(No Model.) 2 Sheets—Sheet 1.

G. W. BROWN.

APPARATUS FOR STOPPING ENGINES.

No. 575,144. Patented Jan. 12. 1897.

Fig. 4.

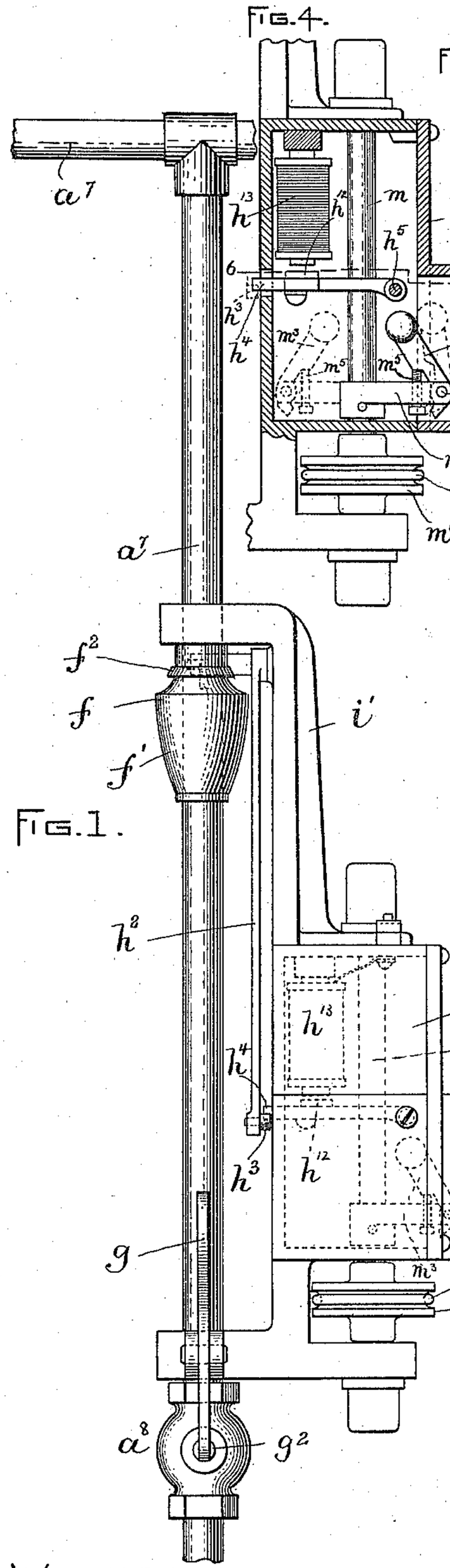


Fig. 1.

Fig. 5.

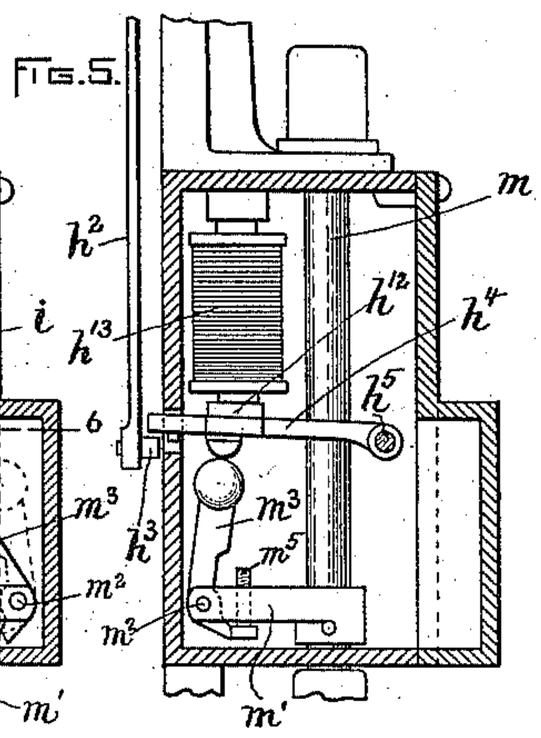


Fig. 6.

