Oct. 26, 1948. R. C. ZUCKERMAN 2,452,418

BEET DIGGER

Filed May 29, 1944 2 Sheets-Sheet 1

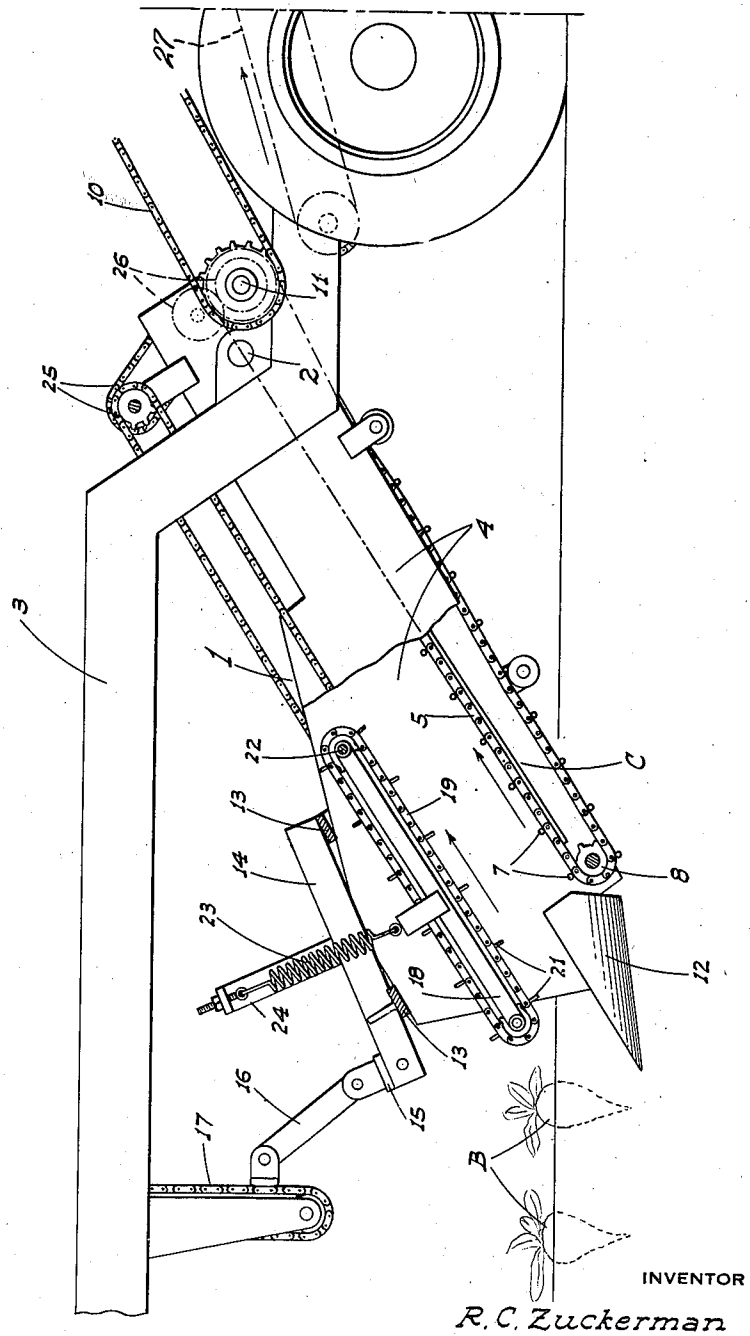


Fig. 1

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Fig. 2

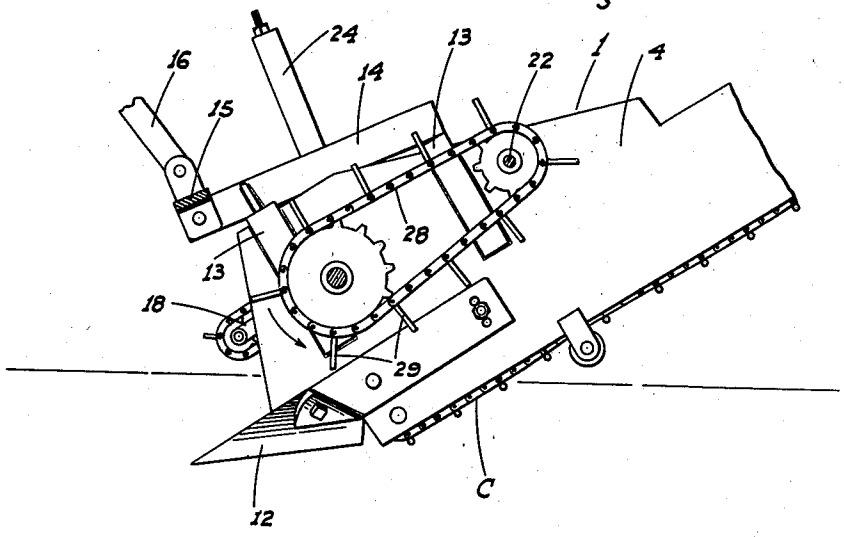
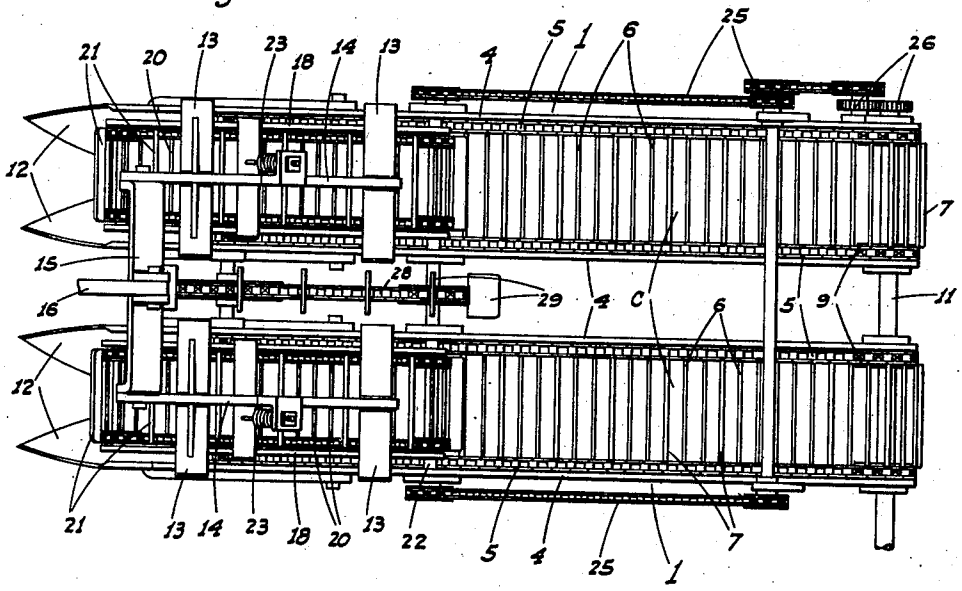


Fig. 3



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BEET DIGGER

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Application May 29, 1944, Serial No. 537,794

5 Claims. (Cl. 55—138)

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This invention relates to beet digging devices, my principal object being to provide a beet digging mechanism which, while using conventional beet lifting and elevating elements, combines these elements together with certain novel features in such cooperating relationship as to produce an extremely efficient beet digging, conveying and cleaning unit.

It is also an object of the invention to mount the digging unit in such a manner that there is no tendency for the same to buckle out of the ground during digging operations, as is frequently the case with conventional digging devices.

The digging units are preferably arranged in transversely spaced pairs in order to dig two rows of beets simultaneously; and in their operation a certain amount of dirt is inevitably pushed and lifted up ahead of the units. Since these units, on account of the somewhat close spacing of adjacent beet rows, are similarly spaced, such lifted dirt tends to crowd and clog between the units and retard the advance thereof. A further object of my invention therefore is to provide, in connection with a pair of spaced digging units, a dirt engaging means which digs into and spreads out the constantly crowding dirt and prevents the same from clogging between the units.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Figure 1 is a side elevation of my improved beet digging mechanism, partly in section, and shown as mounted in connection with a wheel supported frame and in operative position.

Figure 2 is a fragmentary longitudinal section of the mechanism taken between the two digging units to show the dirt engaging and spreading or leveling device therebetween.

Figure 3 is a top plan view of the mechanism detached from the supporting frame.

