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M. D. BROWN.

AUTOMATIC RAILWAY SIGNAL.

No. 345,412. Patented July 13, 1886.

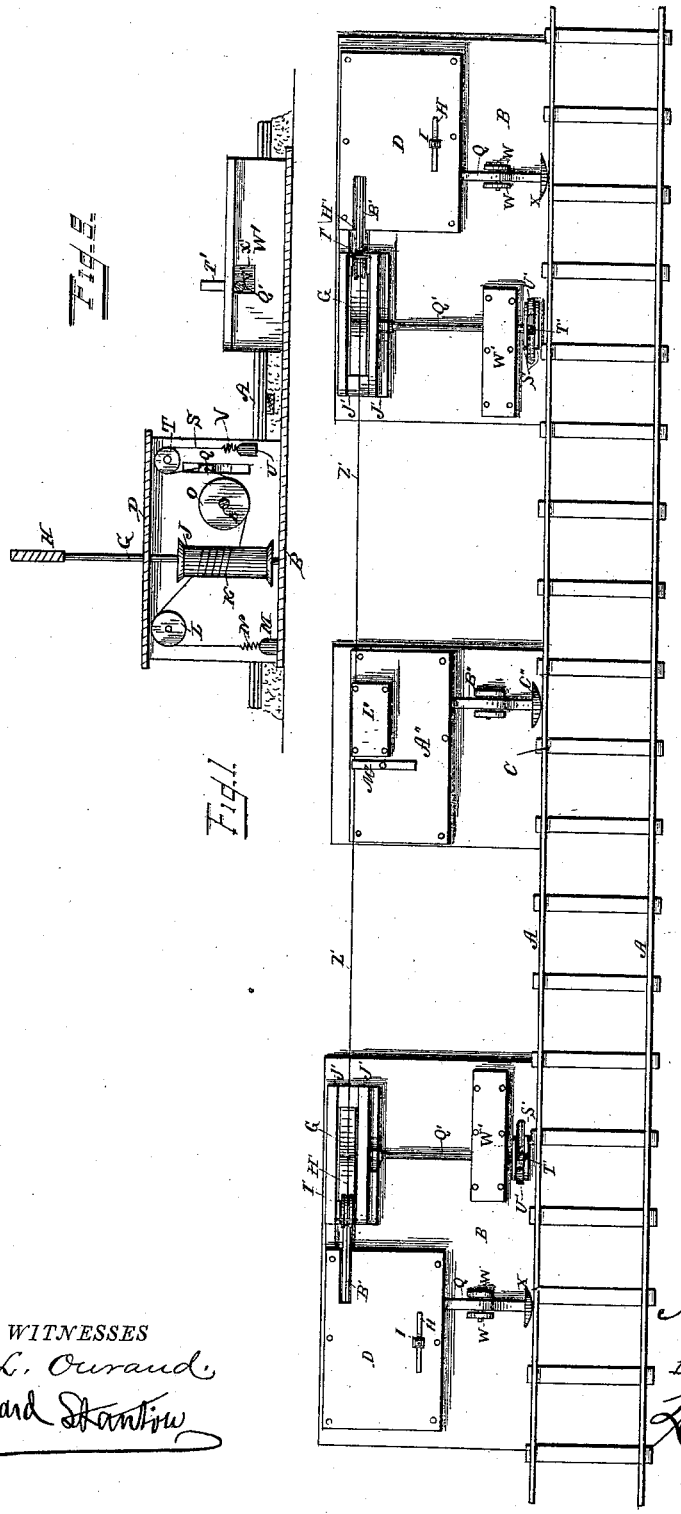

Fig. 2.

Fig. 1.

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Fig. 2.

