No. 662,144. Patented Nov. 20, 1900.

M. J. CARROLL & T. D. & J. D. MILLEA.

DEVICE FOR STOPPING ENGINES.

(Application filed July 20, 1898.)

(No Model.) 4 Sheets—Sheet 1.

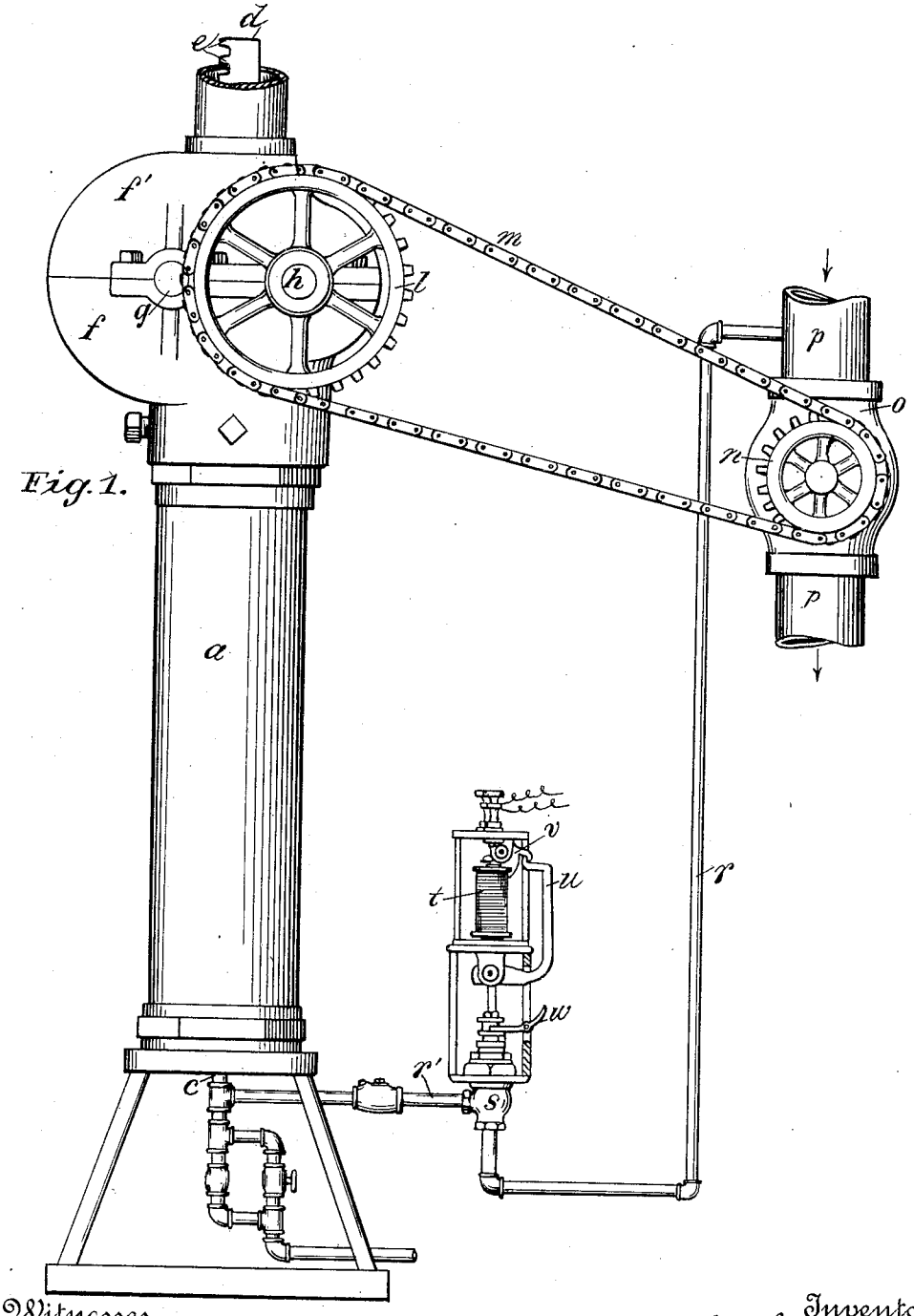


Fig. 1.

