

(No Model.)

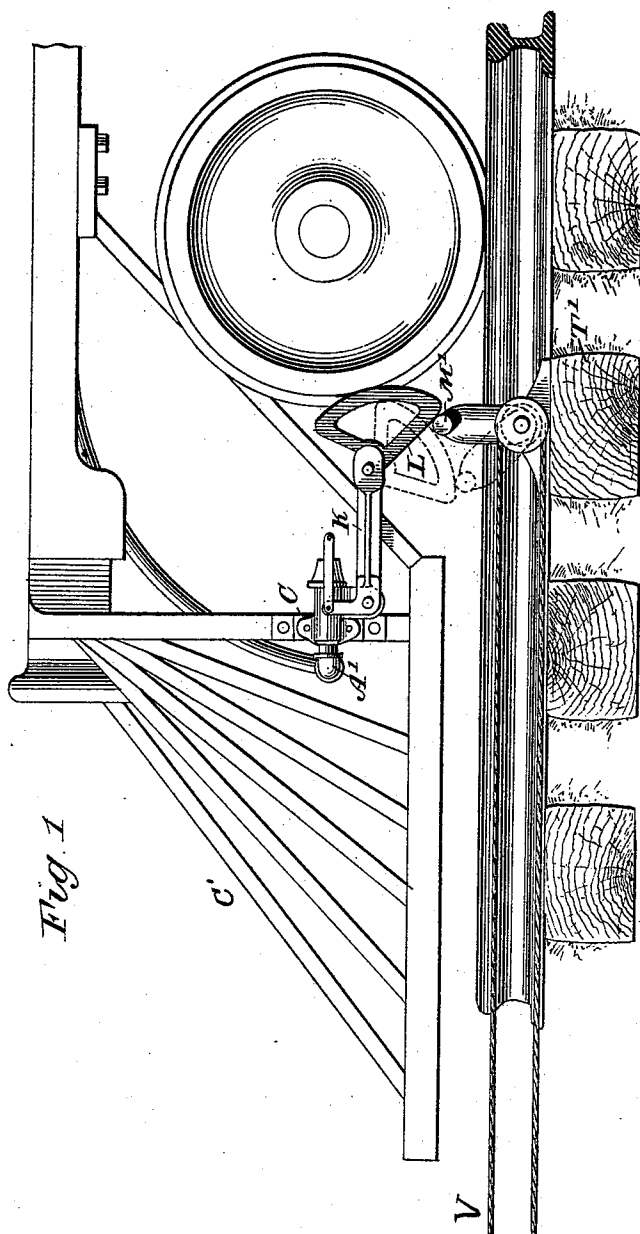
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J. H. FOX.

MECHANISM FOR AUTOMATICALLY ACTUATING AIR BRAKES.

No. 530,938.

Patented Dec. 18, 1894.



Attest
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W. F. Crane

Inventor
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Thomas S. Crane, Atty.

(No Model.)

3 Sheets—Sheet 2.

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Fig. 4.

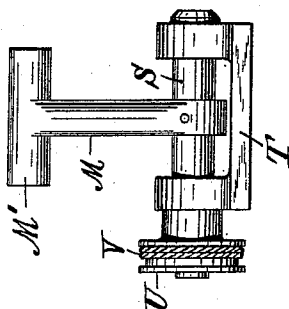


Fig. 3.

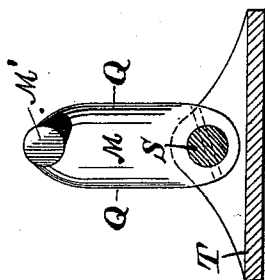
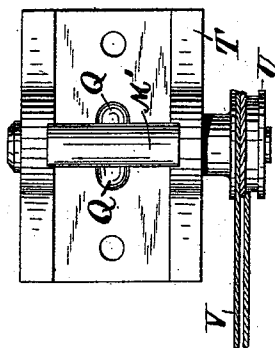


Fig. 2.



