Nov. 18, 1952 R. Q. ARMINGTON ET AL 2,618,083

EXCAVATING AND LOADING PLOW WITH ENDLESS CONVEYER

Filed May 12, 1945 6 Sheets-Sheet 1

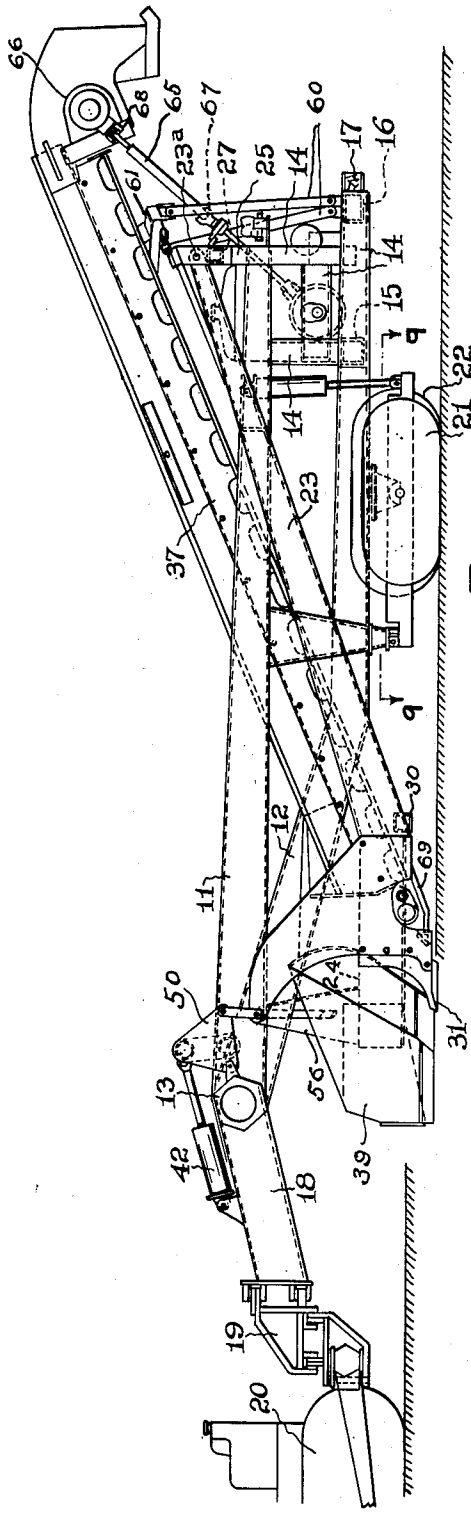


FIG. 2

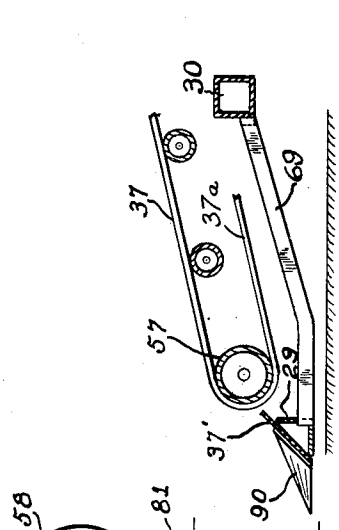


FIG. 8

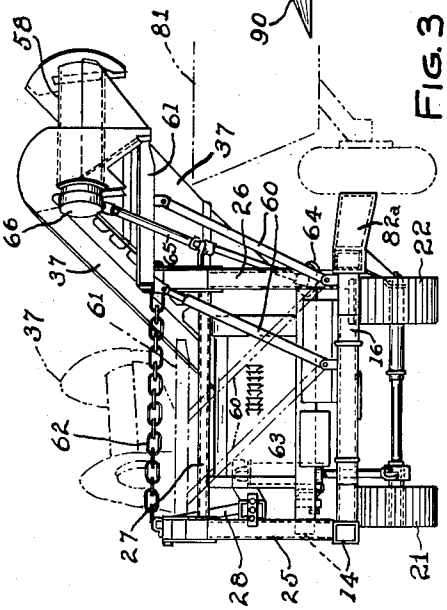


FIG. 3

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Filed May 12, 1945 6 Sheets-Sheet 2