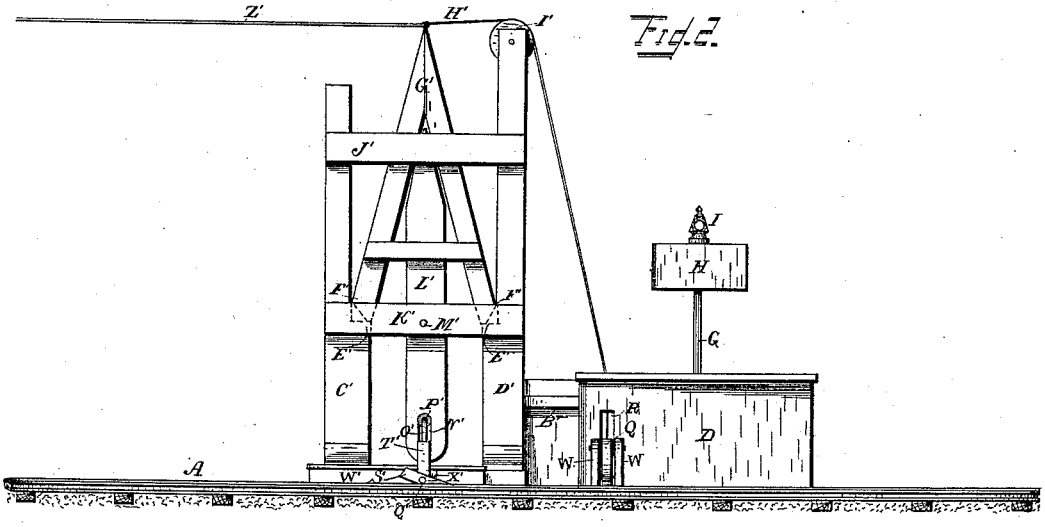


Fig. 3.

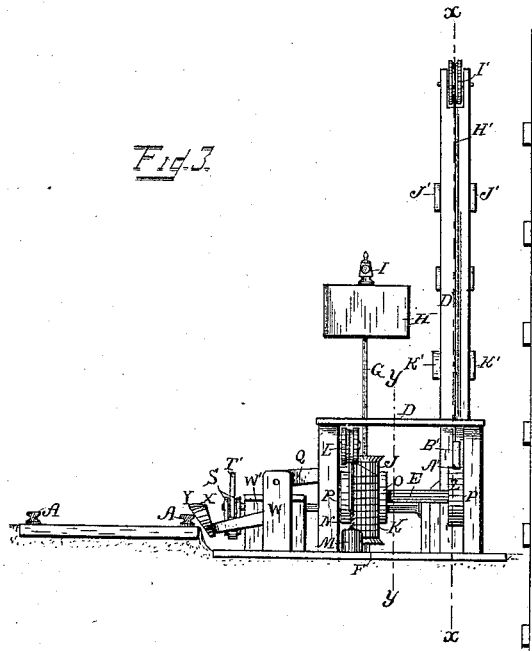
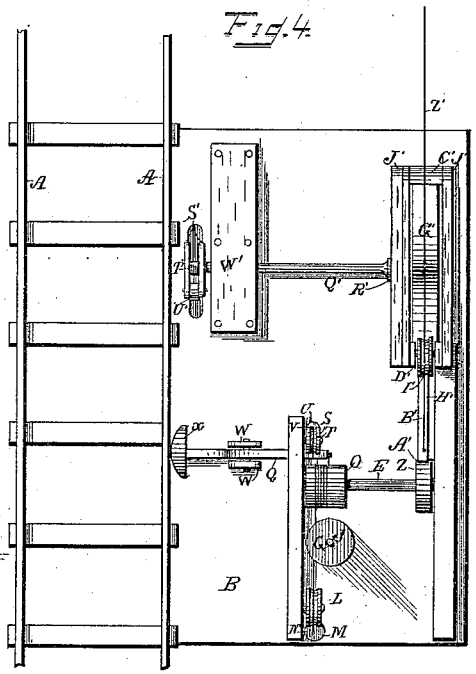


Fig. 4.



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AUTOMATIC RAILWAY SIGNAL.

