

F. R. THOMPSON.
SIGNALING DEVICE.

No. 459,083.

Patented Sept. 8, 1891.

Fig. I.

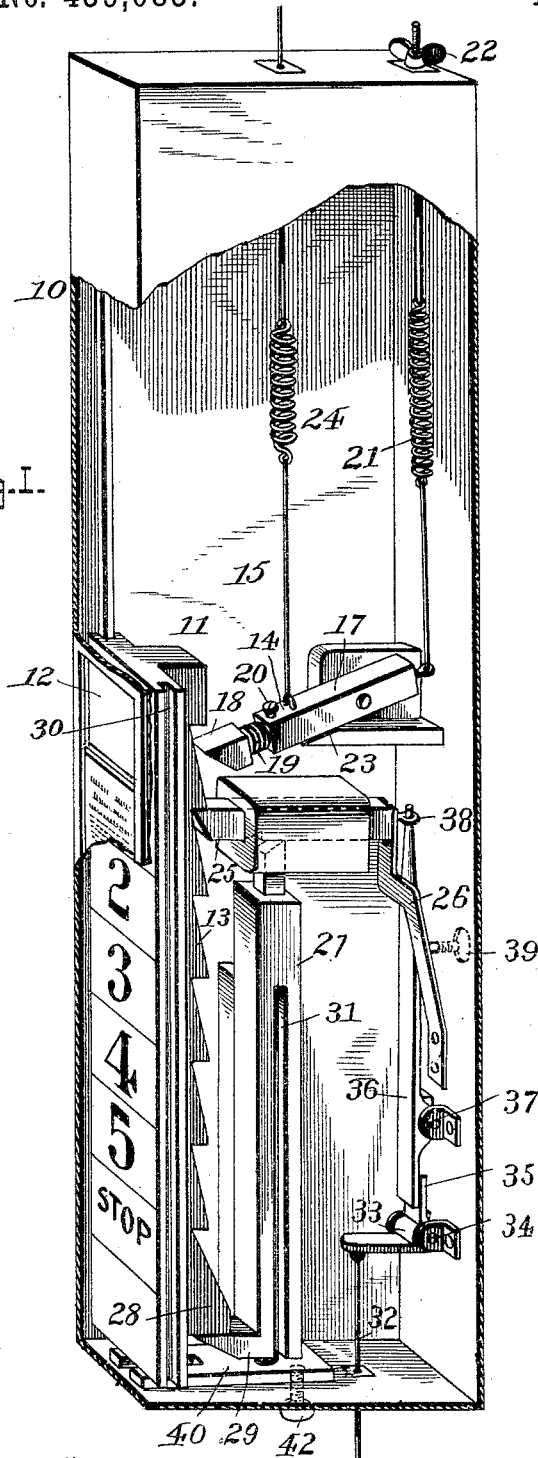


Fig. II.

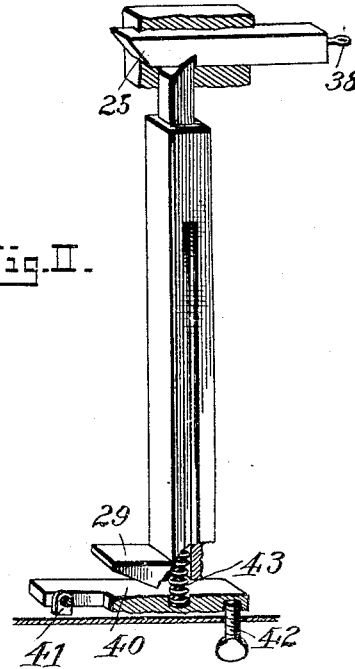
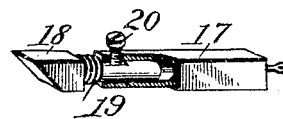


Fig. III.



WITNESSES:
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(No Model.)

