

No. 645,558.

Patented Mar. 20, 1900.

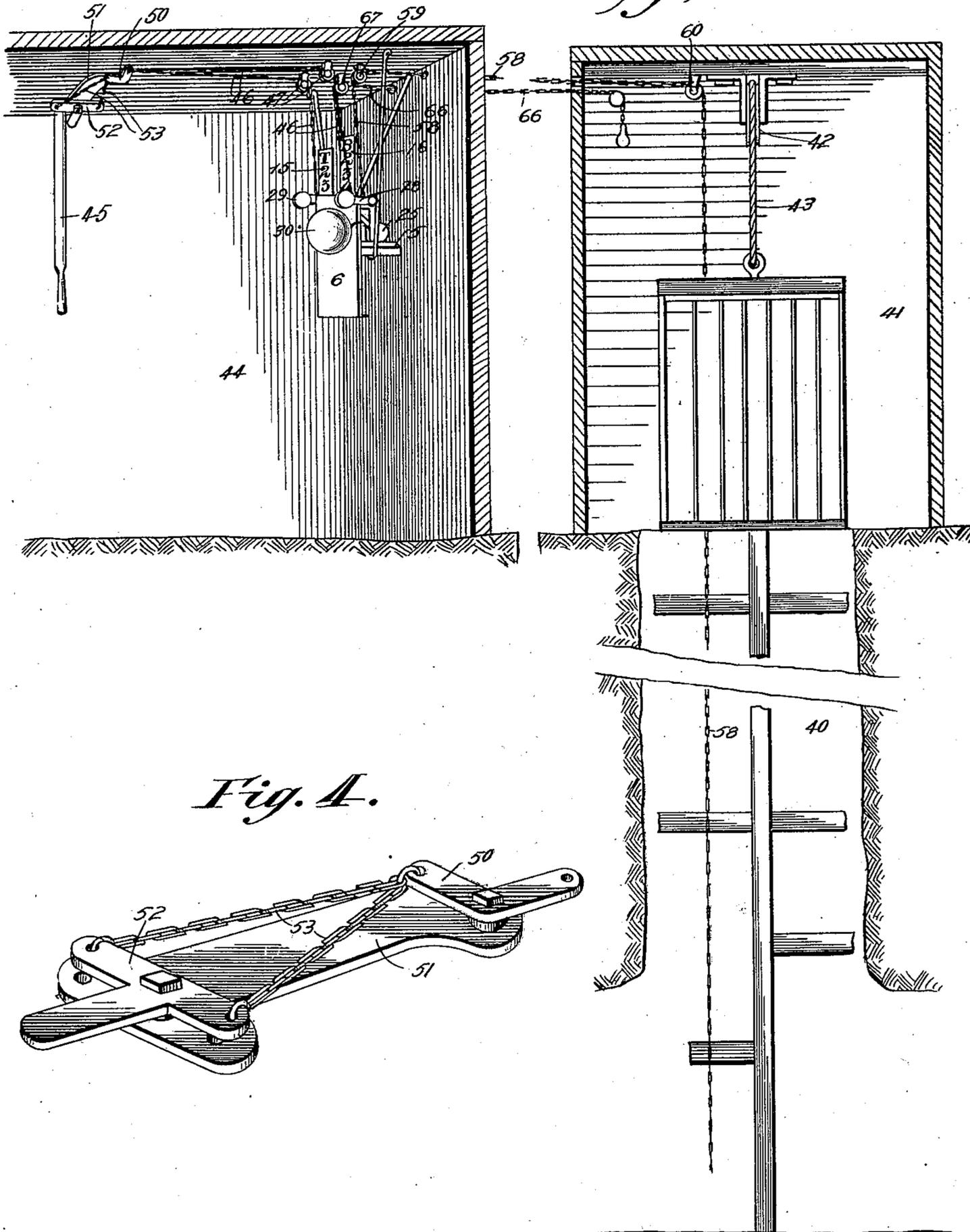
J. B. & G. A. FALKENSTEIN.  
MINE SIGNAL.

(Application filed Nov. 17, 1899.)