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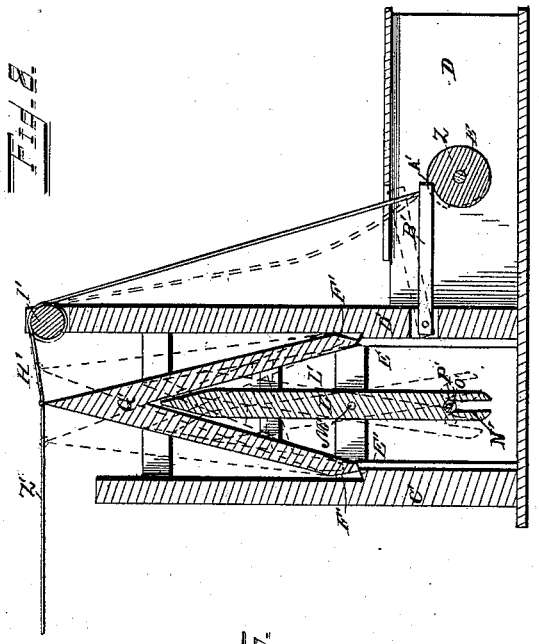
Fig. 8.



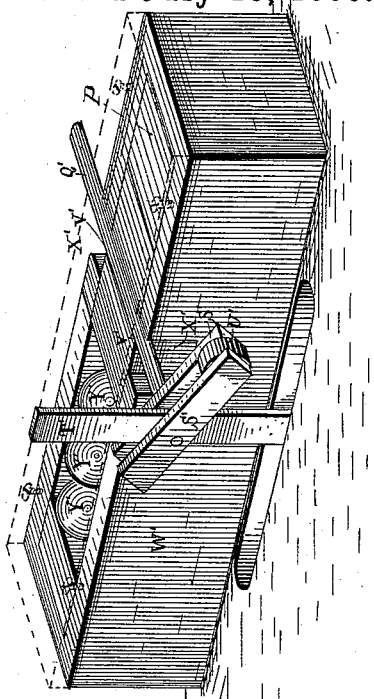


Fig. 5.

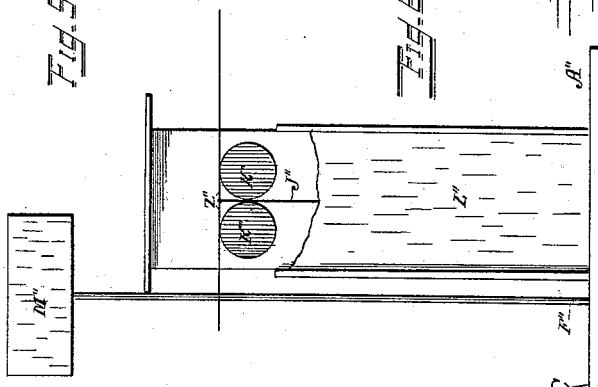
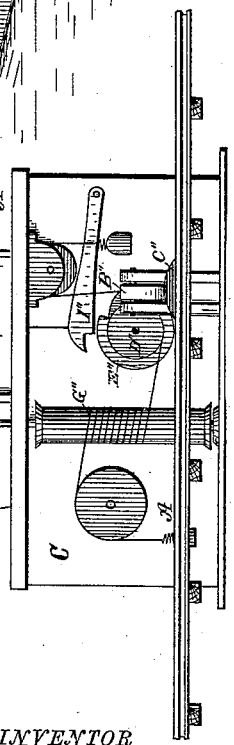


Fig. 6.



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AUTOMATIC RAILWAY SIGNAL.

