July 8, 1958 V. F. BOZEMAN ET AL 2,842,265

ROTATABLE SORTING TABLE FOR BEET HARVESTERS

Filed July 16, 1954 4 Sheets-Sheet 1

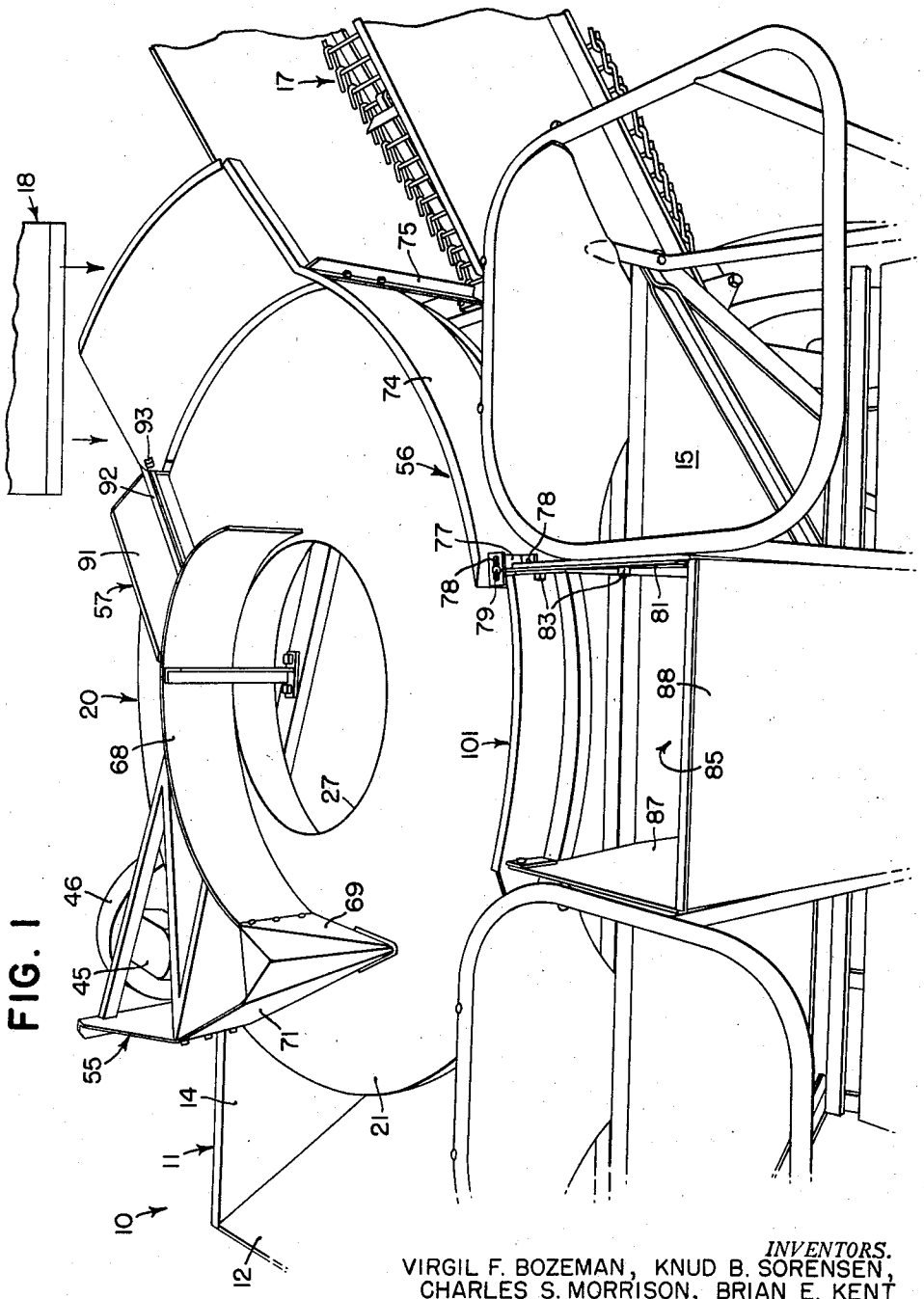


FIG. 1

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ROTATABLE SORTING TABLE FOR BEET HARVESTERS

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4 Sheets-Sheet 2

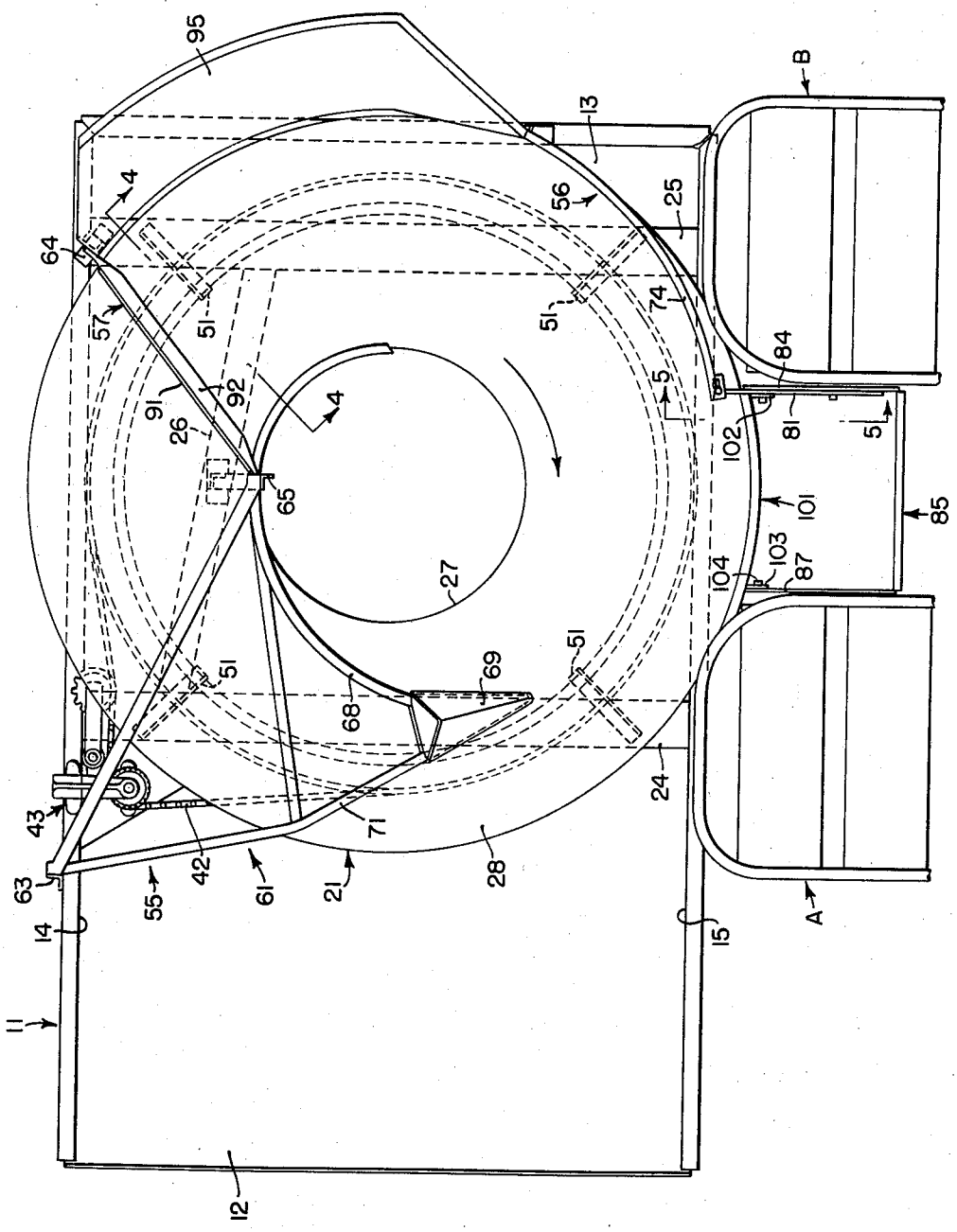


FIG. 2

