

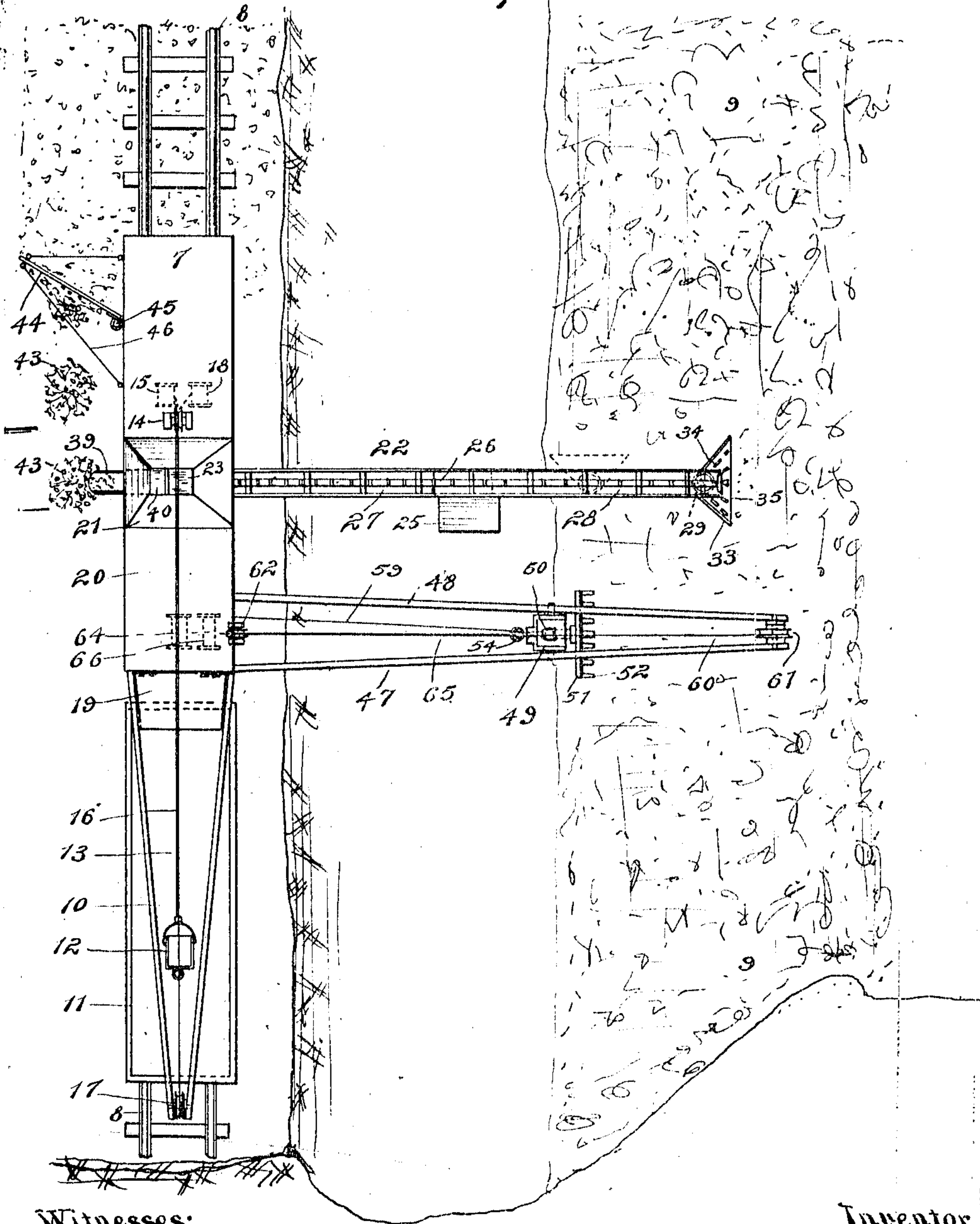
S. B. FLEMING.
MACHINE FOR BALLAST BURNING.
APPLICATION FILED AUG. 8, 1910.

993,590.

