No. 620,412. Patented Feb. 28, 1899.

C. W. BORING.

AUTOMATIC CONTROLLING STOP FOR ENGINES.

(Application filed July 16, 1897.)

(No Model.)

FIG. I.

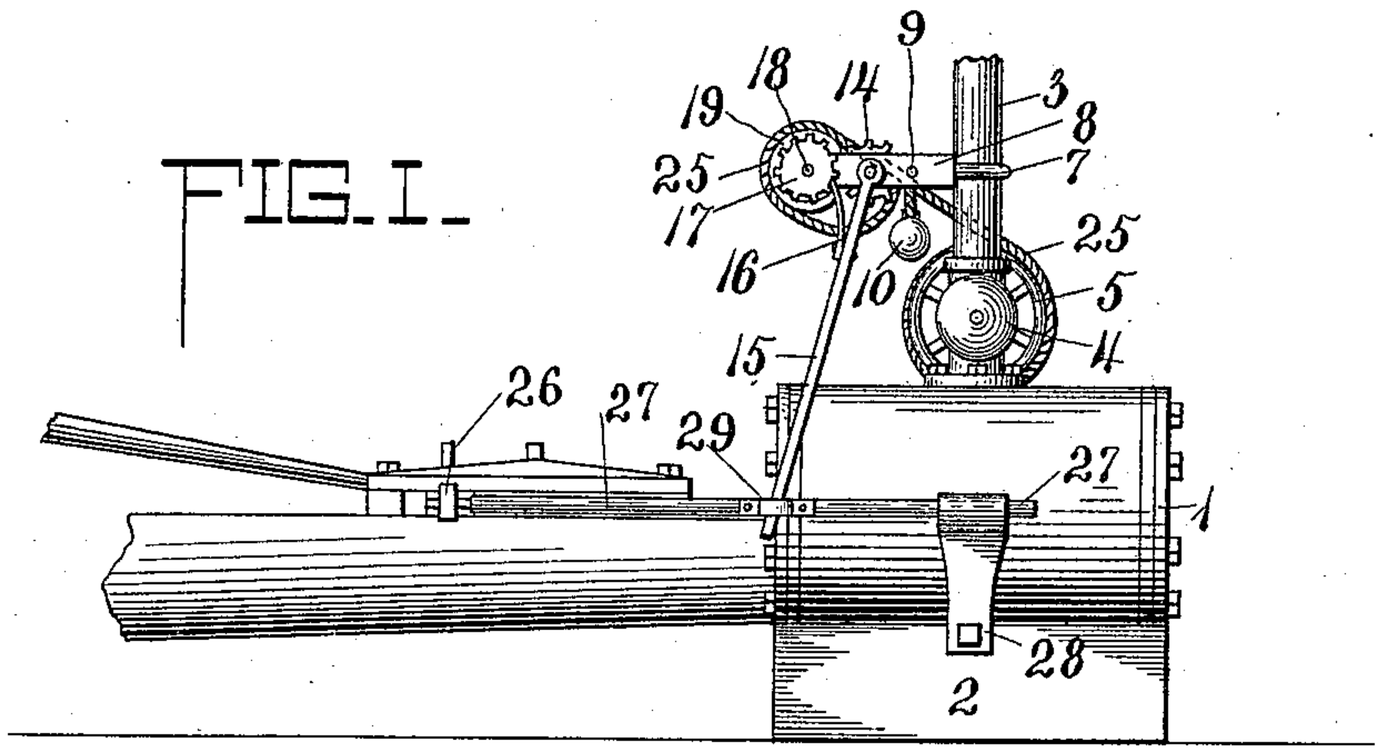


FIG. II.

