

(No Model.)

2 Sheets—Sheet 1.

J. H. CRUTCHFIELD.
CUT-OFF FOR LOCOMOTIVES.

No. 567,299.

Patented Sept. 8, 1896.

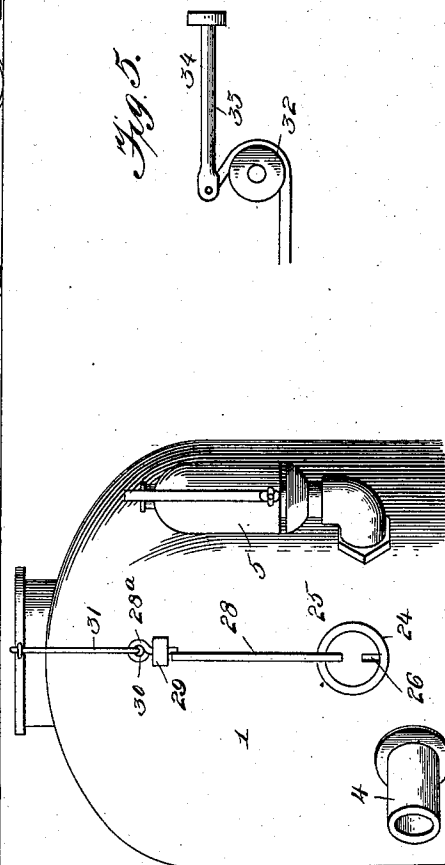
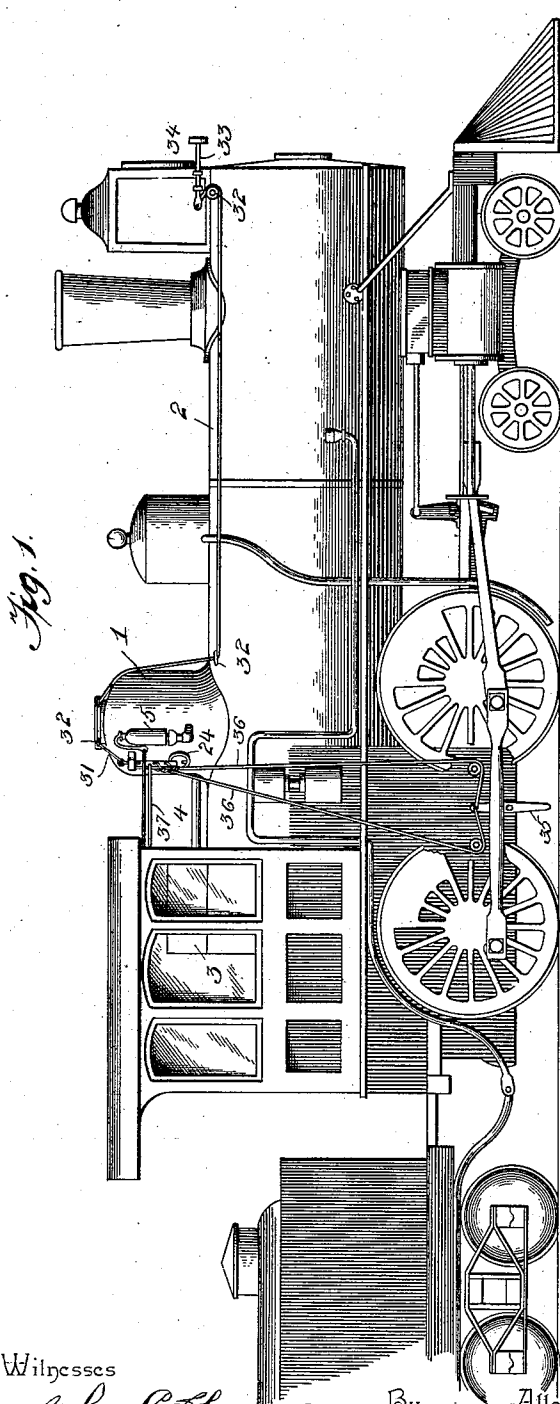
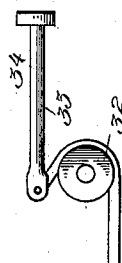


Fig. 3.



