No. 890,767.

PATENTED JUNE 16, 1908.

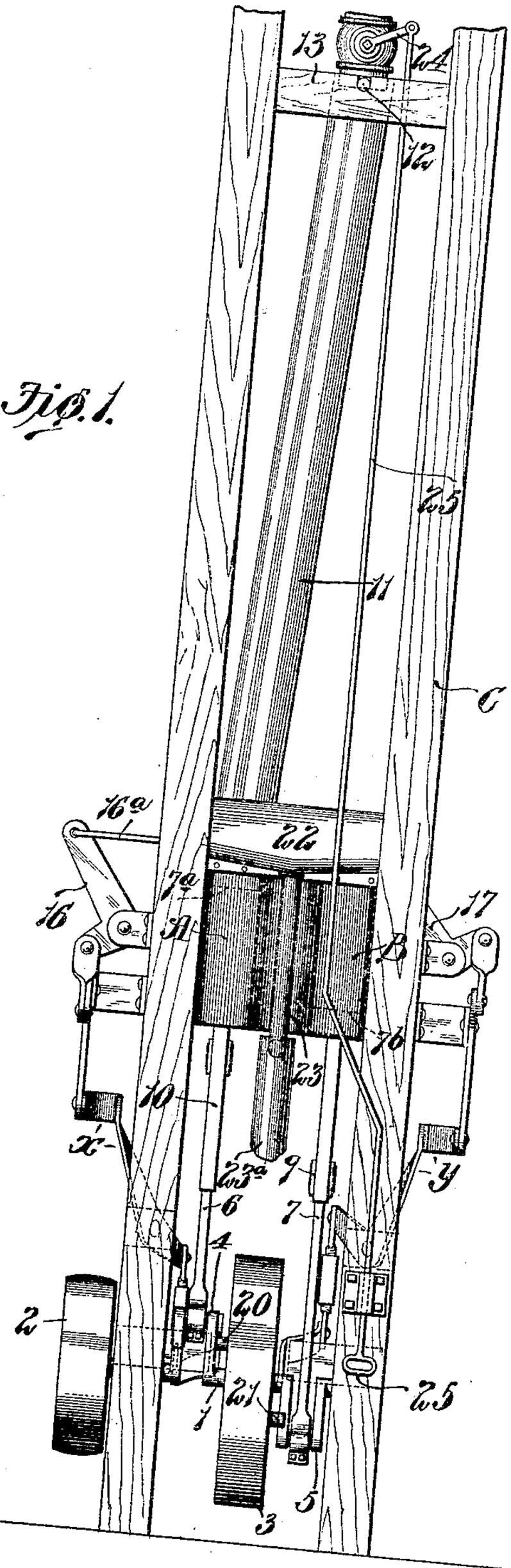
M. HAUGHEY.

WATER POWER ENGINE.

APPLICATION FILED NOV. 1, 1907.

3 SHEETS—SHEET 1.

Fig. 1.

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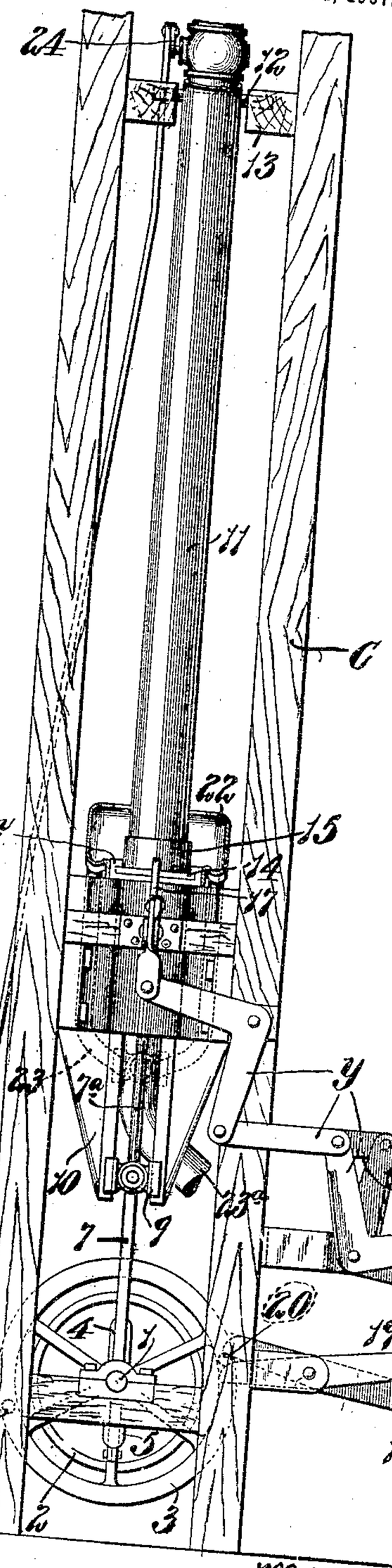
3 SHEETS—SHEET 2.

