

(No Model.)

2 Sheets—Sheet 1.

M. CORTESE.
RAILWAY SIGNAL.

No. 435,801.

Patented Sept. 2, 1890.

Fig. 1.

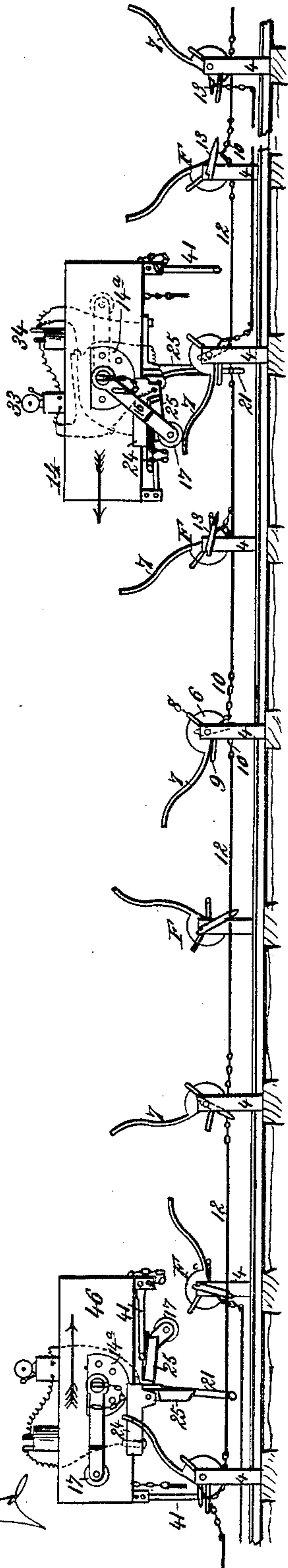
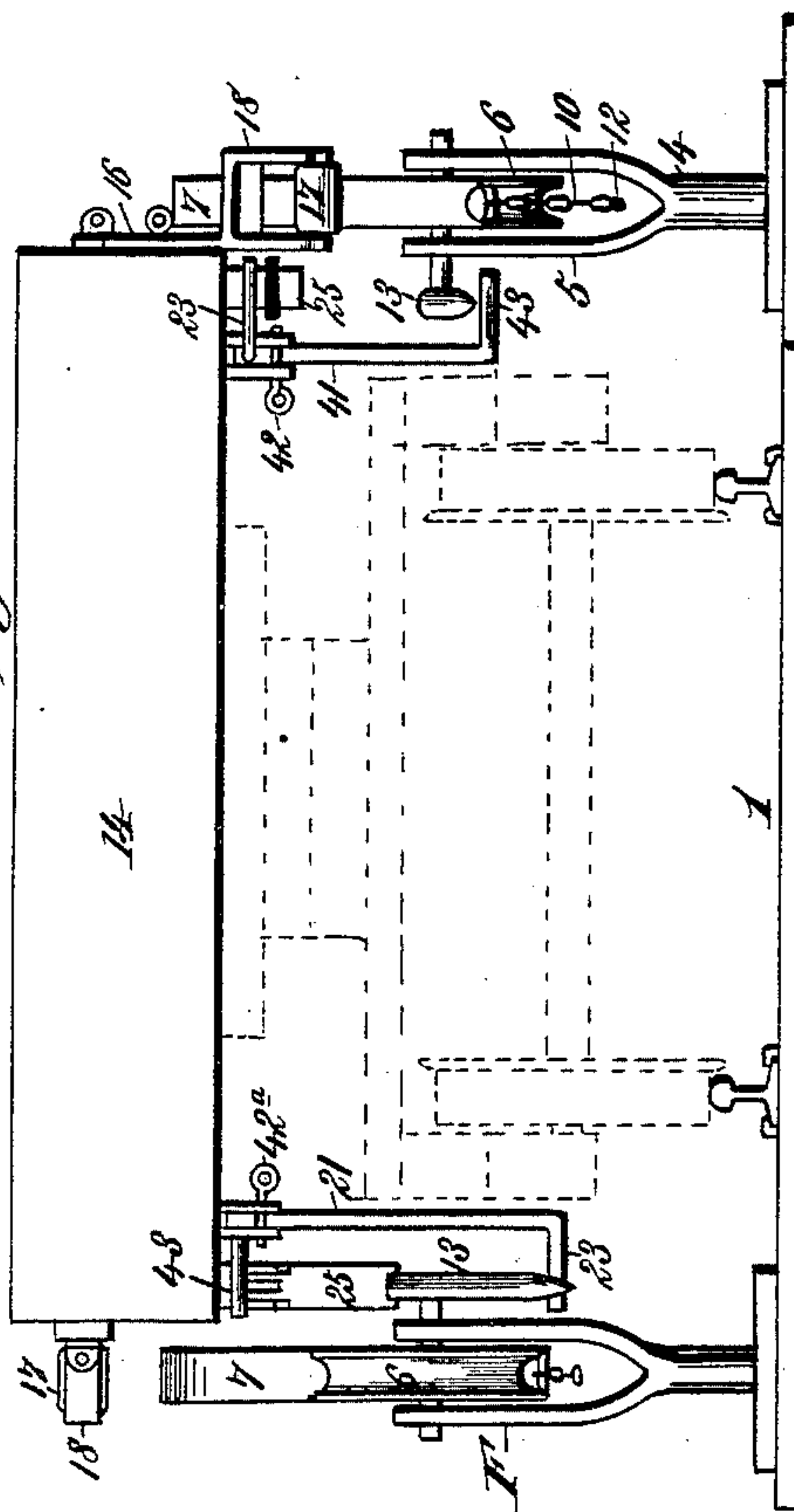


