R. P. GREENLEAF.

LOADING MACHINE.

APPLICATION FILED MAR. 12, 1920.

1,435,920. Patented Nov. 21, 1922.

2 SHEETS—SHEET 1.

Fig. 1.

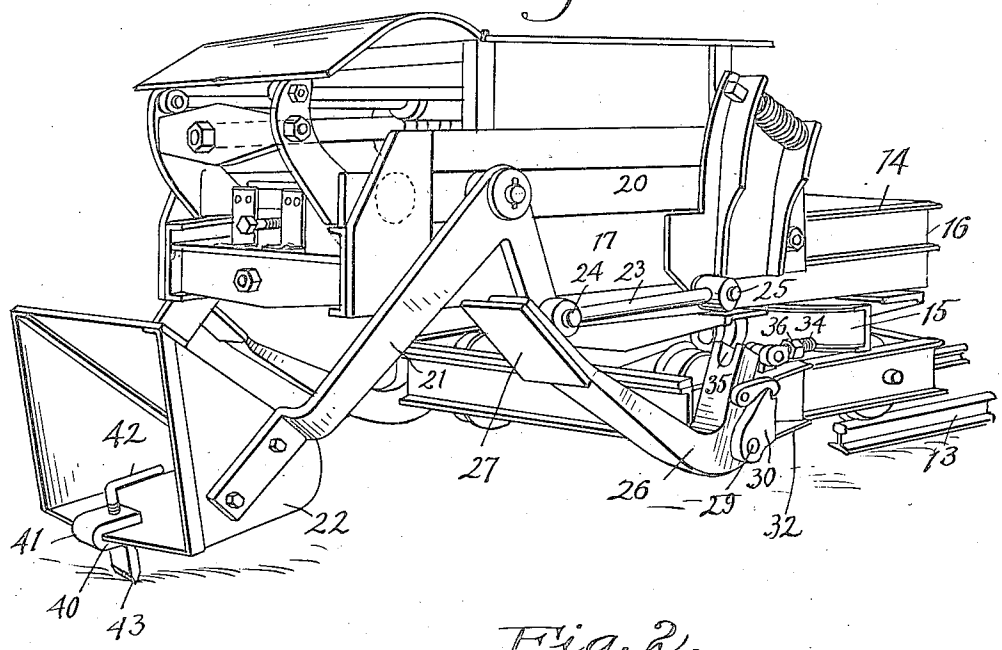
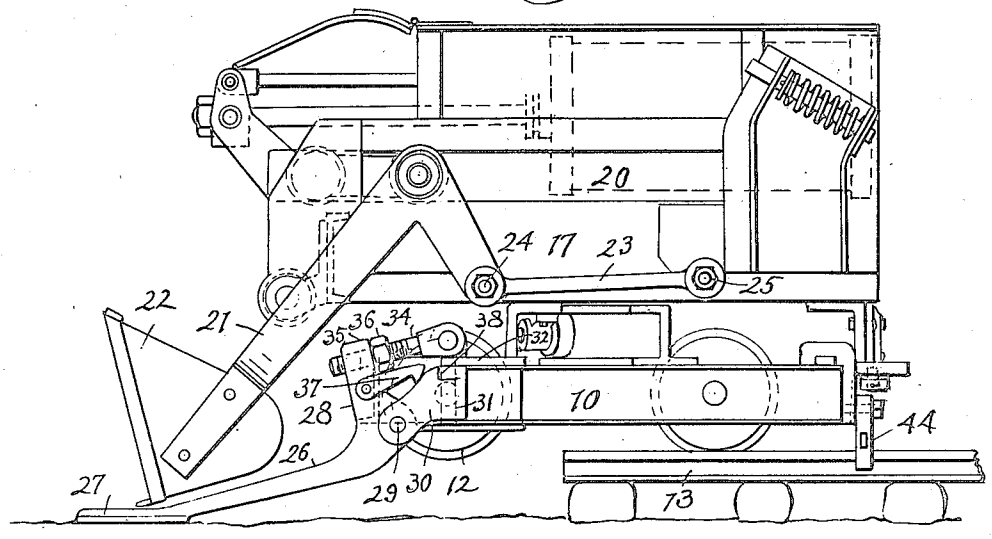


Fig. 2.



