No. 624,390. Patented May 2, 1899.

E. S. SIMMS.

ELECTRIC SIGNALING SYSTEM.

(Application filed Oct. 28, 1896.)

(No Model.) 2 Sheets—Sheet 1.

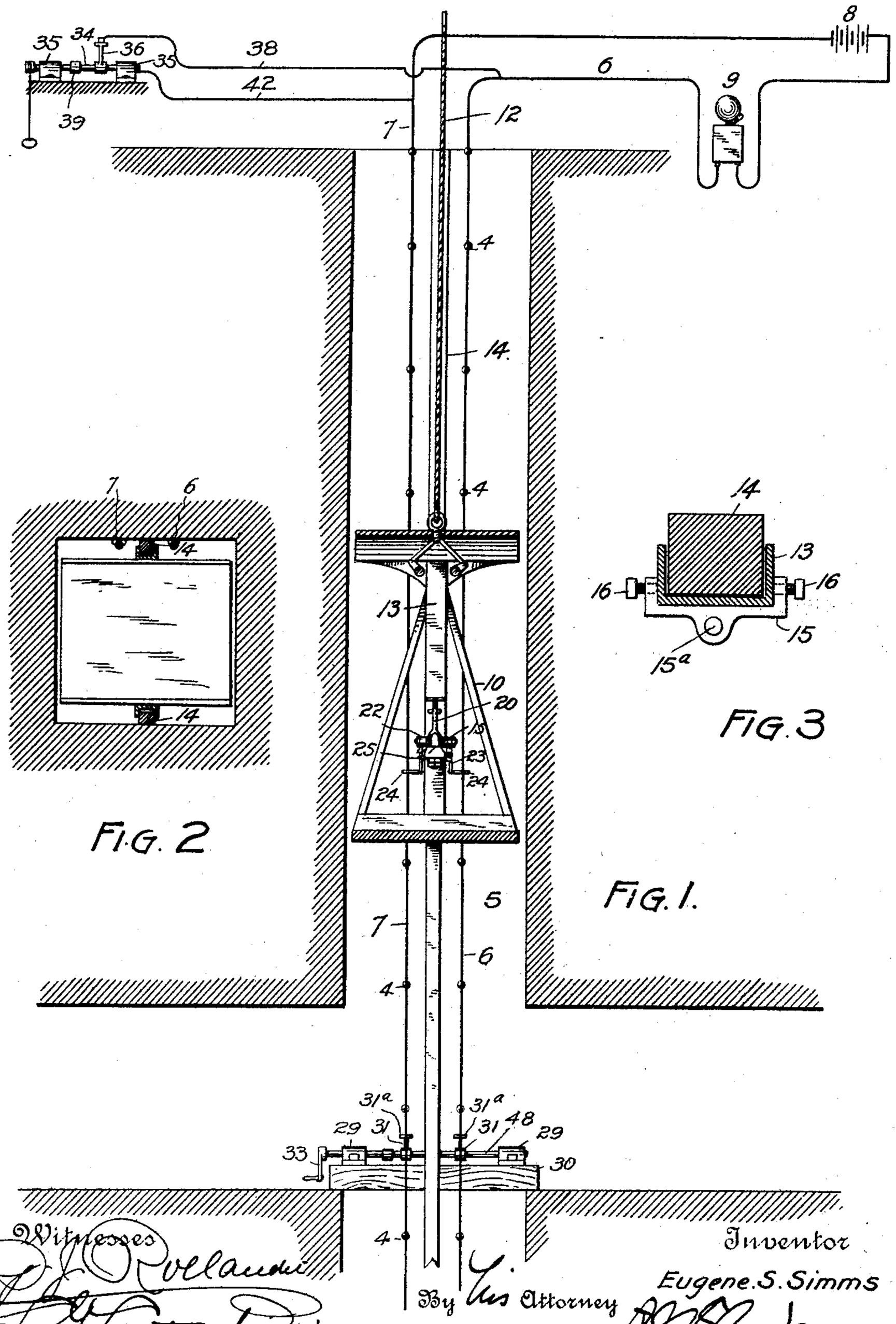

FIG. 1.

FIG. 2.

FIG. 3.