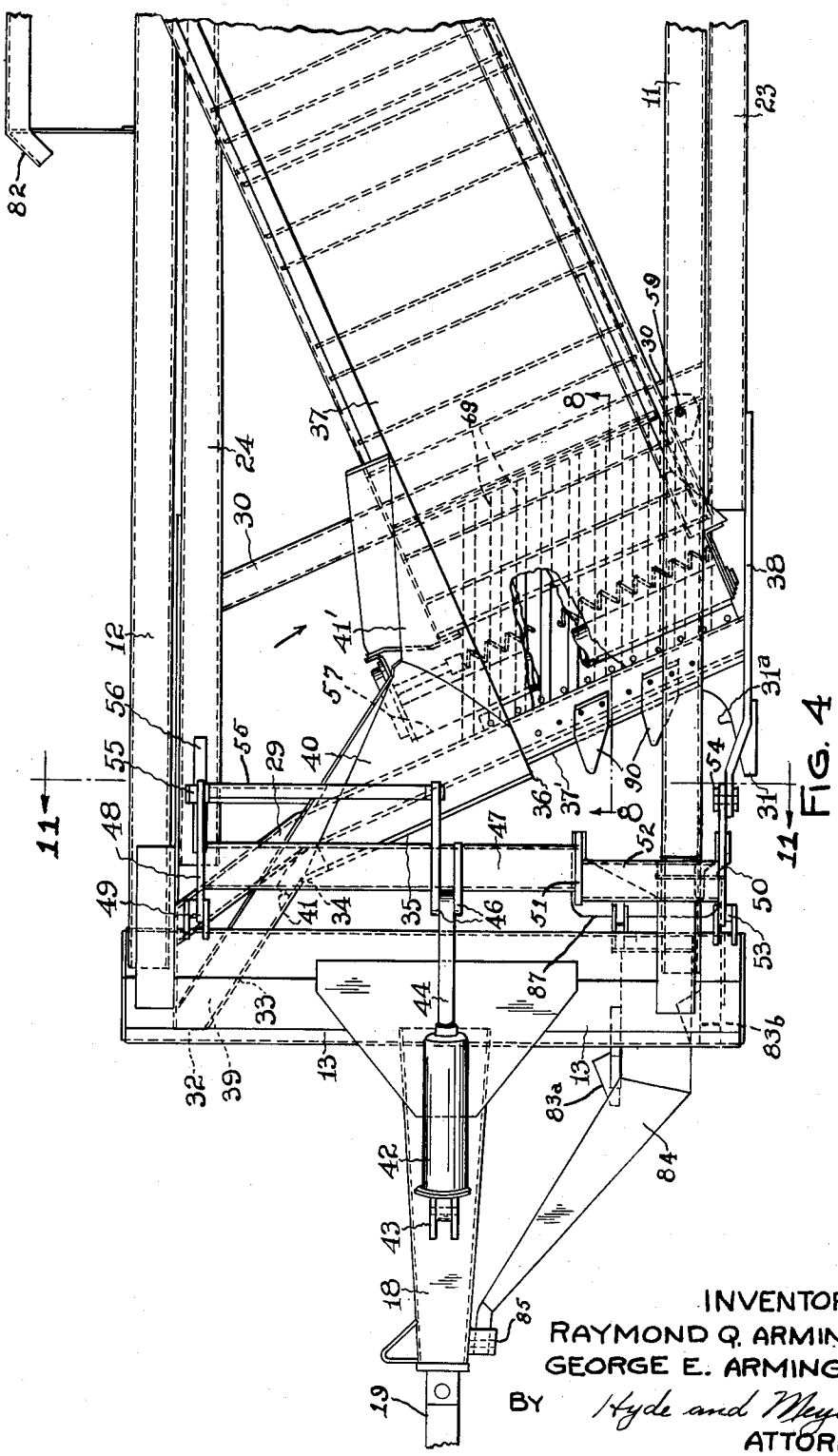


FIG. 4

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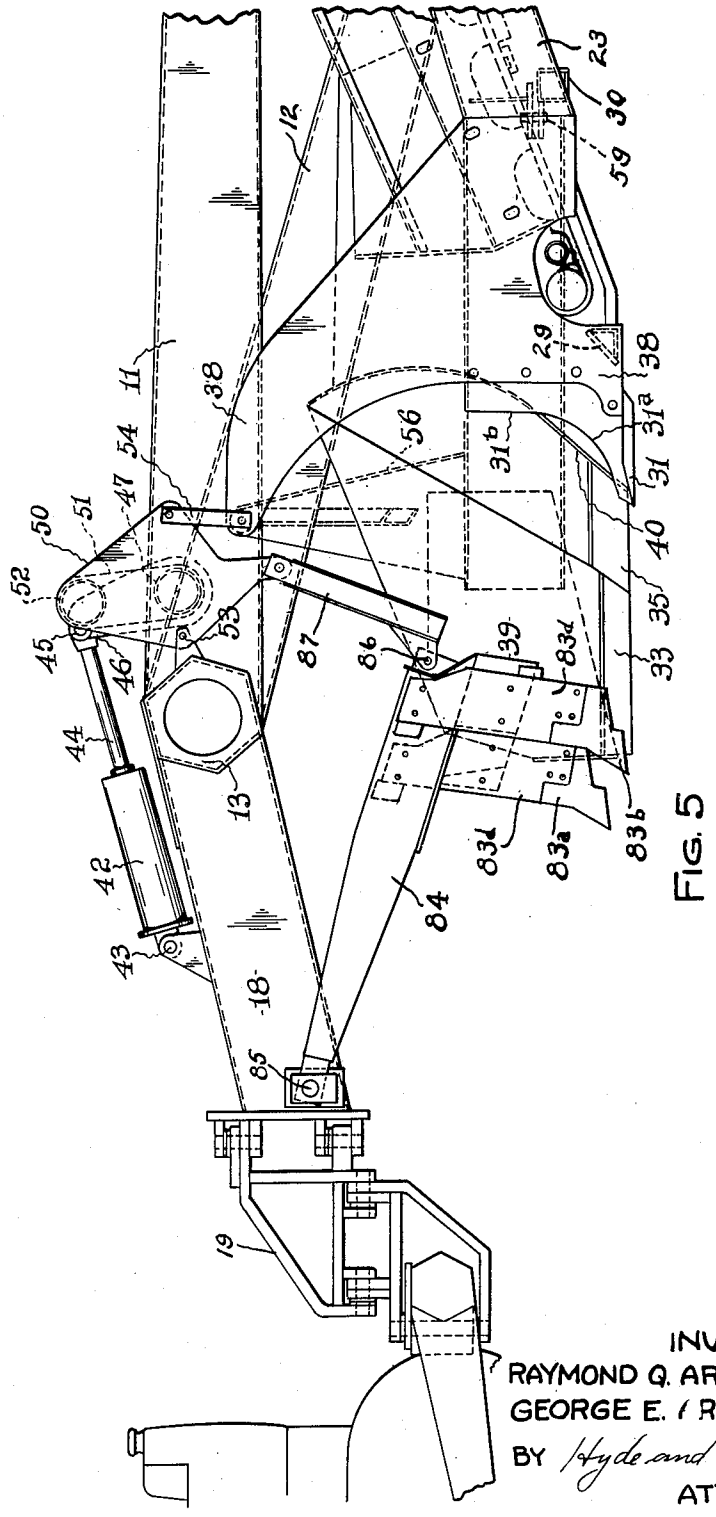