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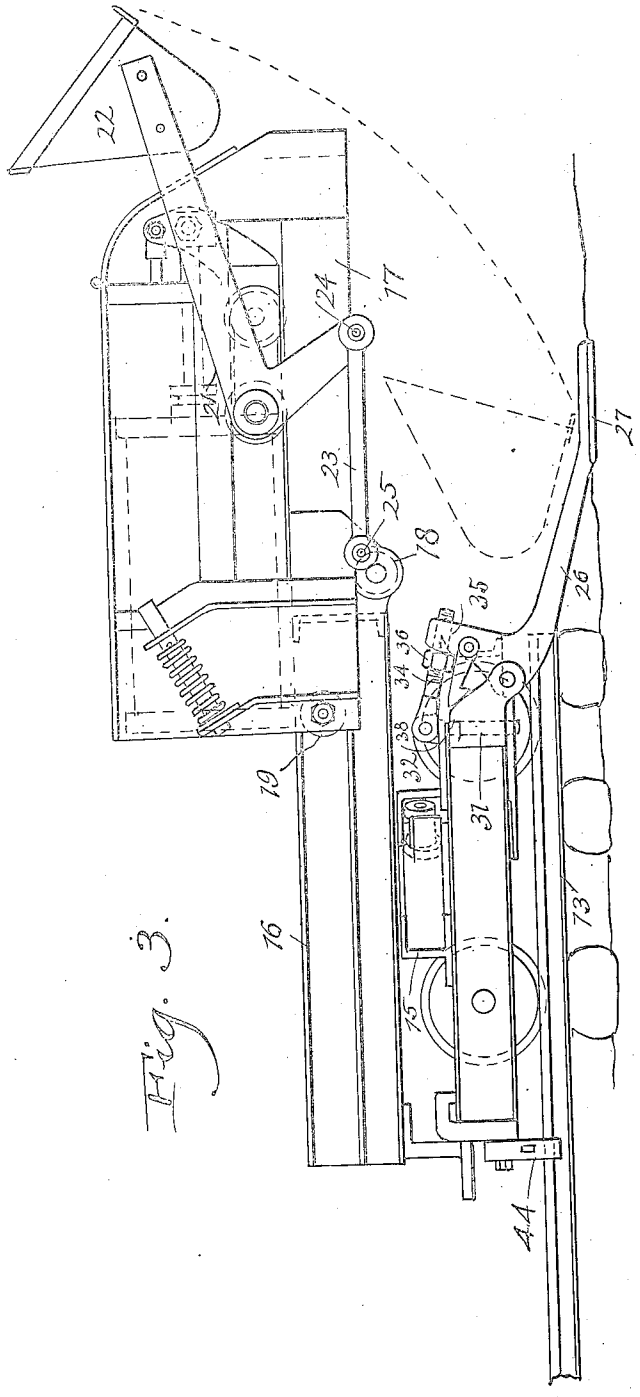


Fig. 3.

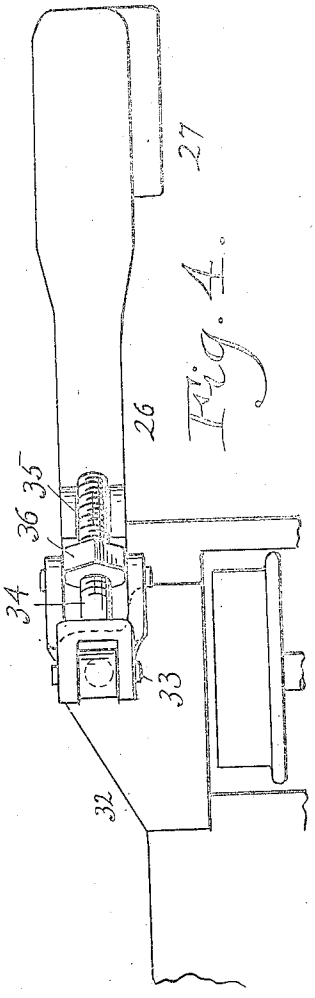


Fig. 4.

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UNITED STATES PATENT OFFICE.

ROBERT P. GREENLEAF, OF CLEVELAND, OHIO, ASSIGNOR TO FRANK BILLINGS, OF CLEVELAND, OHIO.

LOADING MACHINE.

Application filed March 12, 1920. Serial No. 365,159.

To all whom it may concern:

Be it known that I, ROBERT P. GREENLEAF, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Loading Machines, of which the following is a full, clear, and exact description.

