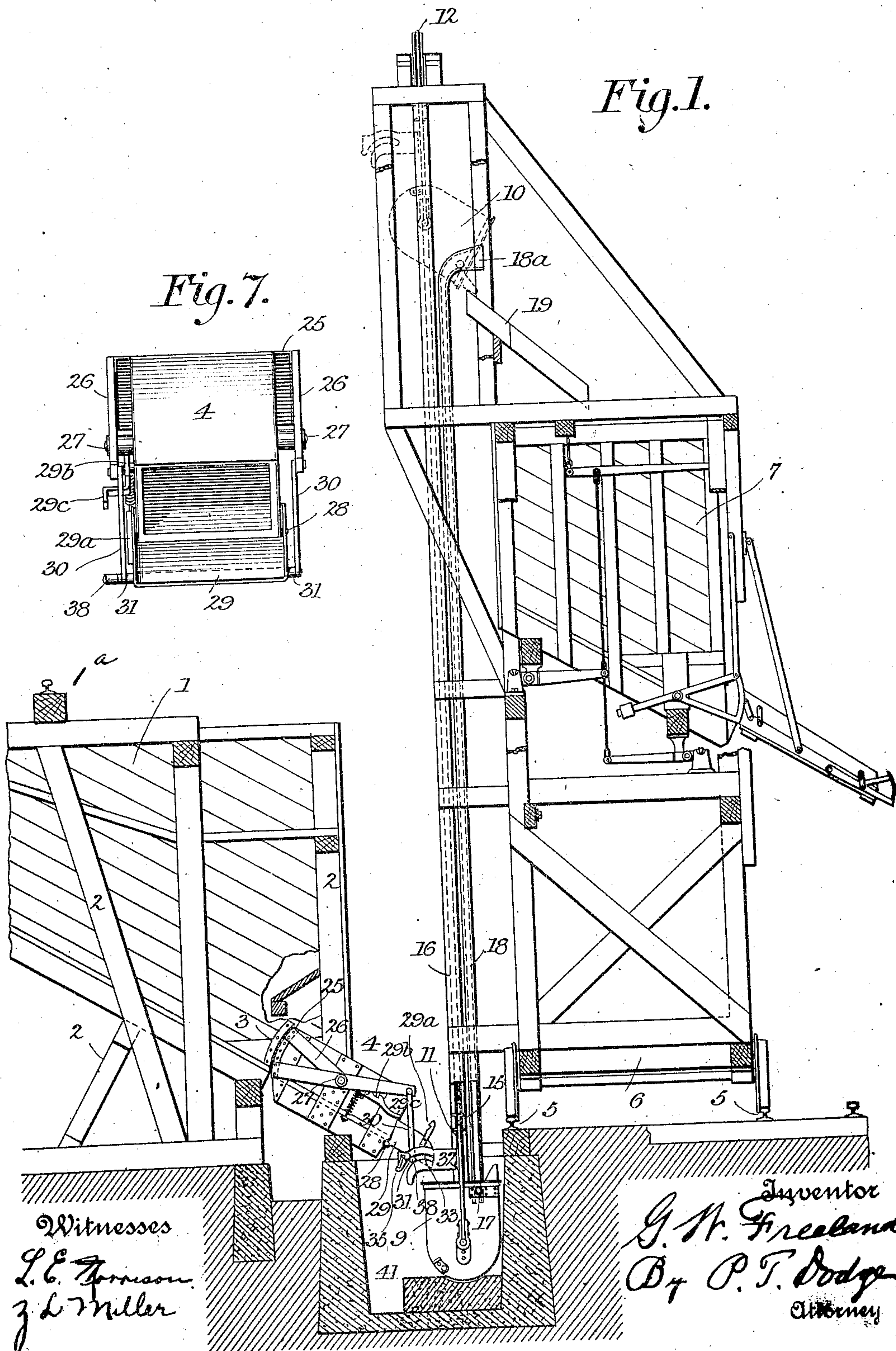


928,595.

G. W. FREELAND.
COAL HANDLING APPARATUS.
APPLICATION FILED JULY 11, 1908.

Patented July 20, 1909.
6 SHEETS—SHEET 1.



