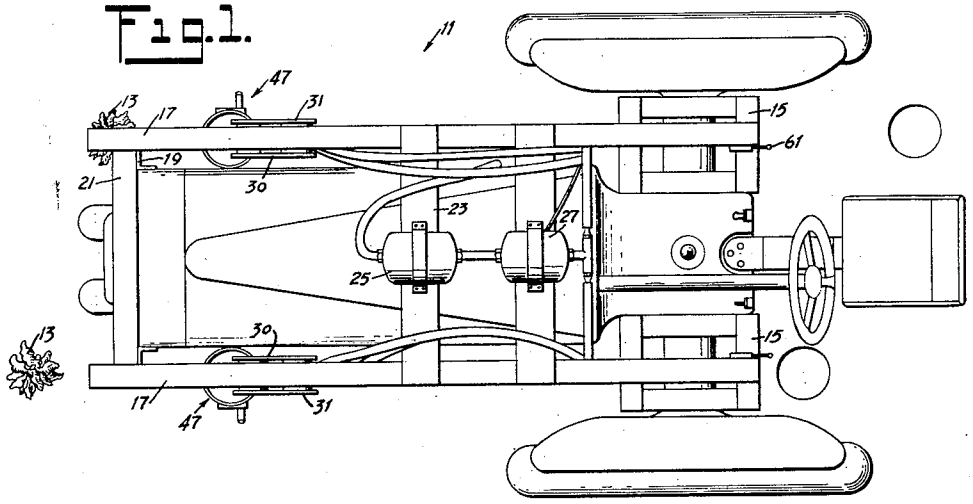
Jan. 29, 1957 A. D. CARTWRIGHT, JR 2,779,111

MEANS FOR TRANSPLANTING SHRUBBERY AND THE LIKE

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Fig. 1.



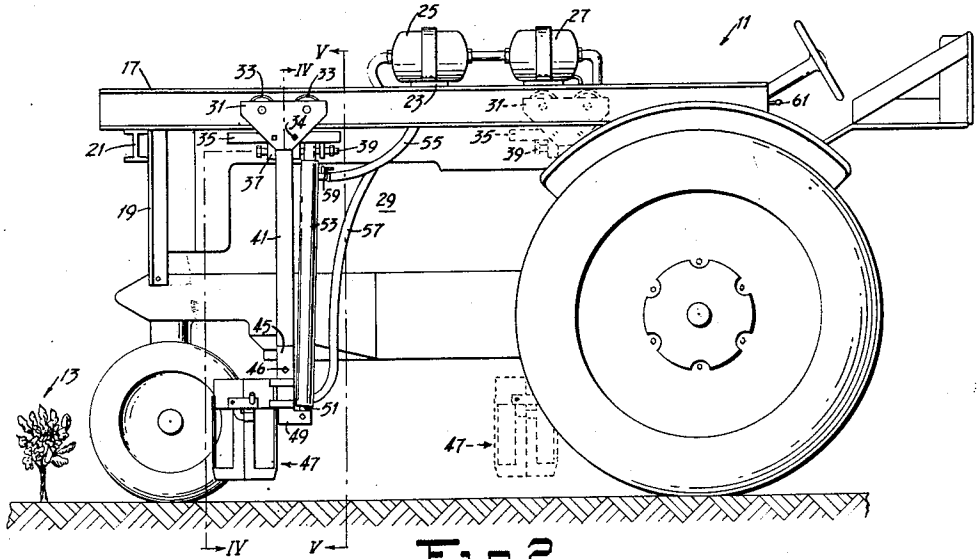


Fig. 2.