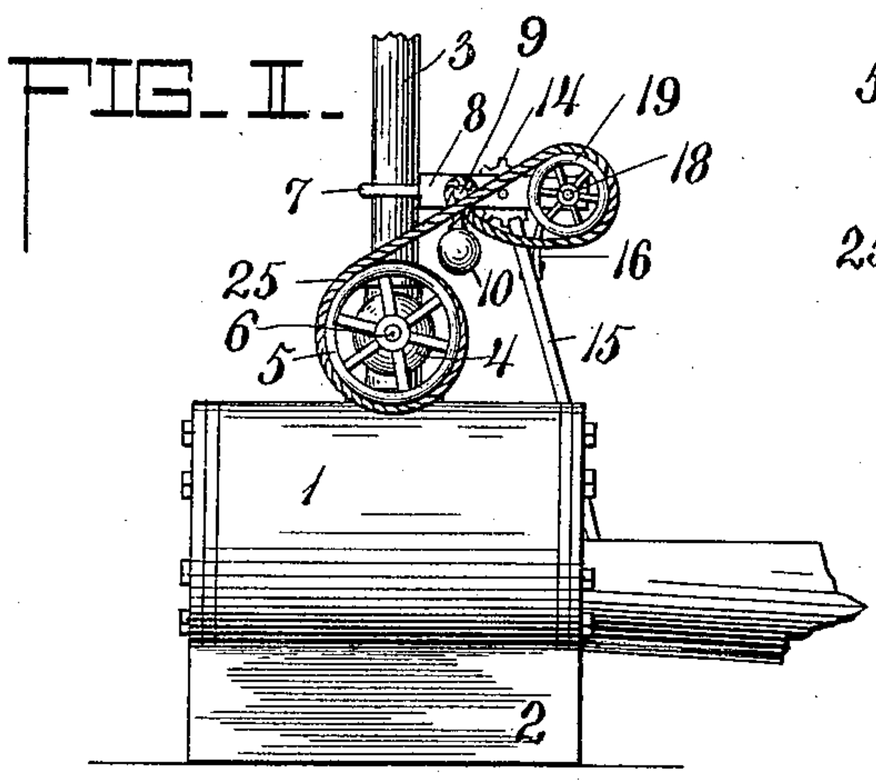


FIG. III.

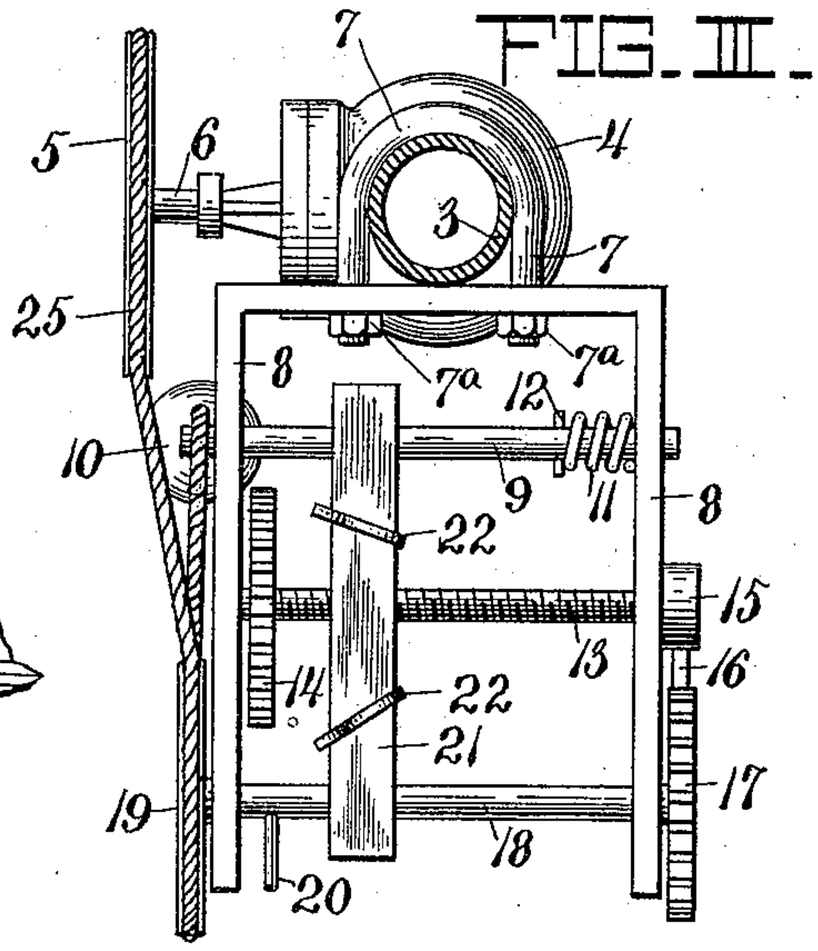
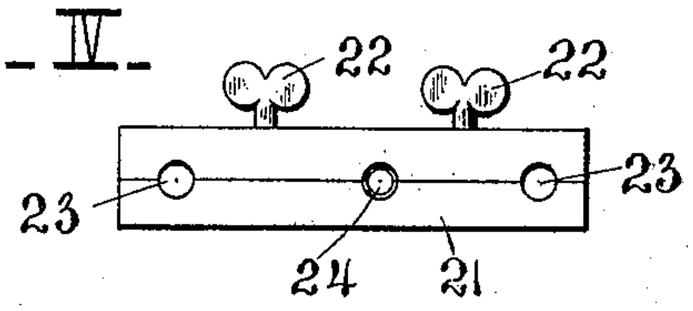