Patented May 30, 1911.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 2

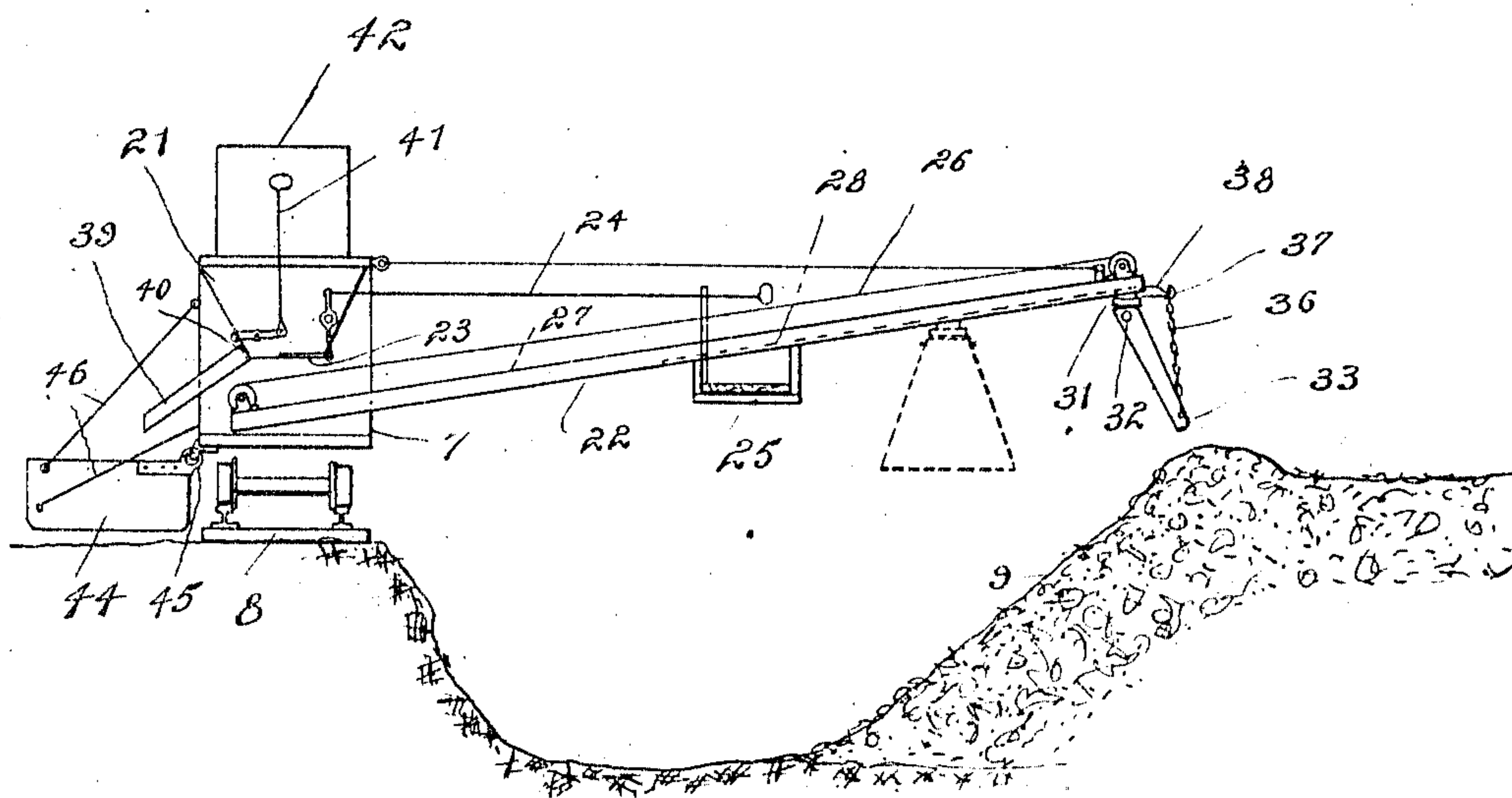
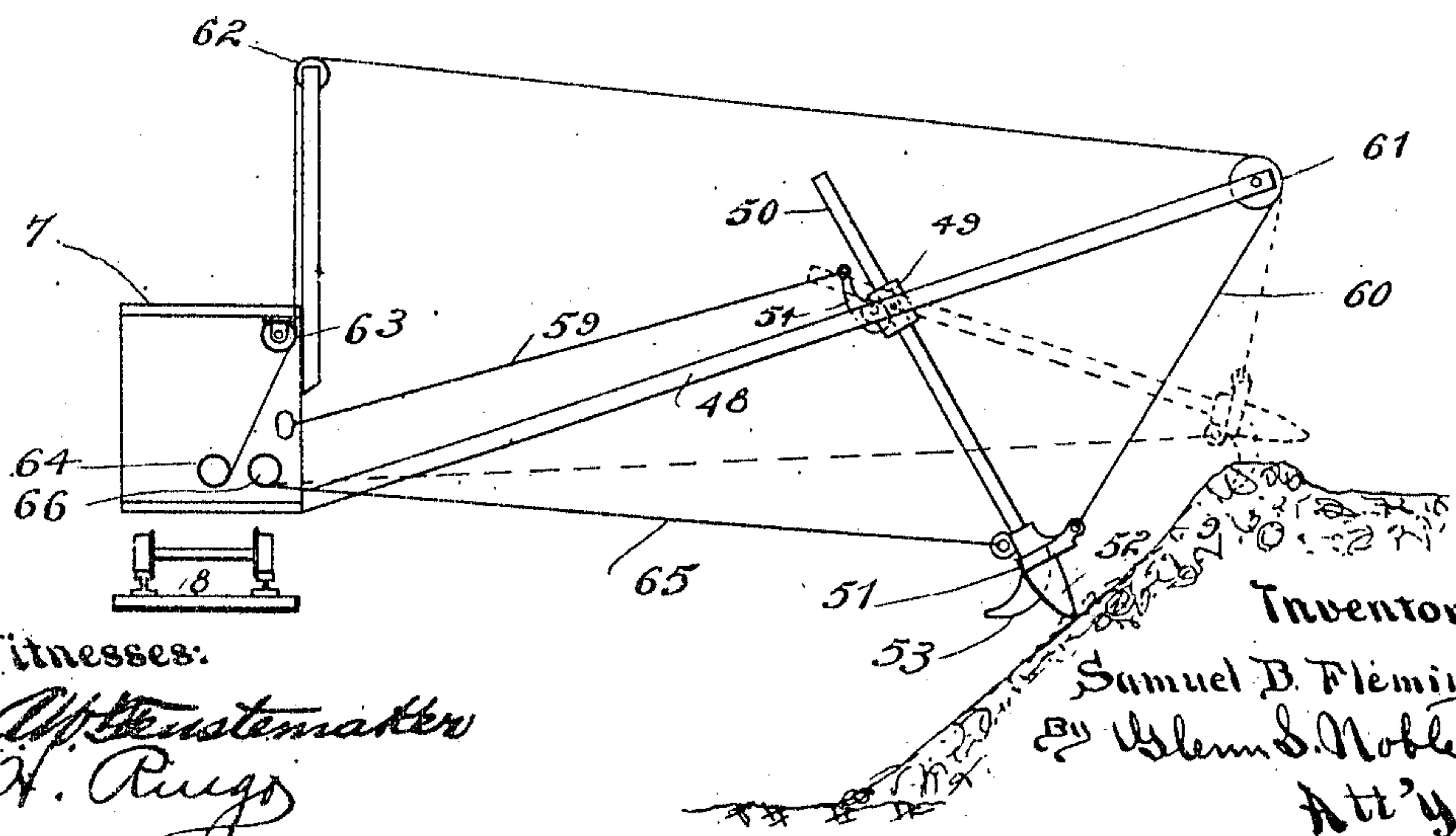


