

No. 798,657.

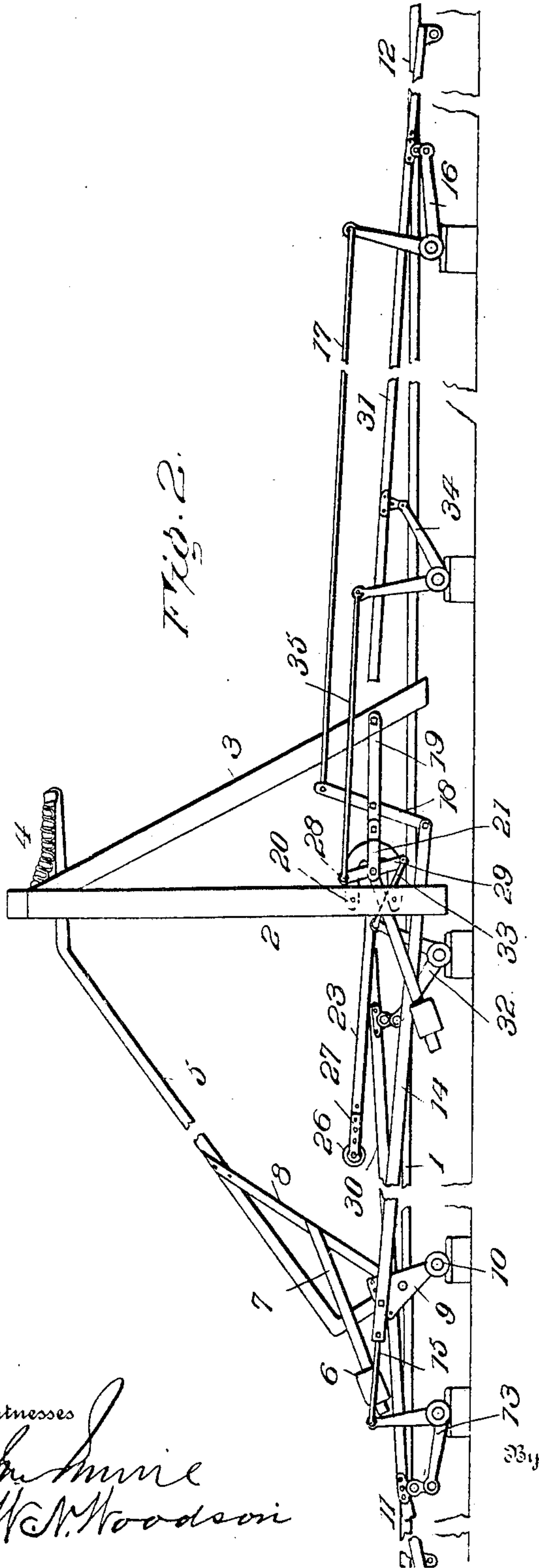
PATENTED SEPT. 5, 1905.

N. K. BOWMAN.

MINE GATE.