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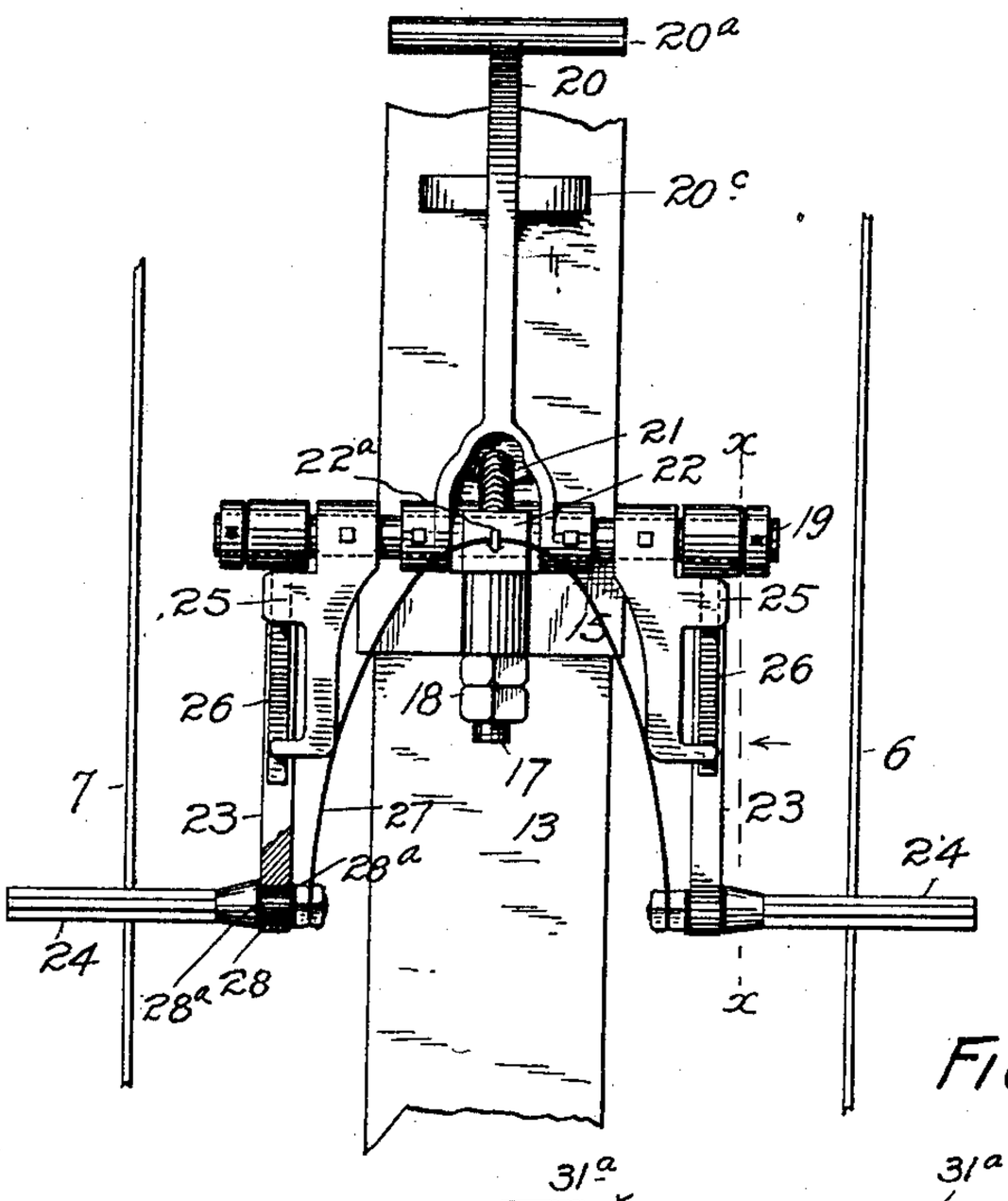