2 Sheets—Sheet 2.

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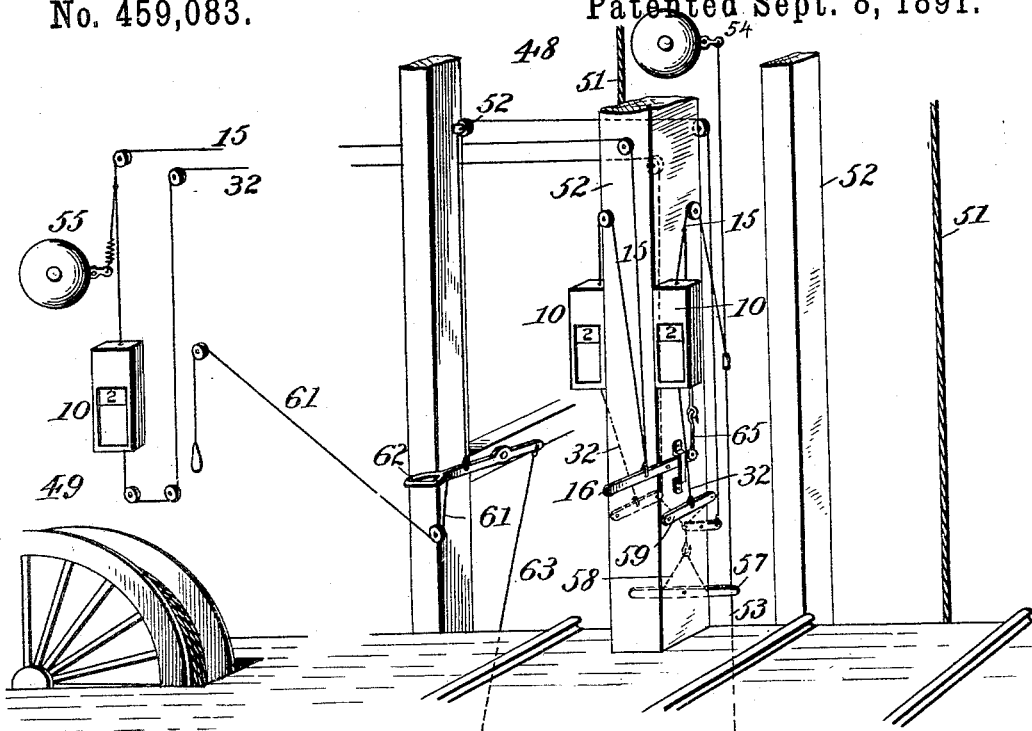
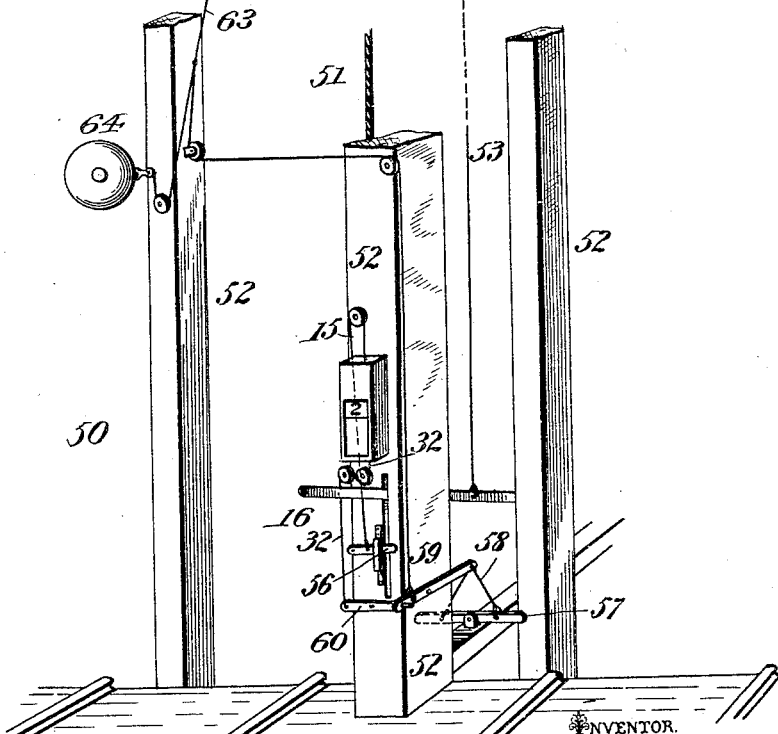


Fig. IV.