Fig. 2.



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2 Sheets—Sheet 2.

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Patented Sept. 2, 1890.

Fig. 3.

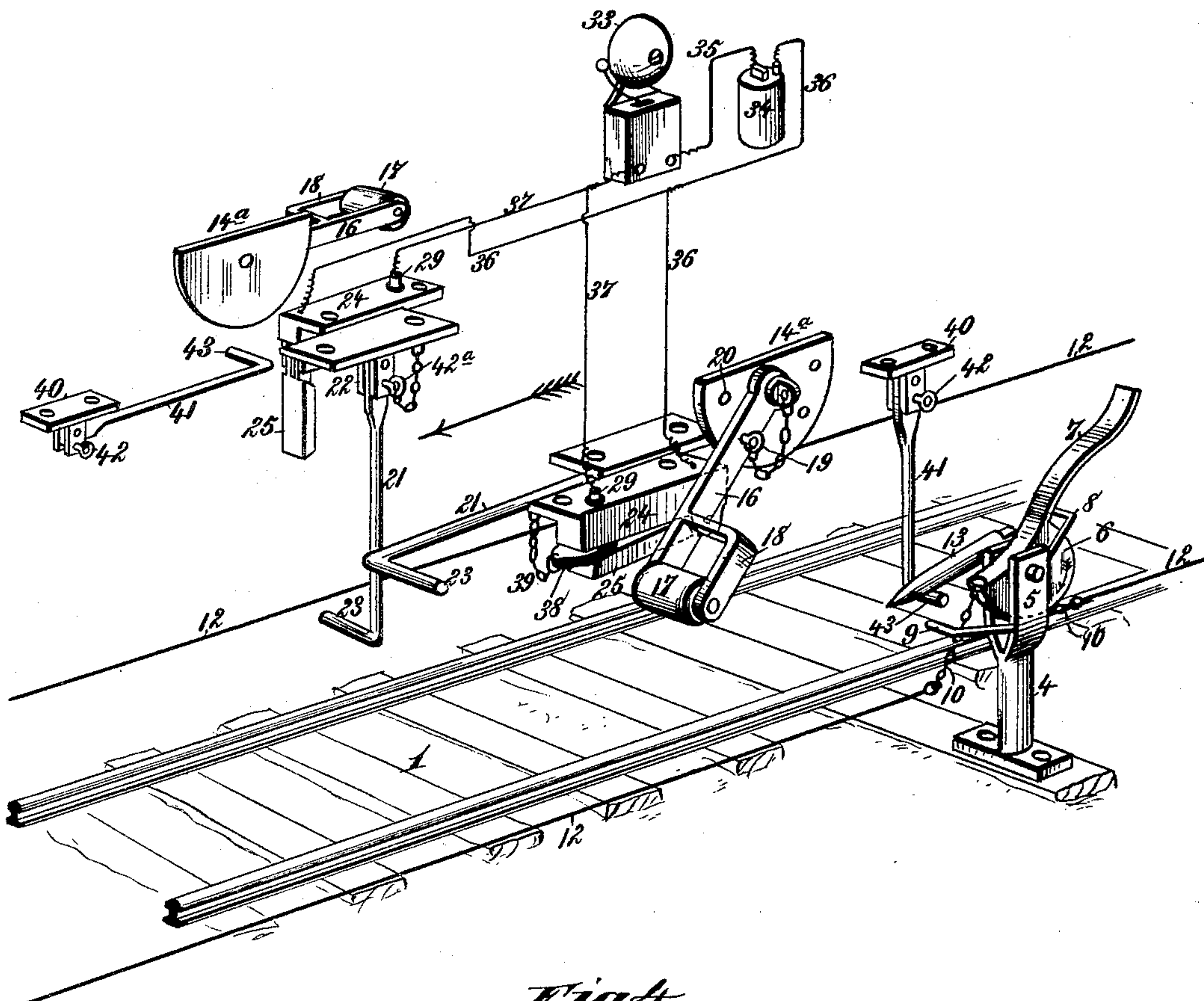
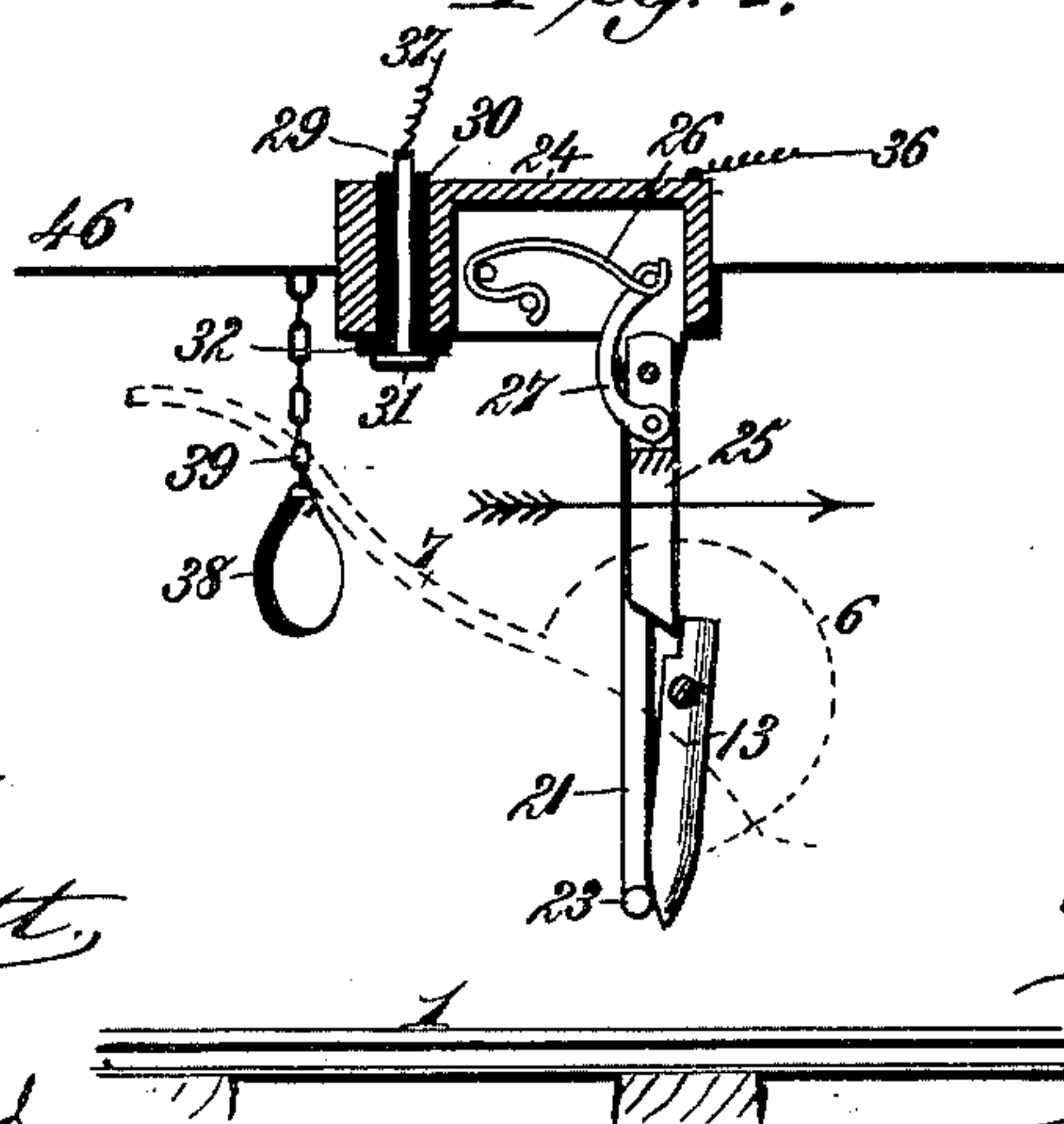


