

No. 840,659.

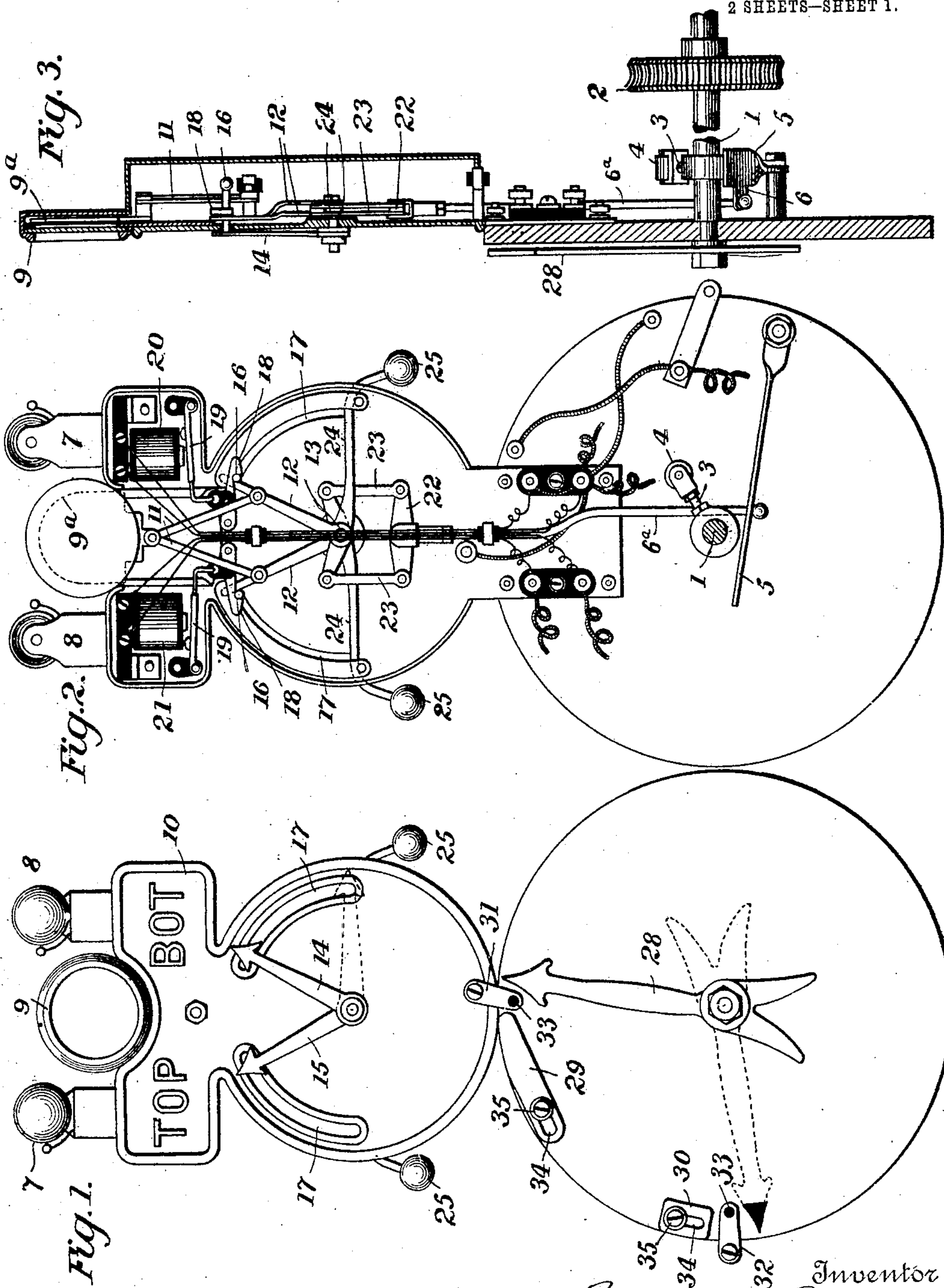
PATENTED JAN. 8, 1907.

B. T. REILLY.

SIGNAL AND ALARM ATTACHMENT FOR MINE HOISTS.