Witnesses

John C. Shaw
W. B. Shaw

By

Attorneys,

John H. Crutchfield

Ca. Snow & Co.

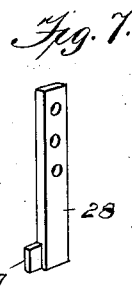
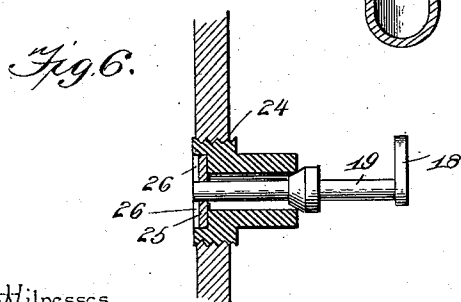
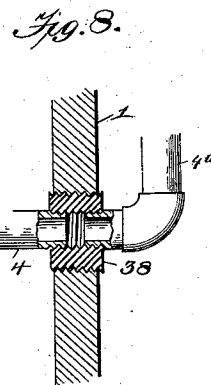
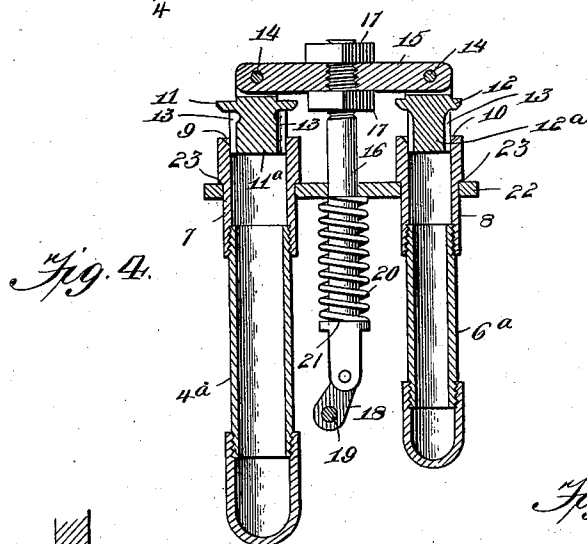
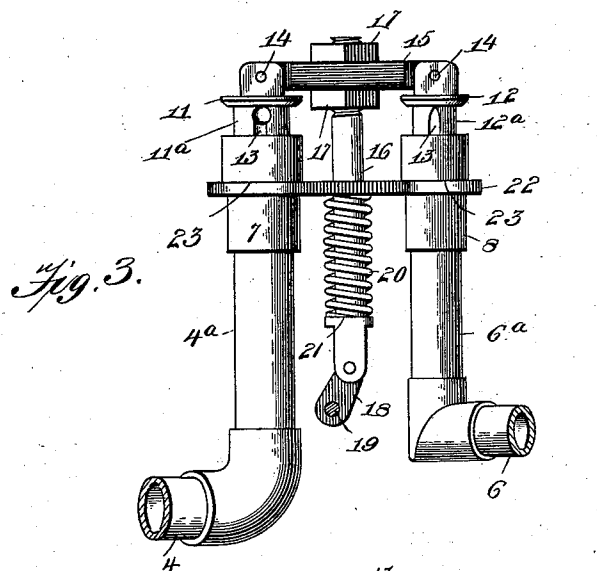
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2 Sheets—Sheet 2.

J. H. CRUTCHFIELD.
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Witnesses

John C. Shaw
[Signature]

By *his* Attorneys,

John H. Crutchfield,

Carroll & Co.

Inventor

UNITED STATES PATENT OFFICE.

JOHN H. CRUTCHFIELD, OF CHARLOTTE, NORTH CAROLINA.

CUT-OFF FOR LOCOMOTIVES.

SPECIFICATION forming part of Letters Patent No. 567,299, dated September 8, 1896.

Application filed October 10, 1895. Serial No. 565,272. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. CRUTCHFIELD, a citizen of the United States, residing at Charlotte, in the county of Mecklenburg and State of North Carolina, have invented a new and useful Automatic Cut-Off for Locomotives, of which the following is a specification.