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Fig. 2.

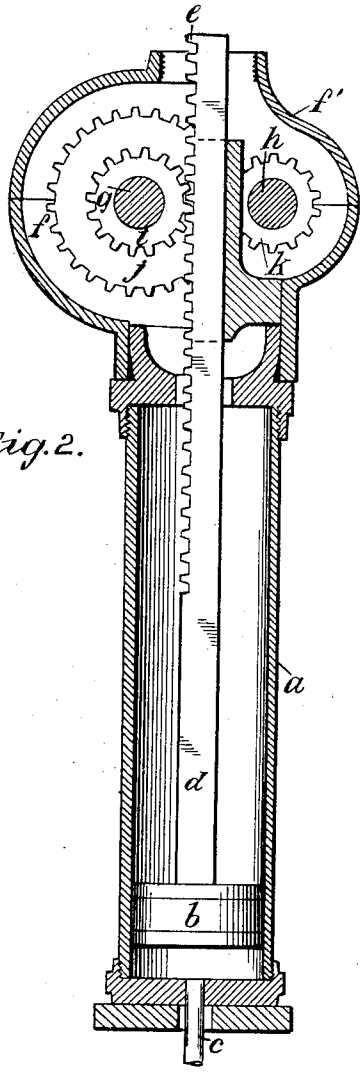
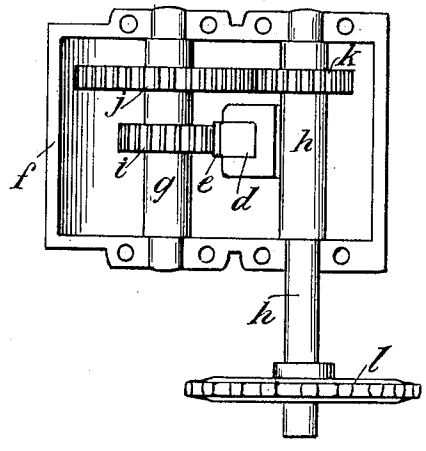


Fig. 3.



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Fig. 4.

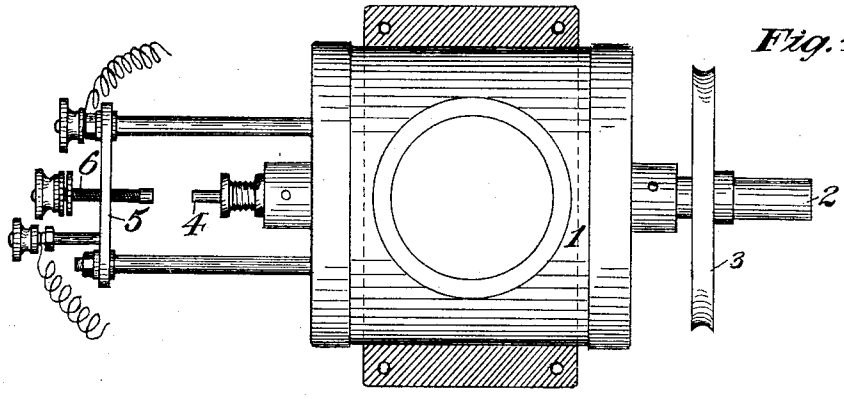


Fig. 5.

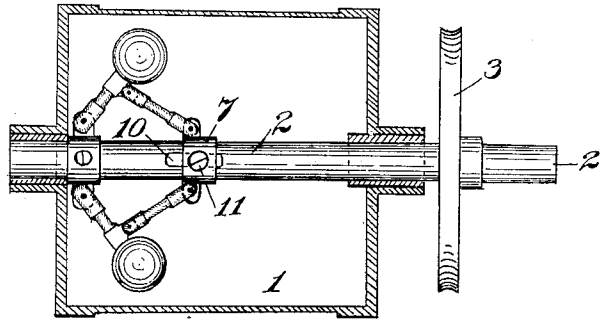
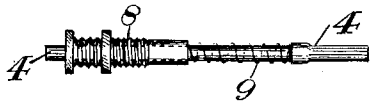


Fig. 6.