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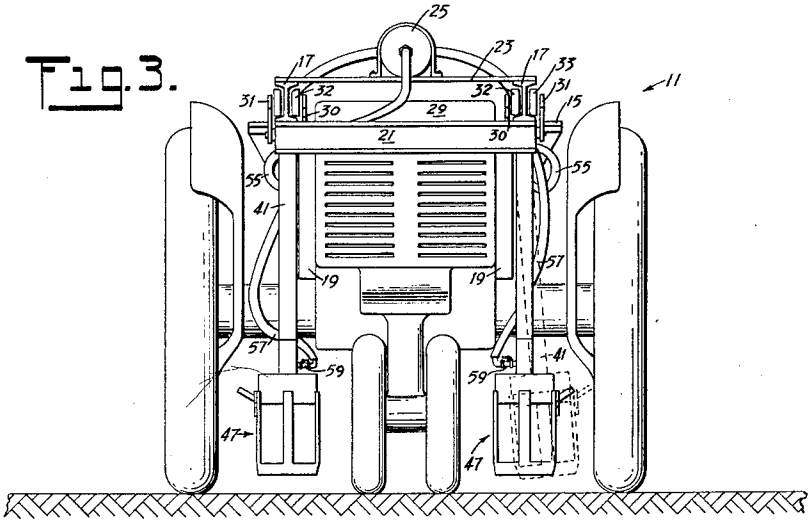
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Jan. 29, 1957 A. D. CARTWRIGHT, JR 2,779,111

MEANS FOR TRANSPLANTING SHRUBBERY AND THE LIKE

Filed May 3, 1954 2 Sheets-Sheet 2

Fig. 3.



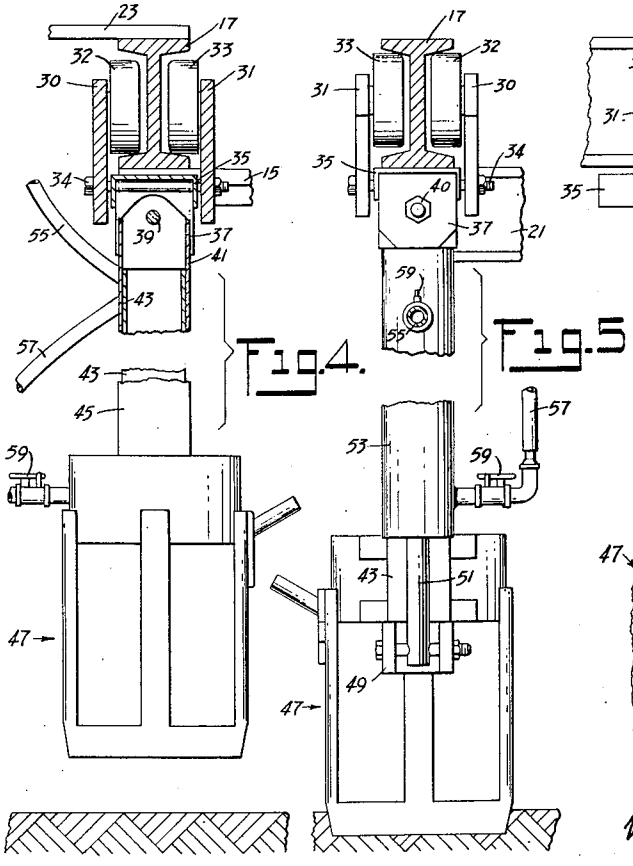


Fig. 4.

Fig. 5

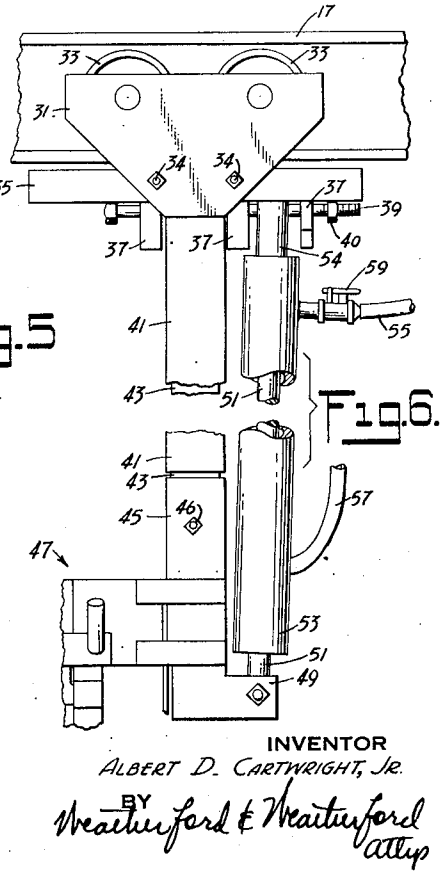


Fig. 6.

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United States Patent Office 2,779,111 Patented Jan. 29, 1957

2,779,111

MEANS FOR TRANSPLANTING SHRUBBERY AND THE LIKE

Albert D. Cartwright, Jr., Collierville, Tenn.