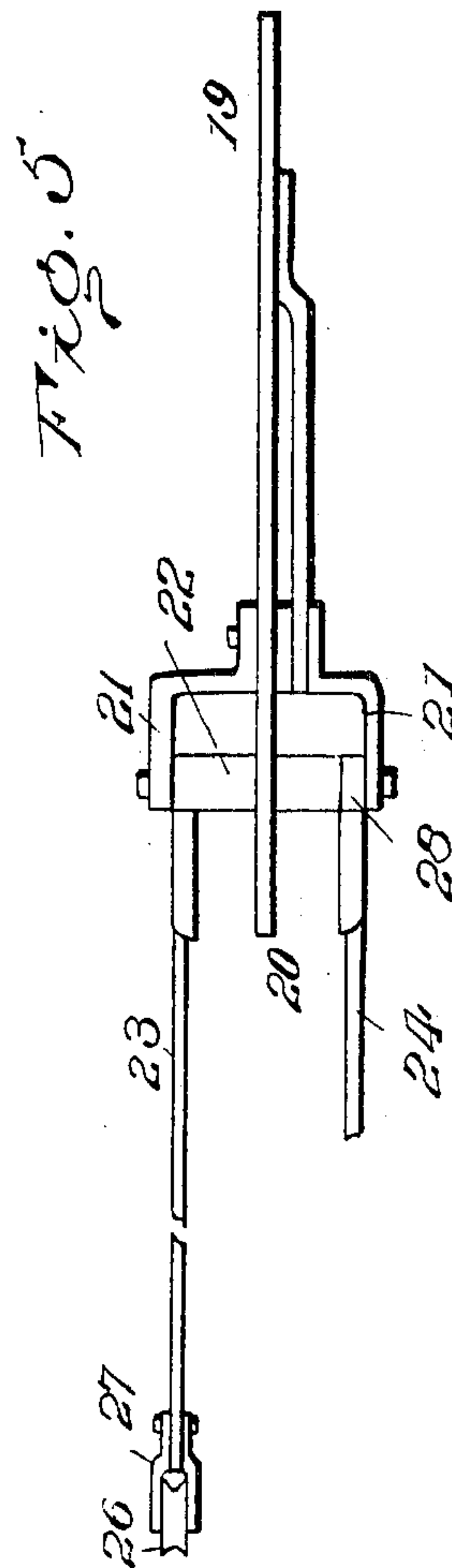
APPLICATION FILED DEC. 28, 1904.

3 SHEETS—SHEET 2.



Witnesses

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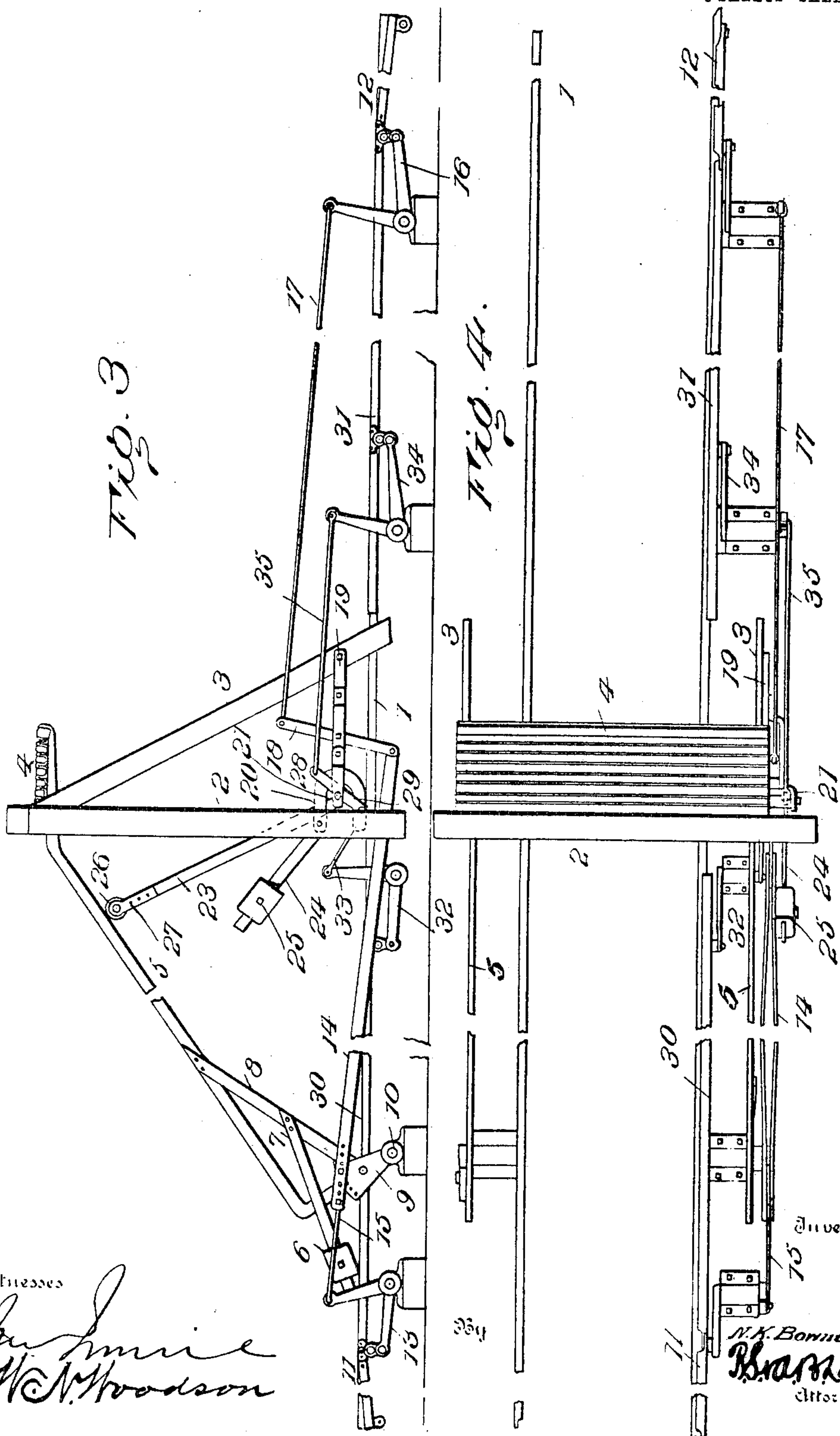
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UNITED STATES PATENT OFFICE.

