

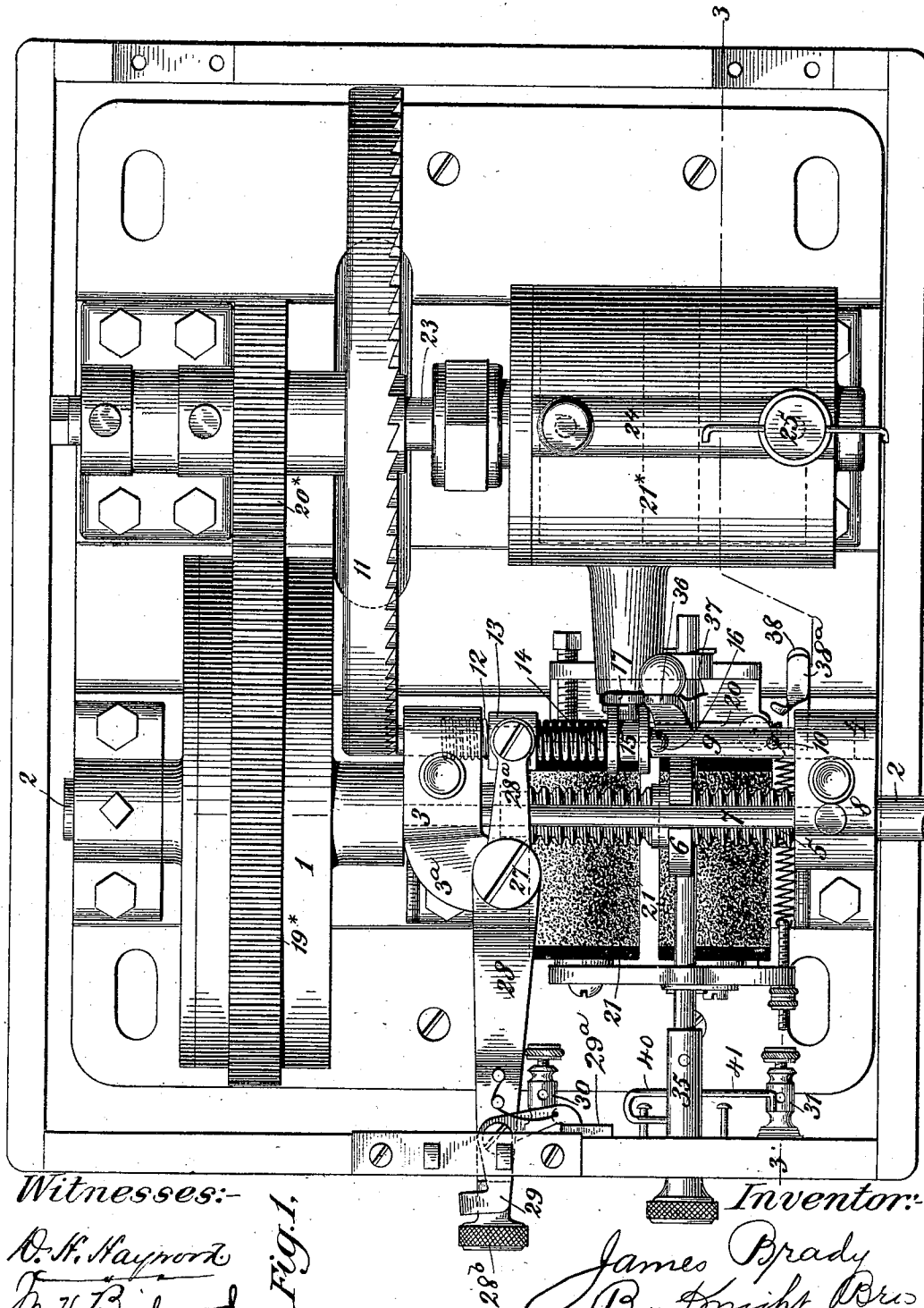
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4 Sheets—Sheet 1.

J. BRADY.
ENGINE STOP.

No. 552,464.

Patented Dec. 31, 1895.



Witnesses:-
D. H. Haywood
M. V. Bidgood

Fig. 1.

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(No Model.)

