W. T. GATES.

TRAIN ORDER SIGNAL.

APPLICATION FILED JUNE 18, 1907.

922,273.

Patented May 18, 1909.

3 SHEETS—SHEET 1.

Fig. 1

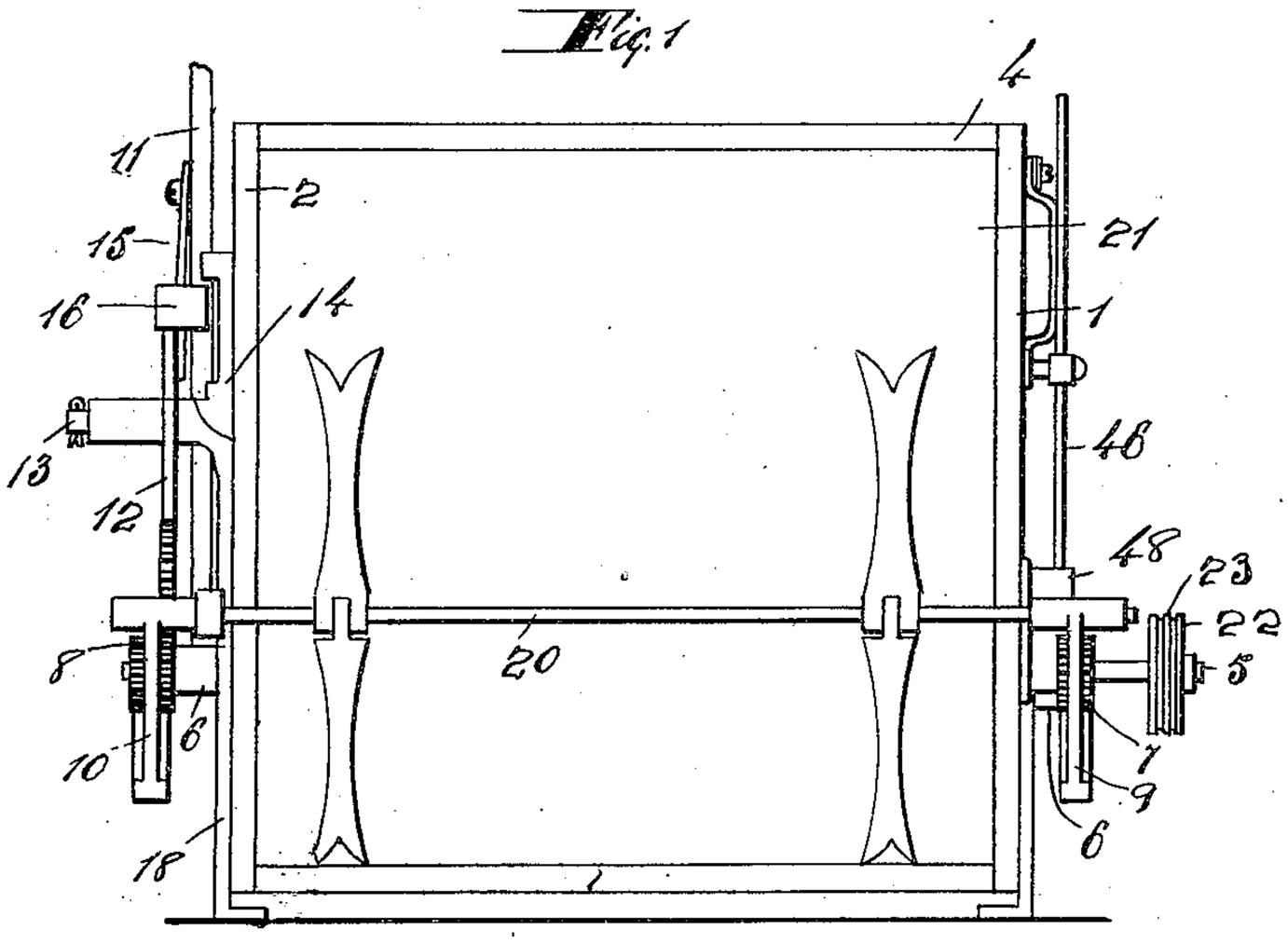


Fig. 3

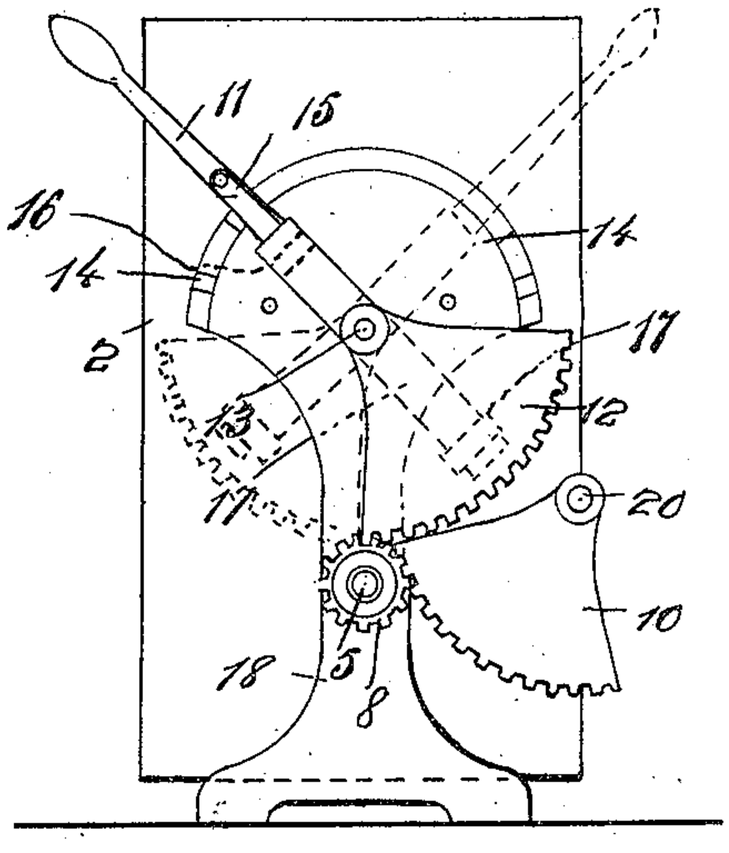