Fig. 4.



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MICHELE CORTESE, OF PHILADELPHIA, PENNSYLVANIA.

RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 435,801, dated September 2, 1890.

Application filed May 7, 1890. Serial No. 350,896. (No model.)

To all whom it may concern:

Be it known that I, MICHELE CORTESE, a citizen of Italy, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in Railway-Signals, of which the following is a specification.

My invention relates to that class of railway-signals which are intended to prevent the collision of trains running in opposite directions upon the same line or track.

It is the purpose of my said invention to provide simple means, mounted upon the cab of the locomotive and co-operating with devices arranged at definite intervals along the track, whereby said devices are set to a certain distance ahead of the train and upon one side of the track, and in such position that a train running in the opposite direction upon the same line may close an electrical circuit and ring a bell upon or within a suitable casing in the cab, thereby notifying the engineer that a train is approaching upon the same line and within a certain definite distance of the point where the signal is sounded.

It is a further purpose of my invention to so construct and organize the parts by which the signal is operated that there shall be a duplex action upon each of the locomotives approaching each other upon the same track, and whereby, also, the passage of a train in one direction shall set the operative parts in position to act should the passing train back up or should a separate train run in a direction opposite to that by which said signals are set.

My invention consists in the several novel features of construction and new combinations of parts hereinafter fully set forth, and then definitely pointed out by the claims following this specification.

To enable others skilled in the art to practice my said invention, I will describe the same in detail, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a portion of the track, showing the locomotive-cabs upon two approaching trains and the duplex series of setting devices upon each side of the track, together with the setting and circuit-closing devices upon each locomotive. Fig. 2 is a transverse vertical section of the track, taken

immediately in front of the right-hand car in Fig. 1. Fig. 3 is a perspective view of the operative parts as they are arranged upon the car, shown at the right hand of Fig. 1, together with the co-operating parts located upon the sides of the road-bed. Fig. 4 is a sectional detail showing the action of the circuit-closing lever and the local and movable devices whereby said lever is operated. This view also includes a side elevation of a portion of the track.

In the said drawings the reference-numeral 1 denotes a single line of railway-track of ordinary construction, the rails being supported upon sleepers in the usual manner.

At any suitable and equal, or substantially equal, intervals upon the road-bed or track I arrange upright brackets 4, having bifurcated upper continuations 5, within which are pivoted the segments of disks 6, having upon their chords or flat edges rigidly-mounted levers 7, having a double or reverse curve. Upon the upper ends of the bifurcated brackets 4 are mounted yokes 8, by which the swing of the levers 7 is limited in one direction, and upon a lower portion of said bracket, projecting in an opposite direction, is a second yoke 9, by which the swing of the lever 7 is checked in the opposite direction. Upon the single line of track described these brackets are arranged alternately upon opposite sides, those upon one side being arranged at regular intervals of any suitable length—such, for example, as one-fourth of a mile or one-eighth of a mile apart—this space being subdivided by the similar brackets upon the opposite side. This arrangement is shown in Fig. 1, in which the alternating brackets upon the farther side of the track are indicated by the letter F.

