(No Model.) 2 Sheets—Sheet 1.

A. H. JOHNSON.

RAILWAY SWITCH AND SIGNAL MECHANISM.

No. 421,283. Patented Feb. 11, 1890.

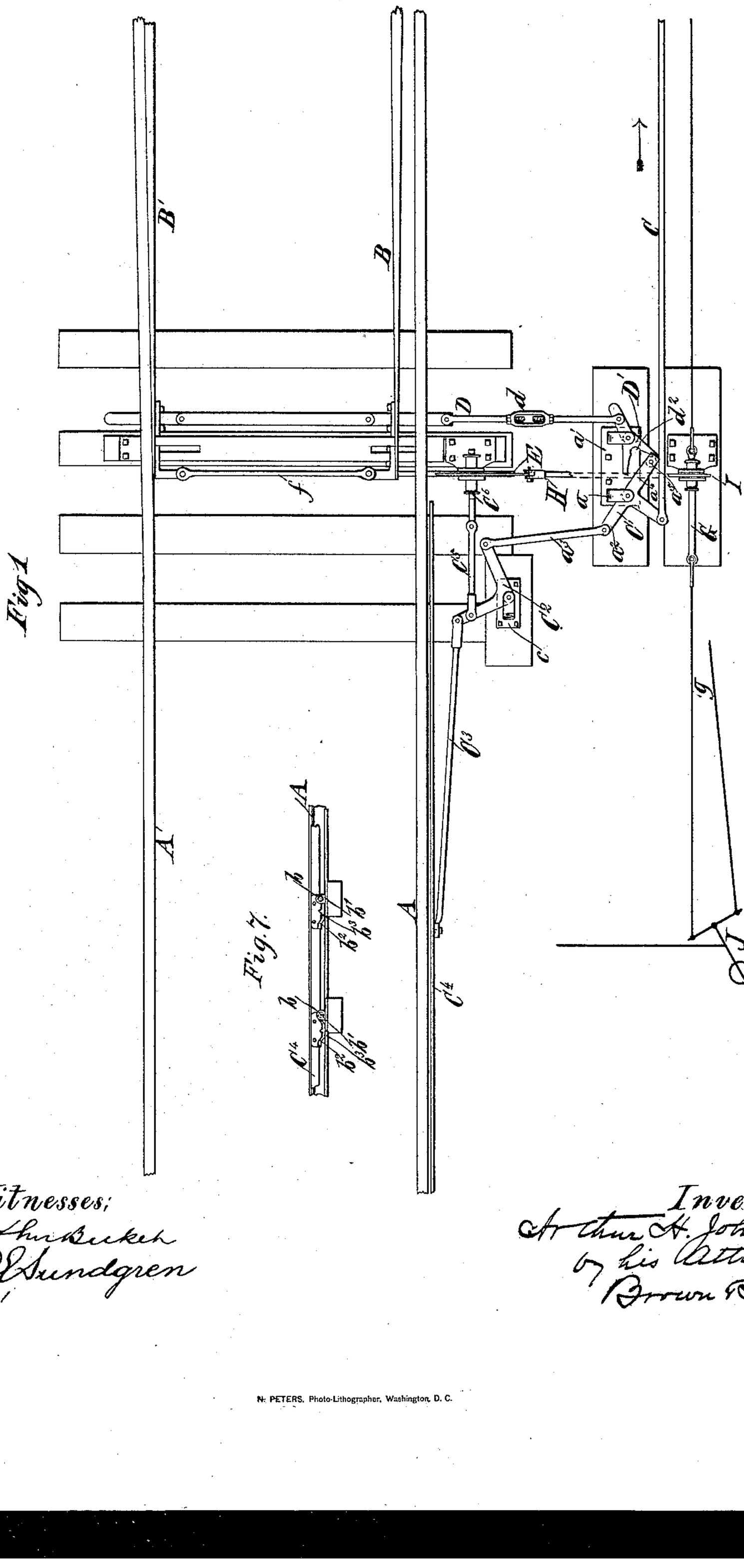

Fig 1

Fig 2.

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(No Model.) 2 Sheets—Sheet 2.

