Sept. 25, 1951 I. D. BAKER 2,568,702

SHOVELING MACHINE

Filed March 19, 1949 2 Sheets-Sheet 1

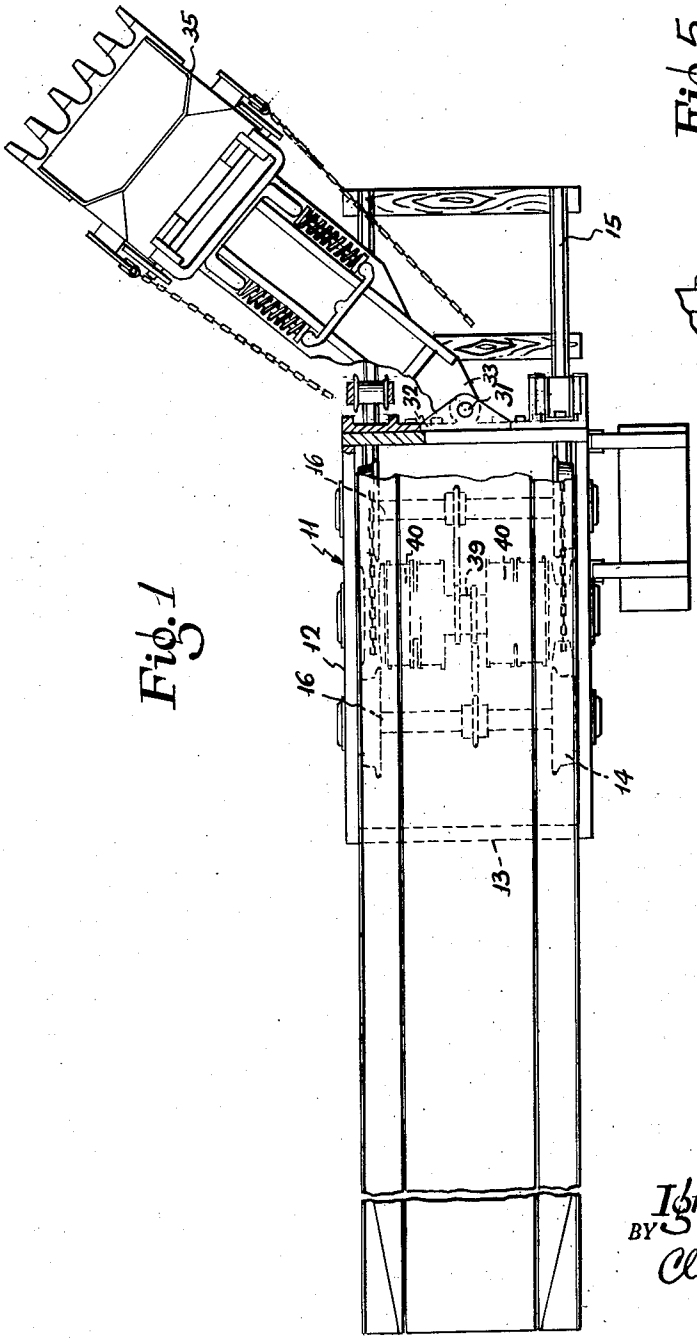


Fig. 1

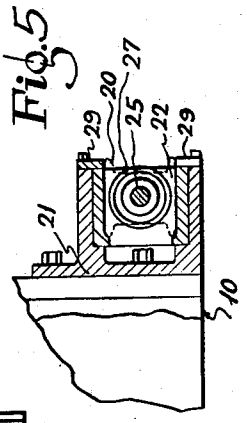


Fig. 5

INVENTOR.
Ignatius D. Baker
BY
Clarence F. Poole
ATTORNEY

Sept. 25, 1951 I. D. BAKER 2,568,702

SHOVELING MACHINE

Filed March 19, 1949 2 Sheets-Sheet 2

Fig. 2

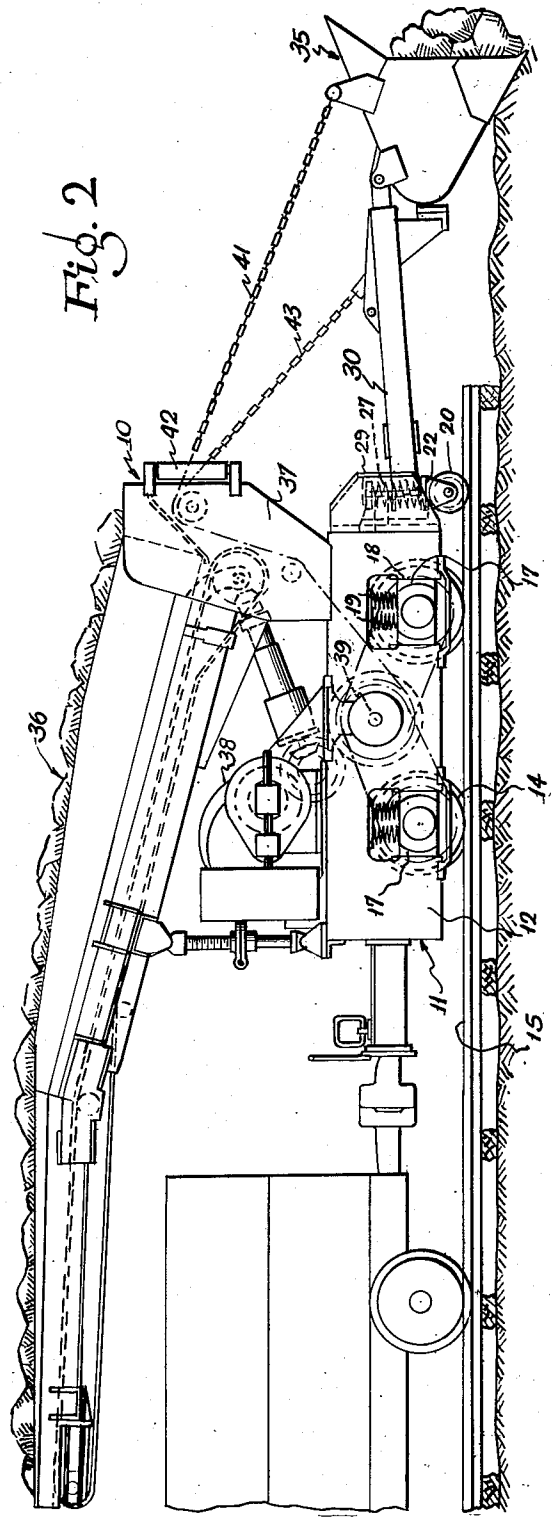


Fig. 4

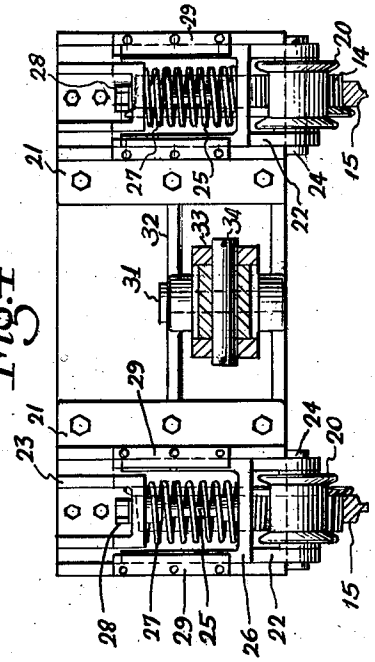
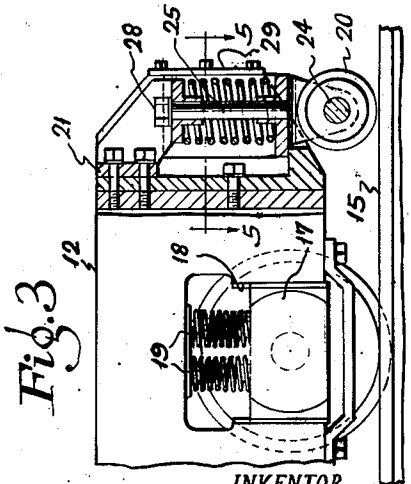


Fig. 3



INVENTOR.
Ignatius D. Baker
BY
Clarence F. Poole
ATTORNEY

Patented Sept. 25, 1951 2,568,702

UNITED STATES PATENT OFFICE

2,568,702

SHOVELING MACHINE

Ignatius Dunlop Baker, Los Angeles, Calif.

Application March 19, 1949, Serial No. 82,359

4 Claims. (Cl. 214—90)

1

This invention relates to improvements in shoveling machines of the type adapted for use in shoveling muck or other loose material in tunnels or mines, and commonly known in the art as a "mucker." More particularly, this invention is directed to a new and useful supporting roller for increasing the stability of the mucking machine during digging operations.

The principal object of this invention is to provide means for transmitting the lateral thrust of the mucking shovel to the track rails on which the machine is mounted, when the machine is digging laterally of its longitudinal axis.

A further object is to provide a novel means for absorbing the lateral thrust of the digging element of a mucker machine by the track rails at a point forward of the main carriage wheels of the machine, in order to insure greater stability and ease in operation and minimize the tendency of the machine to become derailed.

A still further object is to provide increased stability to the digging machine against forward tipping when the digging scoop is raised fully loaded.

Other objects of the invention will appear from time to time as the following specification proceeds.

