THE DAKE ENGINE.

THE extremely compact type of engine shown in the accompanying illustrations is unusually interesting on account of the ingenious mechanical principles involved in its design. As a steam engine, aside from questions of design, the manufacturers claim that experience has demonstrated that in reliability, and especially durability, it is not exceeded by any of the types of usual design. On account of its compact form,

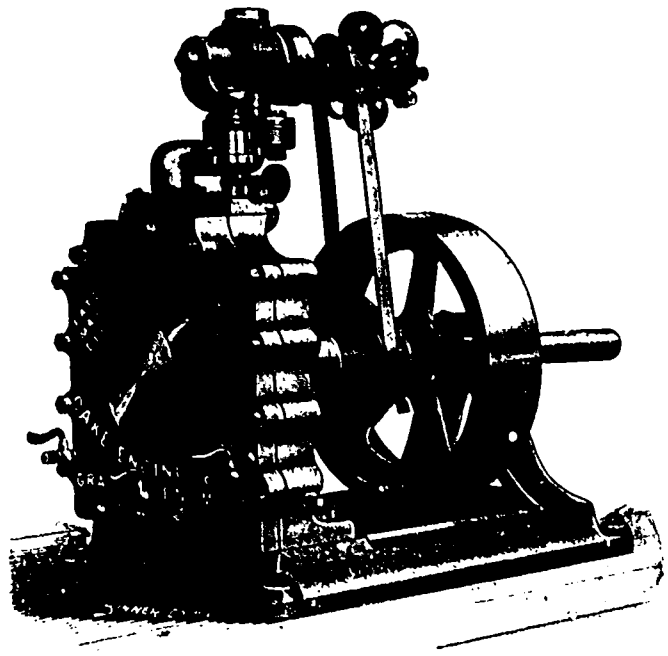

FIG. 1.—DAKE STATIONARY ENGINE.

this engine is claimed to be particularly suited for running ventilating fans, centrifugal pumps, incandescent lighting dynamos and saw mill carriages. Being strongly built, self-contained, and not affected by ordinary jars, it also gives reliable service when used to run smoke-consumers and head-light or other dynamos on railway trains, and when employed for various auxiliary purposes aboard vessels.

Fig. 1 illustrates the engine complete, and in Fig. 2 the pistons are removed, showing the interior of the case with the crank in position, this latter revolving in the chamber shown in the

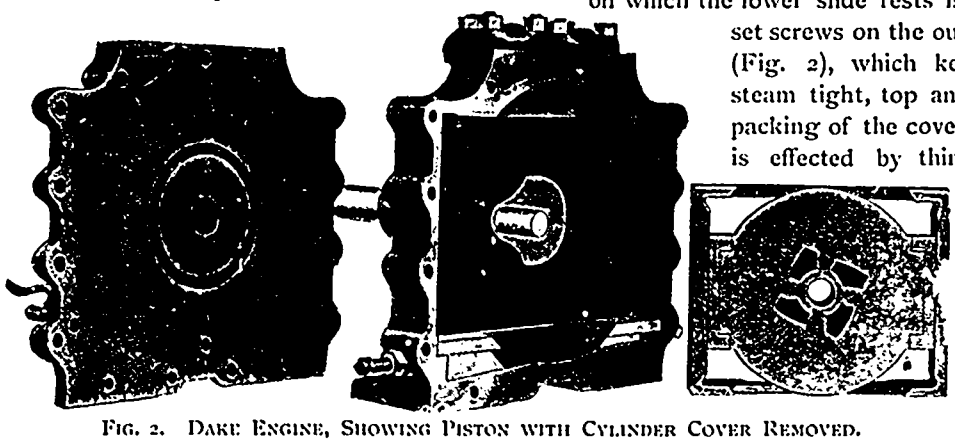

FIG. 2. DAKE ENGINE, SHOWING PISTON WITH CYLINDER COVER REMOVED.

back of the case in the central cut. This chamber is supplied with oil and water from an opening in its back, thus securing lubrication to every part of the interior of the engine.