APPLICATION FILED JULY 23, 1906.

2 SHEETS—SHEET 1.



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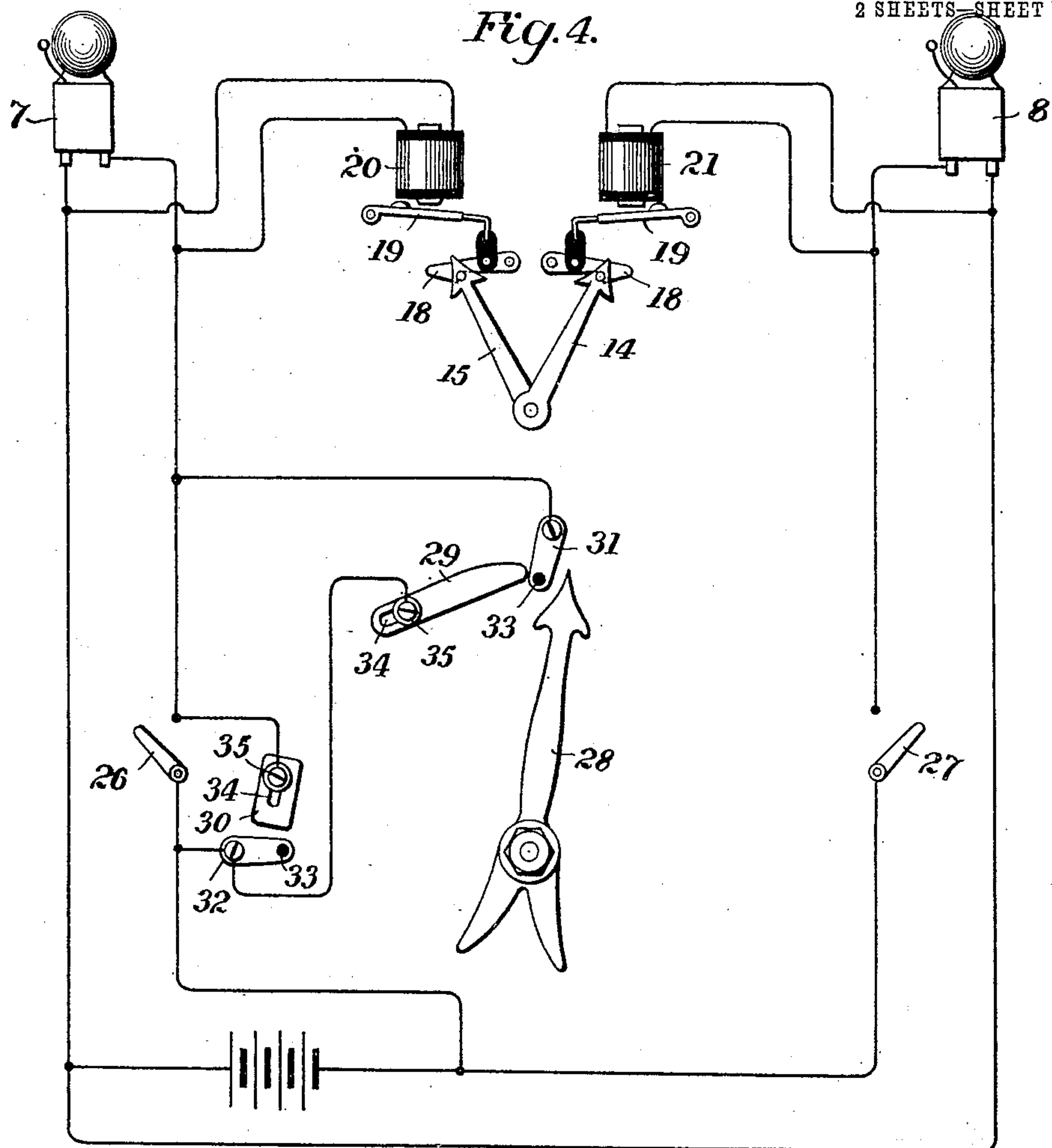
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UNITED STATES PATENT OFFICE.