Witnesses
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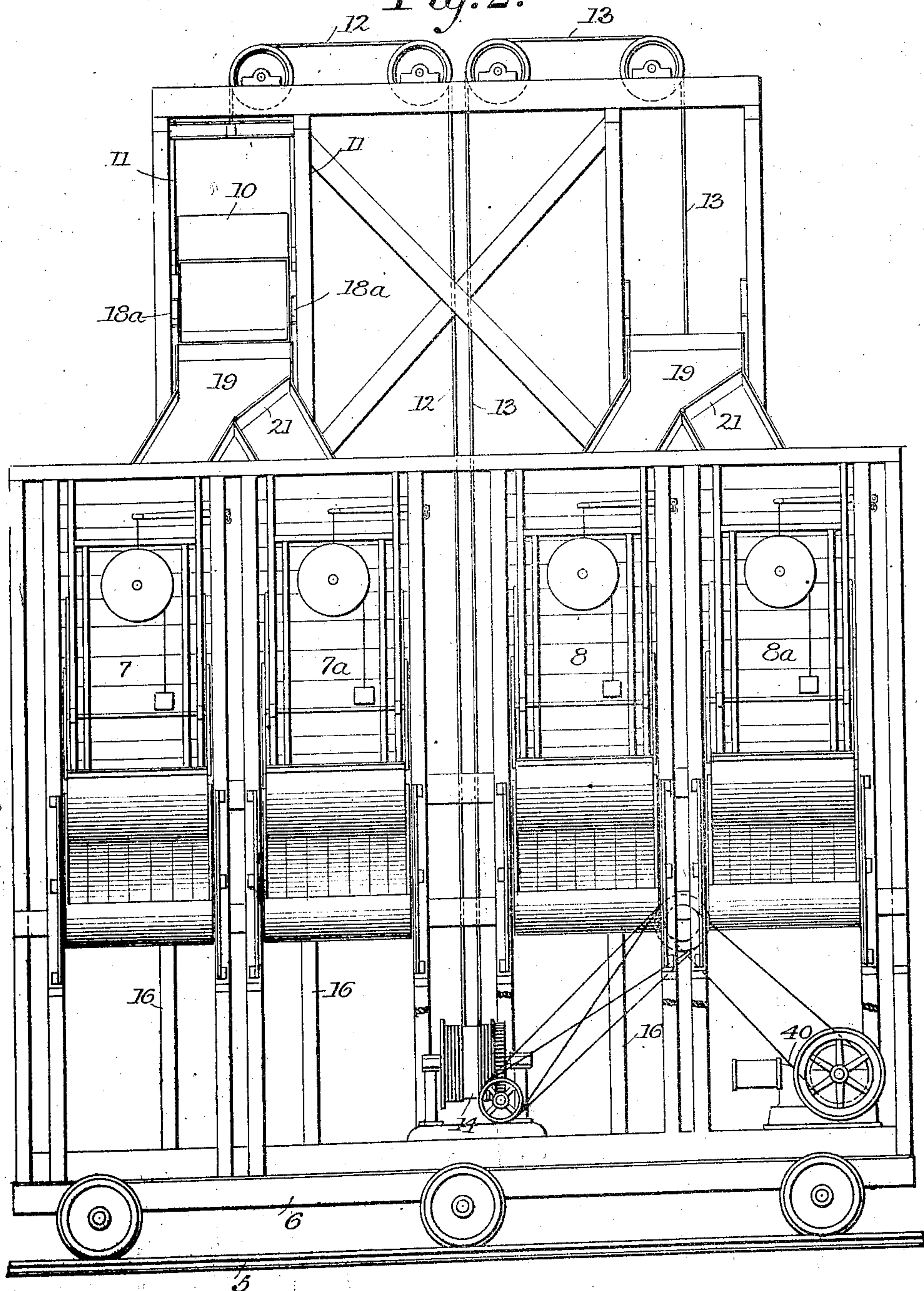
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5 SHEETS—SHEET 2

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Fig. 2.



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5 SHEETS—SHEET 3.

Fig. 4.