Application May 3, 1954, Serial No. 427,324

13 Claims. (Cl. 37—2)

This invention relates to certain new and useful improvements in means of effecting transplanting of shrubbery and similar plants, and particularly relates to a self-propelled vehicle type means for effecting transplanting.

More specifically the device relates to a self-propelled machine comprising means for supporting one or more excavating devices including digging elements in which the supporting means are relatively shiftable and limitedly swingable relative to the supporting vehicle and in which the device includes means for operating the excavating device.

Excavating devices approximately adapted for the purpose of excavating and/or lifting items such as shrubbery or other plants, both of manually transported and machine transported type have heretofore been known. The manually transported devices have laregly been undesirable because of the cumbersome character and the ineffectiveness of human ability to operate same in excavating shrubs or other plants. In addition the machine transported devices which have heretofore been contemplated have largely been characterized by relatively fixing excavating means upon and in connection with the supporting and transporting machine, resulting in an inflexible arrangement requiring great nicety and care in operation on the part of the operator of the transporting machine in order to effect proper positioning of the device for the excavation of a single plant or shrub, and in general requiring movement of the transporting machine to the location of each additional shrub or plant to be excavated, resulting accordingly in inaccuracy of operation and time-consuming duplication of movement.

The principal object of the present invention is to provide machine transported excavating means in which one or more excavating means is supported by the transporting machine and are mounted for longitudinal shift relative to the transporting machine.

A further object of the invention is to provide a machine transported excavating means in which the excavating means is limitedly rockably supported for fore and aft rocking relative to the transporting means.

A further object of the invention is to provide a machine transported excavating means in which the excavating means is laterally swingably mounted relative to the transporting machine.

A further object of the invention is to provide a machine transported excavating means with machine-powered operating means.

A further object of the invention is to provide in such a machine-transported excavating means, machine-powered hydraulic means for operating the excavating means; and

A further object of the invention is to generally improve the design, construction and efficiency of means for supporting and operating excavating means.

The means by which the foregoing and other objects of the present invention are accomplished and the manner of their accomplishment will be readily understood from the following specification upon reference to the accompanying drawings, in which:

Fig. 1 is a top plan view of a self-propelled machine embodying the present invention.

Fig. 2 is a side elevational view of the device as seen in Fig. 1, with certain parts additionally shown in dotted lines.

Fig. 3 is a front end elevational view of the device of Figs. 1 and 2, with the excavating means of the invention being additionally shown in dotted lines laterally swung outwardly.

Fig. 4 is a fragmentary view, partly in section and partly in elevation, taken on an enlarged scale as on the line IV—IV of Fig. 2, showing the excavating means at rest.

Fig. 5 is a fragmentary view, partly in section and partly in elevation on a similar scale, taken as on the line V—V of Fig. 2, and illustrating the excavating means as in position beginning ground penetration; and

Fig. 6 is a fragmentary side elevational view on a similar scale of the excavating means of the present invention.

Referring now to the drawings in which the various parts are indicated by numerals, the excavating means of the present invention are shown as supported and carried by a substantially conventional tractor 11, the drive wheels of the tractor being transversely spaced apart to straddle two rows of plants or shrubs 13. Preferaebly tractor 11 is provided with an upper supporting framework 15, framework 15 preferably including a pair of laterally spaced, parallel, longitudinally extending track members 17 which are preferably formed of I-beams disposed with their flanges horizontal and their webs vertical. The framework also may include supports such as forward posts 19, and a transverse tie member 21.

Intermediate their lengths the upper surface of the track member 17 provides a support for a transversely disposed platform 23 which may consist, as illustrated, of a pair of spaced plate-like members. Mounted on and rigidly fixed to the platform 23 is a suitable reservoir or tank 25 for retaining a supply of hydraulic fluid, withdrawal and delivery of fluid from the tank being accomplished by suitable pump means, such as the pump 27, which may be drivingly connected to the engine 29 of tractor 11, or may be electrically powered from the tractor system.

