Feb. 2, 1943. R. Q. ARMINGTON 2,309,623

CONVEYER LOADER

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FIG.-1

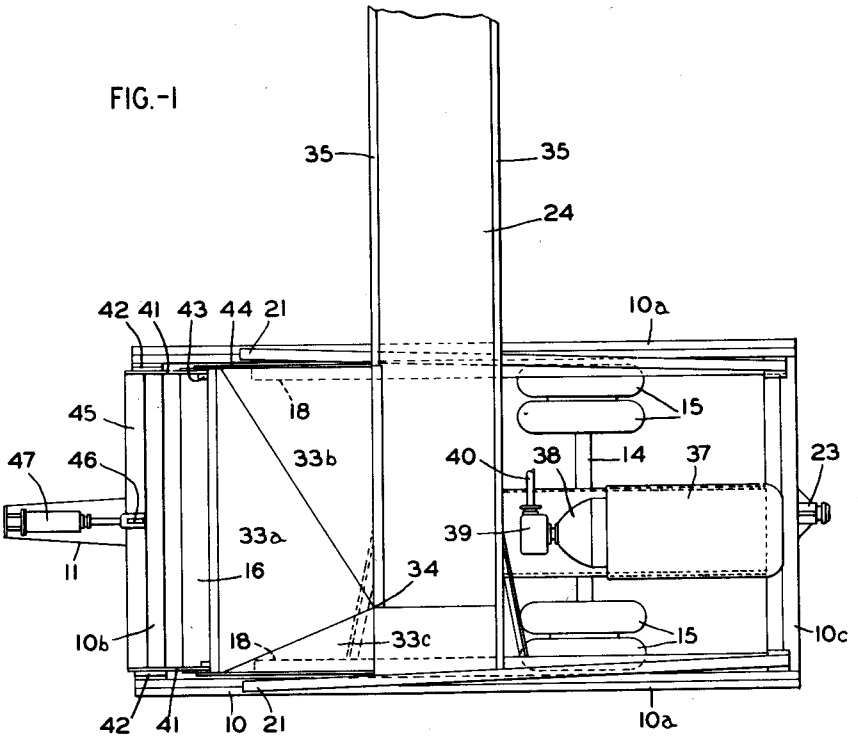
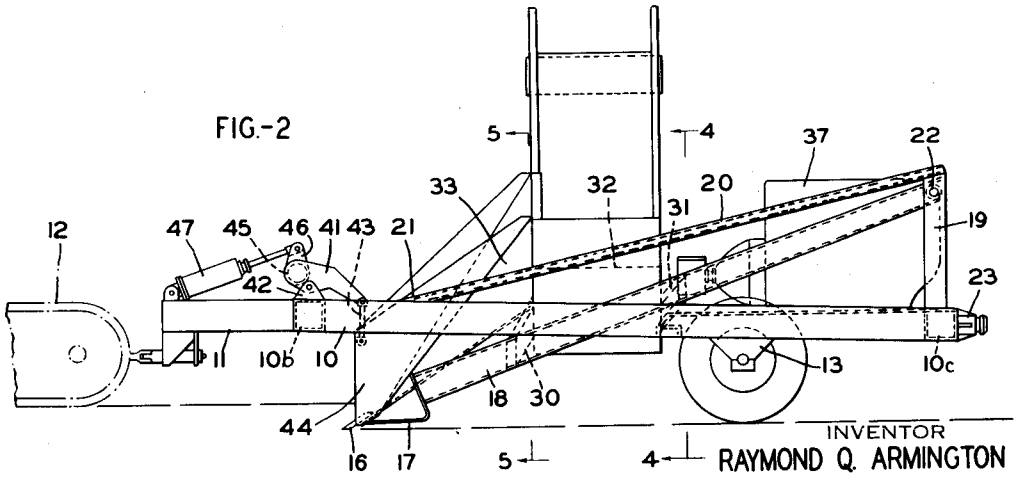


