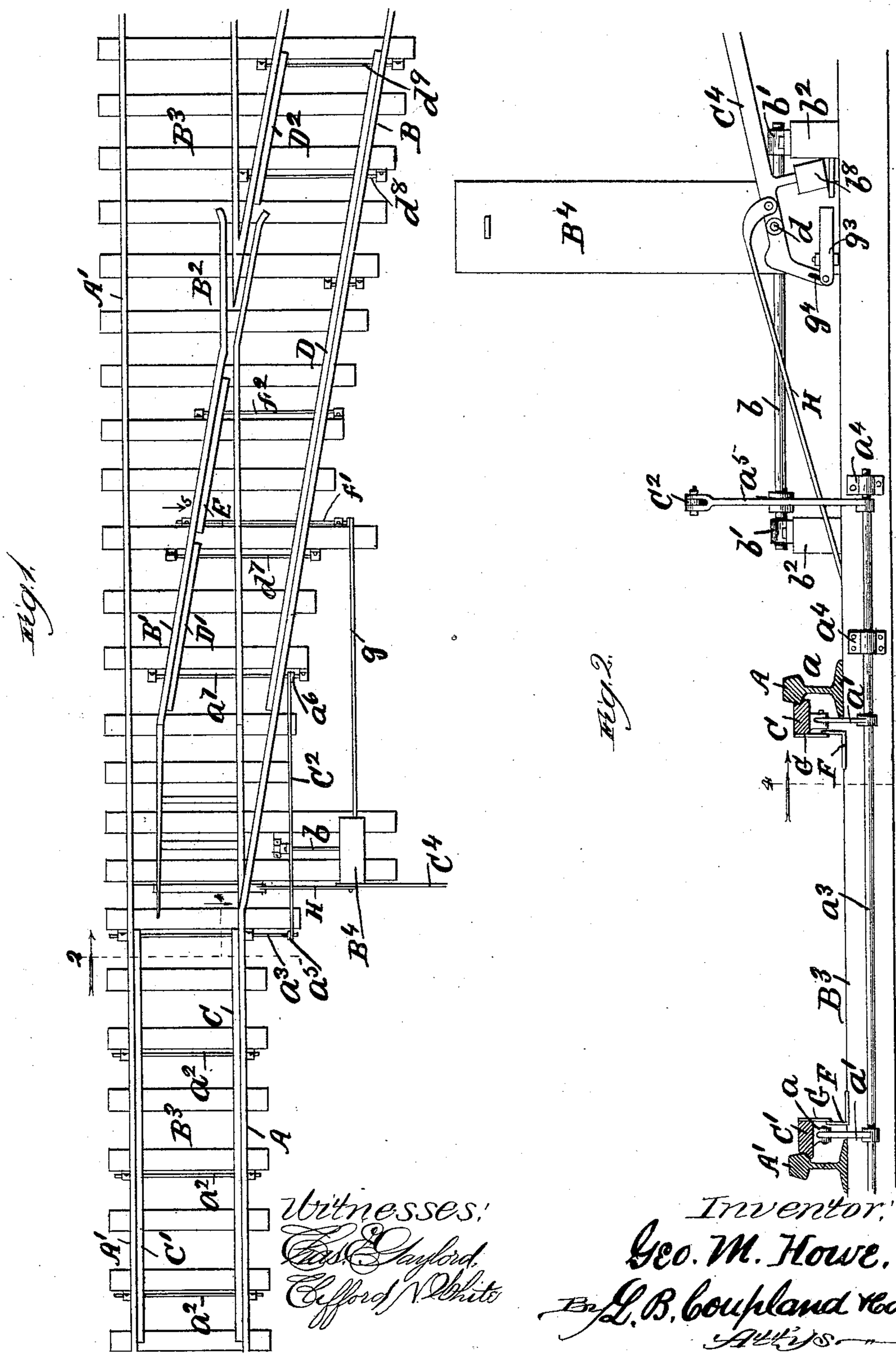
(No Model.) 3 Sheets—Sheet 1.

G. M. HOWE.

AUTOMATIC SAFETY SWITCH.

No. 454,169. Patented June 16, 1891.



THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 2.

G. M. HOWE.

AUTOMATIC SAFETY SWITCH.

No. 454,169. Patented June 16, 1891.

Fig. 3.

