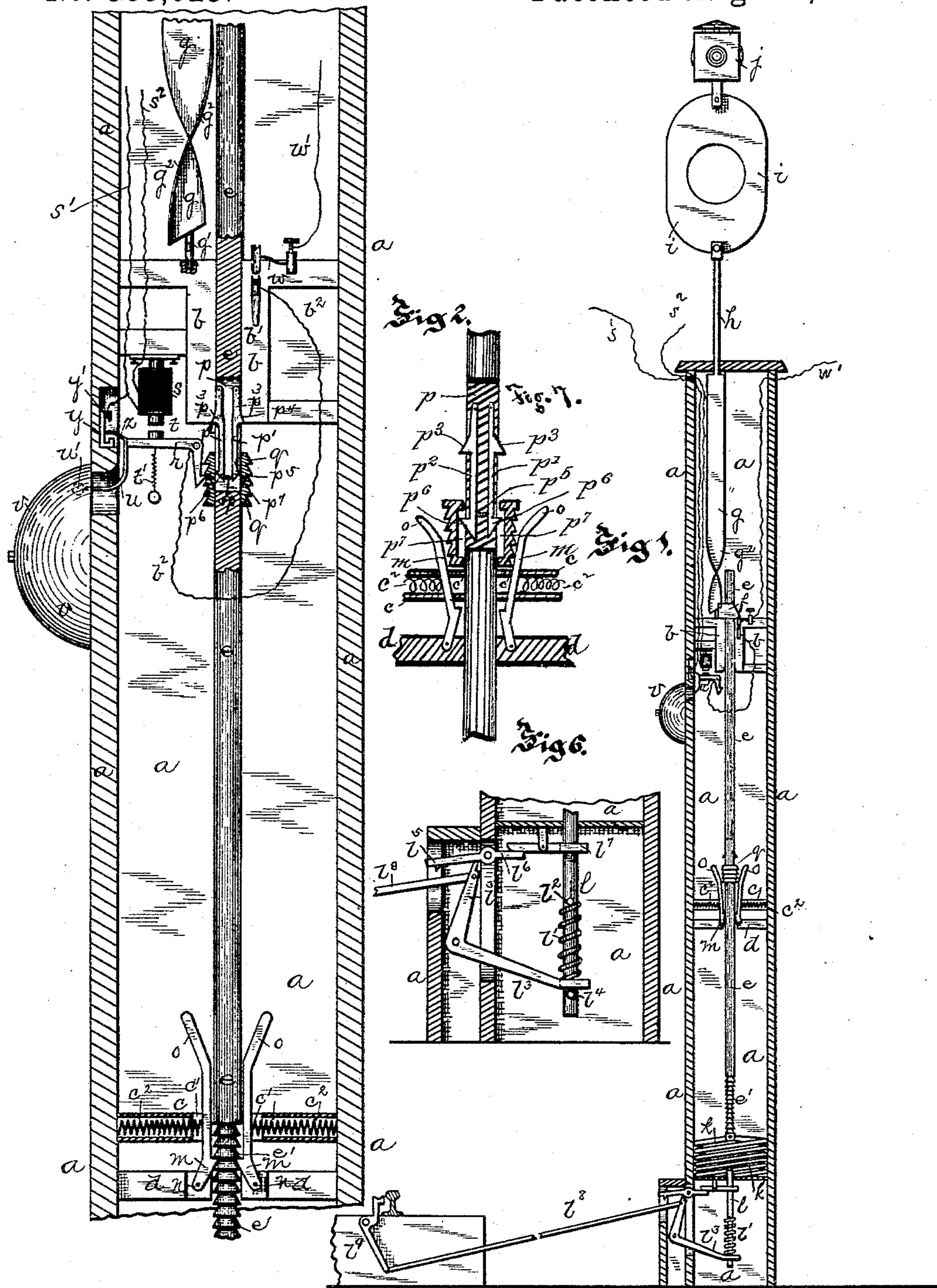


T. P. CURRY.  
RAILWAY SIGNAL.

No. 388,023.

Patented Aug. 21, 1888.



Witnesses:  
J. H. Cooke  
J. C. Barnes

Inventor:  
Thomas P. Curry  
By James D. Day  
Attorney.