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Fig 2

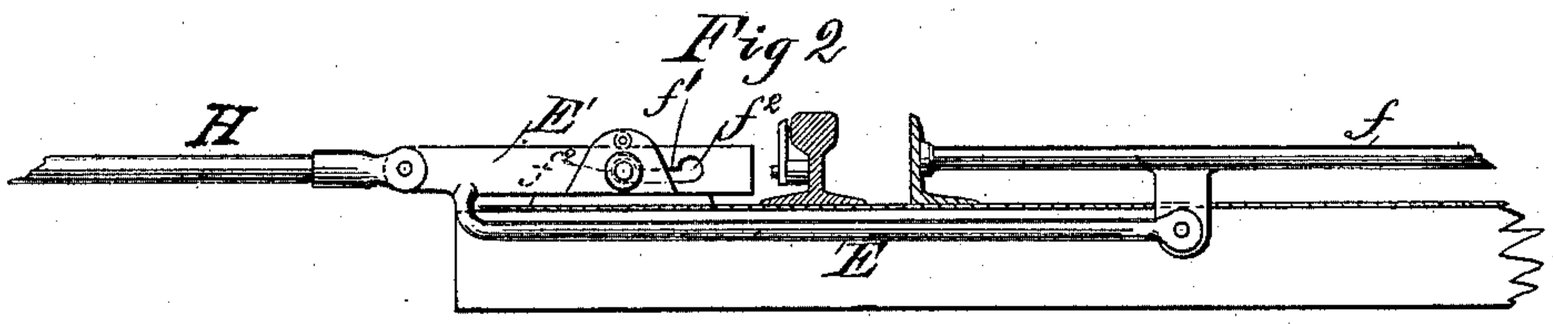


Fig 3.

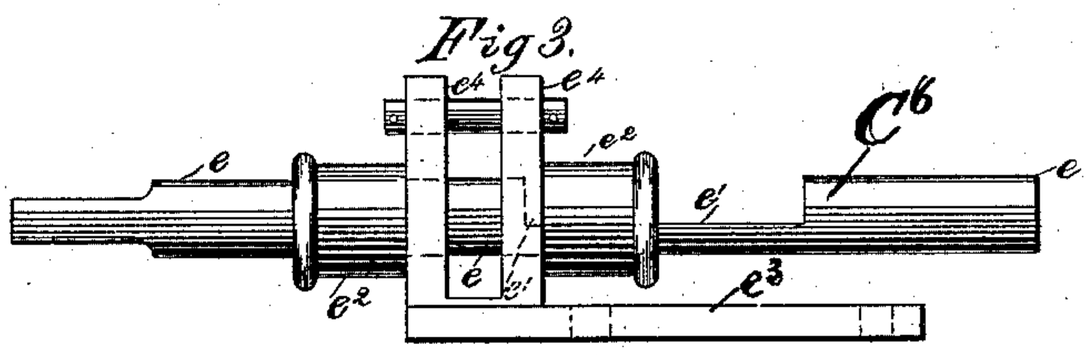


Fig 4.

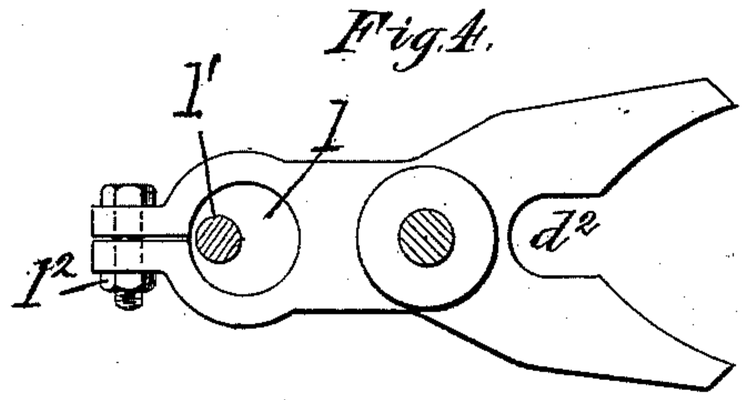


Fig 5.