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UNITED STATES PATENT OFFICE.

FRANKLIN R. THOMPSON, OF PANA, ILLINOIS, ASSIGNOR OF ONE-THIRD TO
JOHN EVANS, OF SAME PLACE.

SIGNALING DEVICE.

SPECIFICATION forming part of Letters Patent No. 459,083, dated September 8, 1891.

Application filed March 19, 1891. Serial No. 385,677. (No model.)

To all whom it may concern:

Be it known that I, FRANKLIN R. THOMPSON, a citizen of the United States, residing at Pana, in the county of Christian and State of Illinois, have invented certain new and useful Improvements in Signaling Devices; and I do hereby 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.

This invention relates to that class of signaling devices which are used in connection with elevators in mines and in connection with other devices whereby communication from place to place is made by means of cords, wires, chains, or rods to be pulled to sound bells; and its object is to provide means for exhibiting to the eye the character of each signal which is struck upon the bell in communicating with the engineer and others who operate the elevator from the top or bottom of the elevator-shaft, and means for registering at various points what order has been given, so that in case the engineer or other person signaled was absent at the time the order was passed in it would be shown to him on his return and in order that a person at any of the above-stated points may be notified of any signal which has been given and not executed.

To this end my invention consists in the construction and combination of parts forming a signaling device hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure I represents in perspective the interior of the registering-box of my signaling device, portions of the casing being removed or broken away to expose to view parts within. Figs. II and III are detail views in perspective showing portions of the registering device. Fig. IV is a perspective diagrammatic view representing detached parts or localities, such as the top and bottom of a mine-shaft and the engine-room, all of which parts, being normally located at considerable distances (sometimes hundreds of feet) from one another, are here associated somewhat ideally for the purpose of showing details of my invention, in connection with their general construction, on a scale large enough to be intelligible.

Number 10 represents the registering-box, which is used for the purpose of indicating to the eye of the operator the number of any signal which may have been given in his absence, one such box to be located in the engine-room to control the action of the engineer in raising, lowering, and stopping the cage and others to be placed in convenient position for inspection by the top man at the top of the shaft and by miners or the bottom man at the bottom of the shaft, so that all the operators may be notified of any signal which any one of them may have given, thus preventing two signals being given at once either to the engineer or by him to the top or bottom, thus avoiding confusion and accidents.

11 represents the slide, marked on its face with numbers 1, 2, 3, 4, and 5 and the word "Stop" and adapted to register one mark at a time with a window 12 in the side of the box. A series of notches or teeth 13 are made in the back of this slide, corresponding in vertical height to the spaces between the numbers.

14 represents a lift-bar, to which a cord or wire 15 is attached, the said wire 15 being connected with a lever 16 at top of the mine. This bar 14 is pivoted at 17 to a suitable support within the register-box 10 and is provided with a pawl 18, adapted to engage the teeth 13 successively as often as the wire 15 is pulled to raise the lift-bar. The pawl 18 is fitted to slide longitudinally within the lift-bar and is provided with a spring 19, adapted to push it outward from the bar, the said outward movement being limited by a pin 20. The object of the sliding motion of this pawl is to enable it to yield backward in dragging down over the teeth 13 and to be sprung forward to engage each successive tooth.