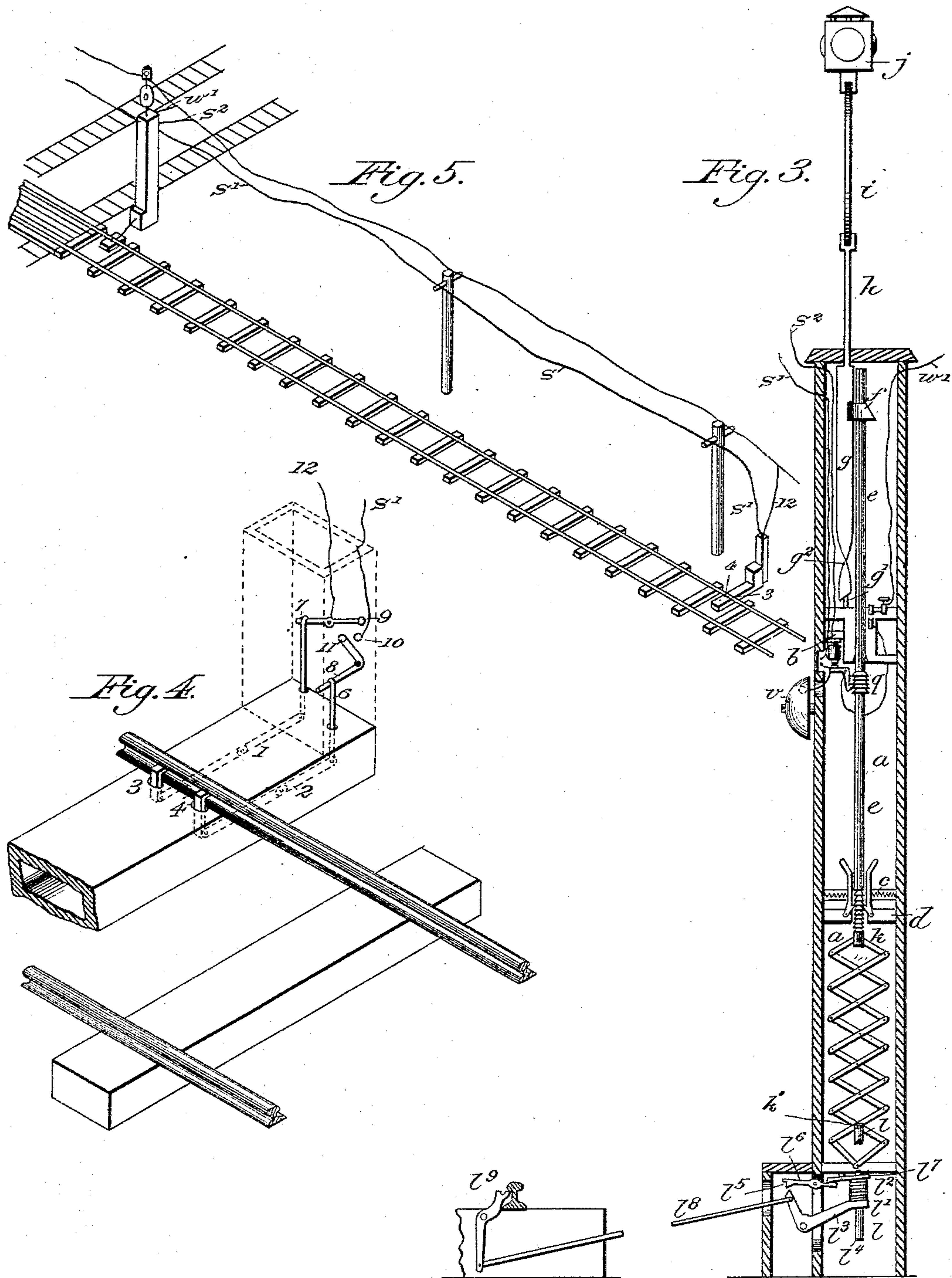
(No Model.)

2 Sheets—Sheet 2.

T. P. CURRY.  
RAILWAY SIGNAL.

No. 388,023.

Patented Aug. 21, 1888.



Witnesses:  
*[Signature]*  
*[Signature]*

Inventor:  
*T. P. Curry.*



# UNITED STATES PATENT OFFICE.

THOMAS P. CURRY, OF DANVILLE, KENTUCKY.

## RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 388,023, dated August 21, 1888.

Application filed March 9, 1887. Serial No. 230,205. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS P. CURRY, of Danville, in the county of Boyle and State of Kentucky, have invented a new and useful Improvement in Railway-Signals; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to signal apparatus for railroads, and more particularly to that class which indicates the approach of an oncoming train or the arrival at any specified point in advance of a train that has passed.