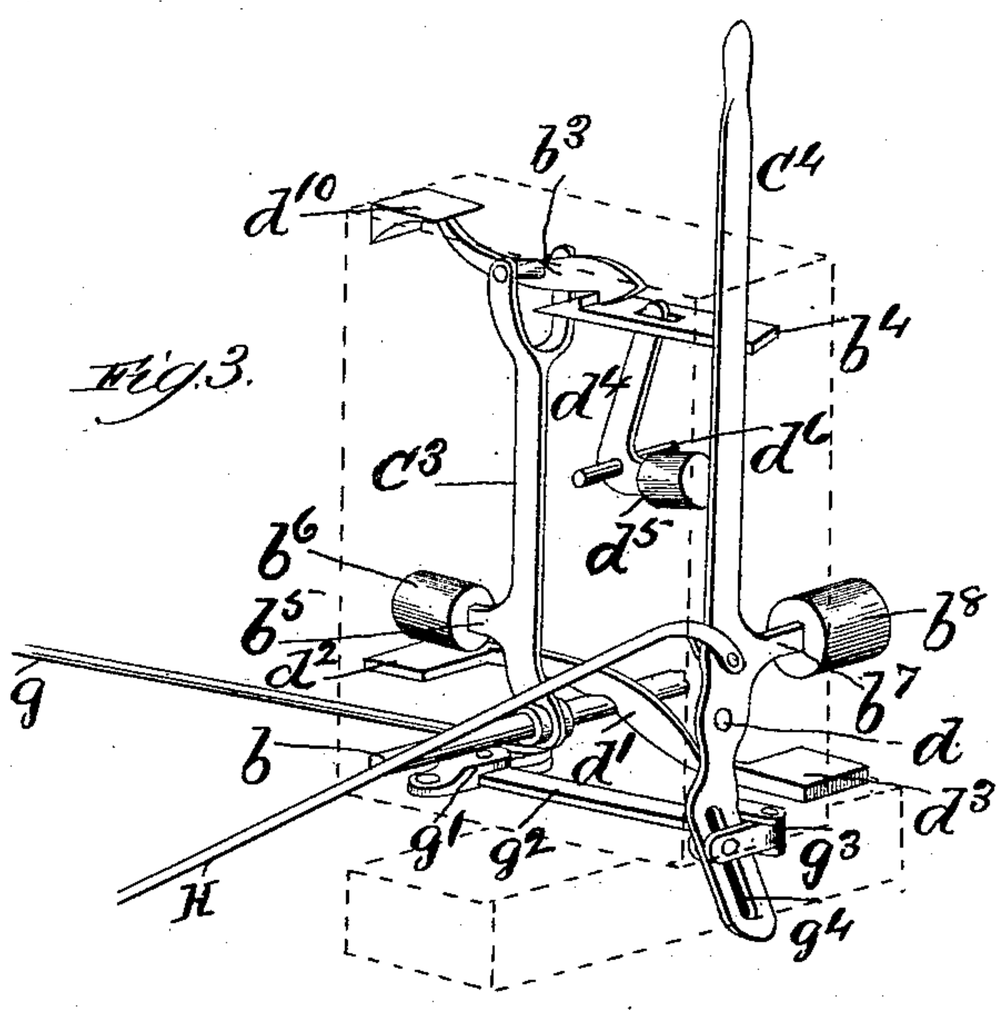


Fig. 4.