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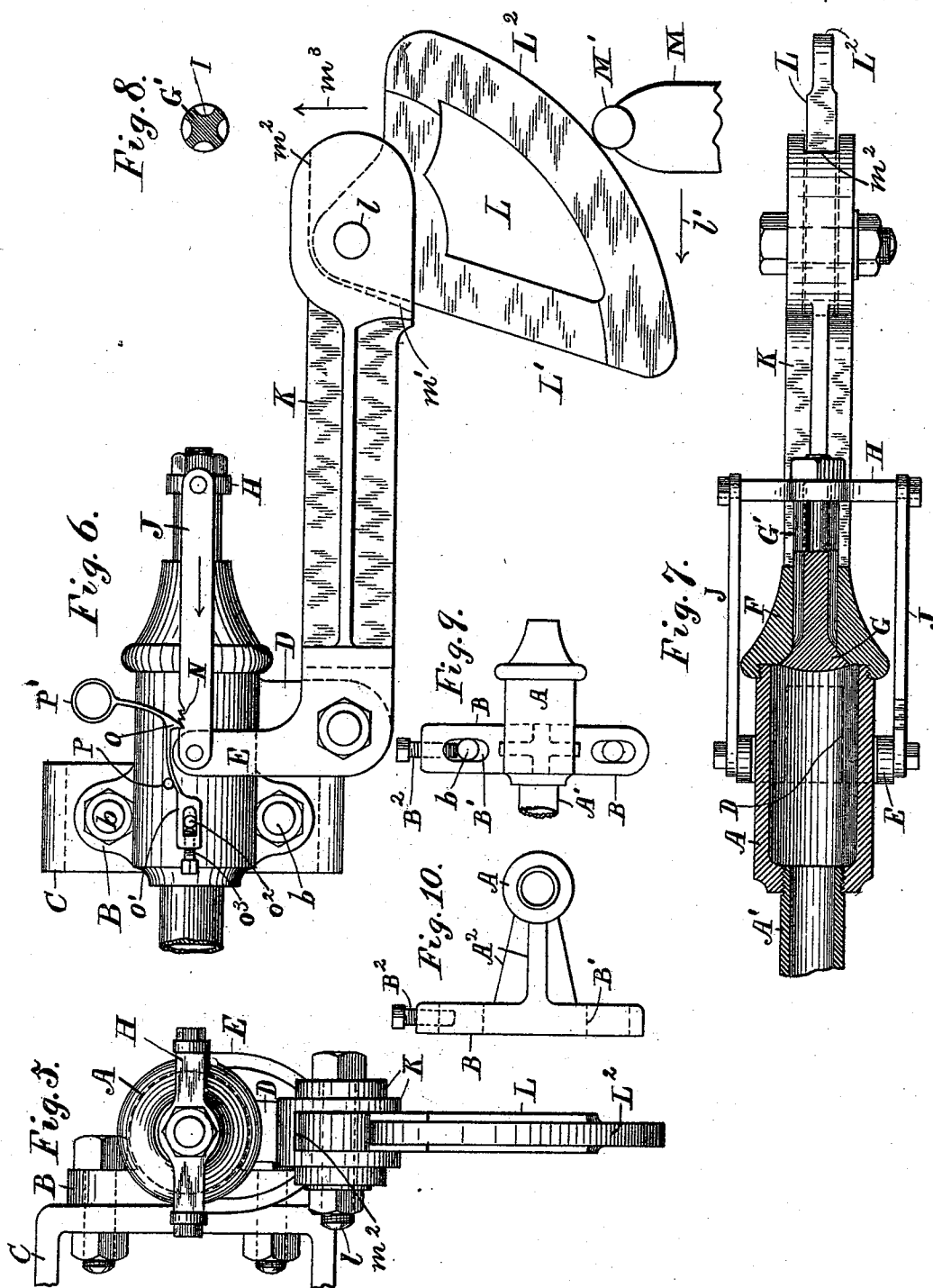
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UNITED STATES PATENT OFFICE.

JOHN H. FOX, OF JERSEY CITY, NEW JERSEY.

MECHANISM FOR AUTOMATICALLY ACTUATING AIR-BRAKES.

SPECIFICATION forming part of Letters Patent No. 530,938, dated December 18, 1894.

Application filed January 24, 1894. Serial No. 497,885. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. FOX, a citizen of the United States, residing at Jersey City, Hudson county, State of New Jersey, have invented certain new and useful Improvements in Mechanism for Automatically Actuating Air-Brakes, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

10 This invention relates to the brake valve used in connection with the tripping arm at the side of a railway for automatically arresting the movement of a railway train.