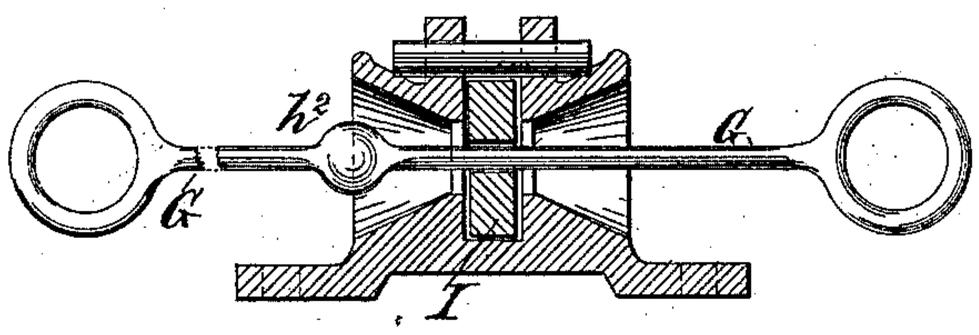
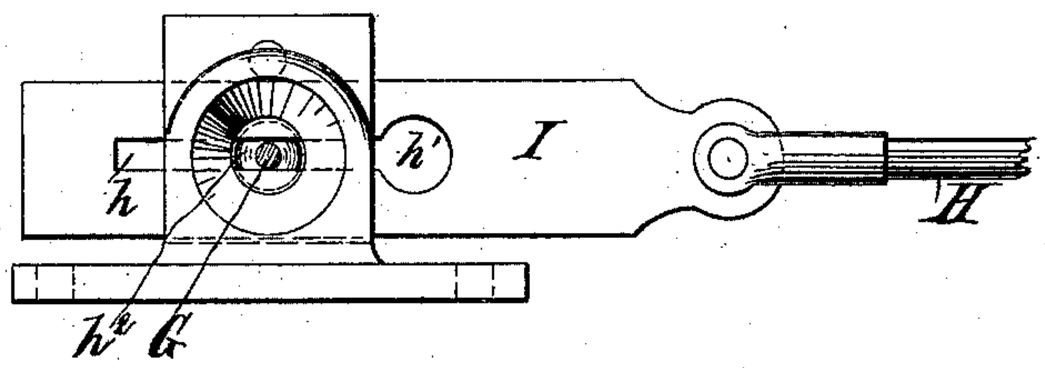


Fig 6.



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UNITED STATES PATENT OFFICE.

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RAILWAY SWITCH AND SIGNAL MECHANISM.

SPECIFICATION forming part of Letters Patent No. 421,283, dated February 11, 1890.

Application filed February 27, 1889. Serial No. 301,301. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR H. JOHNSON, of Rahway, in the county of Union and State of New Jersey, have invented a certain new and useful Improvement in Movements for Railway Switches, Locks, &c., of which the following is a specification.

I will describe my improvement in detail, and then point out the novel features in claims.

In the accompanying drawings, Figure 1 is a diagrammatic view of a portion of a railway-track and mechanism for operating a switch, a lock therefor, a detector-bar, and a signal embodying my improvement. Fig. 2 is a side elevation showing a portion of a stretcher-bar and means for locking the same, and a portion of a railway rail and switch. Fig. 3 is a side elevation of a lock for said stretcher-bar. Fig. 4 is a plan of a lever employed in shifting the switch. Fig. 5 is a sectional elevation of mechanism for locking a signal. Fig. 6 is an end view of the same. Fig. 7 is a side elevation of a portion of a detector-bar. Figs. 3, 4, 5, and 6 are upon a larger scale than Fig. 2.

Similar letters of reference designate corresponding parts in all the figures.

A A′ designate the rails of a railway, and B B′ switch-points.

C designates a draw-rod, which may extend from any suitable point and be operated in any well-known manner to give it longitudinal movement. One end of this draw-rod is connected with one arm of a lever C′, which lever is here shown as a T-lever fulcrumed upon a fulcrum-piece a extending from a support a'. One of the arms or arm a^2 of the lever C′ has pivotally connected to it near one end a link a^3. The other end of the link a^3 is pivoted to one of the arms of a bell-crank lever C^2, fulcrumed upon a support c. To the other arm of the bell-crank lever C^2 is pivotally connected a rod C^3, which rod at its other end is rigidly secured to a detector-bar C^4. The detector-bar C^4, of which a small portion is shown in Fig. 7, is of the kind which when moved lengthwise will first rise to a position where it will detect the presence of an obstruction upon the track, will then move longitudinally for a distance in a horizontal plane, and will then fall. I have shown the means for doing this to consist of rollers b, mounted upon plates b' secured to the railway-ties, and over which inclined surfaces b^2 and intermediate horizontal surfaces b^3 upon the detector-bar will pass when movement is imparted to the detector-bar. It will be readily seen that by a single movement of the draw-rod C all of the described movements of the detector-bar will be imparted to it.