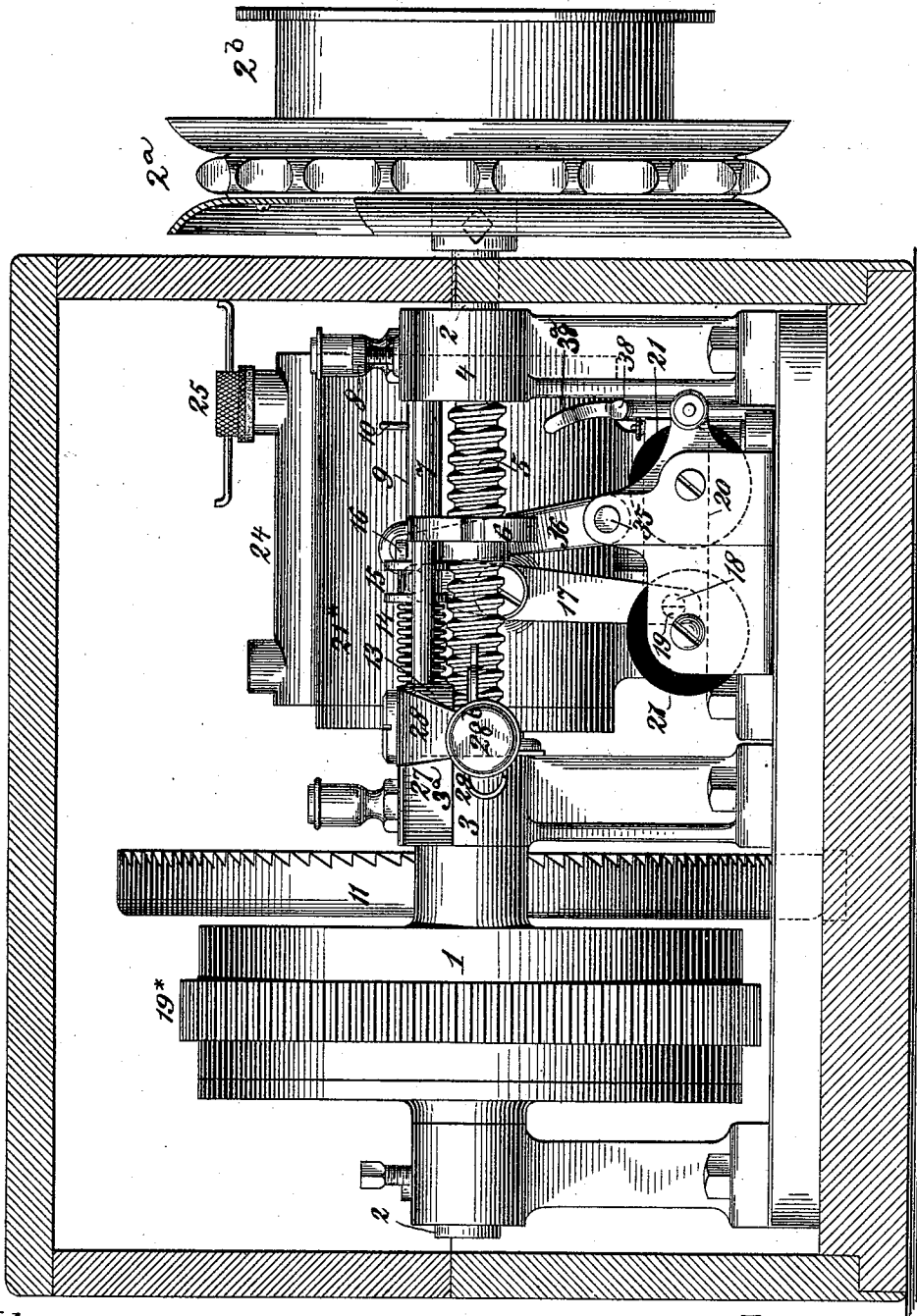
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Fig. 2.



