

Sept. 23, 1924.

1,509,375

J. A. NOLAN

AUTOMATIC LANDER

Filed Oct. 1, 1923

2 Sheets-Sheet 1

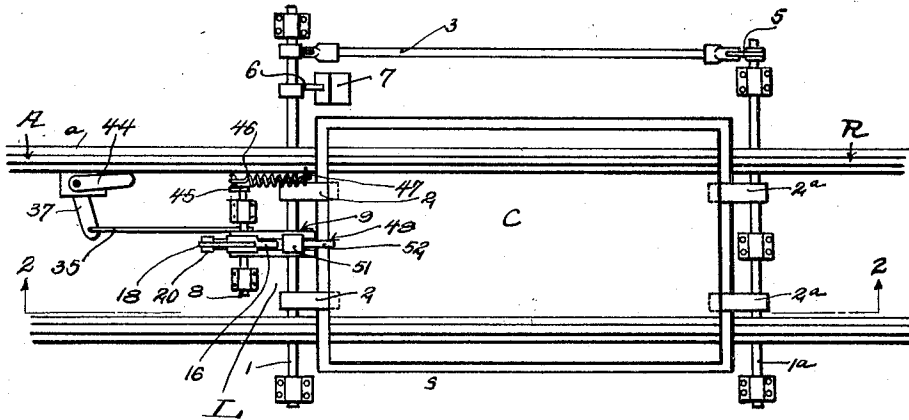


FIG. 1.

FIG. 6.

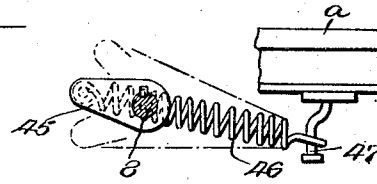
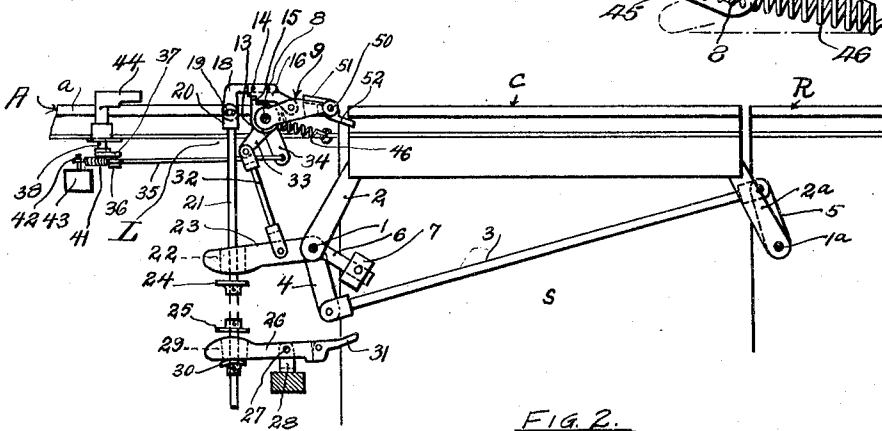


FIG. 2.

FIG. 8.

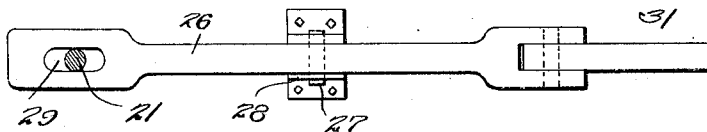
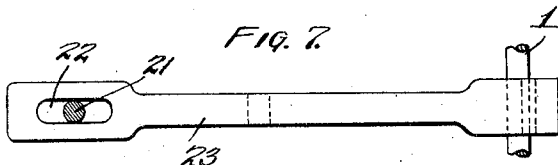


FIG. 7.