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ROTATABLE SORTING TABLE FOR BEET HARVESTERS

Filed July 16, 1954 4 Sheets-Sheet 3

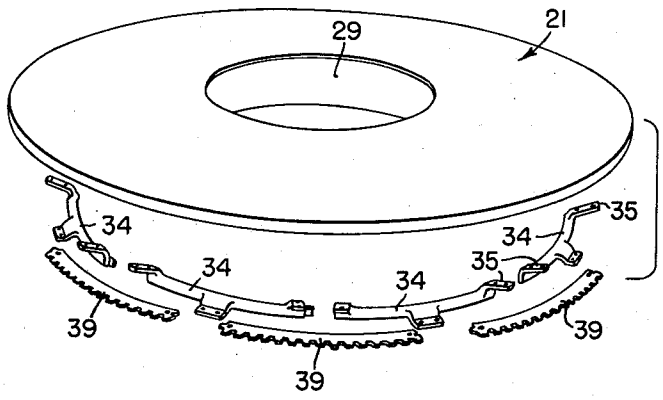


FIG. 3

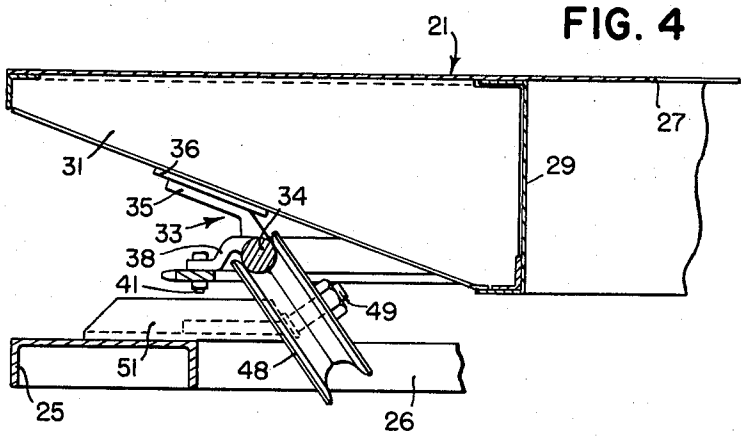


FIG. 4

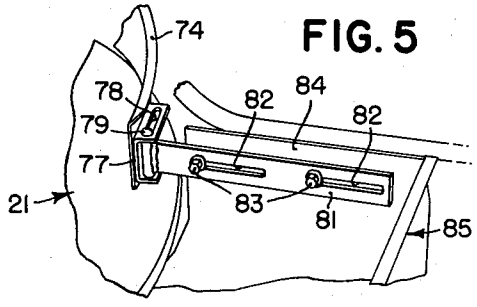


FIG. 5

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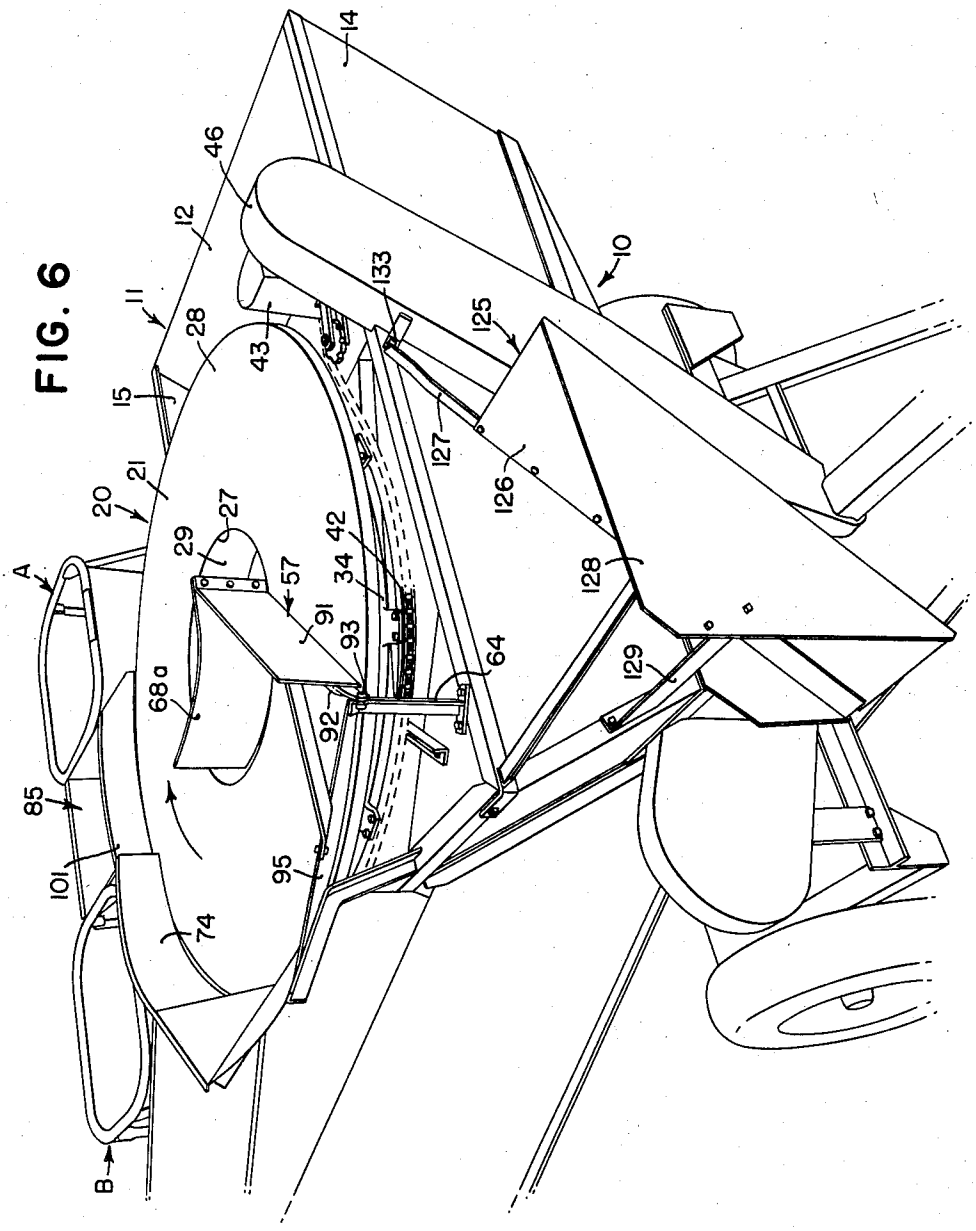
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ROTATABLE SORTING TABLE FOR BEET HARVESTERS

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FIG. 6



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United States Patent Office 2,842,265 Patented July 8, 1958

2,842,265

ROTATABLE SORTING TABLE FOR BEET HARVESTERS

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Application July 16, 1954, Serial No. 443,886

12 Claims. (Cl. 209—124)

The present invention relates generally to beet harvesters and similar agricultural equipment and has for its object and general nature the provision of a new and improved beet-handling arrangement whereby clods and other debris may be manually removed from the harvested beets and delivered onto the ground while the beets, thus separated out, are delivered into a beet container, preferably of the mobile type and connected with the beet-digging or -pulling unit, generally tractor-mounted.