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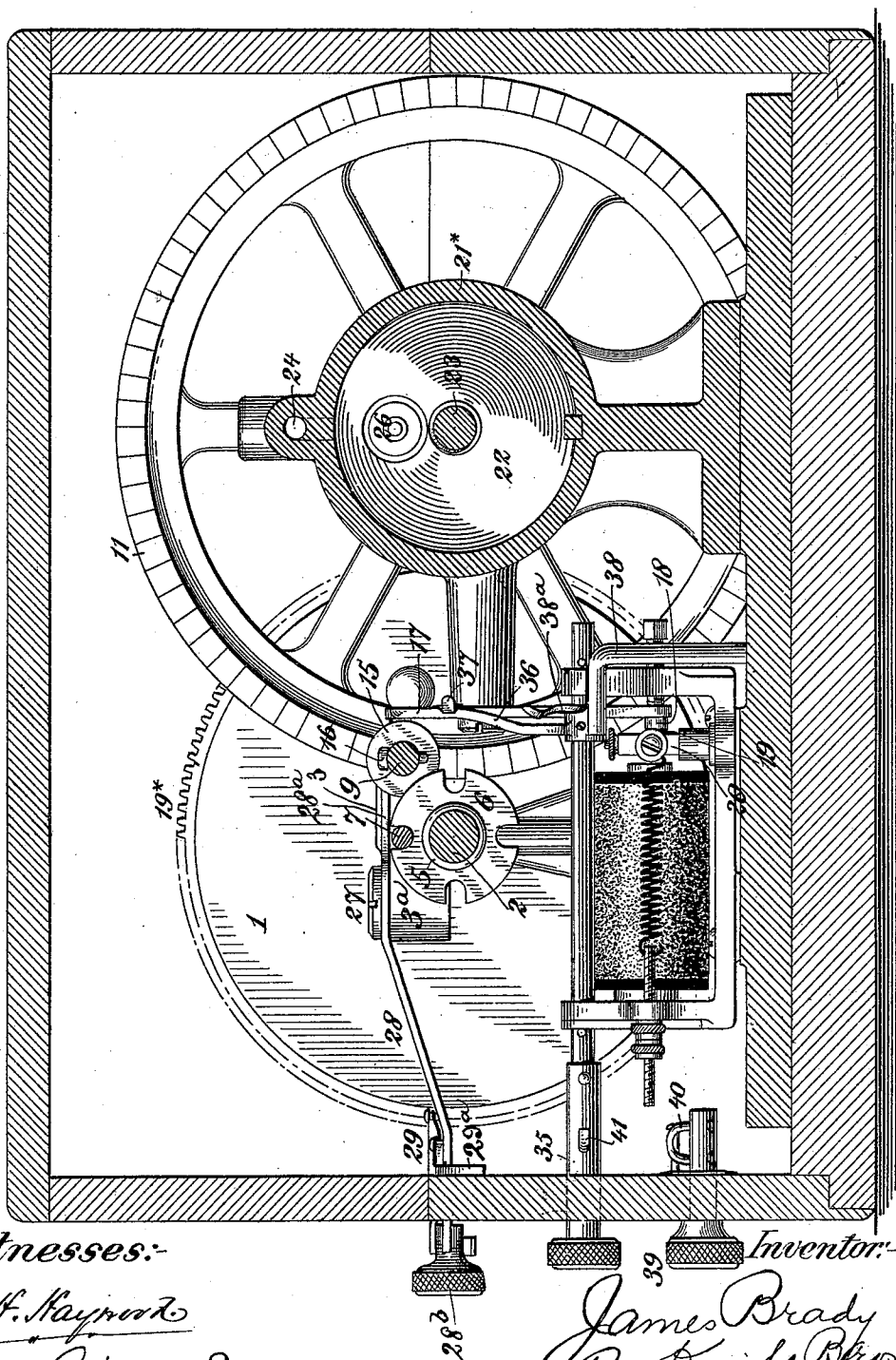
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Fig. 3.