Mounted on the track members 17 are supporting carriages for the excavating means of the device, these carriages preferably consisting of inner and outer plates 30, 31, each of the plates 30, 31 providing a support for a pair of wheels 32, plates 31 each providing a support for a pair of wheels 33, the wheels being suitably journalledly connected to the respective plates 30, 31. The plates 30, 31 beneath the track members 17 are rigidly connected, as by bolts 34, to a longitudinally disposed channel section 35, the flat web of the channel 35 being the uppermost portion of the channel section and closely underlying the lower face of the lower flange of the respective track members 17, with the channel section web being slightly spaced from the face of the track flange when the excavating means are at rest, as best shown in Fig. 4. With the device thus connected the wheels 32, 33 are positioned to ride in the inner and outer channels of the I-beam track members 17. It will be observed that the diameter of wheels 32, 33 is slightly less than the vertical space between the upper and lower flanges of the track members 17 so that the wheels 32, 33 when the excavating means are at rest normally ride upon the upper face of the lower flange of the track members and are spaced slightly away

from the under face of the upper flange of the track members, as shown in Figs. 2 and 4.

The carriage thus formed consists of an inner triangular plate 30, an outer triangular plate 31, an inner pair of wheels 32, an outer pair of wheels 33 and a longitudinally disposed channel section 35, which, it will be observed is freely shiftable along the respective track members 17. Rigidly connected, preferably as by welding, to channel sections 35 and depending downwardly therebelow so as to extend downwardly beyond the limits of the depending flanges of channel sections are rigid ears 37 which are longitudinally spaced apart and which are apertured to receive a longitudinally disposed pivot rod 39, pivot rod 39 being preferably provided with a head at one end and being threaded at its opposite end for engagement by a nut 40 so as to provide for the removable attachment of pivot rod 39 in ears 37.

Embraced between two of the ears 37 is the upper end of a hollow elongated guide sleeve 41 which is preferably of square internal cross section. The upper end of guide sleeve 41 is apertured for the extension therethrough of pivot rod 39, which, when received within the apertures, mounts and supports the guide sleeve for limited lateral swinging movement relative to the carriage. Within guide sleeve 41 a slide member 43 is slidably and telescopically mounted. Slide members 43 are of a cross sectional shape complementarily of the internal section of guide sleeve 41, and in the preferred embodiment are of square cross section, thus engaging with the guide sleeve against relative rotation. The lower end of slide member 43 projects below the open lower end of guide sleeve 41 and extends into the upwardly open mouth of a complementarily shaped socket 45, slide member 43 extending into and engaging with the socket 45, and being rigidly, detachably connected thereto as by a suitable bolt 46. Rigidly connected to the socket 45 and projecting laterally therefrom so as to be forwardly offset from beneath slide member 43 is a vertically disposed sectional digging element 47, preferably consisting of a pair of substantially semi-cylindrical sections hingedly connected by vertical hinges for opening and closing movement and being adapted to surround and embrace a plant 13 for digging and excavating such plant. Preferably the lower edge of digging element 47 is sharpened for ground digging penetration.

The slide 43 extends through the socket 45 and projects therebelow and a clevis 49 is rigidly fixed to the lower end of slide member 43 and projects laterally therefrom, being disposed to project rearwardly or oppositely to the offset of digging element 47. To the clevis is detachably secured the distal end of a piston rod 51, piston rod 51 being mounted in and operated by a double action hydraulic cylinder 53. The upper end of hydraulic cylinder 53 is connected to pivot rod 39 as at 54. Hydraulic fluid for operation of cylinder 53 and extension of rod 51 is provided through a hydraulic pipe 55 connected to pump 27 and reverse flow of hydraulic fluid for retraction of piston rod 51 is supplied from pump 27 as through hydraulic line 57. Control of flow to hydraulic cylinder 53 for extension or retraction of piston rod 51 may be effected through conveniently located hand valves 59, 59 and additional control, if desired, may be provided by a convenient two-way valve 61 located on the tractor 11.

In operation of the excavating means of the present device, the operator of the tractor vehicle may drive the self-propelled unit so as to overlie a pair of adjacent rows of plants 13. As will be observed, the trackways 17 are transversely spaced apart at approximately the spacing between such adjacent plant rows, and the wheels of tractor 11 are spaced apart to straddle such two adjacent rows. In the present device the driver of the tractor may concentrate his attention upon forwardly guiding the device along its path of travel so as not to crush any of the rows of the plants with the wheels of the tractor, and when the tractor has been advanced to a point approximately near the plants which it is desired to excavate as for transplanting, the vehicle may be brought to a halt. It will be appreciated, as is readily apparent, that, while the spacing of planting of shrubs and the like is intended to be substantially uniform, it is practically impossible to exactly spot all shrubs and plants in an exact pattern of uniform planting. Additionally when plants are being selected for transplanting it frequently is found that plants immediately opposite in adjacent rows are not uniformly desirable for such removal and that often the plants which must be removed are in staggered relation, the one to the other. With the present invention the tractor is positioned approximately in the vicinity of the plants which it is thought will be desired to be moved.