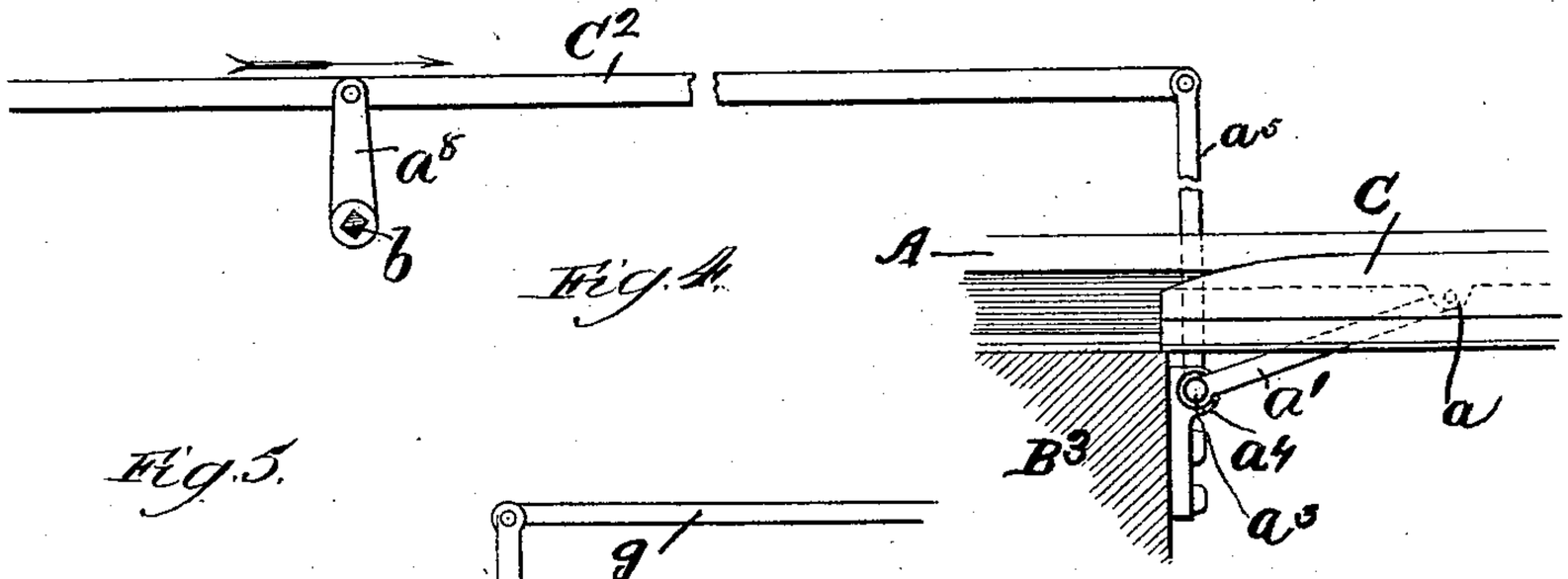
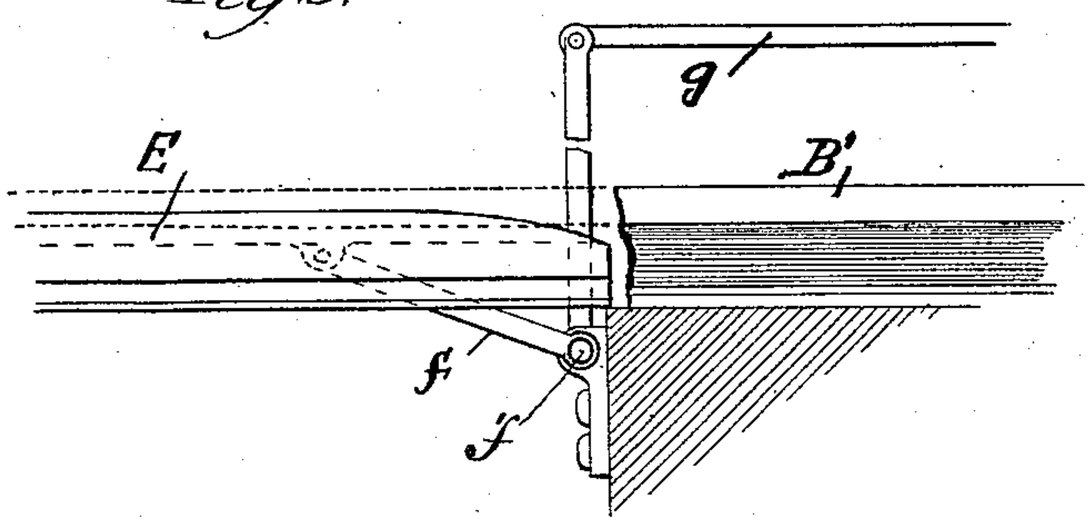


Fig. 5.



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(No Model.) 3 Sheets—Sheet 3.

G. M. HOWE.

AUTOMATIC SAFETY SWITCH.

No. 454,169. Patented June 16, 1891.

Fig. 6.