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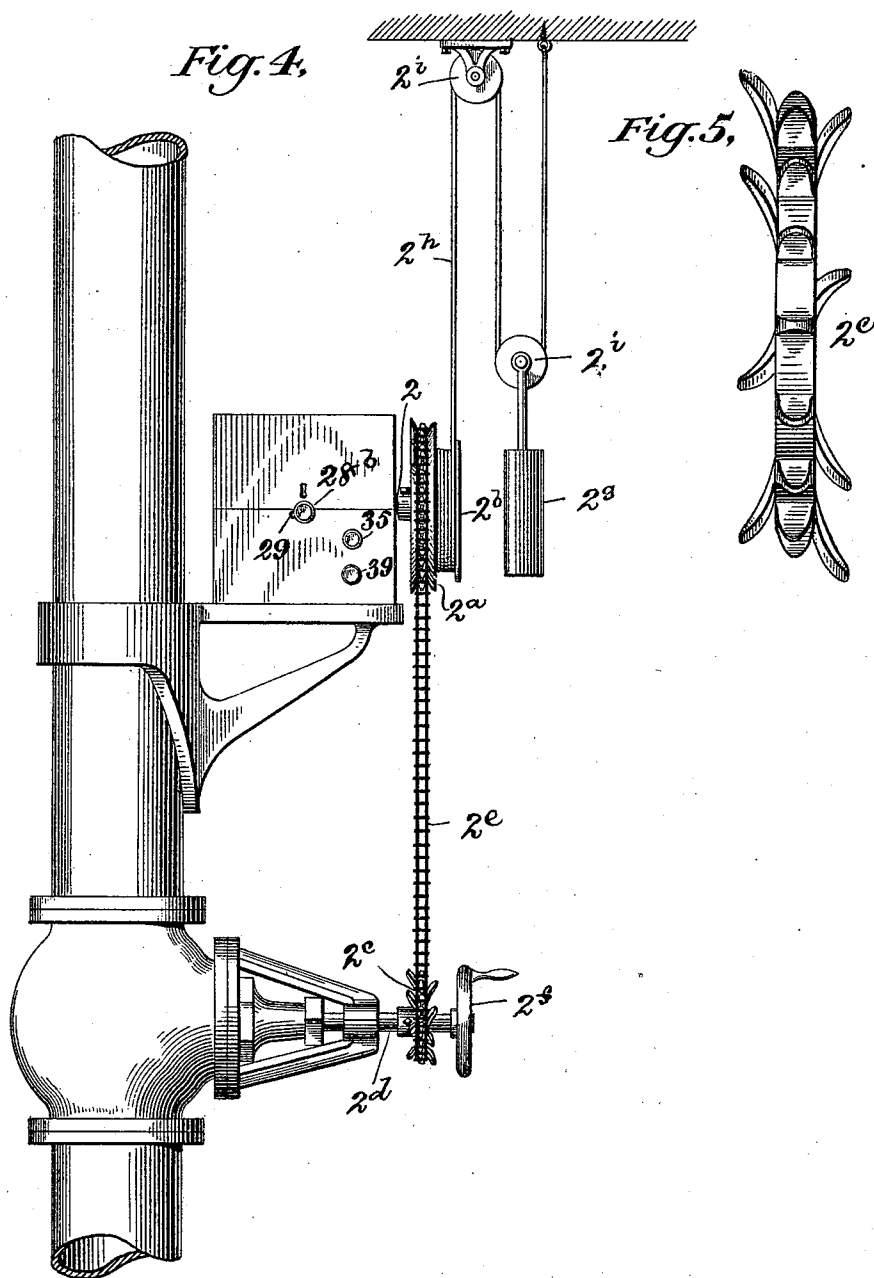
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Inventor: *James Brady*
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UNITED STATES PATENT OFFICE.

JAMES BRADY, OF BROOKLYN, ASSIGNOR TO LEONARD W. SWEET, OF
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ENGINE-STOP.

SPECIFICATION forming part of Letters Patent No. 552,464, dated December 31, 1895.

Application filed February 14, 1895. Serial No. 538,339. (No model.)

To all whom it may concern:

Be it known that I, JAMES BRADY, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Engine-Stops, of which the following is a specification.

My invention relates to a means for stopping steam or gas engines or other moving machinery from a distant point by means of a spring or weight operated mechanism which is released by an electric current sent through an electromagnet forming part of said mechanism.

The object of my invention is to provide safety appliances whereby engines and other machinery may be stopped from a distance, and to combine with the mechanism for such purpose a governing device, whereby a stoppage is effected in any case where the speed of the moving parts becomes too great for the safety thereof.

My invention relates to certain improvements on the device of C. A. Hatch, for which United States Letters Patent were issued October 10, 1893, No. 506,229.

My improvements are of a nature to simplify and render certain the action of the above-mentioned device.

My invention is set forth in the following specification and the drawings thereto appended, in which—

Figure 1 shows a plan view of my invention. Fig. 2 shows an elevation of one side thereof, and Fig. 3 shows a section on the line 3 3, Fig. 1. Fig. 4 shows my invention in its case connected to the valve of an engine and having an auxiliary driving-weight attached. Fig. 5 is an enlarged view of the valve-sprocket.

Referring to the drawings, 1 is a spring-barrel of usual construction and containing a spring. 2 is a shaft extending therefrom and passing through bearings in supports 3 4. This shaft projects beyond bearing 4 and carries on its end a transmitting-gear, preferably a sprocket-wheel 2^a having a drum 2^b. Upon said shaft is cut a thread 5, on which runs freely a nut 6 having peripheral notches cut in its periphery, as shown. Parallel to shaft 2 is a fixed rod 7 which passes through one of the notches in nut 6 and is adapted to

slide through holes in the supports 3 and 4, in which it is secured by the set-screw 8. By loosening set-screws 8 rod 7 may be withdrawn endwise and the nut 6 turned one way or the other to adjust its normal position on shaft 2, when the rod 7 is replaced, passing through the notch in nut 6, which comes in line with the said rod 7. Through other holes in supports 3 and 4 passes a sliding locking-bar 9 loosely fitting therein, and capable of longitudinal motion limited in one direction by a pin 10 through said bar, and in the other direction by the rim of the ratchet-wheel 11, whose function will be described later.