The operator of the excavating means generally is on the ground adjacent the plants and may grasp either of the depending members, that is the guide sleeve 41 or the hydraulic cylinder 53, and may shift the carriage of the excavating means longitudinally along the trackway 17 until the same has been brought to a position overlying a plant which is selected for excavation. Thus it will be seen that one of the excavating means may be positioned forwardly of the tractor and trackways, as for example in the positions shown in Fig. 1 and in full lines in Fig. 2, or it may be shifted to a position further rearwardly along the trackways, as for example in the position shown in dotted lines in Fig. 2. Thus it can be seen that great flexibility in positioning the excavating means longitudinally of the trackways is provided by the present invention, thus minimizing the necessity of shifting the tractor in order to bring the excavating means into use position adjacent the plant to be dug. Additionally it is frequently found that the plants are not exactly longitudinally alined although they are planted substantially along the longitudinal line, but when slightly out of line it becomes necessary to effect a lateral shift of the excavating means. With the arrangement of the present invention the excavating means are supported for limited lateral swinging movement, as best shown in Fig. 3, being capable of swinging outwardly as shown in dotted lines in Fig. 3, and thus enabling the digging element to be positioned over a plant which is out of longitudinal alinement.

When the position of the excavating means relative to the plant to be dug has been established, the digging element 47 may be opened and placed to surround the foliage and branches of the plant. Thereafter the ground operator may open the valve 59 on upper line 55 causing the introduction of hydraulic fluid supplied from pump 27 into the hydraulic cylinder 53 and immediately exerting an extending pressure on piston rod 51.

As the piston rod 51 is extended the lower sharpened edge of digging element 47 comes into ground contact. Immediately upon the ground contact the downward force being exerted effects a reaction and forces the carriage upwardly, moving the upper web of the carriage longitudinal channel 35 into firm contact with the lower flange of trackway 17 and also moving the wheels 32, 33 upwardly into contact with the underside of the upper flange of trackway 17. With the device thus moved upwardly under the action of the hydraulic operation it will be seen that an immediate braking effect is placed upon the carriage, thus insuring that no undesired or accidental longitudinal shift of the carriage means and of the excavating means supported thereby will take place while the actual excavation of the plant is undertaken, thus eliminating the possibility of damage to the root system of the plant which might occur if for example the carriage were permitted to freely shift during such excavation.

The hydraulic system continues to exert its force upon the piston rod 51 which, acting through the clevis 49, moves downwardly the slide member 43 and consequently

moves downwardly the socket 46 which is rigidly secured, as heretofore described, to the slide member 43, moving with it the forwardly offset digging element 47. It will be seen that by virtue of the rearward offset of the connection of the piston rod 51 to the clevis 49 and the forward offset of digging element 47 from the socket 46 that there is in effect a balancing of the force exerted in that the digging element 47, being forwardly offset, exerts under gravity a downward and rearward force, while the piston rod, which as can be best observed in Fig. 6, is set at a slight angle of divergence from the upright slide member 43 and guide sleeve 41, exerts a downward and forward force as the piston rod is extended. In this manner the bucket is maintained for movement substantially parallel to the guide sleeve 41 and thus undesired binding which might otherwise result is avoided.

When the digging element 47 has been forced downwardly to the desired depth for digging out the plant 13 the valve 59 on upper line 55 may be closed, shutting off the rod extending flow through line 55 into the cylinder 53 and the lower valve 59 on line 57 opened, introducing fluid under pressure into the lower end of the cylinder 53 and thus effecting a retraction of piston rod 51, releasing the braking engagement, drawing upwardly with it the clevis, slide member 43, socket 45, digging element 47 and the excavated plant which is carried upwardly by the digging element. When the device has been raised above the ground level the carriage carrying the excavating means and the plant excavated may be shifted along the trackway so as to enable the plant to be rested on the ground level and removed from the digging element without the necessity of having to otherwise block off the excavation from which the plant has been removed.

