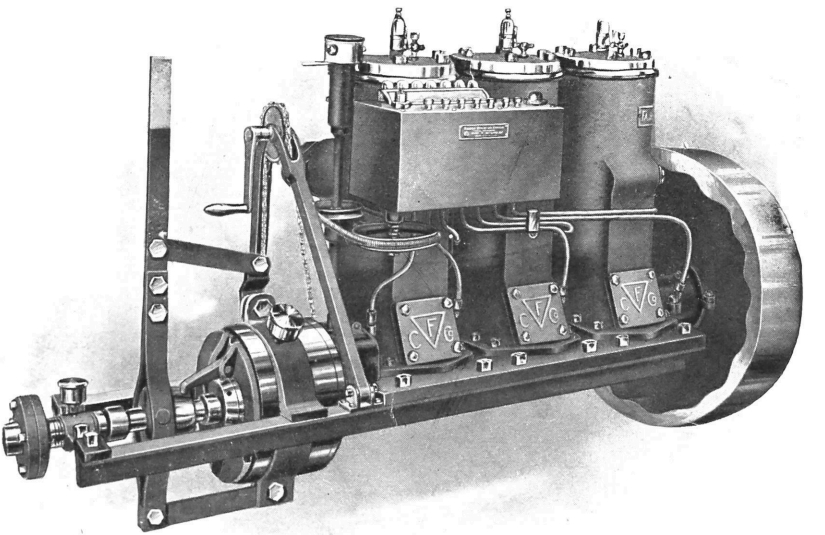
FAIRBANKS-MORSE
TWO CYCLE
MARINE ENGINE
INSTRUCTION BOOK



The Canadian Fairbanks-Morse Co.
LIMITED

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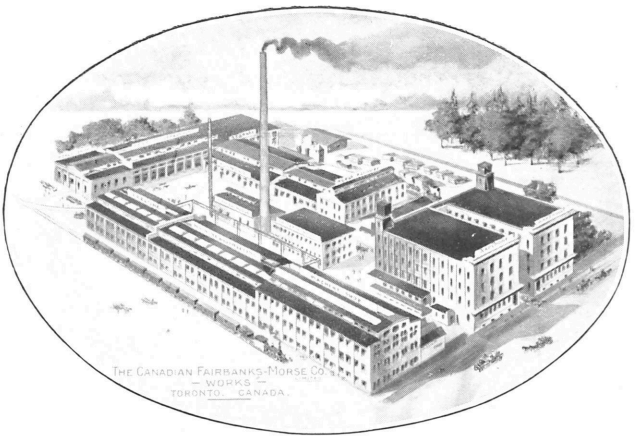
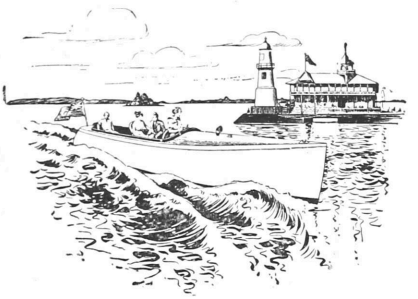
Factory: TORONTO



THE FINEST ENGINE FACTORY IN CANADA,

The Canadian Fairbanks-Morse Company, Limited.
Manufacturers of the Fairbanks-Morse Marine Engines.



ANNOUNCEMENT

As our motors are used by people varying widely in mechanical ability, we have endeavoured to make the following instructions clear, complete and simple, and to cover every question liable to arise in the installing, operating and maintenance of the motor, and at the same time to be understood clearly by a person of slight mechanical knowledge.

If, however, any additional information is desired, and if any instructions are not clear, we shall always be pleased to give further instructions.

Our motors are entirely beyond the experimental stage, and the methods herewith set forth we believe to be the best. We would suggest rigid compliance with them; but court correspondence with our customers, who may discover better means to the same end. We cannot, nor is it possible for any one to suggest quick and ingenious methods of repairing parts that may accidentally become broken. When an accident of this nature occurs, it is best to order a new part at once.

In writing for supplies or repairs, always give letter and number of motor and refer to part broken or wanted by the number of the part. To avoid misunderstanding, we have established a rule requiring the return of the broken part, charges paid, claimed under our guarantee, that we may examine or determine if the claim is correct. We also, in order to save unnecessary book-keeping, send all repairs not replaced by us, C.O.D.

THE CANADIAN FAIRBANKS-MORSE CO., Limited

Montreal, St. John, Toronto, Winnipeg
Calgary Vancouver, Saskaton, Victoria.

FACTORY: TORONTO, ONT.

INSTALLATION

KEELSON AND BILGE KEELSONS

In constructing a power boat, a keelson is usually notched over the ribs and bolted to the keel. In addition to this, bilge keelsons or stringers are recommended, one on either side, and running nearly parallel to the keelson.

These keelsons also should be notched to fit over and securely fastened to the ribs and planking. The keelsons, coming under the motor foundation timbers and over a number of ribs, distribute the strain over a large area and contribute largely to the stiffness of the structure.

SHAFT HOLE

The shaft hole should be bored the size given in table of motor dimensions in the catalogue, taking care that it is of such a pitch or angle that the propeller will be entirely submerged, and that no part of the motor bed or fly-wheel will come in contact or touch the inside of boat aside from the foundation timbers.

With a properly constructed dead-wood, there is no shaft hole lining needed except where the stuffing box is placed on the inside of the boat. With the last named arrangement a brass or iron tube may be used, the stuffing box fastened to the inboard end and the stern bearing to the outboard end.

The shaft hole being bored, stretch a fine line through the centre of it; fasten the outboard end to a stick nailed to the stern of the boat; make the other end fast inside of the boat, go over the line carefully and see that it is in the exact centre of the hole throughout the swing, and if the shaft hole has been properly bored, a plumb bob held beside the line should point to the centre of the keelson, provided boat sits level.

The face of the stern post must be absolutely smooth and at exactly right angles with the line which has been stretched where the centre of the shaft should be.

FOUNDATION

The foundation timbers, which should be of good sound oak, should be securely fastened to keelsons at the given distance from the line, and at the same pitch or angle as the line.

These foundation timbers may run either athwart ship or fore and aft; in either case they must be securely fastened to every timber or plank over which they pass. The table of motor dimensions gives all necessary measurements, but it is well to check your measurements over when you receive the motor.

PLACING MOTOR

Place the motor on the foundation at the proper position fore and aft, and in line with the centre of the shaft. The shaft now being in place, compare the faces of flange couplings and see that their faces come together fairly. The least variation at this point, if allowed to remain, will cause undue friction and heating.

With motor securely bolted down and faces of flanges on the coupling coming up perfectly fair, you may feel reasonably sure your motor and shaft are in line. **This is important.**

STERN BEARING AND STUFFING BOX

Bolt the stern bearing to stern-post with a film of white lead between. See that the shaft turns perfectly free after the stern bearing is fastened to place. If it binds the shaft, it would indicate that the face of the stern-post is not exactly at right angles to the shaft and must be dressed off until the shaft works free.

If a log is used, the inside stuffing box is bolted to the inboard end, after having squared the end the same as described for the stern-post. If the log is not used, a sleeve, one end of which screws into the stern bearing, long enough to extend into the boat far enough to admit of the stuffing box being screwed on the inboard end, replaces it.

PIPING

Use care in cutting threads on all pipe, so that they will make up tight, using white lead on all joints of water and exhaust. When boat is to be used on salt water, all piping should be in brass or galvanized iron.

In piping for exhaust where elbows are necessary it is best to use 45 deg. elbows if possible. An exhaust pipe 5 to 6 feet in length will give best results.

Make all pipe run as direct as possible, avoiding elbows and bends.

For the sea cock or intake to the pump, the pipe should have long running thread cut on the end intended to go through the planking. The holes should be bored through the bottom of the boat small enough so that the pipe will screw tight into planking. Have a lock-nut both inside and out after the pipe is screwed through the planking far enough to admit of a full thread on the lock-nut outside. Put a few turns of white-leaded candle wicking under the lock-nuts, and screw down firmly, fastening the strainer plate, sent out with engine, over the end of the pipe, to keep all foreign matter out of the pump.

The discharge from the water-jacket overboard should be above the water line if possible, and should be fastened as described above for the sea-cock pipe; all water pipe should be no smaller than the openings in or out of the motor for same.

GASOLINE TANK

The Gasoline Tank should be securely fastened in boat and placed high enough to insure a good flow of gasoline to Carburetor. If tank is placed under the deck, a threaded filling-pipe with deck plate attached should be screwed into tank, and securely fastened to deck, so that there will be no leak of Gasoline into boat if tank should overflow when filling.

All gasoline put into tank should be strained through chamois skin, as no water or other foreign matter will pass through it.

GASOLINE PIPE

Gasoline pipe should be of copper, and should be run from the tank to the carburetor as directly as possible along the keelson. See that the gasoline tank and pipe are thoroughly clean before making up. These joints should be made with either shellac or soap, care being taken that it is used only on outside threads, as there would be danger of stopping gasoline flow.

A strainer should be placed at outlet of tank to catch any dirt or scale, which might get into gasoline pipe or Carburetor. A shut-off cock should be placed at gasoline tank and another at Carburetor.

MUFFLER

The exhaust muffler is provided with a 3-8 in. pipe opening, which should have pipe connection to outboard to drain any excess of water from muffler. The muffler should be so placed that this drain will be at the lowest part and above the water line.

WATER TO EXHAUST

On all engines provision is made for allowing a quantity of water into exhaust piping. This should be just sufficient to keep exhaust pipe from burning woodwork in boat. Flooding exhaust with water will result in reduced speed.

In installations where the exhaust piping is not drained through Muffler, or when the exhaust piping is above the exhaust outlet on engine, the water should not be turned into piping until engine is started and should be turned off before stopping.

A stop cock should be placed in water overflow pipe so that overflow can be restricted if necessary for the purpose of forcing water into exhaust pipe. Very little pressure is required for this. The cock should never be entirely closed as damage may result.

LUBRICATION

Where the engine shaft bearings are lubricated by grease cups, these should be kept well filled. The handle should be screwed down a little when the engine is started and at such intervals while the engine is running as may be found necessary to keep the bearings in proper condition. As these bearings are fitted very close, it is best to lubricate them quite freely during the first few days the engine is in operation.

Use a good quality of grease, preferably "Fairbanks" brand, which is specially prepared for this work.

In the 3½ H.P. the 7 H.P., and the 10 H.P. type "E" engines, with non-removable heads, the piston, piston pin and crank pin are all lubricated from the cylinder oil feed. The piston pin has a hole drilled in the end that travels past the opening where oil enters the cylinder from the cylinder oiler. Part of the oil passes into the hole in the piston pin and down a tube to the crank pin, lubricating the lower end of the connecting rod. The lower end of the connecting rod dips into the oil in the crank chamber also.

The 6 H.P. Type "G" and the 4 and 6 H.P. Type "M" have a two feed oiler attached to cylinder. One feed supplies the cylinder, the other the connecting rod bearing through an oil feed to crank case.

The 10 H.P. Type "E" and the 12, 18, 24 H.P. Type "G" have a pressure oiling system. In this system the lubricating oil is placed in a tank attached to engine cylinder. In this tank are placed the oil pumps, which force with considerable pressure the necessary oil to each bearing, feeding more or less automatically as the engine runs faster or slower.

In two, three or four cylinder Type "G" Engines the feed to the bearing forward of the cylinders also supplies oil to the connecting rod bearing in the crank case. This feed should be supplied with enough oil for both crank pin and main bearing.

While the engine is new, allow the oiler to feed from fifteen to twenty drops a minute. This can be reduced after the engine has been in use for a short time.

Too much oil will foul the spark plugs, or ignitor. Too little oil will not give a free running engine.

Always use a good grade of gas engine cylinder oil, preferably "Fairbanks" brand, which is strictly a high grade mineral oil.

Occasionally the worn oil in the base should be removed and replaced by fresh oil.

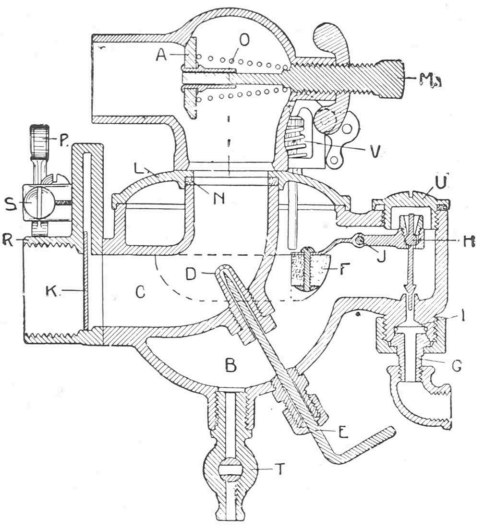
CARBURETORS

The Carburetor sent with each engine is the one used to operate the engine while testing, and it is adjusted for the best results on that engine. If the gasoline needle valve "E" should be changed, ½ to ¾ of turn open is about the usual position and after engine is running this can be changed for best results. After this is set it is not advisable to disturb the adjustment, as it will likely make starting difficult.

When starting an engine, when it is cold, it will need more gasoline. This may be supplied by pressing down priming pin "V" a few seconds and allowing a little gasoline to flow into intake pipes. The engine will quickly warm enough to run on the regular adjustment of gasoline valve "E."

SCHEFLER CARBURETOR

MODEL "D"



Model "D" Carburetor is adjusted by the following method:

Engine under load is slowed down by nearly closing throttle "P" and retarding spark. The gasoline valve "E" is closed until engine runs without missing.