This improved signal is adapted to be used either as a crossing-signal, to signal around curves, to signal through a tunnel, to indicate the approach of trains toward each other, or in connection with a block-signal system; and it has for its object to provide a signal apparatus which, when the train has reached a certain distance from where the signal is located, will cause the latter to automatically display a suitable visual signal, and when it may be desired also ring a bell or gong to further warn any person in the vicinity.

It also has for its object to provide an apparatus which, after being operated to indicate "danger" or "safety," will be automatically caused to resume its normal position as the train passes by it.

To that end the invention consists, generally, of a signal-box located at one side of the track, having therein a signal rod or bar carrying the signal lamps, disks, or other suitable device, means for operating said rod, electrical mechanism for starting said operating mechanism into activity, and a circuit-closing device operated by the passing train, located at a distance from the signal box, said device having a connection with a line-wire, or with a local battery where a line-wire is not used, and with the electrical mechanism within the signal-box.

The invention further consists in a tripping-lever on one side of the rail-head opposite the signal-box and connections between said tripping-lever and the mechanism for operating the signal-rod, whereby when the train passes the signal-box the signal-rod will be compelled to resume its normal position.

The invention also consists in an alarm-bell attached to the signal-box and a circuit for operating said bell, which, when the signal-rod

is turned so as to expose the danger-signal, is closed to ring the bell until the signal-rod again resumes its original position.

The invention also consists in certain other improvements, all of which will be more fully hereinafter set forth.

To enable others skilled in the art to make and use my invention, I will describe the same, referring to the accompanying drawings, in which—

Figure 1 is an elevation showing the interior mechanism of the signal-box. Fig. 2 is a detail view, on an enlarged scale, of the mechanism for operating the signal-rod. Fig. 3 is an elevation showing the signal-box mechanism in its normal position. Fig. 4 is a perspective view of the circuit-closing device. Fig. 5 is a perspective view showing the relative positions of the signal-box and circuit-closing device on the railroad-track. Fig. 6 is a detail view of the lower part of the mechanism for raising the operating-rod, and Fig. 7 is a detail view of the device for carrying the weight that is dropped back to its original position.

*a* is the signal-box, in the interior of which are located at suitable distances apart guides *b*, *c*, and *d*, in which slides the operating-rod *e*, having upon its upper end a slotted block, *f*, Fig. 3, within the slot of which the edge of the signal-bar *g* fits. This bar *g* has upon its lower end a pivot-pin, *g'*, bearing in a suitable socket in the upper surface of the guide *b*, and above said pivot a spiral twist, *g''*, sufficient to insure that when the block *f* passes along the edge of the bar *g* it will cause said bar to make a quarter-turn. This twist is placed near the lower end of the bar *g*, so that it may be encountered by the block *f* with the force accumulated through the drop (or fall) of the operating-rod *e* and its attachments. Instead of the groove being in the block the signal-rod may have a spiral groove therein, which is engaged by a pin or lug on the operating-rod. The other end of the bar *g* is reduced and rounded off at *h*, so as to pass through an opening in the upper part of the signal-box *a* and give a bearing-surface on which the bar *g* may turn in connection with the pivot-pin *g'*. Above this bearing portion of the signal-bar *g* is attached the danger or signal disk *i*, carrying a semaphore-lamp,