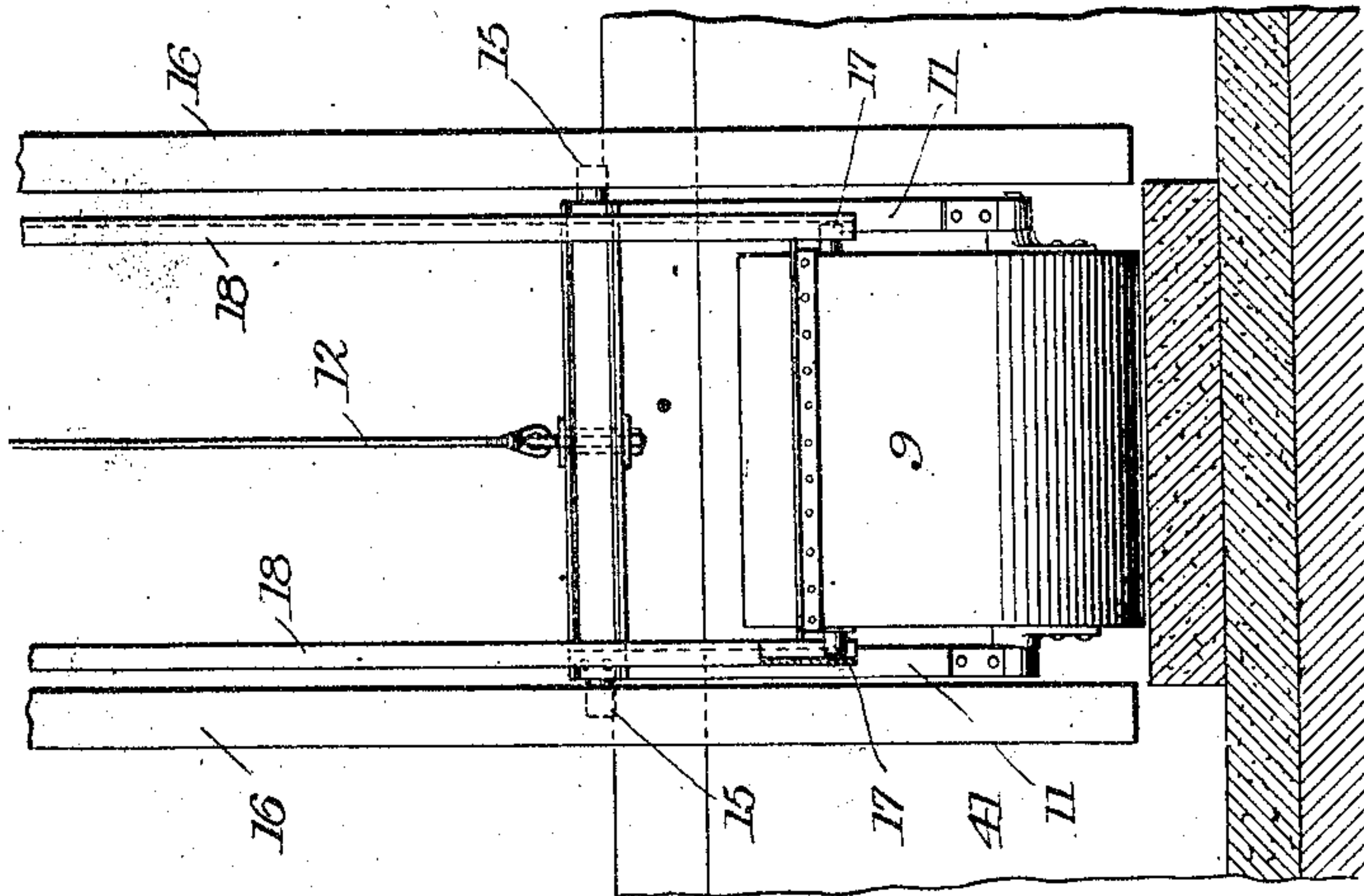
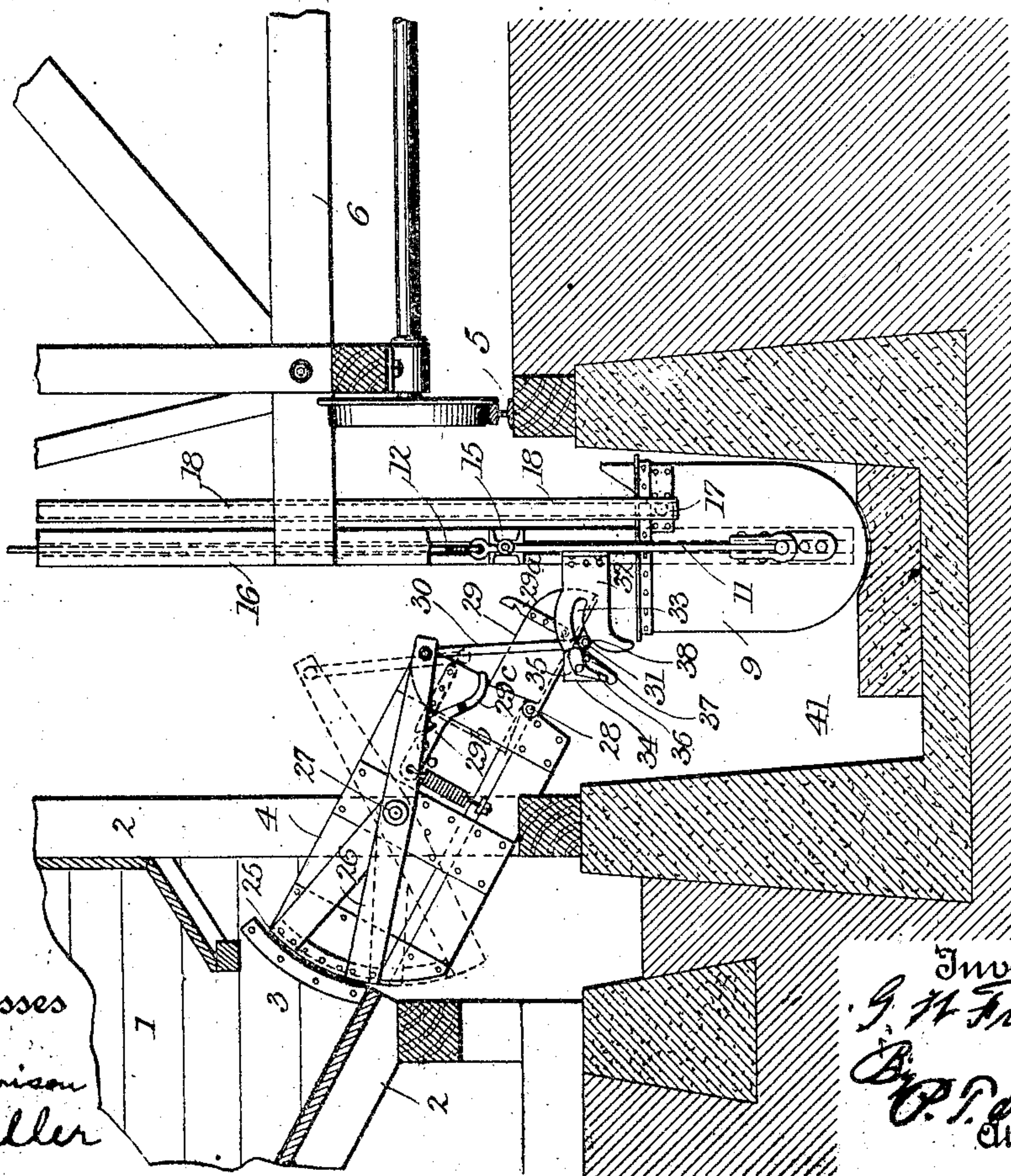


Fig. 3.