FIG. IV.



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UNITED STATES PATENT OFFICE.

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AUTOMATIC CONTROLLING-STOP FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 620,412, dated February 28, 1899.

Application filed July 16, 1897. Serial No. 644,864. (No model.)

To all whom it may concern:

Be it known that I, CLEMENT W. BORING, a citizen of the United States, and a resident of Bradford, in the county of McKean and State of Pennsylvania, have invented a new and useful Improvement in Automatic Controlling-Stops for Engines, of which the following is a specification.

My invention relates to a controlling-stop to be used in conjunction with engines of oil and Artesian wells when compressed air, gas, steam, or other liquid is used as a motive power.

My invention relates more especially to an improved automatic device to be attached to the pressure-supply pipe above the steam-chest of the engine and which is actuated by a ratchet mechanism which is operated by a connection to the cross-head of the engine, the said device being so constructed as to close the engine throttle-valve, and thereby shut off the motive power after the engine has run the desired length of time. In oil regions, and particularly in the oil regions of Pennsylvania, the wells are pumped, as it is termed, "by head," and the length of time the engine is used depends on the amount of oil the well produces, some wells being exhausted in one-half of an hour, while other wells may require eight or ten hours of pumping.

The objects of my invention are, first, to provide a device which can be connected to any engine and which can be set so as to allow the engine to run any predetermined time and at the end of that time to automatically close the engine throttle-valve; secondly, to save labor, the pumpers being obliged to go to a well to start it up, and when the well is pumped off they must go to the well and stop the machinery, while with my device in use they are saved the second trip, and, thirdly, to economize in fuel and power, as in some instances as many as two or three hundred wells are attached to one compressor, these wells being distributed over a large extent of territory, and during the time consumed by the pumpers in going from well to well to shut them down the power is being wasted, as well as the fuel used in generating it. I attain these objects by my improvement hereinafter described and claimed.

In order that my invention may be fully understood, I will proceed to describe it with reference to the accompanying drawings, in which—

Figure I is an elevation of one side of my improved automatic controlling-stop for engines, showing it attached to the pressure-supply pipe and its connection with a reciprocating part of the engine, whereby it is actuated. Fig. II is an elevation of the opposite side to that represented by Fig. I and shows a suspended weight which when tripped drops and instantaneously closes the throttle-valve by revolving the wheel thereof. Fig. III is an enlarged top view of the device attached to the pressure-supply pipe and shows the working parts in detail. Fig. IV is a side view of the divided clamp-block which travels on the screw-threaded rod and operates the trip-rod so as to drop the weight.

Similar reference-numbers refer to similar parts throughout the several views.

1 is the cylinder of an engine.

2 is the chest, and 3 is a compressed-air-pressure-supply pipe, the air being fed from an air-compressor, (not shown,) as it is situated at some central location among the wells.

4 is the throttle-valve, and 5 is a grooved wheel secured on the stem 6 of the throttle-valve 4.

7 is a screw-threaded yoke or clip having nuts 7^a, by which a frame 8 is rigidly secured to the pressure-supply pipe 3. Movably mounted in the frame 8 is an inner trip-rod 9, which has it ends projecting through the frame to permit it to slide a certain distance. When in normal position, it supports on one projecting end a weight 10. On the other end, on the inner side of the frame, is located a spiral spring 11, bearing against the frame and held in place by a cross-pin 12.