Referring now more particularly to the characters of reference on the drawings, the mechanism comprises a pair of duplicate beet digging and conveying units, indicated generally at 1 and disposed in transversely spaced relation a predetermined distance, according to the conventional spacing of adjacent beet rows. These units are pivoted in common adjacent their rear end, as at 2, on a wheel supported frame 3 movable along the ground.

Each unit comprises side frame plates 4, the forward portions at least of which are relatively

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high. An endless beet elevator and conveyor C is mounted between and extends lengthwise of the plates 4 adjacent the bottom thereof, said conveyor comprising side chains 5 connected by cross bars 6 in relatively close relation and having shallow cross cleats at intervals. The chains are carried on end sprockets 8 and 9, the sprockets 8 being relatively small. The chains of both digging units are driven so that their upper runs travel rearwardly by suitable drive means, indicated at 10 and applied to the rear shaft 11 of the sprockets 9.

Beet digging or lifting plows 12 of conventional form are mounted at and project from the forward end of the plates 4 in position to deliver onto the upper run of the conveyor at its forward end. Longitudinally spaced arch members 13 rigidly connect and stiffen the side plates 4 of each unit at the front, said members being connected with each other by a longitudinally centrally disposed bar 14. The bars 14 of the two digging units are connected at their forward end by an arch 15, from which a centrally disposed link 16 extends upwardly to a suitable depth control device, here shown as being an endless vertical chain 17 mounted on the frame 3; the link 16 being connected to the rear run of said chain.

By this means the two digging units are rigidly connected together for simultaneous raising and lowering movement and may be positioned and held at any desired digging level or so that the lifting plows 12 pass under and exert a lifting action on the beets B as the machine advances. The initially lifted beets, as they pass between the plows to the rear end thereof, are engaged by the cross bars and cleats of the elevating conveyor C, the upper run of which travels rearwardly, as stated.