Upon bar 9 is an enlarged portion 13, beyond which is a coiled retracting-spring 12, lying partly within a recess in support 3, which tends to drive said bar away from the ratchet-wheel 11, with the teeth of which its end is formed to engage, after the manner of a detent. Upon bar 9 and on the opposite side of part 13 is a second coiled advancing-spring 14, stronger than spring 12, which holds a movable grooved collar 15 against a pin 16 passing through the bar 9 near the middle of its length.

The upper end of a releasing-lever 17 enters the groove in the movable collar 15 on the bar, while its lower end carries a pin 18, which may be brought into engagement with a lug 19 upon the armature 20 of an electromagnet 21, fastened to the base of the apparatus.

The spring-barrel 1 has on its circumference a gear 19* which meshes into a smaller gear 20* of the speed-regulator. Said speed-regulator is for controlling the speed of revolution of the shaft 2 and consists of a cylinder 21*, in which travels a piston 22 on the threaded shaft 23 of gear 20*. This cylinder 21* is filled on each side of the piston 22 with glycerine or oil, and the opposite ends have a communicating by-pass 24, in which there is an adjusting-valve 25 for increasing or diminishing the area of the opening there-through. The piston 22 has in it a check-valve 26, which allows of its free motion in one direction, but closes against motion in the opposite direction, compelling the transference of liquid from one end of the cylinder to the other to take place through the by-pass 24 and valve 25. The shaft 23 carries a

ratchet-wheel 11, held from rotating by the detent on the end of bar 9.

Pivoted upon an extension 3^a of support 3 at 27 is a setting-lever 28 having its inner end 28^a pivotally connected to the enlarged portion 13 of bar 9 and its outer end, which projects through the box or case in which the entire apparatus is inclosed, provided with a handle 28^b and a spring-latch 29 in such position that when fastened by the latch being sprung behind a keeper 29^a the lever 28 holds the end of bar 9 out of engagement with the teeth of ratchet-wheel 11. Binding-screws 30 31 receive the wires from the battery and push-buttons or other circuit-closing devices distributed at desirable points.

In applying my device to the valve of a steam-engine, a sprocket-wheel 2^c would be placed on the valve-stem 2^d thereof, and a gear-chain 2^e would connect this with the sprocket 2^a on shaft 2.

The operation of the device is as follows: The parts being in the position shown, upon opening the steam-valve of the engine by means of the usual wheel-handle 2^f the shaft 2 would be revolved in a direction to wind up the spring in the barrel 1. The nut 6 would be moved along shaft 2 by the screw thereon in the direction of support 4. The turning of the spring-barrel 1 would revolve the gear 20* with its shaft 23, thereby moving the piston 22 toward gear 20* in its cylinder 21*, the valve 26 opening to give free passage of the contained fluid therethrough. Having opened the steam-valve to a sufficient extent, the latch 29 of lever 28 is released by a pressure of the finger, allowing the bar 9 to have its end driven into engagement with the teeth of ratchet-wheel 11 by the spring 14, which being stronger than spring 12 overcomes the force of the latter. Upon desiring to close the steam-valve of the engine, one of the push-buttons closing the electric circuit to the binding-posts 30 31 is pressed. This sends a current through the electromagnet 21. The armature 20 is attracted and lug 19 escapes from engagement with the pin 18 on the lower end of lever 17. The upper end of said lever being engaged in the groove of collar 15 is now free to move, the tension of the spring 14 is released, and the bar 9 with its attachments is thrown out of line of the teeth of ratchet-wheel 11 by the spring 12. The spring in barrel 1 revolves the barrel with its shaft and the shaft of the regulator. The piston therein moves as described along the screw which pierces its center, and its check-valve now being closed the circulation of fluid between the ends of cylinder 21* must take place through the by-pass 24 and valve 25, whereby the speed of all the moving parts is controlled. As the steam-engine valve is gradually closed by the sprocket-gearing the nut 6 moves along the shaft 2, and at length comes in contact with collar 15, and the motion continuing said collar is driven along its shaft, the spring 14 is compressed, and the pin 18 on the lower end of