D designates a switch-rod, provided, as here shown, with a turn-buckle d, for adjusting its length. One end of the switch-rod is connected to one of the arms of a crocodile-jaw lever D′, which lever is fulcrumed upon the support a'.

One of the arms or arm a^4 of the lever C′ is provided upon its under side with a roller or bowl a^5, adapted when the lever C′ is rocked to play back and forth between the jaws of the lever D′. The arc in which the roller or bowl a^5 moves when the lever C′ is swung on its fulcrum is coincident with the arc of the inner faces of the jaws of the lever D′ when the lever D′ is swung into its two extreme positions, or, in other words, when it has been operated to shift the switch fully from one side to the other, so that when the lever C′ is swung no motion will be imparted to the lever D′ during a portion of the movement of the lever C′. This will be quite apparent from an examination of Fig. 1.

Midway between the jaws of the lever D′ is a recessed portion d^2, into which the roller or bowl will pass after having been moved the length of the jaw to which it is adjacent. The side edges of the recess d' are approximately straight and parallel with each other, as shown more clearly in Fig. 4, and extend in a direction parallel with a line drawn through the center upon which the lever swings. The continued movement of the lever C′ will then cause the rocking of the lever D′ until the other jaw of the latter has been brought into the arc of movement of the roller or bowl. It will thus be seen that there is lost motion upon the lever D′ throughout two portions of the movements of the lever C′.

Assuming that the parts occupy the position shown in Fig. 1, and that it is desired to shift the switch, movement of the draw-rod C in the direction of the arrow will cause the rocking of the lever C′. During the first por-

tion of its movement it operates the link a^3, the bell-crank lever C^2, and also causes the elevation of the detector-bar. The second portion of the movement of the lever C′ will cause the rocking of the lever D′ and the consequent shifting of the switch after the lever has been unlocked, an operation which I will now proceed to describe.

Connected to the lever C^2, near one end and, as here shown, near the bar C^3, is a rod C^5, which rod is connected pivotally near its other end to a plunger C^6. This plunger is shown more clearly in Fig. 3. It has, as here shown, near its extremities cylindrical portions *e*. Intermediate of the cylindrical portions *e* is a narrow portion *e′*, formed in this instance by cutting out a portion of the plunger between the cylindrical portions *e*. In its to-and-fro movements the plunger is guided through guides e^2, formed upon a frame-like support e^3, secured in this instance upon one of the railway-ties. This support comprises two uprights e^4, which uprights are between the guides e^2, and are provided with suitable apertures coincident with the passages through the guides e^2.

E designates a stretcher-bar connected near one end to a connecting-rod *f*, extending between the switch-points, which connection is formed below said connecting-rod. A portion of the stretcher-bar E extends beneath the track. Near its other end it is turned round upon itself and is flattened, as shown more clearly in Fig. 2. The flattened portion E′ extends backwardly toward the track and is provided with a longitudinally-extending slot *f′*, which slot at opposite ends has an enlarged circular portion f^2, of such diameter that the cylindric portions *e* of the plunger, when the stretcher-bar occupies proper position, may pass through them. When one of the cylindric portions *e* of the plunger is within one of the enlarged portions of the slot *f′*, the stretcher-bar is locked against longitudinal movement, and the switch cannot therefore be shifted. When the first portion of the movement of the lever C′ is taking place and the lever C^2 is being rocked, the plunger is moved longitudinally, so that the narrow portion *e′* thereof will be brought within the narrow portion of the slot *f′* in the stretcher-bar, the cylindric portion of the plunger being of course moved out. The shifting of the switch now takes place, due to the further movement of the lever C′. At the same time the movement of the plunger in the same direction is continued, and of course the stretcher-bar E is being moved longitudinally by the switch, and the narrow portion *e′* of the plunger is passed from one end of the slot *f′* to the other. By the time that the switch has been fully thrown the other cylindric portion of the plunger has been moved into the other enlarged circular portion of the slot and the switch is again locked. During the shifting of the switch also the detector-bar has been moved along in a horizontal plane for a distance and then again dropped down into its lowermost position.