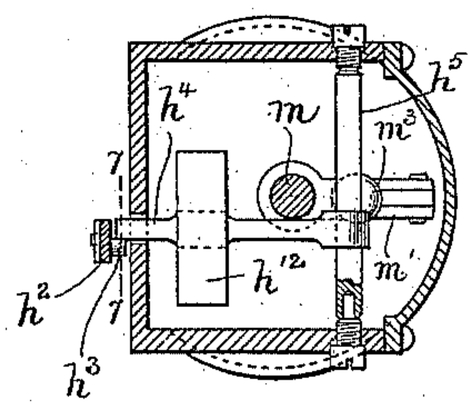


Fig. 7.

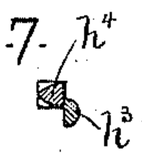


Fig. 2.

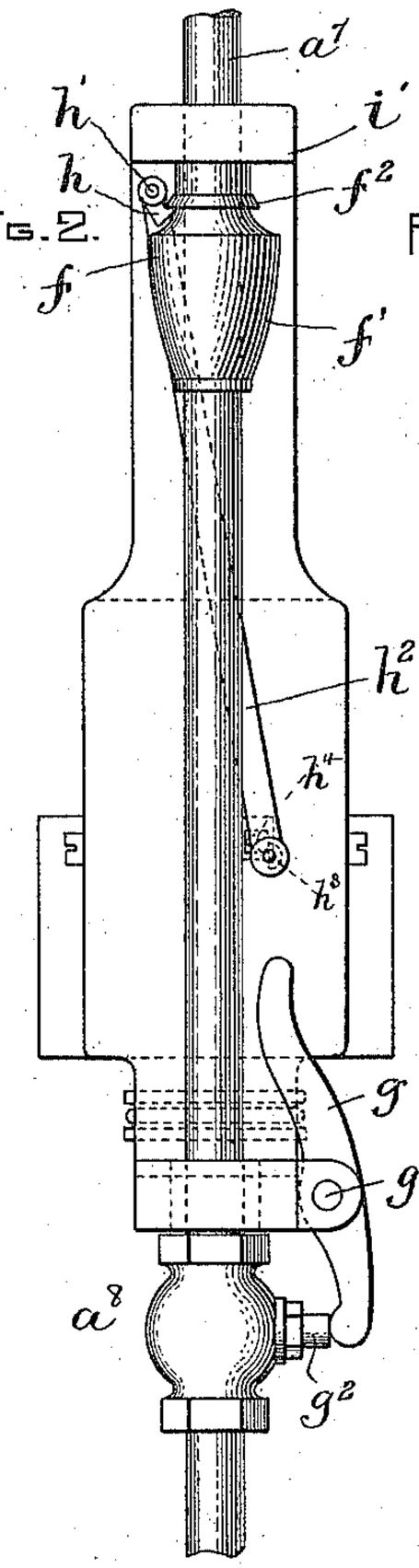
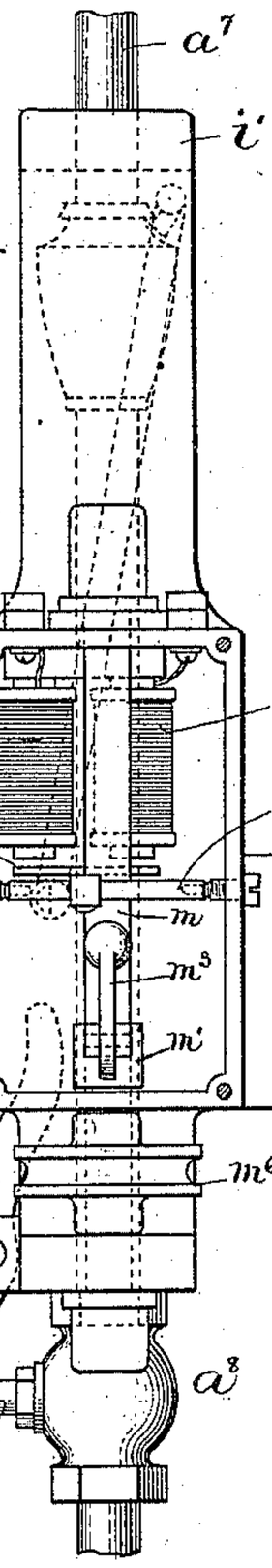


