G. R. BENNETT.

LOADING MACHINE.

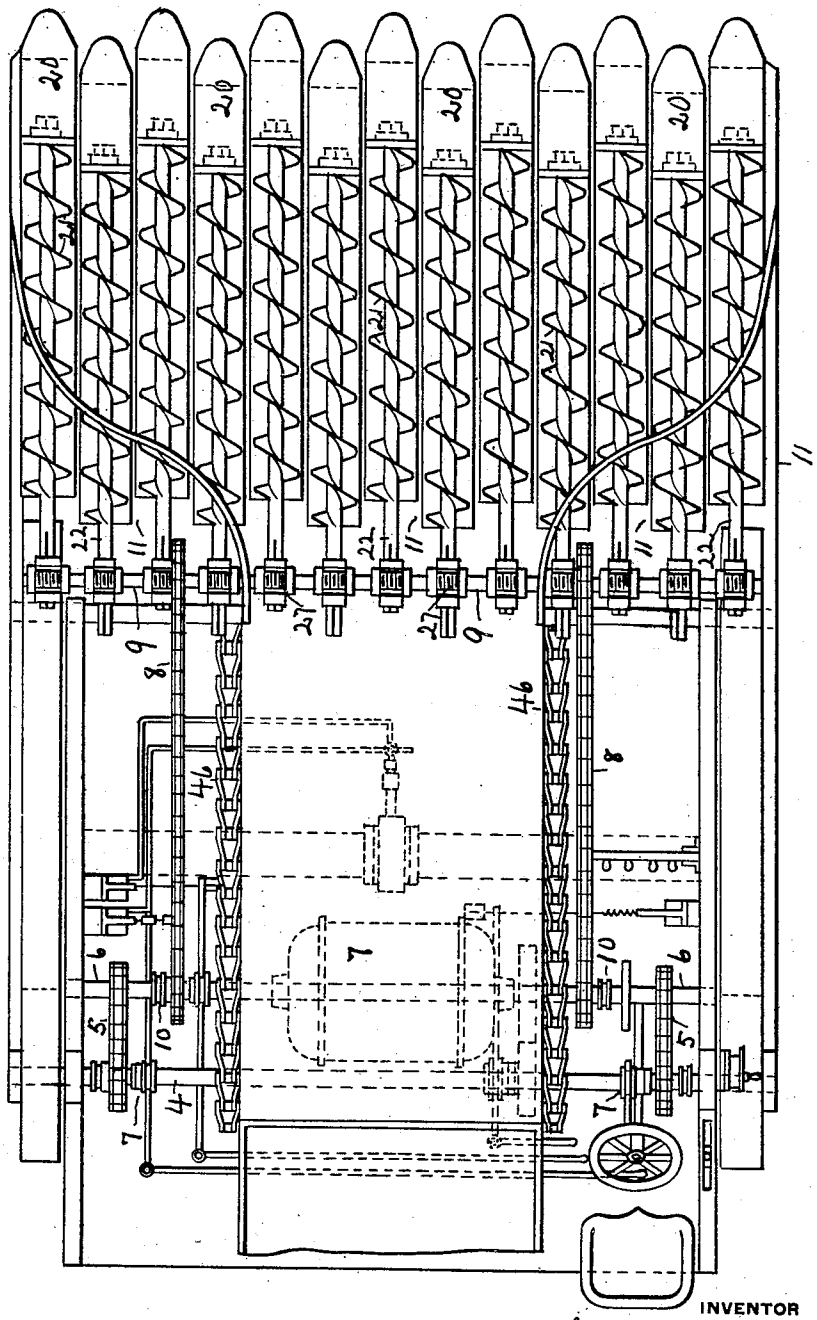
APPLICATION FILED NOV. 1, 1918.

1,383,593.

Patented July 5, 1921.

4 SHEETS—SHEET 1.

FIG. 1.



INVENTOR

George R Bennett

by Dennis B. Wolcott

Atty

G. R. BENNETT.

LOADING MACHINE.

APPLICATION FILED NOV. 1, 1918.

1,383,593.

Patented July 5, 1921.

4 SHEETS—SHEET 2.

FIG. 2.