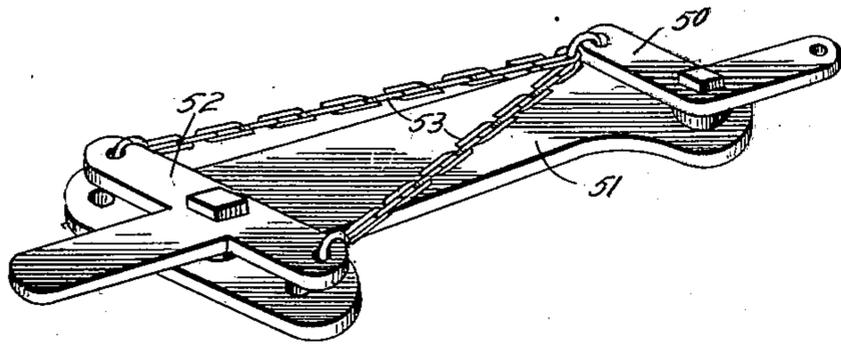
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(No Model.)

*Fig. 1.*



*Fig. 4.*



Witnesses

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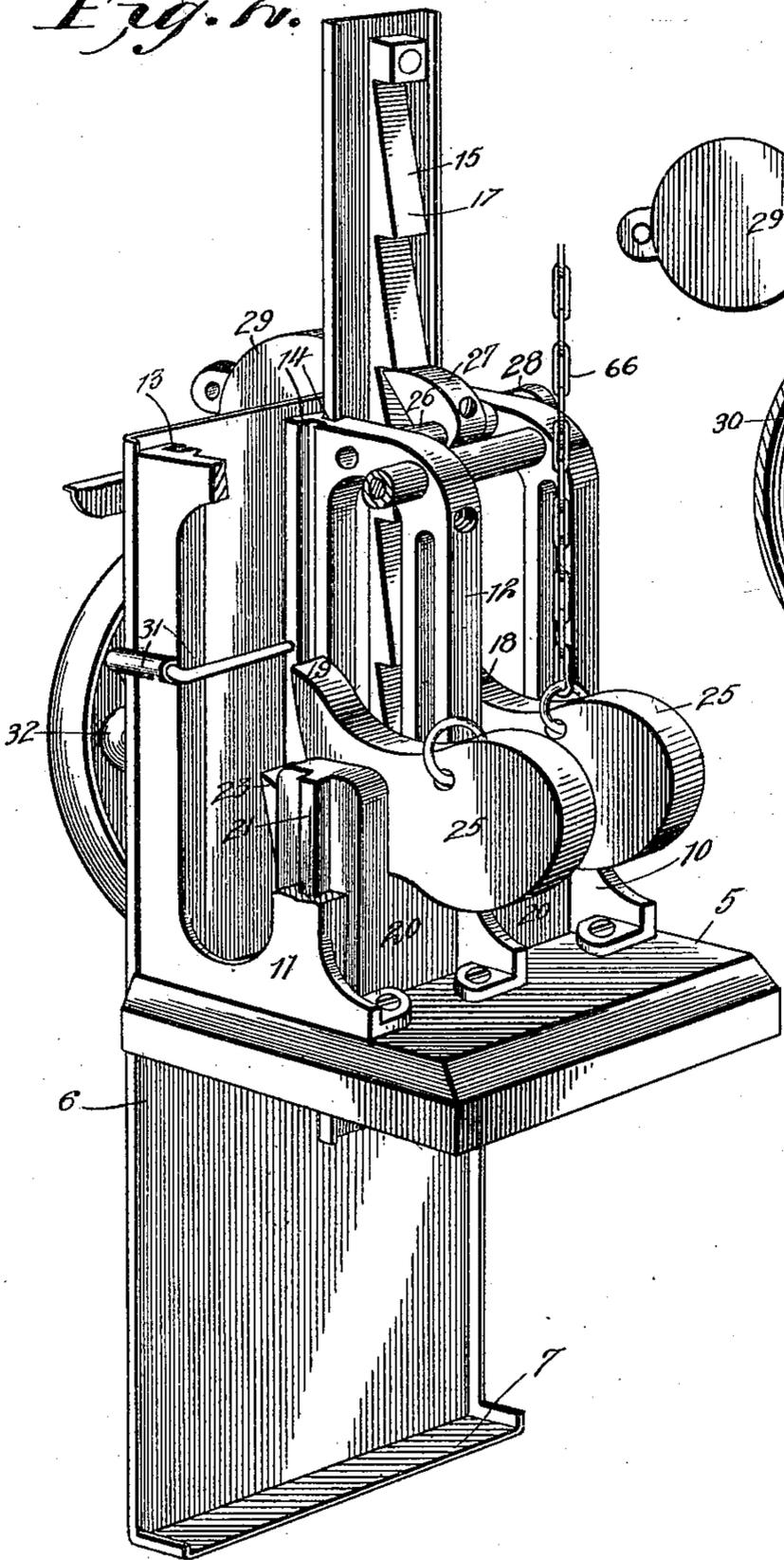
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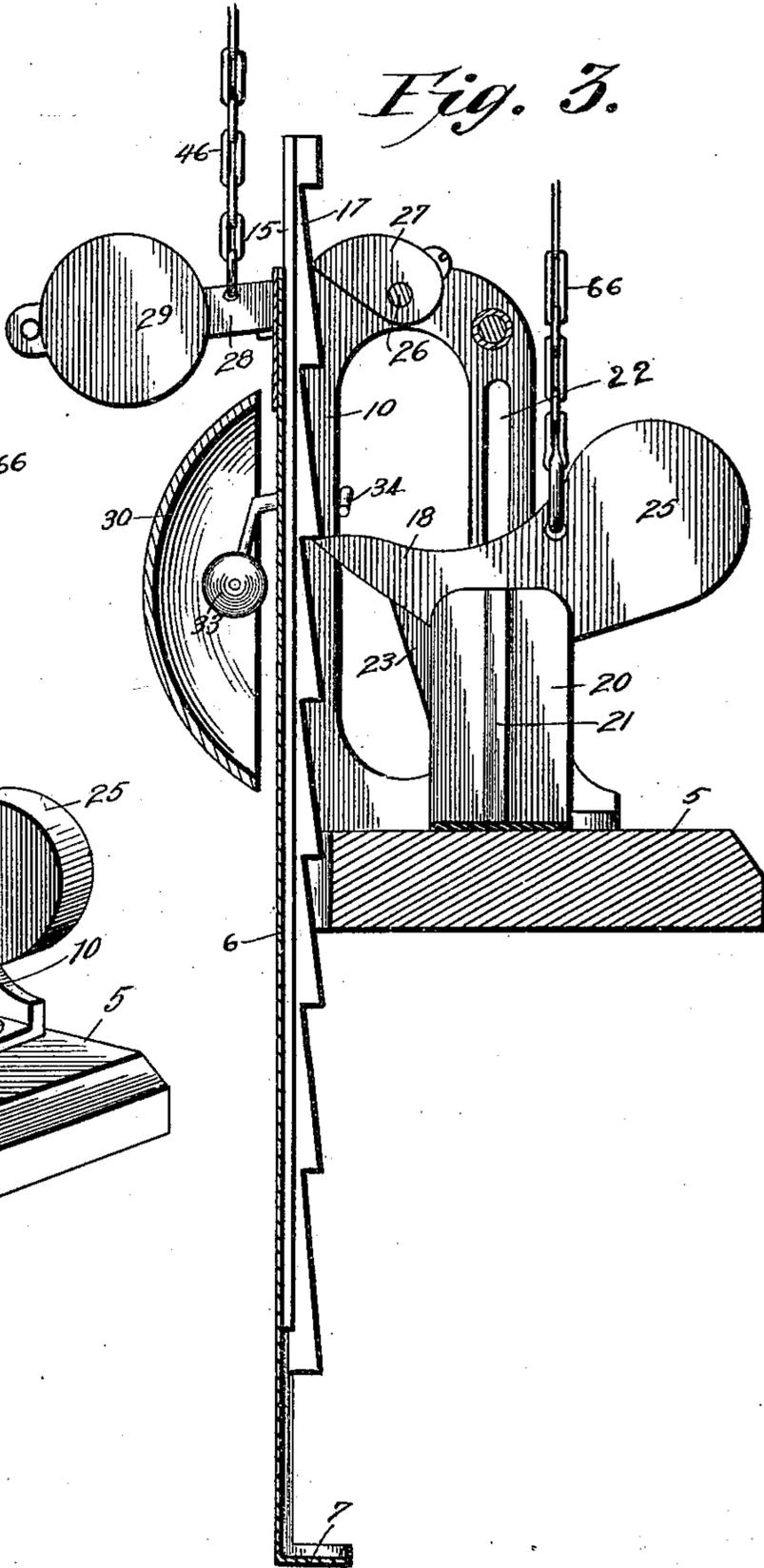
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*Fig. 2.*



*Fig. 3.*



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# UNITED STATES PATENT OFFICE.

JOHN B. FALKENSTEIN AND GEORGE A. FALKENSTEIN, OF ASTORIA, ILLINOIS, ASSIGNORS OF ONE-THIRD TO WILLIAM SCRIPPS, OF SAME PLACE.

## MINE-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 645,558, dated March 20, 1900.

Application filed November 17, 1899. Serial No. 737,365. (No model.)