In this class of apparatus the tripping arm has been commonly actuated by a suitable connection with a switch or draw bridge for setting the arm in an operative position to engage the lever of the brake valve. The brake valve is commonly attached to some part of the locomotive with its lever projected into line with the tripping arm to be actuated automatically by the latter when it becomes necessary to stop the train by reason of the displacement of the switch or draw-bridge. Heretofore, the head of the tripping arm has been commonly made of T-shape, to intercept the brake valve with certainty; as the locomotive carrying the brake valve is liable to lurch from side to side when passing the arm.

The present invention furnishes an improved construction for the brake-valve, and combines with the brake-valve lever a pawl for locking the valve when opened, and means for disengaging the pawl to close the valve. It also provides means for adjusting the pawl, so as to lock the valve with a graduated opening, when actuated by the lever. It also includes a segmental trip depending from the end of a horizontally projecting brake-valve lever and provided with faces of special shape upon its front and rear edges, with stops upon the valve-lever to hold the segment in a suitable position when shifted by the tripping arm.

The construction will be understood by reference to the annexed drawings, in which—

Figure 1 is a side elevation of a locomotive pilot, with the valve and its operating devices. Fig. 2 is a plan of the tripping arm and its bearings. Fig. 3 is a front elevation of the same with the nearer end of the shaft S and the nearer journal of the bearing 2 cut away to show the arm more clearly, and Fig.

4 is a side elevation of the same. Fig. 5 is an end elevation of the valve with its lever and trip. Fig. 6 is a side elevation of the same, both views showing a portion of the bracket by which the valve is attached to the pilot. Fig. 7 is a plan of the same parts with the valve chamber and a portion of the valve in section at its center line, and Fig. 8 is a cross section of the valve stem adjacent to the valve. Fig. 9 is a front view, and Fig. 10 an end view of a valve casing provided with slotted foot. Figs. 2, 3 and 4 are drawn larger than Fig. 1; and Figs. 5 to 8 inclusive still larger. Figs. 9 and 10 are drawn one half the scale of Fig. 6.

The valve is shown in the drawings with casing A having feet B at one side for securing it to the locomotive or other section of the railway train. The air pipe A' is fitted to one end of the casing. The foot of the valve casing is shown in Fig. 1 attached to one side of the pilot C' by a bracket C which is partly shown in Figs. 5 and 6.

At one side of the casing a lug D is projected, and a forked lever K is pivoted upon the lug, with cranks E projected to the center line of the casing upon its opposite sides. One end of the casing is provided with a valve seat F, and a conical valve G is fitted to such seat within the casing, and is provided with a stem G' which is projected outside of the casing and attached at the outer end to a cross head H. The valve stem is formed with longitudinal grooves I which permit the escape of the air from the casing at a given rate when the valve is pushed inward the required distance. The cranks E are connected with the ends of the cross head upon opposite sides of the casing by links J, and one of the links is shown formed with several ratchet teeth N, adapted, when the valve is opened in the required degree, to engage a pawl O, secured upon the casing. The pawl is shown fixed to the casing by a slotted foot O' and bolt O², and the free end of the pawl is provided with a handle P' by which it may be disengaged from the ratchet teeth.

The handle is shown formed with an eye or ring in which the finger may be inserted to lift the pawl, and the ring is projected sufficiently above the top of the casing to expose it fully to view, and render it convenient for access from either side of the casing.

The pawl is preferably made as a spring in

one piece with the foot, and held in its relation to the teeth N by a pin P. A set screw o^3 is inserted through the outer end of the foot o' into contact with the bolt o^2 , and affords the means of adjusting the pawl when desired. The arm M is formed of a single bar secured upon a shaft S pivoted in bearing T which is secured to the sleeper T' at the side of the track. The arm is shown with T-head M, and is made of much greater width than thickness below the head, to form ribs Q upon opposite sides of the head, to receive the impact of a snow plow or other object moving close to the rails.