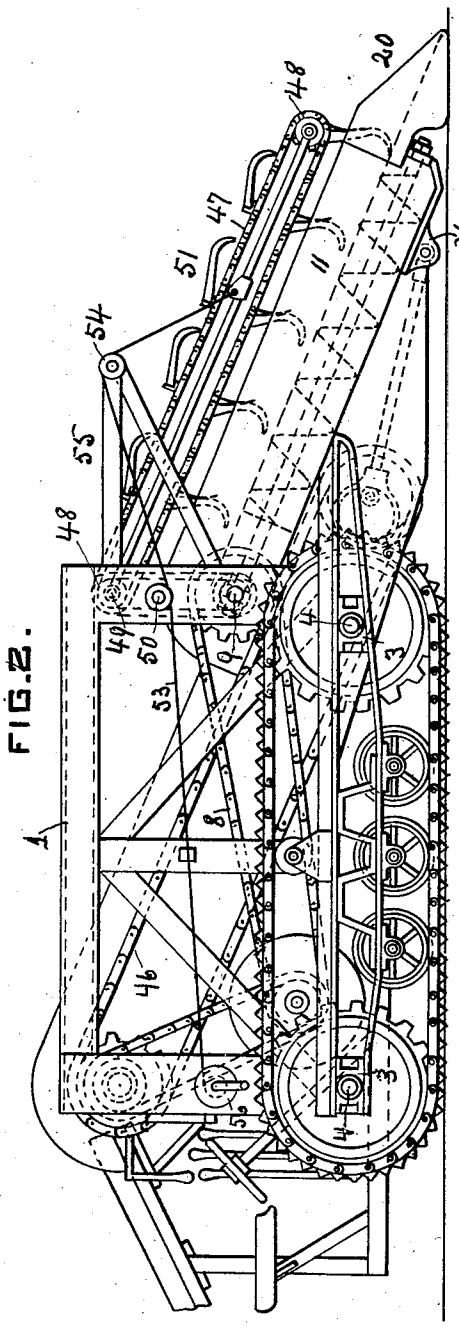
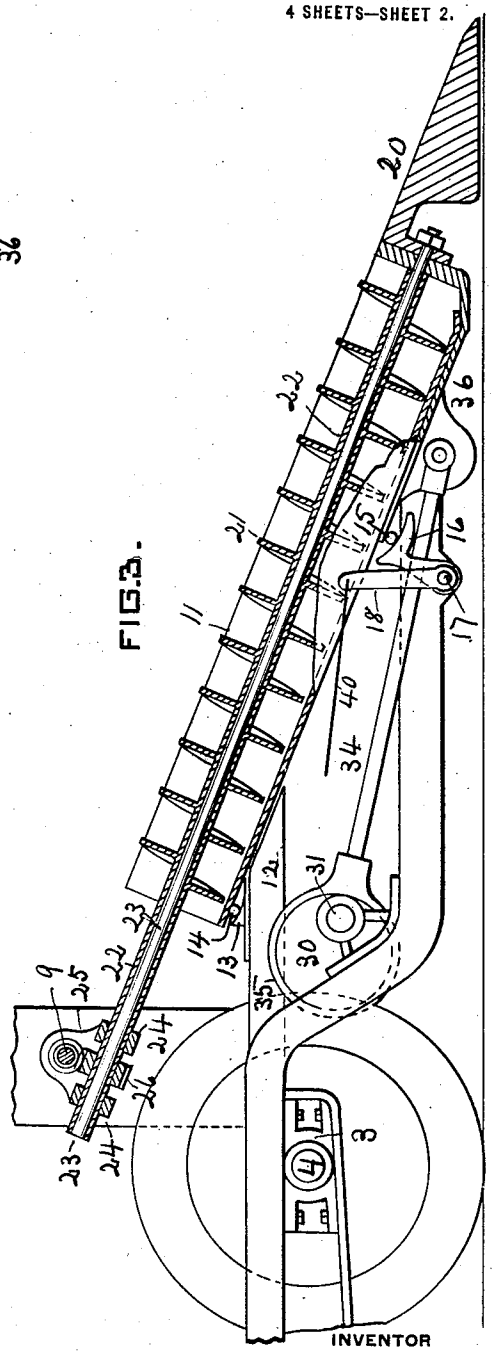


FIG. 3.