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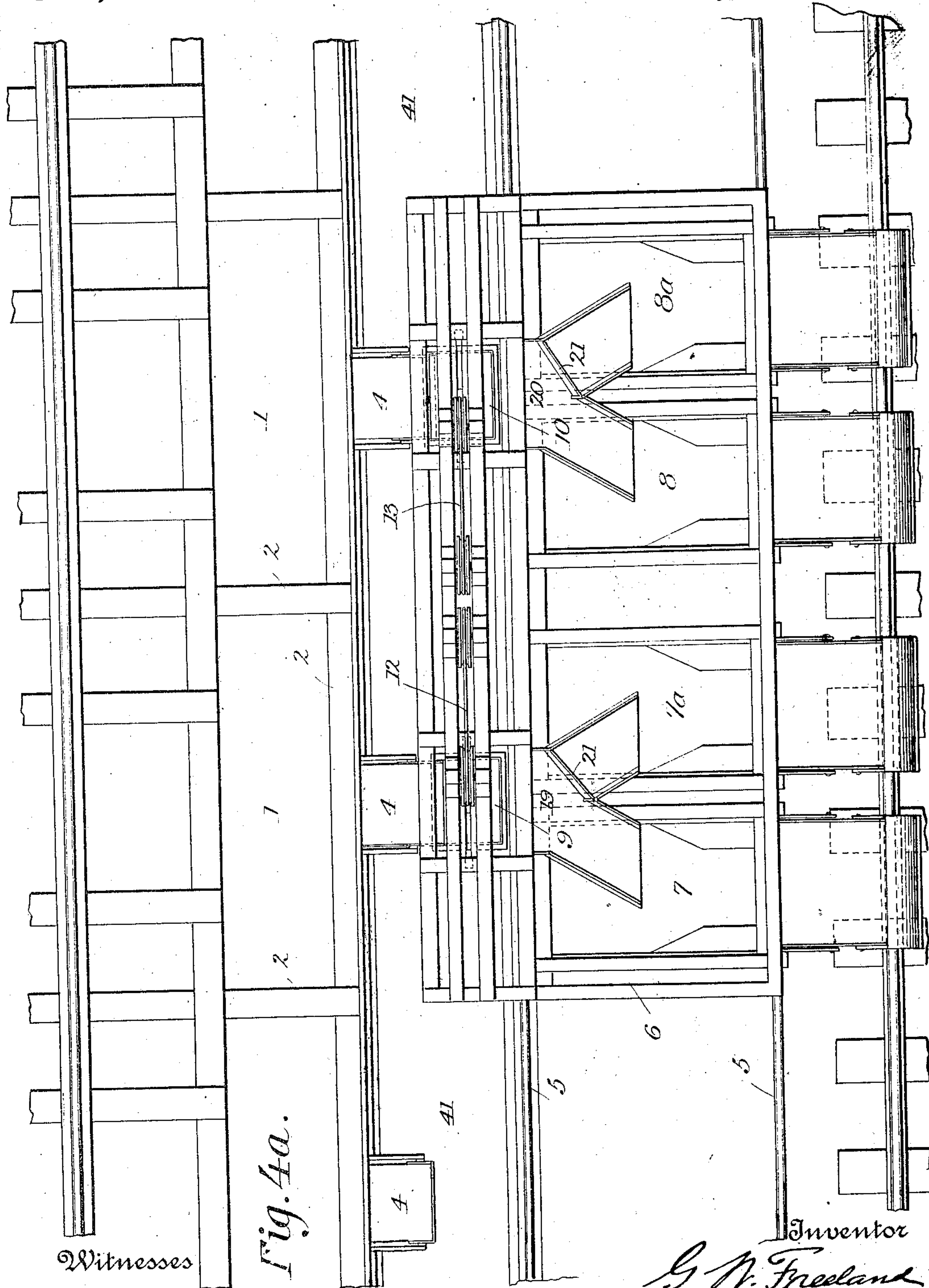


Fig. 4a.