When the engine is running slow, all the air taken through Carburetor goes through the fixed opening below valve "A," and to get the proper mixture gasoline is turned on at needle "E" to make the right proportion of gasoline vapour. This will allow engine being slowed down and yet to be perfectly reliable. When throttle is opened and spark advanced, engine increases speed and causes a greater suction on valve "D." This increased suction also opens valve "A" and allows a greater supply of air, and if spring "O" is at the proper tension engine will get a perfect mixture at high speed and also at slow speed.

If, on high speed, engine shows signs of not getting enough gasoline, tighten spring "O" by screwing in "M," or vice versa.

Flooding of Carburetor may be caused by dirt getting under valve "H." By pressing down priming pin "V" a few times, this may be dislodged.

A small hole is drilled in Carburetor below throttle to prevent an accumulation of gasoline in intake pipe.

It is recommended that a pan be placed under Carburetor to prevent any gasoline that might drip from Carburetor getting into bottom of boat. Gasoline leaks to the bottom of boat from piping or Carburetor should not be allowed for a moment.

IGNITION

The Jump Spark, which is the most popular system, consists of six important parts: the battery, switch, coil, timer, spark plug and connecting wires.

BATTERY

The battery should be so located in a boat that it will be kept dry, and so that it will be easily accessible. All connections should be securely made. An ammeter for testing the cells is a good investment. Each cell when new will test 15 to 20 amperes, and should not be used when exhausted below 8 or 9 amperes. Bear in mind that the least amount of tension on vibrator spring results in the least consumption of electric current and lengthens the life of battery.

SPARK COIL

This consists of an iron core, a high tension winding, a low tension winding, a vibrator and suitable binding posts for the connecting wires. The wiring diagrams in the back of the Instruction Book show the method of wiring. The coil should be located in a dry place.

In connection with the vibrator there is an adjustment for varying the tension on the vibrator. Increasing this tension gives a larger current consumption and a larger spark. Less tension means less current consumption and a weaker spark. It is better to adjust the vibrator for the least tension at which the coil will give a strong enough spark to operate the engine without missing. This will give longer life to the battery. A higher voltage and small current consumption is better for the coil than a low voltage and larger current consumption.

TIMER

The timer closes the circuit at the proper time for igniting the compressed charge of gasoline and air. A small cam within the timer body is attached to a rotating shaft by a taper set screw. By removing the set screw, the cam can be taken off. The end of the cam in rotating comes in contact with a steel roller closing the circuit.

The end of cam and roller should be kept clean. A little gas engine oil or a little vaseline may be used to lubricate them. A little gas engine oil should be used at intervals to lubricate the rotating timer shaft where it passes through the timer body. Be sure and keep the contacts clean.

Moving timer lever in direction of shaft rotation gives later ignition and vice versa. The timer bracket is slotted. A stud with nut, clamps it to timer shaft, holding timer in place.

SPARK PLUG

The spark plug screws into the head of the engine, the sparking points being inside the combustion chamber. The gap across the spark passes should be about $\frac{1}{32}$ in.

The excessive use of lubricating oil or gasoline will foul the inner end of spark plug, and short circuit it. It should be keep clean. A hood to protect the plug from rain or spray is a desirable feature. The high tension wire from coil is connected to the binding post on plug.

To test, remove the plug from cylinder, ground it on the engine and close the circuit. If in proper condition, a rapid succession of sparks should pass at the points.

CONNECTING WIRES

The larger wire with heavy insulation is to carry the high tension current from the coil to the spark plugs. The smaller wire is to carry the current from battery to coil and from coil to timer. All connections should be securely made and the wires so placed that they are not likely to be broken or damaged.

SWITCH

The switch is for opening or closing the circuit. It should be placed where it will be easily accessible.

MOTOR CONSTRUCTION

The motor is of the two cycle type. The cycle of operation is as follows:—The piston on its upward stroke causes a partial vacuum in the crank chamber. When near the top of the stroke it uncovers a port and a quantity of explosive mixture passes into the crank chamber. On the downward stroke of the piston this mixture is compressed. When the piston is at the lower part of its travel, it uncovers a port, allowing a quantity of the compressed mixture in the base to pass into the upper part of the cylinder. The piston on its upward stroke compresses the charge above it, and when the piston reaches the highest part of the stroke, the charge is ignited, the pressure increases, and the expansion of the gases on the downward stroke gives the power. When the piston nears the end of its downward stroke, it uncovers an exhaust port in the side of the cylinder and the burned gases pass out through the exhaust pipe. Meanwhile, a fresh charge has been drawn into the crank chamber and compressed, and as soon as the burned gases pass out of the cylinder, the fresh charge from the base passes through a port into the cylinder above the piston. This fresh charge is in turn compressed, exploded, expanded and exhausted, and the cycle is continuously repeated.

BY-PASS SCREEN

In type "G" engines, a gauze screen is placed in by-pass from base to cylinder, to prevent base explosions. This should be examined occasionally and cleaned with gasoline if necessary.

This may be removed by unscrewing plug in side of cylinder. Then screen may be drawn out.

OPERATING CONDITIONS

There are four important points that the operator must attend to in order to successfully run any gasoline motor.

1. See that the parts are properly lubricated and that the lubrication is automatic, positive and under control.

2. That a proper mixture of vapour is supplied to the cylinder and that this vapour is compressed.

3. That the compressed vapour is properly ignited.

4. That a sufficient quantity of water is pumped through the cylinder jacket to keep it cool enough for proper lubrication.

STARTING THE ENGINE

We will assume that the engine is properly installed in the boat; that the gasoline tank has a supply of fuel free from dirt and sediment; that the gasoline pipes have been properly flushed out and are not filled with dirt that will clog the carburetor; the oil cups and grease cups are full; the batteries are in good shape, properly placed and wired; the coil is in proper adjustment and the switch is in a convenient place; and that the propeller reverse lever is in the neutral position.

Turn the handle of the timer in the direction the timer shaft rotates until contact is not made until the crank reaches or just passes the upper centre, the direction of rotation of the engine being to the left, as looked at from fly wheel end.

Open valve in inlet to the water pump. Screw down the grease cups a little. Open feed on cylinder oilers so that each will feed 15 to 20 drops a minute. See that the gasoline is turned on. Set the throttle of the carburetor about two-thirds open. Press down priming pin "V" a few seconds to allow a little gasoline to flow into carburetor intake. Close the switch. Fill the priming cup and allow the gasoline to pass into the cylinder. Place the starter crank at the end of the shaft and turn engine over until a sharp explosion occurs at the priming cup. Close priming cup and turn the engine over quickly and it will start.

On multi-cylinder engines, prime each cylinder and proceed in the same way.

Advance the ignition and open the throttle on the carburetor to increase the speed of the engine.

In speeding up it is preferable to advance the ignition, and then increase the opening in the throttle of the carburetor.

In slowing down, it is usually best to partly close the throttle and then retard the ignition by moving the timer handle in direction of rotation of timer shaft.

HIGH TENSION MAGNETO

When engine is fitted with high tension magneto, the magneto is gear driven from the engine timer shaft and the regular timer is omitted. A control lever with link connection to the magneto provides a convenient means for retarding or advancing the time of ignition. On the type "E" or "G" engines, moving the top end of the control lever towards the fly wheel gives earlier ignition. Moving this lever in the opposite direction gives later ignition.

Two types of magnetos are used, the dual and the Independent.

With an engine fitted with the dual magneto, a battery, a dual coil and a timer on the magneto, make the starting operation practically the same as first described. After the engine is started, the switch on the dual coil is changed over to the magneto contact and the engine operates on magneto ignition.

With the Independent magneto no battery is used. The engine is primed, oiled, etc., in the usual manner. The control lever for the magneto is set for late ignition. The switch for grounding the magneto primary circuit is opened. The engine is turned **quickly** over the upper center and started. If turned slowly over the center, the engine is not likely to start as the spark will not have enough heat to fire the mixture. The spark from the magneto comes when the engine piston is near top center and whether the spark will be large or small depends on the speed. A quick motion over the top center gives the desired start.

For further information on magnetos with magneto wiring diagrams, see separate magneto instruction book.

MAKE AND BREAK IGNITION

On 2-cycle engines fitted with Make and Break ignition, an eccentric on engine shaft connects through an eccentric rod 29 (see page 36) and pin 30 to the extension 18 on the water pump plunger. Above the water pump plunger extension is located the Make and Break ignition body "1" which contains the insulated or fixed electrode 14, and the movable electrode 2. Attached to the movable electrode 2, by the clamp stud 6 is the arm 3.

In operation as the engine shaft turns the water pump plunger extension 18 moves up and down. As it moves up to the top end of the pawl 20 comes against the lower end of the drop rod 10 moving it up. This moves the end of the movable electrode arm 3 upwards and brings the ignitor contact points 4 together. These are inside the cylinder. Further upward movement of the rod 10 results in the nuts moving away from the arm 3. When the lower end of pawl 20 comes in contact with the spiral on timing stud 23, further upward movement results in the upper end of pawl 20 moving to the left and disengaging the drop rod 10. The drop rod moves rapidly down and the lower nut strikes the arm 3, resulting in a quick separation of the ignitor points. As the points on ignitor wear, a re-adjustment of the arm 3 on the movable electrode 2 may be necessary. It should be located as shown in the diagram when the ignitor contact points are $\frac{1}{16}$ in. apart. The timing lever 24 is used to vary the time of ignition. Moving it to the left gives earlier ignition. Moving it to the right gives later ignition.

See that ignitor parts are kept oiled and work freely. Keep contact points clean. Ignitor contact points should come together when the engine piston has made about 60% of its up stroke. With lever 24 to the right the ignitor should trip just before pawl 20 reaches the highest point in its travel. This is the late ignition. Wiring diagram is shown in the back of instruction book. With switch in the battery circuit closed, and one wire connected to the ignitor fixed electrode 14, and the other wire grounded on the engine a current should flow when the ignitor contact points are together and at no other time.

TO STOP THE ENGINE

Open the switch; close the oil cups and the valve in gasoline pipe. When Independent magneto is used close the switch to ground.

To start again within an hour or so, it is usually not necessary to use any gasoline in the priming cups, an explosive mixture having been left in the base of the engine when shutting down.

A little experience, remembering that a cold engine needs more gasoline and a warm engine less gasoline through the priming cups, will make starting very easy.

In cold weather we would recommend that a supply of warm air from the exhaust pipe be piped to the carburetor.

In the case of an engine having three or more cylinders, before stopping, if the engine is speeded up for a moment or so by opening throttle, and the switch thrown out, the engine can generally be started by throwing in the switch and moving the timer handle to late ignition and then advancing.

CAUTION:—The boat should never be cut loose until the motor is running, nor should the motor be stopped until the boat is secured to its moorings.

LOCATING TROUBLE

If, after a proper trial, the motor fails to start, first of all examine the spark. If the jump spark is used, disconnect the wire and take out the spark plug. Reconnect the wire and lay the plug on the top of the cylinder in such a position as to ground the metal part with the cylinder. Then turn the fly-wheel until a circuit is formed, when a spark should show between the points of the spark plug.

If make and break is used, test this by turning the engine over until the points or electrodes within the cylinder are brought into contact, then detach the wiring from the stationary electrodes and pass the end of the wire across its post and see if there is a spark. If the spark shows all right, turn the fly-wheel until the electrodes are separated and try again the same way. This time there should not be any spark.

If no spark occurs with the jump spark, look over the insulation wires and spark coil and see that the coil is vibrating. Examine the insulation of the plug and see that same is not cracked, also that the inside of plug is clean and points not over $\frac{1}{32}$ inch apart.

If no spark occurs with the make and break, look over the insulation wires and all connections, see that no wire is broken under the insulation and that connections are firmly made.

Ascertain if the battery is weak. When a motor stops and refuses to start, in ninety-nine cases out of every hundred the trouble will be found to be in the spark. In the case of dry cells, a weak battery will sometimes recuperate and show a good spark, but this will not last. This often puzzles the amateur as he will try the spark and apparently it will be all right, and on the other hand the motor will stop after making only a few revolutions. We would recommend an ammeter, which is the only satisfactory way of testing the condition of a dry cell battery.

Never add new battery cells to an old set of batteries to strengthen them, as one old weak cell will bring down the new ones to its strength or voltage.

If the spark and ignition are not at fault, then look into the mixture. This may be either too rich or too poor in gasoline. A mixture that is too rich will cause a smoky exhaust, resulting in fouling the cylinder, electrodes and valves. A mixture that is too poor will not ignite regularly and there is apt to be slow firing, which is one of the causes of back firing.

Commercial gasoline frequently contains water. Always strain through a chamois leather, which will prevent either dirt or water going into the tank.

If neither the mixture nor the ignition is at fault look to the compression of the cylinder. If the cylinder leaks or loses its compression through a leak, it will result in a loss of power and may cause the motor to stop. A two cycle motor may leak past the piston if the rings become fouled or worn or it may leak at the spark plug or in the base, any of which will cause a loss of compression.

It will sometimes happen that the flow of gasoline to the carburetor is interrupted by not having a proper vent in the

tank. If this has not been provided for, it will be sufficient to unscrew the filler plug slightly at intervals.