INVENTOR

George R. Bennett

by Dennis S. Wolcott

atty

G. R. BENNETT.

LOADING MACHINE.

APPLICATION FILED NOV. 1, 1918.

1,383,593.

Patented July 5, 1921.

4 SHEETS—SHEET 3.

FIG.4.

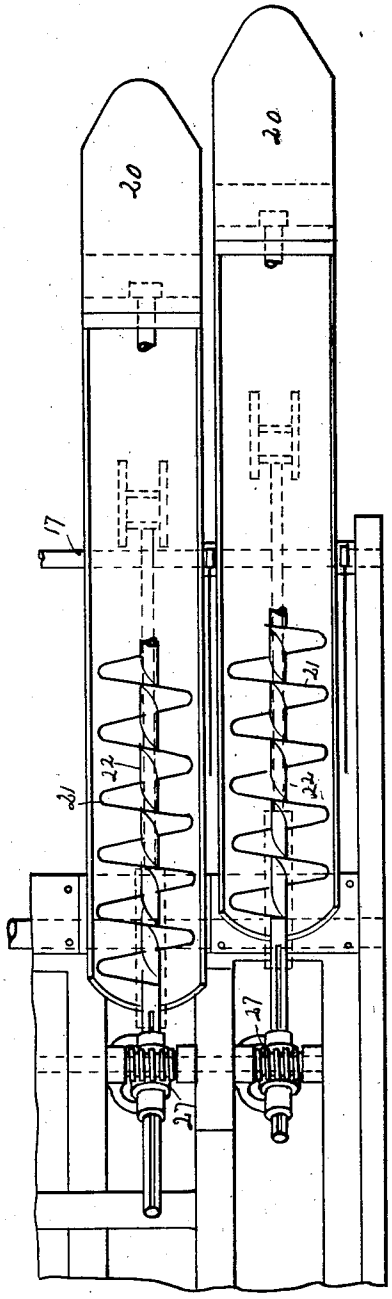


FIG.6.

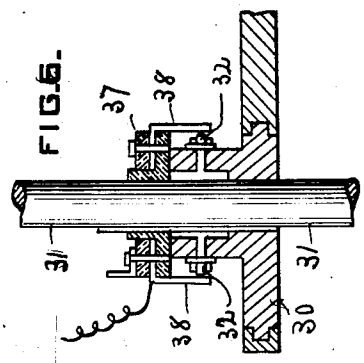


FIG.5.

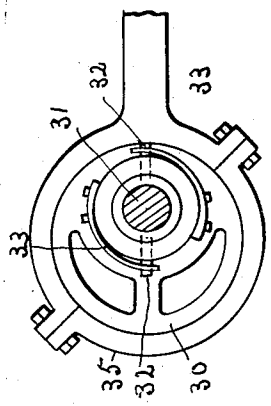
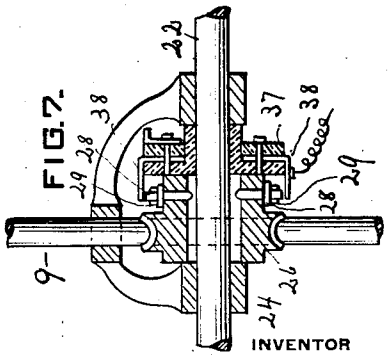


FIG.7.



INVENTOR

George R. Bennett

by Dannis & Wolcott

Attys

G. R. BENNETT.

LOADING MACHINE.

APPLICATION FILED NOV. 1, 1918.

1,383,593.

Patented July 5, 1921.

4 SHEETS—SHEET 4.

FIG. 9.