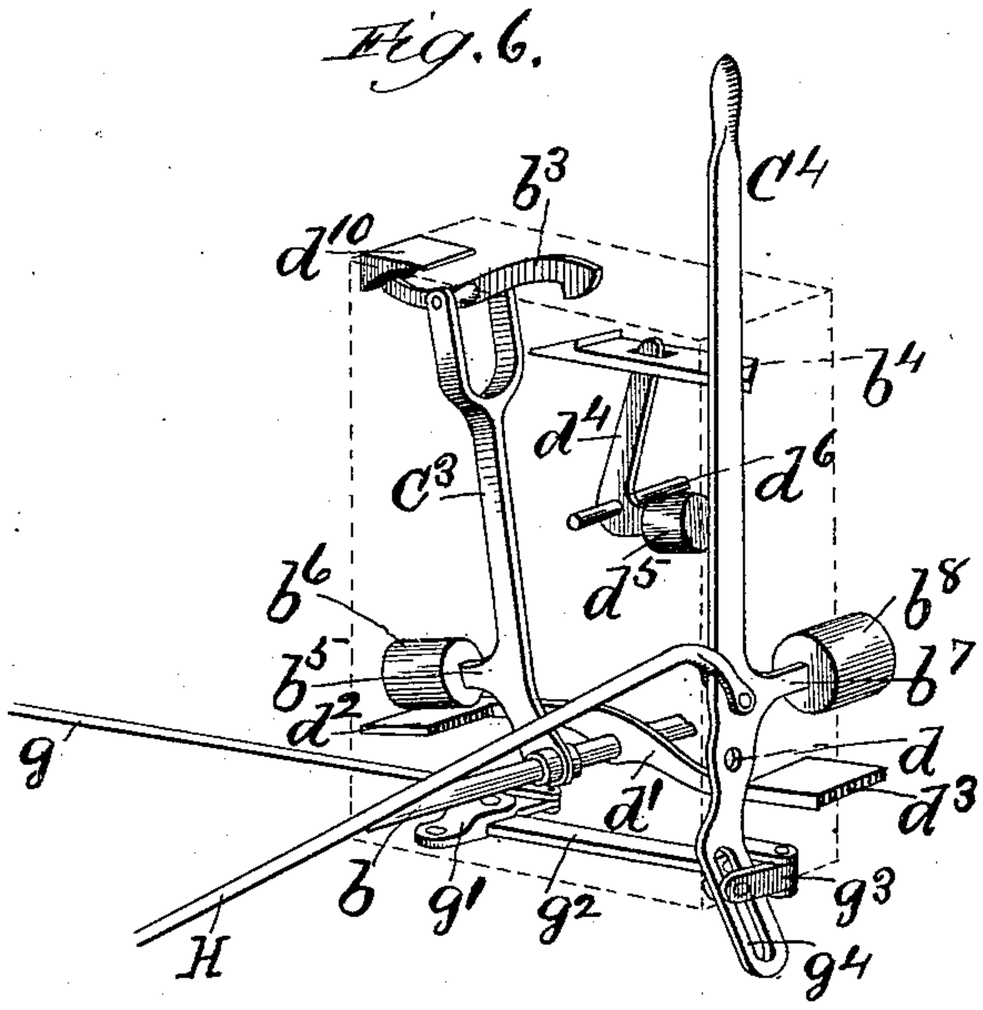
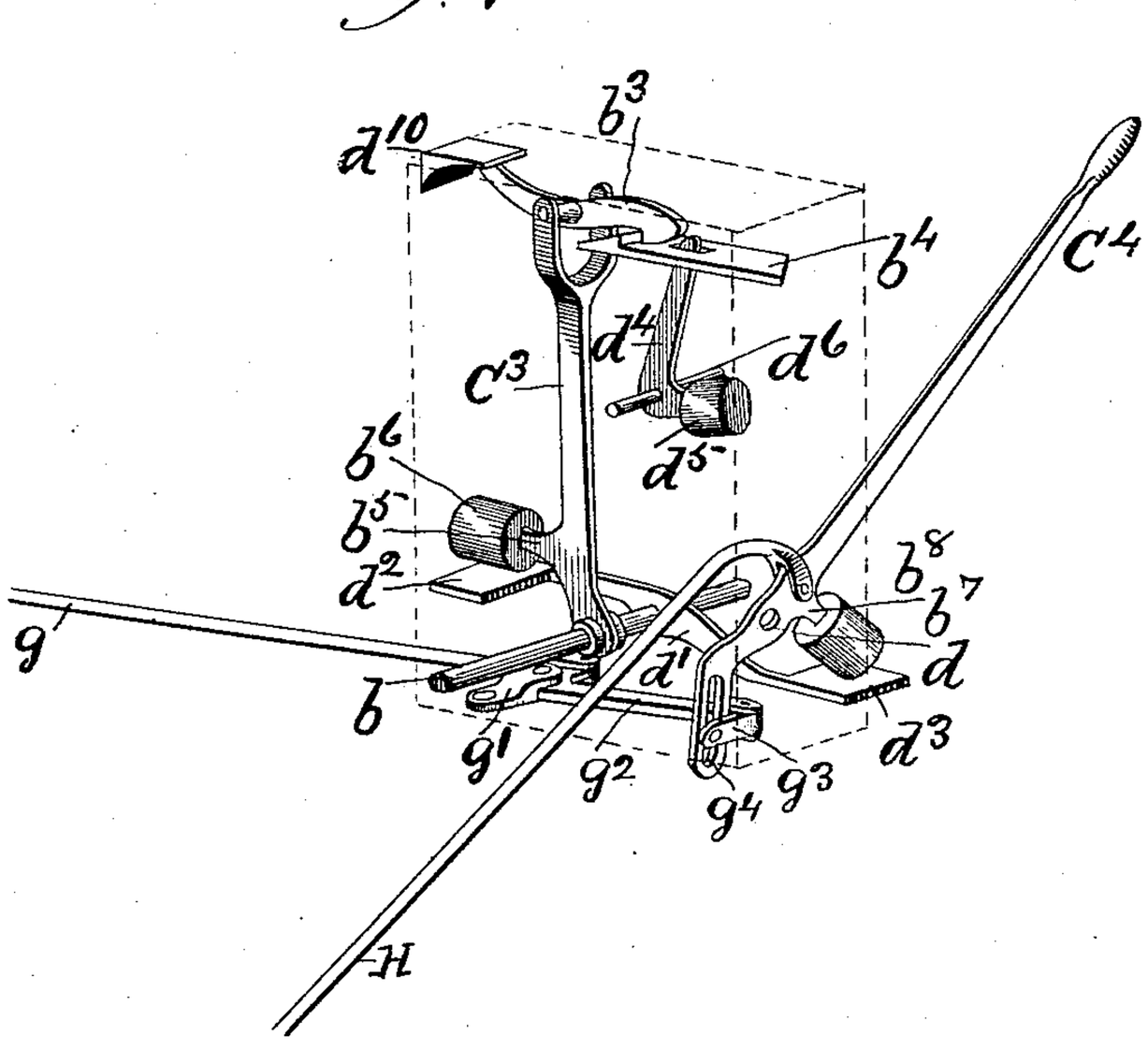