Fig. 3.



Witnesses:
E. Batchelder
A. D. Harrison

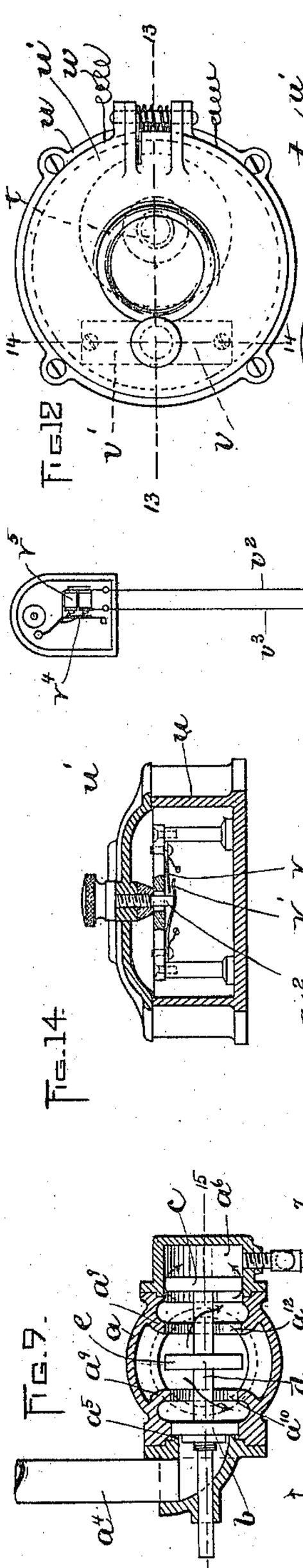
Inventor:
Gilman W. Brown
by Wright Brown & Quinby
Attys

(No Model.) 2 Sheets—Sheet 2.

G. W. BROWN.

APPARATUS FOR STOPPING ENGINES.

No. 575,144. Patented Jan. 12, 1897.



WITNESSES:
E. Batchelder
A. D. Harrison.

INVENTOR:
Gilman W. Brown
by Wright Brown & Quinby
Attys.

UNITED STATES PATENT OFFICE.

GILMAN W. BROWN, OF WEST NEWBURY, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE ELECTRO STEAM APPLIANCE COMPANY, OF NEW JERSEY.

APPARATUS FOR STOPPING ENGINES.

SPECIFICATION forming part of Letters Patent No. 575,144, dated January 12, 1897.

Application filed October 4, 1895. Serial No. 564,582. (No model.)

To all whom it may concern:

Be it known that I, GILMAN W. BROWN, of West Newbury, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Apparatus for Stopping Engines, of which the following is a specification.

This invention relates to apparatus of the character described in Letters Patent of the United States No. 544,085, granted to me August 6, 1895, for improvements in apparatus for stopping engines, said apparatus including a casing adapted to form a part of the steam-conduit which supplies the engine and provided with a steam-outlet and with a cylinder having a vent, an outlet-closing valve within the casing adapted to be held in its closed position by the steam-pressure, a valve-operating piston movable in said cylinder and connected with the outlet-valve, a vent-controlling valve adapted to close said vent, a vent-valve-operating device or actuator adapted to be set for action, and an actuator-arresting trigger or trip, the arrangement being such that upon the release of said actuator the vent will be opened, thus permitting the escape of steam from the cylinder at one side of the valve-operating piston, so that the steam-pressure in said casing will displace the piston and close the steam-conduit, thus shutting off the steam from the engine and at the same time opening the steam-outlet to the atmosphere. In said patent I show electrically-controlled means, adapted to be operated by an attendant, for releasing or unlocking the vent-valve actuator.