FIG. 5

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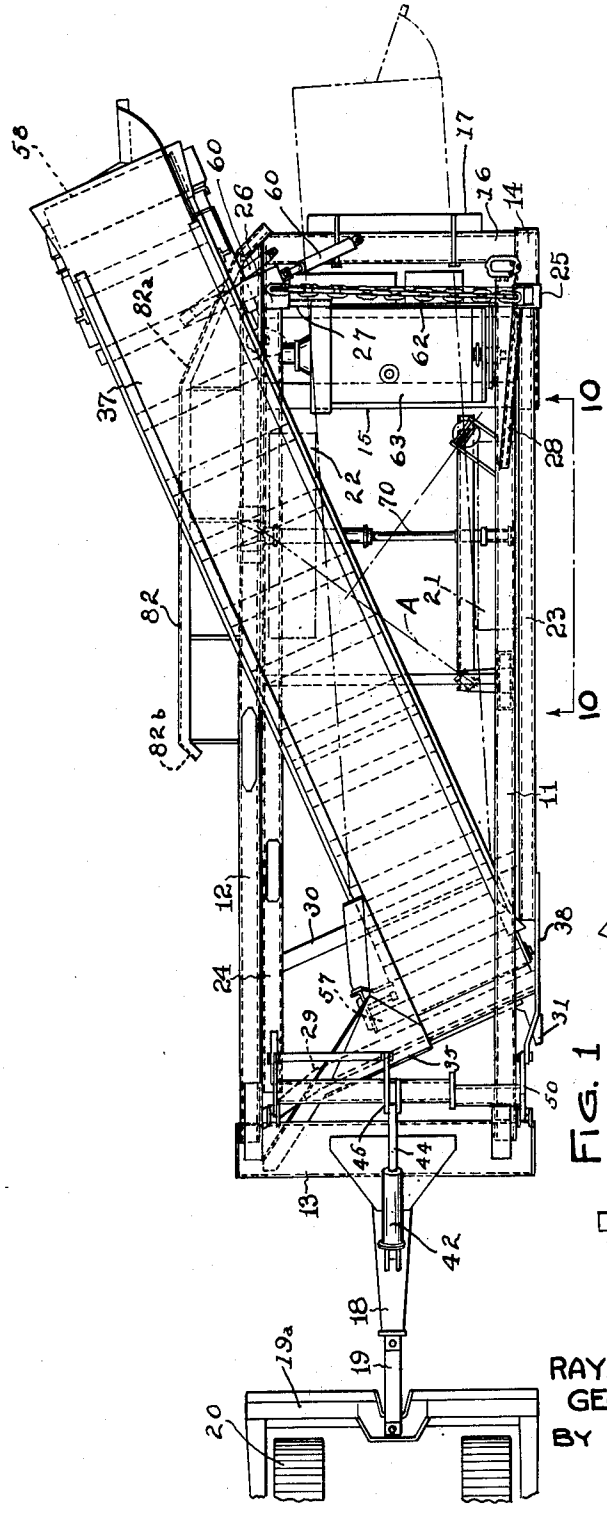


FIG. 1

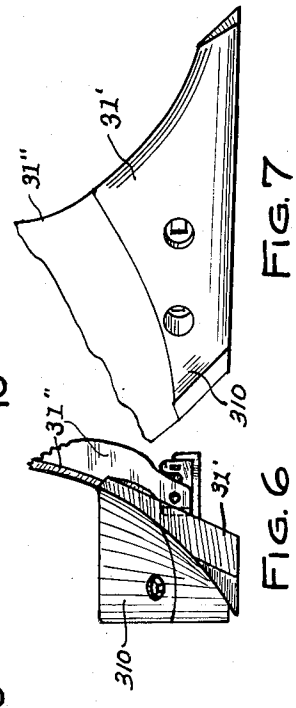


FIG. 7

FIG. 6

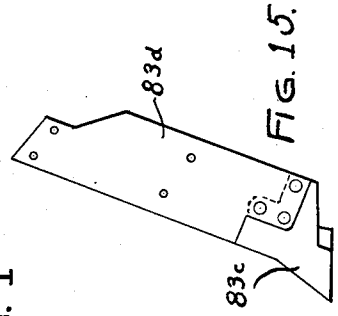


FIG. 15.