21 is a spring attached to the rear end of the lift-bar, and connected with the top of the box by means of the adjusting-screw 22. The action of the spring 21 is to raise the rear end of the lift-bar, thereby depressing the forward end and returning it to its normal position of rest upon the shoulder 33, fixed in the box. The adjusting-screw 22 is for the purpose of regulating the tension of the spring 21.

24 is a spring inserted between portions of the wire 15 for the purpose of yielding to any undue strain which might be placed upon the

wire and its connections if the wire should be jerked to forcibly. The spring 24 is much stronger than the spring 21, and in general service it is hardly strained open at all, thus leaving the wire 15 to act with the same effect upon the lift-bar as though the spring 24 were not in it.

25 represents a catch-bolt fitted to slide in the bearing in the box 10 and impelled constantly forward by a spring 26 to engage the teeth 13 as they are successively raised by the lift-bar.

27 is a detent adapted to hold the catch-bolt 25 out of engagement when the latter is drawn far enough back to be caught thereby, as shown in Fig. II. When the slide 11 is being raised, the successive teeth 13 do not push the catch-bolt far enough back for it to be stopped by the detent 27; but when the slide is raised to its limit a larger or more projecting tooth 28 pushes the catch-bolt 25 far enough back for it to be caught and held by the said detent. When this occurs, the slide will be dropped immediately to its lower position without being caught by bolt 25.

29 is a toe projecting from the side of the detent at its lower end in the path of the projection 28, so that when the slide 11 drops to its normal position of rest it falls upon the toe 29 and draws the detent 27 downward out of engagement with the catch-bolt 25, permitting the bolt to be pressed forward by its spring 26 ready for re-engagement with the teeth 13 as they may be again successively raised. Each pull of the wire 15 raises the slide one tooth, and the catch-bolt 25 holds the slide so raised. The slide 11 and the detent 27 may be fitted to slide in any suitable manner in bearings or slideways in the box 10—such, for example, as the grooves 30 and 31 shown in the sides of the respective pieces 11 and 27, adapted to slide upon projecting ribs of the box.

32 is a cord or wire entering the bottom of the box 10 and having suitable connections with the catch-bolt 25 to withdraw the same to release the slide, thus permitting the slide to drop and carry its numbers out of sight whenever it is desirable to cancel or conceal the last signal given. The device which I have here shown to make such connection consists of an elbow-lever 33, pivoted at 34 to the box 10 and having one arm engaged with the wire 32 and another arm 35 adapted to engage one arm of a retracting-lever 36, which lever is pivoted at 37 to the box and is connected by means of a loop-bolt or screw-eye 38 with the catch-bolt 25. The force of the spring 26, which impels the catch-bolt forward, is sufficient to act through the levers 36 and 33 to hold the wire 32 normally raised, and this force of the spring 26 may be regulated by a set-screw 39.

40 represents a step which limits the downward motion of the detent 27. It is pivoted at 41 to the base of the box 10, and is supported at its opposite end upon the set-screw

42, whereby its height may be raised or lowered to adjust it to the proper relation to the detent to regulate the movement of the latter. 7c

43 is a spring acting between the step 40 and the detent 27 with sufficient force to impel the detent to constantly bear against the under side of the catch-bolt 25, ready to engage the notch therein whenever the bolt is moved back far enough; but the said spring 43 readily yields to the weight of the slide 11 when the latter falls upon the toe 29 of the detent. 75

Upon the front of the box 10 a printed signal-code is exposed beneath the glass to control the movement of the operator, so that each one can read any signal given thereby and know how many pulls to make upon the handle of the wire 15 to give the proper signal. 8c 85

In Fig. IV, 48 represents the top of the shaft or well which descends to the mine; 49, the engine-room on the same level, or, as is generally the case, above ground, and 50 the bottom of shaft. 90

51 represents the rope by which the cage is to be raised or lowered.