Witnesses

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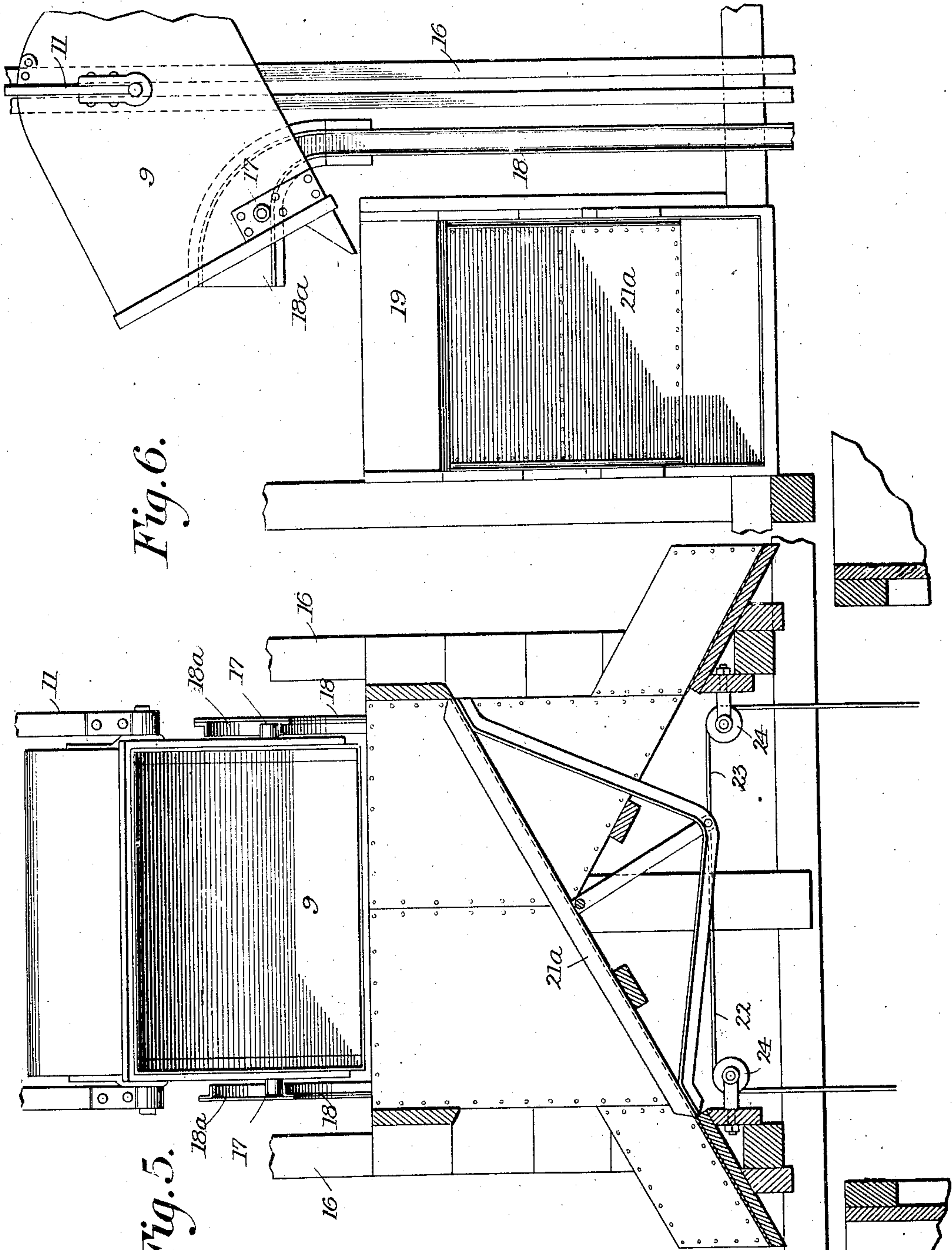


Fig. 6.

Fig. 5.

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UNITED STATES PATENT OFFICE.

GEORGE W. FREELAND, OF MOLINE, ILLINOIS, ASSIGNOR TO WILLIAMS, WHITE & COMPANY,
A CORPORATION OF ILLINOIS.

COAL-HANDLING APPARATUS.

No. 928,595.

Specification of Letters Patent.

Patented July 20, 1909.

Application filed July 11, 1908. Serial No. 443,108.

To all whom it may concern:

Be it known that I, GEORGE W. FREELAND, of Moline, county of Rock Island, and State of Illinois, have invented a new and useful Improvement in Coal-Handling Apparatus, of which the following is a specification.

In the handling of coal it is the practice in certain cases, to store the same in bins or pockets from which it may be delivered in known quantities for use, an example of which is in the manner of supplying locomotive tenders, the storage pockets being arranged at the side of the track and provided with weighing mechanisms and discharge gates, by means of which the engineer may fill the tender, and by means of the weighing mechanism determine the amount of coal withdrawn from the pocket. It is necessary, of course, that the pockets be refilled from time to time, the coal for this purpose being usually taken by suitable means from a large storage pile constantly maintained for this purpose.

It is the aim of my invention to facilitate and conduct in a methodical and speedy manner and without waste of material, the delivery of coal to the pockets or receiving bins from the main storage pile, and the invention consists primarily in combining with a main storage bin in which a large supply of coal may be stored and kept on hand, and provided with a series of discharge openings, an elevated receiving storage pocket or a plurality of them movable alongside the main bin, and an elevating mechanism adapted to receive the coal from any one of the discharge openings in the main bin and deliver the same into the receiving storage pockets.

The invention consists also in mounting the elevating mechanism on the movable receiving storage pockets so that it may by the movement of said pockets be adjusted in operative relation to the different discharge openings in the main bin, in order to take the coal from the main supply at different points.

The invention consists also in providing the discharge openings of the main bin with devices for controlling the flow of coal there-through, and means for the automatic action of these devices by the elevating mechanism.

The invention consists further in forming the discharge controlling devices of the main bin so that they will discharge at each ac-

tion, a predetermined and known quantity of coal, and providing the elevating mechanism with receptacles of a capacity each to hold a single discharge from the bin.

The invention consists also in the details of construction and combination of parts hereinafter described and claimed.

In the accompanying drawings:—Figure 1 is a transverse section through my improved apparatus, with parts in elevation, one of the elevating receptacles being shown as receiving a charge from the main storage bin, and the other being shown as dumping its charge into one of the receiving pockets. Fig. 2 is a front elevation of the movable receiving storage pockets. Fig. 3 is a transverse section on an enlarged scale, through one of the discharge mouths of the main storage bin and a portion of the framing carrying the storage pockets, showing in elevation one of the discharge controlling devices and one of the elevating receptacles, the latter in position to receive a charge of coal from the bin. Fig. 4 is a front elevation of one of the elevating receptacles or buckets. Fig. 4^a is a plan view in the nature of a diagram showing the entire apparatus and the relation of the movable storage pockets to the main storage bin, and the tracks on which the pockets are moved so as to take the coal from different parts of the bin. Fig. 5 is a front elevation partly in section, of a valve for controlling the flow of coal from the elevating receptacles into two adjacent receiving pockets, and the means by which said valve may be operated from below. Fig. 6 is a side elevation of the same. Fig. 7 is a detached view in front elevation of the discharge controlling device.