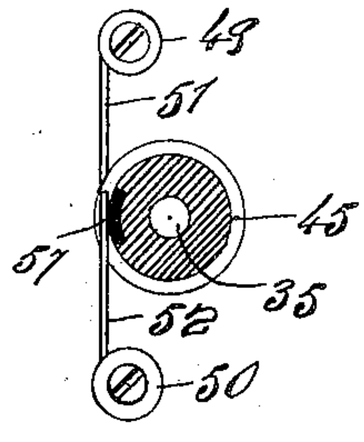


Fig. 7.



Witnesses
E. J. Lofkowski.
L. J. Knight

Inventor,
W. T. Gates,
By A. D. Jackson,
Attorney

W. T. GATES.

TRAIN ORDER SIGNAL.

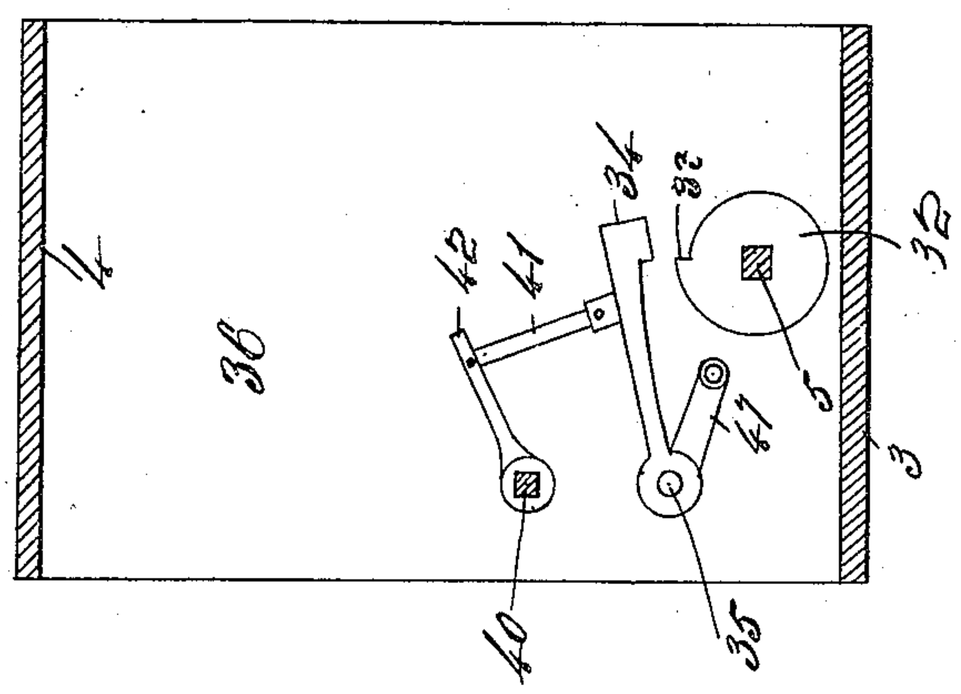
APPLICATION FILED JUNE 18, 1907.