*To all whom it may concern:*

Be it known that we, JOHN B. FALKENSTEIN and GEORGE A. FALKENSTEIN, citizens of the United States, residing at Astoria, in the county of Fulton and State of Illinois, have invented a new and useful Mine-Signal, of which the following is a specification.

This invention relates to signals in general, and more particularly to that class employed in mines; and it has for its object to provide a construction which will positively show the different signals transmitted to the engine-room of a mine and in which these several signals will remain set until the act requested has been performed.

The present invention has for a general object to provide means for insuring a proper reading of the signals set, and thereby preventing accidents which often result from a failure on the part of the engineer to properly read the signal or upon his forgetting the signal sent.

In the drawings forming a portion of this specification, and in which similar numerals of reference designate like and corresponding parts in the several views, Figure 1 is a view partially in section and partially in elevation and showing a part of a mine-shaft with a shaft-house and also a part of an engine-house. Fig. 2 is a rear perspective partially broken away and showing means for setting the signals and for releasing them, a portion of the frame being broken away and one of the signal-boards being omitted. Fig. 3 is a vertical section taken through the supporting-frame of the signal mechanism and showing parts in elevation. Fig. 4 is a detail perspective view showing the throttle-operated lever and its supporting-plate, as also a bell-crank lever and its connection with the throttle-operated lever.

Referring now to the drawings, the signal mechanism consists of a base 5, to the front edge of which is fixed a covering-plate 6, the lower end of which is bent rearwardly, as shown at 7, to form a stop for the signal-boards at the lower limit of their movement. Upon the base 5 and at the opposite sides thereof are mounted angular frame-pieces 10 and 11, intermediate of which is a similar frame-piece 12. These frame-pieces 10 and

11 are provided with guideway-slots 13 in their inner faces adjacent the plate 6, and in the faces of the frame-piece 12 and correspondingly disposed are cooperating guide-slots 14. A signal-board 15, which may be in the form of a metallic plate, is disposed with its edges in the guideways of the frame-pieces 10 and 12, while a second and similar board 16 is similarly disposed in the slot of the frame-piece 11 and the corresponding slot of the piece 12.

Upon the back of each of the boards 15 and 16 is fixed a rack 17, the teeth of which are disposed downwardly and which are adapted for engagement by dogs 18 and 19 to move the signal-boards upwardly. These dogs 18 and 19 are each pivotally mounted in a block 20, at the edges of which are formed ribs 21, which engage corresponding guide-grooves in the frame-pieces 10, 11, and 12. These dogs are limited in their movement into engagement with the racks 17 by stops 23 upon the blocks 20, the dogs being returned to their disengaged positions when moved from the racks by means of their counterweighted rear ends 25.

In order to hold the signal-boards in their elevated position, two rock-shafts 26 are journaled in rings in the frame-pieces 10, 11, and 12 and in axial alinement, each of these shafts being provided with a pawl 27, which is held yieldably in engagement with its respective rack through the medium of an arm 28, which extends beyond the front face of the plate 6 and is provided with a weight 29.

The slots 22 in the frame-pieces are of such lengths as to limit the sliding movements of the dogs 18 and 19 to an extent sufficient to raise the signal-boards to the extent of one tooth, and thus if these dogs be reciprocated they will raise the signal-boards one tooth at a time until they have reached the upper limits of their movements. If at any time the arms 28 be moved upwardly, the pawls 27 will release the teeth of the racks 17, and the weights of the signal-boards and their connected parts will cause the boards to drop to their initial positions.

In order to attract attention to the signals when set; a bell 30 is mounted upon the outer face of the plate 6, and to the side of the frame-

piece 11 is pivotally connected a bell-crank lever 31, one end of which is provided with a clapper 32, which lies within the inclosure of the bell, while the other end projects across the rear face of the adjacent signal-board 16 and into the path of movement of the dog 19. Thus as the dog 19 moves upwardly it will engage the end of this bell-crank lever and will elevate the clapper. As the dog passes downwardly it passes outwardly and over the adjacent end of the bell-crank lever, the dog having previously released the lever just prior to reaching the upper limit of its motion. When the bell-crank lever is released, the clapper falls into engagement with the bell and sounds it. A second and similar clapper 33 is mounted upon the frame-piece 10 and is carried by a bell-crank lever 34, one end of which lies in the path of movement of the dog 18 and has a similar operation.

