. On one occasion, after we had shut down, the mine manager came into the power-house and expressed a wish to see the engine started. I drew his attention to the fact that we had only 60 lb. of air in the receiver, but she started quite readily. On another occasion I saw the engineer-in-charge start her up without the slightest hitch, although the air pressure was down to 50 lb."

The discerning buyer is showing preference for the WIDDOP Engine. Amongst other recent customers we have included such firms as Messrs. Elder Dempster & Co., Messrs. The Cambridge Instrument Co., The Frodingham Ironworks, The Pacific Steam Navigation Co., The War Office, the Niger Company, Messrs. Harland & Wolff, The J. & N.E. Rly., Llangollen Tanning Co. and many other large power users and engineers.

As we believe the opinion of old customers is the best guidance for prospective purchasers, we take the liberty of printing the following extracts from letters we have received from time to time :-

"Please send me nickel plate and filling plug cap for burner. These small items are all that are required after one year's running, so I have no complaints to make at all. Yours, J. A. PARRY."

"With reference to the engine she is a beauty. Her consumption of fuel is averaging under a gallon per hour (25 B.H.P.) and she has been in every detail thoroughly reliable. The small engine is also doing well and it has been a great pleasure to run both. Yours, ERNEST GORDON."

The two following extracts from letters by old marine engine customers replying to queries by intending purchasers are of interest :

Aklow, 17. 9. 1925

"In reply to your enquiry of the 15th inst., re H. Widdop & Co., we beg to state we have been customers of the firm for marine engines for the last nine years, and we have found them very capable of carrying out all contracts which we have placed with them in a prompt and efficient manner. Their engines have always proved highly satisfactory in design, materials and workmanship, and we have much pleasure in recommending them.

"The following are some of the engines supplied to us by the firm during the above period :

MOTOR FISHING DRIFTERS : "Ebblyn" 50 B.H.P., "Ferrybank" 50 B.H.P., "Parnell" 50 B.H.P., "Beneader" 50 B.H.P., "Hibernia" 50 B.H.P., "Busy Bee" 50 B.H.P., "St. Maur" 35 B.H.P.

MOTOR COASTERS : "J. T. & S." 70 B.H.P., "Village Belle" 70 B.H.P., "Agnes Craig" 70 B.H.P., "Isabel" 50 B.H.P., "William Ashburner" 100 B.H.P., "Harvest King" 70 B.H.P., "Invermore" 100 B.H.P., "Crest" 70 B.H.P., "Bertha Grace" 70 B.H.P., "Pacific" 50 B.H.P., "Uncle Ned" 100 B.H.P., "E. E. Fisher" 50 B.H.P.,

MOTOR BARGES : "E. D. J." 50 B.H.P., "P. M. R." 30 B.H.P., "Enterprise" 50 B.H.P., "New Fishing Boat" 18 B.H.P.

"The motor coasters 'J. T. & S.' and 'Invermore' are owned and operated by us. Yours,

JOHN TYRRELL & SONS."

Braunton, 18. 8. 1925.

"In reply to your enquiry, H. Widdop Co. Ltd. have been supplying engines in this locality since 1914, and there are now 25 vessels belonging to this port alone with WIDDOP engines ranging from 8 to 100 B.H.P. about 1,800 B.H.P. in all, besides motor winches, are installed and are still running and in working order.

"I am personally interested in some of the coasters which have WIDDOP engines installed, and consider them quite as good and in some respects better than any other make of marine engine on the market. I have been doing business with them since 1914 and have always found them honourable to meet their obligations. Yours,

(Capt.) GEO. G. CRABBE."

WIDDOP

Stationary Crude Oil Engines

OUR STANDARD EQUIPMENT FOR STATIONARY SETS INCLUDES :

ENGINE complete with heavy flywheel supported by outer bearing (except on the smallest sizes) specially sensitive WIDDOP PATENT Governor, fuel pump and sprayers, lubricating system complete, and all pipe connections on the engines.

CIRCULATING WATER PUMP. These are fitted as standard on every engine. They are of gunmetal, plunger type, operated by an eccentric on the engine crankshaft.

SILENCERS are of cast-iron, of ample capacity, cooled by engine circulating water.

STARTING EQUIPMENT. Not necessary and not included with CS, ES, FS, and CST sizes.

(a) EST and FST:—Equipment includes air receiver, pressure gauge, etc., connections to engine and starting and charging valves on cylinder.

(b) GST and HST: Include items as for smaller sizes, also hand-operated air compressor.

(c) GS₃ to HS₄: Include gear as for smaller sizes, but auxiliary air compressor is belt-driven from the engine.