Both side pistons have a horizontal movement sliding from side to side, and at the same time an inner piston to which the crank pin is attached has a vertical or up and down motion, the two movements imparting rotary motion to the crank. Steam is admitted through channels in the cover, one opening into a central aperture and another into an annular opening on the inside of the cover. Four channels are cored through the inner piston, one leading to the top and another to the bottom, and one to each end of the inner piston, the latter also leading through the ends of the outer piston. Four parts corresponding with the channels in the interior of the inner piston are cut through the face (or side next to the cover) of the inner piston in the proper position to register over the central aperture in the cover. The steam entering the port in the inner piston, through the central aperture of cover and re-acting against the side of the case, imparts motion to the crank, the port passing over the annular ring and exhausting into it after having done its work. There are four distinct impulses of steam to each revolution of the crank, and the arrangement of the ports to the crank are such that each impulse of steam is given at a point where it has the greatest power. The expansion of steam is secured in the passage of the ports of the inner piston over the central aperture in the cover.

With the reversing engine, the channelling on the cover and in the piston is the same as in the engine built to run one way, but the ports in the inner piston are shaped so that they register over both the central and the annular openings, using each alternately as steam and exhaust. The ports on the top of the case being fitted with a suitable valve which connects the channels leading to the working parts of the engine, motion is given to the engine either to the right or left, as desired. The reversing engine is the same as a stationary engine, only with reversing throttle instead of governor.

Provision is made for taking up the wear of the working parts of the engine in a simple and effective manner. The inner piston is fitted with phosphor-bronze slides that admit of a thin piece of tin or sheet iron being inserted when the wear is sufficient to allow it. A wedge-shaped plate on which the lower slide rests is arranged with set screws on the outside of the case (Fig. 2), which keeps the piston steam tight, top and bottom. The packing of the cover to the pistons is effected by thin copper joints placed between the edge of the case and cover. The pistons are made so that they are slightly thicker than the case they occupy, and enough copper strips are put in to fill up the space; these joints are removed one at a time as the pistons wear down, and where it is seen that repacking is needed and a copper joint is too much to take off at one time, a piece of thin paper to take its place will repack the cover perfectly. The repacking of the cover as above described, and replacing the nuts or cap screws (as found on the different sizes of engines) evenly, is the only point about the engine that requires careful attention and judgment on the part of the person in charge, and repacking is not required except at long intervals.

There is very little friction, and consequently slight wear on the pistons, from the fact that the steam pressure is inside of the inner piston, instead of against it, making the pistons similar to balanced valves. The bearings for the main shaft and crank pin are in the form of bushings and made from phosphor-bronze. From the manner in which steam is applied to the pistons the wear is slight compared with the ordinary engine. When they need renewing the worn ones are driven out and the new bushings driven to place, which can be done by any good machinist at a small cost to the purchaser. The crank

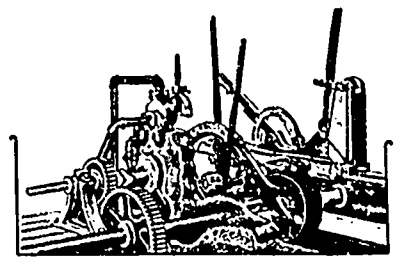

FIG. 3.—CARRIAGE ENGINE.

and pin are made from the best quality of cast steel, and the shaft, which is machinery steel, is shrunk into the crank in a solid manner. The outer piston is also made from best quality of cast steel. Every part of the interior of the engine is fitted with the greatest care. The inner face of the cover and all of the working parts of the engine are ground surfaces, made with tools especially designed for the manufacture of this type of engine, thus ensuring that the engine is practically steam tight from the start. Everything about the inside of the engine is made interchangeable, and can be duplicated in case of accident on short notice.

Fig. 3 shows the carriage engine for setting up and receding head blocks.

In Fig. 4 is shown the steam feed, which is recommended to the consideration of saw mill

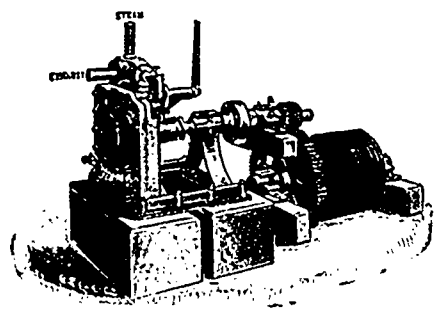

FIG. 4.—STEAM FEED.

owners and operators. The claims made for it are simplicity of construction, positive operation and easy management, economical use of steam, small space occupied, cheapness, and easy adaptation to either new mills or those now in use. In placing the engine in position, it is not necessary to move the husk frame, as it can be lowered from above through the frame onto foundation. The movements of the engine in either direction is under absolute control of the sawyer by lever connecting with reverse valves on top of engine, thus accommodating the speed of the feed to the size and conditions of logs.

The Dake engine has been placed upon the Canadian market by the Phelps Machine Co., of Eastman, Que., who will gladly furnish any further information.