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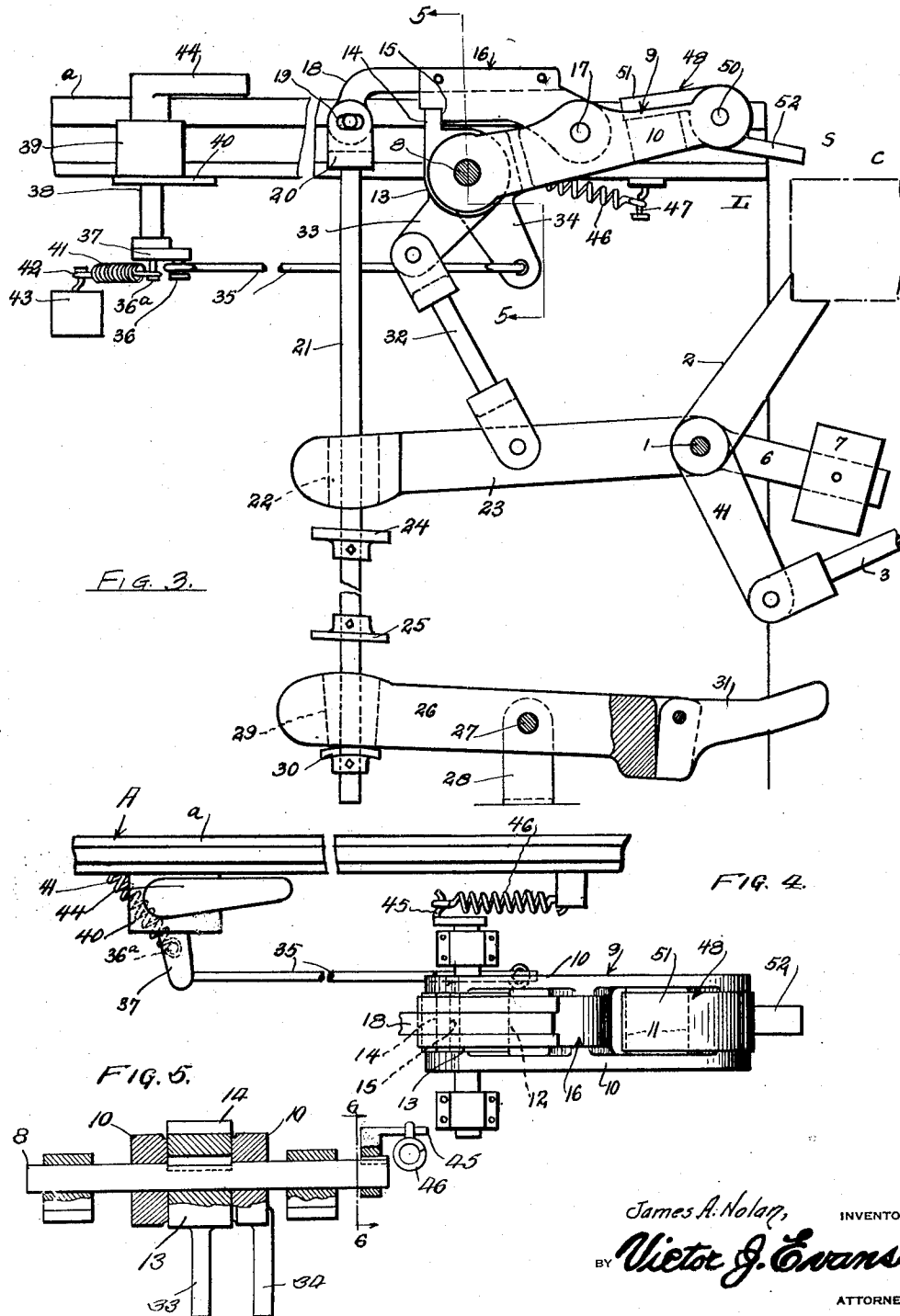
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2 Sheets-Sheet 2



James A. Nolan, INVENTOR
BY Victor J. Evans ATTORNEY

UNITED STATES PATENT OFFICE.

JAMES A. NOLAN, OF BOWERSTON, OHIO.

AUTOMATIC LANDER.

Application filed October 1, 1923. Serial No. 665,960.

To all whom it may concern:

Be it known that I, JAMES A. NOLAN, a citizen of the United States, residing at Bowerston, in the county of Harrison and State of Ohio, have invented new and useful Improvements in Automatic Landers, of which the following is a specification.