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SIGNAL AND ALARM ATTACHMENT FOR MINE-HOISTS.

No. 840,659.

Specification of Letters Patent.

Patented Jan. 8, 1907.

Application filed July 23, 1906. Serial No. 327,371.

To all whom it may concern:

Be it known that I, BERNARD T. REILLY, a citizen of the United States, residing at Wilkes-Barre, Luzerne county, State of Pennsylvania, have invented certain new and useful Improvements in Signal and Alarm Attachments for Mine-Hoists, of which the following is a specification.

The present invention relates to a signal and alarm device particularly adapted for use in connection with hoisting-engines such as are employed in mines.

It is customary in the operation of mine-hoists to provide in the engine-room two electric signal-bells controlled, respectively, by switches at the bottom and top of the shaft, and both of such bells are supposed to be actuated before the engineer starts the engine. While such a signal system is generally satisfactory, it will be seen that great care is required on the part of the engineer. The bells are often situated at some distance from the engineer's station and differ but slightly in tone, and either of them may be actuated more than once prior to the other being struck, and the engineer hearing two signals and not observing that both were given by the same bell frequently starts the engine when the cars of the hoisting mechanism are not in proper position, thereby causing serious damage. Another fruitful source of accidents in this class of machinery is that the engine is started in the wrong direction, thus carrying a car against or over the upper sheaves.

The object of the present invention is to provide a signal and alarm device which will be free from the objection to the signals commonly employed and provide a visible as well as an audible signal, thereby relieving the strain on the engineer, and also provide an alarm for automatically indicating any false or improper movement of the hoisting-drum.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a front view of a signal and alarm device constructed in accordance with the present invention. Fig. 2 is a rear view, a portion of the casing inclosing the operating parts of the signal mechanism being removed. Fig. 3 is a vertical longitudinal sec-

tional view through the device. Fig. 4 is a diagrammatic view illustrating the several electric circuits employed in connection with the device.

Referring to the drawings, 1 designates a shaft which is suitably geared to the drum of the hoisting-engine, (not shown,) so that said shaft will be turned through the greater part of a rotation by each operation of the winding-drum required to effect a hoist or lifting of a car from the bottom to the top of a shaft. A worm-wheel 2 is shown on the shaft 1 as a means for rocking it; but as various means may be employed for actuating such shaft it is not deemed necessary to illustrate this feature more in detail. On the shaft is mounted to rotate therewith a suitable sleeve having a radially-projecting arm 3, at the outer end of which is mounted a roller 4. As the shaft 1 rocks about its axis the roller 4 is caused to contact with a yielding lever-arm or spring-blade 5, one end of which is fixed to a suitable support, said blade or lever having a laterally-projecting lug 6, to which is connected the lower end of a pull-rod 6^a, that actuates the restoring mechanism of the signal device, as will be hereinafter described.

The signal mechanism includes two bells 7 8, shown as mounted on a suitable casing, within which is arranged the mechanism for actuating the visible signal, comprising a colored target or disk 9^a, adapted to be moved to and from a position where it will be visible through an apertured ring or plate 9. It will be understood that the bells 7 8 may be supported in any suitable way and other than that shown, they being similar to the signal devices commonly in use. The arrangement shown in the drawings, however, is very simple and compact and is therefore preferable.

The target or disk 9^a is mounted to slide in suitable ways formed in the frame or casing 10 and at its lower end is connected through links 11 with levers or links 12, pivotally mounted upon a shaft 13. On said shaft 13 are also mounted two pointers or indicating-hands 14 15, adapted to move over the forward face of a section of the casing 10, each of said hands being provided with a stud or pin 16, that extends through a suitable slot 17 in said casing. The pins 16 are adapted to be engaged within the casing 10 by pivot-

ally-mounted latches 18, which are connected with the armatures 19 of magnets 20 21, the magnet 21 being associated with the hand or pointer 14 and the magnet 20 with the hand or pointer 15.

To the upper end of the rod 7, which, as before described, is connected with the spring-blade or lever 5, is centrally connected an equalizing-lever 22, the ends of which are by means of links 23 connected with restoring-levers 24, mounted upon the stud or shaft 13 and, as shown, extending through suitable slots in the sides of the casing 10 and provided at their outer ends with weights 25.