If it is desired to remove another plant which is adjacent (within the length of trackways 17) in the same plant row, it will be observed that the excavating means may be shifted as heretofore described until it is satisfactorily positioned relative to the additional plant without the necessity of moving the tractor vehicle which carries the device. The operation may then be proceeded with and repeated in the manner already described.

Simultaneously the operation of the excavating means on the opposite side of the tractor may be independently proceeded with, with the excavating means being positioned as desired along the opposite plant row and selected plants removed as desired.

It will be understood that the embodiment of the invention which has been illustrated and described is the preferred embodiment thereof, but that it is but one specific embodiment of the invention and that details of the construction shown may be altered without departing from the spirit of the invention as defined by the following claims.

I claim:

1. A self-propelled machine for excavating shrubs or plants for transplanting, comprising a tractor, longitudinal track means mounted on said tractor, carriage means shiftably supported by said track means, said carriage means including inner and outer wheel means rollingly engaging opposite sides of said track means, a web connected with said wheel means, said web closely underlying said track means and being spaced therebelow, a longitudinally disposed pivot rod connected to said web means, a guide member dependingly connected to said carriage means, said guide member being laterally swingably mounted on said pivot rod, a slide member telescopically and non-rotatably engaged with said guide member, said slide member extending below and being slidable relative to said guide member for extension therefrom and retraction thereinto, a digging element adapted for ground penetration connected to said slide member below said guide member, said digging element being forwardly offset from said slide and guide members, hydraulic cylinder-and-piston means dependingly connected to said carriage means, said cylinder-and-piston means being laterally swingably supported on said pivot rod and including an extensible and retractible piston rod, with said piston rod extending downwardly, said piston rod converging downwardly toward and at its lower end being connected to the lower end of said slide member, the connection between said piston rod and said slide member being offset from said slide member oppositely to said digging element offset, hydraulic means for actuating said piston rod to selectively effect extension and retraction movements thereof and of said slide member and digging element, said carriage means being normally freely shiftable along said track means, hydraulic actuation to effect piston rod extension moving said digging element into ground penetrating contact and engaging said web against said track means to fix said carriage means in relative longitudinal position during ground penetration.

2. A self-propelled machine for excavating shrubs or plants for transplanting, comprising a tractor, longitudinal track means mounted on said tractor, carriage means shiftably supported by said track means, said carriage means including inner and outer wheel means rollingly engaging opposite sides of said track means, a longitudinally disposed pivot rod connected to said carriage means, a guide member dependingly connected to said carriage means, said guide member being laterally swingably mounted on said pivot rod, a slide member telescopically and non-rotatably engaged with said guide member, said slide member extending below and being slidable relative to said guide member for extension therefrom and retraction thereinto, a digging element adapted for ground penetration connected to said slide member below said guide member, hydraulic cylinder-and-piston means dependingly connected to said carriage means, said cylinder-and-piston means being laterally swingably supported on said pivot rod and including an extensible and retractible piston rod, with said piston rod extending downwardly, said piston rod converging downwardly toward and at its lower end being connected to the lower end of said slide member, hydraulic means for actuating said piston rod to selectively effect extension and retraction movements thereof and of said slide member and digging element, said carriage means being normally freely shiftable along said track means, hydraulic actuation to effect piston rod extension moving said digging element into ground penetrating contact.

3. A self-propelled machine for excavating shrubs or plants for transplanting, comprising a tractor, longitudinal track means mounted on said tractor, carriage means shiftably supported by said track means, said carriage means including wheel means rollingly engaging said track means, a web connected with said wheel means, said web closely underlying said track means and being spaced therebelow, a guide member dependingly connected to said carriage means, a slide member telescopically engaged with said guide member, said slide member extending below and being slidable relative to said guide member for extension therefrom and retraction thereinto, a digging element adapted for ground penetration connected to said slide member below said guide member, hydraulic cylinder-and-piston means dependingly connected to said carriage means, and including an extensible and retractible piston rod, with said piston rod extending downwardly, said piston rod converging downwardly toward and at its lower end being connected to the lower end of said slide member, hydraulic means for actuating said piston rod to selectively effect extension and retraction movements thereof and of said slide member and digging element, said carriage means being normally freely shiftable along said track means, hydraulic actuation to effect piston rod extension moving said digging element into ground penetrating contact and engaging said web against said track means to fix said carriage means in relative longitudinal position during ground penetration.