The present invention relates to certain improvements in loading machines, applicable particularly to machines of the general type disclosed in prior patents granted to Frank Billings on applications filed by me, or jointly by Frank Billings and me, and including the following:

No. 1,286,168, Billings and Greenleaf, Nov. 26, 1918; No. 1,297,150, Robert P. Greenleaf, Mar. 11, 1919; No. 1,322,476, Billings and Greenleaf, Nov. 18, 1919; No. 1,322,477, Billings and Greenleaf, Nov. 18, 1919; No. 1,322,478, Billings and Greenleaf, Nov. 18, 1919; and such as disclosed also in a pending application filed in my name, Ser. No. 311,591, July 17, 1919.

The present improvements reside in certain attachments to machines of the type shown in the patents and application referred to, which improvements increase the efficiency and utility of such machines.

In one aspect the invention resides in the provision of jack arms adapted to be attached to the front corners of the truck frame and adapted to support the front part of the machine to prevent it tipping forwardly when the ram is extended, and to support the front part of the machine either wholly or partially independently of the front truck wheels, thus making it possible to relieve the track rails of at least part of the weight, or to support the machine with the front wheels in advance of the foremost track rails.

In another aspect the invention relates to an attachment to the shovel, adapted to be applied to the digging edge thereof to enable the machine to be pulled forwardly and to constitute a support for the front part of the machine to enable the track wheels to be reset on the track should they be displaced from the rails.

The invention may be further briefly summarized as consisting in certain novel details of construction, and combinations and arrangements of parts which will be described in the specification and set forth in the accompanying claims.

In the accompanying sheets of drawings, wherein I have shown the preferred embodiment of the invention applied to a machine of the type and design illustrated in my pending application, Serial No. 311,591, Fig. 1 is a perspective view of the machine showing the bucket attachment in place, and illustrating the manner in which it is utilized to pull the machine forwardly so that the front wheels may be advanced beyond the track rails and supported in operative position by the jack arms, which in this figure are shown elevated; Fig. 2 is a side view of the machine with the jack arms in supporting position and the bucket about to begin a digging stroke; Fig. 3 is a similar view with the ram fully extended and the bucket partly elevated but with all the four truck wheels on the rails of the track; and Fig. 4 is an enlarged detail view showing one corner of the truck and the jack arm attached thereto.

Though the present invention is not confined to a loading machine constructed precisely as herein illustrated, I have shown a machine constructed much like that of my prior application referred to, the machine shown being illustrative of the general type with which the invention has particular utility. A machine of this type includes a truck frame 10, with front and rear wheels 12 designed to be run upon a mine track 13 which is usually extended forwardly as the digging progresses. Pivotally supported on the truck frame, on the turntable principle, is a superstructure including a turning frame 14 which may be connected at its rear end, by a king bolt, to the truck frame, and usually has one or more turntable wheels engaging a curved track 15 on the truck frame. The frame 14 has a guideway 16 for a forwardly and rearwardly movable carriage, generally termed a ram 17, which can be, and preferably is supported through wheels 18 and 19, the former in this instance being carried by the forward end of the frame 14, and the latter carried by the ram and adapted to travel back and forth in the guideways 16. The ram is motor actuated, and is preferably

operated by a fluid pressure motor carried by the turning frame 14, and having its plunger connected to the forward end of the ram.

The ram 17 has on opposite sides guide slots or trackways 20 for a traveling carriage or trolley, also motor operated, and preferably by a fluid pressure cylinder carried by the ram, which trolley has a pair of bell crank shaped arms 21, supporting a shovel 22 adapted to receive a load in front of the machine, and to be swung upwardly and rearwardly over the machine to dump the material at the rear. A turning movement is imparted to the shovel when the trolley or carriage travels along the guideways 20, by links 23 which are connected at 24 to the short arms of the bell cranks 21, and at their rear ends are connected at 25 to the lower rear sides of the ram 17.

Coming now to the features constituting the present invention, it will be observed that I have provided at the front corners of the truck frame 10, a pair of L-shaped jack arms 26 having lower forwardly extending portions 27, which are adapted to rest on the ground forwardly of the truck frame. Each jack arm has at its inner end a relatively short upright portion 28, and at the junction of the forwardly extending portion 27 and of the upright portion 28 the jack arm is pivotally connected on a horizontal pivot 29 between a pair of ears of a support preferably in the form of a casting 30 which is pivotally connected by a vertical pin 31 extending through flanges 32 at the corner of the frame.

Pivotally connected by a pin 33 to the top of the vertical pin 31 is a bolt 34, whose threaded shank is adapted to fit into a slot 35 at the top of the upright arm 28 of the jack arm. The bolt carries a nut 36 adapted to bear against the rear side of the upright arm 28 of the jack arm and to constitute a supporting abutment by which the load of the forward part of the truck frame is transmitted to the jack arm.