It is the object of my present invention to provide means for automatically unlocking the actuator by speed-controlled mechanical means under such an arrangement that when the speed of the engine is unduly increased or exceeds a predetermined rate the actuator will be allowed to act.

The invention also has for its object to provide means for giving an alarm prior to the release of the actuator by the electrically-controlled trigger-operating means set forth in said patent, the apparatus being equipped with both electrical and mechanical means for releasing the actuator. The object of said alarm is to reduce to the minimum the liability of unnecessary tampering with the apparatus, particularly by mischievously-disposed persons.

To these ends the invention consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a side elevation of that portion of the apparatus which includes my improved mechanical or speed-controlled actuator-releasing means. Fig. 2 represents an elevation of the construction shown in Fig. 1 from a different point of view. Fig. 3 represents an elevation from the side opposite that shown in Fig. 2. Figs. 4 and 5 represent vertical sections of a portion of the apparatus. Fig. 6 represents a section on the line 6 6 of Fig. 4. Fig. 7 represents a section on line 7 7 of Fig. 6. Fig. 8 represents an elevation showing an engine provided with my improvements. Fig. 9 represents a section on line 9 9 of Fig. 8. Fig. 10 represents a section similar to Fig. 9, showing the parts in a different position. Fig. 11 represents a section on line 11 11, Fig. 8. Fig. 12 represents a top view of the shell or casing which contains the circuit-closing device hereinafter referred to. Fig. 13 represents a section on line 13 13, Fig. 12. Fig. 14 represents a section on line 14 14, Fig. 12. Fig. 15 represents a section on line 15 15, Fig. 9.

The same letters of reference indicate the same parts in all the figures.

In the drawings, a represents a casing which forms a part of the conduit a', supplying steam to a steam-engine a^2. a^4 represents an outlet connecting said casing with the external air, said outlet having at its inner end an annular valve-seat a^5.

b represents the outlet-closing valve, which is formed to be seated upon the seat a^5 and is adapted to be held upon said seat by the steam-pressure in the casing under normal conditions.

c represents the valve-operating piston, which is connected by a rod or stem d within the outlet-valve b and is located in a cylinder a^6, which forms a part of the casing, said cylinder opening at one end, which I term

the "mouth" of the cylinder, into the casing, and having at its other end a vent a^7, which is preferably a pipe extending from said cylinder and provided with a valve a^8, whereby it may be opened and closed. The piston c fits the interior of the cylinder a^6 somewhat loosely, so that steam can pass around it into the cylinder, as indicated by the arrows in Fig. 9, steam being thus caused to balance the piston so long as the vent a^7 remains closed. So long as the piston is thus balanced the shut-off valves hereinafter described are held open and the outlet-valve b is closed, the latter being subjected to steam-pressure upon one side only.

The piston c is of greater area than the outlet-valve, so that when the vent of the cylinder is opened, as hereinafter described, it releases the pressure from the cylinder and thereby unbalances the piston, the steam-pressure exerted on the inner side of the piston displacing the latter, forcing it into the cylinder, and removing the outlet-valve from its seat, thus opening the outlet a^4, as shown in Fig. 10, and permitting a discharge of the steam into the atmosphere. This operation relieves the pressure in the casing and in the conduit between the casing and the engine sufficiently to prevent the pressure of the steam between the casing and the engine from continuing the operation of the engine.