52 represents the standing timbers, which are the side guides up and down the shaft for the cage to slide against. The shaft is shown as double—that is, having two well-holes side by side, up one of which wells one cage may pass while the other cage passes down the other well, the rope 51 passing over a pulley at the top, as usual in such cases. Two of the boxes 10 have been shown at the top 48, attached to one of the timbers 52, by the right one of which the top man may see the signals given from below and by the left one he may note what signal he forwards to the engine-room, and one box 10 is located in the engine-room 49, so that the engineer may see the signals given to him by others, and another box 10 is located at the bottom 50, whereby the miners or the bottom man may see the signals given by themselves. 95 100 105 110

53 represents the wire which passes up and down the shaft, and is connected with a bell-clapper 54 at the top and with a hand-lever 16 at the bottom. The wires 15 of all the registering-boxes are connected either directly or indirectly with the vertical wire 53, and the wire 15, which extends to the engine-room, is connected both with the register-box 10 and with a bell 55. As the lever 16 at the bottom 50 has to be moved a great deal too far in order to operate the wire 53 to safely operate the signal in box 10, I interpose an intermediate lever 56 across the lower end of the path of the lever 16, and I connect the lever 56 with the lift-bar of the lower box 10 by means of the wire 15, as before described relative to wire 15. Now if the lever 16 be given two strokes downward each stroke will sound the bell 54 to notify the top man that the cage is to be lowered, and as a check against any accident of not properly counting the number of bells sounded the wire 15 at the top 48, connecting wire 53 with 115 120 125 130

the register-box 10, brings in sight No. 2 of the signal-slides, so that the top man may see if he did not chance to hear what signal was given, and if the way is clear to lowering the cage the top man gives two strokes upon his lever 16, to which wires 15 are attached, communicating with the box 10 at the left in the top 48 and with the box 10 in the engine-room, also with the engineer's bell 55. Thus by means of a bell sounding the signal and by means of the box 10 with the signal-number 2 raised in sight in the engine-room, verifying the signal of the bell to the engineer, and by means of the slide in the signal-box 10 at the top 48, enabling the top man to see for a certainty what signal he has given to the engineer, mistakes are avoided. The two strokes made by the bottom man will operate the intermediate lever 56 to raise the signal-slide in his own box 10, so that he also may see that he has not made a mistake and sounded the wrong signal.

57 represents two trip-bars, each pivoted midway upon fixed bearings and having their ends extended into the path of the cage, one end being in the path of one cage and the other end being in the path of the other cage. Each end of each lever 57 is connected by means of a flexible cord or chain 58 with levers 59, to which the under wire 32 of each box is directly connected, as in the top 48, or is connected by another intermediate lever 60, as at the bottom 50. As the connections 58 are flexible, it is evident that the passing of the cage will pull upon the lever 59, whether the cage passes upward or downward at either side of the shaft, because the pushing upward of the flexible connections 58 would merely slacken it, but the opposite end of the same lever would be pulled downward. The result of this is that as soon as either cage passes one of the levers 57 it will operate the lever 59 to pull upon the wire 32, thereby withdrawing the catch-bolt 25 (see Fig. 1) and releasing the signal-slide 11 to drop the previous signal out of sight, thus restoring the box to condition to receive any new signal which may be given.

61 represents a wire passing from the engine-room to a lever 62 at the top 48, which lever is connected by another wire 63 with a bell 64 at the bottom of the shaft and with a trip-lever 59, whereby either the engineer or the top man may sound the bell 64 to the bottom man, and at the same time drop all the signals. For example, 3 is rung from the bottom, signifying "Men coming up." The bell 55 rings 3 to the engineer and he pulls cord 61 and rings one bell at 64, which is notice to the men at the bottom to get on the cage. This also drops all the signals. The men after receiving the signal get on the cage and ring one bell to "start." This is sent to the engineer by the top man and the starting begins. Now while the cage is in motion, if one bell be rung by the bottom man, the engineer will stop the cage and ring the re-