4. A self-propelled machine for excavating shrubs or

plants for transplanting, comprising a tractor, longitudinal track means mounted on said tractor, carriage means shiftably supported by said track means, a plate connected with said carriage means, said plate closely underlying said track means and being spaced therebelow, excavating means connected to said carriage means, said excavating means being laterally swingably mounted on said carriage means, power means dependingly connected to said carriage means, said power means being coupled to said excavating means to selectively effect extension and retraction movements of said excavating means into and out of ground penetrating contact, said carriage means being normally freely shiftable along said track means, power means actuation to effect extension of said excavating means into ground penetrating contact engaging said plate against said track means to transfer the weight of said tractor to said excavating means for ground penetrating thrust and fix said carriage means in relative longitudinal position during ground penetration.

5. Means for excavating shrubs or plants for transplanting, comprising a vehicle, longitudinal track means mounted on said vehicle, carriage means shiftably supported by said track means, a guide member dependingly connected to said carriage means, said guide member being laterally swingably mounted on said carriage means, a slide member telescopically engaged with said guide member, said slide member extending below and being slidable relative to said guide member for extension therefrom and retraction thereinto, a digging element adapted for ground penetration connected to said slide member below said guide member, power means dependingly connected to said carriage means including an extensible and retractible downwardly extending rod, said rod at its lower end being connected to the lower end of said slide member, said power means being connected to said rod for rod actuation to selectively effect extension and retraction movements thereof and of said slide member and digging element, said carriage means being normally freely shiftable along said track means, actuation to effect rod extension moving said digging element into ground penetrating contact.

6. Transplanting means comprising track means, carriage means shiftably mounted on said track means, said carriage means including braking means adjacent said track means, digging means supported by said carriage means, said digging means including extensible telescoping members substantially perpendicular to and extending downwardly from said braking means, power means coupled to said digging means for actuation thereof, and means supporting said track means and power means for transportation from place to place, power actuation of said digging means moving said braking means into braking contact with said track means to immobilize said carriage means, and to transfer the weight of said supporting means to said digging means for ground penetration.

7. Transplanting means comprising a vehicle, track means mounted on said vehicle, carriage means mounted on said track means for relative longitudinal shift, said carriage means including braking means underlying a portion of said track means and being limitedly vertically shiftable relative to said track means to move said braking means into and out of braking contact with said track means, digging means supported by said carriage means, said digging means being laterally swingably mounted on said carriage means and including substantially vertically extensible members, hydraulic power means coupled to said digging means for extending and retracting thrust actuation thereof, and means supporting said track means and power means for transportation from place to place, thrust extending actuation of said digging means reacting to vertically shift said carriage and move said braking means into braking contact with said track means to transfer the weight of said vehicle to said digging means for ground penetrating thrust and immobilize said carriage means against shift.

8. A self-propelled machine for excavating shrubs or plants for transplanting, comprising a tractor; longitudinal track means mounted on said tractor; extensible and retractable connecting means, means for shifting said connecting means from and to a retracted position and to and from extended ground penetrating positions, excavating means connected to said connecting means adjacent the lower end of said connecting means, means adapted to engage said track connected to said connecting means adjacent the upper end of said connecting means and closely underlying said track; suspending means; said connecting means, said track engaging means and said excavating means shiftably suspended from said track by said suspending means when said connecting means is in said retracted position; said track engaging means, said connecting means and said excavating means supporting part of the weight of said tractor when said connecting means is in said ground penetrating positions, thereby effecting penetration of the earth by the thrust developed from the weight of said tractor.

9. A self-propelled machine for excavating shrubs or plants for transplating, comprising a tractor, longitudinal track means mounted on said tractor, carriage means shiftably supported by said track means, a longitudinally extending plate connected with said carriage means, said plate closely underlying said track means and being spaced therebelow, a pair of depending longitudinally spaced ears rigidly attached to said plate, a longitudinally disposed pivot rod rigidly connected to and interposed between said ears, a depending guide member laterally swingably mounted on said pivot rod, excavating means connected to said guide member, power means dependingly connected to said carriage means, said power means being coupled to said excavating means to selectively effect extension and retraction movements of said excavating means into and out of ground penetrating contact, said carriage means being normally freely shiftable along said track means, power means actuation to effect extension of said excavating means into ground penetrating contact engaging said plate against said track means, thereby effecting penetration of the earth by the thrust developed from the weight of said tractor and fixing said carriage means in relative longitudinal position during ground penetration.