922,273.

Patented May 18, 1909.

3 SHEETS—SHEET 2.

Fig. 5



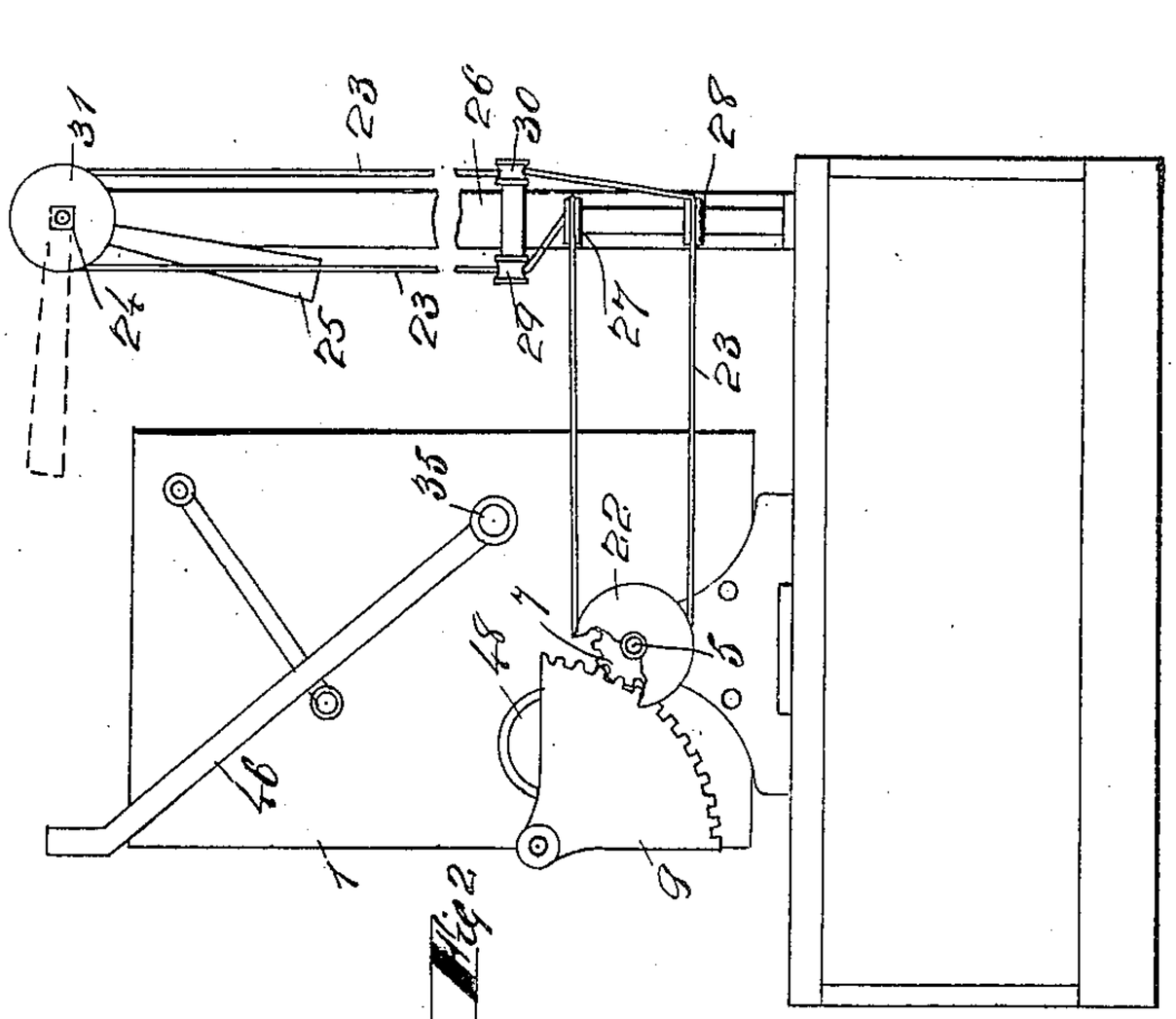


Fig. 2

Witnesses:-
B. J. Lorkowski
L. T. Knight

Inventor,
W. T. Gates,
By A. D. Jackson,
Attorney

W. T. GATES.

TRAIN ORDER SIGNAL.