FIG. 4

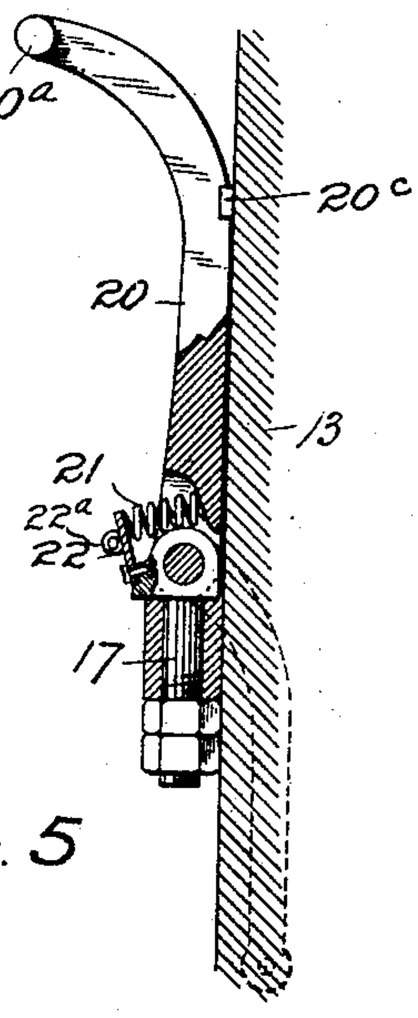

FIG. 5

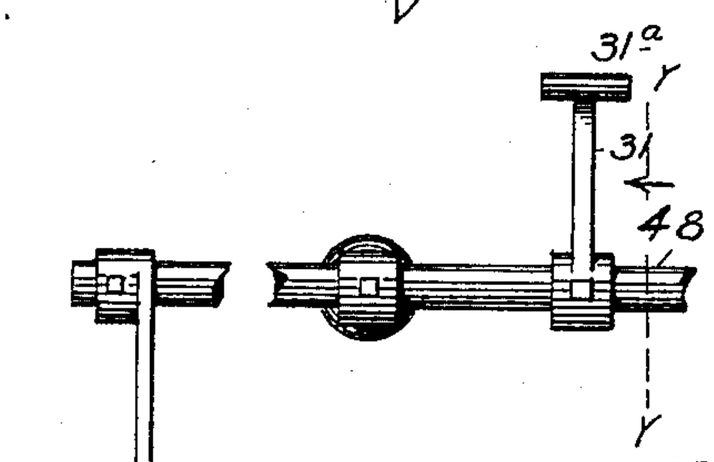

FIG. 6

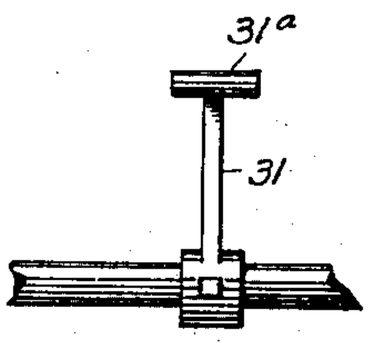

FIG. 8

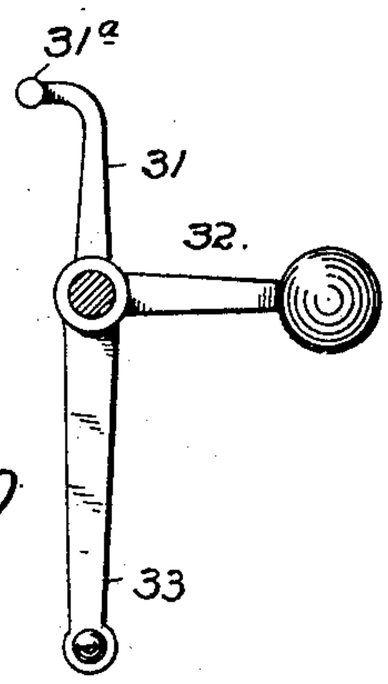

FIG. 10

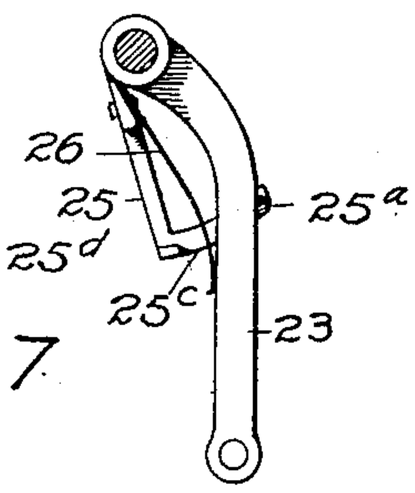

FIG. 7

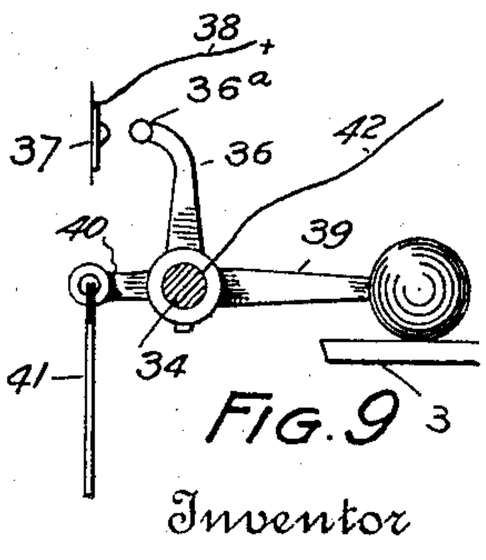

FIG. 9

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UNITED STATES PATENT OFFICE.

EUGENE S. SIMMS, OF DENVER, COLORADO.

ELECTRIC SIGNALING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 624,390, dated May 2, 1899.

Application filed October 28, 1898. Serial No. 694,827. (No model.)

To all whom it may concern:

Be it known that I, EUGENE S. SIMMS, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Electrical Signaling Systems; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in electrical signaling systems for use in mining-shafts, and comprises a normally open electrical circuit and coöperating circuit-closing mechanism mounted on the cage and located at the various stations as well as at the top of the shaft, my object being to provide a system of this class which shall be simple in construction, economical in cost, reliable, durable, and efficient in use; and to these ends the invention consists of the features, arrangements, and combinations hereinafter described and claimed, all of which will be fully understood by reference to the accompanying drawings, in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a section taken through a shaft provided with an electrical circuit, the circuit-closing mechanism being shown located at one station and at the top of the shaft as well as mounted upon the cage. Fig. 2 is a horizontal section taken through the shaft above the cage, which is shown in top view. Fig. 3 is a horizontal section taken through one of the guide-shoes of the cage, the parts being shown on a larger scale. Fig. 4 is a front view of the cage circuit-closing