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DEVICE FOR STOPPING ENGINES.

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(No Model.) 4 Sheets—Sheet 4.

Fig. 7.

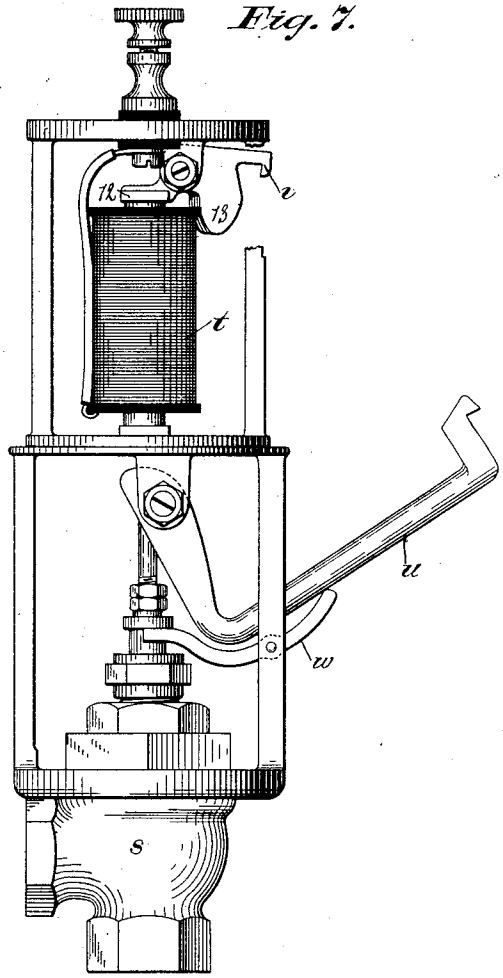
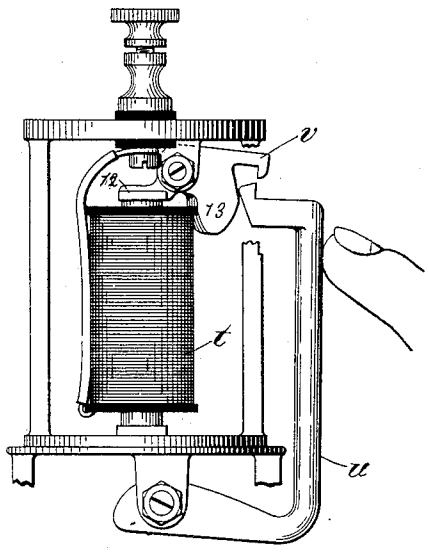


Fig. 8.



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UNITED STATES PATENT OFFICE.

MICHAEL J. CARROLL, THOMAS D. MILLEA, AND JOHN D. MILLEA, OF SPRINGFIELD, MASSACHUSETTS.

DEVICE FOR STOPPING ENGINES.

SPECIFICATION forming part of Letters Patent No. 662,144, dated November 20, 1900.

Application filed July 20, 1898. Serial No. 686,393. (No model.)

To all whom it may concern:

Be it known that we, MICHAEL J. CARROLL, THOMAS D. MILLEA, and JOHN D. MILLEA, citizens of the United States of America, and residents of Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Devices for Stopping Steam-Engines or other Motors, of which the following is a specification, reference being had to the accompanying drawings and the characters of reference marked thereon.

One object of our invention is to provide an improved construction of shut-off mechanism which may be employed with both high and low speed motors and with motors provided with governors of any construction and a device wherein, if desired, an independent governor may be employed to put in operation the shut-off mechanism, so that the engine or other motor may be provided with two safeguards, thus avoiding a danger at times resulting from the clogging of the ordinary governor employed.

A further object is to provide an improved mechanism which while being of simple construction and of few parts will be effective and practical in its operation and a device which may be set up without altering the construction of the motor with which it is intended to operate.