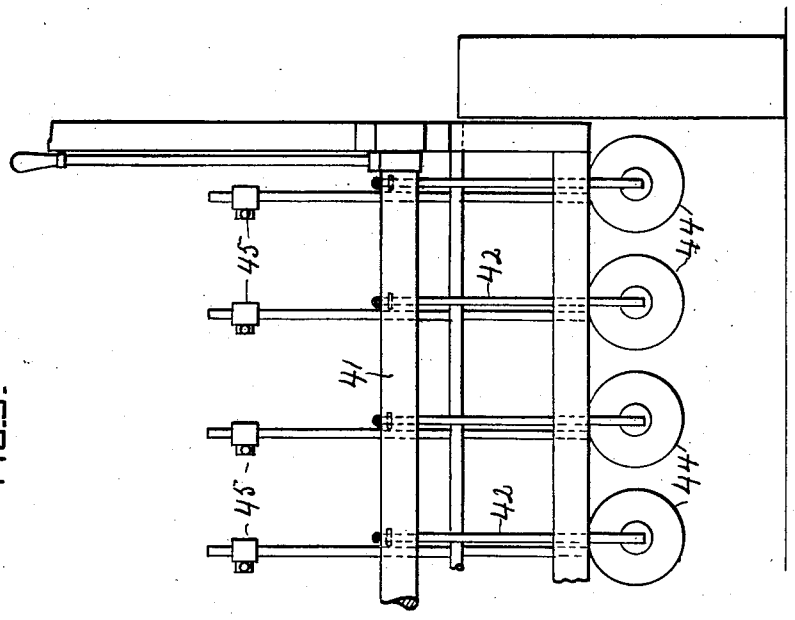
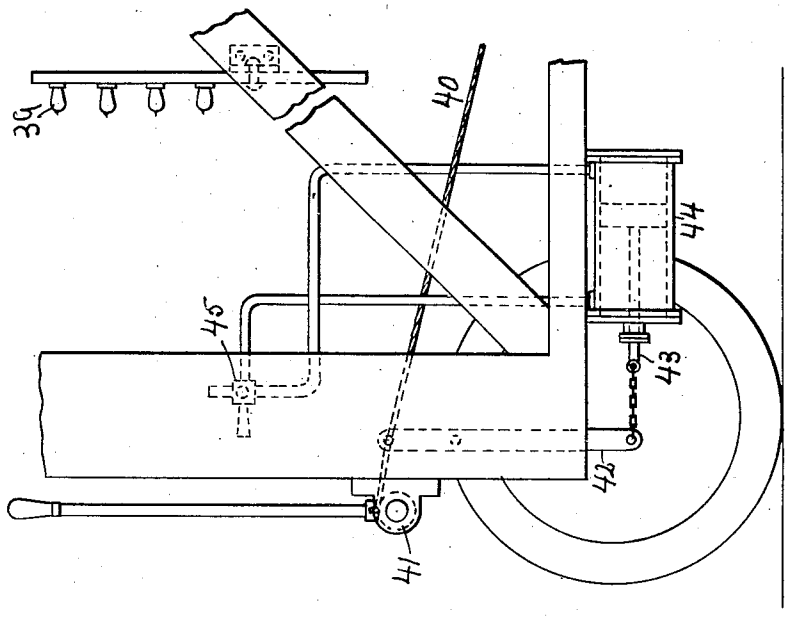


FIG. 8.



INVENTOR

George R. Bennett

by Dannie B. Wolcott

Atty

UNITED STATES PATENT OFFICE.

GEORGE R. BENNETT, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO ALBERT M. HANAUER, OF PITTSBURGH, PENNSYLVANIA.

LOADING-MACHINE.

1,383,593. Specification of Letters Patent. Patented July 5, 1921.

Application filed November 1, 1918. Serial No. 260,741.

To all whom it may concern:

Be it known that I, GEORGE R. BENNETT, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, a citizen of the United States, have invented or discovered certain new and useful Improvements in Loading-Machines, of which improvements the following is a specification.

The invention described herein relates to certain improvements in machines for loading material onto cars, etc., the improvement being especially adapted to raising material thrown down in tunneling operations and consists, generally stated, in the provision of a plurality of longitudinally and vertically movable fingers or shovels, each finger or shovel being provided with means for moving the material along the same and discharging it onto a suitable carrier, and in other novel features hereinafter more fully described and claimed.

In the accompanying drawings forming a part of this specification, Figure 1 is a top plan view of a loading machine embodying the improvements claimed herein; Fig. 2 is a side elevation of the same; Fig. 3 is a longitudinal section on an enlarged scale through the axis of one of the fingers; Fig. 4 is a plan view on an enlarged scale of two adjacent fingers or shovels; Figs. 5 and 6 are side elevation and a sectional view showing a preferred construction of means for transmitting motion to the eccentric employed for moving the fingers longitudinally, such means embodying a safety device and contacts for a signaling circuit; Fig. 7 is a sectional detail view showing the driving connection to shafts of the screw conveyer carried by each finger or shovel; Figs. 8 and 9 show side and front elevations of the means employed for imparting vertical movement to the fingers or shovels.