Each of the disks 6 is grooved or channeled upon its periphery, and upon the angle to which the end of the lever 7 is attached I attach a chain or other flexible connection 10, which lies within said groove or channel when the lever lies in normal position. To the ends of these chains, which are very short, are connected the extremities of wires 12, which extend to the corresponding chains upon the two adjacent disks pivoted or journaled upon the adjacent brackets upon either side of each single bracket, as shown in Fig. 3, and in the same manner throughout the

entire line of the road, the chains 10 giving just enough slack so that the swing of the lever 7 on any one of said brackets shall set the levers 7 upon the adjacent brackets upon the same side of the road-line, but to a less angle than the lever upon which the action is exerted, as more fully explained herein-after. Upon the axis of each segmental disk 6, and upon that end of said axis which is adjacent to the track, is rigidly mounted a tripping-bar 13, which turns with the disk in the manner now to be set forth.

Referring now to Figs. 1 and 3 of the drawings, the reference-numeral 14 designates the cab of the locomotive, on which is mounted a segment 14^a, to which is pivoted an arm 16, having a friction-roll 17, journaled between the end of said arm and an angular attachment 18, as shown by Fig. 3. This arm is locked by a detachable pin 19 at an angle of about forty-five degrees, the pin entering an opening in the arm and passing into one of a series of openings 20 in the segment 14^a. The arrangement of this arm is such that the friction-roll 17 will travel in the same vertical plane with the levers 7. Mounted pivotally upon the same side of the cab is a rod or bar 21 in rear of the arm 16, pivoted upon a drop-bearing 22, and having at its lower end an outwardly-bent tang 23, so arranged that it runs in the same or substantially the same vertical plane with the tripping-bars 13 on the shafts or journals of the disks 6. The purpose of this arrangement will be shown presently. Upon the side of the cab, also, is mounted a metallic housing 24, to which is pivotally connected a circuit-closing arm 25, which, like the housing, is of electrically-conducting material. This arm is normally thrown upward by a spring 26, mounted in the housing, and connected at its end to one end of a link-bar 27, which is pivoted to the circuit-closing arm 25 below its point of pivotal support when the latter is in the position shown in Fig. 4. The tension of the spring being almost directly upward, it will be seen that when the circuit-closing arm is thrown down into the position shown in Fig. 4 the spring tension will tend to retain it in that position, as the upward draft of said spring will be exerted a little behind the pivotal point; but the moment the bar is moved far enough to pass the pivotal axis in the opposite direction the spring 26 will instantly raise it and snap it upward against the lower part of the housing 24. In the end of this housing, against which the free end of this arm is thrown by this action of the spring 26, is arranged a vertical pin or bolt, arranged in an insulating-sheath 30, and having a head 31, against which the circuit-closing arm 25 is thrown by the spring. An insulating-collar 32, forming part of the sheath 30, is placed beneath the head of the bolt 29 to prevent the short-circuiting of the current of the battery, now to be described.

Mounted at any suitable point upon the

engine is an electric call-bell or other signal 33, operated by a battery 34. From one pole of this battery a wire 35 is connected to one of the binding-posts on the bell-casing, and from the other pole of the battery a wire 36 connects directly with the housing 24, as seen in Figs. 3 and 4 of the drawings. From the other terminal of the bell-coil a wire 37 is connected to the insulated connecting-bolt 29, Fig. 4. It will be seen that the moment the circuit-closing arm 25 is tripped and thrown against the head of the bolt 29 the bell-circuit is completed by way of the wire 36 from one pole of the battery, the housing 24, the arm 25, the bolt 29, wire 37, the bell-coil, and wire 35 back to the other pole of the battery. When it is desired to render the circuit inoperative, a rubber washer 38 or other insulator is inserted between the head of the bolt 29 and the end of the contact-bar 25, as seen in Fig. 3. For convenience this washer or insulating-disk may be suspended from the cab at any convenient point by a chain, cord, or wire 29.