turn-bell by wire 61 to show that the cage is stopped in the shaft, and the signals are dropped waiting for the next order. It is sometimes necessary for the top man to be absent; but before leaving his post he clears the way, so that both cages can pass up and down freely, and then he connects with the lever 16 at the top a hook 65, that is attached to the wire 15, which is connected with the vertical wire 53. By this means any signal from the bottom which operates the right box 10 at the top will be transmitted through the said hook 65 and the top man's hand-lever 16 to the left-hand box 10, also to the box 10 in the engine-room, the same as though the top man had been there to operate the top lever 16 in accordance with the signal sent up from the bottom. The mines and the shaft leading thereto are often many hundreds of feet down in the ground, and yet the signals have to be operated between the top-man and the bottom-man and the engineer with the greatest rapidity, so that the failing to hear or to properly count the strokes of the bell might tear up a car or kill a man. Therefore the importance of representing to the eye as well as to the ear the exact signal given is evident.

I am aware that wires have been before used in mines for the purpose of sounding bells at a long distance from the operator for the purpose of communicating signals, and I do not claim such as my invention.

Having thus fully described my invention, what I believe to be new, and desire to secure by Letters Patent, is the following:

1. The combination, in a signaling device, of a box having a window in its side, a slide having numbers marked upon it and notches corresponding to the height of the numbers and fitted to slide within the box to register the said numbers with the window, a lift-bar adapted to engage said notches and a wire or similar connection therewith for raising the slide, and a catch-bolt adapted to engage the said notches to hold the slide raised, substantially as described.

2. The combination of a box having a window in its side, a numbered slide having a series of notches or teeth, and, further, having one tooth at the end of the series projecting beyond the plane of the other teeth, means for raising the slide one tooth at a time, a catch-bolt adapted to engage the said teeth and to be driven out of the path of engagement by the said last projecting tooth and having a retaining-notch, and a spring-detent adapted to engage the said notch, substantially as described.

3. The combination of a box having a window in it, a numbered and toothed slide fitted to register with the window and having one tooth projecting beyond the rest, means for raising the slide, a notched spring catch-bolt adapted to engage the teeth of the slide and hold it raised and to be pushed out of the path of engagement by the said last projecting tooth, and a spring-detent adapted to re-

tain the catch-bolt when pushed out, the said detent being provided with a toe in the path of the slide, substantially as described, whereby the fall of the slide releases the catch-bolt.

5 4. The combination of a toothed signal-slide, means for raising it, a catch-bolt to hold it raised, a retracting-lever connected with the catch-bolt, an elbow-lever adapted to engage the retracting-lever, and a wire connected with the elbow-lever, substantially as described.

10 5. The combination of a toothed signal-slide, means for raising it, a spring catch-bolt to hold it raised, a casing therefor, and a wire connected with the catch-bolt to retract it, substantially as described.

15 6. The combination of a toothed signal-slide, means for raising the slide, a spring catch-bolt to hold it raised, means for retracting and pushing out the catch-bolt, a spring-detent to hold it retracted, the said detent having a toe projecting into the path of the slide, and a pivoted and adjustable step beneath the detent, supporting the detent-spring, substantially as described.

20 7. The combination of a toothed signal-slide, a lift-bar pivoted in front of the teeth

and provided with a receding pawl, a spring therefor, and a casing for the said parts, substantially as described.

30 8. The combination of a toothed signal-slide, a lift-bar adapted to engage the same and provided with a returning-spring, an operating-wire connected with the lift-bar, and a spring stronger than the returning-spring interposed between parts of the operating-wire, and a casing for the said parts, substantially as described.

35 9. The combination of a signal-slide, a catch-bolt therefor, a lever pivoted midway, with its ends projecting into the paths of ascending and descending cages, and connections, substantially as described, between both ends of the lever and the said catch-bolt, whereby the movement of either end of the lever up or down from its normal position acts to retract the said catch-bolt.

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

FRANKLIN R. THOMPSON.

Witnesses:

EDDIE MURDAGH,
STEPHEN F. PARKER.