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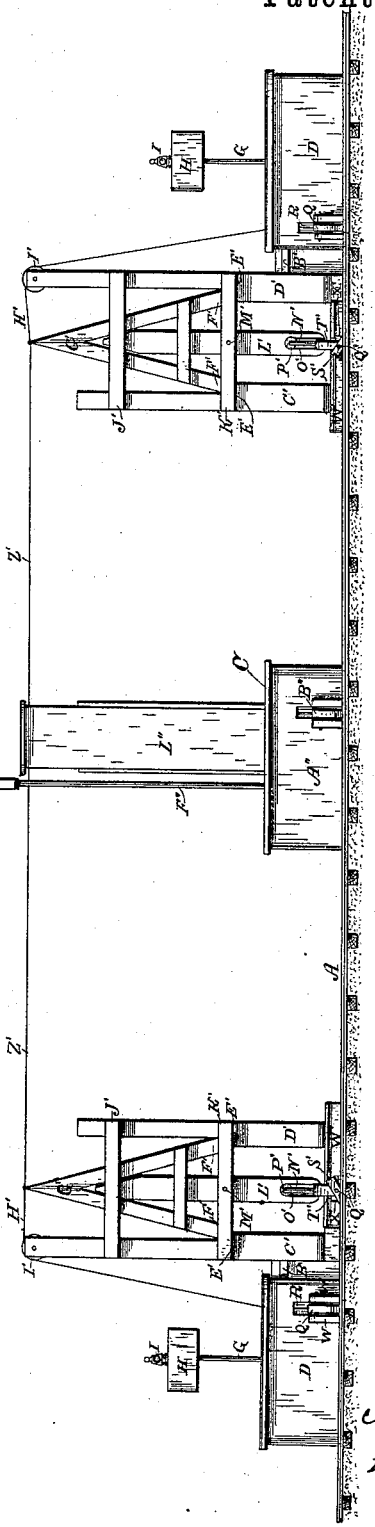

Fig. 7.

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UNITED STATES PATENT OFFICE.

MORGAN D. BROWN, OF FOREST, OHIO.

AUTOMATIC RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 345,412, dated July 13, 1886.

Application filed March 29, 1886. Serial No. 196,995. (No model.)

To all whom it may concern:

Be it known that I, MORGAN D. BROWN, a citizen of the United States, and a resident of Forest, in the county of Hardin and State of Ohio, have invented certain new and useful Improvements in Automatic Railway-Signals; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a plan view of a portion of a railway-track provided with my improved railway-signal. Fig. 2 is a front view of one of the signal apparatus. Fig. 3 is an end view of the same. Fig. 4 is a top view with the top of the casing inclosing the operating mechanism removed. Fig. 5 is a view of the crossing-signal. Fig. 6 is a perspective detail view of the bearing for the shaft operating the signal-setting device. Fig. 7 is a front view showing the track, the two signal apparatus, and the crossing-signal. Fig. 8 is a vertical sectional view taken on the line *x x* of Fig. 3; and Fig. 9 is a similar view of the same figure, taken on the line *y y*, but looking in the opposite direction.

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

This invention relates to automatic railway-signals; and it consists in the improved construction and combination of parts, as will be hereinafter more particularly described, and pointed out in the claims.

Along all lines of railroad there are portions of the track, usually in curves around hills and mountains, on which approaching trains are hidden from each other until they are so close together that on single-track roads it is impossible to check the trains before they come together. At such places it is very desirable to have some device by which the train which first enters upon such portion of the track can operate a signal at the other end and give notice to any approaching train that the track is already occupied. These signal-stands are located far enough apart to give the engineer of the approaching train plenty of time to stop his train after he sees the signal and get it out of the way, or to signal to the other train in time to prevent a collision. Such a device I have invented and will now describe.

In the accompanying drawings, A A represent the rails of the portion of the track to be protected, and B B are the signal-stands. At each of these stands an ordinary revolving signal-staff, G, provided at its top with the signal-board H and lantern I, is secured in bearings in the top and bottom of the casing D. Upon this staff, within the casing, is a spool or drum, J. A transverse shaft, E, is journaled in the sides of the casing, and is provided at one end, near the drum J, with a horizontal drum, O, and at the other end with a disk or cam wheel, Z, provided with a shoulder or stop, A′. Journaled to the side of the casing, near the two drums, are two rollers or pulleys, L and T. Pivotally secured between two uprights, W W, between the casing and the track is a lever, Q, one end of which is provided with a curved cross-head, X, the outer face of which is parallel with the rail of the track and inclined, and the other end of the lever projects through a slot, R, in the side of the casing, with its end between the drum O and pulley T. Wound around the drum J and secured to it at its middle portion is a rope, chain, or wire cable, K, one end of which is passed over the pulley L and provided with a coiled spring, N, and weight M, and the other end is wound around the drum O and secured to the end of the lever Q. A short rope or cable, S, is secured at one end to the lever Q, passed over the pulley T, and provided at the other end with a coiled spring, V, and weight U. If desired, however, the cables K and S can be made of a single piece and secured to the end of the lever Q in the same manner that cable K is secured to the drum J. At one end of each of the casings D is an upright frame, consisting of the posts C′ and D′ and the cross-pieces J′ J′ and K′ K′, the posts being provided upon their inner or facing sides with the notches or shoulders E′ E′. Within the upper portion of this upright frame a triangular-shaped frame, G′, is secured, with the ends of its legs, which are beveled, resting in the notches E′ E′. A lever, L′, the upper end of which is pointed and en-