Normally when the hoisting drum or engine is stationary the hands or pointers 14 15 occupy the elevated position, (shown in full lines in the drawings,) and the other parts heretofore described are positioned as shown in Fig. 2, the latches 18 being in engagement with the pins 16 and the restoring-levers 24 being in their lowest positions. When either of the magnets 20 21 is energized, the movement of its armature will disengage the latch 18 connected therewith, and the hand 14 or 15 thus released will fall by gravity to the lower end of the slot 17, or into the position indicated in dotted lines in Fig. 1. Such a releasing and downward movement of one of the hands or pointers 14 15 will not, however, have any effect upon the visible signal, the target or disk of which will be retained in its position across the opening in the frame 9 by reason of the engagement of the free end of one of its levers 12 with the pin 16 of the hand or pointer 14 15 that is still retained in elevated position. When, however, the second magnet 20 21 is energized and the latch 18 connected therewith moved to disengage the second hand or pointer, the latter will fall to its lowest position, and both of the levers 12 being thus released the colored disk or target will move downwardly and away from the opening in the frame 9. The signal-bells 7 8 are, as shown in Fig. 4, included in the same electric circuits as the magnets 20 21, respectively, said circuits being controlled by suitable switches, 26 27 representing the switches placed at the top and bottom of the shaft. Therefore whenever the switch 26, for example, is closed the bell 7 will be sounded and the magnet 20 energized to release the hand or pointer 14, and when the switch 27 is operated to close its circuit the bell 8 will be sounded and the magnet 21 energized, and whenever both of the magnets 20 21 are energized the signal-disk or target will be withdrawn from view of the engineer, and he will thus be notified to start the engine. As the shaft 1 is turned by the engine the roller 4 thereon will come in contact with and depress the lever 5, drawing down on the rod 7 and through the lever 22 and links 23 moving the restoring-levers to elevate the target or signal-disk and

bring the hands 14 15 where their studs 16 will be again engaged by the latches 18.

It has been customary heretofore to provide an indicator for showing when the cars or buckets of the hoisting mechanism are respectively at the upper and lower limits of their travel, such indicator comprising a pointer 28, shown herein as connected with the shaft 1 and adapted, according as it is in the position shown in full or dotted lines in Fig. 1, to indicate the relative positions of the parts of the hoisting apparatus. According to the present invention this indicating-hand 28 is employed as a means for automatically sounding an alarm in event of the engine being started in a wrong direction. As shown, the electric circuit containing the bell 7 also includes two relatively stationary contacts 29 30, with which are adapted to cooperate, respectively, movable contacts 31 32, extending into the path of said indicator 28. The parts are so positioned that when the hoisting apparatus is at the proper limits of its travel in either direction the indicator 28 will be at one side of the movable contacts 31 32. If, however, the movement of the winding-drum is continued beyond the proper limit in either direction, said indicator 28 will move the adjacent contact 31 32 into engagement with its coacting contact 29 30, and thus close the circuit of the bell 7, which will ring continuously until said contacts 29 31 or 30 32 are separated. To permit of readily separating these contacts, the movable contacts 31 32 are preferably provided with finger-pieces 33. By this means it will be seen that an alarm will be sounded whenever the winding-drum is moved improperly, and the parts are so arranged that the alarm will be sounded in ample time to permit the engine to stop before any damage results. In order that, if desired, a limited movement of the winding-drum in either direction beyond the normal limits of its movement may be effected, the contacts 29 30 are adjustably supported. As shown, each of said contacts has a slot 34 formed therein, through which extends the set-screw 35, by which the contact is held in place on its support.

The operation of the device has been clearly set forth in the preceding description. It will be seen that the signal-disk 9^a will not be moved from its normal position until both bells 7 8 have been actuated and that said disk, as well as the indicating-hands or pointers 14 15 of said bells, will be restored to normal position at each rocking of the shaft 1. Also if said shaft is rocked beyond its desired limit in either direction, owing to the winding-drum being turned improperly, the alarm controlled by the contacts 29 31 and 30 32 will be automatically sounded.