Additionally the jack arm is provided with a hook 37 which is adapted to engage over a shoulder 38 on the casting 30 to hold the jack arm in elevated position as shown in Fig. 1 when the bolt 34 is swung out of the slot 35 back onto the upper flange 32 on the truck frame.

The second attachment forming a part of the present invention is in the form of a casting or forging 40, adapted to be applied to the shovel. In this instance the attachment 40 has a U-shaped portion 41 which receives the bottom or digging edge of the shovel as shown in Fig. 1, and is adapted to be clamped in that position by a screw 42 having a threaded engagement with the upper part of the attachment. Additionally the attachment is provided at the bottom with a pointed lip 43 which is designed to be forced into the ground so as to enable the shovel to have a holding attachment with the ground, and thus permit the machine as a whole to be moved along the track through the operation of the ram cylinder.

In the use of these attachments when the machine is in position for operation, the jack arms will be tipped forward until the pads or plates at the forward end of the lower forwardly extending portions 27 rest on the ground forwardly of, and at the sides of the truck frame. Then the nuts 36 of the bolts 34 will be adjusted so that all, or part of the weight of the front part of the machine is supported by these jack arms, (it being assumed that all four wheels were resting on the track rails as shown in Fig. 3). These jack arms will then prevent the machine tipping forwardly when the ram is extended as shown in Fig. 3, and if rear track clamps such as shown at 44 are employed, the jack arms relieve the track of the concentrated weight on the forward wheels of the truck.

It should be noted that the ground engaging portions of the track arms are low down, and that the construction of the jack arms as a whole is such that they do not interfere with any of the movements of the shovel. This is apparent from a consideration of Figs. 2 and 3.

Not only do the jack arms have utility when all four wheels of the truck are resting on the track rails, but they are equally useful in supporting the front part of the machine with the front wheels in advance of the foremost track rails. It might be mentioned that ordinarily as the digging progresses additional rails must be laid, but the forward wheels of the truck can not advance beyond the rails already on the ground. However, the present improvements allow the digging to be continued with all but the rear wheels of the truck frame forward of the rails as shown in Fig. 2.

To position the truck as shown in Fig. 2, the attachment 40 will be applied to the digging edge of the shovel, the ram will be extended, the shovel will be lowered, and the point 43 of the attachment will be forced into the ground. Then with the load of the front part of the machine supported by the shovel in its extended and lowered position, the jack arms then being elevated as shown in Fig. 1, and the rear track clamps removed, if previously employed, the plunger of the ram operating cylinder will be retracted and the whole machine will be pulled forwardly. Then the jack arms will be lowered and adjusted so as to properly support the front part of the machine in that position, as illustrated in Fig. 2, and when the rear track clamps are provided to clamp the rear end of the machine so as to resist

end thrust, the machine is ready for operation when the shovel attachment is removed.

The shovel attachment is useful also in placing the machine back on the track should either the front or rear wheels leave the track. Assuming that the front wheels are off the track, with the shovel attachment in place, the ram would be extended and the shovel lowered. Then by power applied to the shovel arms the front part of the machine will be elevated so as to raise the front wheels above the top level of the track rails. Then by operating the turntable cylinder with which the machine is preferably provided, or by means of a crow-bar, the truck frame can be swung to the right or left relative to the superstructure.

Should the back wheels be off the track, the jack arms would be lifted off the ground and the ram would be extended so as to allow the machine to tip forward, the bucket being lowered so as to prevent a too rapid downward swing, and at the same time to permit the rear wheels to be elevated above the track rails. Then by again operating the turntable cylinder, or by means of a crow-bar, if desired, the rear end of the truck is moved laterally until the rear wheels are above the track rails. Then the ram is retracted and the truck automatically sets itself on the track.

It might be mentioned in conclusion that the shovel attachment is useful in moving the machine along the track either forward or backward by sinking the point of attachment into the ground and operating the ram cylinder. Likewise it should be noted that a very important feature of the jack arms is the adjustment at their inner ends rather than at their outer ends, it being an essential characteristic when applied to a loading machine such as illustrated that the outer ends of the jack arms be thin, and that they do not project above the ground to any considerable distance so that the shovel can work over them as the turntable is swung laterally.

Having described my invention, I claim:—

1. In combination with a loading machine having a truck, and digging and conveying mechanism supported thereby to swing laterally thereof, of means for supporting the front of the machine wholly or partially independently of the front truck wheels, comprising jack arms connected to the truck and having forwardly extending ground engaging portions.