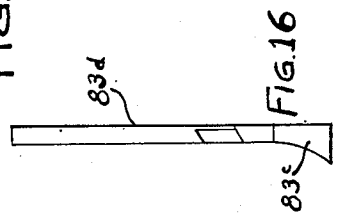


FIG. 16

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EXCAVATING AND LOADING PLOW WITH ENDLESS CONVEYER

Filed May 12, 1945 6 Sheets-Sheet 5

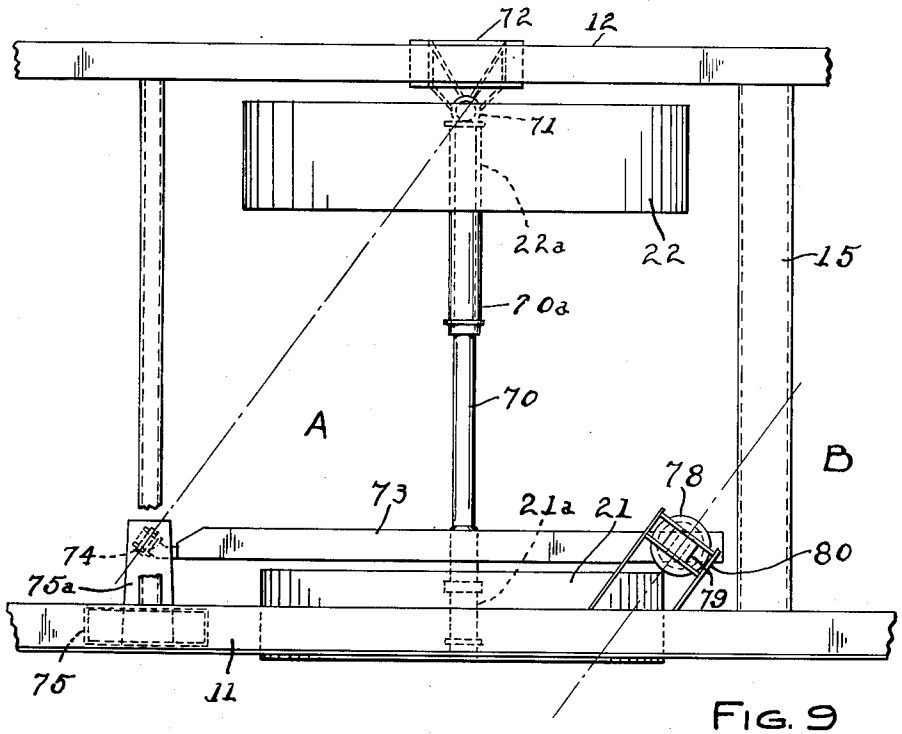


FIG. 9

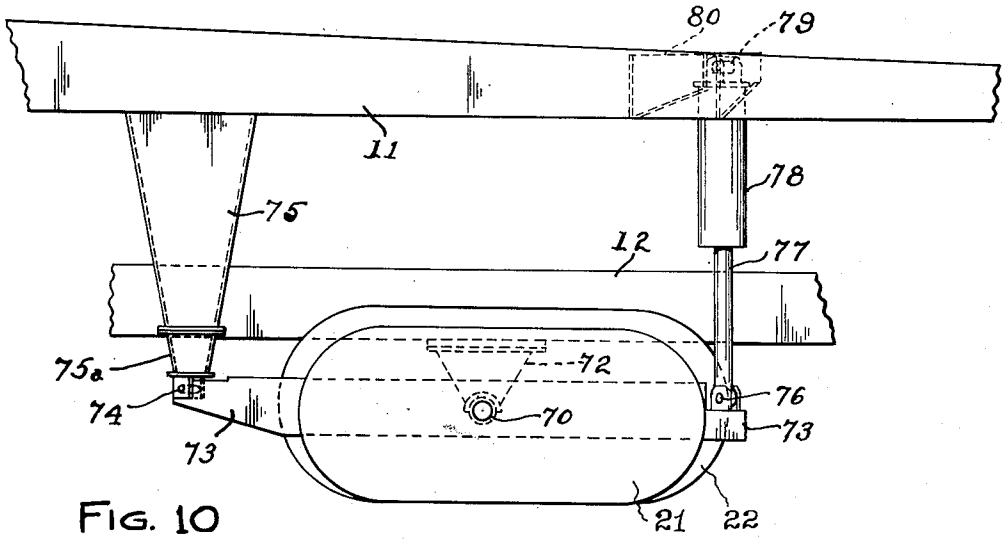


FIG. 10

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EXCAVATING AND LOADING PLOW WITH ENDLESS CONVEYER

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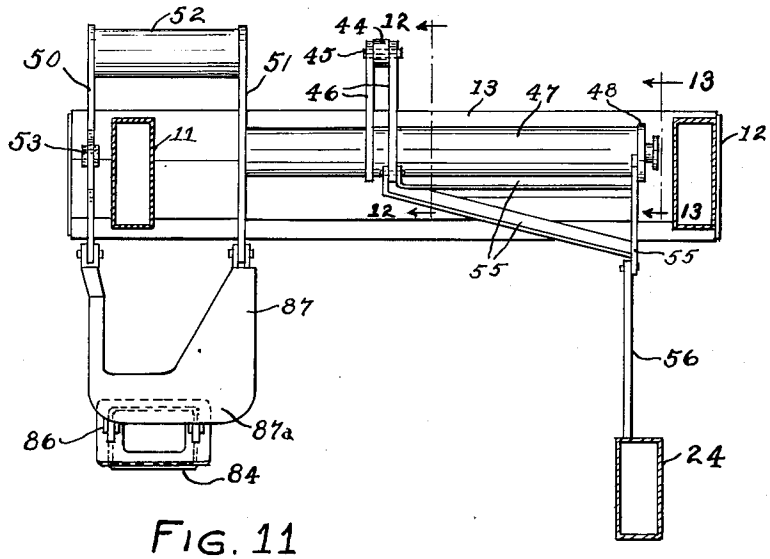


FIG. 11

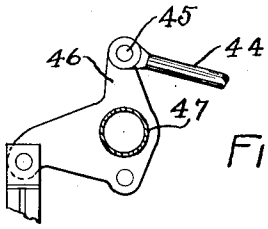


FIG. 12.

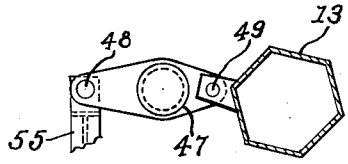


FIG. 13.

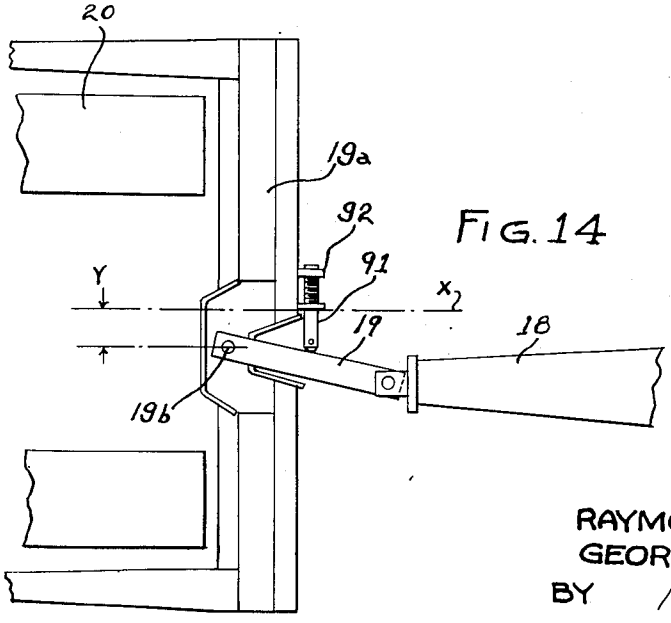


FIG. 14

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Patented Nov. 18, 1952

2,618,083

UNITED STATES PATENT OFFICE

2,618,083

EXCAVATING AND LOADING PLOW WITH ENDLESS CONVEYER

Raymond Q. Armington, Shaker Heights, and George E. Armington, South Euclid, Ohio, assignors to The Euclid Road Machinery Co., Euclid, Ohio, a corporation of Ohio

Application May 12, 1945, Serial No. 593,412

5 Claims. (Cl. 37—110)

1

This invention relates to improvements in apparatus for digging and loading earth or the like by means of a device traveling along the ground and cutting and loading material as it moves.

One of the objects of the present invention is the provision of apparatus of the type described having a frame and earth-cutting means so arranged that it may move into an embankment of considerable height cutting the bank away and loading the loosened material without any interference. The invention also provides a subframe for raising and lowering the cutting means with corresponding adjustment of the conveying means, all of which is arranged to cut into a high embankment as above described.