This invention relates to automatic landers for use in mining operations.

One of the main objects of the invention is to provide landers which may be used in connection with a cage of standard construction and which are automatic in their operation. A further object is to provide simple and efficient means for moving the landers into and out of operative position, this means being cage-actuated and car controlled so that the apparatus, as a whole, is automatic in its operation. Further objects will appear from the detail description.

In the drawings:—

Fig. 1 is a top plan view of the landers as applied;

Fig. 2 is a side view;

Fig. 3 is an enlarged side view, partly in section, of the landers and associated parts;

Fig. 4 is a detail plan view of the control shaft and associated parts;

Fig. 5 is a section taken substantially on line 5—5 of Fig. 3;

Fig. 6 is a section taken substantially on line 6—6 of Fig. 5;

Fig. 7 is a top plan view of the lander shaft operating arm;

Fig. 8 is a top plan view of the trip lever.

My landers are intended to be used in connection with a cage C of known construction movable in a shaft S by known means past a landing L. An approach track A leads to one side of shaft S and a receiving track R leads from the other side of the shaft. In practice cars are fed down the approach track A onto the cage C, any suitable or preferred feeding means being employed for this purpose, though I prefer to employ the feeder disclosed in my U. S. patent for mine car cager dated April 20th 1920, Patent Number 1,337,945.

A lander shaft 1 is rockably mounted adjacent to one side of the cage shaft S and below the landing L. Landers 2 of a known type are secured on this shaft and are normally positioned so as to project into the path of travel of cage C. Similar landers 2^a are secured on a shaft 1^a rockably mounted at the other side of cage shaft S, the

shafts 1 and 1^a being connected by a rod 3 which is secured at its ends to arms 4 and 5 secured to shafts 1 and 1^a respectively, arm 4 being directed downwardly and arm 5 being directed upwardly. A weight arm 6 is secured to shaft 1 and a weight 7 is secured on this arm, this weight acting to rock shaft 1 in such direction as to hold landers 2 and 2^a in normal or lowered position.

A control shaft 8 is rockably mounted on landing L and an operating lever 9 is loosely mounted on this shaft to turn about it. The lever 9 includes two spaced arms 10 which are connected by web elements 11 and 12, the outer ends of these arms being loosely mounted on control shaft 8. A ratchet-wheel 13 is secured on shaft 8 between arms 10 of lever 9, this ratchet-wheel serving to prevent movement of the lever longitudinally of the shaft. Ratchet-wheel 13 is provided with an outwardly projecting finger 14 adapted for engagement by shoulder 15 of a pawl 16 pivotally mounted at one end, at 17, between arms 10 of lever 9. An L-shaped connecting bar 18 is secured in the upper portion of pawl 16, which is provided with a longitudinally extending groove for this purpose. The outer end of bar 18 is connected by pin and slot connections 19 to a fork 20 secured on the upper end of a trip rod 21. Rod 21 passes through a slot 22 provided in the outer end of a lander shaft operating arm 23 which is secured at its inner end on lander shaft 1. A disc 24 is secured on rod 21 below arm 23, and a disc 25 directed oppositely to disc 24 is secured on the trip rod above a trip lever 26 rockably mounted intermediate its ends on a stub-shaft 27 supported by bearing brackets 28. Rod 21 passes through a downwardly tapering slot 29 provided in lever 26 and a disc 30 is secured on rod 21 beneath lever 26 to limit downward movement thereof. A hinged trip finger 31 is mounted in the inner end of lever 26, this finger projecting into the path of movement of cage C. The finger 31 is connected to lever 26 in such manner that the finger will be raised when the cage moves upwardly past the same and, when the cage moves downwardly and strikes finger 31, lever 26 will be rocked so as to raise the outer end of this lever. This arrangement of the finger 31 is similar to that disclosed in my U. S. patent above referred to and need not be further described in detail.

