Equipment and Engineering

Interesting Notes on the latest Municipal and Telephone Appliances.

OIL ENGINES

Cheap fuel has been the goal of every power user, ever since power of any kind superseded handicraft workmanship, and the Canadian Fairbanks-Morse Company claim that they have solved part of this problem by supplying engines which use the comparatively cheap oil instead of the increasingly expensive gasoline.

To bring this before those who require engine-power, they have just issued a handbook on Oil Engines, on which is the striking statement.

"The power-user who feeds his engine with gasoline to-day is literally *burning dollars*.—Fairbanks-Morse oil engines, using cheap fuel, will solve this problem for you."

The gasoline engine—succeeding the steam engine—was an enormous advance in power, but because it was so successful, the small supply of gasoline advanced in price. And as only 6 per cent. of gasoline can be obtained from crude petroleum, the scarcity is noticeable. On the other hand, crude petroleum contains 72 per cent. of refined oil that contains as much heating property as the gasoline, and which is, naturally, much less expensive.

Students and inventors have long been trying to invent an engine which could be run by gas, instead of gasoline, and the Canadian Fairbanks-Morse Company claim that their engineers have solved the problem "By designing engines that will use any oil in the grades that make up the whole 72 per cent. of the combustible distillates from crude oil." They go further and claim that their oil engines will develop the same power from cheap oil that other engines do from costly gasoline.

This illustration points out the various details which are referred to below. To describe these briefly:—

Lever handle fuel pump.—The oil is pumped into the fuel reservoir (for starting) by means of a small pump placed on the side of the engine base. This pump is fitted with our patented pump link and handle, and is a marked improvement over the old style fuel pump.

Fuel feed.—The liquid fuel feeding device, in connection with the governor, provides automatically for a uniform quality of charge mixture throughout the full range of loads. It has no float valve and no liquid above the level of the outlet nozzle which terminates in the air passage leading to the engine suction valve. There is therefore no possibility of liquid fuel flowing after engine shuts down, even if the throttle on reservoir were not closed, There is no auxiliary air inlet as found on most carburetors. No spring is used and only one simple butterfly valve, this being controlled by the governor. The liquid fuel is drawn from the nozzle by the suction of the engine piston and the location of the outlet nozzle in connection with this butterfly valve is such as to keep the mixture right, when the load changes. The arrangement of a nozzle from constant level reservoir terminating in the air suction passage is covered by patent, and other details are the subject of a pending application. Liquid fuels are pumped up to the fuel reservoir where a constant level is maintained, the overflow pipe carrying the surplus back to the supply tank below the level of the engine. The needle valve adjustment determines positively the amount of fuel to be sprayed into the cylinder for each charge.

Advantages of automatic fuel feed —These engines are easy to start, because the first charge admitted to the cylinder is exactly the right mixture, and the same amount is admitted as at every other charge.

They will start in cold weather—because we do not have to rely upon air passing over the oil or other fuels in a "mixture chamber" to pick up the requisite amount of vapor.

This automatic fuel feed is designed to use the heavier, cheaper grades of oil and distillates. Any grade of kerosene or gasoline can also be used.

The action is such as to admit more or less fuel at each charge according to the load, the mixture proportion remaining the same, and the engine taking regular impulses.

It gives the best economy—because the mixture can be regulated to give maximum power with minimum fuel, and this same mixture is then maintained indefinitely.

Water reservoir.—A water reservoir (patented), with tube for feeding water, in a manner similar to the fuel feed referred to, is another important improvement which is applied to engines of 10 H.P. and larger sizes operating on oil.

This is for the purpose of introducing a fine spray of water with the mixture. It acts to moderate the force of the explosions and to prevent premature ignitions, at the same time increasing somewhat, both power and economy.

Throttling governor.—This governor is regularly fitted to Type "N" oil engines. It is of the centrifugal type, and is connected with the governor valve direct. This governor is very sensitive and gives close regulation.

The action is such as to admit more or less fuel at each charge, according to the load, the mixture pr oportion remaining the same, and the engine taking regular impulses.

Relief cam.—Every engine 10 H.P. and larger is fitted with a compression relief cam. When this is thrown into action the engine can more easily be turned over by hand.

Quick start.—The engines can be started quickly by using a small quantity of gasoline. Not over one minute and usually only a few secondes are required to start in this manner and apply full load. The self starter pump and detonator are used to obtain the first impulse. The next ones come from gasoline sucked in by the engine from a small gasoline tank attached to engine base. After running a few minutes in this way the engine is heated sufficiently to permit changing to the heavier fuel oil on which it will then run regularly.

Self-starter.—Our self-starter (patented), is fitted to all Type "N" Oil Engines 10 H.P. to 60 H.P. and is clearly shown in the cut. To start by means of this device, the detonator (or match igniter) is charged with the head of a parlor match and inserted in the fixture attached to the cylinder. A small amount of gasoline is poured into the cup at the base of the hand pump. By working the pump, the charge is forced into the engine cylinder and fired by the detonator at the proper moment. The explosion of this charge has sufficient force to start the engine. This method has proven both safe and convenient. A great advantage possessed by our engines is the facility with which they can be started. When stopped, all fuel expense also stops, and they can be started when wanted.

High tension ignition.—Wherever High Tension Ignition is specified on the following pages as being optional or standard equipment, we use the Bosch Oscillating Type of High Tension Magneto. This magneto is mounted on a bracket on the engine and operated by a trip lever from an eccentric on the cam shaft. The trip lever is provided with a simple device for retarding the spark while starting the engine. The magneto delivers high tension current direct to the spark plug located in the cylinder head. It is water-proof and dust-proof, and by far the most simple and reliable high tension ignition equipment on the market for stationary engine purposes.

It will readily be seen that as the operation of the magneto derives its motive power from the spring with which it is equipped, it is in no way dependent upon the speed at which the engine is running, and therefore it produces just as powerful a spark when the engine is being pulled round at starting as is produced when the engine is running at full speed. This entirely eliminates the necessity for batteries, coils, or any auxiliary form of ignition. It means that the ignition is incorporated with the engine and is permanently part of it, whilst the simple nature of the outfit practically eliminates any chance of ignition trouble.

They are adapted for any service where a substantial stationary engine is needed. Equipped with Bosch High Tension Ignition System if desired.