Another object of the present invention is to provide, in apparatus of the type described, digging means including a plow point which is effective for cutting into virgin soil and is particularly effective where rocks or roots are encountered. Our invention contemplates the use of such a plow point with or without the combination of a cutting blade extending generally vertically above the point for slicing into an embankment as will be later described.

Another object of the present invention is to provide a plow point earth-digging device in combination with a specially constructed horizontally extending digging and clean-up blade. Our invention also contemplates the combination of the earth-digging point and blade with an endless conveyor arranged for the most efficient cooperation therewith.

Another object of the present invention is to provide an improved mounting of the conveying means on the frame so that the conveying means may be swung outwardly when in use for loading vehicles alongside, together with a second position of the conveying means within the limits of the frame itself for purposes of shipping the device from place to place.

Another object of the present invention is to improve the wheel means for supporting the apparatus for travel along the ground including a novel mounting of the wheel means for adjustment to various positions on ground surfaces which are not level.

Other improvements included in our invention include a novel protective device for the conveyor belt, a novel means for locating a hauling vehicle alongside the digging and loading apparatus, novel means for scarifying the ground in front of the cutting and digging blades, and other novel features and improvements which will be apparent from the accompanying drawings and specification, and all of which will be summarized in the appended claims.

2

In the drawings,

Fig. 1 is a top plan view of one embodiment of our device showing a second position of the conveyor in dot-dash lines;

Fig. 2 is a side elevational view of the device of Fig. 1;

Fig. 3 is an end view of the same showing a portion of a hauling vehicle in dot-dash lines;

Fig. 4 is a fragmental top plan view of the left-hand portion of Fig. 1 enlarged and with the single addition of a scarifier;

Fig. 5 is a fragmental side elevational view of the left-hand portion of Fig. 2 enlarged and with the single addition of a scarifier;

Figs. 6 and 7 are end and side elevational views respectively of a plow point digging device;

Fig. 8 is a fragmental sectional view taken along the line 8—8 of Fig. 4;

Fig. 9 is a fragmental sectional view taken along the line 9—9 of Fig. 2;

Fig. 10 is a fragmental elevational view taken approximately from the line 10—10 of Fig. 1;

Fig. 11 is a sectional view taken along the line 11—11 of Fig. 4;

Figs. 12 and 13 are sectional views taken along similarly numbered lines of Fig. 11;

Fig. 14 is an enlarged view similar to the left-hand end of Fig. 1 but showing a modified position of the hitch;

Fig. 15 is an enlarged elevational view of one of the scarifier teeth of Fig. 5; while

Fig. 16 is an end elevational view of the tooth of Fig. 15.

Our invention provides a device of exceptional size and capacity adapted to travel along the ground and to dig and load the material over which the device travels at the rate of half a ton to a ton every second. In the drawings, we have shown a device of the trailer type supported at its forward end solely by a hitch mounting on a tractor device and supported near its rear end by wheel means later described. It should be understood, however, that certain features of our invention are applicable to a device of this type whatever the mounting for travel along the ground may be. In other words, certain features of our invention are equally applicable whether the forward wheel means is on the tractor or trailer portion of the entire apparatus.

The digging and loading device comprises a main frame having side frame members 11 and 12, each generally parallel to the path of travel of the apparatus. These side beams are preferably of hollow box construction, and each of them may be formed of a pair of channel-shape sec-

tions having their flanges facing each other and welded together. The two side beams are rigidly joined together at the front end of the device by a hollow box beam 13 generally hexagonal in section as clearly seen in Figs. 2 and 5. At the rear end a subframe numbered 14 extends downwardly from beam 11 to connect rigidly with cross-beams 15 and 16 which in turn are connected to the rear end of the side-beam 12. A bumper block 17 is secured to the rear face of the cross-beam 16 for use if a pusher tractor is used. It will be noted that the beam 11 is positioned high along its entire length. Note in Figs. 1 and 4 that beam 11 passes over the lower left-hand corner of conveyor 37, when looking in the direction of vehicle travel. This beam is of the order of several feet above the ground and permits the movement of the cutting and loading apparatus into an embankment on the side of the beam 11, in which case the raised position of this beam permits the apparatus to dig into the embankment and permits dirt to pass underneath this side frame member without piling against it. This is very helpful where dirt piles high in front of the cutting blade, especially if there is any sod or roots in the dirt. The side frame member 12 is at the same level with beam 11 at the point of connection with the front beam 13, but the beam 12 drops down rearwardly of this point to permit the diagonal position of the conveyor as will be later described. Extending forwardly from this mid portion of beam 13 is the drawbar 18 which is connected by hitch 19 to a tractor vehicle 20. This hitch connection is fully described and claimed in the copending application of Mayner and Kapel, Serial Number 513,702, filed December 10, 1943, to which reference may be had for further details. The only other support for the apparatus is the wheel means indicated at 21 and 22 to the rear of the center of the digging and loading apparatus and which will be described in greater detail later. It results from the construction above described that the hitch 19 being rigid in a vertical direction supports the cutting blade at a point midway between the tractor 20 and the wheel means 21, 22. This leads to an evening up of cuts over uneven ground because approximately half only of the vertical movement of the tractor 20 is transmitted to the cutting blade. In addition to this, practically none of the pitching of the tractor 20 is transmitted through this hitch 19 as is more clearly described in the above-mentioned copending application.

The digging and loading devices are carried on a subframe which is mounted on the main frame above described in a manner to permit the vertical adjustment of the cutting devices. This subframe comprises a pair of compression strut push beams 23 and 24, each oscillating in a vertical plane parallel to, and to the left of, beams 11 and 12 respectively when looking toward the front of the apparatus. Each of these push beams is of box-beam construction, the beam having a greater vertical depth toward the front of the machine and tapering rearwardly and upwardly. The push beam 23 has a pivotal mounting at 23*a* on the vertical rear post 25 which is in alinement with one of the frame beams 14. The push beam 24 has a pivotal mounting in alinement with 23*a* on the vertical rear post 26. A cross beam 27 rigidly connected between posts 25 and 26 above the level of beam 11 ties the rear posts together. Each of these posts has a diagonal brace extending from the top of post 25 or 26 diagonally downward to the adjacent side beam member of the main frame as shown clearly in Fig. 1 by brace 28. At their forward ends the push beams 23 and 24 are rigidly connected together by the diagonally extending cross beam 29, generally triangular in section, and by the diagonally extending beam 30, of generally square section, these beams being clearly shown in Figs. 4 and 8.