Arm 23 is connected by a link 32 to an arm

33 depending from and rigid with ratchet-wheel 13. One of the arms 10 of lever 9 is provided with an angularly disposed arm 34 which is connected by a link 35 to a pin 36 carried by an arm 37 secured on the lower end of a shaft 38 which is rockably mounted through a block 39 carried by a plate 40 secured to one of the rails *a* of approach track A. A tension spring 41 is secured at one end to a second pin 36^a secured in arm 37 beyond pin 36. The other end of spring 41 is secured to a pin 42 which is secured in a block 43 or anchored in any suitable manner. This spring is so positioned that, when shaft 38 is turned a predetermined distance in either direction, the line of tension of the spring passes beyond the center of the shaft so that the spring acts to complete the throw of the shaft and to hold the shaft in rocked adjustment. This spring arrangement is similar to that disclosed in my U. S. patent for mine car cager dated April 20th 1920, Patent Number 1,337, 944 and need not be further described in detail. A reset block 44 is secured on the upper end of shaft 38 adjacent to rail *a*. This block is movable across rail *a* so as to be displaced inwardly of the rail by the wheel of a car traveling down the approach track A onto cage C. An arm 45 is secured to one end of control shaft 8 and a tension spring 46 is secured at one end to this arm, the other end of this spring being anchored at 47 to rail *a*. Spring 46 acts to complete the throw of shaft 8 in either direction and to hold this shaft in rocked adjustment, in the same manner that spring 41 acts to complete the throw of shaft 38.

A contact member 48 is lockably mounted at 50 between arms 10 of lever 9, at the inner end thereof. Member 48 is provided with an upper arm 51 and a lower arm 52, these arms being oppositely directed. Arm 51 is broader and heavier than arm 52 and normally rests upon web element 11 so as to hold arm 52 in position in the path of movement of cage C. With the parts in the positions illustrated in Figs. 1 to 4, in which it is assumed that a car has passed from the approach track A onto cage C; when the cage is raised off of the landers it will strike arm 52 of contact member 48 and will rock lever 10 about shaft 8 and this shaft will be turned by means of shoulder 15 of pawl 16 and finger 14 of ratchet-wheel 13, a sufficient distance to move spring 46 below the axis of the shaft, after which this spring will act to complete the throw of the shaft and to hold it in rocked adjustment. This serves to turn ratchet-wheel 13, which is secured on shaft 8, into its extreme position in one direction. This turning of the ratchet-wheel serves through arms 33 and 23 and link 32 to rock shaft 1 in such direction as to raise the landers 2 and 2^a out of the path

of travel of cage C. During its upward movement off of the landers cage C is raised slightly above the uppermost position of the inner end of lever 9. If the cage, in descending after being raised, should contact with arm 52 of member 48 lever 9 would not be operated since this member is free to turn about pivot 50 and, after the cage has passed, will be returned to normal position by the weighted arm 51. As the cage descends and passes beyond the landers, it will contact with finger 31 thus rocking lever 26 so as to raise the outer end of this lever into contact with disc 25. This raises trip rod 21 so as to raise pawl 16 and move shoulder 15 out of the path of movement of finger 14 of ratchet-wheel 13. Continued upward movement of rod 21 brings disc 24 into contact with the outer end of arm 23 raising the outer end of this arm and rocking shaft 1 a sufficient distance to turn shaft 8, through the medium of link 32 and arm 33, to such an extent as to bring spring 46 above the axis of this shaft, after which the spring completes the throw of shaft 8 and the landers are returned to normal or lowered position by means of weight 7 supplemented by the action of spring 46. During this operation of returning shaft 8 to normal or set position, pawl 16 is held raised into inoperative position. After shaft 8 and consequently ratchet-wheel 13 has been returned to normal position, the cage passes downwardly out of contact with finger 31 thus releasing lever 26 so that trip rod 21 is returned by gravity to normal position. When the trip rod is lowered pawl 16 is lowered and rests upon the finger 14, shoulder 15 being positioned outside of or beyond this finger. In this manner the cage is released and the landers are moved into inoperative or raised position thus permitting the cage to pass downwardly in the shaft, the cage acting, after it has passed beyond the landers, to release the landers which are returned to operative or lowered position.