The arm is mounted at a sufficient distance from the side of the rails to clear the pilot of the locomotive, but is liable to be struck by a snow plow or other construction wider than the pilot. When the arm is struck by a snow plow moving close to the rails, the ribs Q receive the impact of the plow and operate to throw the T-head downward before it can be engaged by the edge of the plow; although the latter may be of sloping shape like a pilot. The shaft S to which the arm is attached is shown provided at the end with a pulley U having cords V attached thereto for connecting the shaft with a switch or draw bridge.

The lever K is provided at its outer end with a pivoted trip L adapted to engage the upper end of the tripping arm. The trip is formed as a triangular segment hinged upon a pin l inserted transversely through a socket in the end of the lever.

The front edge L^1 and upper side of the triangular segment project outward from the sides of the pin l , and the rear edge L^2 connects the upper side with the front edge in a curved or inclined line, which, in the normal position of the trip, is adapted to slide the trip upward when it contacts with the head of the arm M. Two such curved or inclined surfaces cannot be formed upon the trip at the same distance from or in the same relation to the fulcrum of the brake lever; and the front edge of the trip is therefore held by weighting the rear edge at an opposite angle to its operative position, which serves to hold it considerably higher from the track rail than if it hung vertically when not in use.

The contact of the tripping arm with the front edge of the trip throws it rearward until arrested, by a suitable stop, at the proper angle to slide upward over the head of the tripping arm. The contact of the trip with the tripping arm, when the railway train and the brake valve lever are moved in either direction, thus produces the same effect upon the lever, and opens the air brake valve with the same facility. The outer or rear edge L^2 of the trip is formed in a curve to present the same angle to the head M as the arm and trip move upward.

The socket in the end of the valve lever K is formed with a shoulder m' to arrest the rotation of the trip when the outer or rear edge is pressed by the tripping arm, as indicated

by arrow l' in Fig. 6, and it is also formed with an opposite shoulder m^2 which permits the rotation of the trip through a suitable arc, when the inner or front edge L^1 is pressed by the tripping arm, thus turning the front edge, as indicated in full lines in Fig. 1, at the proper angle to force the valve lever upward.

The tripping arm M is shown in Fig. 1 in dotted lines in an inoperative position, and in full lines turned upward to intercept the trip. The head M' is shown in contact with the opposite sides of the trip in its two opposite positions; in either of which the horizontal movement of the trip would produce a suitable upward movement of the valve lever K; thus effecting a similar movement of the lever, in whichever direction the railway train may be moving.

The stop m' is so arranged as to hold the center of gravity of the trip in the rear of the pin l , thus securing a preponderance of weight at the rear edge of the trip which tends to hold such rear edge normally in its operative position, with the front edge L^1 a little in advance of the pin l , as shown in full lines in Fig. 6 and in dotted lines in Fig. 1. In my Patent No. 513,676, granted January 30, 1894, I have claimed a jointed trip attached to the valve lever so as to hang normally in a vertical line, and adapted to swing in an arc of a circle upon either side of said vertical line by contact with the tripping arm. With such construction the sides of the trip extend alike from opposite sides of the pivot at an acute angle with one another; while my present construction employs a triangular segment in which the rear edge is distant at all points from the pivot.

The trip claimed herein is not adapted to swing in both directions, but is held normally with its rear edge in an operative position, and its front edge in the contrary position.

I disclaim herein a trip adapted to swing in the arc of a circle upon either side of a vertical line, as my present trip is designed to swing only toward the rear, and neither of its sides hangs normally in a vertical line.

The concussion of the trip with the tripping arm may throw the valve lever upward to an excessive degree, and thus open the valve to an unnecessary extent, and needlessly diminish the pressure in the air brake system. As it is essential that the valve should remain open, to hold the brakes against the wheels, it requires to be locked in its open position, to secure the actuation of the brakes after the tripping arm has operated, and the ratchet teeth N are therefore arranged to hold the valve open to the desired extent only.

With such construction of the ratchet teeth, the tripping arm may, by the rapidity of its operation upon the valve lever, open the valve to a greater degree than is desired; but the weight of the valve lever and the trip operates to close the valve to such degree after the trip has passed over the arm. A single

tooth N, in a suitable position, would operate to engage the pawl *o* and hold the valve open to such degree; but one or more additional teeth are provided, to insure the holding of the valve open in case the trip does not shift the lever K to the full extent.