NEWTON K. BOWMAN, OF NORTH LAWRENCE, OHIO.

MINE-GATE.

No. 798,657.

Specification of Letters Patent.

Patented Sept. 5, 1905.

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To all whom it may concern:

Be it known that I, NEWTON K. BOWMAN, a citizen of the United States, residing at North Lawrence, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Mine-Gates, of which the following is a specification.

It is the intent of this invention to provide novel actuating means for the gates or closures of mine entries, drifts, or passages automatically operated by the cars in their travel toward and from the shaft, the purpose being to insure positive and quick action of the gate and to reduce the wear and tear to the smallest amount possible, whereby early and frequent repairs are not rendered necessary. The means cooperating with the gate may be divided into two kinds, each adapted to be operated by the moving car and having a cooperative relation. The gate-actuating means effects an opening of the gate. The gate-staying means holds the gate open and relieves the actuating means of the load and prevents movement of the gate such as would always be occasioned by irregularities in the contact between the car and the gate-actuating means.

For a full description of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result reference is to be had to the following description and accompanying drawings.

While the invention may be adapted to different forms and conditions by changes in the structure and minor details without departing from the spirit or essential features thereof, still the preferred embodiment thereof is shown in the accompanying drawings, in which—

Figure 1 is a side elevation of a mine-gate embodying the invention, parts being broken away. Fig. 2 is a view similar to Fig. 1, showing the relation of the parts when the gate-actuating means have been operated to open the gate preliminary to operation of the gate-staying means. Fig. 3 is a view similar to Fig. 1, showing the relative arrangement of the parts when the gate-actuating and the gate-staying means have been operated. Fig. 4 is a top plan view of the gate and adjunctive parts illustrated in the preceding views. Fig. 5 is a plan view of the counterbalance gate-holder, parts being broken away. Fig. 6 is a detail perspective view of the counterbalance gate-holder, its support, and the le-

ver having its opposite ends connected to the gate-actuating bars.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The track upon which the mine-cars operate in the entry, passage, or drift is indicated at 1, and at a determinate point is erected a frame 2 and brace 3, constituting a support for the gate or closure provided for controlling the air-currents. The gate or closure 4 may be of any variety generally employed in mines, and, as shown, is of the flexible type and arranged to open upward in a series of folds, the upper end of the gate being attached to the cross-piece of the support or frame. Pivoted arms 5 are connected to the gate or closure 4, so as to effect positive movement thereof, particularly when opening the gate. These arms may be pivotally supported in any manner and attached to the gate in any way so as to insure positive movement thereof. The gate is counterbalanced to facilitate movement thereof, and for this purpose weights 6 have adjustable connection with rods or bars 7, extended from the pivoted arms 5. The arms 5 are stayed by braces 8, both being connected to plates 9, pivoted at 10.