Upon return of the cage to the landing L, as the cage travels upwardly in shaft S it will contact with finger 31 which will be raised without affecting lever 26. After passing beyond finger 31, the cage will contact with landers 2 and 2^a which will be rocked upwardly and outwardly a slight distance but will be immediately returned to lowered or operative position after the cage passes by. After the cage has passed beyond the landers it is then lowered onto the landers so as to be supported thereby as illustrated. When the cage is in position at the landing L, a car is fed down the approach track A and acts to move the trip block 44 inwardly of rail *a*, it being understood that this block was turned so as to extend outwardly across the tread of rail *a*, through the medium of arms 34 and 37 and

link 35, when lever 9 was rocked upwardly and outwardly about shaft 8 by contact of cage C with arm 52 of member 48. This inward movement of reset block 44 serves to turn the shaft 38 in such direction as to withdraw link 35 thus rocking lever 9 downwardly and inwardly about shaft 8 into the position illustrated in Fig. 3, in which position shoulder 15 of pawl 16 engages behind finger 14 of ratchet wheel 13 and arm 52 of member 48 projects into the path of movement of the cage C above the same. When the car has passed onto the cage C, the cage is again raised so as to rock lever 9 in proper direction to turn shaft 8 in lander-raising direction, the operation previously described being repeated. This provides very simple and highly efficient means whereby the landers positioned at the various landings in a mine or tippie, are automatically actuated and controlled by the movement of the cage and the cars.

As will be well understood by those skilled in this art, changes in details of construction and arrangement of parts can be resorted to without departing from the field and scope of the invention, and I intend to include all such variations, as fall within the scope of the appended claims, in this application in which a preferred form only of my invention is disclosed.

What I claim is:—

1. In combination with a landing and a cage movable past the same, landers normally extending into the path of travel of the cage, means actuated by the cage as it moves in one direction past the landers for moving said landers out of the path of movement of the cage and for holding them in inoperative position, means actuated by the cage for releasing the landers and returning them to normal position as the cage moves past said landers in the other direction, and car actuated means on the landing for returning the first mentioned cage actuated means to operative position.

2. In combination with a landing and a cage movable past the same, landers normally extending into the path of travel of the cage, and co-operating car controlled and cage actuated means for withdrawing the landers out of the path of travel of the cage when the cage moves in one direction past the landers and for subsequently returning the landers to normal position when the cage travels past said landers in the other direction.

3. In combination with a landing and a cage movable past the same, landers normally extending into the path of travel of the cage, and automatic means controlled by the position of the cage and by a car traveling on the landing for moving the landers out of the path of travel of the cage when said cage travels past the landers in one

direction and for returning the landers to normal position when the cage travels past the landers in the other direction.

4. In combination with a landing, a cage movable past said landing, landers normally extending into the path of travel of the cage, and automatic means for withdrawing the landers when the cage travels past the landers in one direction and for returning the landers to normal position when the cage travels past said landers in the other direction, said means acting to hold the landers in inoperative position until the cage travels a predetermined distance beyond the landers in said other direction.

5. In combination with a landing and tracks leading to and from the landing, a cage movable past the landing and provided with a car-receiving track section, landers normally extending into the path of travel of the cage, cage actuated means for withdrawing the landers when the cage travels past them in one direction, and for holding the landers in inoperative position, cage actuated means for releasing the landers, returning them to normal position when the cage travels past said landers in the other direction, and means actuated by a car traveling on one of said tracks for placing the first mentioned cage actuated means in condition to be again actuated by said cage upon its return movement.

6. In combination with a landing and tracks leading to and from the landing, a cage movable past the landing and provided with a car-receiving track section, a lander shaft rockably mounted below the landing, landers secured on said shaft and normally extending into the path of travel of the cage, a control shaft rockably mounted on the landing, connections between said shafts for rocking the lander shaft in lander raising direction when the control shaft is rocked in one direction and in lander lowering direction when said control shaft is rocked in the other direction, cage actuated means for rocking said control shaft in lander raising direction when the cage travels past the landers in one direction, cage actuated means for rocking the control shaft in lander lowering direction when the cage travels past the landers in the other direction, and car actuated means for returning the first mentioned cage actuated means to operative position.