Fig. 7



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UNITED STATES PATENT OFFICE.

GEORGE M. HOWE, OF CHICAGO, ILLINOIS.

AUTOMATIC SAFETY-SWITCH.

SPECIFICATION forming part of Letters Patent No. 454,169, dated June 16, 1891.

Application filed April 3, 1890. Serial No. 346,369. (No model.)

To all whom it may concern:

Be it known that I, GEORGE M. HOWE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Automatic Safety-Switches; of which the following is a full, clear, and exact description, that will enable others to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

The object of this invention is to provide a railway-switch device whereby the main track is always clear and accidents incident to an open switch avoided.

Figure 1 is a plan of a portion of a railway-track and switch connection embodying my improved features; Fig. 2, a vertical transverse section in plane 2, Fig. 1, looking in the direction indicated by the arrow; Fig. 3, a view in perspective of the switch-stand mechanism; Fig. 4, a broken-away vertical longitudinal section in plane 4, Figs. 1 and 2, looking in the direction of the switch-stand, as indicated by the arrow. Fig. 5 is a vertical longitudinal section similar to Fig. 4, looking in the direction of the arrow 5, with the rail B′ removed. Figs. 6 and 7 are similar views of the switch-stand as illustrated in Fig. 3, the several elements being shown in different relative positions.

Referring to the drawings, A A′ represent the rails of the main line; B B′, the side track; B^2, the usual switch-frog, and B^3 the ties.