APPLICATION FILED JUNE 18, 1907.

922,273.

Patented May 18, 1909.

3 SHEETS—SHEET 3.

Fig. 6.

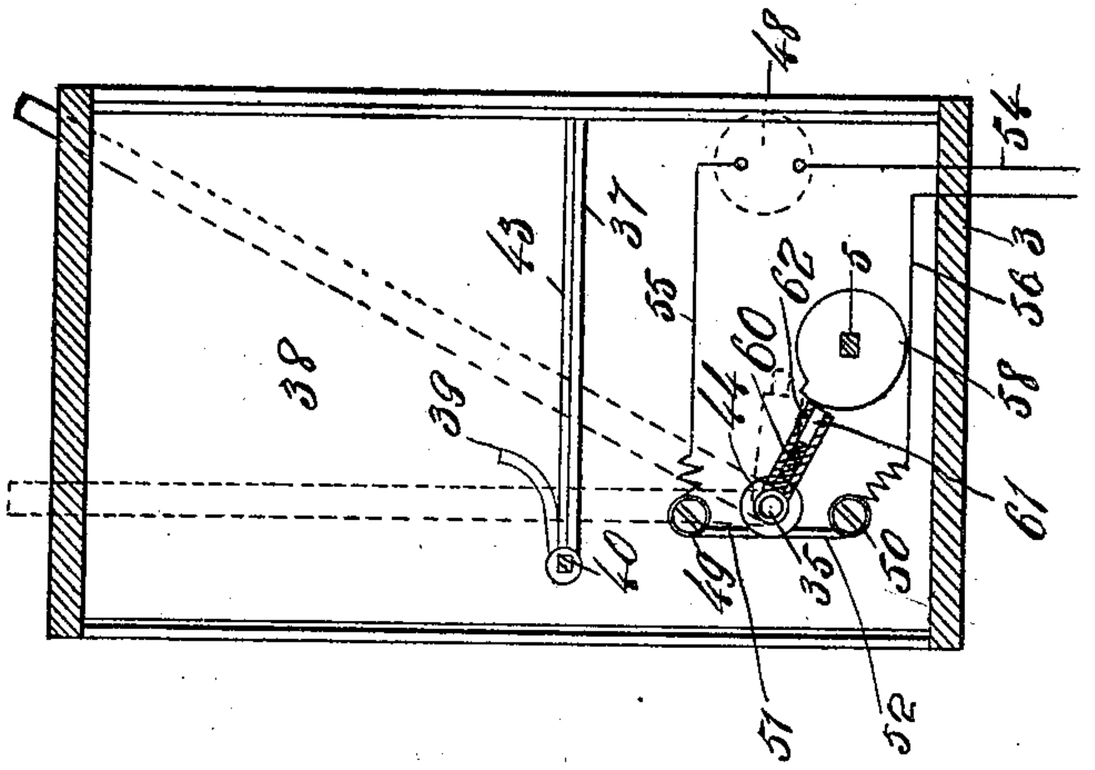
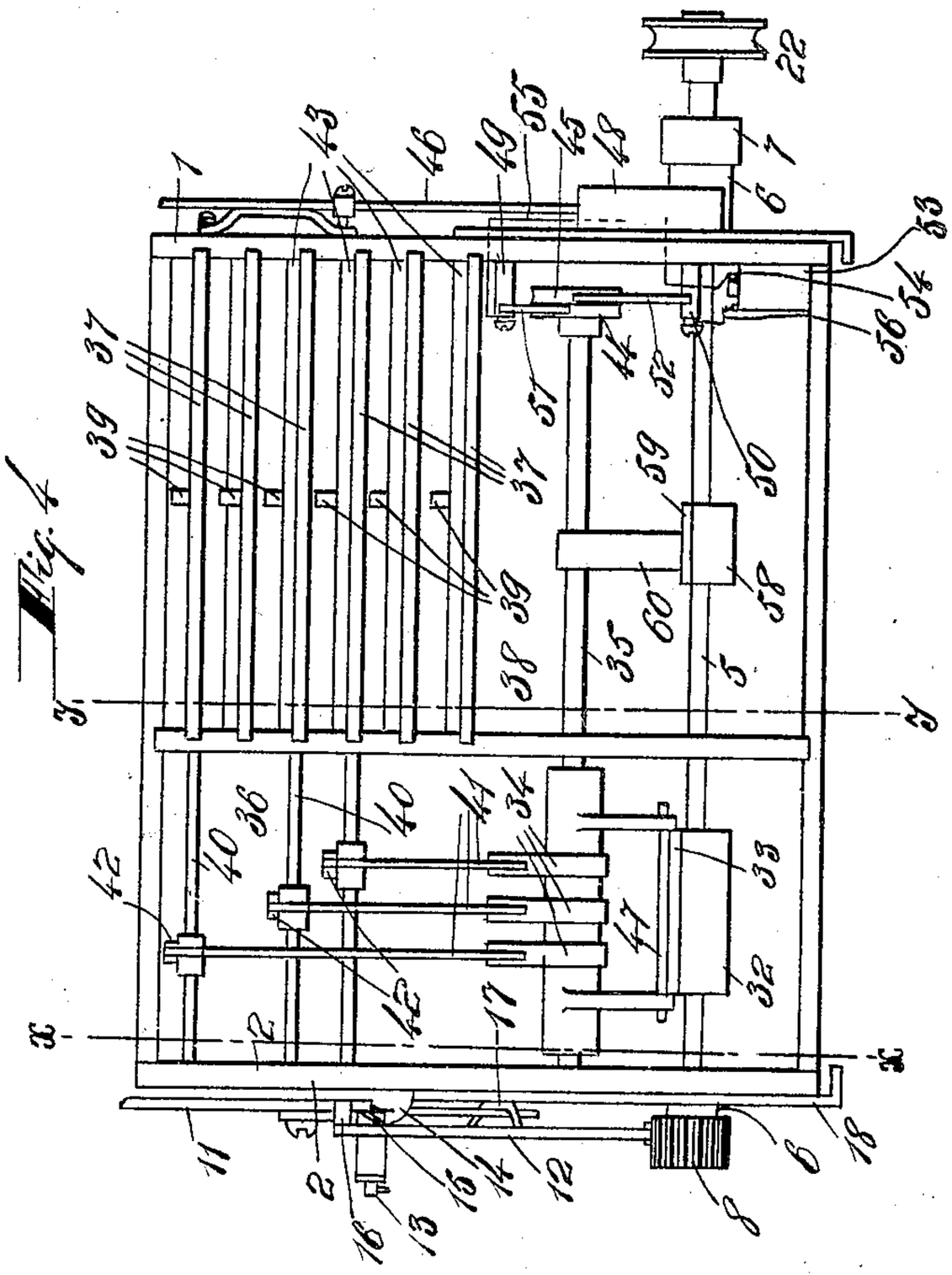