Fig. 2.

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3 SHEETS—SHEET 3.

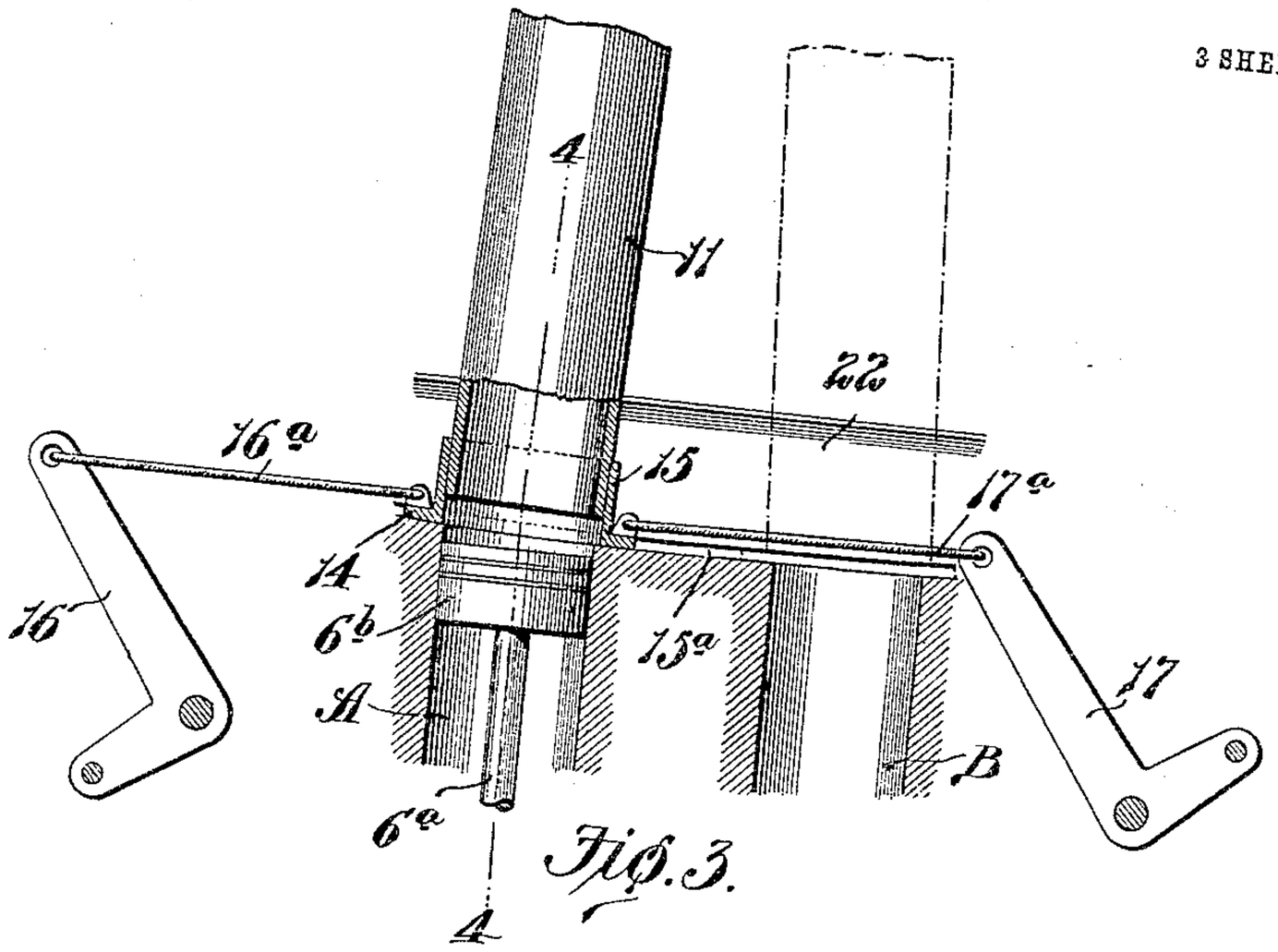


Fig. 3.