FIG.-2



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CONVEYER LOADER

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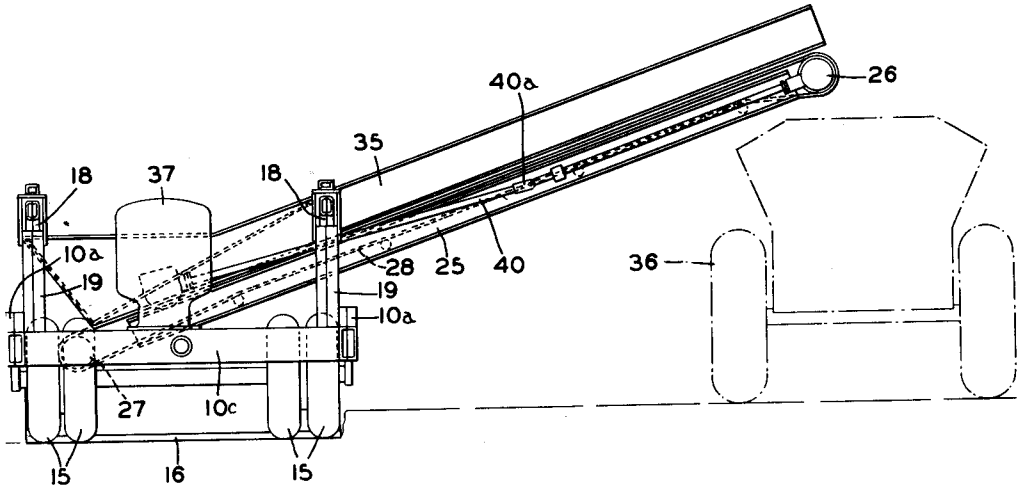


FIG.-3

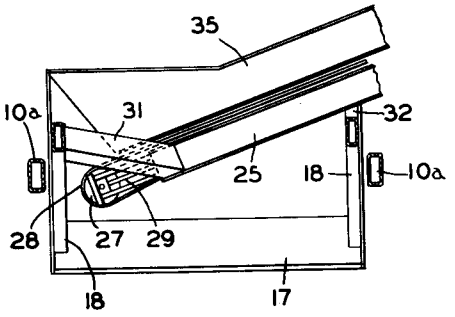


FIG.-4

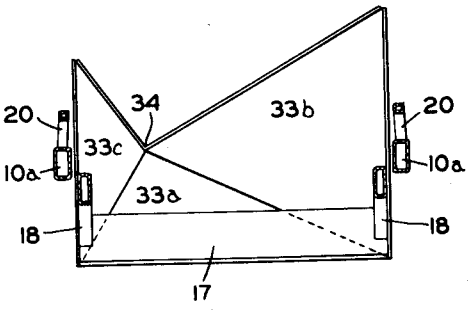


FIG.-5

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Patented Feb. 2, 1943

2,309,623

UNITED STATES PATENT OFFICE

2,309,623

CONVEYER LOADER

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Application November 6, 1940, Serial No. 364,481

2 Claims. (Cl. 37—108)

This invention relates to improvements in conveyer loaders of the type adapted to scrape or excavate earth material from borrow pits or the like to convey the same to a vehicle alongside the equipment where the excavated material is loaded and carried away to a remote point.

One of the objects of the present invention is to provide apparatus which will make a cut of such cross sectional dimensions that a large volume of earth is excavated per lineal foot of travel of the apparatus, together with means for handling this large volume of excavated material in an expeditious manner.

Another object of the present invention is to provide a scraper adapted to dig up large quantities of material per lineal foot of travel, utilizing the forward motion of the digging vehicle to transfer the loose material three or four feet up a moldboard onto a conveyer adapted to transfer the material laterally beyond the frame of the vehicle itself where the excavated material may be transferred to a dump vehicle or the like to be carried away.

Another object of the present invention is to provide a conveyer loader of the type above described with wheel means so arranged that the apparatus may be moved backward and forward in a borrow pit so as to save time generally consumed in turning similar apparatus around.

Other objects of the present invention include the arrangement of a scraper blade adapted to load large quantities of material and at the same time resting flat upon the ground so that it is suitable for a certain amount of grading operation, the provision of a scraper blade which cuts a path wide enough for the wheels of the scraping vehicle to follow, special improved arrangements for supporting the scraper blade, for supporting and moving the conveyer and moldboard, and remote control means for the entire device so as to reduce the cost of operator attention to a minimum.

Other objects and advantages of the present invention will be apparent from the accompanying drawings and description and the essential features thereof will be set forth in the claims.

In the drawings, Fig. 1 is a top plan view of apparatus embodying the present invention; Fig. 2 is a side elevational view of the same; Fig. 3 is an end elevational view of the machine of Figs. 1 and 2; while Figs. 4 and 5 are fragmental sectional views taken along similarly numbered lines of Fig. 2.