A further important feature of this invention is the provision of a new and improved beet-sorting apparatus wherein beets, separated from debris and the like, may be delivered more or less uniformly into a beet container, and an additional feature of this invention is the provision of means whereby the manual separation of clods and the like, when necessary, may readily be performed. Still further, a feature of this invention is the provision of means to prevent beets from moving into the clod-discharge zone when, as under favorable soil conditions, clod separation is not required.

Still further, an additional feature of this invention is the provision of new and improved means for supporting and actuating a rotary sorting table, with means for keeping the table clean, means for adjusting the disposition of beets and the like over the table and means for dividing the beet flow into two streams, one going to one portion of the beet-receiving container and the other portion going to another part of said container.

Another feature of this invention is the provision of an auxiliary clod chute that is attachable to the side of the beet hopper opposite the sorter's stations, the auxiliary clod chute being used under conditions where the clods and soil coming over onto the table with the beets are in excessive amounts such that the sorters cannot manually take care of all of the clods and soil. For use in such situations, we contemplate the removal of the beet divider and the addition of the auxiliary clod chute, whereby the operators or sorters manually remove the beets from the mass of clods and soil and deposit them into the beet hopper, one sorter depositing the beet through the central opening at the sorting table while the other sorter moves the beets off the outer edge of the table toward one end of the bin, allowing the clods and soil and other debris to remain on the table. The scraper part then acts in conjunction with the auxiliary clod chute to scrape all the clods, soil, debris and the like off the table and discharge such material into the auxiliary clod chute.

These and other objects and advantages of the present invention will be apparent to those skilled in the art after a consideration of the detailed description of one preferred embodiment, taken in conjunction with the accompanying drawings illustrating such embodiment.

In the drawings:

Fig. 1 is a fragmentary perspective view showing one portion of a beet harvester in which the principles of the present invention have been incorporated.

Fig. 2 is a plan view of the construction shown in Fig. 1.

Fig. 3 is an exploded view of the rotary sorting table and a portion of the supporting and drive means associated therewith.

Fig. 4 is a sectional view, taken generally along the line 4—4 of Fig. 2.

Fig. 5 is a fragmentary view, taken generally along the line 5—5 of Fig. 2, showing the beet-flow-adjusting means.

Fig. 6 is a view similar to Fig. 1, illustrating the use of the rotatable table of the present invention with an auxiliary clod chute whereby the beets may manually be removed from the clods, soil and the like and deposited into the beet-bin or hopper, the clods, soil and the like being scraped off the table automatically and deposited into an auxiliary clod chute attached to the harvester for this purpose.

Referring first to Fig. 1, the beet harvester of the present invention is shown as incorporating a mobile container **10**, preferably in the form of a wheel-supported cart having suitable supporting wheels or the like and an open top receptacle generally in the form of a rectangular box-like structure **11** having side walls **12** and **13** and front and rear end walls **14** and **15** the end walls **12** and **13** sloping laterally inwardly and downwardly and the front and rear walls **14** and **15** are disposed generally vertically, at least in their upper portions. Thus, the cart or beet receptacle is propelled by the digging unit of the harvester in a generally transverse position. The bottom of the container or receptacle is formed by or includes a chain conveyor, the right-hand portion of which is extended upwardly, as at **17**, Fig. 1, to form a discharge or cart-unloading elevator. Generally speaking, the construction just described is conventional, so far as the present invention is concerned, and the harvesting outfit also includes beet-digging or -pulling means (not shown) and other associated means by which beets are removed from the ground and delivered through a harvester elevator indicated in its entirety by the reference numeral **18**, beets from the elevator **18** being dropped onto a rotary sorting table, indicated in its entirety by the reference numeral **20**, that is carried by and, in turn, delivers the sorted beets into the receptacle **11**.