(d) Auxiliary air compressor set can be supplied, consisting of an 8 B.H.P. petrol paraffin engine direct-coupled to a horizontal two-stage, water-cooled compressor, as an extra.

FUEL TANK. A galvanised steel fuel tank with riveted seams is supplied as standard equipment, with length of copper supply pipe. The tank is sufficient for about twelve hours' run at full load.

WATER AND EXHAUST PIPES. These are supplied at an extra cost to suit requirements.

COOLING WATER TANKS. For temperate climates we recommend that water tanks of a total capacity of approximately 30 gallons per B.H.P. should be installed, and double this quantity for tropical climates.

ACCESSORIES.

- 1 Piston Lifting Eyebolt.
- 1 Sprayer withdrawal nut.
- 1 Set Spanners.
- 1 Adjustable Wrench.
- 1 Handle for Reverse Lever.
- 1 Lamp Lighter.
- 1 Oil Can.

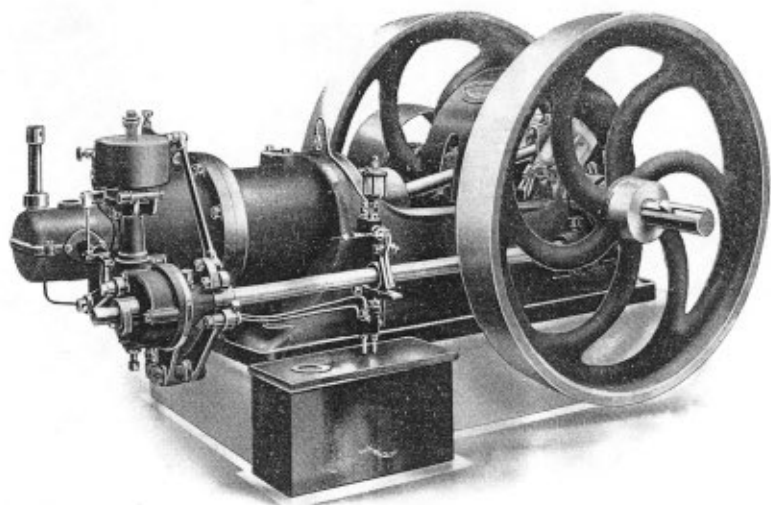
SPARES.

- 1 Set Springs.
- 1 Set Rubber Joints.
- Lamp Spares and Cleaners.
- 1 Dome for each cylinder.
- 1 Sprayer and pipe for each cylinder.
- 1 Piston Ring.

A Few OTHER

WIDDOP

PRODUCTS



Widdop "Invincible" Oil Engines

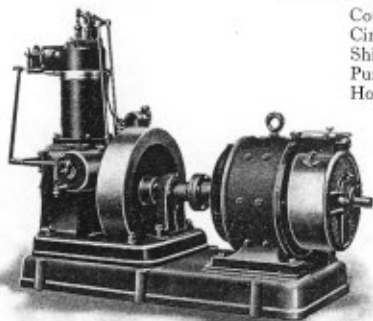
For Kerosene, Paraffin, Refined and Semi-Refined Oils, Naphtha and Lamp Oils.

Built in sizes 5 to 25 B.H.P., all of the slow-running single-cylinder type; easily handled by native labour.

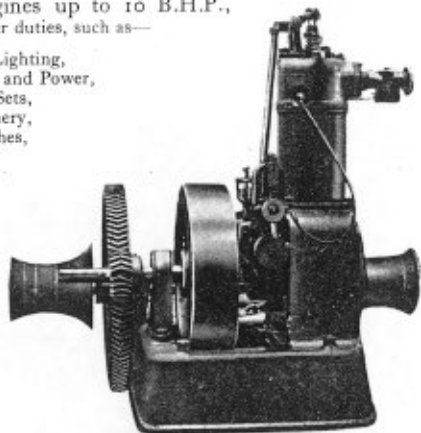
EFFICIENT. ECONOMICAL.

Four-cycle petrol-paraffin Engines up to 10 B.H.P.,
suitable for all small power duties, such as—

Country House Lighting,
Cinema Lighting and Power,
Ships' Lighting Sets,
Pumping Machinery,
Hoists and Winches,
Etc.



P.D. TYPE GENERATING SET, MADE IN SIZES 3 TO 6 K.W.,
SPEEDS 500 TO 850 R.P.M.



PETROL-PARAFFIN ENGINE WINCH

The illustrations are all from actual photographs, and every care has been taken in the compilation of this catalogue, but the details are liable to revision without notice, as improvements are made from time to time in the various types of engines.

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