The switch-stand mechanism will be inclosed by the casing or box B^4, as shown in Fig. 2 and indicated by dotted lines in Figs. 3, 6, and 7. The horizontal bars C C′ are placed inside of and against the respective rails of the main line, (see Figs. 1 and 2,) their highest position being below the level of the same, as shown. The bars C C′ are provided at intervals on the under side with lugs *a*, in which are inserted and pivoted thereto the upper ends of the inclined arms *a*′, the lower ends of which are in turn rigidly mounted on the shorter rock-shafts a^2 and the longer rock-shaft a^3. The different rock-shafts are provided with suitable bearings a^4, bolted to the sides of the ties. The lower end of the vertical arm a^5 is rigidly mounted on the extended end of the longer rock-shaft a^3, (see more particularly Figs. 2 and 4,) and has one end of the horizontal lever C^2 connected thereto. The opposite end of the lever C^2 is secured to the upper end of the arm a^6, the lower end of which is fast on the extended end of the rock-shaft a^7 in the switch or side-track section. The lower end of the intermediate arm a^8 (see Fig. 4) is fixed on the rock-shaft *b*, extending into the switch-stand and provided at the ends with bearings *b*′, resting on the blocks b^2, as shown in Fig. 2. The upper end of the arm a^8 is connected to the horizontal lever C^2. The lower end of the reciprocating lever C^3 is rigidly mounted on the rock-shaft *b* inside of the switch-box, as shown in Figs. 3, 6, and 7. The upper end of the lever C^3 is forked, and has the latch b^3, pivoted between the forks. The hook end of this latch is shown in engagement with the inner end of the trip-plate b^4, the outer projecting end of which forms a stop-rest for the switch-lever C^4 and serves to retain the same in the vertical position shown in Fig. 3, the switch being open.

The lever C^3 is provided near its lower end with the projecting spur b^5, on which is mounted the counter-weight b^6. The switch-shifting lever C^4 is also provided with the spur b^7, carrying the weight b^8. The shifting-lever C^4 is pivoted to the switch-box at *d*, forming the required fulcrum bearing for the movement of the same. The bent horizontal lever *d*′ is secured near its longitudinal center to the upper side of the rock-shaft *b*, and is located inside of the switch-box and provided on the two ends with the plates d^2 d^3, and adapted to have an up-and-down rocking movement with its shaft. The plate b^4 is returned to the normal position illustrated in Figs. 3, 6, and 7, by means of the angle-lever d^4, the upper end of which is pivoted to said plate and the lower end carries the counter-weight d^5, the pin d^6 passing through the lever and having suitable bearings in the inclosing box.

The rock-shaft a^7 and the companion shafts d^7 d^8 d^9 are provided with suitable bearings in the ties of the switch-section, and are connected with the horizontal bars D D′ D^2 in the switch-section, the same as on the main track, the bars D D′ D^2 being counterparts of and broken continuations of the bars C C′ on

the main line. By means of the continuous bar D in the switch-section and the series of rock-shafts the two shorter bars D′ D² are made to have a simultaneous movement. It is of course obvious that the bar C on the main line and the bar D, located in the switch-section, would ordinarily be sufficient to accomplish the desired result, these parts being duplicated to insure a more positive action by receiving the required pressure from the truck-wheels on both sides of the car. The normal position of the switch or operating hand-lever is that shown in Figs. 1, 2, and 7, the switch being closed and the main line clear.

When side-tracking a train, the operating-lever must first be thrown up to the vertical position illustrated in Figs. 3 and 6 by hand, and will be retained in that position by the projecting end of the trip-plate b^4. Raising the operating-lever to a vertical position lifts the weight b^8 out of contact with the plate d^3, formed on one end of the horizontal lever d'. The companion weight b^6, mounted on the lever C^3 and resting on plate d^2, depresses the opposite end of the horizontal lever d', rocks the shaft b, brings the lever C^3 to the inclined position shown in Fig. 6, disengages the latch b^3 from the trip-plate and elevates the parallel bars to their highest position through the connections described, so that the truck-wheels will have contact therewith. The weight of the cars depresses the parallel bars to their lowest position and returns the lever C^3 to the vertical position shown in Figs. 3 and 6, and throws the latch into engagement with the trip-plate. When the last car passes onto the side track and the pressure on the parallel bars is removed, the weight b^6 again depresses the plate on the end of the horizontal lever moving the lever C^3 to its inclined position, and the latch, pivoted in the forked end of the same, draws back the trip-plate far enough to release the operating-lever, which then drops down to the position shown in Fig. 7, the weight b^8 coming in contact with the plate d^3, and depressing that end of the horizontal lever brings the forked lever C^3 to its normal or vertical position, and thus automatically closes the switch and leaves the main track clear. When the hook end of the latch b^3 draws back the trip-plate b^4 far enough, it is thrown out of engagement by the opposite end being depressed by coming in contact with the beveled under side of the lug d^{10}, formed on the under and inner side of the top of the switch-box, the trip-plate being returned to its normal position by means of the weight d^5. The projecting end of the trip-plate is beveled, as shown in Figs. 6 and 7, so that the operating-lever will pass easily when being moved to a vertical position.