Referring to the drawings:—1 represents a main fixed storage bin built in a suitable framing 2 and formed with side walls and a bottom, the latter sloping forward and downward so as to direct the coal through a series of contracted discharge mouths 3, arranged at intervals along the front of the bin at its base, preferably at the ground level, each of which mouths is provided with a measuring device 4 adapted by its action, as will be more fully described hereinafter, to discharge by its successive operations a definite and known quantity of coal.

The bin may be of any capacity desired, the idea being that it shall accommodate a large supply of coal to constitute a main

storage supply, to be drawn on at intervals for distribution to its place of use, the coal being conveniently supplied to the bin by cars traveling on tracks 1^a supported on the framing above the bin. This bin may comprise a single storage chamber, or it may be divided at intervals by transverse partitions to adapt it for the storage of different kinds of coal, the provision of the several discharging devices arranged at intervals, being to enable the coal to be taken from different parts of the pile, so that in the event of the coal being exhausted at one point the supply at other points may be drawn on.

Arranged in front of the bin and extending throughout the length of the same is a track 5, on which is adapted to travel a truck or wheeled frame 6, carrying a number of receiving storage pockets, four in the present instance, 6, 7, 8 and 9, which pockets are sustained by a suitable framing at an elevation above the ground level, so that the coal stored therein may be discharged into cars, locomotive tenders, or other receptacles on the ground level at the side of the pockets. These storage pockets may be of any suitable form and construction which will adapt them to be carried on the supporting track, to receive and hold a quantity of coal and permit the same to be discharged therefrom for use, and I have represented a form of pocket equipped with a weighing mechanism and a discharging gate and chute, which constructions form the subject matter of two applications filed by me, one on the 23rd day of October, 1907, Serial No. 398,733, and the other on the 30th day of November, 1907, Serial No. 404,477, the said pockets being in the form of bins or receptacles open at their upper ends to receive their supply of coal.

The coal is supplied to the four pockets by means of an elevating mechanism in the form of two elevating receptacles or buckets 9 and 10, movable vertically at the back of the framing in front of the main bin, from a lower position where they receive their supply from the main bin, to an upper position where they dump their contents into the pockets, which buckets are so operated, as will be presently described, that while one is receiving its supply from the main bin, the other is discharging its contents into one of the pockets.

Each of the buckets is suspended by a bail 11 jointed to the sides of the bucket below the center of gravity, so that the bucket will dump automatically, the bails being connected with hoisting cables 12 and 13 passing over guiding pulleys sustained by the framing above the pockets, and then downward side by side to a winding drum 14 around which the cables are coiled in opposite directions, so that in the rotation of the drum one cable will be wound up and the other will unwind, thus causing one bucket to ascend

while the other is descending, as before mentioned. The bails are each provided on their opposite sides with studs 15 traveling in vertical guideways 16 on the framing, and the buckets are provided on opposite sides near the top with studs 17 traveling in vertical guideways 18, by which means the bucket is maintained in an upright position throughout its travel, except at the point where it dumps into the receiving pocket, at which point the guides 18 are deflected forwardly toward the pockets as shown at 18^a, Fig. 6, thus causing the bucket when it reaches this point to turn forwardly on its axis and discharge its contents.

The buckets discharge into the upper ends of two chutes 19 and 20, each of which is provided with two branch chutes leading to two adjacent pockets, each bucket being thus adapted to supply two pockets. A movable valve 21 is provided in each chute to deflect the flow of coal into one or the other, which valve may be either in the form shown in Fig. 2, consisting of a plate pivoted at the point where the branch chutes meet; or it may be in the form shown in Figs. 5 and 6, consisting of a plate 21^a pivoted midway between its ends at the point where the two branch chutes meet, and adapted to be shifted alternately to the right or left to direct the coal respectively to one or the other of the adjacent pockets. This plate is adapted to be operated by the attendant below, by means of two ropes 22 and 23, extending upwardly over guiding pulleys 24 and then inwardly and connected with an arm depending centrally from the plate. By pulling on one or the other of these ropes, the arm will be shifted and the valve plate correspondingly shifted on its axis, by which means the flow of coal from the bucket may be caused to enter either pocket as desired.

In their lower positions, as shown particularly in Figs. 1 and 3, the elevator buckets receive their charge of coal from the main bin through the medium of the measuring devices 4, before alluded to, with which the main bin is equipped at intervals, the capacity of a bucket being such as to just hold the quantity of coal discharged by the measuring devices at each operation, the buckets acting in their descent to effect automatically the operation of the measuring devices to charge the buckets in the manner now to be described.

As shown more particularly in Figs. 3 and 7, the measuring devices 4 are each in the form of a trough of rectangular form in cross-section, and fixed in position through an opening in the front of the bin to receive the coal flowing through the contracted mouth, the bottom of the trough forming in effect a sloping continuation of the sloping bottom of the bin. The upper end of the trough, where it communicates with the interior of the bin, is adapted

to be closed by a segmental gate 25 carried by the rear ends of two arms 26 pivoted between their ends, as at 27, to the sides of the trough and terminating at their forward ends at the lower or front end of the trough, the construction being such that by the rocking of these arms on their axis, the gate may be swung upwardly or downwardly to close or open the upper end of the trough. At its lower end the trough has pivoted to its bottom, as at 28, a combined door and chute 29, which when swung upwardly as shown by dotted lines, will close the lower end of the trough, and when swung downwardly as shown by full lines, will open the lower end of the trough and form in effect a sloping continuation of the bottom of the same, thus constituting a chute by which the coal will be directed into the elevator bucket. The door is locked in closed position by means of a keeper 29^a fixed to the side of the door and adapted, when the latter is closed, to interlock with a spring latch 29^b pivoted between its ends to the side of the trough and provided with a forwardly extending arm 29^c, for the purpose presently to be described.