j. The operating-rod *e* is attached at its lower end to the expanding-lever device *k*, forming what is known as a "lazy-tongs," which is secured at the bottom to a cross-piece 5 between the sides of the box *a*, and is lifted (or expanded) by the rod *l*, pivoted to it at *k'* and passing down into the lower part of the signal-box. The rod *e*, just above where it is attached to the expanding-levers *k*, has a number 10 of ratchet-teeth, *e'*, formed on each side of the bar, and engaging said ratchet are the dogs or levers *m m*, pivoted at their lower ends to the guide *d* at *n*, (see Fig. 2,) and having on their upper ends outwardly-bent arms *o o*. To 15 keep these levers *m m* pressed against the bar and hold them in position, the inner ends of the guides *c c* are slotted to receive the levers, and have recesses *c'* therein, in which are located springs *c''*, which press against the levers. 20 Pivoted within a slot, *p*, in the operating-rod *e*, about the middle thereof, are two levers, *p'* and *p''*, having on their upper ends the beveled or inclined surfaces *p'''*, which, when the rod *e* is raised, strike against the beveled surface *p''* on 25 the lower end of the guide *b* and force the levers inward, the latter being held normally outward by a spring, *p''''*. The lower ends of these levers have thereon lugs or projections *p''''*, which, when the rod *e* is dropped, engage 30 socket *p''''* in the inner surface of the loose weighted collar *q*, which embraces the rod *e*, and so sustain said collar while the rod *e* is being raised, the levers being forced outward by the spring *p''''*. This collar *q* has a series of 35 ratchet-teeth on its periphery, which are engaged by the projection or tooth on the end of the lever *r* and the collar held suspended thereby when the levers *p'* and *p''* have been forced inward by the bevel-surfaces *p'''* of the guide *b*. 40 Above the lever *r*, and secured to the under side of the guide *b*, or to any other convenient support, is an electro-magnet, *s*, one pole of which is connected by the wire *s'* to the button 10 in the circuit-closing device, and the 45 other pole by the wire *s''* to a line-wire which is kept constantly charged, as is the line-wire of a telegraphic system. The lever *r* is rocked on its pivot by this magnet attracting an armature, *t*, on one arm of the lever *r* when the 50 magnet is energized by the passage of the current through the coil thereof, and to insure a positive return movement of the arm, a spring, *t'*, serves to hold it down normally. The lever *r* has attached to its outer end a bent arm, *u*, 55 which passes through an opening in the side wall of the signal-box and has a bell-hammer, *u'*, thereon for ringing a gong, *v*, secured to the side of the signal-box *a*.

On the upper side of the guide *b*, opposite 60 the side to which the magnet *s* is secured, is supported a contact-button, *b'*, which is connected to the arm *r* by a wire, *b''*, and for the purpose of making a connection with said contact-button and the line-wire or local battery 65 a spring-key, *w*, is mounted over the contact *b'* said key being connected to the line-wire by suitable connections, *w'*. Located in a recess

in the side of the signal-box *a*, opposite the end of the arm *r*, is an L-shaped contact-piece, *y*, which has at its upper end a binding-screw, 70 *y'*, for connecting a wire from the coil of the electro-magnet *s*, said wire being a branch of the wire *s'*. This contact-piece is connected with the lever *r* by the strip of metal, *z*, which rests on the lower end of the contact when the 75 lever *r* is in its normal position. As the head of the key *w* is so located as to be in line with the block *f* on the rod *e*, the block will, when the rod falls, strike against the key and force it down into contact with the button *b'*, closing 80 the circuit from the line-wire to the electro-magnet *s* through the wire *b''*, arm *r*, strip *z*, contact-piece *y*, and short branch of *s'*, and back to the line-wire by the wire *s''*, causing the magnet to attract the armature *t* on the 85 lever *r* and draw the strip *z* out of connection with the contact *y*, breaking the circuit. As soon as the circuit is broken, the lever *r* will be drawn back to its normal position by the spring *t'*, and the strip *z* will strike against 90 the contact *y*, again closing the circuit and lifting the arm *r*, and so on, which gives a vibratory motion to the lever *r*, so as to keep ringing the bell as long as the key *w* is in contact with the button *b'*. The passage of suc- 95 cessive wheels of a train over the circuit-closing levers 3 and 4 will make the ringing of the bell somewhat irregular, but will not impair its usefulness.

Coiled around the rod *l* is a spring, *l'*, which 100 impinges at its upper end against a pin or collar, *l''*, on the rod *l*, and at its lower end against a bell-crank lever, *l'''*, the forked end of which embraces the rod *l*, and is prevented from dropping by a pin or collar, *l''''*, on said rod. The 105 other end of the lever *l'''* engages a notch, *l''''*, in end of the pivoted lever *l''''*, the other end of which bears against a pivoted tripping-lever, *l''''''*, which is in the path of the pin *l''* on the rod *l* as the latter moves upward. The bell crank 110 lever *l'''* is connected by the link *l''''* to the tripping-lever *l''''''*, pivoted or mounted on one side of the head of the rail, so that when the wheels pass over the latter it will depress the tripping-lever, which cants the bell-crank lever *l'''* 115 upward, compressing the spring *l'*, and causing the other end of the lever *l'''* to be caught by the notch *l''''* in the lever *l''''*, thus preventing the compressed spring *l'* from expanding downward as soon as the car-wheel has 120 passed over the tripping-lever *l''''''*. The expansion of the compressed spring *l'* forces the rod *l* upward, and through the medium of the expanding-levers *k* lifts the operating-rod *e*. As soon as the rod *l* has been raised by the 125 expansion of the spring *l'* to a sufficient height for the pin *l''* thereon to strike against the lever *l''''*, the latter will be forced upward, tripping the lever *l''''* and releasing the bell-crank lever *l'''*, so that it may be free to resume its 130 normal position.