The parts thus far described are, with the exception of the call-bell or other signal, duplicated upon the opposite sides of the cab, having a reverse arrangement to enable the train to run in opposite directions upon the same track.

It will be understood that when running in the direction indicated by the arrow in Fig. 1 the cab of the locomotive at the right hand of said figure will have its parts arranged in the manner shown in Fig. 3, having relation to the far and near sides of said cab, respectively. Upon each side of the cab, pivoted in a forked hanger 40, is a rod or bar 41, having vertical position, in which it is locked by a pin or bolt 42, inserted in holes in the bracket or hanger 40 and passing through an opening in the rod or bar. At its lower end this rod is provided with an outwardly-bent tang or end 43, arranged at such height that it may make engagement with the point or lower end of the tripping-bar 13 when the bar is in the proper acting position. When the train is running in the direction denoted by the arrow in Fig. 1 at the right-hand end of said figure, the parts of the apparatus are arranged as shown in Fig. 3, the arm 16, carrying the friction-roll 17, being raised upon the far side of the cab into a horizontal position, or substantially so, and confined by a pin or other suitable device 19, which passes through an opening in the arm and enters one of the apertures 20 in the segment 14^a, on which the arm is pivoted. The arm or bar 21 upon the far side is also thrown into vertical position and locked by the pin 42^a. This arm 21, which may be termed the "tripping-arm" for the circuit-closing arm 25, is arranged in a hanger alongside of the housing 24 in line, or nearly so, with the contact 25, which is thrown down into vertical position, as shown in Fig. 4. The corresponding contact on the near side is, however, thrown up and the rubber insulator inserted be-

tween its end and the end of the bolt 29. The resetting-arms 41, which are provided like the tripping-arms with outwardly-bent tangs, are arranged at the diagonally-opposite angles of the cab, or thereabout, and upon the near side of the cab the resetting-arm is thrown down, as seen in Fig. 3, while on the other side it is turned up out of the way. The purpose of this duplication and alternation of construction is to enable the train to run in either direction, the relative position of the parts shown in Fig. 3 being reversed upon the respective sides when the direction of movement is reversed. The numeral 46 in Fig. 1 denotes the cab of a locomotive upon the same track and moving toward the train shown at the right hand in Fig. 1. This cab is equipped in the manner already set forth, the only difference being that the arrangement of the parts is exactly the reverse of that shown in Fig. 3. Both trains being now in motion and approaching each other, the arm 16 upon the cab at the right of Fig. 1 will by its friction-wheel 17 make engagement successively with the rocking arms or levers 7, turning said lever in the direction of movement of the cab, and thereby taking up so much of the slack of the wires upon the near side of the track as to turn the lever 7 next in advance and, it may be, slightly moving the lever 7 still farther beyond. The same action takes place upon the opposite side, or far side, of the track, due to the similar arm 16 upon the far side of the approaching cab. As the rolls 17 pass off the levers 7, the resetting-levers 41 engage the points of the trip-arms 13 and reset them to the position shown in the extreme right hand of Fig. 1, or as shown in the foreground of Fig. 3. Let it be supposed, now, that the two trains have approached within an interval measured by two of the levers 7 on alternate sides of the track. The circuit-closing arms 25 will then make engagement on each cab with the tripping-arms 13 on opposite sides of the roadway, snapping the arms up against the head of the bolt 29 and closing the bell-circuit on each engine, thereby giving notice to both engineers that an approaching train is within a certain definite distance, which is known by the intervals between the levers 7. This action is not necessarily simultaneous on both cabs, but must occur on each at the instant that either circuit-closing arm 25 makes engagement with a tripping-arm 13, lying in the position shown in Fig. 4, to which they are set one, two, or more points in advance, in the manner already described. By these means all danger of collision upon single-track roads may be effectually avoided. The action of the tripping-bar 13 and the tripping-arm 21 will be readily understood from Fig. 4. The point or tang of the latter engages the point of the tripping-bar 13 at substantially the same moment that the point of the circuit-closing arm 25 engages the rabbeted upper end of the tripping-bar 13 above its shaft or pivotal axis, and the forward movement of the rigid arm 21 swings

the arm 13 sufficiently to throw the circuit-closing arm 25 far enough to enable the spring 26 to draw it up and close the bell-circuit on that side.