CARE OF ENGINE DURING WINTER

Gasoline engines often suffer from neglect during the winter months when their services are no longer required. They rust and corrode, when an hour put in as the launch is hauled out would leave the engine in such condition that in the spring, wiping off with a cloth would remove all traces of the winter's idleness. As soon as cool weather sets in, the water should be drained off the engine each time it is used, so that there will be nothing to freeze and crack the cylinder. When launch is hauled out and engine is still in position, give it about a minute's run with plenty of lubricating oil, and with water connections broken and cocks open. This will dry out any water that may remain. Next coat all parts except the brass work with grease or oil—the ordinary lubricating oil will do. Wipe all brass clean and dry. Remove oil, spark plugs and dry cells from the launch and store in a dry place.

With these slight precautions, Spring will find the engine in excellent condition.

After a year's running there are usually some slight repairs or adjustments to be made, or some changes that would give a more satisfactory running, in which case ship the engine to us, and we will have it overhauled by our experts and carefully adjusted, and advise you of any changes which we think would make a better running engine.

TO CALCULATE SPEED OF BOAT

To find the speed of a boat over a course of known length, the following formula will be found useful:—

A equals length of course.

B equals minutes in one hour.

C equals minutes required to run the course.

Then A times B divided by C equals rate of speed per hour. For example, it is $2\frac{1}{4}$ miles from your dock to a given point,

and the boat makes the run in 8 minutes 45 seconds. What is the rate of speed per hour?

A equals 2¼ miles, 2.25.

B equals minutes in hour.

C equals run in minutes, 8.75.

2.25 times 60 equals 135.00, divided by 8.75, equals 15.43 (speed per hour).

CONCLUSION AND FINAL ADMONITION

In conclusion, we wish to say that a little good judgment, care and thoughtfulness on the part of the operator will do more to keep the motor in good working order than a book full of instructions. We do not claim that our motor will run itself, or keep forever in repair without attention.

It requires judgment, patience, and mechanical ability to run any piece of machinery. It is of great importance that the owners of motors should personally understand them thoroughly and be qualified to operate them without having to depend on an engineer entirely.

The motor should be kept perfectly clean, as nothing adds more to the looks and running qualities of a motor than cleanliness.

We wish also to say to the purchasers and operators of our motors that success in producing good results would be to a mutual extent dependent, not only on the ability and accuracy of the motor, but also on care and attention exercised in the setting of the same in general, and in its several parts, as a motor, no matter how perfect, will do more or less work, good or bad, in proportion to the skill expended in setting and operating the same.

"DONT'S."

Don't try to start the motor with any load on.

Don't try to start the motor with the switch off.

Don't try to start the motor without opening the gasoline valves.

Don't try to run with worn out batteries.

Don't try to run with soot-fouled spark plugs.

Don't crank your head off—look for the cause.

Don't cast off until you have the motor running.

Don't stop the engine until the boat is secured to its moorings.

Don't forget to open the lubricators when the motor is started.

Don't forget to close the lubricators when the motor is stopped.

Don't forget to see that the pump is working.

Don't let the base of the motor get out of oil.

Don't get too much oil in the base of motor.

Don't forget to oil the motor frequently.

Don't use anything but gasoline cylinder oil in the motor.

Don't use more gasoline than the motor requires.

Don't forget to drain the motor in cold weather.

Don't forget to strain the gasoline when filling the tank.

Don't let batteries get wet.

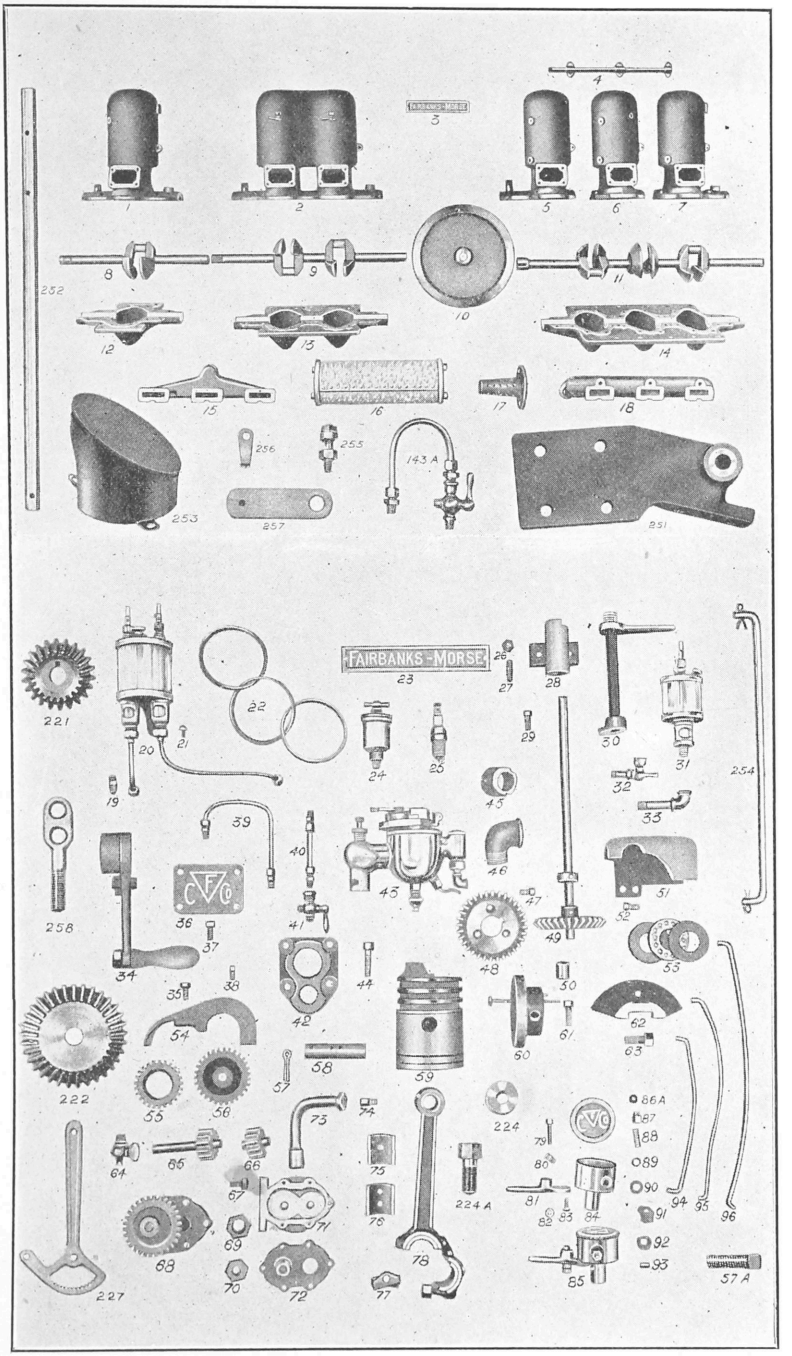
Don't let bare wire come in contact with the motor.

Don't let wires run through bilge water.

Don't let wire connections and terminals get loose.

Don't forget that eighty-five per cent. of motor failures can be traced to electric trouble; either in the battery or the coil, or the wiring, or the plugs.

TYPE "E" ENGINE REPAIR PARTS.



Sizes: 3½-7-10 H.P.

(See next page for name of part)

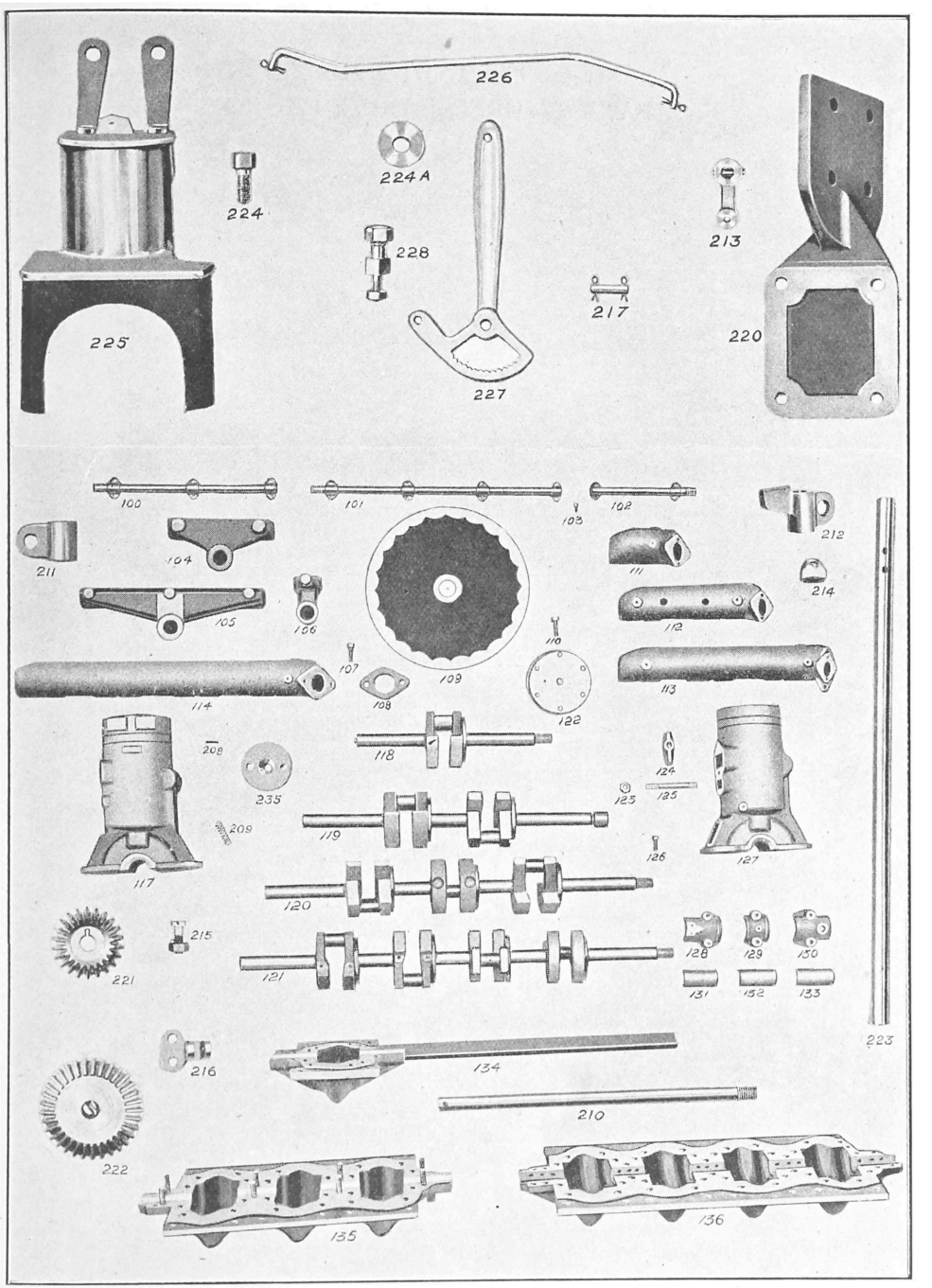
NAME OF PARTS TYPE " E "

FAIRBANKS-MORSE MARINE ENGINES

No.	NAME
1.	Engine Base, 1 cyl.
2.	Engine Base, 2 cyl.
3.	Name Plate.
4.	Water pipe, 3 cyl.
5.	Aft. Cyl. of 3 cyl. "E".
6.	Middle Cyl. of 3 cyl. "E".
7.	Forward Cyl. of 3 cyl. "E".
8.	Crank Shaft for 1 cyl. "E".
9.	Crank Shaft for 2 cyl. "E".
10.	Fly-wheel.
11.	Crank Shaft for 3 cyl. "E".
12.	Lower half of base 1 cyl.
13.	Lower half of base 2 cyl.
14.	Lower half of base 3 cyl.
15.	Intake pipe for 3 cyl.
16.	Muffler for type "E" Engines.
17.	Muffler end piece.
18.	Exhaust pipe for 3 cyl. "E".
19.	Union and connection.
20.	Lavigne Oiler for 2 cyl. "E".
21.	Screw for Oiler.
22.	Piston Rings.
23.	Name Plate.
24.	Grease Cup.
25.	Spark Plug.
26.	Timer Bracket stud nut.
27.	Timer Bracket .
28.	Timer Bracket.
29.	Cam Screw.
30.	Carburetor control.
31.	Lavigne Oiler for 1 cyl. "E".
32.	Priming Cup.
33.	Oiler pipe for one cylinder.
34.	Starter crank.
35.	Gear shield stud and nut.
36.	Hand Hole Plate.
37.	Hand Hole Plate Cap Screw.
38.	Set Screw for water pump gear.
39.	Water connection to exhaust 2 cyl.
40.	Water connection to exhaust 1 cyl.
41.	Water connection exhaust valve.
42.	Exhaust and intake flange.
43.	Schebler Carburetor.
44.	Exhaust and intake pipe flange cap screw.
45.	Fly-wheel Nut.
46.	Intake Pipe 1 cyl.
47.	Bevel Gear on crankshaft screw.
48.	Bevel Gear on crankshaft.
49.	Timer shaft with bevel gear and collar.
50.	Timer shaft bushing.
51.	Timer gear shield.
52.	Timer gear shield screws.
53.	Thrust bearing complete.
54.	Gear shield for water pump.
55.	Water pump pinion on crankshaft.
56.	Water pump gear, on pump.