The gate-actuating bars 11 and 12 are located upon opposite sides of the plane of the gate or closure and normally incline upward from the track and toward the gate, so as to be depressed by a car approaching the gate in either direction. A bell-crank lever 13 has one arm connected by a link to the free end of the actuating-bar 11 and its opposite arm connected to a rod or bar 14 by means of a link 15, said rod or bar 14 having adjustable connection with the plate 9 on the same side of the track with the gate-actuating bars 11 and 12. The bell-crank lever 13 receives movement from bar 11, and by having the rod or bar 14 adjustably connected with the plate 9 the movement of the pivoted arms 5 may be adjusted to suit the height of the entry or passage. A companion bell-crank 16 has one arm connected by means of a link to the free end of the gate-actuating bar 12 and its other arm connected by rod or bar 17 to the upper end of a lever 18, pivotally supported midway of its ends and having its lower end connected to the rod or bar 14. A depression of either one of the bars 11 or 12 will effect a movement of the pivoted arms 5 and an opening of the gate or closure.

The support for the lever 18 consists of a bar 19, attached at one end to the brace 3 and provided at its opposite end with a fork 20 and lateral brackets 21, the members of the fork 20 being attached to an upright of the frame 2 and the lateral brackets 21, pivotally supporting a sleeve 22, from which project lugs to which arms 23 and 24 are connected. The arm 24 has a weight 25 adjustable thereon, the same constituting the counterbalance for the arm 23 and the parts coöperating therewith. The arm 23 is the stay or holder for propping the gate when open and is provided at its outer end with a roller 26, having its mounting 27 adjustably connected with the arm 23 to admit of proper adjustment of the roller to insure firm connection with the gate when forming a brace or prop to hold the same open. Other arms 28 and 29 extend from the sleeve 22 in opposite directions and are adapted to be connected to the operating elements of the gate-staying means.

Actuating-bars 30 and 31 are located upon opposite sides of the gate and normally occupy a horizontal position and are pivoted or otherwise loosely connected at their outer ends to the adjacent ends of the respective gate-actuating bars 11 and 12. The inner end portion of the actuating-bar 30 is connected by means of a link to an arm of a bell-crank lever 32, the other arm of said lever being connected to the arm 29 by means of a rod or analogous device 33. The inner end portion of the actuating-bar 31 is loosely connected by a link or other means with an arm of a bell-crank lever 34, the other arm of said bell-crank being joined to the arm 28 by a rod 35 or other suitable connection. A depression of either one of the bars 30 or 31 causes operation of the gate-staying means for holding the gate open, as indicated most clearly in Fig. 3. When the bars 30 and 31 are relieved of direct pressure, the counterbalance 25 predominates and returns the gate stay or holder 23 and the actuating-bars 30 and 31 to a normal position.

A mine-gate embodying the invention has its parts arranged approximately as shown in Fig. 1 when the gate is closed, and no one of the several actuating-bars is operated on by the moving car. On the approach of a car from either direction one or the other of the bars 11 or 12 is depressed by contact of the wheels or other part of the car therewith. Movement is transmitted from the bar thus actuated to the remote bar through the lever 18 and intermediate connections, and at the same time the plate 9, connected to the bar 14, is turned, and the pivoted arms being set in motion effect an opening of the gate, as indicated most clearly in Fig. 2. The outer ends of the actuating-bars 30 and 31, loosely connected to the inner ends of the respective bars 11 and 12, are depressed without producing any corresponding movement of the