My invention relates to cut-off mechanism for locomotives, and has for its object to provide simple and efficient means for closing certain valves which allow steam to pass from the boiler in case of accident, such as a collision or derailment, the closing of said valves cutting off the steam from the reservoir in the engineer's cab and from the whistle, as well as from any heating or steam-circulating pipes which may extend to the other parts of the train.

Further objects and advantages of the invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a side view of a locomotive-engine equipped with cut-off mechanism embodying my invention. Fig. 2 is a rear view of the dome, showing the position of the trigger and contiguous parts when the valves are open. Fig. 3 is a rear view of the valve mechanism. Fig. 4 is a vertical section of the same. Fig. 5 is a detail view of the trip which projects beyond the front end of the engine. Fig. 6 is a detail section parallel with the rock-shaft. Fig. 7 is a detail view of the trigger. Fig. 8 is a detail section of the connection between the steam-pipes and the dome at the point of penetration.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

1 designates the dome of the boiler 2, and 3 represents the reservoir, which is arranged in the engineer's cab and is in communication with the dome by means of a pipe 4. The whistle mechanism 5 is also in communication with the dome by means of the pipe 6.

The object of the invention, as above explained, is to provide means for closing communication between the dome and the pipes 4 and 6, as well as any other pipes which may be connected with the dome. It will be suf-

ficient for the purposes of illustration to describe the means which I employ for automatically closing the pipes shown in the drawings, and in order to adapt said pipes for the application of valves they are provided within the dome with vertical extensions 4^a and 6^a, respectively, to which are attached tubular casings 7 and 8, containing valve-seats 9 and 10. Operating in said casings are the valves 11 and 12, of which the cores 11^a and 12^a are longitudinally channeled, as shown at 13, to allow the passage of steam from the dome to the pipes 4 and 6 when the valves are unseated, while the cores serve as guides for said valves.

The upper ends of the valves are pivotally connected, as at 14, with the extremities of a cross-head 15, and adjustably attached to the center of this cross-head is a stem 16, which is engaged above and below the plane of the cross-head by the nuts 17. The lower extremity of this stem is pivotally connected to a crank-arm 18 on a rock-shaft 19, a spring being coiled upon the stem with its lower end in contact with a shoulder 21 on the stem and its upper end in contact with a horizontal plate 22, which is perforated to receive the stem and the valve-casings, and which bears against shoulders 23 on said casings to prevent upward displacement. The effect of the spring is to depress the stem and close the valves when said stem is released, and the function of the rock-shaft is to enable the valves to be opened from the exterior of the dome, said rock-shaft extending through an opening 24 in the wall of the dome and being surrounded with a soft-metal bushing or other suitable packing.

The outer extremity of the rock-shaft is preferably provided with a head 25, having a transverse kerf or slot 26 for engagement by an ear 27 on the trigger 28, said trigger consisting of a flat blade or shank, by means of which the rock-shaft may be turned to open the valves. The trigger may be secured in position to maintain the valves in their unseated position by any suitable means, but the arrangement illustrated in the drawings embodies a removable stop or limiting pin 28, arranged in a perforation in a stud 29, projecting from the exterior surface of the dome, the lower extremity of said stop or

limiting pin being arranged in the path of the free end of the trigger, and the upper end of said stop or pin being formed with an eye 30, to which is connected a wire or its equivalent, the straining of said wire parallel with the length of the stop or pin being designed to withdraw the latter and thus release the trigger and allow the controlling valves to be closed by the spring provided for that purpose.

In practice the wire 31, which is attached to the stop or limiting pin, is carried over suitable direction-pulleys 32 to a point near the front end of the locomotive, where it is attached to the stem 33 of a repressible trip 34, projecting in advance of the locomotive in position to be encountered by an obstacle, as in a collision. The repression of the trip strains the flexible connection 31, and thereby releases the trigger and allows the steam to be cut off from the reservoir and other outlets.

In addition to the trip above described I employ a pivotal trip 35, mounted upon the truck or other part of the frame of the locomotive with its lower end contiguous to the plane of the track-rails, whereby in case of derailment said lower end will come in contact with the ties. The upper end of this derailment-trip is connected by means of wires 36, or their equivalent, to the trigger, the latter being perforated to facilitate attachment, and it is obvious that the movement of the lower end of the trip in either direction will strain one of the flexible connections 36, and thus draw the trigger out of engagement with the stop or limiting pin and release the valves. A wire 37, or its equivalent, also extends from the trigger rearwardly to the cab of the engine in position to be operated by the occupant of the cab.