Fig. 4.



Witnesses:

B. J. Lorkowski

J. W. Stitt.

Inventor,
W. T. Gates.

By A. D. Jackson,

Attorney.

UNITED STATES PATENT OFFICE.

WILLIAM T. GATES, OF AUBREY, TEXAS, ASSIGNOR TO THE GATES SAFETY SIGNAL BOARD ATTACHMENT COMPANY, OF AUBREY, TEXAS, A CORPORATION OF TEXAS.

TRAIN-ORDER SIGNAL.

No. 922,273. Specification of Letters Patent. Patented May 18, 1909.

Application filed June 18, 1907. Serial No. 379,539.

To all whom it may concern:

Be it known that I, WILLIAM T. GATES, a citizen of the United States, residing at Aubrey, county of Denton, and State of Texas, have invented a new and Improved Train-Order Signal, of which the following is a specification.

This invention relates to signals for railways and more particularly to certain safety signaling devices; and the object is to provide operators and despatchers with safety devices which will operate automatically and positively to prevent improper displays of signals and the passage of trains without orders. A separate order pad is kept for each station on a railway to which an operator must give orders. When an operator gets a call to take an order, he cannot get the order pad until he raises or displays the semaphore. Then he cannot lower the semaphore until he replaces the order pad in the cabinet, and he will not do this until the conductor takes the order. Thus a semaphore cannot be thrown or cleared for passage until the operator replaces his order pad in the signal cabinet.

Other objects and advantages will be fully explained in the following description and the invention will be more particularly pointed out in the claims.

Reference is had to the accompanying drawings which form a part of this application and specification.