10. A self-propelled machine for excavating shrubs or plants for transplanting comprising a tractor, longitudinal track means mounted on the side of said tractor, carriage means shiftably supported by said track means adapted to be shiftable along the side of said tractor, a longitudinally extending plate connected with said carriage means, said plate closely underlying said track means and being spaced therebelow, excavating means connected to said carriage means, power means dependingly connected to said carriage means, said power means being coupled to said excavating means to selectively effect extension and retraction movements of said excavating means into and out of ground penetrating contact, said carriage means being normally freely shiftable along said track means, power means actuation to effect extension of said excavating means into ground penetrating contact engaging said plate against said track means, thereby effecting penetration of the earth by the thrust developed from the weight of said tractor and fixing said carriage means in relative longitudinal position during ground penetration.

11. A self-propelled machine for excavating shrubs or plants for transplanting, comprising a tractor, longitudinal track means mounted on said tractor, carriage means shiftably supported by said track means, said carriage means including inner and outer wheel means rollingly engaging opposite sides of said track means, a plate below said track means connected to said wheel means, a guide member dependingly connected to said

carriage means adjacent to and below said plate, a slide member telescopically and non-rotatably engaged with said guide member, said slide member extending below and being slidable relative to said guide member, for extension therefrom and retraction thereinto, a digging element adapted for ground penetration connected to said slide member below said guide member, hydraulic cylinder-and-piston means dependingly connected to said carriage means, said cylinder-and-piston means including an extensible and retractible piston rod, with said piston rod extending downwardly, said piston rod converging downwardly toward and at its lower end being connected to the lower end of said slide member, hydraulic means for actuating said piston rod to selectively effect extension and retraction movements thereof and of said slide member and digging element, said carriage means being normally freely shiftable along said track means, hydraulic actuation to effect piston rod extension moving said digging element into ground penetrating contact.

12. A self-propelled machine for excavating shrubs or plants for transplanting, comprising a tractor, longitudinal track means mounted on said tractor, carriage means shiftably supported by said track means, said carriage means including inner and outer wheel means rollingly engaging opposite sides of said track means, a plate below said track means connected to said wheel means, a guide member dependingly connected to said carriage means adjacent to and below said plates, a slide member telescopically and non-rotatably engaged with said guide member, said slide member extending below and being slidable relative to said guide member for extension therefrom and retraction thereinto, a digging element adapted for ground penetration connected to said slide member below said guide member, means connected to said slide member selectively effecting extension and retraction movements of said slide member and digging element, said carriage means being normally

freely shiftable along said track means, actuation to effect piston rod extension moving said digging element into ground penetrating contact.

13. A self-propelled machine for excavating shrubs or plants for transplanting, comprising a tractor, a pair of longitudinal tracks mounted on said tractor respectively at the opposite sides of said tractor above ground level, a pair of carriages respectively shiftably supported by said tracks, each said carriage including inner and outer wheels rollingly engaging the opposite sides of its related said track, a plate underlying and below said tracks and connected to said inner and outer wheels, a guide member dependingly connected to said carriage means, each said guide member depending alongside said tractor substantially perpendicularly to said plate, a slide member telescopically and non-rotatably engaged with said guide member, said slide member extending below and being slidable relative to said guide member for extension therefrom and retraction thereinto, a digging element adapted for ground penetration connected to said slide member below said guide member, means connected to said slide member for selectively effecting extension and retraction movements of said slide members and digging elements, said carriages being normally freely shiftable along said tracks, actuation to effect piston rod extension moving said digging elements into ground penetrating contact alongside said tractor.

References Cited in the file of this patent

UNITED STATES PATENTS

694,836	Cook	Mar. 4, 1902
1,302,861	Schott	May 6, 1919
1,431,491	Schacht	Oct. 10, 1922
1,764,935	Davey et al.	June 17, 1930
2,035,980	Pope	Mar. 31, 1936
2,169,913	De Nault	Aug. 15, 1939
2,639,048	Glashaw	May 19, 1953