No.	NAME
57A.	Piston pin set screw.
58.	Piston pin.
59.	Piston.
60.	Half Coupling, Engine end.
61.	Coupling cap screw.
62.	Crankshaft counterweight.
63.	Counterweight bolt.
64.	Drain cock for cylinder.
65.	Water pump long shaft with gear.
66.	Water pump short shaft with gear.
67.	Water pump stud with nut.
68.	Water pump complete.
69.	Water pump packing nut locknut.
70.	Water pump packing nut.
71.	Water pump body.
72.	Water pump side plate.
73.	Water pump pipe.
74.	Water pipe screw.
75.	B'tm liner for crank end connecting rod
76.	Top liner for crank end connecting rod
77.	Shims for crank pin bearing.
78.	Connecting Rod complete.
79.	Push Button switch.
80.	Spring for push button switch.
81.	Timer lever.
82.	Push button insulator.
83.	Timer lever screws.
84.	Timer Body.
85.	Timer complete.
86A.	Timer terminal nut.
87.	Cap for insulated sleeve.
88.	Contact ball spring.
89.	Insulating washer, small.
90.	Insulating washer, large.
91.	Insulated sleeve on timer.
92.	Timer contact cam.
93.	Contact roller pin.
94.	Carburetor control link 1 cyl.
95.	Carburetor control link 2 cyl.
96.	Carburetor control link 3 cyl.
143A.	Water fitting 3 cyl. "E".
251.	Magneto bracket with bushing.
224.	Magneto bracket distance collar.
221.	Magneto gear.
222.	Magneto drive shaft gear with taper pin.
252.	Magneto drive shaft.
253.	Magneto gear cover.
254.	Magneto control link with cotters
227.	Magneto control lever.
255.	Magneto control fulcrum stud with nuts.
256.	Magneto control lever lock spring.
257.	Magneto fulcrum stud support on 2 cyl. "E".
258.	Magneto H.T. wire support 3 cyl. "E"
224A.	Magneto to bracket screw.

TYPE "G" ENGINE REPAIR PARTS



Sizes: 6-12-18-24 H.P.

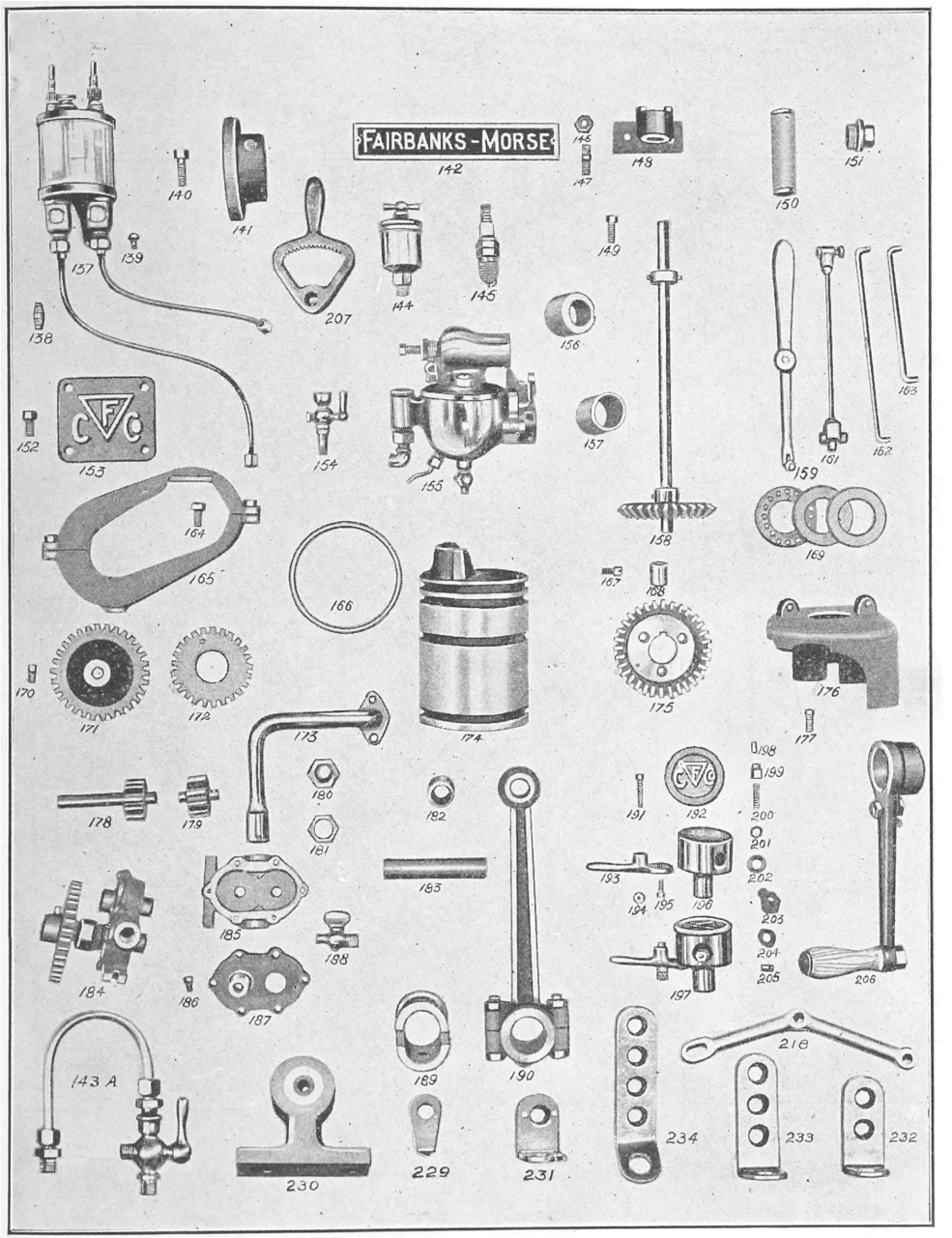
(See page 22 for name of part)

NAME OF PARTS OF TYPE " G "
FAIRBANKS-MORSE MARINE ENGINES

No.	NAME
100.	Water Pipe 3 cyl. "G"
101.	Water Pipe 4 cyl. "G"
102.	Water Pipe 2 cyl. "G"
103.	Water pipe screw
104.	Intake pipe for 2 and 4 cyl. "G"
105.	Intake pipe for 3 cyl. "G"
106.	Intake pipe for 1 cyl. "G"
107.	Flange to exhaust pipe cap screw
108.	Exhaust pipe flange
109.	Fly-wheel
110.	Cyl. Head screw
111.	Exhaust pipe 1 cyl. "G"
112.	Exhaust pipe 2 cyl. "G"
113.	Exhaust pipe 3 cyl. "G"
114.	Exhaust pipe 4 cyl. "G"
117.	Cylinder, aft end
118.	Crankshaft for 1 cyl. "G"
119.	Crankshaft for 2 cyl. "G"
120.	Crankshaft for 3 cyl. "G"
121.	Crankshaft for 4 cyl. "G"
122.	Cylinder Head
123.	Nut for exhaust clamp
124.	Exhaust and air pipe clamp
125.	Exhaust and air pipe clamp to cyl. stud.
126.	Hand hole plate screw
127.	Cylinder forward
128.	Forward end crank shaft bearing cap.
129.	Middle cap on 2-3-4 cyl. "G"
130.	Aft end cap
131.	Forward end cap liner
132.	Middle cap liner
133.	Aft end cap liner
134.	Base for 1 cyl. "G"
135.	Base for 3 cyl. "G"
136.	Base for 4 cyl. "G"
137	Lavigne, 2 feed Oiler for 1 cyl. "G"
138.	Pipe end connection for oil tube
139.	Oiler screw to cylinder
140.	Coupling screw
141.	Coupling, Engine half
142.	Name plate
143A.	Exhaust pipe water fitting
144.	Grease cup
145.	Spark plug
146.	Nut for timer bracket stud
147.	Timer Bracket Stud
148.	Timer Bracket
149.	Timer cam lock screw
150.	By-pass screen
151.	By-pass plug
152.	Hand hole plate screws
153.	Hand hole plate
154.	Priming cup
155.	Schebler Carburetor
156.	Flywheel Nut
157.	Carburetor Nipple
158.	Timer shaft with bevel gear and collar
159.	Carburetor control lever 1 cyl. "G"
161.	Carburetor connecting rod 4 cyl.
162.	Carburetor control rod for 3 cyl. "G"
163.	Carburetor control rod for 2-4 cyl. "G"
164.	Gear shield to base screw
165.	Water pump gear shield
166.	Piston Ring
167.	Bevel gear on crankshaft screw
168.	Timer shaft bushing in screw base
169.	Thrust collar
170.	Water pump gear set screw
171.	Water pump gear on pump shaft
172.	Water pump gear on crankshaft

No.	NAME
173.	Water pump pipe 1 cyl.
174.	Piston
175.	Timer Bevel gear on crankshaft
176.	Timer gear shield
177.	Timer gear shield to base screw
178.	Water pump gear and long shaft
179.	Water pump gear and short shaft
180.	Water pump packing nut
181.	Water pump packing locknut
182.	Connecting rod bushing piston end
183.	Piston Pin
184.	Water pump, complete
185.	Water pump body
186.	Water pump body to side plate screw.
187.	Water pump body side plate
188.	Drain cock
189.	Connecting rod bushing
190.	Connecting rod
191.	Push button switch for 1 cyl. "G"
192.	Timer body cover
193.	Timer lever
194.	Push button switch insulator
195.	Time lever screw
196.	Timer body
197.	Timer complete
86A.	Timer terminal nut
199.	Timer cap for insulated sleeve
200.	Contact Ball Spring
201.	Timer locknut for insulated sleeve
202.	Insulating washer
203.	Timer insulated sleeve
204.	Timer contact cam
205.	Contact roller pin
206.	Starter crank
207.	Carburetor control lever
208.	Carburetor control lever lockpin
209.	Carburetor control lever lockpin spring
210.	Carburetor control lever shaft
211.	Carburetor control lever shaft top bracket
212.	Carburetor control lever shaft lower bracket
213.	Carburetor control lever shaft rocker with taper pin
214.	Carburetor control lever shaft nut
215.	Carburetor control lever shaft rocker pin with nut
216.	Carburetor control lever fulcrum bracket
217.	Carburetor control lever fulcrum pin with cotter
218.	Carburetor control lever fulcrum arm
220.	Magneto bracket
221.	Gear on magneto
222	Gear on driving shaft with pin
223.	Gear driving shaft
224	Magneto distance collar
224A.	Magneto bracket screw
225.	Magneto gear cover
226.	Magneto control link
227.	Magneto control lever
228.	Magneto control lever fulcrum stud with nuts
229.	Magneto control lever lock spring
230.	Bracket at top of gear driving shaft
231.	H.T. wire support for one wire
232.	H.T. wire support for two wires
233.	H.T. wire support for three wires
234.	H.T. wire support for four wires
235.	Gear driving shaft bracket.

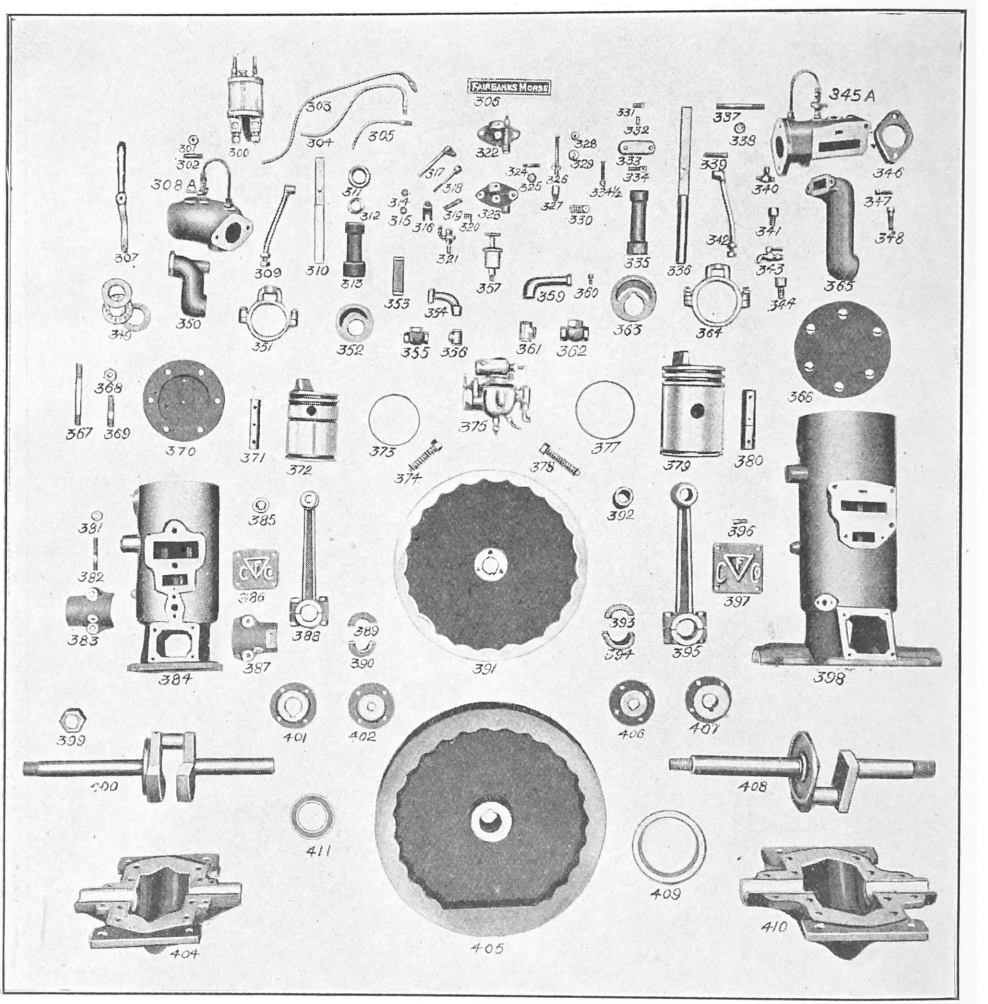
TYPE "G" ENGINE PARTS—Continued



Sizes: 6-12-18-24 H.P.