Figure 1 is a front elevation of the signal cabinet, showing the actuating mechanism. Fig. 2 is a side elevation of the same, this view being the right side of Fig. 1 and showing the lever for giving an alarm and showing the semaphore actuating mechanism. Fig. 3 is a side elevation, being the left side of Fig. 1 and showing the main operating lever and gearing for operating the semaphore. Fig. 4 is a front elevation of the cabinet with the entire front part of the casing removed. Fig. 5 is a vertical cross-section along the line $x\,x$ of Fig. 4. Fig. 6 is a vertical cross-section along the line $y\,y$ of Fig. 4. Fig. 7 is a detail view of the contact making devices of the alarm mechanism.

Similar characters of reference are used to indicate corresponding parts throughout the several views.

The devices set forth herein are adapted to actuate signals of any ordinary construction, but for convenience of illustration a semaphore is set forth. A cabinet has sides 1 and 2 and a bottom 3 and a top 4 which make a rigid structure. A semaphore actuating shaft 5 is mounted in and journaled on the sides of the cabinet, journal bearings 6 being attached to the sides of the cabinet. The shaft 5 does not rotate but oscillates substantially 90 degrees. Pinions 7 and 8 are mounted on shaft 5. These pinions are actuated by a lever 11 through a sector 12. The lever 11 and the sector 12 are both mounted on the shaft 13, the lever 11 being loosely mounted on the shaft and the sector being rigidly mounted thereon. The lever must be movable in order to engage different portions of the segmental rack 14 which is rigid with the side of the cabinet for the purpose of locking the semaphore shaft in different fixed positions. The lever 11 is held in engagement with the rack 14 by a spring 15 which is attached to the lever 11 at one end and presses against the sector 12. The lever 11 is held in alinement with the sector 12 by means of loops 16 and 17 which are formed integral with the sector 12. The segmental rack 14 is integral with the brace 18 and the journal bearing 19 for shaft 13 is also integral with the brace 18. When the sector 12 drives the pinion 8 and consequently the shaft 5 and the pinion 7, the pinion 8 drives the sector 10 which is rigidly mounted on the shaft and door hinge 20 and the shaft and the door hinge 20 are also driven by the pinion 7 and sector 9. When the shaft 20 is driven the door 21 is opened. When the shaft 5 is driven or oscillated the semaphore is raised or lowered. The shaft 5 drives the pulley 22 and consequently the belt 23. The belt 23 may run in any suitable manner to the shaft 24 of the semaphore. The semaphore 25 is shown mounted on a post 26. The cabinet is supposed to be mounted in an office and the belt 23 extended out of the office to the semaphore. In the drawings the belt 23 runs about the idle pulleys 27 and 28, then under pulleys 29 and 30, and up over the pulley 31 which is rigid with the semaphore shaft 24. With the mechanism thus described the semaphore can be raised or lowered at will.

Means are provided for locking the semaphore up until the conductor has secured his orders. A cam 32 is rigidly mounted on shaft 5. This cam is provided with an abrupt shoulder 33. Locking dogs 34 are pivot-

ally mounted on the shaft 35 in the compartment 36. Any suitable number of shelves 37, determined by the number of stations or switches for which an individual station operator gives orders, are mounted in the compartment 38. Weighted arms 39 are rigidly mounted on shafts 40 and the shafts 40 are pivotally mounted in the side pieces 1 and 2. Arms 42 are rigidly mounted on the shafts 40. Links 41 are pivotally connected with the dogs 34 and pivotally connected with the arms 42. The order pads 43 for the different stations are mounted on the shelves 37. Normally the pads 43 hold the dogs 34 out of engagement with the cam shoulder 33. When an order pad 43 is taken from a shelf 37 the weighted arm 39 will drop down and let the shaft 40 turn. This will let the dog 34 fall by means of the arm 42 and the link 41 and engage the shoulder 33. This operation will lock the semaphore up because the shaft 5 cannot move until the dog 34 is disengaged from the cam shoulder 33 and this will not be done until the operator delivers the orders to the conductor and puts his pad back in place. When the pad is put back in its place, the pad will strike the beveled surface of the arm 39 and raise this arm and thus turn shaft 40 and raise the dog 34 out of engagement with the cam shoulder 33. The semaphore may then be let down by means of the lever 11. It is noted that the lever 11 is thrown forward to the dotted line position in Fig. 3 when the semaphore is raised and that the lever 11 cannot move as long as the dog 34 is in engagement with the cam shoulder 33.