In the practice of the invention the frame 1 carrying the operating mechanism and the fingers or shovels, is supported on bearings 3 mounted on the shafts 4 of wheels 4^a which form members of what is known as the caterpillar traction. One of the shafts 4, preferably the rear one, is driven by a sprocket chain 5 from the shaft 6 of the electric motor 7. The sprocket wheels on the shaft 4 are loosely mounted but are adapted to be locked to the shaft 4 by a clutch mechanism 7^a. Sprocket chains 8 pass around sprocket wheels on the shaft 6 and on a power transmitting shaft 9 employed as hereinafter described for driving the screw conveyers carried by the shovels. The sprocket wheels of the chains 8 are loosely mounted upon the shaft 6 but can be locked thereto when necessary by clutches 10.

The fingers or shovels 11 have their rear ends supported by an extension 12 of the frame of the machine, as shown in Fig. 3, but between this extension or ledge and the under sides of the fingers are interposed inclined blocks 13 and rollers 14 so that when the fingers or shovels are reciprocated, as hereinafter described, the rear ends of the fingers will be permitted to move down on the movement of the fingers under the material and be raised on the reverse movement. A similar movement is imparted to the front portions of the fingers by means of rollers 15 interposed between the undersides of the fingers and inclined heads 16 loosely mounted on the shaft 17 and provided with arms 18 which are connected to suitable operating devices on the frame of the machine, as hereinafter described. Under normal conditions the fingers or shovels will be bodily raised and lowered when reciprocated, by the movements of the rollers 14 and 15 along the surfaces of the blocks 13 and heads 16, but when it is desired to raise merely the forward ends of the shovels, the arm 18 is shifted throwing the head 16 to the left and raising the forward part of the shovels. As hereinbefore described, the arms 18 are so connected to operating mechanisms that any one or all of the fingers may be raised simultaneously. These shovels consist of a trough-like body portion having at their forward ends wedge shaped blocks 20, detachably secured to the end of the trough-like portions. Within the troughs are arranged screw conveyers 21, the shafts 22 of the conveyers being made hollow and mounted on solid rods 23, which have their forward ends secured in the front wall of the trough. The rear ends of the hollow shafts are supported in spaced bearings 24 formed on hangers 25 loosely mounted on the shaft 9, and the hollow shafts have secured thereto at points intermediate of the bearings 24 worm wheels 26 adapted to be engaged by the worms 27 on the shaft 9.

The worm wheels 26 are operatively connected to the shaft 22 by means of pins 28 passing through the hub of the worms and having their rounded points engaging similarly shaped holes in sleeves secured to the shafts, as shown in Fig. 7. These pins are held inward to engage the holes in the shafts by springs 29 and the springs are so adjusted as to permit the pins being forced out in case the screw conveyers encounter an abnormal resistance, so that the shaft 9 may continue to rotate and operate all except the obstructed conveyer, until the obstruction is removed, whereupon the pins will again engage the holes in the shafts 22 so as to operate all the conveyers.

The reciprocation of the shovels is effected by means of eccentrics 30 on the shaft 31 which is adapted to be rotated by a sprocket chain. These eccentrics are operatively connected to the shaft 30 in the manner similar to that employed for connecting the worm wheel 24 to the hollow shaft 22, that is, by means of pins 32 passing through the hub of the eccentric and engaging at their inner ends recesses or circular depressions in the shaft or block secured thereto. The pins are held in engagement with these recesses by springs 33 as clearly shown in Fig. 5, and the operation of these devices will be similar to that described in relation to the worm wheel 26. The stems 34 of the straps 35 surrounding the eccentrics, have their forward ends connected to lugs 36 on the undersides of the respective fingers as shown in Figs. 2 and 3.