The digging devices are mounted at the front lower ends of the push beams 23 and 24. As best seen in Fig. 4, cutting means is provided in a generally horizontal plane and arranged concave in a forward direction with a plow point 31 in the forwardmost point at the left side of the apparatus and a hardened point 32 at the forwardmost point on the right-hand side of the cutting devices. A cutting blade 33 extends inwardly and rearwardly from the point 32 at an angle of approximately thirty-six degrees with the center line of the apparatus. At the point 34 the cutting blade turns toward the center of the vehicle through an angle of approximately thirty degrees, and the blade 35 then extends at an angle of approximately sixty-six degrees with respect to the center line of the apparatus over to the point 36 adjacent the conveyor 37. The cutting blade 37' extends across in front of the conveyor and is approximately in line with the blade 35 although preferably it is set back slightly as shown in Fig. 4.

The plow point or share 31 may be constructed as shown in Figs. 2, 4, and 5, or in the modified form shown at 31' in Figs. 6 and 7. In the form shown at 31, a narrow and relatively sharp digging point has a substantially flat bottom and a top cutting edge 31*a* which curves rearwardly and upwardly to a substantially vertical cutting edge 31*b*. The plow point 31 is extremely useful regardless of the form of the blade to the rear of and above it. This plow point buries itself in the ground and tends to hold that side of the cutting blade down to the desired level because the pressure of the ground above it is bearing down on the sloping surface 31*a*. The form of blade shown at 31' in Figs. 6 and 7 has a short vertical plow support 31'' and renewable point 31'. Back of point 31' is a share 310 on the inside of the point only and adapted to throw dirt from the point 31' substantially directly onto the conveyor 37. However, we find in cutting into higher embankments and especially where it is desired to blend the dirt from a plurality of strata, the vertically extending blade 31*b* is very advantageous. As shown in Figs. 2 and 5, this blade extends between two and three feet above point 31, but we contemplate the extension of this blade portion 31*b* to a height of eight or ten feet if necessary in making deep cuts.

It will be noted in Figs. 1 and 4 that the plow point 31 is offset laterally outside of the beam 11, a distance of the order of eight inches to a foot. This is for the purpose of insuring that the point 31 and cutting edge 31*b* is the first surface of the apparatus to engage an embankment which is to be cut. It will be noted that the plow point 31 is rigidly connected by means of plate 38 with the push beam 23, and this plate 38 also serves for the raising and lowering of the blade means as will presently appear. The push beam 23 is almost directly back of the plow point 31 and in line with the landside thereof as clearly shown in Fig. 4.

Suitable mold board means is provided to direct all dirt between the points 31 and 32 on-

to the conveyor 37 which is arranged to receive this dirt from the rearmost portion of the generally concavely arranged cutting blades. Referring to Figs. 4 and 5, a mold-board portion 39 extends upwardly from the blade 33 at an angle of approximately eighty degrees with respect to the ground. A mold-board portion 40 slopes upwardly and rearwardly at approximately forty-five degrees from the blade 35. A small hardened casting 41 is provided at the point 34 to make a smooth connection between the blades 33 and 35 and between the mold-board portions 39 and 40. Another mold-board portion 41' leads inwardly and upwardly at the lower end of the conveyor to insure that all dirt moving along the mold-board portion 40 is directed toward the conveyor belt.

Means is provided for raising and lowering the earth-cutting devices above described. To this end the hydraulic jack 42 is provided with the trunnion mounting 43 on the drawbar 18. This jack has a piston (not shown) and a piston rod 44 which is pivotally connected at 45 with a pair of crank arms 46 which are rigidly connected to the torque beam 47 extending from side to side of the vehicle. At one end, this torque arm is rigidly connected with plate 48 which is pivotally mounted at 49 on ears connected with beam 13. At the opposite end, the torque arm is connected with plate 50 by means of the offset members 51 and 52 which pass up and over the beam 11. The plate 50 is pivotally mounted at 53 on the beam 13. The plate 50 is connected by two parallel links 54 with the upper end of plate 38 for the support of push beam 23. The plate 48 and one of the plates 46 pivotally support truss link 55 which is pivotally connected with a bracket 56 which is a rigid bracket upstanding on the forward end of push beam 24. It results from this construction that when control means (not shown) for hydraulic jack 42 is operated, it drives the piston rod 44 backward and forward thus causing oscillation of the torque beam 47, oscillating plates 48 and 50 about their pivotal mountings and through the link connections raising or lowering the push beams 23 and 24. Side thrust of the digging means is resisted by the truss link 55.

It should be noted that the conveyor 37, previously mentioned, has its lower end mounted on the push beams 23 and 24 so as to move up and down with the mold board and cutting means. This conveyor is of a conventional type and comprises an endless belt 37 travelling over troughing idlers from the tail pulley 57 to the head pulley 58 with the usual idle or return run underneath. The rear end of the conveyor is mounted on an over-center device which permits an operating position as shown in full lines in Fig. 1 where the conveyor is positioned diagonally of the frame and extends upwardly, rearwardly, and toward the right, as viewed in Fig. 1, crossing the lower portion of frame member 12 to pass outside of the confines of the main frame so that material discharged from the top of the cnveyor may fall directly into a hauling wagon or the like traveling in a path parallel to the cutting and loading device as indicated in dot-dash lines in Fig. 3. A second position of the conveyor is possible as shown in the dot-dash lines of Fig. 1. In this position the conveyor frame has been swung around the pivot mounting 59 (Fig. 4) where the main frame of the conveyor is pivotally mounted on a bracket connected with push beam 23. The over-center support at the rear end of the conveyor permits this movement of the entire conveyor from the diagonal position to the very nearly parallel position inside the frame as shown in dot-dash lines in Figs. 1 and 3.