It is difficult, in constructing the ratchet teeth N, to determine the precise effect of a valve opening corresponding to such teeth, and I have therefore provided an adjustable pawl to regulate the maximum valve opening. As the set screw operates in opposition to the load upon the pawl, it furnishes the means of adjusting the valve opening in the most accurate manner. The foot B of the valve casing A may be formed with slots B' as shown in Figs. 9 and 10, to permit its adjustment vertically, and thus assist in regulating the upward movement of the valve lever K when actuated by the tripping arm. The accidental loosening of the bolts *b* inserted through the slots B' would permit the valve casing to slide downward, and thus derange its adjustment without detection. To prevent such displacement of the valve casing, I insert a set screw B² through the upper end of the foot into contact with one of the bolts. Such set screw supports the weight of the casing at all times, and affords a means of adjusting it vertically; after which it would be clamped in position by the bolts *b*.

The foot B is, in Figs. 9 and 10, shown connected with the casing A by ribs A², to project the casing outward from its supporting seat, but the foot in Figs. 5 and 6 is shown very low, and clamped rigidly to a bracket C, and such bracket may be used where the valve casing requires a greater projection from its supporting surface than is afforded by the foot itself. In such case the foot of the bracket may be provided with the slots B' and set screw B² if desired.

Having thus set forth the nature of the invention, what is claimed herein is—

1. In an emergency air-brake valve, the combination, with an arm for actuating the valve-lever, of a valve casing, a valve-lever pivoted adjacent thereto and provided with a trip to engage the arm, a valve with stem and suitable connection to the valve lever, a pawl for locking the valve when opened, and means for disengaging the pawl, substantially as herein set forth.

2. In an emergency air-brake valve, the combination, with a valve casing, of a fulcrum lug projected from one side of the same, a forked lever pivoted to such lug with cranks at opposite sides of the casing, a seat within one end of the casing with valve having its stem projected outside of the same, and links connecting the cranks with the end of the valve stem, as herein set forth.

3. In an emergency air-brake valve, the combination, with a valve casing provided with a valve seat F, of a valve G having its stem grooved as set forth, and extended outside of the valve seat, a valve-lever pivoted

adjacent to the casing, with suitable connections to the valve stem, and a ratchet and pawl for locking the valve with a graduated opening when actuated by the lever, substantially as herein set forth.

4. In an emergency air brake valve, the combination, with the casing A having the foot B for attachment to its support and the lug D formed upon one side of the casing of the forked lever K having a trip pivoted in its outer end, and having the cranks E projected to the center line upon opposite sides of the casing, the removable cap containing the valve seat F with valve G having a grooved stem G' projected outside of the cap, the cross head H secured upon the stem, the links J connecting the cranks with the cross head, and provided with one or more ratchet teeth, and the pawl *o* secured upon the casing and provided with a handle projected beyond the side of the casing, as herein set forth.

5. In an emergency air brake valve, the combination, with the casing A having the foot B for attachment to its support, and the lug D formed upon one side of the casing of the forked lever K having the trip L pivoted in its outer end, and having the cranks E projected to the center line upon opposite sides of the casing, the removable cap containing the valve seat F with valve G having a grooved stem G' projected outside of the cap, the cross head H secured upon the stem, the links J connecting the cranks with the cross head and provided with the ratchet teeth N, and a pawl for engaging such ratchet teeth, with means for disengaging the pawl to close the valve, substantially as herein set forth.

6. The combination, with the brake valve and a brake valve lever having a transverse pin as described, of the pivoted trip L with stops to limit its motion upon the pin, and the trip being weighted to throw its forward edge L' at an inclination opposite to its operative inclination, as and for the purpose set forth.

7. The combination, with the brake valve and brake valve lever K projected horizontally, and having the socket provided with the transverse pin *l* and the stops *m'* and *m*² at its opposite end, of the pivoted trip consisting of the triangular segment having the front edge L', and the top side connected thereto by the rear edge L², as set forth, and the trip being weighted as described to hold its rear edge in an operative position, and its front edge normally at an angle opposite to its operative position, substantially as herein set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHN H. FOX.

Witnesses:

L. LEE,

THOMAS S. CRANE.