The gate and door are adapted to operate in unison in such manner that when one is opened the other will be closed, their cooperation in this manner acting, when the gate is opened and the door closed, to fill the trough, and acting when the gate is closed and the door opened, to discharge the contents of the trough, the successive actions in this manner resulting in the successive discharge of a definite quantity of coal, the capacity of the trough. To effect this action of the parts in unison, the forward ends of the arms 26 have jointed to them the upper ends of links 30, the lower ends of which are pivoted as at 31 to the bottom of the door at its sides, so that when the door is swung down the arms 26 will be rocked and the gate will be swung upwardly, and when the door is swung upwardly to closed position, the arms rocking in the opposite direction will swing the gate downwardly to open position.

The automatic operation of the measuring devices by the elevator buckets to charge the latter, is effected by means of a projection 32 on each bucket in the form of a plate fixed to the bail 11 at one side and extending rearwardly toward the trough, which plate is formed with an open curved slot 33 forming a projecting finger 34, to the side of which is pivoted a dog 35 provided with an active end 36 free to move in one direction but held against movement in the opposite direction by a stop pin 37. The relation of these parts to the trough and its door, when the latter is in closed position, is such that just before the bucket reaches its lowest position, where it receives its charge, the active end 36 of the finger will engage the end of arm 29^c of the spring latch, and depressing the latch will re-

lease the keeper, thereby unlocking the door. Simultaneously the upper wall of the slot 33 engages a stud 38 on the side of the door, and as the bucket continues to descend, the door is positively swung downward to open position as shown in Fig. 3, the stud 38 as this motion continues, moving back in the slot in the plate. As this action takes place, arms 26 are rocked on their axes and act to swing the gate upwardly and close the communication of the trough with the interior of the bin, the result being that the contents of the trough are discharged into the bucket as the latter reaches its lowest receiving position. When the bucket begins to ascend, the lower wall of the slot in the plate acting on the stud 38, will swing the door upwardly and continuing in engagement with the stud will act to close the door and cause the interlocking of the keeper with the spring latch. Simultaneously with this action, the gate is swung downward to open position permitting the coal in the bin to again fill the trough. It is seen therefore that the buckets as they descend and ascend act to automatically operate the measuring devices, the descending movement serving to unlatch the door, open it and close the gate, and the ascending movement acting to close the door, latch it and open the gate.

Any suitable means may be employed for raising or lowering the elevator buckets, but I prefer to adopt for this purpose the winding drum and cables described, and to operate the drum by a motor carried by the truck, preferably a gas engine 40, as shown in Fig. 2, which by suitable gearing and belting may be connected up with the drum. The truck may by the same motor be propelled along its trackway by coupling up the motor in suitable manner with one set of wheels, and by the provision of the proper clutching means the attendant may control the motions of the truck and also the motions of the hoisting drum.

It will be understood, of course, that the hoisting buckets are spaced a distance apart corresponding to the distance between the discharge openings in the main bin, so that the two buckets may, by the movements of the truck, be each adjusted in operative relation to corresponding measuring devices at whatever point in the length of the main bin desired.

It is preferable in cases where the main bin discharges at the ground level, to provide a pit 41 to permit the elevator buckets to be lowered to the proper point to receive the charges from the measuring devices, which pit extends longitudinally in front of the main bin as shown in Figs. 1 and 3.

Having thus described my invention, what I claim is:—

1. In an apparatus of the type described, the combination with a main storage bin

provided with a series of discharge openings, of an elevated receiving bin movable along the discharge openings, and an elevating mechanism acting to receive the coal from the discharge openings and discharge the same into the receiving bin.

2. In an apparatus of the type described, the combination with a main storage bin provided at intervals with means for discharging the coal therefrom, of a receiving bin movable along the main bin, and an elevating mechanism carried by the movable receiving bin and adapted to receive the coal from the main bin at different points and discharge it into the receiving bin.

3. In an apparatus of the type described, the combination with a main bin provided at intervals with means for discharging the coal at or about the ground level, of a receiving bin elevated above the ground level and provided with means for discharging its contents into receptacles movable on the ground level, and an elevating mechanism acting between the main bin and the receiving bin to receive the coal from the former and discharge it into the latter.

4. In an apparatus of the type described, the combination with a main bin provided with a series of discharge openings, of a truck movable on ways along the discharge openings, a plurality of independent receiving bins mounted on the truck and elevated above the main bin, an elevating mechanism carried by the truck and receiving the coal from the main bin, and means for controlling the discharge of the coal into the different independent bins.

5. In an apparatus of the type described, the combination of a main storage bin, discharging mechanisms at intervals thereon, a receiving bin movable from one discharging mechanism to the next, a vertically movable elevating receptacle carried by the receiving bin and adapted when lowered to receive the coal from one of the discharging mechanisms of the main bin, and means for operating said receptacle to discharge its contents into the receiving bin.