The particular over-center device illustrated is of the strut type and comprises two substantially parallel struts 60 pivotally connected at their lower ends with the beam 16 at the rear end of the main frame and pivotally connected at their upper ends with a small beam 61 which underlies the conveyor 37. In the full line position of Figs. 1 and 3, the conveyor is retained in the position shown by means of the chain 62 which forms a tension member connected between the top of the post 25 and the frame of conveyor 37. It will be understood that the conveyor is quite heavy, and the force of gravity is sufficient to retain the conveyor in the full line position of Figs. 1 and 3. When it is desired to ship the apparatus either by hauling the same along a highway or loading it upon a flat car or the like, it is desirable to have the rear end of conveyor 37 in a lower position and within the confines of the main frame. This is accomplished by moving the upper rear end of the conveyor inwardly toward the main frame until the struts 60 pass over center from the full line position of Fig. 3 to the dot-dash line there shown. The conveyor then rests upon the cross beam 27 of the main frame.

Driving means for the conveyor comprises a motor 63 mounted on the frame 14 and having its power offtake shaft connected through the beveled gear arrangement 64 with the jointed propeller shaft 65 which in turn drives the head pulley 58 through bevelled gearing within the housing 66. Universal joints are provided at the points 67 and 68 on the propeller shaft so that an efficient drive is provided regardless of the alinement of the parts.

The return run of the conveyor belt 37*a* near the ground and adjacent the tail pulley 57 is protected against damage from sharp rocks and the like by means of a series of parallel bars 69 which extend rearwardly and upwardly between beams 29 and 30 as best seen in Figs. 2, 4, and 8. These bars are parallel to the path of travel of the cutting and loading apparatus, that is to say, parallel to the movement of the main frame along a cutting path. In this way the bars 69 act to protect the conveyor belt by riding over or deflecting rocks and other articles without scraping them up into a mound which would impede the progress of the apparatus.

The wheel means shown for supporting the main load of the entire trailer apparatus comprises the parallel endless crawler tracks 21 and 22 previously mentioned although it will be understood that ordinary wheels might be used at this point if desired. The reason we have shown the crawler tracks is that they give a greater bearing surface and permit the device to travel over soft ground without sinking in. We provide novel means for mounting these crawler tracks on an undercarriage together with means for tilting the loader relative to this undercarriage which makes it possible to control the grade cut by the digging and scraping means. To this end the tracks are provided with central supporting trunnions 21*a* and 22*a* respectively which are connected by means not shown with the frame portion of the crawler tracks. A type of track suitable for use here is disclosed in the copending application of Stewart F. Armington, Serial Number 493,555, filed July 5, 1943, and the trunnions 21*a*, 22*a* above de-

scribed corresponds to sleeve 24 in said copending application. These trunnions are mounted on a suitable undercarriage which here comprises a common shaft 70 which is preferably provided with a telescoping joint which is shown at 70a to permit slight elongation and contraction as is necessary during the adjustments about to be described. One end of this shaft is mounted in the ball-and-socket joint 71 supported from the bracket 72 which is mounted on the main frame member 12. This permits oscillation of the shaft 70 in a vertical plane and permits slight oscillation of the shaft in a fore-and-aft direction also. Near its other end the shaft 70 is provided with a bearing in a lever 73 intermediate the ends of the lever. This lever is pivoted at its forward end on the pivot pin 74 which is supported on bracket 75 which is rigid with and extends downwardly from the main frame member 11. This bracket at its lower end has a portion 75a extending laterally inwardly to give the proper position of pivot 74. The other end of the lever or beam 73 is pivotally connected at 76 with the piston rod 77 of the hydraulic jack 78 which in turn has a trunnion mounting at 79 on a bracket 80 which is connected with side frame member 11. It will be noted from examination of Figs. 1 and 9 that the pivot pin 74 is on a line A, which when extended passes through the ball-and-socket joint 71. The pivot pin 76 lies along the line B which is parallel to the line A. This reduces to a minimum any friction which might occur when the hydraulic jack 78 is actuated by means (not shown) to raise and lower the piston rod 77 so as to vary the angularity of shaft 70 with respect to the upper portion of the loader. By this means the crawler tracks 21 and 22 always rest flat upon the ground and the superstructure of the loader may be tilted relative thereto.

Preferably means is provided for properly locating the hauling vehicle 81 (Fig. 3) with reference to the cutting and loading apparatus. As best seen in Figs. 1 and 3, a beam 82 is provided rigidly connected with the main frame member 12. Most of the beam 82 is parallel to the path of travel of the cutting and loading device and adapted to abut the hub of the wagon wheel as shown in dot-dash lines in Fig. 3. The rear end of beam 82 at the portion 82a slopes gradually inward and rearwardly toward the main frame so as to guide the wagon 81 gradually into the proper position as the wagon approaches from the rear to take up a position parallel to the cutting and loading device preparatory to receiving a load. Preferably the front end of beam 82 has a short inclined portion 82b to insure against the hooking of the beam 82 into a vehicle.

Sometimes a scarifier is necessary to cut up the dirt before it passes onto the conveyor belt. The is particularly the case when operating on tough blue clay or black gummy clay. Since the scarifying device is often not necessary, it has been omitted from Figs. 1 and 2, but has been shown in the larger views of Figs. 4 and 5. The scarifier teeth 83a, 83b are rigidly mounted on opposite sides of beam 84 and depend downwardly therefrom. The forward end of this beam is pivotally mounted at 85 in the drawbar 18. The rear end of the beam is pivotally mounted at 86 on the horizontal cross member 87a of a U-shaped yoke 87. The side members of this yoke are pivoted respectively to the plates 50 and 51 which oscillate about the pivot 53 whenever the moldboard and cutting devices are raised and lowered by means of the jack 42. Thus the cutting points 83c of the scarifier teeth always maintain substantially the same level relative to the earth cutting portions of the device, namely the plow point 31 and the blades 33, 35, and 37. It results from this construction that the scarifier teeth cut the soil into three ribbons as it approaches the lower end of the conveyor, and each of the ribbons breaks up into chunks as it starts up the conveyor belt. This avoids the large pieces which might otherwise jam up the conveyor. Because of the connection of the beam 84 at its forward end to the drawbar, a strong pull on the scarifier teeth is assured.