We accomplish the objects of our invention by the mechanism illustrated in the accompanying drawings, in which like characters of reference indicate like parts.

Figure 1 is a side elevation of the stop mechanism. Fig. 2 is a vertical sectional view of the shut-off-cylinder mechanism. Fig. 3 is a plan view of the shut-off cylinder, the cap being removed. Fig. 4 is a plan view of the auxiliary governor mechanism. Fig. 5 is a plan view showing the governor shell or case in section and with a part of the mechanism in place. Fig. 6 is a view of the adjustable contact-stem. Fig. 7 is a side elevation of the valve which controls the inlet to the shut-off cylinder, the magnet, its supporting-frame, and parts mounted thereon; and Fig. 8 is a side elevation of the electromagnet and its frame and showing the lever u in the act of being set.

In detail, a indicates a cylinder; b, a piston-head; c, an inlet-port; d, a piston-rod provided with teeth; e, teeth on the piston-rod; f, a gear-supporting case; g and h, gear-shafts; i k j, gears; l, sprocket-wheel; m, a sprocket-chain; n, sprocket-wheel mounted on the valve-spindle; o, throttle-valve body; p, main conduit to motor; r, conduits; s, inlet-valve; t, electromagnets; u, releasing arm or lever; v, latch; w, relief-lever.

1 indicates the governor-case; 2, governor-shaft; 3, governor-pulley; 4, contact-stem; 5, binding-post support; 6, adjustable contact-screw.

The construction and operation of our device will be readily understood on reference to the drawings in connection herewith.

In Fig. 1 we illustrate the construction of our device for operating an ordinary globe throttle-valve, which valve is arranged in the main conduit of a steam-engine or other motor.

The preferable method of arranging the device is to mount the cylinder a upon a suitable support in a vertical position and mount the gear-case f upon the cylinder. The two shafts g and h are mounted in the gear-case. A gear i is mounted on the shaft g and is arranged to mesh with the teeth e on the piston rod or rack d. A gear j is mounted upon the shaft g, and a gear k is mounted on the shaft h, the gears k and j being arranged to mesh with each other. A sprocket-wheel l is mounted upon the shaft h, and a sprocket-wheel n is mounted on the stem of the throttle-valve o. A sprocket-chain m extends between the two sprocket-wheels, as illustrated in the drawings.

The device as illustrated is arranged with the shut-off or throttle valve in the main conduit open, the piston-head b being adjacent to the inlet-port c, and when steam, water, or other medium under pressure is admitted to the cylinder the piston-head b is caused to move, carrying the rod or rack d, thus revolving the gear i and with it the shaft g and gear j, the latter in turn causing the revolution of the gear k and it causing the shaft h to revolve and with it the sprocket-wheel l, thus through the medium of the sprocket-chain and sprocket-wheel n causing the revolution

of the valve-stem and the consequent closing of the valve. A stop is arranged in any convenient manner to take the thrust of the piston rod or rack *d* or piston-head *b* after it has moved the requisite distance to cause the closing of the throttle-valve, so that further strain upon the valve or its stem is avoided. The steam or other medium is admitted into the cylinder through the conduits *r* and *r'*, a valve *s* being interposed to shut off the supply except when desired. The valve *s* is maintained in its closed position by the lever *u*, which lever when in its raised position, as shown in Figs. 1 and 8, bears downwardly continually upon the stem of the inlet-valve *s* and maintains this valve in its closed position, which prevents the passage of steam or other medium through the conduit. When, however, the electromagnet is energized, the armature is drawn toward the core of the electromagnet. The latch *v* is raised by the motion of the armature. The lever *u* is released and moves to a position which allows the stem of the inlet-valve *s* to be raised and thus the valve *s* opened. To aid in the opening of this valve, we provide a lever *w*, and when the lever *u* strikes the lever *w* it tends to force the valve-stem upwardly, thus overcoming any tendency to stick which might be found if the valve had not been operated for a long time. The armature 12 and the latch *v* are mounted upon the same pivot and operate together, and the latch *v* has a downwardly-projecting lug 13, against which the free end of the lever *u* strikes when it is thrown back to its elevated position, and this lug is provided with an inclined front face in its upper portion, so that when the lever *u* is forced against the lug with sufficient force the free end of the latch *v* is forced downwardly, thus causing its overhanging part to engage the lever *u* and at the same time the armature is lifted from the magnet-core. It will thus be observed that the device may be set with a single motion, as it is simply required to carry the lever back to its normal position, which operation results in causing it to be engaged by the latch *v* and the armature to be moved from contact with the magnet-cores.