Elevating graders of the prior art have been designed to excavate such small amounts of material per lineal foot of travel as to require a considerable length of vehicle travel in order to load the dump wagons or other equipment used to haul the excavated material. This has had two disadvantages, namely, either the borrow pit had to be of exceptional length or the excavating eqiupment had to be turned around at frequent intervals. In either case much time was lost because large borrow pits in many cases were not available. Also, these elevating graders required a separate operator, it was impossible to back them up because they had a dolly at the front end of the excavating vehicle and in general this type of equipment has been limited in its application because of the inability to handle the large quantities of material which are necessary in many operations. The present invention overcomes many of the above named difficulties as will presently appear.

In the embodiment here disclosed a frame **10** is provided comprising two parallel side frame members **10***a*, a transverse front member **10***b* and a transverse rear member **10***c*. Preferably all of these members are hollow or box beams, one manner of forming which as best seen in Fig. 3 is the assembling of two channels in flange to flange relationship as indicated on the side beams **10***a*. A drawbar **11** extends forwardly from the central portion of the cross beam **10***b* and is there provided with means for connecting the trailer conveyer loader to a suitable traction vehicle such as the crawler tractor diagrammatically indicated at **12**, Fig. 2. The sole support for the frame **10** other than the drawbar is provided by wheel means located on a transverse axis preferably slightly to the rear of the center of the vehicle. As here shown, brackets **13** connected with the side frames **10***a* support an axle **14** on which are mounted sets of double wheels **15** near either side of the frame. With this construction it is possible to move the excavating vehicle backward in a borrow pit after the manner of a cart so as to save time required for turning around or in cases where such a maneuver would be impossible, as for instance in a very small borrow pit. Obviously, the internal combustion engine **37**, later described, to a very substantial degree counterbalances the weight of the conveyer **24** and other parts resting on the frame **10** in front of the axle **14**. It is this feature which leads to easy maneuverability of the trailer vehicle back and forth in the manner of a cart behind the tractor **12**.

A scraper blade **16** is supported on the frame for vertical movement so that the blade may

enter the ground as indicated in Figs. 2 and 3 to excavate material as the blade is pulled forward by the traction vehicle 12. Preferably the scraper blade extends the full width of the vehicle and as shown in the present embodiment, particularly in Figs. 2 and 3, the blade 16 is at least as wide as the tread of the wheel means 15 so that the wheels may follow in the path cut by the blade.

I provide a very strong construction for supporting the blade from the vehicle so that it may enter the ground to a depth for instance of as much as eighteen inches on a total width of approximately nine and one-half feet. To this end I have provided a backing for the blade of a hollow beam 17 triangular in section as best seen in Fig. 2 and this beam in turn is rigidly attached to two push beams 18 which are connected at each end of the blade construction 16, 17 and extend upwardly and rearwardly to the rear end of the frame where they are pivotally connected. To provide this connection vertical beams 19 are rigidly connected at the rear corners of the frame 10 and at their upper ends these beams are braced by the diagonal braces 20 which extend forwardly and downwardly to the points 21 where they are connected rigidly to the side frame members 10*a*, as for instance by welding. The push beams 18 are pivotally mounted at 22 adjacent the junction point of the beams 19 and 20. Preferably a bumper 23 is provided at the rear of the vehicle so that a second vehicle may be used to push the excavating apparatus when the going is tough. Obviously the pull transmitted at the drawbar 11 or a push on the bumper 23 will be transmitted by the beams 19 and 20 to the push beams 18 and thus directly to the scraper blade without putting a strain on any other parts of the vehicle.