(See page 22 for name of part)

TYPE " M " ENGINE REPAIR PARTS



Sizes : 4-6 H.P.

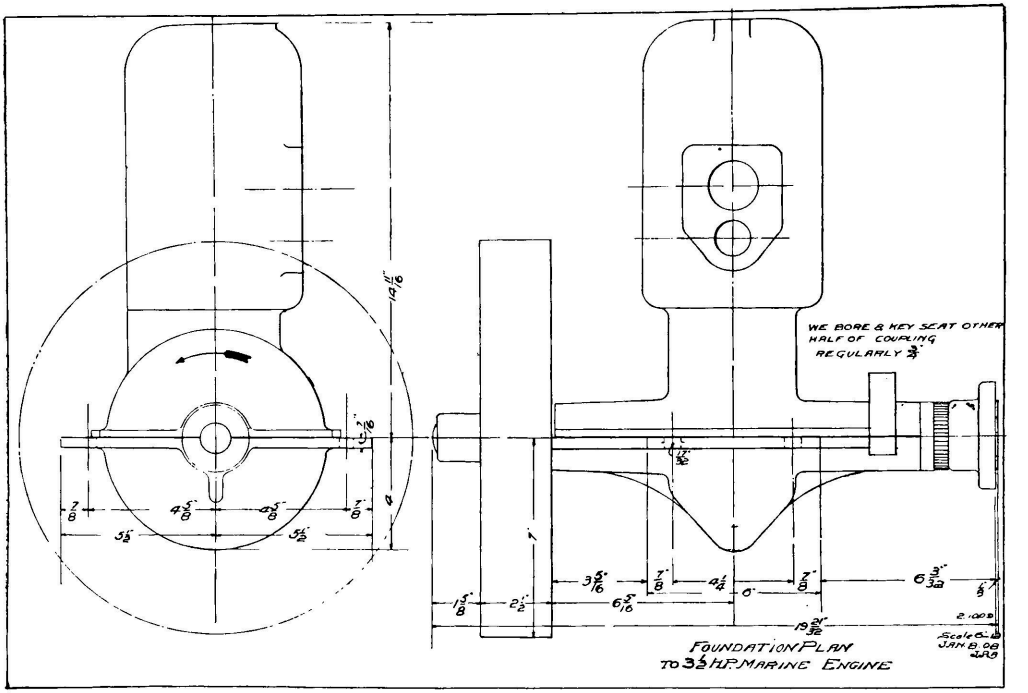
(See next page for name of part)

NAME OF PARTS OF TYPE " M "

FAIRBANKS-MORSE MARINE ENGINE

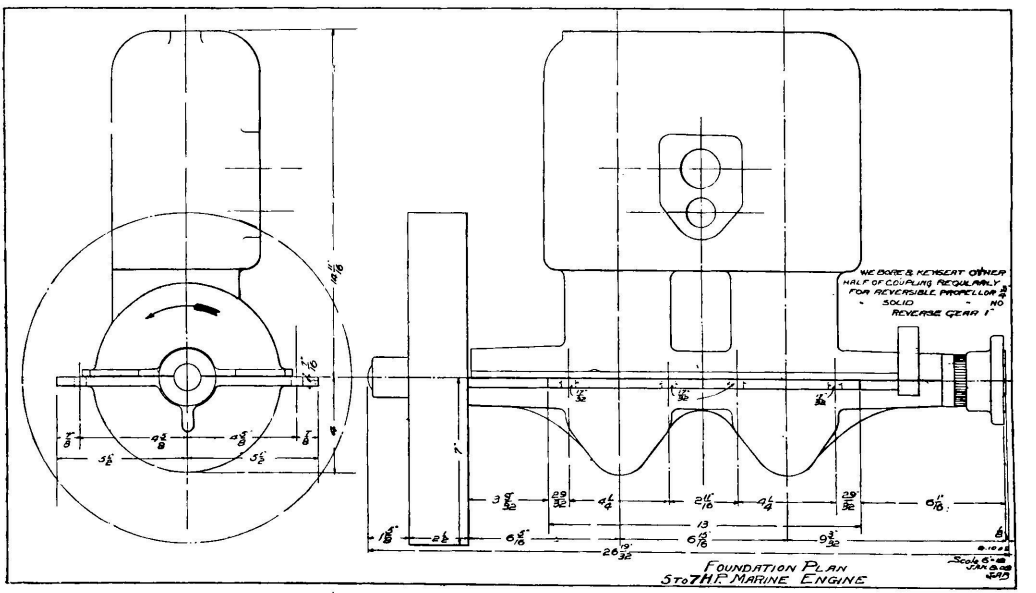
No.	NAME
300.	Lavigne 2 feed oiler
301.	Carburetor control stud nut
302.	Carburetor control stud
303.	Oiler to base tubing, 6 H.P.
304.	Oiler to base tubing, 4 H.P.
305.	Oiler to cyl
306.	Name plate
307.	Carburetor control lever 4 H.P.
308A.	Exhaust pipe, 4 H.P.
309.	Eccentric Rod
310.	Water pump plunger and extension
311.	Water pump packing nut
312.	Water pump gland
313.	Water pump, 4 H.P.
314.	Igniter arm nut
315.	Igniter arm washer
316.	Igniter movable electrode arm
317.	Movable electrode
318.	Fixed electrode
319.	Igniter drop rod spring
320.	Igniter movable electrode spring
321.	Priming Cup
322.	Igniter complete
323.	Igniter body
324.	Igniter Stud
325.	Igniter Stud nut
326.	Drop rod
327.	Drop rod guide
328.	Drop rod nut
329.	Drop rod washer
330.	Insulator (Ignitor)
331.	Timing lever lock spring
332.	Timing lever lock pin
333.	Guide for plunger extensions
334.	Timing stud lever
334½.	Timing stud
335.	Water pump, 6 H.P.
336.	Water pump plunger and extension
337.	Exhaust pipe stud
338.	Exhaust pipe stud nut
339.	Eccentric rod pin
340.	Drain cock for water pipe
341.	Water pump to base screw
342.	Eccentric rod
343.	Cylinder relief cock
344.	Cylinder head stud and nut
345A.	Exhaust pipe, 6 H.P.
346.	Exhaust pipe flange
347.	Intake pipe to cyl. screw
348.	Exhaust flange screw
349.	Thrust collar complete
350.	Air intake pipe for 4 H.P.
351.	Eccentric strap, 4 H.P.
352.	Eccentric, 4 H.P.
353.	By-pass screen, 4 H.P.
354.	Water pump pipe, 4 H.P.
355.	Water pump check valve, 4 H.P.
356.	Water pump tee, 4 H.P.

No.	NAME
357.	Grease cup
359.	Water pump pipe, 6 H.P.
360.	Water pump pipe screw
361.	Water pump tee, 6 H.P.
362.	Water pump check valve, 6 H.P.
363.	Eccentric, 6 H.P.
364.	Eccentric straps, 6 H.P.
365.	Intake pipe, 6 H.P.
366.	Cylinder head, 6 H.P.
367.	Exhaust pipe clamp studs, 4 H.P.
368.	Cyl. head stud nut, 4 H.P.
369.	Cyl. head stud, 4 H.P.
370.	Cyl. head, 4 H.P.
371.	Piston Pin
372.	Piston, 4 H.P.
373.	Piston ring, 4 H.P.
374.	Starter handle with spring, 4 H.P.
375.	Schebler Carburetor
377.	Piston ring, 6 H.P.
378.	Starter handle with spring, 6 H.P.
379.	Piston, 6 H.P.
380.	Piston pin, 6 H.P.
381.	Nut for stud in bearing cap, 4 H.P.
382.	Stud in bearing cap, 4 H.P.
383.	Bearing cap, aft end, 4 H.P.
384.	Cylinder, 4 H.P.
385.	Connecting rod bushing piston end, 4 H.P.
386.	Hand hole plate, 4 H.P.
387.	Bearing cap, forward end, 4 H.P.
388.	Connecting Rod, 4 H.P.
389.	Upper half of bushing in connecting rod, 4 H.P.
390.	Lower half of bushing in connecting rod, 4 H.P.
391.	Fly-wheel, 4 H.P.
392.	Connecting rod bushing piston end, 6 H.P.
393.	Upper half of bushing in connecting rod, 6 H.P.
394.	Lower half of bushing in connecting rod, 6 H.P.
395.	Connecting rod, 6 H.P.
396.	Hand hole plate cap screw
397.	Hand hole plate
398.	Cylinder, 6 H.P.
399.	Crankshaft nut, 4 H.P.
400.	Crankshaft, 4 H.P.
401.	Coupling Engine half, 4 H.P.
402.	Coupling propeller half, 4 H.P.
404.	Base, 4 H.P.
405.	Fly-wheel, 6 H.P.
406.	Coupling propeller half, 6 H.P.
407.	Coupling, Engine half, 6 H.P.
408.	Crankshaft, 6 H.P.
409.	Oil ring, 6 H.P.
410.	Base, 6 H.P.
411.	Copper asbestos gasket for ignitor



Foundation Plan. Single Cylinder Solid Head Engine

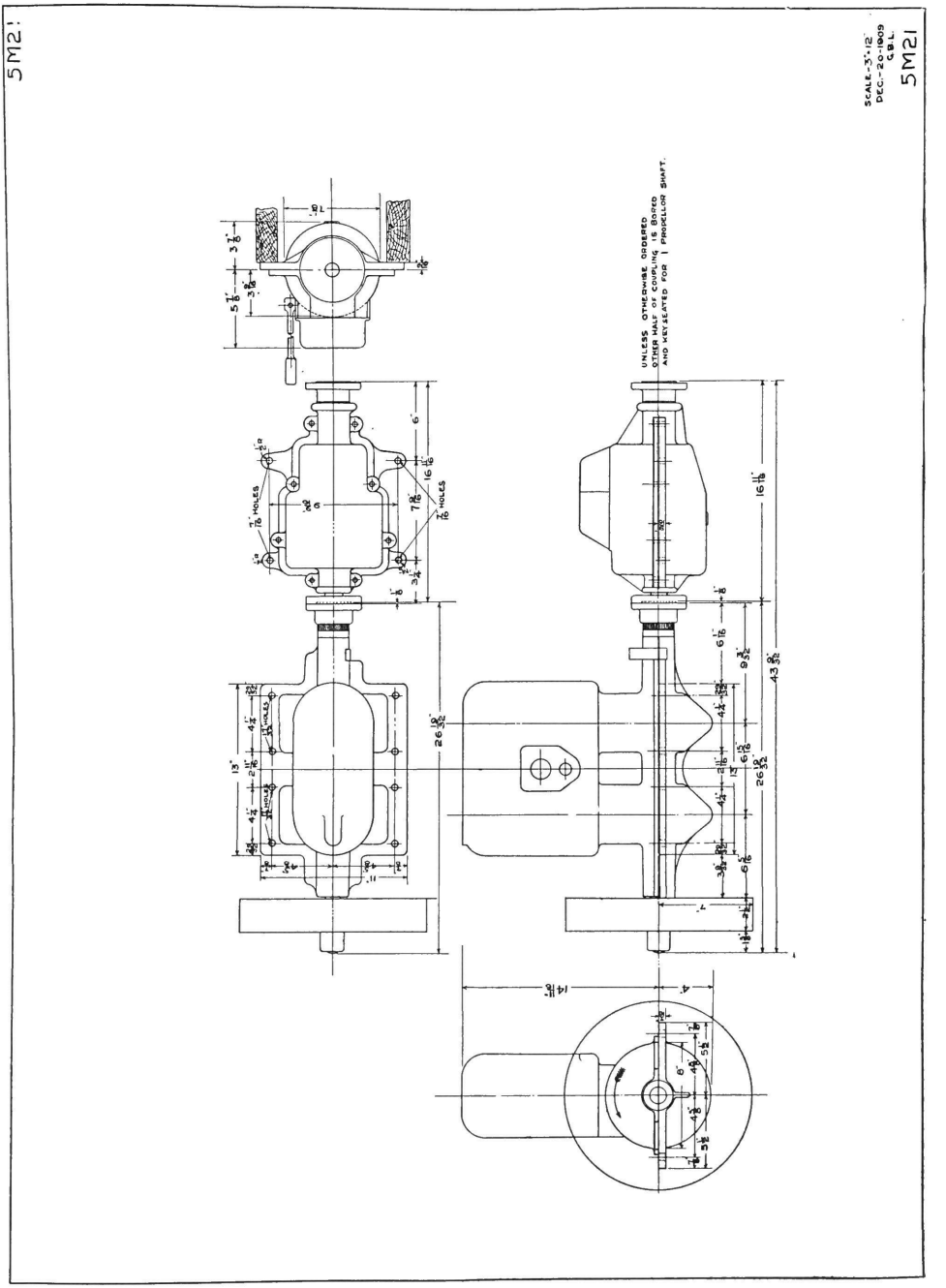
TYPE "E"—3½ H.P.