Fig. 3.



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3 SHEETS—SHEET 3.

Fig. 4.

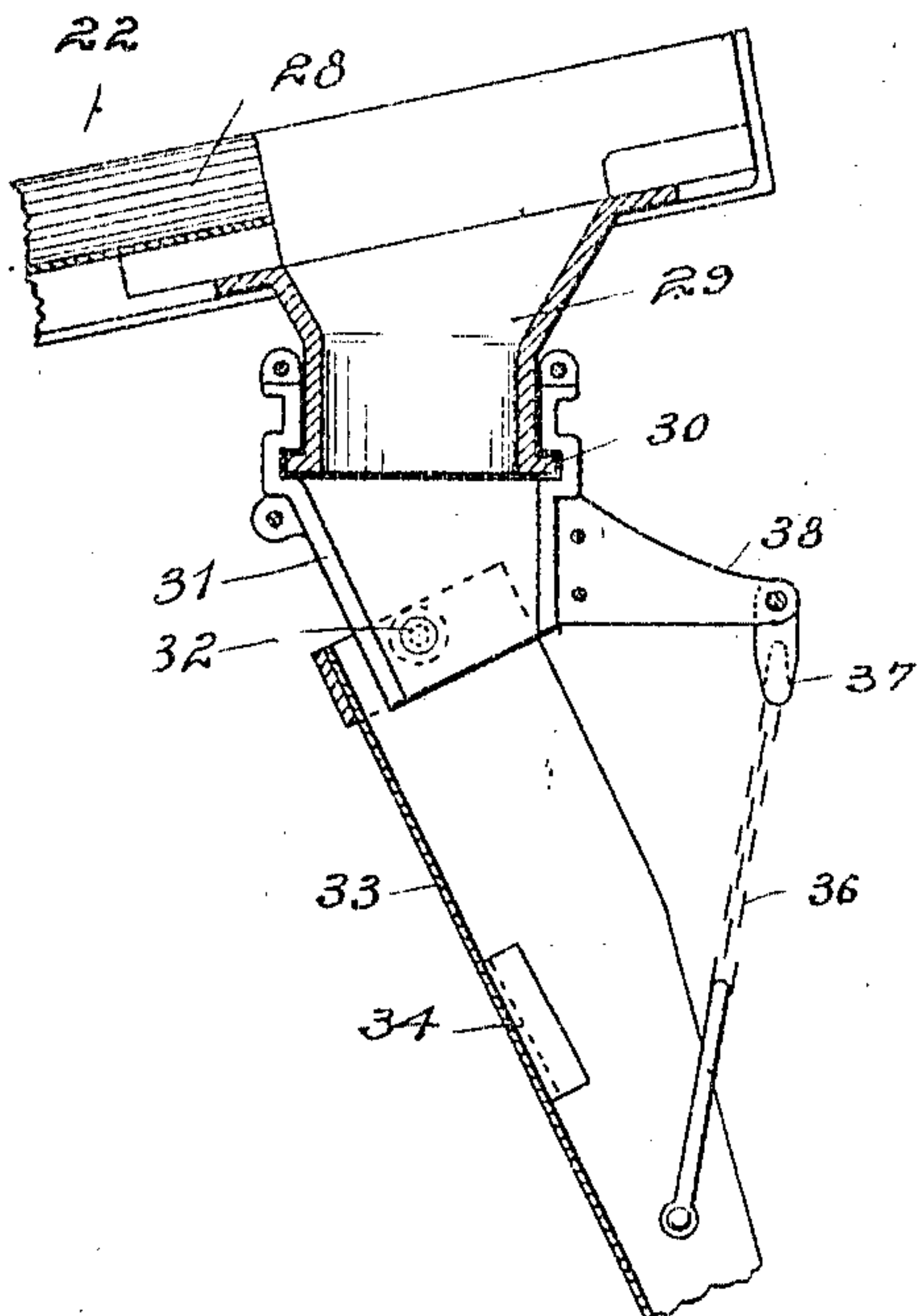


Fig. 5.