In order to increase the efficiency of the beet elevating and conveying action, and maintain the throat of the unit (adjacent the forward end of the plates 4) clear of any accumulation of beets and dirt which might otherwise tend to clog the unit, I provide the following device:

Disposed between the forward portion of the plates 4 a predetermined distance above the corresponding portion of the conveyor C is another endless booster conveyor 18 which also comprises chains 19, cross bars 20, and projecting cleats 21, the latter being preferably deeper than the cleats 7. The conveyor 18 is pivoted at its rear end on a cross shaft 22 extending across and common to the conveyors of the two units; the forward end of each conveyor 18 overhanging the corresponding plows 12 some distance ahead of the

lower conveyor C, as shown in Fig. 1. Each conveyor 18 is floatably hung so that it can yield and swing about the shaft 22 as an axis, by means of a tension spring 23 connected at its lower end to the conveyor intermediate its ends and adjustably hung from a post 24 upstanding from the bar 14. The shaft 22 is driven so that the lower run of conveyor 18 moves rearwardly by a suitable device connected with the shaft 11 at one end thereof, and which includes chain drives 25 and direction reversing gearing 26.

By reason of this auxiliary conveyor 18 the beets as lifted by the plows and moved toward the lower main conveyor C, are engaged by the cleats on the upper conveyor 18 and forced rearwardly onto the lower conveyor, said conveyor 18 also engaging and breaking up any dirt in its path. The conveyor 18, due to its spring suspension, can yield upwardly as may be necessary to accommodate itself to beets and accumulated masses of dirt of different heights. The two conveyors C and 18 thus work together to elevate the beets, keeping the throat of the unit clear and tending to efficiently break up any clods which may be intermingled with the lifted beets, so that the latter are discharged from the main conveyor C onto the secondary or carry-off conveyor 27 at the rear of the main conveyor in a relatively clean condition. Further cleaning of the beets, or the separation thereof from any dirt, is then accomplished as the beets move along said conveyor 27 for depositing with a truck or the like following along with the machine.

The two units, including the relatively high side plates, unavoidably form a somewhat narrow passage therebetween, which is apt to become clogged with dirt thrown up by the action of the plows. To engage and spread this dirt and thus prevent the clogging of the same, I mount a relatively short endless single-chain conveyor 28 in a fixed position in said space, with relatively wide and deep ground engaging cleats 29 projecting from the chain. The rear end of the conveyor 28 is mounted on the drive shaft 22 so that the lower run of said conveyor moves rearwardly; said lower run at its forward end extending to adjacent the rear end of the plows and being at such a level that the cleats 29 on said run extend to approximately ground level when the digging units are in an operative position, as shown in Fig. 2.

Due to the particular mounting of the digging units, including the digging plows as described, that is, with the point of mounting of the conveyor on the main frame at the rear end of said conveyor frame, the plows are pushed instead of being pulled through the ground and hence there is no chance for them to pull out of the ground during digging.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described my invention, what I claim as new and useful and desire to secure by Letters Patent is:

1. A two-row beet digger comprising a wheel mounted frame, a pair of transversely spaced beet lifting plows carried by the frame, means on the frame and connected with the plows to lower them into the earth whereby with a forward movement of the frame such plows will move in digging relation with the earth about the beets whereby to lift such beets, means carried by the frame and associated with the plows to carry the lifted beets to a point of discharge, an earth moving instrumentality carried by the frame and disposed between the plows and immediately adjacent the ground level and being operable to engage earth loosened by the plows and drag and spread it along the ground surface in a direction opposite to the direction of travel of the plows.

2. A device as in claim 1 in which such instrumentality comprises a driven endless chain the lower run of which travels in a direction opposite to the direction of movement of the units, and earth engaging cross cleats on the chain.

3. A two-row beet digger comprising a wheel mounted frame, a pair of transversely spaced beet digging units pivotally mounted at the rear of said frame and extending downwardly and forwardly beneath the same, and means rigidly tying the units together at their outer ends whereby they will move as an entity on the pivot means; such tying means comprising a pair of side plates on each unit, a rigid arch member rigidly fixed relative to the side plates, and a depth control means interposed between the forward end of the frame and arch and operable to raise and lower the arch and units as an entity.

4. A device as in claim 3, in which said depth control means comprises an endless chain mounted for vertical movement on the frame, and a link pivoted to the arch and to the chain.

5. A two-row beet digging mechanism comprising a frame, a pair of transversely spaced digging units each pivoted at one end to the frame, each unit including spaced side plates, longitudinally spaced rigid arch members rigidly fixed to each pair of side plates adjacent the outer ends thereof, longitudinally extending rigid bars fixed to the arch members of each unit, a rigid arch member rigidly connected to the bars of both units whereby to tie the units rigidly together as an entity and a depth control means interposed between said last named arch member and the frame and operable to raise and lower the two units as an entity.

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