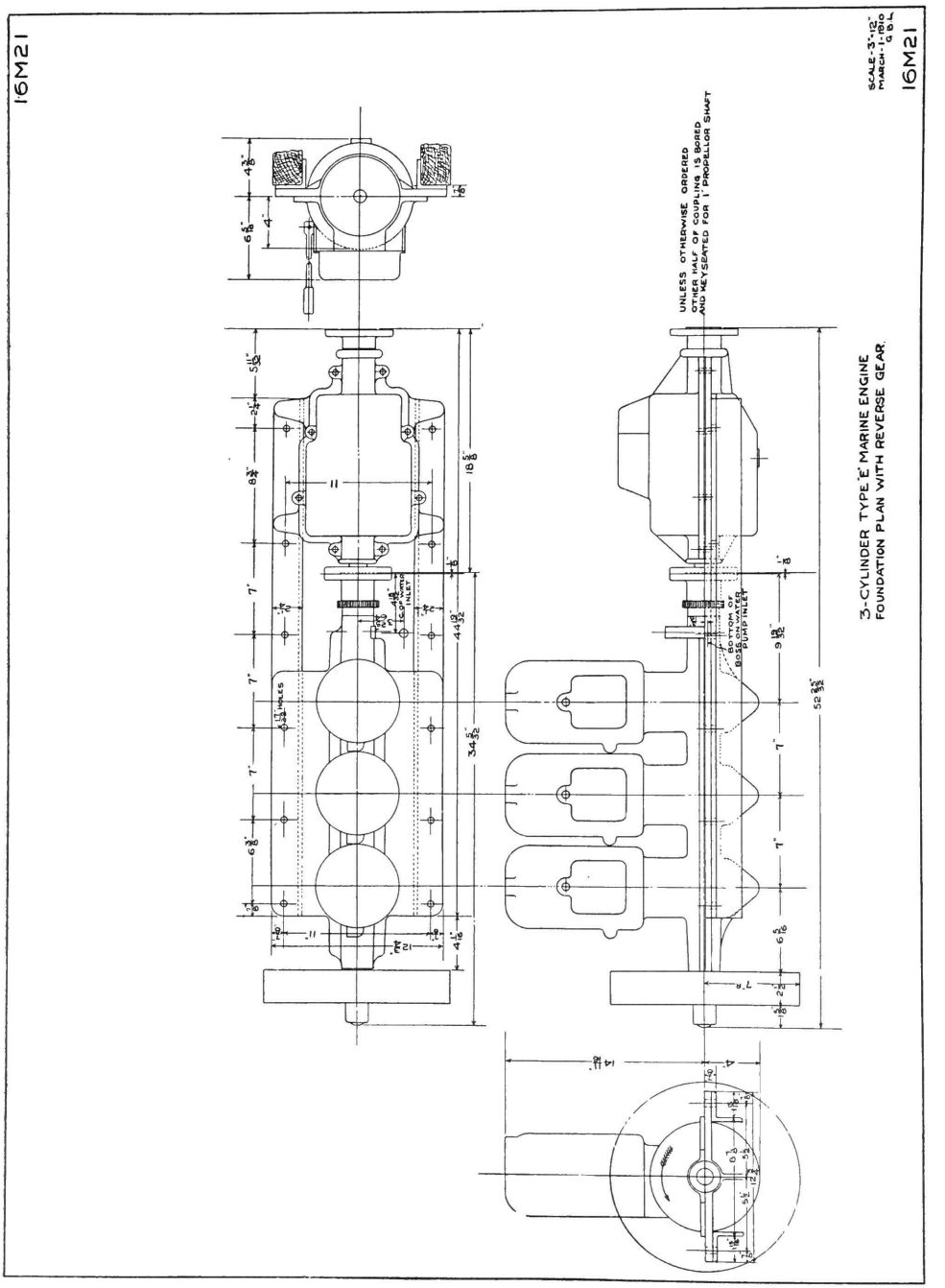
Foundation Plan. Double Cylinder Solid Head Engine

TYPE "E"—7 H.P.

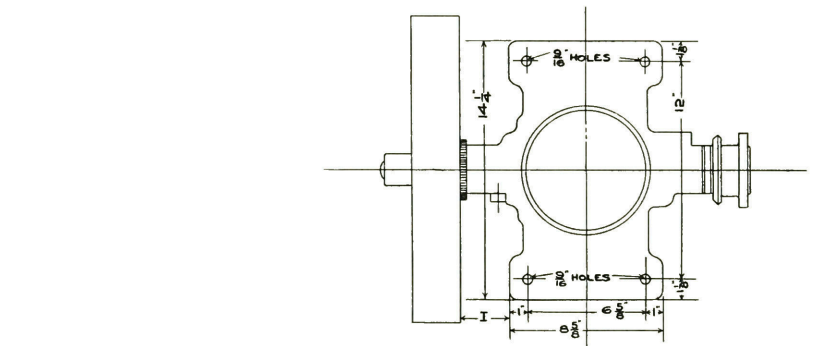
Foundation Plan
2 CYLINDER—TYPE "E"—7 H.P.
Fitted with Baldridge Reverse Gear



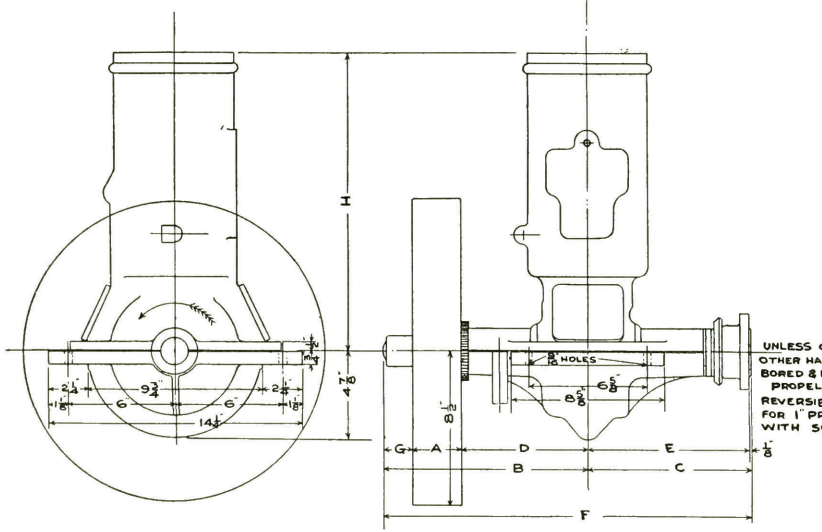
Foundation Plan
3 CYLINDER—TYPE "E"—10 H.P.
Fitted with Baldridge Reverse Gear



Foundation Plan
1 CYLINDER—TYPE "G"—6 H.P.



TYPE OF ENGINE	A	B	C	D	E	F	G	H	I
TYPE G	2 3/4"	11 1/2"	9 5/32"	7 5/8"	9 1/32"	20 21/32"	1 5/8"	16 9/16"	2 5/16"



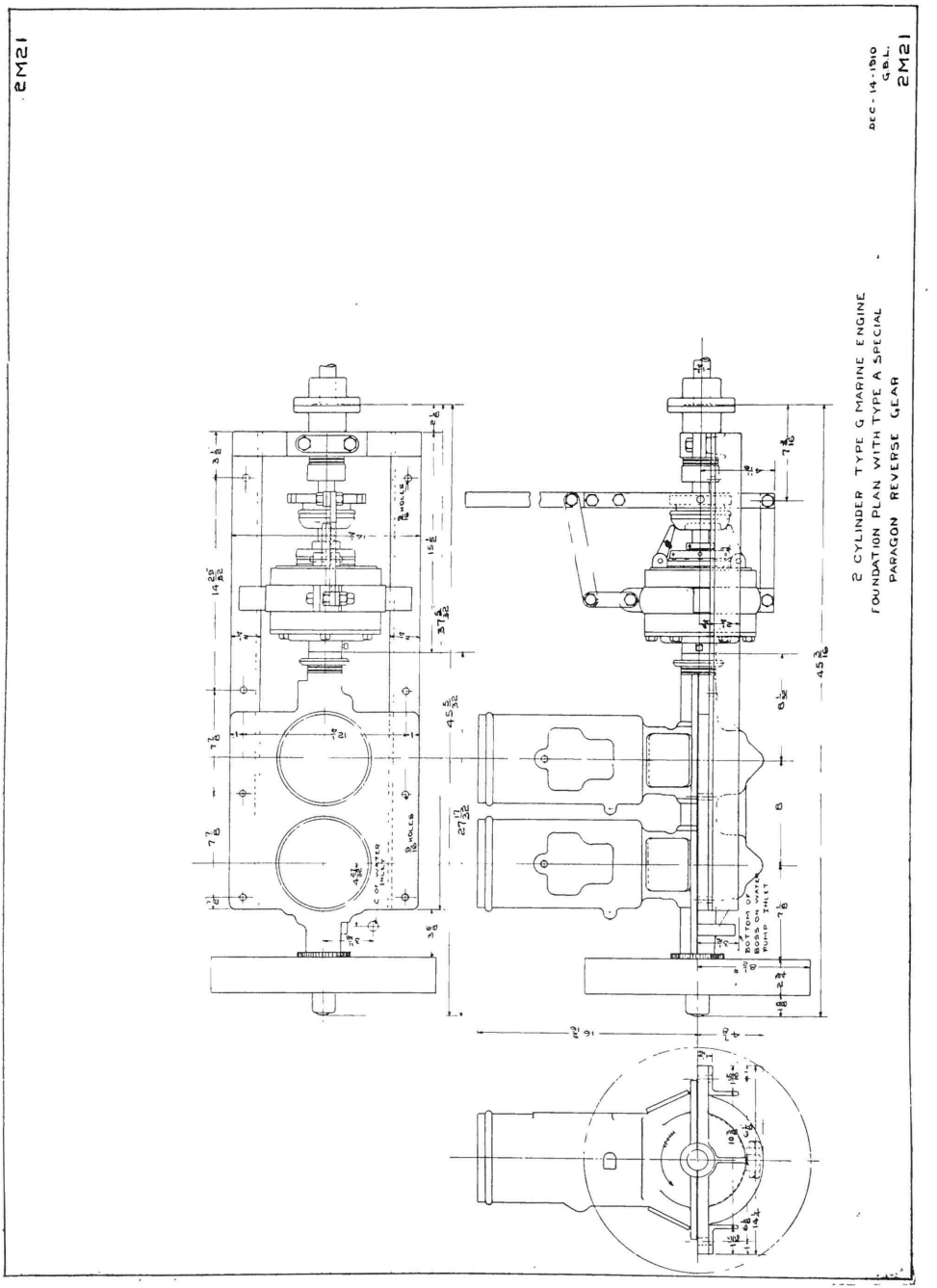
UNLESS OTHERWISE ORDERED OTHER HALF OF COUPLING BORED & KEYSEATED FOR 1 5/16" PROPELLOR SHAFT WITH REVERSIBLE PROPELLOR AND FOR 1" PROPELLOR SHAFT WITH SOLID PROPELLOR