When the train that is on the side track is to be returned to the main line, the switch-lever is automatically raised from its normal to a vertical position by the following-described arrangement and mechanism: The parallel bar E is located inside of and against one of the switch-rails and is of precisely the same construction and arrangement as the bars C C′ and D D′ D² with the exception that the slight longitudinal movement incident to these bars is in the opposite direction, as shown in Fig. 5. The arm or arms f connecting the bar E with its two rock-shafts f' f^2 are set in the opposite inclination compared with Fig. 4. One end of the horizontal rod g is properly connected with the rock-shaft f', (see Figs. 1 and 5,) the opposite end extending into the switch-box, where it is bifurcated and connected to one end of the angle-lever g^2. Said angle-lever is pivoted to the bearing g' connected with the casing. The other end of the angle-lever g^2 is bifurcated and has the angle connection g^3 with the lower end of the switch-shifting lever, which is provided with the elongated slot g^4 to allow for the change of position of these parts. When the switch-shifting lever is in its normal or horizontal position, the bar E is at its highest point, and as the truck-wheels strike the same the bar is depressed and the shifting-lever is automatically thrown up to a vertical position and the switch opened by means of the connections and mechanism last described and the way clear for the train to pass from the switch onto the main line, after which the switch-shifting lever will be returned to its normal position by the means before described and the switch automatically closed. The angle guard-plate F (see Fig. 2) runs the length of the several parallel bars and is rigidly secured to the ties. The vertical plate G, secured to and moving with said bars overlaps the vertical part of the plate F and is for the purpose of excluding snow, dirt, &c., that might interfere with the free movement of these parts. The rod H forms the usual connection between the shifting-lever and the switch-rails.

I do not confine myself to the precise construction and arrangement shown, but may make such changes as practical working may require without departing from the spirit of my improvement.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a switch-shifting mechanism, the combination of the main line, the horizontal bars placed inside of and running parallel with the rails thereof, the side or switch track, the companion horizontal bars located along the inner side of the side-track rails, a series of rock-shafts arranged underneath and transversely to said bars, the pivotal arms connecting said bars and rock-shafts, the horizontal lever connecting the two series of rock-shafts in the main and side track, the rock-shaft, upon which said horizontal lever is mounted, the vertical forked lever mounted on the rock-shaft inside of the switch-box, and mechanism, substantially as described, for automatically closing the switch when the train has passed

onto the side track and the pressure of the truck-wheels on the horizontal bars is removed, substantially as described.

2. The combination, with the track-rails, of a number of movable horizontal bars arranged parallel with and along the inner side of said rails and adapted to be pressed downwardly by the truck-wheels, the series of rock-shafts, the inclined arms connecting said bars and rock-shafts, the horizontal lever C^2, connecting the two series of rock-shafts arranged in the main and switch track, respectively, the rock-shaft b, with which the lever C^2 is connected, the forked vertical lever C^3, mounted on the rock-shaft b inside of the switch-box, the latch b^3, the trip-plate b^4, the beveled lug formed on the inner top side of the box, the shifting-lever C^4, and the weighted angle-lever d^4, substantially as and for the purpose set forth.

3. The combination of the rock-shaft b, passing through the switch-box, the vertical reciprocating lever C^3, the weight mounted on the lower part thereof, the latch b^3, pivoted between the forked end of said lever, the trip-plate b^4, the beveled lug formed on the inside of the switch-box, the switch-shifting lever C^4, the counter-weight attached thereto, and the horizontal lever d', provided on each end with the plates d^2 d^3, substantially as and for the purpose set forth.

4. The combination, with the switch-rails, of the movable parallel bar E, located inside of and resting against one of said rails, the arm or arms f, the rock-shafts f' f^2, the horizontal rod g, the angle-lever g^2, the bearing g', the angle connection g^3, and the shifting-lever C^4, whereby the switch is automatically closed by the train passing from the side track to the main line, substantially as and for the purpose set forth.

GEORGE M. HOWE.

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