Placed at some distance from the signal-box *a* is the circuit-closing device, (illustrated in Fig. 4,) which consists of an L-shaped box or



receptacle, a portion of which extends under the rails, and pivoted therein are two levers, 1 and 2, having on their inner ends the upwardly-extending pedals 3 and 4, which rest against the side of the rail-head, and on their outer ends arms 5 and 6, connecting them with the pivoted levers 7 and 8, respectively. The arm 7 is connected by the wire 12 to the line-wire and has upon its outer end a contact-disk, 9, which, when the lever is moved in the manner hereinafter described, rests against a button, 10, connected by the wire  $s'$  to one pole of the electro-magnet  $s$  in the signal-box, the circuit being completed by the wire  $s''$ , running from the other pole of the magnet back to the line-wire. The arm 8 has upon its end a disk of insulating material, 11, which, when the arm 8 moves, as hereinafter described, rests on the button 10 and prevents the lever 7 from making a contact therewith, and thus closing the circuit.

The operation of my improved signal device is as follows: If the apparatus in the signal-box is in the position shown in Fig. 3—that is, the rod  $e$  in its elevated position and the danger-signal not turned toward the observer—and a train is coming toward the circuit-closer, so as to strike the pedal 3 first, the latter will be depressed and the lever 7 will move the disk 9 downward, so as to make a contact with the button 10, when a current will immediately pass from the line-wire through the wire 12 and the wire  $s'$  to the electro-magnet  $s$  and back to the line-wire through  $s''$ , energizing the magnet, so that it attracts the armature  $t$ , lifting the lever  $r$ , so that its toothed end no longer engages with the teeth on the periphery of the collar  $q$ , which collar immediately drops, and, striking against the arms  $o o$ , forces them apart by its impact, so that the teeth or dogs on the arms  $m m$  no longer engage the teeth  $e'$  in the bar  $e$ . As soon as the bar  $e$  is thus released, it immediately falls, compressing the expanding-lever device  $k$ , and the block  $f$ , by its engagement with the edge of the signal-bar  $g$  and the twist in the latter, causes the same, by its downward rectilinear movement with the rod  $e$ , to turn a quarter-revolution on the pivot  $g'$  and bearing  $h$ , exposing the danger-signal to the observer. When the block  $f$  has reached the end of its fall, it compresses the spring-key  $w$ , so as to close the circuit with the button  $b'$  and the line-wire, which causes the ringing of the bell or gong  $v$ , in the manner heretofore described. In order, when contact is made between 9 and 10, to insure the passage of a current through the wires 12  $s'$ , the electro-magnet  $s$ , and the wire  $s''$ , these wires are to be so constructed or disposed as to offer less resistance to an electric current than the line-wire. Should a train run over the track in a direction to strike the pedal 4 first, the latter would raise the insulating-disk 11 over the button 10, and when the lever 7 is lowered by the wheel striking the pedal 3 would prevent the disk 9 from closing the

circuit with the line-wire and the button 10, and thus energizing the magnet  $s$ . When the train reaches the signal-box, the wheels strike the tripping-lever  $l'$  and cause the lever  $l''$  to compress the spring  $l'$ , as heretofore described, which forces the device  $k$  to expand and lift the rod  $e$  to its original position, the levers  $m m$  engaging by their teeth the toothed portion  $e'$  of the rod to maintain the rod in its elevated position. When the rod  $e$  falls to turn the signal-bar, as heretofore described, the levers  $p' p''$  engage, by the lugs  $p''$ , the socket  $p'$  in the interior of the collar  $q$  as it rests on the guide  $c$ , and when the rod  $e$  is raised by the expansion of the lever  $k$  it lifts the collar until the teeth on its periphery are caught by the lever  $r$ , the levers  $p'$  and  $p''$  being forced inward out of engagement with the socket  $p'$  by surfaces  $p'''$  on the guide  $b$ . The signal apparatus is thus returned to its normal position, ready to indicate the approach of the next train.

When my improved apparatus is employed as a block-signal, the only difference is that the danger-signal is exposed by the train passing over the lever  $l'$ , which acts to turn the signal to "danger," and at a suitable point beyond the signal-box the circuit closing device shown in Fig. 4 is located, so that as the train passes over it it will close the circuit leading therefrom to the magnet  $s$ , thereby freeing the sleeve or collar  $q$  and causing the operating-rod  $e$  to drop, as above described, by which means the signal will be turned from "danger" to "safety," indicating that the train has left the block. In either case the electric circuits may be arranged to operate the apparatus by breaking instead of closing the circuit, as is well known to the skilled electrician, the operation of the apparatus by breaking the circuit being preferable where it is employed as a block-signal, as in case it should for any cause become inoperative the danger-signal would be displayed.