The circuit which energizes the electromagnets and causes the armature to move is made or broken by push-buttons or switches located in the building at a point remote from the motor and is also made and broken when an ordinary ball-governor is used by mounting a contact-piece upon a movable part of the governor and mounting contact-pieces in the path of the movable contact-piece, so that the motor will be controlled between certain predetermined limits. This arrangement of speed-limit construction and the specific construction of the valve *s* are made the subject-matter of other applications filed by the said Thomas D. Millea and are not therefore illustrated and described in detail herein. It will be observed, however, that valves and speed-limit devices of various forms of construction may be employed with the invention herein described and that we do not limit ourselves herein to the construction illustrated in said applications. When the motor is not provided with the ordinary ball-governor and in cases where a supplementary governor is desired, we employ a governor like that illustrated in Figs. 4, 5, and 6, which comprises a suitable support or case having a shaft 2 and a driven wheel 3 mounted upon the shaft, this being driven by a belt running from the main driving-shaft of the motor, governor-arms with balls of the well-known type of construction being mounted upon the shaft 2, with a collar 7 free to move within certain limits. The position of the collar will be controlled by the rapidity of the revolution of the governor-shaft 2. The contact-stem 4 is mounted in a central recess in the shaft 2 and projects through an adjustable collar 8, a spring 9 serving to maintain the inner end of the contact-stem 4 against pins or screws which pass through the collar and enter the slot 10 in the shaft. The governor may be regulated by compressing the spring 9, this being accomplished by turning the collar 8 to carry it either in or out from the opening in the end of the shaft 2, the opening in the end of this shaft being provided with a thread to receive the threaded portion of the collar 8. If now the adjustable contact screw or piece 6 be so adjusted with reference to the outer end of the stem 4 that when the motor is running at the desired speed the end of the stem 4 is adjacent to but out of contact with the contact-screw 6, contact will not be made and the shut-off mechanism will not be put in operation. When, however, this speed is exceeded, then the collar will be moved to bring the stem 4 in contact with the contact-piece 6, a circuit will be established, and the shut-off mechanism put in operation.

It will be seen that the device can be arranged to work on both an open and a closed circuit.

Having therefore described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a device for stopping engines, the combination of the main steam-pipe, a throttle-valve mounted therein, a sprocket-wheel on the stem of the throttle-valve, a piston-cylinder, a steam conduit-pipe leading from the main steam-pipe between the boiler and the throttle-valve and opening into the said cylinder, a valve interposed in said steam conduit-pipe, a lever *u* to hold said valve closed, a pivotally-supported latch to lock the lever in position, an armature movable with the latch, an electric magnet to operate the armature and move the latch to release the lever, a piston in the cylinder provided with a toothed piston-rod, gears meshing with the piston-rod, a sprocket-wheel on one of the gear-shafts and

a sprocket-chain connecting the latter-mentioned sprocket-wheel with the sprocket-wheel on the throttle-valve stem.

2. The combination of the cylinder *a*, the piston *b*, the tooth-provided rod *d*, the gear *i* arranged to mesh with the teeth on said rod, the gear *j* mounted on the same shaft with the gear *i*, the gear *k* with its teeth arranged to mesh with the teeth of the gear *j*, the sprocket-wheel *l* mounted on the same shaft with the gear *k*, a valve having a disk arranged to be moved by the rotation of its stem, the sprocket-wheel *n* mounted on said valve-stem to cause the rotation thereof, and a sprocket-chain extending between the two sprocket-wheels, substantially as shown.