My invention will be more clearly understood with reference to the accompanying drawings wherein:

Figure 1 is a top plan view of a shoveling machine embodying my invention;

Figure 2 is a side elevation of the machine shown in Figure 1, with the scoop in digging position;

Figure 3 is a fragmentary detail in side elevation, with parts in section, showing the mounting of a track roller and a front carriage wheel in normal position when the scoop is empty and not in digging position;

Figure 4 is a front end view of the frame parts shown in Figure 3; and

Figure 5 is an enlarged section taken along line 5—5 of Figure 3.

Referring now to the embodiment of the invention shown in the drawings, a mucker or loading machine 10 includes a main frame 11 composed of two parallel longitudinally extending side beams 12, suitably cross connected at their ends by end beams 13. These four frame members may be of heavy plate steel and suitably fastened to one another as by welding.

Four single flanged, rail engaging drive wheels 14 support the main frame 11 for movement along two conventional steel track rails 15, such as are

2

normally used in railroads. The wheels 14 are mounted in opposing pairs at the ends of two axles 16 which are disposed transversely beneath the main frame, and are journaled in journal boxes 17 positioned in slotted openings 18 in the main frame side beams 12. Each journal box is spring mounted, as usual, for slidable vertical movement as by a pair of compressible coil springs 19, 19 connected to the main frame so that the springs will compress under a load.

The main feature of this invention consists of a pair of rail engaging double flanged rollers 20, 20, rotatably mounted in front of and extending slightly below the forward end beam 13 of the main frame 11. The immediate mounting for each of said rollers comprises a roller bracket 21. As shown herein, one such bracket is mounted at each lower corner of the main frame and may be connected to the forward end beam 13 by any convenient means such as bolts (see Figure 4). An H-shaped roller support 22 is guided for vertical sliding movement in the bracket 21. A U-shaped retainer 23 is rigidly secured to the upper end of the bracket 21, and fits between the spaced upper legs of the H-shaped member 22 to assist in guiding the latter in its vertical movement. Each roller 20 is rotatably mounted on a horizontal pin 24 extending crosswise of the spaced lower legs of its respective H-shaped roller support 22.

A vertically disposed guide rod 25 is rigidly attached to a cross member 26 of each H-shaped member 22, and extends upwardly therefrom through the lower portions of the U-shaped retainer 23. A compressible coil spring 27 surrounds the guide rod 25 and is mounted between the abutting H-shaped and U-shaped members to give flexibility to the roller mounting. A retaining nut 28 is threaded to the upper end of each guide rod for adjusting the compression load of the spring 27. A pair of guide plates 29, 29 may also be mounted on the side of each bracket 21 extending partially over the front of the H-shaped member 22 to further guide the latter during its vertical sliding movement.

A digging boom 30 may be provided, as usual, for lateral and vertical swinging movement at the forward end of the main frame and fastened thereto as by means of a vertical pivot pin 31 fitting through a pivot bracket 32, and a connecting link 33 having a horizontal pin 34 fastening the rear end of the boom 30 therewith. Any suitable means for digging or scooping up loose material, such as dirt or loose rock, may be provided at the forward end of the digging boom,

herein shown as comprising a scoop 35 pivotally connected to the boom for vertical arcuate movement.

The machine may be equipped with a belt conveyor structure 36 for conveying and unloading the loose material discharged from the digging elements, substantially as shown in the patent of A. R. Biedess No. 2,322,368 and therefore will not be more fully described herein. Upright support members 37, 37, suitably cross connected, are attached to the upper edges of the main frame side beams 12 near the front of the machine for supporting the conveyor structure 36.

A drive motor 38 is provided for supplying driving power to the four main drive wheels 14, the digging boom 30 which lifts the digging scoop 35, and the continuous belt conveyor 36. Driving power is transmitted from the main motor through suitable gearing to an intermediate shaft 39 which is disposed horizontally in a position slightly forward and below the main motor. A pair of hoisting drums 40 are mounted on the intermeidate shaft, one near each end thereof, to afford means for raising and lowering the digging boom 30 and scoop 35. Each main axle 16 is driven by a conventional sprocket and chain drive from the intermediate shaft.

The digging boom 30 and scoop 35 are lifted by a pair of heavy chains 41 threaded between suitable roller guides 42 on the upright support members 37, and connected to the rear portion of said digging scoop 35. Each lifting chain is tensioned by and wound around one of the hoisting drums 40, which are capable of tensioning the chains individually for slewing the digging boom and scoop laterally about the vertical pivot pin 31. A third chain 43 is connected between the digging boom 30 and cross connections between the upright support members 37, for limiting the downward swing of the digging boom.