A special positioning of the scarifier teeth is shown in Figs. 4 and 5. Looking toward the front of the machine or toward the drawbar 18, it will be noted that the scarifier tooth 83a, the one farthest toward the right, is positioned rigidly on the beam 84 in a position somewhat ahead of the tooth 83b which is to the left and to the rear of the tooth 83a and (if desired) at a slightly lower level as shown in Fig. 5. Both of the scarifier teeth are ahead of and to the right of the plow point 31. The details of the scarifier teeth are best seen in Figs. 15 and 16 where an elongated plate-like structure 83d is rigidly mounted on the beam 84 and carries at the lower end a renewable tooth 83c. By reference to Figs. 4 and 16, it will be noted that the points 83c have been given a moldboard design so as to throw the dirt upwardly and toward the right as the apparatus travels along its cutting path.

It results from the above-described scarifier tooth construction and positioning that the tooth 83a cuts a narrow strip of earth and throws it upward and slightly toward the right after which the tooth 83b cuts a strip equal to the distance separating the two scarifier teeth and throws it upward and slightly to the right. This action will be relatively free of resistance because of the gap made in the ground by the first tooth 83a. The remaining ribbon of dirt between tooth 83b and the plow point 31 will pass upward and onto the belt, in like manner having a space created for it by the action of the scarifier tooth 83b. The narrow strips or ribbons of earth will freely flow up to the conveyor since the conveyor extends in the same general direction as the flow of earth from teeth 83a and 83b.

As an aid to splitting up the dirt into ribbons as it passes onto the conveyor, digger teeth 90 may be rigidly mounted on the cutting blade 37' which extends in front of the tail pulley end of the conveyor 37. Two of these teeth are shown in Fig. 4, and the position and shape will be more clearly understood from Fig. 8. These teeth 90 are approximately in line with the cuts made by the scarifier teeth 83a and 83b, respectively, as the dirt moves back toward the conveyor 37.

A modified form of the connection from the drawbar 18 to the tractor 20 is shown in Fig. 14. There is a tendency for the apparatus, previously described, to travel toward the left as it moves along its cutting path. This action is largely due to the plow point 31 digging into the higher ground on the left side of the apparatus. It is also desirable to have the tractor 20 travel on ground the surface of which has already been cut level. To accomplish these two purposes, the hitch link 19 may be mounted on the cross beam 19a of the yoke (which is attached to the tractor) slightly to the left of the center line X of the tractor relative to the line of vehicle movement. In one form of our device we place a pivot pin 19b

a distance Y to the left of the center line X equal to approximately five inches. The construction of the yoke 19a makes it possible for the link 19 to swing still further to the left, as shown in Fig. 14, approximately another seven inches so that the center line of the drawbar 18 is approximately one foot to the left of the tractor's center line X. This equalizes the pull on the tractor and gives the tractor smooth ground to travel upon. Means is provided, as shown in Fig. 14, to compel the positioning of the link 19 toward the left of the path of travel of the digging apparatus when it is desired to insure a cut as far as possible to that side as when digging into a bank. This means comprises the screw 91 threaded into the bracket 92 and having its free end bearing against the link 19.

During normal cutting, the screw 91 may be backed off so that the link 19 would be free to swing back and forth, whichever way the loads were applied, and in this way decrease the side pull on the crawler tractor.

What we claim is:

1. In a device adapted to dig and load earth by travel along a path, a frame, wheel means supporting said frame for movement along the ground, earth digging means at the forward end of said frame, a conveyor for receiving earth from said digging means and for carrying the same rearwardly and upwardly, there being a pivot mounting for said conveyor on said frame permitting swinging of said conveyor at various angles relative to said path, strut means supporting the upper rear end of said conveyor on said frame, said strut means having one overcenter position where the upper rear end of said conveyor is outside said frame, and said strut means having a second overcenter position where the upper rear end of said conveyor is inside said frame.

2. In a device adapted to dig and load earth by travel along a path, a frame, wheel means supporting said frame for movement along the ground, earth digging means at the forward end of said frame, a subframe supporting said digging means, said subframe movably mounted on said frame to vary the position of said digging means relative to said frame, a conveyor for receiving earth from said digging means and for carrying the same rearwardly and upwardly, there being a pivot mounting for said conveyor on said subframe permitting swinging of said conveyor at various angles relative to said path, strut means supporting the upper rear end of said conveyor on said frame, said strut means having one overcenter position where the upper rear end of said conveyor is outside said frame, and said strut means having a second overcenter position where the upper rear end of said conveyor is inside said frame.

3. In a device adapted to dig and load earth by travel along a path, a frame, digging means near the front end of said frame, conveyor means adapted to receive earth from said digging means and to carry the same upwardly and rearwardly to an elevated discharge point laterally outside of said frame to there drop said earth into a hauling vehicle alongside said device, and an elongated beam carried by said frame adapted when engaged by a hauling vehicle to locate said vehicle in proper earth-receiving position, said beam having an end bent laterally to guide a vehicle along said beam.

4. In a device adapted to dig and load earth by travel along a path, a frame having on one side a laterally outermost side member adapted to be presented to an embankment to be cut into, wheel means supporting said frame for movement along the ground, said side member extending in a vertical plane generally parallel to said path of travel, a plow point supported on said frame at the forward portion of said first named side member and adapted to enter into the ground as said frame travels therealong, said plow point being offset laterally outside of said frame side member so that said point is the laterally outermost part of said device engaging soil on that side of said device, a conveyor extending from a low point adjacent and to the rear of said plow point diagonally upward and rearward toward the opposite side of said frame, said plow point having a forwardly directed point the bottom of which is substantially flat and the top of which slopes upwardly to the rear and having a share on the inside of said point only and adapted to throw dirt from said point substantially directly onto said conveyor.

5. In a device adapted to dig and load earth by travel along a path, a main frame, wheel means supporting said frame for movement along the ground, a subframe mounted on said frame for up-and-down movement relative thereto, said subframe comprising straight push beams pivotally mounted on a rear portion of said main frame, and a plow point carried by said subframe near its forward end and substantially directly in fore-and-aft alignment with one of said push beams, said one of said push beams being the laterally outermost frame member on that side of the device whereby said plow point is adapted to be presented to an embankment to be cut into, a conveyor extending from a low point adjacent and to the rear of said plow point diagonally upward and rearward toward the opposite side of said frame, said plow point having a forwardly directed point the bottom of which is substantially flat and the top of which slopes upwardly to the rear and having a share on the inside of said point only and adapted to throw dirt from said point substantially directly onto said conveyor.

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