mechanism shown on a larger scale. Fig. 5 is a section taken through the same. Fig. 6 illustrates the station circuit-closing mechanism on a larger scale. Fig. 7 is a section taken on the line *x x*, Fig. 4, the contact-pin being removed. Fig. 8 shows the circuit-closing construction employed at the top of the mine and shown on a larger scale than in Fig. 1. Fig. 9 is a section taken through the same. Fig. 10 is a section taken on the line *y y*, Fig. 6.

Similar reference characters indicating corresponding parts in these views, let the numeral 5 designate a shaft in which are located electrical conductors 6 and 7, whose upper extremities lead to a suitable electrical source 8, a signal-bell 9 being interposed in the circuit and conveniently located at the top of the shaft. These conductors are held in place by insulators 4. The cage 10 is shown suspended in the shaft by a cable 12. This cage is equipped with stirrup-shaped shoes 13, which engage vertical guides 14, located on opposite sides of the shaft in the usual manner.

Embracing each guide-shoe 13 is a saddle or bracket 15, held in place by set-screws 16. Each bracket 15 is provided with an opening or bearing 15^a, through which is passed an eyebolt 17, secured in place by nuts 18, applied to its lower extremity. This eyebolt is adapted to turn in its bearing more or less freely, according to the tightness of the nuts. Through the eye extremity of this bolt is passed a horizontal shaft 19, upon which is mounted and made fast a hand-lever arm 20, inwardly curved and provided with a T-head 20^a for convenience of manipulation. This arm is further provided with a cross-piece 20^c, which engages one of the guide-shoes 13, the latter forming a rest for the arm, which is normally held in contact with the guide-shoe by means of a spring 21, interposed between the base of the arm and a plate 22, attached to the head of the eyebolt.