FOUNDATION PLAN-ONE CYLINDER
TYPES G&M MARINE ENGINES

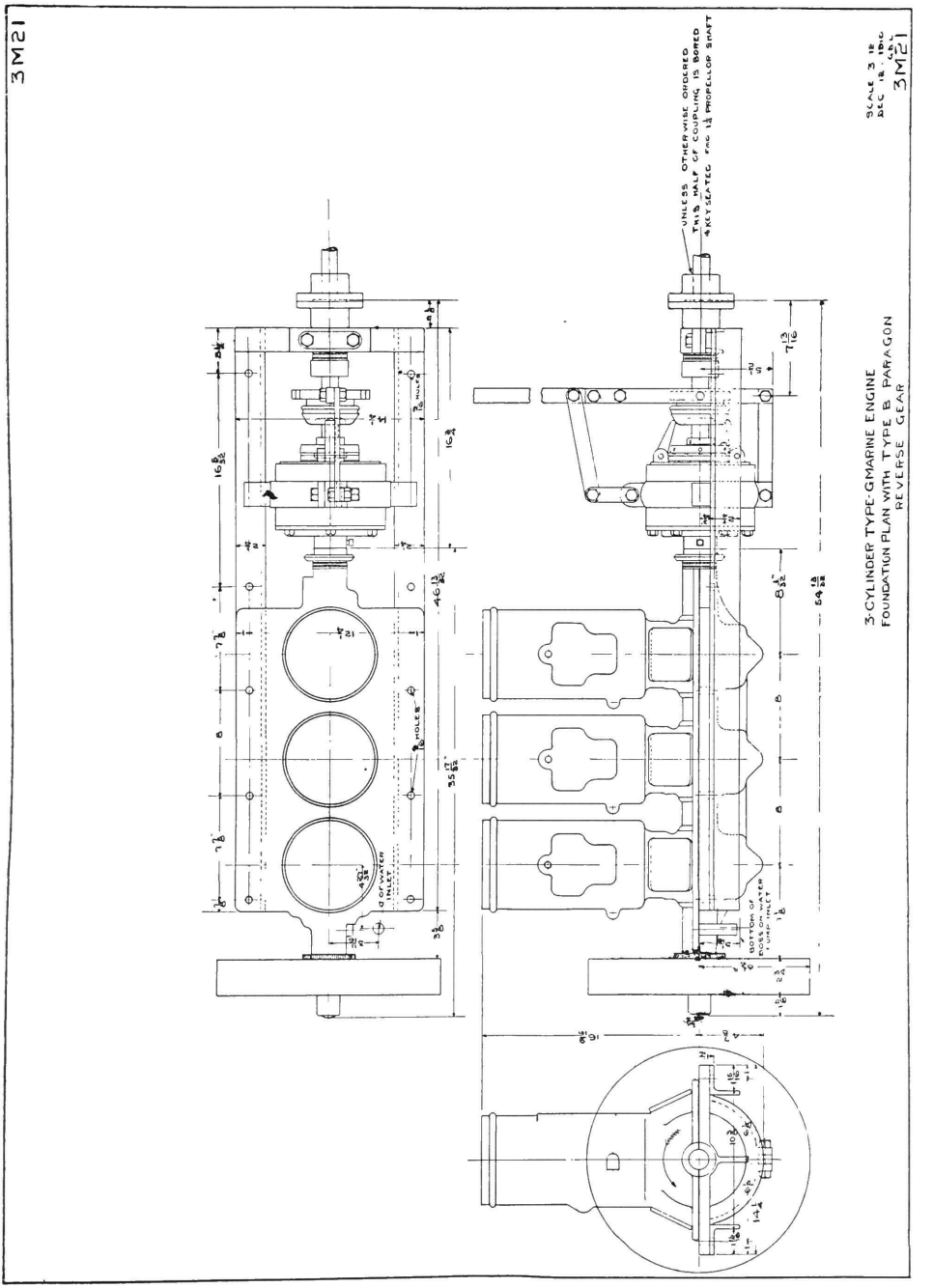
SCALE - 3"=12"
MARCH-23-10
G.B.L

M21

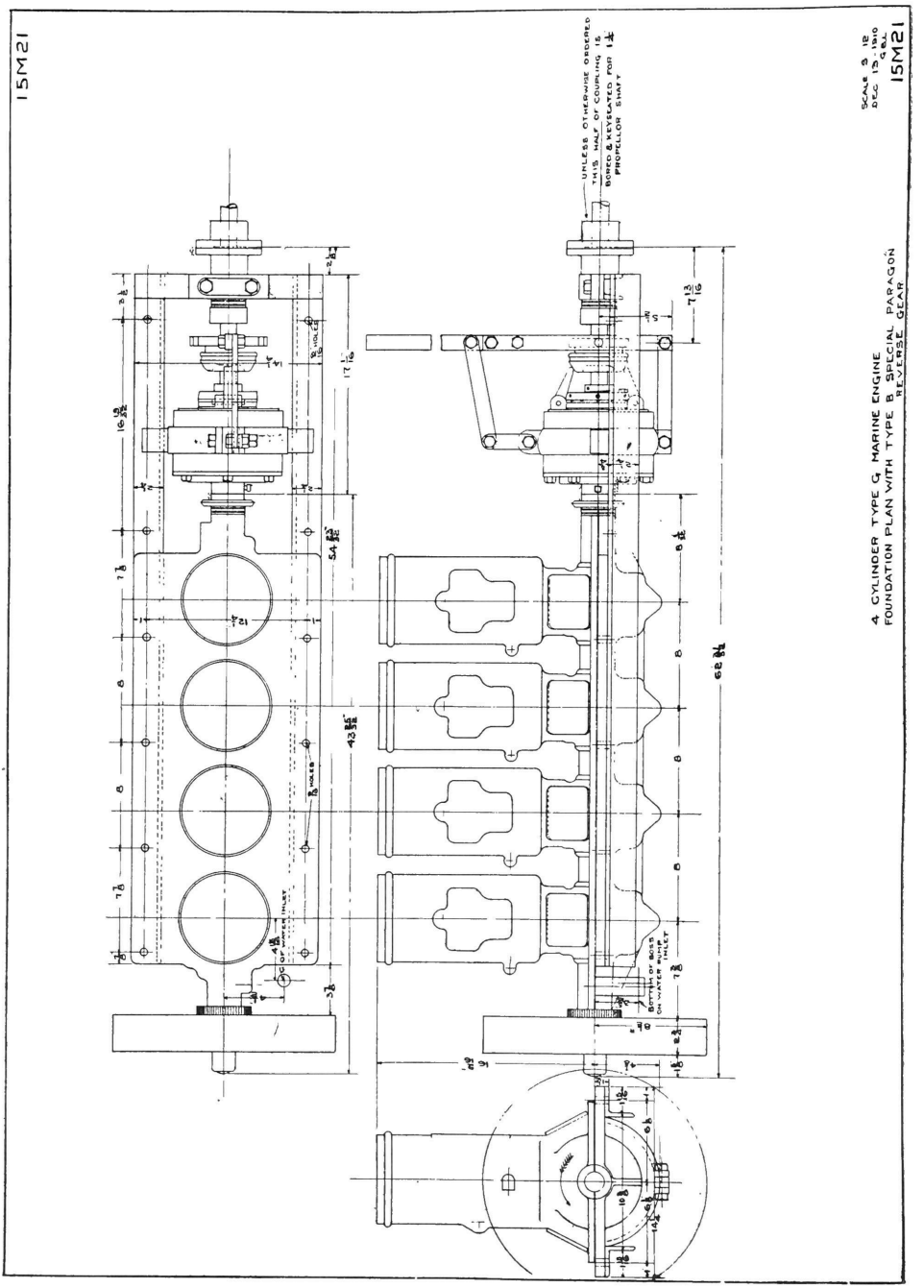
Foundation Plan
2 CYLINDER—TYPE "G"—12 H.P.
Fitted with Paragon Reverse Gear



Foundation Plan
3 CYLINDER—TYPE " G "—18 H.P.
Fitted with Paragon Reverse Gear

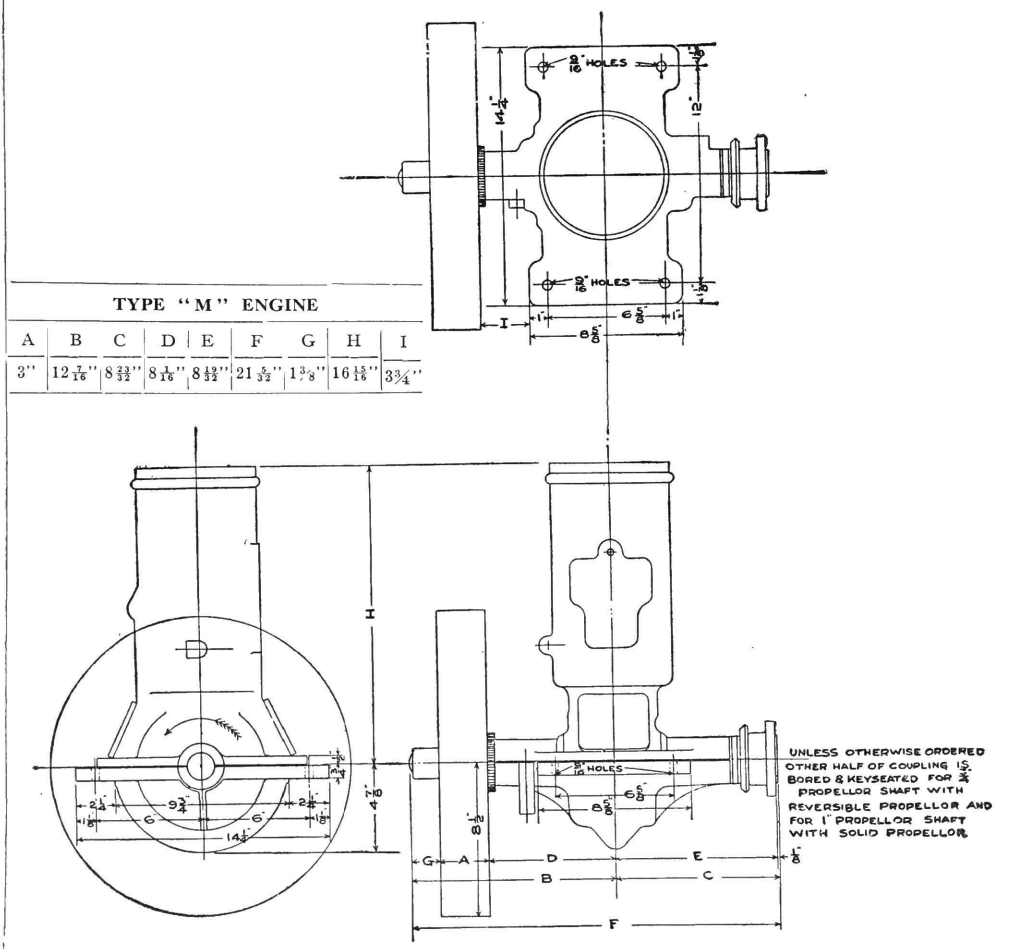


Foundation Plan
4 CYLINDER—TYPE "G"—24 H.P.
Fitted with Paragon Reverse Gear



Foundation Plan

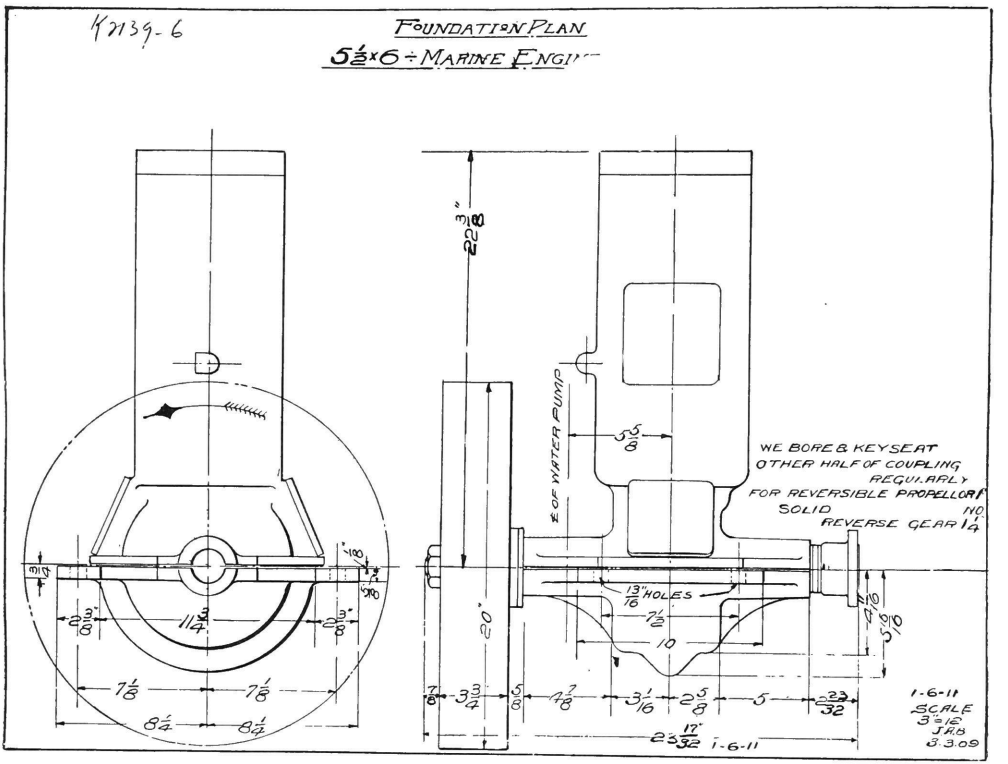
1 CYLINDER—TYPE " M "—4 H.P.



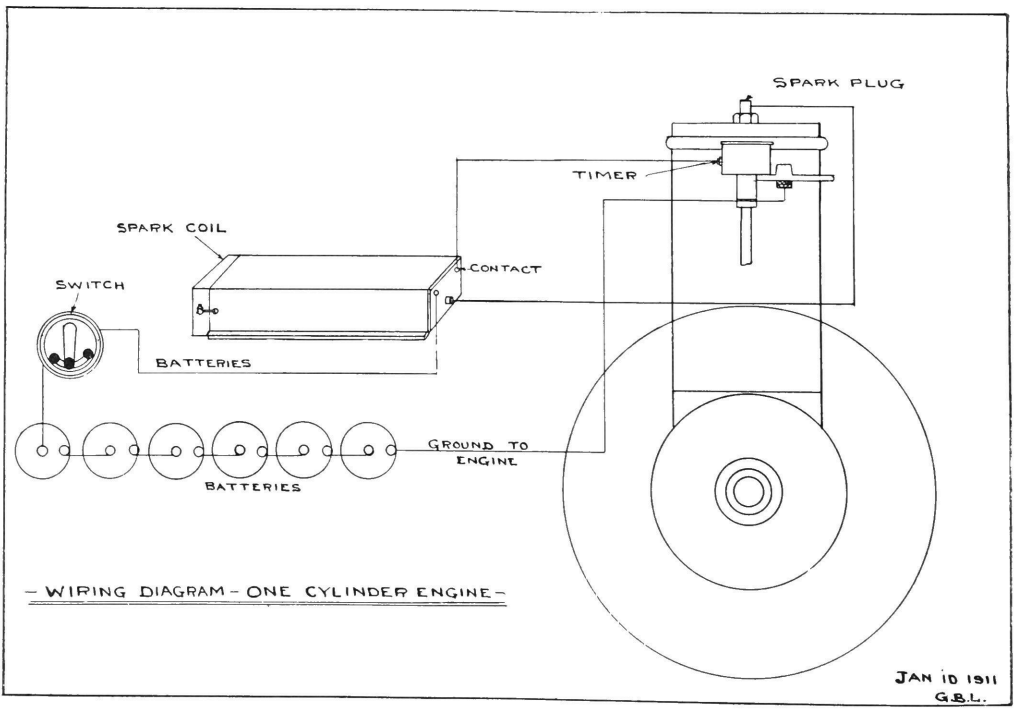
FOUNDATION PLAN-ONE CYLINDER
TYPES G&M MARINE ENGINES

SCALE - 3"-12"
MARCH-23-10
G.B.L.
M21

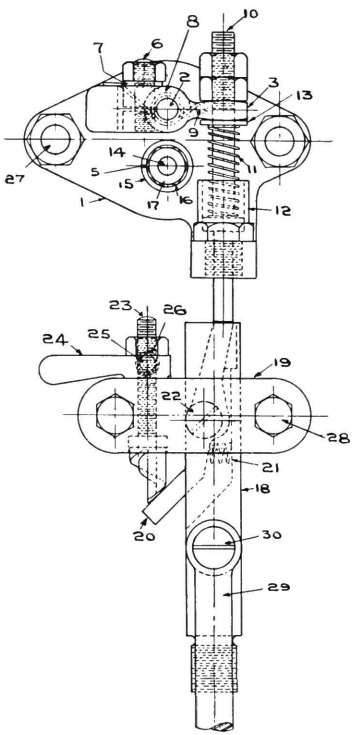
Foundation Plan
1 CYLINDER—TYPE " M "—4 H.P.