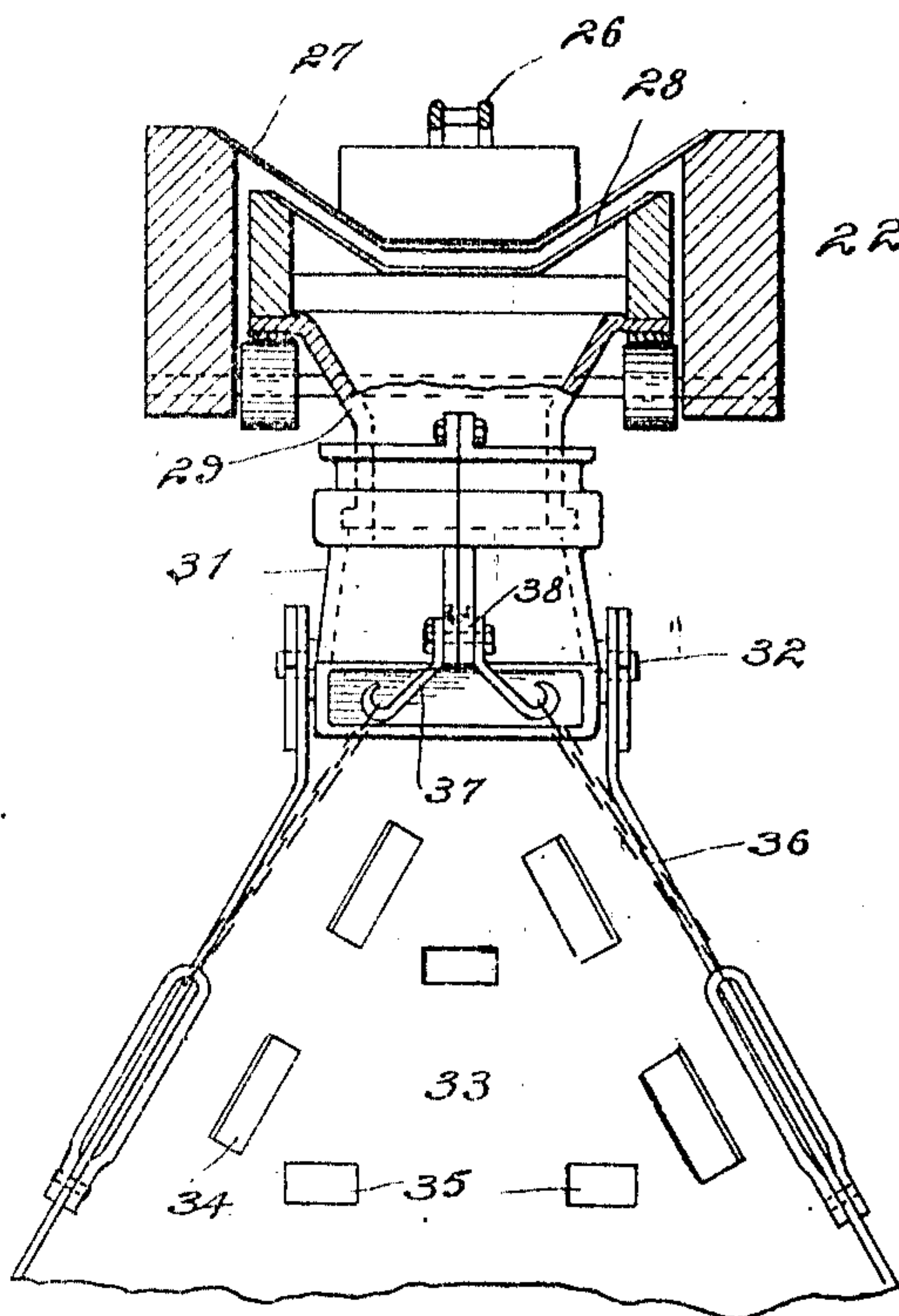
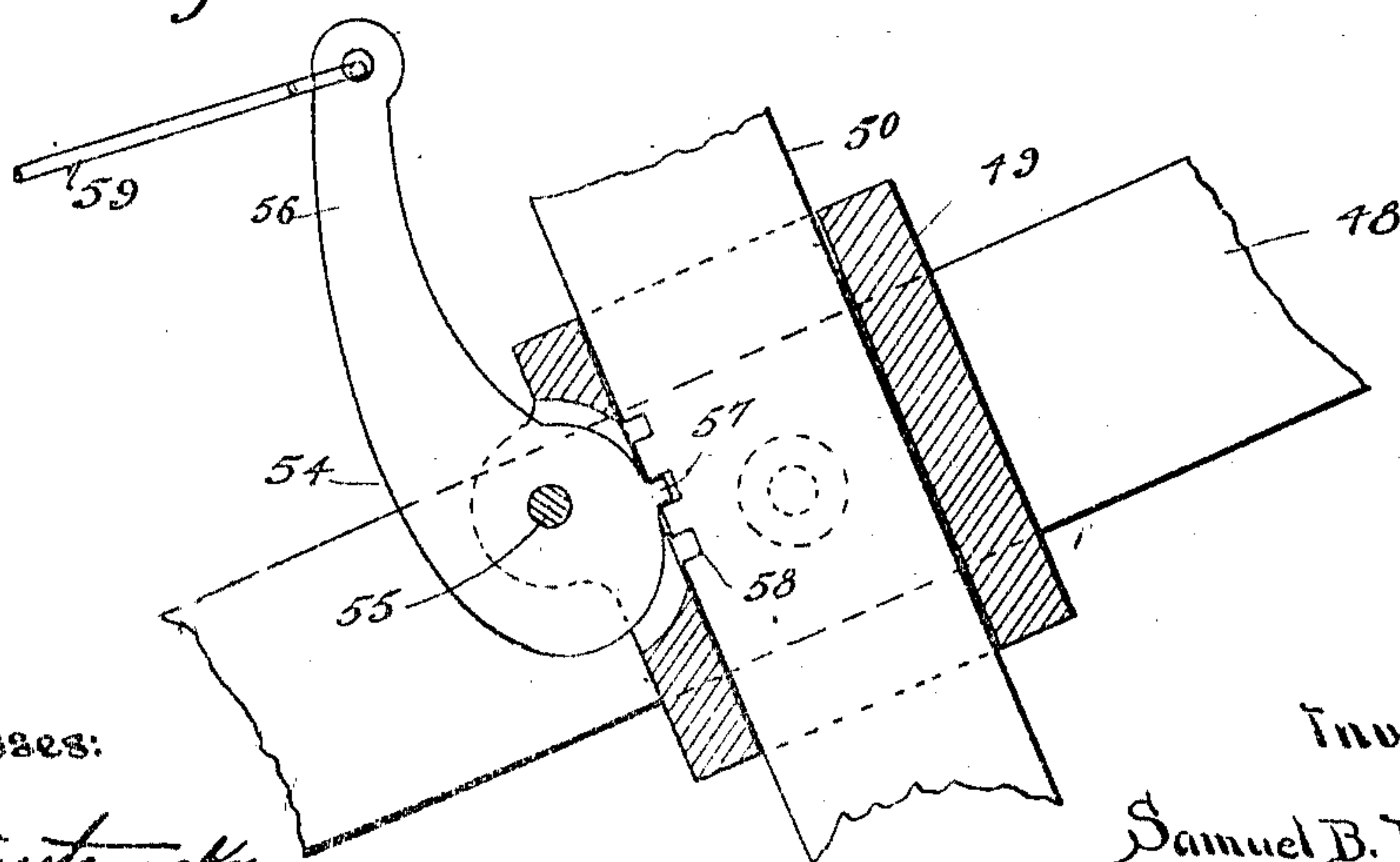


Fig. 6.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR BALLAST-BURNING.

993,590.

Specification of Letters Patent.

Patented May 30, 1911.

Application filed August 8, 1910. Serial No. 576,085.

To all whom it may concern:

Be it known that I, SAMUEL B. FLEMING, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Machines for Ballast-Burning, of which the following is a specification.