Between the steam-inlet end and the steam-outlet end of the casing are offset partitions a^9, which project from the inlet end of the casing across the central portion thereof and are provided with two ports a^{10} a^{12}, through which steam passes from the inlet to the discharge side of the casing, the valve-stem d passing through said ports, as shown in Fig. 9. Between the valve b and piston c is located a shut-off valve e, also affixed to the stem d. When the outlet-valve is closed upon its seat a^5, it is separated from the port a^{10} and the shut-off valve e is separated from the port a^{12}, both of said ports being unobstructed, so that the steam passes through them, as indicated in Fig. 9. When the piston is unbalanced and displaced, as shown in Fig. 10, the outlet-valve closes the port a^{10} and the shut-off valve e closes the port a^{12}, so that when the outlet a^4 is opened the passage of steam through the casing is at the same time shut off.

The valve a^8, which opens and closes the vent of the cylinder, is opened by an actuator, which is preferably a weight f, fitted to slide upon a vertical guide, such as the vent-pipe a^7, said weight having an inclined face f' upon its lower portion formed to engage a lever g, which is pivoted at g' to the valve-casing and bears upon the stem g^2 of the valve. When the weight f is dropped from the elevated position shown in Fig. 2, it moves the lever g and causes the latter to open the valve. The weight f is provided with a flange f^2 at its upper end, which is engaged by a trigger or trip h, pivoted at h' to a fixed standard i', which may be supported in any suitable way. Said trigger has an elongated arm h^2, which projects downwardly and is provided at its lower end with a stud h^3. h^4 represents a lever or detent pivoted at h^5 to the casing i and formed at its outer end to engage said stud h^3 and thus lock the trigger. An armature h^{12} is attached to the lever or detent h^4, said armature being arranged in suitable proximity to the poles of an electromagnet h^{13}, supported in the casing i and included in an electric circuit. When the circuit is broken and the armature is released, the detent h^4 is held in the position shown in Fig. 4 by gravitation and is engaged with the stud h^3 on the trigger-arm, the trigger being therefore caused to hold the weight f in its raised position. When the circuit is closed, the armature is attracted and raises the detent h^4, causing it to release the arm h^2 and the trigger h. The weight f is thus released and allowed to drop and open the valve in the vent of the cylinder.

The construction thus far described is substantially the same as in my former patent above mentioned.

My present improvements relate chiefly to the let-off mechanism whereby the weight or actuator f may be released and allowed to act, and they comprise speed-controlled means operated by the engine for releasing the weight automatically when the speed of the engine rises above a predetermined point, thus preventing the engine from "running away." To this end I provide a shaft m, which is journaled in suitable bearings in or contiguous to the casing i. To said shaft is affixed a projection m, which supports a weighted arm m^3, the latter being pivoted at m^2 to the projection m'. The weighted arm normally stands inclined inwardly from the pivot m^2 toward the shaft, as shown in Fig. 4, and is supported by an adjustable stop-screw m^5, the weight of the arm holding it in said position under normal conditions. The shaft m is connected with a moving part of the engine, so that it is continuously rotated while the engine is in operation, the connecting means here shown being a pulley m^6 on the shaft and a belt m^7, running from said pulley to the main shaft m^8 of the engine, Fig. 11.

The arm m^3 is so weighted and arranged and the shaft m is so connected with the engine that when the engine is running at a normal or safe rate the weighted arm will remain at rest on the stop m^5. When, however, the speed of the engine exceeds a predetermined limit, the arm m^3 is thrown outwardly by centrifugal force, as shown in Fig. 5 and by dotted lines in Fig. 4, and assumes a position which causes it to strike the detent h^4 and raise the latter out of engagement with the trigger-arm h^2, the latter be-

ing thus released and the weight *f* allowed to act. It will be seen, therefore, that I have provided a speed-controlled let-off which is adapted to automatically cause the operation of the engine-stopping apparatus without interfering with the electrically-controlled means for accomplishing the same result and is made operative by an increase in the speed of the engine. I believe this to be broadly new, and I therefore do not limit myself to the details of mechanism herein shown and described, and may variously modify the same without departing from the spirit of my invention.