The application of the mechanism above described is illustrated in Fig. 1 of the drawings, in which 40 represents the shaft of the mine, above which is arranged the usual shaft-house 41, which covers the upper end of the shaft and is provided with a sheave 42, over which is passed the cable 43 for the cage. The cable 43 passes to the engine-room 44 and is operated by an engine, (not shown,) and which latter is controlled by a throttle-lever 45. The signal mechanism is suitably supported within the engine-house and in sight of the engineer, and to the arms 28 are attached chains 46, which pass upwardly and then through guide-rollers 47 and are attached at their opposite ends to the extremity of a bell-crank lever 50, which is mounted upon a plate 51. Upon the plate 51 is also pivoted a T-lever 52, having chains 53 attached to the extremities of its head and extending to the free end of the lever 50. The stem of the T-lever is in the path of movement of the throttle-lever, so that when said throttle-lever is moved to admit steam the arms 28 are raised to disengage the pawl from the rack 17, and thus to release the signal-boards and allow them to drop to their normal positions. Connected with the dog 18 is a chain 66, which passes over a guide-pulley 67, and thence to the tipple-house. A second chain 58 is attached to the dog 19, and after passing over a guide-pulley 59 extends to the shaft-house, where it is taken over a pulley 60, and then passes downwardly into the shaft 40. The board which is operated by the dog 18 has one set of numerals, which indicate certain requests from the tipple-house, while the other board has also numerals, which indicate certain requests from the mine. If then the chain 58 be operated twice, it will raise the corresponding board two notches and expose sounded twice. There can be no mistaking the signal on the part of the engineer, and if this signal indicates the wish to have the figure "2," the bell being at the same time cage raised the movement of the lever 45 to supply steam will release the signal-board

and it will drop. A similar operation of the chain 66 will effect the same results with respect to its signal-board.

With the construction above described it will be seen that the signals may be easily and quickly set and that they will remain in this position until the signal has been complied with, thus eliminating all danger of misunderstanding and erroneous action incident thereto.

What is claimed is—

1. A mine-signal comprising a movable signal-board provided with a rack, a pivoted and bodily-movable dog adapted for engagement with the rack, means for moving the dog pivotally and then bodily to engage the rack and move the board, means for engaging the rack to hold the board in its adjusted position, and means for releasing the rack.

2. A signal apparatus comprising a movable signal-board, a pivoted and bodily-movable dog adapted to engage and move the signal-board, means for pivotally and bodily moving the dog to engage and move the board, means for holding the board at different points of its movement, and means for releasing the board.

3. A signal apparatus comprising a movable signal-board provided with a rack, a block slidably arranged adjacent the rack, a dog pivoted in the block, connections with the dog for moving it into engagement with the rack and for moving the block with the dog, means for engagement with the rack to hold the board at different points of its movement, and means for releasing the rack.

4. A signal apparatus comprising a base, frame-pieces mounted upon the base and having guideways, signal-boards slidably mounted in the guideways, additional guideways in the frame-pieces, blocks slidably mounted in the last-named guideway, dogs pivotally mounted in the blocks and adapted for movement into and out of engagement with the signal-boards, connections with the dogs to move them on their pivots into engagement with the signal-boards and subsequently raise them with the boards, means for holding the boards at different points of their movement, and means for releasing the boards.

5. A signal apparatus comprising a movable signal-board, a dog adapted to engage and move the board, means for holding the board at different points of its movement, means for releasing the board, and an alarm comprising an element extending into the path of movement of the board-engaging means to be operated thereby.

6. A signal apparatus comprising a movable signal-board, a pivoted and bodily-movable dog adapted to engage and move the signal-board, means for pivotally and bodily moving the dog to engage and move the board, a rock-shaft, a dog fixed upon the rock-shaft and adapted for movement therewith to engage and hold the board at different elevations, and means for operating the rock-

shaft to disengage the dog and release the board.

7. A signal apparatus comprising a base, frame-pieces mounted upon the base, guide-  
5 ways in the frame-pieces, movable signal-boards mounted in the guideways and having racks thereon, additional guideways in the frame-pieces, movable blocks mounted in the last-named guideways, dogs pivoted in  
10 the blocks and adapted to engage and disengage the racks, means for moving the dogs into engagement with the racks and for subsequently raising the dogs to raise the racks, pawls adapted for engagement with the racks

to hold them at different elevations, weighted 15 arms connected with the pawls to hold them in operative positions, an alarm comprising elements lying in the paths of movement of the dogs for operation thereby, and means for operating the arms to release the racks. 20

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

JOHN B. FALKENSTEIN.

GEORGE A. FALKENSTEIN.

Witnesses:

JOHN BRUNNERS,

E. E. DAVID.