In accordance with the present well known methods of ballast burning, the clay or earth is placed upon the long bank of fire by means of a machine commonly known as a digging machine, which machine is provided with suitable shovels for digging the clay and discharging it upon the face of the fire bank. After the clay has been placed on the fire bank and has been burned for a certain length of time, it is desirable to break up and more or less disintegrate or separate the upper crust-like surface of the fire bank before placing another layer of coal thereon. Heretofore, it has been the ordinary practice to remove the shovels from the digging machine and replace the same with large heavy drags or rakes which are then used for breaking up and stirring or raking the upper surface of the fire bank. These machines are large ponderous affairs, built on flat cars or other suitable trucks, and in order to use the same effectively, a long strip of fire must be raked at one time before more coal or slack, as is commonly used, is placed thereon. The coal or slack, distributed by means of a coal handling machine which delivers the coal out over the fire, either to a shoveler's platform, from whence it may be shoveled by hand, or to a mechanical spreading device. In the usual manner in which the digging machine, which, as above pointed out, is also used for the dragging or raking process, and the coal handling machines are operated, it is practically impossible to place the coal on the fire immediately after the dragging or raking operation. Frequently, there are long delays between a dragging or raking operation and the spreading of the new layer of coal, which causes a large waste of coal and also tends to injure the quality of the ballast being burned.

One of the principal objects of the present invention is to provide means whereby the face or surface of the fire bank may be raked or dragged immediately ahead of the coal spreading device so that there will, at

no time, be any considerable amount of bank raked or dragged before the coal is placed thereon. In order to accomplish this object and such other objects as will be hereinafter pointed out, I have provided a combined raking or dragging and coal handling or spreading machine, which machine also embodies various other novel features and improvements which will be described hereinafter and which are shown in the accompanying drawings, in which—

Figure 1 is a top plan view of my improved machine, parts being shown diagrammatically on account of the difficulty of showing a machine of such large size on a greatly reduced scale; Fig. 2 is a diagrammatical end view illustrating the coal spreading portion of the machine; Fig. 3 is a diagrammatical end view illustrating the raking or dragging portion of the machine; Figs. 4 and 5 are details of the coal spreading or distributing devices; and Fig. 6 is a detail of the rake or fork arm support.

As shown in these drawings, 7 indicates a railway car or movable support, which may be of any ordinary or preferred form of construction but which is preferably made sufficiently large and strong to be lasting and durable under the conditions of use to which it is subjected. This car moves on a track 8 along the edge of the bank from which the clay is dug to be placed on the face of the fire bank 9. This car may be provided with self-propelling mechanism or may be moved along the track by means of a locomotive, either method being well known at the present time, in so far as the movement of such cars or machines are concerned. At the forward end of the car 7 is a boom 10 of sufficient length to extend out over the coal supply car 11, which supply cars are brought up full of coal or slack and then removed after being emptied. The coal is unloaded from the car 11 by means of a shovel 12 which is operated by means of a drag cable 13 which passes up over a suitable sheave in the mast 14 and down to one of the drums 15 of a hoisting engine, and a tail or return cable 16 which passes from the rear end of the bucket, around a sheave 17 at the outer end of the boom 10, and thence over a suitable sheave on the mast 14 and down to the winding drum 18 of the same hoisting engine. This bucket carries the coal from the car 11 up and over an

apron 19 between such car and the car 7, and thence along a suitable platform or guideway 20, and dumps the same into a hopper 21. A conveyer 22 extends out at the side of the car and is adapted to receive the coal from the hopper and carry it out over the fire. The discharge of the coal from the hopper may be regulated by any suitable mechanism, such for instance as a gate or slide 23 which may be operated by means of a rod 24 which extends out to an operator's platform 25 about midway of the conveyer 22. The conveyer 22 is provided with a trough, along which the coal is moved by means of a chain 26 provided with suitable flights in the well known manner. This trough is made in two sections 27 and 28. The section 27, which extends out from the car to about the center of the conveyer, is stationary; while the section 28 is movable longitudinally of the conveyer frame, as best shown in detail in Fig. 5, the object of this being so that the coal may be discharged at varying distances from the outer end of the conveyer, or, in other words, so that the coal may be spread along the face of the fire bank. The particular spreading mechanism shown herein forms one of the novel features of this invention, and will now be described.

At the outer end of the trough 28 is a circular discharge spout 29 having an outwardly extending flange 30 at the lower end thereof. Fitting over the spout 29 so as to be rotatable thereon is an auxiliary spout or discharge member 31, which member is provided with an internal groove fitting over the flange 30, and is preferably made in halves so that it may be bolted in its operative position. The mouth of the discharge opening of the spout 31 is widened as indicated in Fig. 5 so as to direct the coal onto the spreader proper in a comparatively wide stream. Pivoted at 32 to the lower end of the spout 31 is the spreader proper 33, which spreader consists of a plate having diverging sides and which is provided with a number of deflectors 34 for deflecting the coal so that it will be spread out to discharge along the entire lower edge of the plate. If desired, the discharge plate may also be provided with perforations 35 so as to allow some of the coal to fall therethrough. This spreader is adjustably held in position by its pivotal connection with the spout and by means of chains or other suitable connecting devices 36 extending from the sides of the spreader to hooks 37 on a support 38 extending outwardly from the spout 31. It will be readily seen that by means of this construction the spreader 33 may be revolved so that it will extend at any desired angle from the end of the movable portion of the conveyer trough.