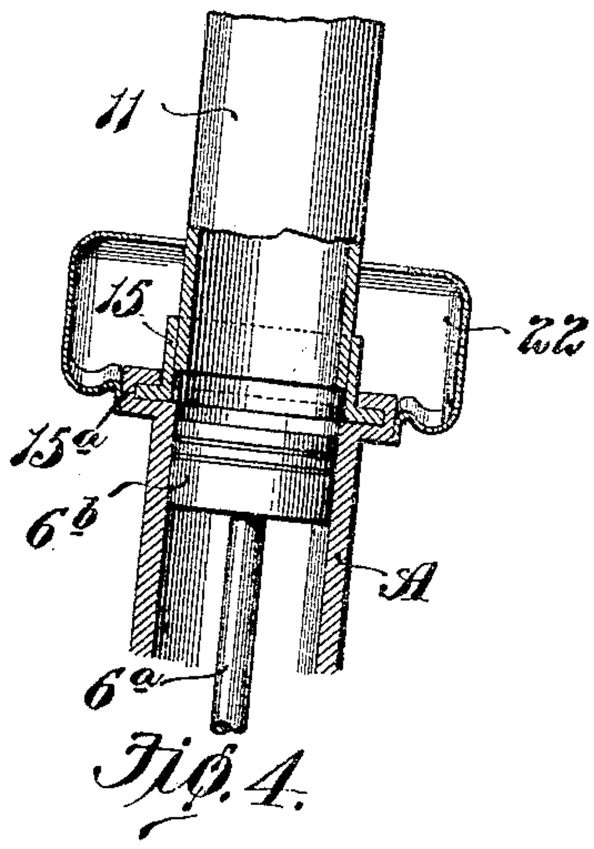


Fig. 4.

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# UNITED STATES PATENT OFFICE.

MICHAEL HAUGHEY, OF ST. LOUIS, MISSOURI.

## WATER-POWER ENGINE.

No. 890,767.

Specification of Letters Patent. Patented June 16, 1908.

Application filed November 1, 1907. Serial No. 400,202.

*To all whom it may concern:*

Be it known that I, MICHAEL HAUGHEY, a citizen of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Water-Power Engines, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a front elevation of an engine embodying the features of my invention; Fig. 2 is a side elevation of same; Fig. 3 is an enlarged detail sectional view for the purpose of illustrating more clearly the relative position of the stand-pipe and cylinders; and Fig. 4 is an enlarged detail sectional view taken on the line 4—4 of Fig. 3.

The invention relates to engines that are operated by water power.

The main object of my invention is to provide an engine of the character described which can be operated by a comparatively small quantity or amount of water, thus enabling the engine to be used at places where the water supply is not great enough to actuate a water wheel or turbine.

My invention, briefly described, consists in an engine provided with a drive shaft having a plurality of cranks or eccentrics that are connected by links to pistons which operate in open-ended cylinders, a pivotally mounted stand-pipe containing water and connected at its lower end to a slide, and two sets of automatically operated levers connected to the opposite ends of said slide for moving said stand-pipe first into alinement with one of the cylinders to introduce water into same and thereafter into alinement with the other cylinder to introduce water into same, the force of the water which was introduced into the first cylinder operating to actuate the piston therein and thus impart a half revolution to the drive shaft, and the force of the water which was introduced into the second cylinder operating to actuate the piston therein so as to complete the revolution of the drive shaft.

Referring to the drawings which illustrate the preferred form of my invention, 1 designates a drive shaft which is provided with a pulley 2 for receiving a belt, not shown, that is used for actuating the machine which is to be driven. The drive shaft 1 is provided with a fly-wheel 3 and a plurality of cranks 4 and 5 to which links 6 and 7 are connected, said links being fastened, respectively, to the piston rods $6^a$ and $7^a$ of pistons $6^b$ and $7^b$ which operate in open-ended cylinders A and B. Said cylinders are carried by a frame C and each of the piston rods is provided with a cross-head 9 that reciprocates in stationary guides 10. The cylinders A and B are arranged side by side, as shown in Figs. 1 and 3 and the upper ends of the cylinders lie in the same horizontal plane. A movable stand-pipe 11, which holds a large quantity of water, is pivotally connected at its upper end to the frame, preferably by means of trunnions 12 that rest in the cross-bars 13 of the frame and the lower end of said stand-pipe terminates adjacent the upper ends of the cylinders.

A slide 14 provided with an opening which is surrounded by an upwardly projecting flange 15, is reciprocatingly mounted in guideways $15^a$ located adjacent the upper ends of the cylinders, and the lower end of the stand-pipe 11 is arranged inside of the flange 15 on the slide so that when movement is imparted to the slide the stand-pipe will be oscillated to carry the lower end of said stand-pipe first into alinement with the cylinder A and thereafter into alinement with the cylinder B to introduce water into same and thus alternately depress the pistons which transmit their movements to the drive shaft 1 by means of the links which connect the cranks on the drive shaft to the piston rods. The means which I have herein shown for reciprocating the slide 14 that oscillates the stand-pipe, consists of a plurality of bell crank levers 16 and 17 that are connected by means of links $16^a$ and $17^a$ to the opposite ends of said slide, straight levers 18 and 19 that are operated intermittently by laterally projecting pins 20 and 21, respectively, on the fly-wheel, and two sets of bell crank levers and links connecting the straight lever 18 to the bell crank lever 16 and the straight lever 19 to the bell crank lever 17. I have designated the set of levers and links which connect the levers 18 and 16 together

by the reference character X and those which connect the levers 19 and 17 together by the reference character Y and I prefer to provide each of said sets with an adjustable link X′ that may be shortened or lengthened to vary the throw of the bell crank levers 16 and 17 so as to properly position the slide which actuates the stand-pipe.