6. In an apparatus of the type described, the combination with a main storage bin provided at intervals with discharge openings, of a plurality of receiving bins movable along said openings, and a plurality of vertically movable elevator receptacles carried by the receiving bins and spaced apart a distance corresponding to that between the discharge openings in the main bin; whereby by the movement of the receiving receptacles along the main bin, the elevating receptacles may be adjusted in operative relation to the discharge openings in the main bin at different points therein.

7. In an apparatus of the type described, the combination with a main storage bin provided at intervals with discharge openings, of

discharge controlling devices associated with said openings, a receiving bin movable along the main bin, and an elevating device carried by the receiving bin and adapted to automatically operate the discharge controlling devices of the main bin.

8. In an apparatus of the type described, the combination with a main storage bin provided at intervals with discharge controlling devices adapted to discharge at each action a predetermined and known quantity of coal, of a receiving bin movable from one discharging device to the next, and an elevating receptacle carried by the receiving bin of a capacity to hold only a single discharge from the discharging devices.

9. In an apparatus of the type described, the combination with a main storage bin provided at intervals with discharge openings, of a truck movable along said openings, a plurality of receiving bins carried by the truck, an elevating mechanism adapted to receive charges of the coal from the different openings and acting to elevate the same, a chute situated above the receiving pockets adapted to receive the coal from the elevating mechanism, and branch chutes extending from the main chute to the different receiving bins.

10. The combination with a storage bin provided at intervals with discharge openings, of a plurality of receiving bins movable along said openings, two elevator buckets carried by the receiving bins and movable vertically, said buckets being adapted to operate with two discharge openings in the main bin.

11. In combination with a storage bin provided with a discharge opening, and with a measuring device including a gate and a cooperating discharge-door, said gate and door adapted to be operated alternately so as to discharge a definite quantity of coal by their successive actions, a receiving bin, a vertically movable elevator bucket, and means carried by the bucket and acting on the descent of the same to open the door and close the gate; whereby the bucket will be charged with the contents of the measuring device, and acting on its ascent to close the door and open the gate, whereby the receiving portion of the measuring device will receive a second supply of coal.

12. In an apparatus of the type described, the combination with a main storage bin provided with a charge measuring device including a discharge-door and a locking latch therefor, of a receiving bin, a vertically movable elevating receptacle to receive the contents of the charge measuring device, and means movable with the receptacle and adapted on the descent of the same to operate the locking latch and release the discharge-door; whereby the contents of the measuring device will enter the receptacle.

13. In an apparatus of the type described, the combination with a main storage bin provided at intervals with charge measuring devices, of a truck movable on ways along said measuring devices, a plurality of receiving bins carried by the truck, and a plurality of vertically movable receptacles carried also by the truck and adapted to actuate the charge measuring devices; whereby the elevating receptacles will be automatically charged from the main bin.

14. In an apparatus of the type described, the combination with a storage bin provided at its front with a series of charge measuring devices at intervals, of a truck movable on ways in front of said bin, elevated receiving pockets carried by the truck, and vertically movable elevating buckets also carried by the truck and at the back of said bins and adapted to receive the coal from the charge measuring devices, and means for operating said elevating buckets to discharge the coal into the receiving pockets.

15. In an apparatus of the type described, the combination with a main storage bin provided with a plurality of controllable discharge openings, of a truck movable on ways along said openings, pairs of coal receiving pockets carried by the truck, a plurality of elevating receptacles carried also by the truck and adapted to be charged from the main bin, and means for directing the contents of each bucket into two adjacent receiving pockets.

16. In an apparatus of the type described, the combination with a main storage bin provided with a single-charge measuring device including a gate and a co-acting discharge-door, and a vertically movable elevating receptacle to receive a single discharge of the contents of the charge from the measuring device and operating to actuate the gate and door to open and close the charge measuring device alternately for discharge of its contents.

17. In an apparatus of the type described, the combination with a main storage bin provided with a single-charge measuring device including a stationary box, a movable gate and co-acting discharge-door, and a verti-

cally movable elevating receptacle to receive the single discharge of the contents of the charge from the measuring-device, and operating to actuate the gate and door to open and close the charge measuring device alternately for discharge of its contents.

18. In an apparatus of the type described, the combination with a main storage bin provided with a single-charge measuring device including a stationary box, a co-acting gate and a discharge-door, and a vertically traveling-receptacle to receive the single charge of the contents from the measuring-device and operating, during its downward travel, to actuate the gate and door to open said door and close the gate and, during upward travel of the receptacle, to close the door and open the gate.

19. In an apparatus of the type described, the combination with a main storage bin provided with a single-charge measuring device including a stationary box, a co-acting gate and a discharge-door, and a vertically traveling receptacle to receive the single charge of the contents from the measuring-device and operating, during its downward travel, to actuate the gate and door to open said door and close the gate and, during upward travel of the receptacle, to close the door and open the gate, and a receiving bin disposed in a plane above the storage bin.

20. In an apparatus of the type described, the combination with a main storage bin provided with a single-charge measuring device including a stationary box, a co-acting gate and a discharge-door pivoted on the stationary box, and a vertically traveling receptacle to receive the single charge of the contents from the measuring device and operating, during its downward travel, to actuate the gate and door to open said door and close the gate and, during upward travel of the receptacle, to close the door and open the gate.

In testimony whereof I hereunto set my hand this 25th day of June, 1908, in the presence of two attesting witnesses.

GEORGE W. FREELAND.

Witnesses:

G. H. LINDBURG,
C. F. HUNT.