Any suitable means may be provided for reciprocating the movable portion 28 of the

conveyer trough, such means, however, being omitted, as the particular form thereof is not included in the present invention. In the ordinary coaling process, the coal is spread up and down along the face of the fire bank, which, with my improved spreading device, is readily accomplished by setting the spreader with its discharge end standing substantially at right angles to the plane of the conveyer, as indicated in full lines in Figs. 1 and 2, and then, as the coal is being delivered, move it back and forth along the outer end of the conveyer by reciprocating the movable portion of the trough. At times, however, it is also desirable to spread a thin layer of coal along the fire, for instance, near the bottom or heel of the bank. This can be readily done by turning the spreader so that its discharge end stands substantially parallel with the conveyer, and then, as the coal is being discharged, moving the entire machine along the track. It will be readily seen that by means of this novel form of spreader or discharge device, the coal may be distributed evenly and rapidly over the face of the fire, either by means of a crosswise movement or by means of a longitudinal movement.

The clay for ballast burning is usually or frequently found in comparatively low, swampy places, and is frequently so wet as to make it difficult to maintain the operating track 8 in proper position, as the weight of the machines tends to press the ties down into the clay. This track has to be frequently shifted as the earth is dug away adjacent thereto, and therefore it is desirable to have something in the nature of ballast on the surface to support such track. I have found that by spreading a certain amount of the coal or slack, which is used for burning the ballast, over the surface of the ground, this provides, as it were, a support or ballast for the operating track. The coal thus used is not wasted, as it will eventually be spread upon the fire by the digging machine when the earth is excavated. In order to place this slack or coal on the ground in an economical manner, I provide a discharge trough 39, which is adapted to receive coal from the hopper 21 and discharge it at the side of the machine, opposite to the conveyer 22. The discharge of coal to this trough may be regulated in any desired manner, as by means of a gate or slide which may be controlled by means of a rod 41 extending up into the cab or house indicated at 42, which is provided for one of the operators of the machine. As the machine moves forward intermittently in its ordinary operation, the coal from the trough 39 will be discharged into piles 43, as indicated in Fig. 1. In order to spread the coal in these piles evenly over the ground, I provide a scraper 44 which is

preferably hinged at 45 to the car 7 so that it may be swung up out of operative position, this scraper being held in operative position by means of suitable rods or braces 46. It will be readily seen that, as the car 7 moves forward, the coal which has been discharged along the side of the track will be spread evenly over the ground, at some distance from the track, by means of the scraper or spreader 44 and will then serve as ballast and also to even up the surface of the ground so that the track 8 may be readily shifted.

The ballast fires are usually of considerable length, frequently being one-half mile long or over, and the switch tracks for storing a number of cars for supply coal are usually located adjacent to one end of the fire, so that when one of the cars has been emptied, the emptied car may be removed and a loaded car brought into unloading position in front of the machine. As it is necessary to bring up a number of these cars during a day's operation, frequently as many as five or more, it is impracticable to operate the digging machines anywhere except at the rear of the coal handling machine, and, therefore, when the digging machine is also used for operating the dragging or raking devices, it will be noted that it is impossible to successively drag the fires, place on the coal, and then cover with clay, as should be done in order to secure the best results. In order to accomplish these results, I arrange a harrow or drag apparatus 47 on the car 7, preferably in advance of the coal spreading apparatus but in some instances it might be in the rear thereof, or one at each end of the car. In order to accomplish this, it will be noted that the hopper 21 must be placed at some distance from the front end of the car so that sufficient space will be left for the harrowing or dragging apparatus and its operating mechanism.

While different forms of harrowing or dragging mechanism may be used for the purpose indicated, so long as it is arranged in front of the conveyer, which arrangement forms one of the desirable features of my invention, I have illustrated a novel form of dragging or raking apparatus, best shown in Figs. 1, 3 and 6. At the side of the car 7 is a boom 48 to which is pivotally secured a block 49 arranged to swing in a vertical plane in alinement with the boom. A rod or beam 50 is adapted to pass freely up and down within the block 49 and carries, at its lower end, a fork or rake 51 which is preferably provided with one set of substantially straight teeth 52 and another set of curved teeth 53. While the boom 50 is normally free to move longitudinally through the block 49, yet, in some instances, it may be desirable to hold the beam from so mov-