The present invention is primarily concerned with the rotary sorting table structure and associated means. For the purpose of rotatably supporting the sorting table, which per se is indicated by the reference numeral **21**, the tank or container **11** provides means supporting a cross brace structure that is made up of a pair of channel bars **24** and **25** and a crossbar **26** disposed generally transversely of the first mentioned crossbars **24** and **25**. The rotatable table **21** includes a generally circular member having a generally central opening **27** and an outer peripheral section **28** slightly greater in dimension than the width of the tank or receptacle **11**, as best shown in Fig. 2. Preferably, the upper portion of the rotatable table **21** is made of flat plate stock and, as best shown in Fig. 4, also includes a reenforcing channel-like structure **29** disposed radially outwardly of the central opening **27**. Generally radially arranged plates **31** form a series of vertical ribs that support the outer portion of the rotatable table. The rotatable table structure **20** also includes segmental track means **33**, and the latter includes a plurality of track segments **34** (Fig. 3) each having at its ends attaching lugs **35** that are connected by any suitable means and through cooperating plate sections **36** to the associated table ribs **31**. In addition to

the lugs 35, each of the track segments 34 is formed with a central downwardly extending apertured lug 38, and to these lugs a plurality of sprocket segments 39 are connected, as by bolts 41 or the like. A sprocket chain 42 (Fig. 2) is trained about the circularly aligned sprocket segments 39 and is driven by a drive unit 43 that per se is generally of conventional construction, the sprockets and shafts thereof being enclosed in housings 45 and 46 (Fig. 1).

The table 21 is supported for rotation generally about a vertical axis coincidental with the axis of the opening 27 by virtue of the support of the track structure 34 in a plurality of supporting flanged rollers 48. Each of these rollers is carried for rotation on a stub shaft 49 (Fig. 4) that extends upwardly and radially inwardly, each stub shaft being welded or otherwise secured to an attaching angle member 51 (Figs. 2 and 4). The particular inclination of the roller shafts acts to support the table 21 for generally free rotation and with no likelihood of the table actually becoming displaced. As will best be seen from Fig. 4, the the track segments 34 are disposed radially inwardly of the attaching lugs 35, and the rollers 48 are angled so that the flanges thereof extend partially around the upper portion of the track segments 34, this preventing upward displacement of the table as a whole. In Fig. 2, the rollers 48 and the supporting shafts 49 are omitted for purposes of clarity.

Also forming a part of the sorting table structure is a beet-dividing unit 55, a beet-flow-adjusting unit 56, and table-cleaning or -scraping unit 57, all indicated in Fig. 1, and also in Fig. 2.

The beet-dividing unit 55 includes a divider framework 61 rigidly supported on the upper portion of the beet container 11 by vertical frame members 63, 64 and 65, the latter being rigidly connected to the crossbar 26 and extending upwardly through the central opening 27 of the table 21, generally at the forward portion of the container unit 11. The inner side of the divider unit 55 is formed as a curved sheet 68 extending generally helically, as shown in Fig. 2, and partially encircling the table opening 27. The advancing end of the curved sheet 68 is fixed to a dividing point member 69 to which the front part of a second deflecting sheet 71 is fixed, as best shown in Fig. 2. The parts are so constructed and arranged that the divider point 69 is supported just above the table surface and generally midway between the opening 27 and the outer peripheral portion 28 of the table 21.

It will be seen from Fig. 1 that the harvester discharge elevator 18 drops the lifted beets onto the table 21 generally at a point substantially diametrically opposite the divider point 69. For the purpose of providing for an even distribution of the beets dropped from the elevator 81, we provide a beet-flow-adjusting member 74 that forms the principal portion of the flow-controlling means 56 mentioned above. The member 74 is a sheet-like part and is movably or flexibly connected with an upstanding angle 75 that forms a part of the superstructure of the tank or container 11. The other end of the flow-adjusting part 74 is provided with a generally U-shaped bracket 77, having upper and lower slotted portions 78 in which a pin 79, carried by a slidable bracket 81, is disposed. The bracket 81, as best shown in Fig. 5, is slotted, as at 82, and connected by a pair of bolts 83 or the like to one side sheet 84 of the clod chute means 85. The opposite side of the clod chute is formed by means including a sheet or panel 87, and the rear part is formed by a similar sheet or panel 88. Under some conditions where clods are not present, this chute 85 may be closed off, and means to this end will be described later.