I have shown a signal-lock operated from the stretcher-bar. In Fig. 5 the mechanism of the lock is more clearly illustrated. Such mechanism comprises a pull-piece G, connected at its ends to a wire or cable *g*, by which the signal is operated. Extending from the stretcher-bar is a bar H, which bar has connected to it near its outer ends a flattened plate I. In the plate I is formed a longitudinally-extending slot comprising a straight narrow portion *h* and an enlarged circular portion *h′*. The diameter of the main portion of the pull-piece G is such that it may pass freely through the slot in the plate I. Upon the pull-piece, however, is formed a projection h^2, (here shown as spherical,) which cannot be passed through the portion *h* of the slot, but may, when the plate I has been moved lengthwise a sufficient distance by the stretcher-bar, be passed through the enlarged portion *h′* of the slot. When the switch occupies one of its positions, therefore, the signal J may be operated, but when it occupies its other position or any position intermediate thereof the signal cannot be operated. It will therefore be always set at "danger" until the switch has been properly shifted.

The switch-rod D has an eccentric connection with the crocodile-jaw lever D′. Such connection is shown more clearly in Fig. 4, in which *l* designates an eccentric rigidly mounted upon a pin or stud *l′*, by which pin or stud the switch-rod is connected with the eccentric. The eccentric may be rotated in a suitable aperture in the lever D′, and may be secured in the position into which it is rotated by a set-screw or by clamping-jaws, as shown in Fig. 4, operated by a bolt and nut l^2. By rotating this eccentric the arm of the lever to which the switch-rod is secured may be lengthened or shortened in order to vary the length of the throw of the draw-rod, as is desirable in certain cases.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with a draw-rod, of a switch, a stretcher-bar provided near one end with a slot having an enlarged portion, a plunger provided with a narrow portion adapted to pass through said slot, and enlarged portions at the ends of said narrow portion adapted to be moved into the enlarged portions of the slot during the movements of the plunger, to lock the stretcher-bar and the switch in two positions, and a connection between the said plunger and the draw-rod for operating the former, substantially as specified.

2. The combination, with a draw-rod, of a switch, a switch-rod, a lever with which said draw-rod is connected, a crocodile-jaw lever operated from said first-named lever, and an

eccentric mounted in said crocodile-jaw lever, and with which said switch-rod is connected substantially as specified.

3. The combination, with a draw-rod, of a lever operated by said draw-rod and provided with a roller, a crocodile-jaw lever upon which the lever first named acts, said crocodile-jaw lever being provided midway between the jaws with a recess, the side edges of which are approximately straight and parallel and extend in a direction parallel with a line drawn through the center upon which said lever swings and into which recess said roller will pass to swing the crocodile-jaw lever upon its fulcrum, a switch-rod pivotally connected to said crocodile-jaw lever, and a switch operated by the switch-rod, substantially as specified.

4. The combination, with a draw-rod, of a lever operated by said draw-rod and provided with a roller, a stretcher-bar, a plunger for locking said stretcher-bar and the switch in proper position, said plunger being operated from said lever, a crocodile-jaw lever upon which the lever first named acts, said crocodile-jaw lever being provided midway between the jaws with a recess, the side edges of which are approximately straight and parallel and extend in a direction parallel with a line drawn through the center upon which said lever swings and into which recess said roller will pass to swing the crocodile-jaw lever upon its fulcrum, and a switch-rod pivotally connected to said crocodile-jaw lever by which the switch is operated, substantially as specified.

5. The combination, with a draw-rod, of a switch, a stretcher-bar provided near one end with a slot having enlarged portions, a plunger provided with a narrow portion adapted to pass through said slot, and enlarged portions at the ends of said narrow portion adapted to be moved into the enlarged portions of the slot during the movements of the plunger to lock the stretcher-bar and the switch in two positions, a connection between the said plunger and the draw-rod for operating the former, a rod connected to said stretcher-bar and provided near one end with a slot having an enlargement at one of its ends, a signal, connections for operating said signal, and a pull-piece comprised in said connections and having a thin portion extending through said slot, and an enlarged portion preventing the longitudinal movement of said pull-piece in one direction when the switch occupies one of its positions, but which may pass through the enlarged portion of said slot to admit of the free movement of the pull-piece when the switch occupies its other position, substantially as specified.

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