Provision is made for temporarily disengaging the dogs 34 from the cam shoulder 33. In order that this disengagement may not continue any longer than the necessity of the disengagement, the act of disengaging the dogs 34 from the shoulder 33 also sets off an electric alarm which continues to run as long as the dogs 34 are disengaged from the shoulder 33. The object of the alarm is to remind the operator to release the alarm and raise the semaphore after a train has passed. While the dogs 34 are temporarily disengaged from the cam shoulder 33, the agent can operate the shaft 5 to lower or raise the semaphore. The means for this temporary disengagement of the dogs 33 are shown in the drawings. Two grooved wheels 44 and 45 are rigidly mounted on the shaft 35 and a crank lever 46 is rigidly mounted on this shaft. A yoke 47 is rigidly mounted on shaft 35 beneath the dogs 34. When the lever 46 is moved the yoke 47 will lift the dogs 34 out of engagement with the cam shoulder 33. The alarm is given as follows: A bell 48 is mounted on the cabinet, preferably on the outside. Binding posts 49 and 50 are mounted in the cabinet on opposite sides of the grooved wheels 44 and 45 and carry contacts 51 and 52 which bear against the wheels 44 and 45 respectively. The post 49 is electrically connected by wire 55 with one side of the bell 48 and the other side of the bell is electrically connected with a battery 53 by a wire 54. The binding post 50 is electrically connected with the battery 53 by a wire 56. The wheel 45 has an insulated portion 57 on which the contact 52 normally rests. When the lever 46 is moved, the wheels 44 and 45 are moved and the bar 52 bears against the metallic portion of the wheel 45. This will complete a circuit through the wheels 44 and 45 with contact 52 and thus ring the bell. The bell will continue to ring until the lever 46 is moved to its normal position, and the semaphores can then be again displayed. Means are provided for preventing the operator from stopping the alarm until the semaphores have been raised or displayed. The operator might not want to hear the continuous alarm. Suppose the semaphore is displayed for one or more trains and it is necessary for an extra train to pass. The operator could move the lever 46. This would start the alarm and at the same time raise the dogs 34 so that the lever 11 could be moved to lower the semaphore. He could then move the lever 11 and lower the semaphore. He could then move the lever 46 back to its normal position and thus stop the alarm. The danger of this would be that he might forget to raise the semaphore after the extra train had passed. In order to prevent an operator from stopping the alarm under such conditions, a lock is provided. A cam 58 is mounted rigidly on a shaft 5 and provided with a shoulder 59. A detent 60 is rigidly mounted on shaft 35. This detent is a tubular arm having a plunger 61 projecting therefrom. This plunger 61 rests against or is attached to a spiral spring 62 which is seated in the detent arm 60. The plunger 61 normally presses against the surface of the cam 58. When the lever 11 is moved enough to lower the semaphore, the plunger 61 will catch behind the shoulder 59. In this position of the cam 58, the lever 46 cannot be moved until the lever 11 is moved to raise the semaphore. Thus the operator is prevented from stopping the alarm until he has raised the semaphore. When the lever 11 has been moved to raise the semaphore the lever 46 can then be moved back to its normal position and the dogs 34 will then again fall on the shoulder 33 of the cam 32. With this provision for raising the dogs 34, the semaphore can be cleared for the passage of any one of the trains for which the agent has orders and the alarm will continue to sound until the train has passed and the semaphore again displayed.

In practice the train order pads are closed in the cabinet. When an operator receives a call to take an order for a train, he cannot get his train order pad until he raises the sema-

phore. He must pull the lever 11. This displays the semaphore and at the same time opens the door of the cabinet. When he removes the pad from the cabinet the semaphore is automatically locked in the displayed position and the semaphore cannot be cleared until the pad is replaced in the cabinet except under conditions above described. The signaling devices herein described make a simple and practical mode of preventing a train from passing a station without orders.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent, is,—

1. A signal actuating device comprising a cabinet provided with a door and containing train order pads, semaphore actuating gearing mounted on and in said cabinet, a lever for operating said gearing to display a semaphore and simultaneously open said door, and locking devices for said gearing automatically actuated by the removal of a train order pad from said cabinet.

2. A signal actuating device comprising a cabinet provided with a door and containing train order pads, signal actuating gearing mounted on and in said cabinet, means for operating said gearing to display a signal and simultaneously to open said door, and gravity actuated devices automatically locking said gearing on the removal of a train order pad from said cabinet.