ing, and suitable means may be provided for this purpose, for instance, a locking member 54 is pivoted at 55 in the side of the block 49, with its lower end eccentrically arranged or made in the form of a cam, so that when the upwardly extending arm 56 is moved, the lower end of the locking member will press against the beam 50 and bind it closely within the block 49. The engaging face of the locking member 54 may be made substantially smooth, or may be provided with one or more teeth 57 which are adapted to engage with recesses 58 in the side of the beam 50 so as to hold the beam rigidly against longitudinal movement. The locking member 54 is operated by means of a rod or other suitable connection 59, which rod preferably extends to a position in the car adjacent to the operator. The fork or rake 51 is operated by means of cables, one of which, 60, passes around a sheave 61 in the outer end of the boom 48 and then back over suitable guide pulleys, for instance, as indicated at 62 and 63, to a winding drum 64 on the car 7; the other cable 65 engages with the back of the fork or rake and passes directly back to a winding drum 66 adjacent to the drum 64, such drums ordinarily constituting the winding drums of a hoisting engine. In breaking up the face 9 of the fire bank, I have found that it is desirable, not only to rake the face by a longitudinal or raking movement of the dragging apparatus, but to also jab or thrust the fork into the face by successive thrusting movements of the rake or fork. In operation, this apparatus may be used to secure such jabbing movement or thrusting action by properly manipulating the operating cables, as, for instance, by pulling on both cables and then simultaneously releasing them, which will cause a longitudinal movement of the fork beam in its guide block 49, or by holding one of the cables steady and repeatedly tightening and loosening the other cable. Then, after the face has been sufficiently broken up, the fork may be adjusted in the block 49 at any desired position and then held against longitudinal movement by means of the locking device 54. Then, by operating the cables, the fork may be swung across the face of the bank, thereby thoroughly raking or dragging the same. The curved teeth 53 serve for the purpose of dragging the top of the fire bank over onto the face, as indicated by dotted lines in Fig. 3.

By means of my improved apparatus, it will be observed that the fire bank may first be raked or dragged, and then, as the machine moves forward, the fire may be immediately supplied with more coal, the apparatus serving to quickly and readily unload the coal from the coal car into the hopper and thence distribute the same onto the

fire. The track being clear at the rear of the machine, the digging machine may follow as closely as desired and the clay placed upon the fire as soon as deemed expedient, after the coal is spread. The work is thus carried on in an orderly and systematic manner, and the fire is not left uncovered for any considerable period of time.

Having thus described my invention, which I do not wish to limit to any of the details of construction, except as provided in the appended claims, what I claim and desire to secure by Letters Patent is:

1. In a machine for ballast burning, the combination of a car or movable support, an unloading apparatus at the front of said car for unloading coal from a coal car and delivering it to said car, a conveying apparatus for conveying the coal from said car to a point over the fire bank, and a dragging or raking apparatus on said car, arranged in front of said coal conveyer.

2. In an apparatus for ballast burning, the combination of a car, a hopper on said car, means for unloading coal from a coal car placed in front of said car and delivering it to said hopper, a lateral conveyer for conveying the coal from said hopper to be distributed onto the fire, and a raking or dragging apparatus on said car for dragging the face of the fire bank.

3. In an apparatus of the character set forth, the combination of a car, a hopper arranged adjacent to the middle of said car, means for transferring coal from a coal car placed in front of said car to said hopper, a conveyer extending out at the side of said car for conveying the coal from said hopper, a spreader at the end of said conveyer, a boom extending outwardly from the side of said car, in front of said conveyer, a drag or the like, cables engaging with said drag, one of said cables extending out and around a sheave at the end of said boom, and the other cable extending back to the car, and winding drums on said car for operating said cables.

4. In a machine of the character set forth, the combination of a car or movable support,

a dragging or raking apparatus extending laterally from one side of the car at the forward end thereof, means for operating said apparatus, said means including an engine arranged in the front end of the car, a hopper arranged at a suitable distance behind said raking apparatus, means for unloading a coal car placed in front of said car and directing the coal over said engine and back to the hopper, and a coal conveyer extending out from beneath said hopper to carry the coal therefrom and distribute it onto the fire.

5. In a machine for use in ballast burning, the combination of a car, a forwardly projecting boom on said car, adapted to extend out over a coal car, a hopper on said first-named car, a shovel for unloading the coal, means associated with said shovel and said boom for moving the shovel back and forth to carry the coal from said coal car to said hopper, a laterally extending boom at the front end of said first-named car, a block pivoted in said boom, a dragging or raking device having a beam or bar extending through said block, an operating cable extending from said dragging or raking device, a winding drum on said car for operating said cable, a second cable connected with said device and passing out over a sheave at the end of said boom and thence back over guide sheaves to the car, a second winding drum on said car for operating said second cable, means for holding said bar or beam in adjusted position in said block, and a conveyer at the rear of said raking or dragging device for conveying the coal from the hopper out to a point over the fire.

6. In a machine of the character set forth, the combination with a conveyer, of a horizontally rotatable discharge spout, and a spreading device, said device having diverging sides and upwardly projecting deflectors and also having perforations therein.

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