3. The combination of the cylinder *a*, the piston *b*, the tooth-provided piston-rod *d*, the gear *i* arranged to mesh with the teeth on the piston-rod, the gear *j* mounted on the same shaft with the gear *i*, the gear *k* with its teeth arranged to mesh with the teeth of the gear *j*, the sprocket-wheel *l* mounted on the same shaft with the gear *k*, a valve having a disk arranged to be moved by rotation of its stem, the sprocket-wheel *n* mounted on said valve-stem to cause the rotation thereof, a sprocket-chain extending between the two sprocket-wheels, the conduit *r r'*, a valve *s* mounted in said conduit, and direct means to control the valve *s* from a point remote therefrom, substantially as shown.

4. The combination of the cylinder *a*, the piston *b*, the tooth-provided piston-rod *d*, the gear *i* arranged to mesh with the teeth on the piston-rod, the gear *j* mounted on the same shaft with the gear *i*, the gear *k* with its teeth arranged to mesh with the teeth of the gear *j*, the sprocket-wheel *l* mounted on the same shaft with the gear *k*, a valve having a disk arranged to be moved by rotation of its stem, the sprocket-wheel *n* mounted on said valve-stem to cause the rotation thereof, a sprocket-chain extending between the two sprocket-wheels, the conduit *r r'*, a valve *s* mounted in said conduit and direct means to control the valve *s* from a point remote therefrom, comprising an electrically-controlled mechanism, substantially as shown.

5. The combination of the cylinder *a*, the piston *b*, the rack-provided piston-rod *d*, the gear *i* arranged to mesh with the teeth on the piston-rod *d*, the gear *j* mounted on the same shaft with the gear *i*, the gear *k* with its teeth arranged to mesh with the teeth of the gear *j*, the sprocket-wheel *l* mounted on the same shaft with the gear *k*, a valve having a disk arranged to be moved by rotation of its stem, the sprocket-wheel *n* mounted on said valve-stem to cause the rotation thereof, a sprocket-chain extending between the two sprocket-wheels, the conduit *r r'*, a valve *s* mounted in said conduit and electrical means to directly control the valve *s* from a point remote therefrom, comprising the lever *u* mounted to engage the stem of the valve *s*, an electromagnet, an armature pivotally mounted, a latch *v* operatively connected with the armature and adapted to engage and release the lever *u*, a source of electrical energy and suitable conductors, substantially as shown.

6. The combination with a shut-off mechanism actuated by the making and breaking of an electric circuit, of a governor-shaft formed with an internal bore or recess, an adjustable sleeve 8 in the recess or bore, a stem 4 projected through the sleeve 8, and connected to the governor, and expanding spring 9 on the stem, an adjustable contact-piece 6 arranged to contact with said stem, and suitable electrical conductors to energize the contact-piece, substantially as described.

7. The combination in a shut-off mechanism, of an electromagnet, a pivotally-supported combined armature and latch, the latch being formed with a projection 13, a lever *u* engaging the projection on the latch, a valve engaged by the lever, substantially as and for the purpose specified.

8. In a device for stopping engines, the combination of the main steam-pipe, a throttle-valve mounted therein, a sprocket-wheel on the stem of the throttle-valve, a piston-cylinder, a steam conduit-pipe leading from the main steam-pipe between the boiler and the throttle-valve and opening into the said cylinder, a valve interposed in said steam conduit-pipe, a lever *u* to hold said valve closed, a pivotally-supported latch to lock the lever in position, a lever *w* actuated by the lever *u* to lift the interposed valve, an armature movable with the latch, an electromagnet to operate the armature and move the latch to release the lever, a piston in the cylinder provided with a toothed piston-rod, gears meshing with the piston-rod, a sprocket-wheel on one of the gear-shafts, and a sprocket-chain connecting the latter-mentioned sprocket-wheel with the sprocket-wheel on the throttle-valve stem.

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