Preferably, a hood or cup 22 is arranged at the upper ends of the cylinders A and B to receive the water which is displaced from said cylinders by the upward movement of the pistons therein, the bottom of said cup being inclined and provided with openings which receive the branches 23 of a discharge pipe 23ª, as shown in Fig. 1 and in dotted lines in Fig. 2. The water can be conducted to the upper end of the stand-pipe 11 by any suitable means, not shown, and for enabling the engine to be stopped I have provided the stand-pipe at its upper end with a valve, the stem of which is provided with an arm 24 to which an operating rod 25 is secured.

The operation of the engine is as follows: When the stand-pipe is in the position shown in Fig. 1 and also in full lines in Fig. 3, water will enter the upper end of the cylinder A and thus depress the piston therein so as to impart half a revolution to the drive shaft 1. The rotary movement of the drive shaft causes the pin or projection 21 on the fly-wheel to engage the inner end of the straight lever 19 and thus actuate same so as to operate the bell crank lever 17 and thereby move the slide 14 so as to carry the lower end of the stand-pipe 11 into alinement with the upper end of the cylinder B, as shown in broken lines in Fig. 3. As the water rushes into the cylinder B it will depress the piston therein and thus complete the revolution of the drive shaft and when the pin 20 on the fly-wheel engages the inner end of the straight lever 18 the bell crank lever 16 will be operated to oscillate the stand-pipe in the opposite direction back into alinement with the upper end of the cylinder A. The engine will continue to operate so long as the valve in the upper end of the stand-pipe is open, the drive shaft being rotated continuously in the same direction by the pistons which are operated intermittently by the water in the stand-pipe the water being displaced from the cylinders into the cup 20 by the upward movement of the pistons. The length of the stand-pipe, of course, is immaterial so far as my broad idea is concerned but I have found that an engine provided with a stand-pipe about eighty feet long will generate a great deal of power. I have herein shown the engine as being provided with cylinders which have both ends open, but it will, of course, be understood that I could use cylinders which were open at their upper ends and provided in their closed ends with ports or openings to permit the air to escape therefrom as the pistons reciprocated back and forth.

I also wish to have it understood that my broad idea is not limited to any particular mechanism for oscillating the stand-pipe, the mechanism herein shown being simply one of many forms of devices that could be used for accomplishing that result. While I have herein shown the cylinders as being arranged vertically it will, of course, be obvious that the cylinders could be arranged horizontally and the stand-pipe so designed that it would introduce water into one end of the cylinders. Furthermore, my broad idea is not limited to a construction in which only two cylinders are employed as four or six cylinders could be used without departing from the spirit of my invention, the actuating mechanism for the stand-pipe being so designed that water would be introduced intermittently into the different cylinders.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. An engine of the character described, comprising a drive shaft, a plurality of cylinders having pistons which are eccentrically connected to the drive shaft, an oscillating stand-pipe having its lower end terminating adjacent one end of the cylinders, a slide mounted in stationary guideways and provided with a flange that receives the lower end of the stand-pipe, and two sets of automatically operated levers connected to the opposite ends of said slide for actuating it to move the stand-pipe into alinement with one cylinder and thereafter into alinement with the other cylinder; substantially as described.

2. An engine of the character described, comprising a drive shaft provided with cranks, a plurality of cylinders having pistons which are connected to said cranks, an oscillating stand-pipe which contains a quantity of water, a slide connected to the lower end of said stand-pipe, bell crank levers connected by links to the opposite ends of said slide, a fly-wheel on the drive shaft, and mechanism actuated by said fly-wheel for actuating said bell crank levers to move said slide and thus carry the lower end of the stand-pipe into alinement with one cylinder and thereafter into alinement with the other cylinder; substantially as described.

3. An engine of the character described, comprising a drive shaft provided with cranks and a fly-wheel, a plurality of open-ended cylinders having pistons which are connected to said cranks, an oscillating stand-pipe having its lower end terminating adjacent the upper ends of said cylinders, a reciprocating slide mounted in guides and con-

nected to the lower end of the stand-pipe, bell crank levers connected by links to the opposite ends of said slide, straight levers adapted to be actuated by projections on the fly-wheel, and means for transmitting the movements of said straight levers to said bell crank levers; substantially as described.

In testimony whereof I hereunto affix my signature in the presence of two witnesses, this twenty-ninth day of October, 1907.

MICHAEL HAUGHEY

Witnesses:

WELLS L. CHURCH,

GEORGE BAKEWELL