lever 17 is replaced behind the lug of the magnet-armature. When the steam-engine valve is again opened, said lug retains the end of lever 17 in position to be released by another impulse sent through the magnet. A rock-shaft or rod 35 passes through the case and has at its inner end a cranked portion 36 terminating in a heavy knob and insulated from the rod 35. The cranked end being turned into a vertical position is held there by a light spring 37 on lever 17, but when said lever is released it flies back with sufficient force to throw down the cranked arm 36 into contact with a spring 38^a on the insulated supporting-arm 38. A battery and bell are in circuit with wires leading from the cranked arm 36 and spring on the arm 38, so that upon releasing lever 17 an alarm is rung if desired. By turning another setting-handle 39 the cranked arm is lifted out of contact with spring 38^a and the alarm made inactive. This is accomplished by the lug 40 of the handle 39 driving aside the trip-arm 41, which projects from the rod 35, thereby turning rod 35 through a small angle.

It might happen in the case of a very large valve that the spring of my engine-stop would not have sufficient power to close said valve tightly. In this event I employ an auxiliary weight 2^g supported by a cord 2^h, which leads over suitable pulleys 2ⁱ to a drum upon the shaft of the engine-stop. By this arrangement the cord is wound around the drum, and the weight elevated as the spring of the engine-stop is wound up. Upon releasing the detent, by pressing one of the electric push-buttons, in the manner described above, the fall of the weight adds its force to that of the aforesaid spring, and the valve is effectually closed by the combined power of both.

In leading the gear-chain from the sprocket on the engine-stop to the sprocket on the valve, provision must be made for the axial advance of the valve-stem as the valve is closed.

The sprocket on the valve-stem is so adjusted to the other sprocket that the chain will pull at right angles to the axes of both sprockets when the valve is in its mid-position. When the valve is entirely open or closed, the links of the chain will of necessity approach the sprockets at an angle which will tend to cause them to mount the teeth of the sprockets and be thrown off the wheels. In order to prevent this accident, the sprockets may be provided with flanges on each side, and in the case of the sprockets on the engine-stop one of these flanges may be formed by the end of the drum which carries the cord for the auxiliary weight. In case no weight is used the sprockets may have instead of flanges a circle of projecting guide-lugs, cast in one piece therewith and so shaped as to direct the links upon the sprocket-teeth independently of the angle at which the links approach them.

Having thus described my invention, the

following is what I claim as new therein and desire to secure by Letters Patent:

1. In an engine-stop, the combination with the threaded power-shaft having a nut provided with peripheral notches; of the shaft-supports, the fixed rod seated in one of the peripheral notches and extending through holes in the shaft-supports, so as to enable the rod to be removed endwise therefrom when the nut is to be adjusted, and the set screw for fastening the rod; substantially as described.

2. In an engine-stop; the combination, with the sliding locking bar; of the pivoted setting lever, having its inner arm pivoted to the locking bar, and its outer arm provided with a handle, the spring latch pivoted to the outer arm, and the keeper with which the latch is automatically engaged and from which it is released manually for setting the locking bar; substantially as described.

3. In an engine-stop, the combination with the sliding locking bar; of the collar shiftable on the locking bar, the pin on the locking bar, for limiting the outward movement of the locking bar, the pin on the locking bar for limiting the outward movement of the collar, the pivoted setting lever having its short arm pivoted to the locking bar, the spring latch on the setting lever, the keeper with which the latch is engaged, the retracting spring on one side of the pivot of the locking bar, the advancing tension spring on

the other side of the locking bar, the releasing lever having its upper end engaging the collar, and a pin on its lower end, the electro magnet, and an armature provided with a lug engaging the pin of the releasing lever; substantially as described.

4. In an engine-stop, the combination, of the releasing lever having a spring arm, the rock-shaft having a crank-arm provided with a knob, and a supporting arm having a spring arm; substantially as described.

5. In an engine-stop, the combination, of the releasing lever having a spring arm, the rock-shaft having a crank arm provided with a knob, and a trip arm, a supporting arm having a spring arm, and the setting handle having a lug, adapted to engage the trip arm; substantially as described.

6. In an engine-stop, the combination with the power shaft, and threaded speed shaft, connected with the power-shaft; of the cylinder having a by-pass, connecting its ends, the adjusting valve for the by-pass, and the piston traveling on the threaded speed-shaft and operating in one direction, and a check valve located in the piston for permitting the piston to travel freely in the opposite direction; substantially as described.

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