It is preferred to employ suitable means for signaling the operator in case either the screw conveyers 21 are checked or the points 20 of the shovels meet with such resistance as to prevent the rotation of the eccentric 30. To that end, blocks 37 of insulating material are arranged on the shafts 22 and 31 in proximity to the worm wheels and eccentrics respectively, and to these blocks are secured the contact fingers 38 normally out of contact with the pins 28 and 32, but in such proximity thereto that when the pins are forced out they will complete the circuit through signaling means such as lamps 39. As it is preferred that a series of lamps should be employed to indicate the conditions of the reciprocating means and the conveyer rotating means respectively, one of the series is made of one color as red and the other of a contrasting color as blue or white. These lamps are so arranged on the frame of the machine as to be seen by the operator so that he may stop the motor in case of either the conveyer or the reciprocating mechanism being rendered inoperative.

As hereinbefore stated, a lifting device consisting of the head 16 and arm 18 which are made integral one with the other, is arranged under each finger and from the arm 18 a rope 40 is extended to the rear of the machine. All of these ropes are connected to a drum 41 so that by the rotation of the drum all of the fingers will be raised simultaneously. In order to raise the fingers independently, the one of the other, a series of levers 42 are arranged across the machine and have their upper ends connected to the ropes 40. These levers may be operated by any suitable means but preferably by fluid pressure and to this end the lower ends of the levers 42 are flexibly connected to the rods 43 of the piston in the cylinders 44 and from the respective ends of these cylinders pipes are extended to valve mechanisms 45 arranged in convenient proximity to the seat of the operator so that by shifting a valve or valves, one or more of the fingers can be raised. As the levers 42 have their lower ends flexibly connected to the piston, and as the connection from the arms 18 to the drum are flexible, it is evident that the fingers may be raised individually or collectively without one operation interfering with the other.

While not at all times necessary, it may be desired to employ means for assisting the conveyers 21 in moving material up along the fingers onto the conveying belt 46 which extends from a shaft underneath the inner ends of the fingers to convenient proximity to the chute whereby the coal may be directed into cars. A suitable means for assisting the conveyer consists of an endless chain 47 passing around sprocket wheels 48 mounted on a frame which has its inner end pivotally supported by a shaft 49, the latter being driven by a sprocket chain 50 from the shaft 9 as shown in Fig. 2. A series of hooks or grapples 51 have their inner ends loosely mounted on the chain so that as they are carried along by the under part of the chain they will engage any lumps of coal projecting above the conveyers and carry them along to the transfer belt or apron 46. In order to raise this booster when its use is not necessary, a rope 53 is connected thereto and passes back over the pulley 54 mounted on a bracket 55 and then to an operating drum 56.

I claim herein as my invention:

1. In a loading mechanism the combination of a plurality of shovels, means for moving material along said shovels, means for alternately reciprocating the shovels longitudinally and means for carrying the material away from the shovels.

2. In a loading mechanism the combination of a plurality of shovels, means for moving material along the shovels, means for independently alternately reciprocating the shovels longitudinally and means for carrying material away from the shovels.

3. In a loading mechanism the combina-

tion of a plurality of shovels, means for moving material along the shovels, means for alternately reciprocating the shovels longitudinally, means for raising and lowering the shovels during such reciprocation and means for carrying material away from the shovels.

4. In a loading mechanism the combination of a plurality of shovels, conveying means arranged longitudinally of and supported by the shovels, a constantly rotating shaft for operating the conveyers, means operating automatically for releasing and causing the reëngagement of the conveyers to the shaft, and means for carrying the material away from the shovels.

5. In a loading mechanism, the combination of a plurality of shovels, means for conveying material along the shovels, a constantly rotating shaft, means operative by the shaft for alternately reciprocating the shovels, means operating automatically for alternately effecting the release of the reciprocating means from the shaft and reconnecting them to the shaft, and means for carrying material away from the shovels.

6. In a loading mechanism the combination of a plurality of shovels, means for alternately reciprocating the shovels, means for conveying material along the shovels, means for simultaneously raising the front ends of the shovels and means for carrying material away from the shovels.

7. In a loading mechanism, the combination of a plurality of shovels, means for conveying material along the shovels, means for raising any of the shovels independent of the others, and means for carrying the material away from the shovels.

8. In a loading mechanism, the combination of a plurality of shovels, means for moving material along each of the shovels, means for shifting each of the shovels and mechanism for indicating the stoppage of one of said means.

In testimony whereof, I have hereunto set my hand.

GEORGE R. BENNETT.