The use and operation of my invention is as follows:

In operation, a machine of the class described herein moves along the rail track to the working area. The digging boom and scoop are lowered into the material to be loaded out and the drive wheels move the machine forward to force the material into the scoop. The digging boom is then raised and the scoop tipped backwardly to dump the material onto the belt conveyor which carries the loose material rearwardly to a waiting mine car at the rear of the mucker. The rollers 20 which constitute the main feature of this invention are designed to work in conjunction with the spring mountings over the drive wheels 14, and particularly with the springs mounted over the front pair of wheels, so that upon raising the digging boom 30 with a loaded scoop 35 compressive loading of the coil springs 19 mounted over the front journal boxes 17 will occur and the rollers 20 will move downwardly to contact the rails 15. The springs 27 associated with the rollers 20 provide flexibility to the roller mounting to overcome possible track obstruction.

This arrangement tends to stabilize the "mucker" during digging operations against sidewise and forward tipping by increasing the effective base of the machine, especially when the digging boom is swung laterally and the scoop loaded in positions of sidewise or lateral displacement from the longitudinal axis of the mucker. Forward tipping of the machine caused by the vertical load of the full scoop is also counteracted by this means, and the forces tending to overturn the machine forwardly are transmitted directly to the track through the rollers at an area adjacent the vertical pivot point of the digging boom. The sideward thrust created when the loaded scoop is in positions of lateral displacement from the longitudinal axis of the mucker and which tend to tip the machine sideways, is likewise transmitted to the track rails at points adjacent the horizontal pivot point of the digging boom through the roller flanges.

While I have herein shown and described one form in which my invention may be embodied, it should be understood that the construction and arrangement of the various parts may be altered without departing from the spirit and scope thereof. Furthermore, I do not wish to be construed as limiting my invention to the specific embodiment illustrated excepting as it may be limited in the appended claims.

I claim as my invention:

1. In a track mounted mucking machine for digging and loading loose material, a main frame mounted on track engaging wheels, spring means mounted over said wheels to provide for vertical movement thereof, means disposed at the forward end of said main frame for digging said material comprising a digging boom and scoop, and means disposed forwardly of and below said main frame for stabilizing said machine against forward and sidewise tipping during digging operation thereof comprising a pair of double flanged track engaging guide rollers positioned normally above the track level.

2. In a track mounted mucking machine for digging and loading loose material, a main frame mounted on track engaging wheels, spring means mounted over said wheels to provide for vertical movement thereof, means disposed at the forward end of said main frame for digging and loading said material comprising a digging boom and scoop, double flanged track engaging guide rollers disposed forwardly of and below said main frame and normally above the track lever for stabilizing said machine against forward and sidewise tipping during digging operation thereof, compressible spring means mounted over each of said rollers to provide for vertical movement thereof, and individual bracket mountings for holding each of said rollers for vertical sliding movement.

3. In a track mounted mucking machine for digging and loading loose material, a main frame mounted on track engaging wheels, spring means mounted over said wheels to provide for vertical movement thereof, means disposed at the forward end of said main frame for digging and loading said material comprising a digging boom and scoop, said boom being swivelably mounted for vertical and lateral arcuate movement, hoisting means for swinging said boom vertically and laterally, double flanged track engaging guide rollers disposed forwardly of and below said main frame normally above the track level for stabilizing said machine against forward and sidewise tipping during digging operation thereof, and compressible spring means mounted over each of said rollers to provide for vertical movement thereof, whereby said spring means mounted over said wheels will be compressed upon loading said scoop and raising said boom to bring said rollers into stabilizing engagement with said rails.

4. In a track mounted mucking machine for digging and loading loose material, a main frame mounted on track engaging wheels, spring means

mounted over said wheels to provide for vertical movement thereof, means disposed at the forward end of said main frame for digging and loading said material comprising a digging boom and scoop, said boom being swivelably mounted for vertical and lateral arcuate movement, hoisting means for swinging said boom vertically and laterally, double flanged track engaging guide rollers disposed forwardly of and below said main frame for stabilizing said machine against forward and sidewise tipping during digging operation thereof, compressible spring means mounted over each of said rollers to provide for vertical movement thereof, individual bracket mountings for each of said rollers comprising a bracket mounted on said main frame, a slidable H-shaped roller holding member, a U-shaped guide member for guiding the upper forked portion of said H-shaped member during vertical movement thereof, an adjustable slide rod connected between said H-shaped member and said U-shaped member, vertically slidable therebetween, guide plates disposed at the sides of said H-shaped member for vertical and lateral guiding thereof, and means for adjusting said spring means mounted over each of said rollers at various compressive loads.

IGNATIUS DUNLOP BAKER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,444,115	Estergreen	Feb. 6, 1923
2,072,495	Browner	Mar. 2, 1937
2,107,688	Browner	Feb. 8, 1938
2,140,421	Fageol	Dec. 13, 1938
2,208,205	Biedess	July 16, 1940