7. In combination with a landing and tracks leading to and from the landing, a cage movable past the landing and provided with a car-receiving track section, a rockably mounted lander shaft, landers secured on said shaft and normally projecting into the path of travel of the cage, means tending to rock said shaft in lander lowering direction, means actuated by the cage

when it travels past the landers in one direction for rocking the shaft in lander raising direction and for holding the shaft in position to hold said landers raised, means actuated by the cage when it travels past the landers in the other direction for releasing the shaft and rocking it in lander lowering direction, and car controlled means for returning the first mentioned cage actuated means to operative position.

8. In combination with a landing and tracks leading to and from the landing, a cage movable past the landing and provided with a car-receiving track section, a rockably mounted lander shaft, landers secured on said shaft and normally projecting into the path of travel of the cage, means tending to rock said shaft in lander lowering direction, a rockably mounted control shaft, an operating lever loosely mounted on said control shaft, interengaging members carried by the lever and the control shaft for turning the latter with the former when the lever is moved in one direction, said lever being provided with a member projecting above and into the path of travel of the cage when the lever is in operative position so as to be struck by the cage for moving the lever in said direction when the cage is raised, connections between said shafts for rocking the lander shaft in lander raising direction when the control shaft is rocked in said direction and in lander lowering direction when said control shaft is rocked in the other direction, means actuated by the cage when it has traveled past the landers in the other direction for disengaging the member carried by the lever from the member carried by the control shaft and subsequently turning the control shaft in lander lowering direction, and car controlled means for returning the lever to operative position.

9. In combination with a landing and tracks leading to and from the landing, a cage movable past the landing and provided with a car-receiving track section, landers normally projecting into the path of travel of the cage, a rockably mounted control shaft, an operating lever loosely mounted on said shaft, a ratchet-wheel secured on the shaft and provided with an outwardly projecting finger, a pawl carried by the lever and positioned to engage behind the finger when said lever is in operative position, a member carried by the lever and positioned to be struck by the cage as it travels upwardly past the landers for moving the lever and the control shaft in one direction, connections between said shaft and the landers for raising the latter when the shaft is moved in said direction and lowering the

landers when the shaft is rocked in the other direction, means actuated by the cage as it travels downwardly past the landers for disengaging said pawl from said finger and subsequently rocking the control shaft in lander lowering direction, a reset block on one of the tracks, and connections between said block and the lever for moving the block into position to be struck by a car when the lever is moved out of operative position by the cage, said connections acting to return the lever to operative position when the block is moved by the car into operative position.

10. In combination with a landing and tracks leading to and from the landing, a cage movable past the landing and provided with a car-receiving track section, a lander shaft rockably mounted below the landing, landers secured on said shaft, means for normally holding the shaft in operative position with the landers lowered and projecting into the path of travel of the cage, an operating arm secured at one end on the lander shaft and provided at its other end with a slot, a trip lever mounted below the arm and provided in its outer end with a slot, a downwardly acting trip finger at the inner end of the lever and projecting into the path of travel of the cage, a rockably mounted lander shaft, an operating lever loosely mounted at its outer end on the shaft, a contact member carried by the operating lever at the inner end thereof and projecting above and into the path of travel of said cage when said operating lever is in operative position, an outwardly projecting arm rigid with and depending from said operating lever, a link connecting said arm and the operating arm, a ratchet wheel secured on the control shaft, a pawl carried by the operating lever and positioned above and engaging with said wheel for turning the same with the lever when the inner end of said lever is raised by the cage, a trip rod passing loosely through the slots of the lander shaft arm and the trip lever and loosely connected at its upper end to the pawl, an abutment member secured on the rod above the trip lever, an abutment member secured on the rod below the lander shaft arm, said abutment member being so related and positioned that upward movement of the outer end of the trip lever will first raise the pawl out of engagement with the ratchet wheel and then raise the outer end of the lander shaft lever so as to return both shafts to operative positions, and car actuated means for returning the operating lever to operative position.

In testimony whereof I affix my signature.
JAMES A. NOLAN.