Conveyer means is provided for moving the excavated material to a point laterally outside of the frame 10. In the form here shown this comprises a single straight run conveyer 24 having side frame members 25 which are rigidly mounted on the push beams 18 and in turn rotatably support a head pulley 26 and a tail pulley 27. An endless belt 28 passes around the pulleys and the usual belt take-up means is provided as indicated at 29. Means for mounting the conveyer side frame members 25 on the push beams 18 comprise hollow beams 30 and 31 at the tail end of the conveyer welded to the push beam 18 and to the conveyer side frame members. Above the right-hand push beam member 18 as viewed in Fig. 4, the conveyer frame members are supported by a generally triangular block member 32 which is shown in end view in Fig. 4 and in dotted side view in Fig. 2. This is in the nature of a filler block which is necessary to provide at its upper surface a substantially horizontal support for the side frame members 35 of the conveyer while the lower inclined surface of the block rests on the sloping push beam 18. Thus as the scraper blade 16 is moved in a vertical direction about the pivot 22 to vary the digging action of the blade, the conveyer moves with it and to this end it is advisable to have the pivot 22 as far back as possible so as to limit the movement of the conveyer as the digging position of the blade is altered. It will be noted in Figs. 1 and 2 that the push beams 18 slope upwardly sufficient to clear the wheels 15 because the push beams are directly connected to the ends of the scraper blade and this blade is wider than the tread of the wheels 15.

A moldboard 33 is provided for transferring the excavated material from the blade 16 to the conveyer belt 28. This moldboard as best seen in Figs. 1, 2 and 5 comprises a triangular plate 33*a* having its longer side the full width of the blade 16 and having its apex 34 adjacent the tail pulley of the conveyer. Other sloping triangular-shape sheets 33*b* and 33*c* guide the material from the sides toward the apex 34 so that the loose material converges as it rises on the plate 33*a* and is thus pushed onto the conveyer belt 28 at or near the converging point. It will be noted that the tail pulley 27 is at approximately the height of the side frame members 10*a* or in the neighborhood of three or four feet above the ground. This provides more favorable operating conditions for the conveyer and sufficient power is provided in propelling the vehicle forward to cause the excavated material to travel several feet up the moldboard and to discharge this material onto the conveyer. Suitable skirt boards 35 are provided to hold the material on the conveyer belt. As indicated in dot-dash lines at 36 in Fig. 3, a vehicle is provided under the head pulley of the conveyer to receive the excavated material and to carry it away. For this purpose the head pulley 26 will be approximately nine or ten feet above the ground.

The drive means provided for the conveyer comprises an internal combustion engine 37 suitably mounted at the central rear portion of the frame and driving through a clutch connection 38 and a gear reduction and bevel gear drive indicated at 39. This drives a shaft 40 extending longitudinally of the conveyer and having a drive connection with the head pulley 26. The shaft 40 is provided with a suitable slip connection 40*a* permitting longitudinal extension and contraction of the drive shaft 40 to compensate for slight movements of the conveyer relative to the point 39.

Power means is provided for raising and lowering the scraper blade 16 which of course carries with it the push beams 18, the moldboard and the conveyer. To this end a pair of cranks 41 are pivotally mounted on brackets 42, one at each side of the frame near the front. Each crank at its rear end is connected by a link 43 with a vertical side plate 44 leading down to the blade 16. The cranks 41 are connected by a torque tube or bar 45 extending across the front of the machine. At its center this bar is provided with an arm 46 to which is connected hydraulic jack 47, the other end of which is pivotally mounted on the front end of the drawbar 11. Suitable pressure fluid means (not shown) is provided for operating the hydraulic jack which moves the two cranks 41 in unison to raise and lower the scraping blade and connected mechanism. The links 43 are preferably made adjustable so that the cutting blade 16 may be trued up with the frame 10.

Preferably the control means for operating the clutch in the housing 38 and the control means for the hydraulic jack 47 are placed within reach of the operator of the traction vehicle 12 so that my improved trailer excavating apparatus does not require a separate operator.

What I claim is:

1. Earth moving apparatus comprising a frame, wheel means supporting said frame, a scraper blade mounted on said frame and adapted to excavate ground beneath it, said blade being at

least as wide as the tread of said wheel means, conveyer means on said frame for transferring excavated material from a receiving point spaced above the ground to a discharging point laterally outside said frame, and a moldboard constructed and arranged to receive excavated material from the entire length of said blade and to transfer said material to said conveyer means at said receiving point.

2. Earth moving apparatus comprising a frame, wheel means supporting said frame, a scraper blade mounted on said frame and adapted to excavate ground beneath it, said blade being at least as wide as the tread of said wheel means, conveyer means on said frame for transferring excavated material from a receiving point spaced above the ground to a discharging point laterally outside said frame, said conveyer means having a tail pulley located approximately at the height of said frame above the ground, and a moldboard constructed and arranged to receive excavated material from the entire length of said blade and to transfer said material to said conveyer means at said receiving point.

RAYMOND Q. ARMINGTON.