The scraper structure 57 for keeping the upper surface of the rotary table 21 clean comprises a sheet or plate 91 fastened to an angle 92 that is fixed, as by a bolt 93, to a receiving sheet 95 that is carried principally by the right-hand wall 13 of the tank 11 and by the vertical member 64. The inner end of the angle 92 is fastened in any suitable way to the vertical angle 65 (Fig. 2). The sheet 91 may be adjustable vertically relative to the angle 92, if desired.

The operation of the harvester as so far described is substantially as follows. Assuming that the outfit is in operation and passing down a row or rows of beets to be harvested, the forward unit to which the beet tank 10 is connected lifts the beets and, after one or more cleaning operations, delivers them through the elevator 18 onto the sorting table 21, the beets being discharged at a point on the table generally diametrically opposite the dividing point 69. The receiving sheet 95 cooperates with the discharge end of the elevator 18 to direct beets onto the rotary table 21. The beet-flow-adjustment provided by the shiftable member 74 is arranged so that too many beets are not crowded over against the radially outer portion of the rotary table and adjacent wall structure, and assuming that the harvester is operating under cloddy conditions, the beet stop mentioned above is disconnected from the chute 85 and one or more operators standing at the sorter's stations A and B manually move the clods, lumps of soil and other debris into the clod chute 85. As will be readily understood, if the cloddy conditions are severe two operators may be required, but if cloddy conditions are not severe one operator at one or the other of the stations A and B may be able to remove all of the clods. The table 21 rotates in the direction of the arrow and carries the beets remaining on the table 21 toward the divider point 69. The beets are fairly evenly distributed over the table and hence the divider point 69 and the curved divider panel 68 divert some of the beets toward the center of the table, dropping them down through the opening 27 into the generally central portion of the tank or container 11. The other beets, which are lying generally radially outwardly of the point 69, are diverted by the sheet 71 and caused to drop over the left-hand edge of the table 21 between the latter and the left side wall 12 of the container 11. In this way, the tank or container 11 is filled generally uniformly and the maximum capacity of the receptacle 11 thus made use of.

Where cloddy conditions do not exist, and the beets coming from the discharge elevator 18 may simply be delivered into the tank 11 without sorting or separation, the clod chute 85 is closed off by a beet stop 101 in the form of a curved member carried at one end on a bracket 102 that may be fastened by one of the bolts 83 to the chute wall 84. The other end of the beet stop member 101 is connected in any suitable way, as by a lug 103 and bolt 104, to the chute side wall 87.

It will be remembered, of course, that the beet stop 101 is removed whenever sorters are required at stations A and B or either of them.

Occasionally, beet harvesting conditions may be such that excessive quantities of clods, soil and other debris pass through the harvester and drop onto the table 21 from the elevator 18. In that case, the procedure outlined above may be reversed, that is, the beets may be sorted out of the mass of clods, soil and the like and moved manually into the container 11, either through the central opening 27 or over the left-hand edge 28 of the table. In that event, the beet divider unit 55 is removed, leaving only the spreader plate 91. Also, the relatively long curved sheet 68 (Fig. 2) is disconnected, and instead a short curved sheet 68*a* (Fig. 6) attached to the angle 64 to which the radially inner end of the sheet 91 is fixed. The latter then serves as means for moving all of the clods, soil and other debris remaining on the table as the latter continues to revolve after the beets have been moved into the beet hopper or bin. For the purpose of guiding the clods, soil and the like to the ground, we provide an auxiliary clod chute 125, best shown in Fig. 6. The chute 125 is in the nature of an attachment and comprises a bottom sheet 126 secured along its laterally inner edge to an angle 127, and a side

sheet **128** that at its forward edge is connected by a cross plate **129** to a portion of the cart frame. A detachable bolt **133** connects the upper end of the angle **127** to the cart frame, and similar means may be used for connecting the lower portions of the angle **127** to the cart frame for fixing the auxiliary chute **125** in position whenever it is desired to operate under excessive cloddy conditions.