3. A signal actuating device comprising a cabinet provided with a door and containing train order pads, signal actuating gearing mounted on and in said cabinet, gearing for opening and closing said door operated by said signal gearing, means for operating said gearing to display a signal and simultaneously to open said door, and gravity actuated devices automatically locking said gearing on the removal of a train order pad from said cabinet.

4. A signal actuating device comprising a cabinet provided with a door and containing train order pads, signal actuating gearing mounted on and in said cabinet, gearing operated by said signal gearing to open said door when a signal is displayed and to close said door when a signal is cleared, and means for operating said signal gearing.

5. A signal actuating device comprising a cabinet provided with a door and containing train order pads, signal actuating gearing mounted on said cabinet and including a shaft running through said cabinet, gearing operated by said signal gearing for opening and closing said door, and means for automatically locking said gearing on the removal of a pad from said cabinet consisting of a cam mounted on said shaft, locking dogs pivotally mounted in said cabinet and weighted arms supported on said pads and pivotally mounted and operatively connected to said dogs.

6. A signal actuating device comprising a cabinet provided with a door and containing train order pads, signal actuating gearing mounted on said cabinet and including a shaft running through said cabinet, gearing operated by said signal gearing for opening and closing said door, a cam mounted on said shaft, a plurality of dogs pivotally mounted in said cabinet for engaging said cam, and weighted arms operatively connected to said dogs and pivotally mounted and supported on said pads.

7. A signal actuating device comprising a cabinet provided with train order pads, signal actuating gearing mounted on said cabinet and including a shaft running through said cabinet, a cam mounted on said shaft, a dog pivotally mounted in said cabinet to engage said cam, a rock-shaft mounted in said cabinet and carrying an arm, a link bar pivotally connected to said arm and to said dog, and a weighted arm mounted rigidly on said rock-shaft and resting on a train order pad.

8. A signal operating device comprising a closed receptacle containing train order pads, signal actuating gearing mounted on and in said receptacle to display a signal and simultaneously to open said receptacle, and means automatically actuated by the removal of a train order pad from said receptacle for locking said gearing with the signal displayed until the train order pad is replaced in said receptacle.

9. A signal actuating device having a closed receptacle containing train order pads, signal actuating gearing mounted on and in said cabinet, and means coöperating with said gearing for opening said receptacle and for preventing the opening of said receptacle until said gearing is actuated to display a signal and serving to close said receptacle and to clear the signal for the passage of a train.

10. A signal actuating device comprising a closed receptacle containing train order pads, signal actuating gearing mounted on and in said receptacle, and gravity actuated devices automatically locking said gearing on the removal of a train order pad from said receptacle, and means for unlocking said gearing temporarily and simultaneously giving an alarm and continuing the alarm until said gearing has been again locked.

11. A signal actuating device comprising a closed receptacle containing train order pads, signal actuating gearing mounted on and in said receptacle for displaying a signal and at the same time opening said receptacle, means for automatically locking said gearing with a signal displayed on the removal of a train order pad from said receptacle, and means for temporarily unlocking said gearing and simultaneously giving an alarm and continuing the alarm until said gearing has been again locked.

12. A signal actuating device comprising a

closed receptacle containing train order pads, signal actuating gearing mounted on and in said receptacle for displaying a signal and simultaneously opening said receptacle, means for automatically locking said gearing on the removal of a train order pad from said receptacle, means for temporarily unlocking said gearing for clearing the signal and at the same time giving an alarm and continuing the alarm until said signal is again displayed and said gearing again locked, and means for preventing the stopping of said alarm while the signal is cleared.

13. A signal actuating device comprising a cabinet provided with a door and containing a series of train order pads, gearing for operating a semaphore and simultaneously opening and closing said door, and locking devices for said gearing consisting of a cam having a shoulder and a series of dogs adapted to engage said shoulder on the removal of pads from said cabinet.

14. A signal actuating device comprising a cabinet provided with a door and containing a series of train order pads, gearing for operating a semaphore and simultaneously opening and closing said door, and locking devices for said gearing consisting of a cam operatively connected with said gearing and a series of dogs and provided with a shoulder, and a series of dogs adapted to engage said shoulder on the removal of said pads from said cabinet.

In testimony whereof, I set my hand in the presence of two witnesses, this 5th day of June, 1907.

WILLIAM T. GATES.

Witnesses:
A. L. JACKSON,
J. W. STITT.