The electromagnet h^{13} is included in a suitable electric circuit, comprising the circuit-wires *w w'* and a push-button or manually-operated circuit-closing device *t*, Figs. 12 and 13, adapted to be moved to close the circuit and energize the magnet, thus causing the operation of the above-described apparatus. In order to prevent the needless operation of said apparatus by mischievously-disposed persons, I provide means for giving an alarm prior to the closing of the circuit, so that the intention of any person to close the circuit will be made manifest. To this end I inclose the circuit-closer *t* in a casing *u*, having a cover *u'*, which must be opened before access can be had to the circuit-closer. In the casing are two separable terminals *v v'*, which, together with the wires v^2 v^3, constitute a branch of the main circuit, which includes the electromagnet h^{13} and the wires *w w'*. The branch circuit includes an electric bell v^4, operated by an electromagnet v^5 of much higher resistance than the electromagnet h^{13}. When the cover *u'* is opened, the terminal *v'* comes in contact with the terminal *v* and thus closes the circuit. Owing to the high resistance of the electric bell and the low resistance of the trigger-operating electromagnet h^{13} the bell will be operated, but the trigger will not be released until the circuit-closer *t* is operated, thus cutting out the branch circuit and the bell, whereupon the magnet h^{13} will operate to release the trigger. It will be seen, therefore, that no one can operate the apparatus electrically without first giving an alarm.

I claim—

1. In an apparatus of the chararcter specified, the combination with a vent-controlling valve, of an actuator therefor, an armature serving as a detent normally restraining said actuator, and speed-controlled means actuated by the power of the engine to displace said detent by centrifugal force, substantially as and for the purpose described.

2. In an apparatus of the character specified, the combination with a vent-controlling valve, of an actuator therefor, a detent normally restraining said actuator, and speed-controlled means actuated by the power of the engine to displace said detent by centrifugal force, substantially as described.

3. An apparatus of the character specified, comprising a vent-controlling valve, an actuator therefor, an actuator-arresting trigger or trip, a locking arm or detent normally standing in position to lock the said trigger, and speed-controlled means actuated by the power of the engine to displace said detent by centrifugal force and thereby release the trigger and actuator, substantially as described.

4. In an apparatus of the character specified, the combination with a vent-controlling valve, of an actuator therefor, an electromagnet, a centrifugal speed-controlled device, and a detent or trigger normally restraining the valve-actuator and located between the electromagnet and the centrifugal speed-controlled device and adapted to be actuated by either.

5. An apparatus of the character specified comprising a vent-controlling valve, an actuator therefor, an actuator-arresting trigger or trip, a locking arm or detent which normally stands in position to lock said trigger, a shaft contiguous to said detent adapted to be driven by the engine, and a weighted arm pivotally connected with said shaft and adapted to be moved centrifugally into position to release said trigger.

6. An apparatus of the character specified, comprising a vent-controlling valve, an actuator therefor, an actuator-arresting trigger or trip, a locking arm or detent which normally stands in position to lock said trigger, an electromagnet arranged to displace said detent when energized, a shaft contiguous to said detent adapted to be driven by the engine, and a weighted arm pivotally connected with said shaft and adapted to be moved centrifugally into position to release said trigger.

7. In an apparatus of the character specified, the combination of a vent-controlling valve, an actuator therefor, electrically-operated actuator-controlling means including an electric circuit and a circuit-closing device therein, a shield or casing adapted to normally prevent the operation of said circuit-closing device, a branch circuit which is broken by the cover of said shield when said cover is closed and is closed automatically when said cover is opened, and an alarm included in said branch circuit and adapted to be made operative by the opening of the casing.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 19th day of September, A. D. 1895.

GILMAN W. BROWN.

Witnesses:
C. F. BROWN,
A. D. HARRISON.