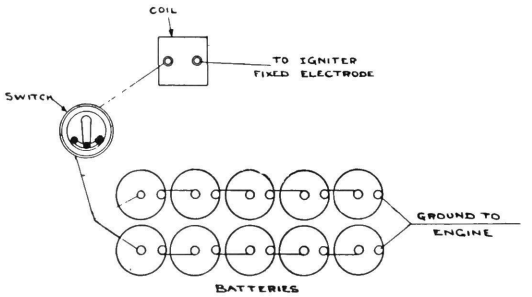
Wiring Diagram
1 Cylinder Engines with New York Coil



Wiring Diagram
Make and Break Engine

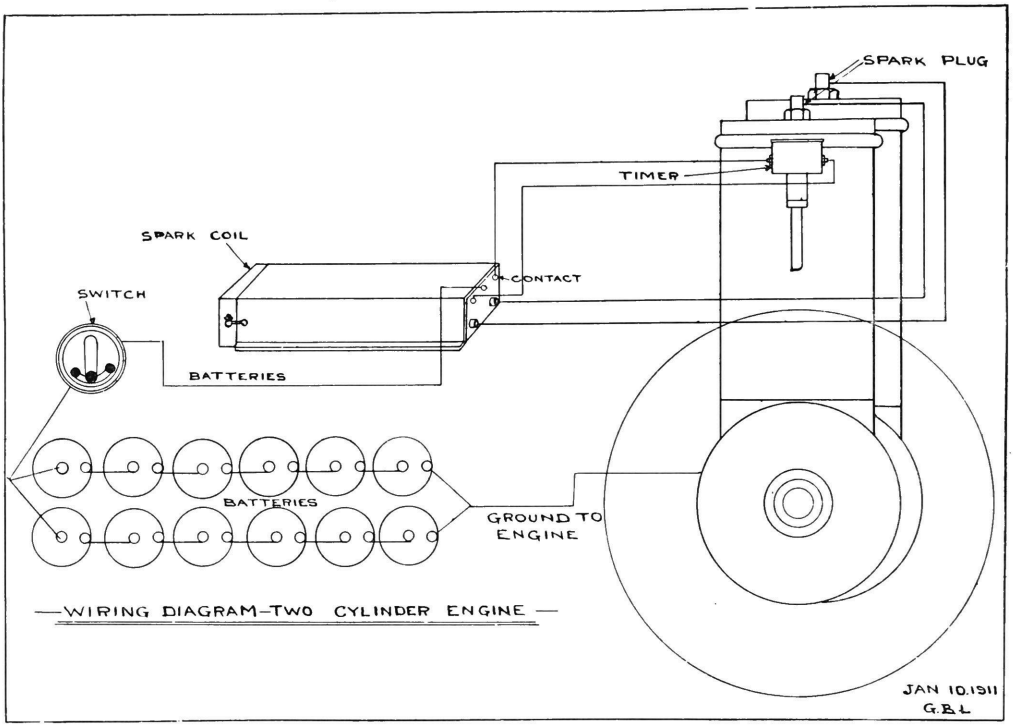


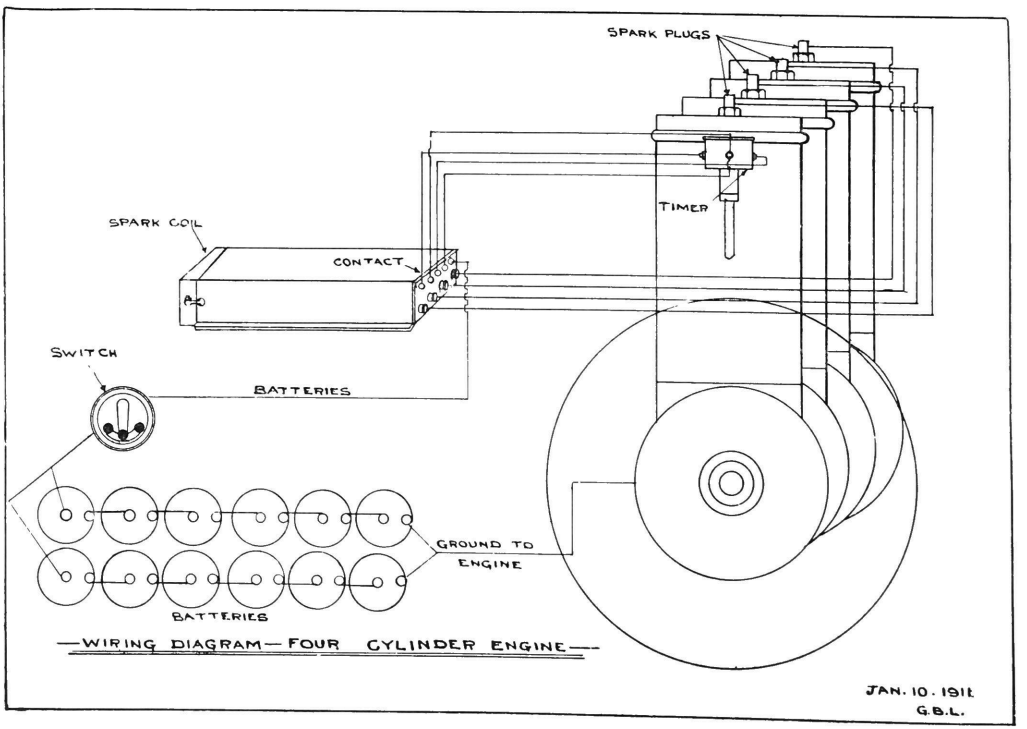
NO.	PARTS
1	IGNITER BODY
2	IGNITER MOVABLE ELECTRODE
3	IGNITER MOVABLE ELECTRODE ARM
4	" " " CONTACT POINTS
5	" FIXED " NUT
6	" MOVABLE " ARM STUD
7	" " " " LOCK WASHER
8	" " " SPRING
9	" " " PIN FOR SPRING
10	" " " ARM DROP ROD
11	" " " " " SPRING
12	" " " " " STOP & GUIDE
13	" " " WASHER
14	IGNITER FIXED ELECTRODE
15	" " " INSULATING BUSHINGS
16	" " " COLLAR
17	" " " TERMINAL NUT
18	WATER PUMP PLUNGER EXTENSION
19	" " " GUIDE
20	PAWL TO TRIP IGNITER
21	PAWL SPRING
22	PAWL PIN
23	IGNITION TIMING STUD
24	" " " LEVER
25	" " " LOCK SPRING
26	" " " PIN
27	IGNITER STUDS
28	IGNITER TRIP ROD GUIDE CAP SCRS
29	ECCENTRIC ROD
30	" " " PIN



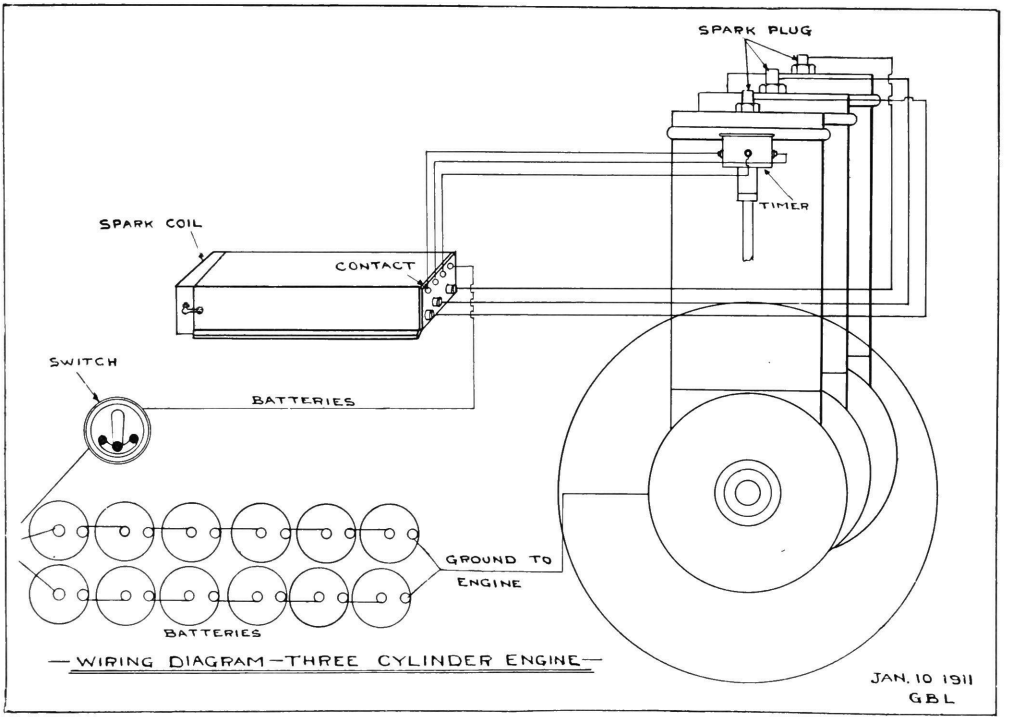
—WIRING DIAGRAM—MAKE AND BREAK ENGINE—

Wiring Diagram
2 and 3 Cylinder Engines with New York Coil



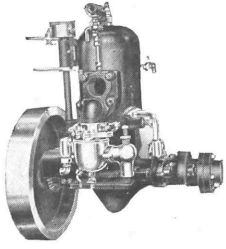


Wiring Diagram—4 Cylinder Engine

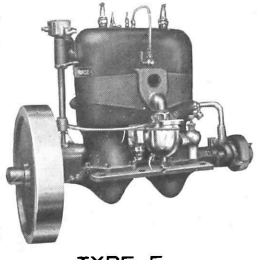


Fairbanks-Morse

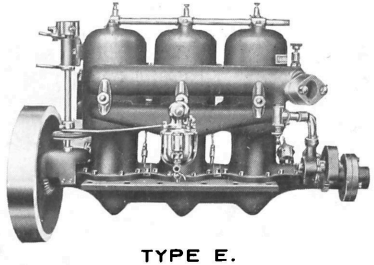
Marine Engines



TYPE E.
Fairbanks-Morse 3½ H.P.
Solid Head, Two Cycle, Three
Port Marine Engine.



TYPE E.
Fairbanks-Morse 7 H.P.
Solid Head, Two Cycle, Three
Port Marine Engine.



TYPE E.
Fairbanks-Morse 10 H.P.
Solid Head, Two Cycle, Three
Port Marine Engine.

FIRST
IN THE MOTOR BOAT FIELD

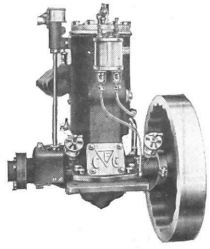
THE REASONS FOR IT:

1st.—YEARS OF EXPERIENCE in the manufacture and development of all classes of gas and gasoline engines. No company in the world has spent as much time and money as Fairbanks-Morse & Co. during the past thirty years developing various types of commercial gasoline engines. The name Fairbanks-Morse is synonymous with gas engine perfection.

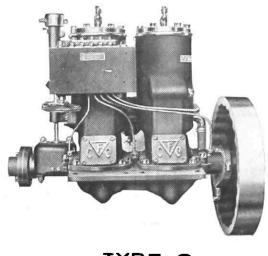
2nd.—Unexcelled Facilities for manufacturing our engines at our Toronto Factory, the largest in Canada devoted exclusively to the manufacture of gasoline engines. The building of gasoline engines is not a side issue with us—taken up when other business is dull—we devote our entire attention to their manufacture the year round.

3rd.—Why do you not take advantage of our Experience and Facilities? Our Marine Engine Catalog, showing complete lines of Engines, will be sent you on request by our nearest branch office. We also sell all Accessories used on a motor boat. Catalog on request.

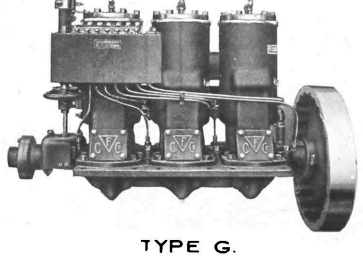
THE CANADIAN FAIRBANKS-MORSE CO., Limited.



TYPE G.
Fairbanks-Morse 6 H.P.
Removable Head, Two Cycle
Three Port Marine Engine.



TYPE G.
Fairbanks-Morse 12 H.P.
Removable Head, Two Cycle,
Three Port Marine Engine.



TYPE G.
Fairbanks-Morse 18 H.P.
Removable Head, Two Cycle,
Three Port Marine Engine.