Loosely mounted on the shaft 19 near its extremities are two depending arms 23, whose outer extremities are provided with contact-pins 24, adapted when properly actuated to engage the conductors 6 and 7, respectively. These guide-pins are insulated from the arms upon which they are mounted, as hereinafter explained. Made fast upon the shaft 19 are two other arms 25, carrying leaf-springs 26, bearing against the front side of the arms 23 and normally holding one side of said arms against stops 25^a, formed on rearward extensions 25^c of the arms 25, which are also provided with stops 25^d. Thus it will be seen that each arm 23 is permitted a limited movement between the stops 25^a and 25^d. The contact-pins 24 are insulated from the arms 23 by a bushing 28 and insulating-washers 28^a, located on each side of the arms. The

said pins are electrically connected by means of a cable conductor 27, whose extremities are connected with the pins and suitably supported on the frame of the apparatus. As shown in the drawings, the conductor 27 is passed through an eye 22ª, formed on the plate 22.

When the person on the cage desires to signal those at the top of the shaft, it is only necessary to grasp the lever-arm 20 and pull it toward him, thus turning the shaft 19 and actuating the arms 25, which in turn acting on the arms 23 through the instrumentality of the springs 26 move the pins 24 to engagement with the conductors 6 and 7, thus closing the circuit through the medium of the cable conductor 27. If for any reason both pins 24 do not engage the conductors simultaneously—as, for instance, by reason of the fact that the conductors 6 and 7 do not lie in a plane parallel with the shaft—as soon as one pin engages its conductor, and therefore stops moving, the shaft, by reason of its eyebolt, support, will turn until the other pin engages its conductor. It must be remembered that the eyebolt 17 turns in the opening 15ª of the saddle-bracket 15, as heretofore explained. As soon as the lever-arm 20 is released the spring 21 returns the circuit-closing apparatus to its normal position, disengaging the contact-pins from the wires 6 and 7 and again opening the circuit. In case the arms 23 should meet with an unexpected obstruction or should be actuated with too much force the springs 26 allow the arms 23 to yield sufficiently to prevent breakage or injury to the parts of the mechanism.

The station-circuit-closing mechanism, which is illustrated in the lower part of Fig. 1 and in Figs. 6 and 10, will now be described in detail.

A shaft 48 is journaled in bearings 29, mounted on suitable stationary supports 30, located on one side of the path of the cage and in proximity to the wires 6 and 7. Upon this shaft are made fast contact-arms 31, having T-heads 31ª so located that by turning the shaft the parts 31ª are brought in contact with the wires 6 and 7 and the circuit closed through the instrumentality of the shaft, through which the current passes from one arm to the other. The contact-arms 31 are normally held out of engagement with the wires 6 and 7 by means of a weighted arm 32, made fast to the shaft 48 and best illustrated in Fig. 10. To one extremity of this shaft 48 is attached a hand-crank 33 for use in turning the shaft by a person wishing to signal from the station.

The signaling mechanism, located at the top of the shaft and which is shown at the top of Fig. 1 and in Figs. 8 and 9, will now be described. A shaft 34 is journaled in bearings 35, mounted on a suitable support. To this shaft is made fast a contact-arm 36, having a T-head 36ª located in proximity to a stationary contact 37, from which leads a branch conductor 38 to the main conductor 6. Upon the shaft 34 is also mounted a weighted arm 39, arranged to normally hold the arm 36 out of engagement with the terminal contact 37, said arm normally resting on a stationary bracket 3, as shown in Fig. 9. Also made fast to the shaft 34 is a crank-arm 40, located on the side of the shaft opposite the weighted arm 39. To this crank-arm is attached a cord or pull-rope 41. Now when it is desired to close the circuit and ring the bell 9 it is only necessary to pull the cord 41 sufficiently to throw the arm 36 to engagement with the terminal contact 37. When this occurs, the circuit is closed through the instrumentality of the wire 38 and a wire 42, connected with the shaft 34 and leading to the main conductor 7.

Having thus described my invention, what I claim is—

1. In an electrical signaling system for mining-shafts, the combination of a normally open electrical circuit having conductors supported in the shaft, a signaling device located in the circuit, circuit-closing mechanism located in proximity to said conductors, and comprising a shaft suitably journaled, contact-arms mounted on the shaft and arranged to engage the conductors when the shaft is actuated, the said contact-arms being electrically connected, and means for automatically returning the shaft to its normal position, whereby the circuit is opened.