2. In a loading machine, a truck, digging and conveying mechanism supported thereby to swing laterally thereof, and means for supporting the front part of the machine independently of the front truck wheels, comprising a pair of jack arms connected to the truck, and having low ground engaging portions extending forwardly from the points of connection with the truck beyond the front end of the truck.

3. In a loading machine, a truck, digging and conveying mechanism supported thereby to swing laterally thereon, and means for supporting the front part of the machine independently of the front truck wheels, comprising a pair of jack arms connected to the truck, each jack arm comprising a pivotally supported member with a low forwardly extending ground engaging portion adapted to engage the ground forwardly of the truck.

4. In a loading machine, a truck, digging and conveying mechanism supported thereby to swing laterally thereon, and means for supporting the front part of the machine independently of the front truck wheels, comprising a pair of jack arms connected to the truck, each comprising a pivoted member with an inner portion and a forwardly extending ground engaging portion adapted to engage the ground forwardly of the truck, and means engaging said inner portion to adjust the position of the ground engaging portion.

5. In a loading machine, a truck, digging and conveying mechanism supported thereby to swing laterally thereof, and means for supporting the front part of the machine independently of the front truck wheels, comprising a pair of jack arms connected to the truck, each comprising a substantially L-shaped member having an inner upright portion and a forwardly extending ground engaging portion adapted to engage the ground forwardly of the truck, and means connected to the upright portion for adjusting the arm.

6. In a loading machine, a truck, digging and conveying mechanism supported thereby to swing laterally thereof, and means for supporting the front part of the machine independently of the front truck wheels, comprising a pair of jack arms connected to the truck, each comprising a substantially L-shaped member pivotally mounted at a point adjacent the truck, and including an inner upright portion and a low forwardly extending ground engaging portion adapted to engage the ground forwardly of the truck, and means connected to said upright portion to adjust the arm.

7. In combination with a loading machine comprising a truck with digging and conveying mechanism supported thereon, of a pair of jack arms at the front of the truck and each including a member connected to the truck and a second member pivoted thereto, and having an inner upright portion and a lower forwardly extending ground engaging portion.

8. In combination with a loading machine comprising a truck with digging and conveying mechanism supported thereon, of a

pair of jack arms at the front of the truck and each including a member connected to the truck adjacent the corner thereof, and a second member pivoted thereto and having an inner upright portion and a lower forwardly extending ground engaging portion, and means engaging said upright portion to adjust the position of the pivoted member.

9. In a loading machine of the type comphising a truck and digging and conveying mechanism including the ram movable forwardly and rearwardly with respect to the truck, a shovel, and arms connecting the shovel to the ram, means whereby the truck may be moved forwardly or rearwardly through the power of the machine comprising a shovel attachment adapted to be secured to the shovel and having a ground engaging portion adapted to extend downwardly therefrom.

10. In combination with a loading machine of the type comprising a truck, a power operated ram movable forwardly and rearwardly with respect thereto, a digging and conveying shovel, and swinging arms connecting the shovel to the ram, of means by which the machine may be pulled forwardly or rearwardly by the ram actuating mechanism comprising a shovel attachment adapted to be secured to the shovel and provided with a pointed portion adapted to project downwardly from the shovel and to be sunk into the ground when the shovel and arms are swung downward.

11. A loading machine comprising a frame with digging and conveying mechanism thereon, and having jack arms connected to the forward ends of the frame, each jack arm being bellcrank-shaped.

12. A loading machine comprising a frame having digging mechanism mounted thereon, jack arms pivoted intermediate their ends to the front corner portions of the frame, and each having on one side of its pivot a low-lying ground engaging portion and on the other side of its pivot means for adjusting the position of the jack arm.

13. In a loading machine, a frame, a superstructure mounted thereon to swing horizontally and including an operating digging member, jack arms for supporting the machine and connected to the forward part thereof and including low-lying forwardly extending ground engaging portions over which said digging member may be swung.

14. In a loading machine, a truck frame, a superstructure mounted thereon to swing horizontally and including a digging member, means for supporting the machine while in operation comprising jack arms connected to the forward portion of the frame and having low-lying forwardly projecting ground engaging portions, said jack arms being located beneath the superstructure so that it may be swung over the same.

15. A loading machine comprising a truck frame, and a superstructure mounted thereon to swing laterally, and having a digging member, means for supporting the machine while in operation comprising jack arms connected to the truck frame and each having a part extending from the point of connection with the truck frame forwardly beyond the truck frame and at its forward end provided with a ground engaging portion.

In testimony whereof, I hereunto affix my signature.

ROBERT P. GREENLEAF.