In order to operate the bell when running in either direction, I duplicate the circuits on both sides, as shown in Fig. 3, cutting either one of the duplex circuits out by means of the insulator inserted between the bolt 29 and the circuit-closer 25, according to the direction in which the cab is moving.

What I claim is—

1. In a railway-signal, the combination, with a duplex series of connected levers arranged upon opposite sides of the road-bed and connected by wires or other similar devices having a flexible slack-section at each end, of a tripping-bar rigidly carried by each lever-support, a riding adjustable lever mounted on the alternate sides of the cab of the engine and adapted to ride upon said levers, and resetting-arms also adjustable to vertical or horizontal position to engage the point of the tripping-bars and restore the levers, substantially as described.

2. In a railway-signal, the combination, with a double series of connecting rocking levers arranged alternately upon opposite sides of the track and at substantially equal intervals, of a series of wires or other similar connections having short flexible sections at their ends which are connected to disks turning with the levers, a tripping-bar mounted on each lever-axis and adjacent to the track, a riding arm on each side of a locomotive or cab mounted on a pivotal axis, a swinging and locking resetting-bar on each side of the locomotive arranged behind the riding arm, a similarly-formed tripping-arm pivotally mounted on each side, and circuit-closing arms closed by springs and tripped by the tripping arms and bars, respectively, substantially as described.

3. In a railway-signal, the combination, with a double alternating series of levers mounted upon rock-shafts on each side of the line, of connections between said levers having a limited slack, tripping-bars rigidly mounted on the axes of said levers, and riding arms pivotally mounted upon the opposite sides of the cab of the locomotive, which are adapted to be turned or arranged and locked in the proper angle to enable them to operate the said tripping-bars in both directions of movement, substantially as described.

4. In a railway-signal, the combination, with a double series of rocking levers separated by substantially equal intervals and connected by wires having flexible sections for slack, of tripping-bars rigidly mounted upon the axes of said levers, stops limiting the swing of the latter, riding arms having friction-rolls which turn said levers, said arms being duplicated on each side of the cab of the engine and pivotally mounted, whereby either one may be brought into action, circuit-closing arms pivoted on each side of the cab and

closed by springs, a tripping-arm on each side, also pivotally mounted and having a tang engaging the point of the tripping-bar on the lever-axis at the same time the circuit-closing arm engages the point or end on the other side of said axis, and a call-bell or other signal the circuit of which is closed by the closing of said arm, substantially as described.

5 5. In a railway-signal, the combination, with a series of substantially equal-distant supports, of a series of levers having reflex curves and mounted on rock-shafts on said supports, a riding arm swinging said levers in succession to raise one or more of those in advance, a resetting-arm on the cab restoring the lever turned by the riding arm to normal position, a circuit-closer pivoted on the engine-cab and raised or closed by a spring which, when the arm is opened, exerts its tension behind the axis, a tripping-bar on the lever-axis, and a tripping-arm on the cab, the latter making engagement with the lower end of the tripping bar and the former with the end of the open-circuit closer, substantially as described.

10 25 6. In a railway-signal, the combination,

with a double series of swinging levers arranged on opposite sides of the track, of a series of connections between said levers on each side, pivotally-adjustable riding arms on opposite sides of the engine-cab acting upon the opposite series of levers in opposite directions of movement, duplicate circuit-closers having a similar arrangement and action, resetting-bars pivoted and adapted to be locked in either a vertical or horizontal position upon or near the diagonally-opposite angles of the cab, tripping-arms similarly mounted on each side substantially in line with the circuit-closers when turned into vertical position, springs operating the latter, and tripping-bars carried by the axes of the rocking levers and having a lower end engaging the point or tang of the tripping-bar as the upper end engages the free end of the circuit-closer, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

MICHELE CORTESE.

Witnesses:

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B. CONSTANTINE.