When the apparatus is employed as a block-signal, it is not necessary to employ the gong.

Having now described my invention, what I claim is—

1. In a signal apparatus, the combination of a signal-rod carrying the signals with an operating-rod engaging therewith and means for starting said rod into activity through virtue of a blow automatically delivered against the sustaining support of said rod, substantially as described.

2. In a signal apparatus, the combination of an operating-rod with lazy-tongs attached at one end to said operating-rod and at the other end to a lifting device which is operated by the expansion of a spring that has been compressed by force communicated from the wheel or wheels of a passing train, substantially as and for the purpose set forth.

3. In a signal mechanism, the combination of the operating-rod, expanding-levers attached to the lower end of said rod, another rod attached to the lower end of said expand-



ing-levers, a forked arm embracing said rod and having a yielding connection therewith, and a tripping-lever connected to said arm, substantially as and for the purpose set forth.

5 4. In a signal apparatus, the combination of an operating-rod having one or more teeth or ratchets in its sides with a lever or levers for engaging said rod and supporting the same and means for withdrawing the levers from support of the rod by a blow automatically delivered against them, substantially as and for the purpose set forth.

15 5. In a signal apparatus, the combination of an operating-rod having a notch or notches therein, and arms pivoted to the signal-box for engaging said notch, with a loose collar or ring embracing said rod, substantially as and for the purpose set forth.

20 6. In a signal apparatus, the combination of an operating-rod, and a collar embracing said rod, having socket or sockets  $p'$  therein, with levers  $p'$  and  $p''$ , attached to said rod for engaging said sockets, substantially as and for the purpose set forth.

25 7. In a signal apparatus, the combination of an operating-rod having one or more notches therein, arms engaging said notches, a loose collar surrounding said rod, and means for raising said collar and for maintaining it in its raised position, substantially as and for the purpose set forth.

30 8. In a signal apparatus, the combination of an operating-rod, a loose collar on said rod having one or more teeth or notches on its periphery, a lever for engaging said collar, and means for operating said lever, substantially as and for the purpose set forth.

35 9. In a signal apparatus, the combination of a signal-rod carrying the signal, an operating-rod, and electrical mechanism for releasing a weight, so that it may drop from its support and start said operating-rod into activity, substantially as described.

40 10. In a signal apparatus, the combination of the button  $b'$ , key  $w$ , a lever,  $r$ , and a wire connecting said lever and button with an electro-magnet, and electrical connection between said magnet and the arm  $r$ , and a circuit-breaker between said parts, substantially as described.

11. In a signal apparatus, the combination of an operating-rod having an enlarged head thereon with the key within the course of said head and adapted to be closed thereby and operate a circuit, substantially as described. 55

12. In a signal apparatus, the combination of an operating-rod having a block or enlarged head thereon, a key connected with the line-wire with which said head or block comes in contact, a pivoted lever having a bell-hammer on one end, an electro-magnet for operating said lever, and circuit-connections and a circuit-breaker between said key and magnet, substantially as and for the purpose set forth. 65

13. In a signal apparatus, the combination of a signal-rod carrying the signals and means for operating said rod with electrical mechanism operated by the train for releasing a weight, so that it may drop and thus start said operating means into activity, substantially as and for the purpose set forth. 75

14. In a signal apparatus, the combination of a button having a connection with the signal-box, an arm connected with the line-wire, and an arm carrying an insulating-disk with means for operating said parts by the train, substantially as and for the purpose set forth. 75

15. In a signal apparatus, the combination of the lever 1, having the pedal 3 attached to one end, a lever, 7, having an electrical connection with the line-wire, and means for connecting said lever 1 and arm 7 with a button, 10, having an electrical connection with the signal-box, substantially as and for the purpose set forth. 85

16. In a signal apparatus, the combination, with a lever, 2, having a pedal, 4, attached to one end, of an arm carrying an insulating-disk moved by said lever, and a button, 10, having a connection with the signal-box, substantially as described. 90

In testimony whereof I, the said THOMAS P. CURRY, have hereunto set my hand.

THOMAS P. CURRY.

Witnesses:

G. W. WELSH, Jr.,  
JNO. J. HOGSETT.