gages with the triangular frame G′, and its lower end provided with the slot N′, is pivoted at M′ to the cross-pieces K′ K′. One of the posts D′ is provided at its top with a pulley or roller, I′, and near its lower end with a weighted lever, B′, pivotally secured thereto at one end, while the other end of this lever engages with the wheel Z within the casing, the top of the casing being slotted to permit the free motion of this lever. In front of this upright frame, and near one of the rails of the track, is a box, W′, having longitudinal slots or notches X′ in the upper edges of its sides. Fitting within one end of this box is a block, P, having bearings V′ in its upper portion for a horizontal shaft, Q′, and at the other end of the box are a series of elastic balls or cushions, Y′ Y′. The end of this shaft which is journaled in a bearing, R′, at the bottom of the upright frame is provided with a crank, O′, having a roller, P′, at its end, which engages with the notch N′ at the lower end of the lever L′. The other end of this shaft, which is at the side of the track, is provided with the arms or bars S′ S′, secured together at their outer ends, with an elastic cushion or washer, U′, between them. A lever, T′, having its lower end weighted or heavier than its upper end, is pivoted upon the end of this shaft between the arms S′ S′, and having its upper end long enough to be struck and operated by the passing train. A wire, Z′, is secured at each end to the tops of the frames G′, and a short wire, H′, is also secured to the top of each of said frames at one end and to the lever B′ at the other, its intermediate portion passing over the pulley I′ at the top of the post D′. If desired, the wires Z′ and H′ can be made in one piece and connected to the tops of the frames.

When the device is placed in its operative position, the top of each of the curved cross-heads X is on a level with the top of the rails of the track, and the signal-boards H or lamps I show the line "clear," the parts being kept in this position by the lever B′ engaging with the notch or shoulder A′ of the wheel Z. As soon, however, as a train passes either stand the pilot or any other ordinary tripping device secured to the locomotive strikes the top of the lever T′ and swings it upon the shaft Q′ until its lower end engages the cushion U′ and rocks the shaft. The rocking of the shaft causes the crank O′ and roller P′ to operate the lever L′, which in turn operates the frame G′ and causes its upper end to be tilted toward the post D′. By means of the wire Z′ the other frame G′ is drawn in the same direction, or away from the post D′ of its frame, which causes the wire H′ to lift the end of the lever B′ at that end out of the notch A′ in the wheel Z. As soon as the wheel Z is released the weight M at the end of the cable K causes the drum J to revolve one-fourth of a revolution, which turns the signal board H to show "danger" to another train which may be approaching that end of the portion of the track. When the train passes the stand on leaving the other end of the track, the wheels strike the curved cross-head X, which has been raised over and above the rail by the operation of the signaling mechanism and the weight U operating the lever Q. As the cross-head is forced down by the weight of the train the inner end of the lever is raised, which operates the signal-board to again show the track "clear," and as the wheel Z is operated at the same time the end of the lever B′ engages with the shoulder A′, and the signal is held in that position until it is again operated by a train entering the track at the opposite signal-stand. As the lever T′ only engages with the arms S′ S′ when operated by the train entering the protected portion of the track, the train passes the stand on leaving it without operating the frames G. Thus the only signal which is operated is that one in front of the train.

By the use of the springs at the ends of the cables K and S and the elastic washers U′ and balls Y′ in the box W′, injury to the mechanism is prevented by taking up the jar or blow of a train passing at a high rate of speed. The notches X′ in the sides of the box W′ permit the block P, carrying the shaft Q′, to move against the balls Y′. As the weight of the wire Z′ is sufficient to keep it taut enough to operate the frames G′, no adjusting device is required to adjust its varying length caused by expansion and contraction.