It will be understood that there may be various modifications and changes in the par-

ticular form of the invention selected for the purpose of illustration without departing from the spirit of the invention.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

1. In a signal apparatus for mine-hoists, the combination of two signal-bells, independent means for actuating each of said bells, and automatically-operated means for indicating when both said bells have been actuated.

2. In a signal apparatus for mine-hoists, the combination of two signal-bells, independent means controlling the actuation of each of said bells, an indicator for each bell, and a third indicator adapted to be automatically operated when both said bells have been actuated.

3. In a signal apparatus for mine-hoists, the combination of two signal-bells, independent means controlling the actuation of each of said bells, an indicator for each bell adapted to be operated when the bell rings, a supplemental indicator adapted to be automatically operated when both said bells have been rung, and means controlled by the hoisting-engine for restoring all of said parts to normal position.

4. In a signal apparatus for mine-hoists, the combination of two signal-bells, two electric circuits each including one of said bells, an indicator for each bell, a latch for holding said indicator in one position, means for moving each indicator when released by its latch, a magnet included in each of said circuits and connected with one of said latches, and means operated by the hoisting-engine for moving said indicators into position to be engaged by said latches.

5. In a signal apparatus for mine-hoists, the combination of two signal-bells, independent means controlling the actuation of each of said bells, an indicator for each bell, means acting to move each indicator, a latch for restraining such movement of each indicator, means for releasing each latch as the corresponding bell is rung, and a supplemental indicator adapted to be automatically operated when both bells are rung.

6. In a signal apparatus for mine-hoists, the combination of two signal-bells, an indicator for each bell, a signal disk or plate, and means controlled by said bell-indicators for moving said disk, whereby the latter will not be actuated until both bells have been struck.

7. In a signal apparatus for mine-hoists, the combination of two signal-bells, independent means controlling the actuation of each of said bells, a vertically-sliding signal disk or plate, and means controlled by the signal-bells for holding said disk or plate elevated, whereby when both said bells are actuated said disk will be automatically released.

8. In a signal apparatus for mine-hoists, the combination of two signal-bells, independent means controlling the actuation of each of said bells, two indicator-hands or pointers adapted to be moved when said bells are actuated, a sliding signal-disk, means acting to move said disk in one direction, and means connected with said bell indicators for restraining such movement of said disk until both bells have been actuated.

9. In a signal apparatus for mine-hoists, the combination of two signal-bells, independent means controlling the actuation of each of said bells, two pivotally-mounted indicator-hands or pointers, latches for holding said hands or pointers in one position and adapted to be released when said bells are actuated, a vertically-sliding disk or plate, means acting constantly to move said plate in one direction, means connected with the bell-indicators for preventing such movement of said disk until both bells have been actuated, and means actuated during each operation of the hoist for moving the bell-indicators into position to be engaged by said latches and returning the sliding disk to normal position.

10. In a signal apparatus for mine-hoists, the combination of two signal-bells, independent means for actuating each of said bells, a rock-shaft adapted to be actuated whenever the hoist is operated, and means for automatically operating one of said bells whenever the shaft is moved beyond the desired limit in either direction.

11. In a signal apparatus for mine-hoists, the combination of two signal-bells, independent means for actuating each of said bells, a rock-shaft adapted to be actuated whenever the hoist is operated, an arm connected with said rock-shaft, two electric circuits including one of said bells, two relatively stationary contacts included in said circuits, and two movable contacts arranged in the path of said arm on the rock-shaft and adapted to be moved thereby against said stationary contacts if said shaft is moved beyond its proper limit in either direction.

12. In a signal apparatus for mine-hoists, the combination of two signal-bells, independent means for actuating each of said bells, an indicator for each bell, a supplemental indicator adapted to be automatically operated when both said bells have been actuated, a shaft adapted to be actuated whenever the hoist is operated, and means controlled by said shaft for returning all of said indicators to normal position.

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

BERNARD T. REILLY.

Witnesses:

CARRICK MACDONALD,
OSCAR ANDERSON.