From the above description it will be seen that a collision or derailment will result in the immediate cutting off of steam by the closing of all communication between the boiler and the various steam-outlets, whereby danger to the train crew and passengers from scalding is reduced to a minimum, but it is obvious that I do not desire to limit myself to the specific form and arrangement of trips above described, for the reason that they may be arranged in a variety of positions and at numerous points of exposure under different conditions; and it will be seen, furthermore, that various other changes in the form, proportion, and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In order to prevent the steam-pipes from breaking out of the openings in the sides of the dome through which they pass and thereby liberating the steam, I fit said openings in the sides of the dome with bushings 28, which are stronger than the pipe-sections, which are threaded in the bore thereof, whereby when

the exposed portion of a pipe is strained to the breaking point it will yield without disturbing the bushing, and hence without disturbing the inclosed or concealed portion within the dome.

Having described my invention, what I claim is—

1. The combination of spring-closed valves for controlling the outlet of steam from a locomotive-boiler, a trigger operatively connected with said valves and capable of swinging movement, a movable stop-pin arranged in the path of the trigger to normally hold it in position to maintain the valves open, and trips connected with the stop-pin and exposed for contact with obstructions, substantially as specified.

2. The combination of spring-closed valves for controlling the outlet of steam from a locomotive-boiler, a rock-shaft connected with said valves, a trigger connected with the rock-shaft to normally hold the valves unseated and adapted to be released to allow the valves to close, a removable stop-pin arranged in the path of the trigger to hold it in position to maintain the valves open, and trips connected with the stop-pin and exposed for contact with obstructions, the engagement of the trip causing the displacement of the pin and the release of the trigger, substantially as specified.

3. The combination of spring-closed valves for controlling the outlet of steam from a locomotive-boiler, a rock-shaft connected to said valves, a trigger detachably engaged with the rock-shaft, a removable stop-pin arranged in the path of the trigger to hold it in engagement with the rock-shaft and maintain it in position to hold the valves unseated, and trips connected respectively with the stop-pin and trigger and exposed for contact with obstructions, substantially as specified.

4. The combination with pipes in communication with a steam-dome, of valve-casings connected to said pipes, valves mounted in the casings and adapted when unseated to allow the passage of steam from the dome through the pipes, a cross-head connected to the valves, a stem attached adjustably to the cross-head, a spring connected to the stem and adapted when the latter is released to close the valve, the tension of the spring being regulated by the adjustment of the stem, a trigger operatively connected with the stem to hold the valves unseated and adapted when displaced to release the same, trips, and connections between the trips and the trigger, substantially as specified.

5. The combination with pipes communicating with a steam-dome, of valves for controlling the passage of steam from the dome through the pipes, a stem connected with the valves, a spring for actuating the stem to close the valves, a rock-shaft connected to the stem and provided with an exposed extremity having a kerf or slot, a trigger having

an ear to engage said kerf or slot, and means for disengaging the trigger to release the rock-shaft, substantially as specified.

5 6. The combination with spring-closed controlling valves and a trigger operatively connected with the valves to hold them unseated, of a horizontally-movable trip adapted to be arranged to project in advance of a locomotive, and flexible connections between the trip
10 and the trigger, substantially as specified.

7. The combination with a steam-dome, of steam-pipes extending through openings in the walls of the dome, valve mechanism for closing the inner ends of the pipes within the
15 dome, and trip mechanism for maintaining the valve mechanism in its open position, the

pipes which project through the openings in the walls of the dome being sectional in construction and being connected by bushings securely fixed in the openings of the dome, 20 whereby when strained the exposed portions of the pipes are fractured without disturbing or detaching the bushings, substantially as specified.

In testimony that I claim the foregoing as 25 my own I have hereto affixed my signature in the presence of two witnesses.

J. H. CRUTCHFIELD.

Witnesses:

J. T. DAVENPORT,
A. V. HARRILL.