As it often happens that a public highway crosses the track at these dangerous portions, it is very desirable to give notice to travelers of the approach of a train. To accomplish this I use an additional stand, C, which is placed at the side of the track at such crossing, and has its operating mechanism connected to the main wire Z′ by the wire J″, in such a manner that it will be operated by moving the wire Z′ in either direction. This stand consists of the casing A″, within which are secured the pivoted lever I″, the drums G″ and D″, the cam wheel or disk E″, the pulleys, cable, and weights, all of which are similar to the corresponding parts in the end casings, and all of which perform the same functions. When the train passes either of the end signal-stands on entering the track, the signal-board M″ on the revolving staff F″ is turned so as to signal "danger" to the highway; but as soon as the wheels of the train pass the stand they strike the cross-head C″ at the end of the lever B″, which operates the signal by means of the cable and drum G″, and the lever I″ engages with the wheel E″, and secures the parts in that position, as is done at the end casings, until they are released and operated by another train entering either end of the protected track, the signal, however, in the crossing-stand being set opposite to those at the ends, as it is for the purpose of giving notice in the opposite direction.

Having thus described my invention, I claim

and desire to secure by Letters Patent of the United States—

1. In a railway-signal, the combination of two vertical semaphore-shafts at the ends of a track-section, having means for automatically turning them in one direction, and having chains, ropes, or wire cables wound upon them for turning them in the opposite directions, horizontal shafts journaled by the vertical shafts, and having the ropes or chains wound around them, and provided with disks having shoulders facing in opposite directions, levers having the ends of the ropes or chains secured to their inner ends, and having cross-heads at their outer ends parallel with the rail of the track, weighted arms engaging the shoulders of the disks upon the horizontal shafts, vertical levers having cords or chains attached to their upper ends and to the outer ends of the weighted arms, levers at the side of the track, having suitable connection with the vertical levers for tilting them in the opposite directions to the direction in which they are tilted, and a wire or wire cable attached at its ends to the upper ends of the vertical levers, as and for the purpose shown and set forth.

2. In a railway-signal, the combination of a vertical shaft provided with a drum and having a semaphore disk and lamp upon its upper end, a horizontal shaft having a drum and a disk provided with a shoulder in its periphery, a lever having a cross-head at its outer end parallel to and immediately adjoining the rail of the track, a rope or wire cable secured to the inner end of the lever and wound around and secured to the drums of the horizontal and vertical shafts, and passing over a pulley, a weight attached to the end of the rope or wire cable, a weighted rope or chain attached to the end of the lever and passing over a pulley, and a weighted arm having means for raising it, as and for the purpose shown and set forth.

3. In a railway-signal, the combination of two upright posts having beveled shoulders upon their facing sides and having cross-pieces connecting them, a V-shaped frame having the lower ends beveled and resting in the beveled shoulders of the upright posts, a lever having its upper beveled end projecting into the V-shaped frame, and having a vertical slot in its lower end, and pivoted at its middle between the lower cross-pieces, and a rock-shaft having a crank at its inner end provided with a roller, and projecting up into the slot of the lever, and having an arm at its outer end projecting at the side of the track, as and for the purpose shown and set forth.

4. In a railway-signal, the combination of a signal-operating rock-shaft journaled transversely to the track, two arms secured with their middles upon the end of the shaft adjoining the rail in an oblique position and at a distance from each other, a yielding bumper or washer secured upon a bolt between the lower ends of the arms, and a lever having a heavy lower end and pivoted upon the shaft between the arms, as and for the purpose shown and set forth.

5. In a railway-signal, the combination of a box parallel to the track, having longitudinal slots in the sides, a bearing sliding in the box, yielding balls interposed between the end of the bearing and the end of the box, and a signal-operating shaft having an arm at its end adjoining the track for engaging the train and journaled in the sliding bearing, as and for the purpose shown and set forth.

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

MORGAN D. BROWN.

Witnesses:
LOUIS BAGGER,
AUGUST PETERSON.