13 is an intermediate screw-threaded rod journaled in the frame, having on one end and within the frame a cog-wheel 14. At the other end of this screw-threaded rod and on the outer side of the frame is loosely secured the swing ratchet-lever 15, to which is attached the spring-ratchet 16, which drives the ratchet-wheel 17, fixed on one projecting end of an outer rod 18, also mounted in the frame. On the other projecting end of the outer rod is fixed a grooved pulley 19. The outer rod is further provided within the frame

with a pin 20, which is in the same plane as the cog-wheel 14 and engages and operates the latter.

21 is a divided clamp-block provided with one or more thumb-screws 22 for holding the parts together. It is further provided with the orifices 23 for the inner trip-rod 9 and the outer rod 18, on which it slides, and also with an orifice 24, screw-threaded to fit the screw-thread on the intermediate rod 13, on which it travels.

25 is a belt attached to the grooved wheel 5 at one end, passing thereover to and over and under the grooved pulley 19 and looped so as to hang on a projecting end of the sliding rod and provided with a weight at its other end.

26 is a projecting arm located on the cross-head of the engine, provided for the purpose of connecting the pump plunger-rod thereto. This arm I utilize by connecting to it a rod 27, which is supported at its other end by a bracket 28, located on the chest 2.

The rod 27 is provided with a bent strap 29, in which the lower end of the ratchet-lever plays.

In operating my machine for pumping oil-wells the engine is started up to run sixty revolutions per minute as near as possible. Each revolution swings the ratchet-lever 15 and causes the spring ratchet-wheel 17 to move one cog forward. This wheel I construct with fifteen cogs, thus making one revolution in fifteen seconds. On each revolution of the ratchet-wheel 17 the pin 20 moves the cog-wheel 14 the space of one cog, and as I construct it with twenty-four cogs it will take twenty-four times longer to make a revolution than the ratchet-wheel 17, which is equivalent to six minutes. The screw-threaded rod 13 is provided with fourteen threads to the inch. Thus the divided clamp-block 21 will be six times fourteen or eighty-four minutes traveling one inch.

It will be understood by a slight study of figures that the clamp-block 21 can be set on the screw-threaded rod 13 at such a point as to contact with the pin 12 on the trip-rod and trip the weight 10 after any desired period of pumping is reached.

The operation of my device is as follows: When starting up the engine to pump the well, the weight 10, attached to the end of the belt, is hung on a projecting end of the trip-rod 9, the throttle-valve opened, and the speed regulated, the clamp-block having been adjusted on the rod 13 so as to have the well pumped its allotted time. As soon as the clamp-block reaches the pin 12 it moves the trip-rod 9 to the right, withdrawing it from the weight-support, causing the weight to drop, which rapidly revolves the grooved wheel 5, and thereby closes the throttle-valve.

This automatic controlling-stop in many instances can be used when the motive power is steam or gas taken direct from the wells under pressure.

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

1. An automatic controlling-stop for engines comprising a frame, means for securing the frame, a device for closing the throttle-valve mounted on the frame, a releasing mechanism connected with the closing device, and means connected with a reciprocating part of the engine for operating the releasing mechanism; substantially as described.

2. An automatic controlling-stop for engines comprising a frame, a trip-rod, a screw-threaded rod, a lever having a ratchet and mounted on one end of the screw-threaded rod, a cog-wheel mounted on the other end of the screw-threaded rod, the rod having a ratchet-wheel at one end, a pulley at its other end and a pin for engaging the cog-wheel, the clamp-block mounted on the rods, means whereby the clamp-block is connected with the trip-rod to operate the latter, means for closing the throttle-valve connected with the pulley, and means for connecting the lever with a reciprocating part of the engine; substantially as described.

3. An automatic controlling-stop for engines comprising a frame provided with a screw-threaded yoke, the trip-rod provided with a spiral spring and a cross-pin, the screw-threaded rod provided with a cog-wheel, a rod provided with a ratchet-wheel, a pin, and a grooved wheel, a clamp-block, a grooved wheel for the throttle-valve, a weight, a lever provided with a ratchet, a bracket, and a rod provided with a bent strap adapted to be connected with a reciprocating part of the engine; substantially as described.

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