2. In a signaling system for mining-shafts, the combination of a normally open electrical circuit having conductors located in the shaft, a signal-bell interposed in said circuit at a suitable point, circuit-closing means mounted on the cage and comprising a shaft suitably journaled, contact-arms mounted on the shaft and arranged to engage the conductors when the shaft is actuated, the said contact-arms being electrically connected, means for automatically returning the shaft to its normal position, whereby the circuit is opened, and distinct circuit-closing devices located at one or more stations in the shaft, whereby the circuit may be closed and the signal given from the cage or station as desired.

3. In a signaling system for mining-shafts, the combination with the cage, of a normally open electrical circuit having conductors projecting into the shaft, a signal device or bell interposed in said circuit at a suitable point, circuit-closing means mounted on the cage and comprising a shaft suitably journaled, contact-arms mounted on the shaft and arranged to engage the conductors when the shaft is actuated, the said contact-arms being electrically connected, means for automatically returning the shaft to its normal position, whereby the circuit is opened, distinct circuit-closing devices mounted at one or more stations in the shaft, and circuit-closing means also located at the top of the shaft, whereby the circuit may be closed and

the signal given from the cage, from any station and also from the top of the shaft, as may be desired.

4. In a signaling system of the class described, the combination with the cage, of a normally open electrical circuit having conductors extending into the shaft and suitably supported, a signal-bell located in the circuit, circuit-closing mechanism mounted on the cage, and comprising a shaft, contact-arms loosely mounted on the shaft, and auxiliary arms fast on the shaft, springs attached to said arms and engaging the contact-arms, whereby as the shaft is actuated, the contact-arms are forced against the wires of the circuit, and a suitable electrical connection between the contact-arms.

5. In an electrical signaling system, the combination with the cage, of a normally open electrical circuit having conductors extending into the shaft, a signal bell or device located in the circuit, and circuit-closing mechanism mounted on the cage and comprising a shaft mounted to turn on its longitudinal axis, and also capable of movement on an axis extending at right angles to its longitudinal axis, contact-arms mounted on the shaft and adapted to engage the conductors of the circuit as the shaft is actuated, and a suitable electrical connection between the contact-arms.

6. In an electrical signaling apparatus, the combination with a normally open circuit having conductors extending into the shaft, and a signal bell or device located in the circuit, of a circuit-closing mechanism mounted on the cage, and comprising a horizontal shaft, a vertical eyebolt mounted on the cage, adapted to turn in its bearing, and forming the support for the shaft, contact-arms mounted on the shaft and adapted to engage the conductors of the circuit, and an electrical connection between the said arms.

7. In a signaling apparatus, the combination with an open circuit, a signal bell or device located in the circuit, and a cage, of a shaft, a bearing in which the shaft is journaled, said bearing being mounted on the cage and having a movement on an axis located at right angles to the shaft's axis, contacts mounted on the shaft and adapted to engage the wires of the open circuit, and an electrical connection between said contacts.

8. In a signaling apparatus, the combination with an open circuit, a signal-bell located therein, and a cage, of a shaft journaled on the cage, arms mounted on the shaft, contact-pins carried by the arms but insulated therefrom, said pins being adapted to engage the conductors of the open circuit, and an electrical connection between the pins.

9. The combination with the cage, an open circuit, and a signal bell or device, of a bracket mounted on the guide-shoe of the cage, an eyebolt journaled in the bracket, a shaft journaled in the eyebolt, contacts mounted on the shaft and adapted to engage the conductors of the open circuit, and an electrical connection between the contacts.

10. In a signaling apparatus, the combination with an open circuit, and a signal bell or device, of a shaft journaled on a suitable support, contact-arms loosely mounted on the shaft, auxiliary arms fast on the shaft, springs attached to the auxiliary arms and engaging the contact-arms in front, the auxiliary arms being provided with extensions engaging the contact-arms from the rear, means for actuating the shaft to bring the contact-arms in engagement with the conductors of the circuit, and means for automatically returning the shaft to its normal position.

11. In a signaling apparatus, the combination with an open circuit, of a shaft journaled in a suitable support, contact-arms loosely mounted on the shaft, auxiliary arms fast on the shaft and having springs engaging the contact-arms, the auxiliary arms having stops located on opposite sides of the contact-arms which are allowed a limited movement between the stops.

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

EUGENE S. SIMMS.

Witnesses:
A. J. O'BRIEN,
EDITH HIMSWORTH.