bell-cranks 32 and 34. As soon as the approaching car reaches a position to depress one or the other of the bars 30 or 31 the corresponding bell-crank 32 or 34 is operated and by reason of its connection to one of the arms of the sleeve 22 causes the latter to turn and the stay or holder 33 to be thrown upward, as indicated in Fig. 3, to sustain the weight of the gate and relieve the gate-actuating means of its load, at the same time preventing any vibratory movement of the gate, which would otherwise occur if no stay or holder were provided and irregularities existed in the engaging parts between the car and actuating-bars 30 and 31. As soon as the car passes the gate and clears the actuating-bar 30 or 31 at the remote side the stay or holder will be returned to a normal position by the counterbalance 25 and the inner ends of the bars 30 and 31 will move upward, but the gate will not close because of the load on the remote actuating-bar 11 or 12. When the car has cleared the gate and its actuating means, the gate will automatically close by gravity and the gate-actuating means will assume a normal position.

Having thus described the invention, what is claimed as new is—

1. In combination, a gate, gate-actuating means, a stay pivoted at one end and adapted to be thrown upward at its other end to form a prop for sustaining the weight of the gate, and actuating means for positively moving the stay upward and downward.

2. In combination, a gate, actuating means therefor, a stay adapted to be moved to a position for propping the gate when open, a counterbalance movable with said stay, and operating means for positively throwing the stay into operative position against its counterbalance, the latter when released automatically returning the stay and its operating means to a normal position.

3. In combination, a gate, actuating means therefor, a pivoted stay for propping the gate when open, means for swinging the stay into supporting position, and other means for returning the stay and its actuating means into normal position when relieved of the operating force.

4. In combination, a gate, an actuating-bar, means connecting said actuating-bar with the gate, a stay for holding the gate open, and an actuating-bar for the stay having loose connection with the actuating-bar of the gate for holding the latter depressed when the stay-actuating bar is operated on whereby the gate-actuating bar when acted on will not effect operation of the stay.

5. In combination, a gate, a gate-actuating bar, connecting means between said bar and gate, a stay for holding the gate open, an actuating-bar for said stay having loose connection with the gate-actuating bar, and connecting means between the stay-actuating bar

and the stay for operating the latter after the gate has been opened.

5 6. In combination, a gate, a pivoted arm therefor, a plate in connection with said pivoted arm, actuating-bars at opposite sides of the gate, a lever pivoted between its ends, bars connecting the end portions of said lever to the respective gate-actuating bars, and means adjustably connecting one of said bars to the aforesaid plate for adapting the gate and its movement to different sizes of openings to be closed.

15 7. In combination, a gate, actuating-bars arranged at opposite sides of the gate, a pivoted lever, connecting means between opposite end portions of the pivoted lever and said gate-actuating bars, connecting means between the gate and its actuating mechanism, a stay for holding the gate open, stay-actuating bars at opposite sides of the gate and connected with the respective gate-actuating bars, and connecting means between the stay-actuating bars and said stay for throwing the latter into operative position after the gate has
25 been opened.

8. In combination, a gate, pivoted actuating-bars at opposite sides of the gate, connect-

ing means between the gate and its actuating-bars, a stay, actuating-bars for the stay loosely connected to the respective gate-actuating bars, bell-crank levers having loose connection with the said actuating-bar, and connecting means between said bell-crank levers and the stay.

9. In combination, an upwardly-opening gate, pivoted arms therefor, actuating-bars arranged at opposite sides of the gate, bell-crank levers having connection with said actuating-bars and with the pivoted arms, a pivoted stay for holding the gate opened, stay-actuating bars having their outer ends loosely connected with the inner ends of the gate-actuating bars, bell-crank levers pivotally supporting the inner end portions of the said actuating-bars, and connecting means between the last-mentioned bell-crank levers and the stay.

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

NEWTON K. BOWMAN. [L. s.]

Witnesses:

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R. A. POLLOCK.