While we have shown and described above the preferred structure in which the principles of the present invention have been incorporated, it is to be understood that our invention is not to be limited to the particular means shown and described above, but that, in fact, widely different means may be employed in the practice of the broader aspects of our invention.

What we claim, therefore, and desire to secure by Letters Patent is:

1. In a beet harvester, a mobile container for beets open at its top portion, a rotary sorting table mounted on the upper portion of said beet container and disposed above the latter, the open portion of said container being larger in area than that of said sorting table so that a portion of said container extends laterally outwardly of said table, said sorting table having a generally central opening and there being a space between the outer edge of the extended portion of the container and the adjacent portion of said rotary table, whereby beets may be dropped downwardly into the container either to the central portion of the container through the opening in said rotary table, or into a peripheral portion of said container over the outer periphery of said table, and means for delivering harvested beets to said table between said open central portion and the radially outer periphery thereof.

2. In a beet harvester, the combination of a beet container having an upper open portion generally rectangular in configuration, a pair of crossbars fixed to the upper portion of said container in spaced apart relation, a rotary sorting table mounted for rotation on said spaced apart bars and having a generally central opening providing for the delivery of beets from said sorting table between said bars and into the lower generally central portion of said container, said bars and said rotary table being located, relative to the container so that there is a space between one end of said container and the adjacent outer peripheral portion of said table, thereby providing for discharge of beets over the peripheral portion of said table and into the zone at said one end of said container, and means for delivering beets to said rotary table.

3. In a beet harvester, the combination of a container for harvested beets having an open upper portion, a rotary table having a generally central opening, means supporting said table for rotation in a generally horizontal plane generally above the open upper portion of said container, the open upper portion of the latter being greater in area than the area embraced by said table and said table and said container being so constructed, one relative to the other, that beets delivered into the container through said generally central table opening are deposited in the generally central portion of said container, and beets delivered into the container over the peripheral edge of said table adjacent one end thereof are delivered into said container adjacent said one end, and means for rotating said table.

4. The invention set forth in claim 3, further characterized by a divider comprising a stationary structure including beet-deflecting means supported above said table in a position between said central opening and the outer peripheral portion of said table adjacent said one end of the container, said divider serving, during rotation of said table with beets thereon, to deflect some of the beets toward said central opening and the other beets toward said one end of said container.

5. The invention set forth in claim 4, further characterized by said divider comprising a dividing point located generally midway between said central table opening and the outer periphery of said table, and inner and outer dividing sheets fixed at one end to said dividing point, one of said dividing sheets extending generally radially inwardly toward such central opening and the other dividing sheet extending generally outwardly toward the peripheral portion of said table.

6. The invention set forth in claim 5, further characterized by an upper framework carried by said beet container and supporting said dividing point and said dividing sheets, and means fixing said divider-supporting framework to said container.

7. In a beet harvester, the combination of a beet container, open at its upper portion to receive beets, a rotary table mounted on the upper portion of said container and including a central opening and means supporting said table for rotation on said container in a position thereon such that there is beet-receiving space between one end of said container and the adjacent peripheral portion of said table, a divider carried by said container in rigid relation and disposed above said table generally midway between said central opening and the edge of the table and having means serving to deflect some of the beets to said central opening and the other beets to the edge of the table adjacent said beet-receiving space, a clod chute carried by said container at one side thereof adjacent radially outer portion of said rotary table, and a beet stop attachable to said sheet at a position closely adjacent the peripheral portion of said table for preventing beets from entering the chute when conditions are such that clod sorting is not required.

8. In a beet harvester, the combination of a beet container, open at its upper portion to receive beets, a rotary table mounted on the upper portion of said container and including a central opening and means supporting said table for rotation on said container in a position thereon such that there is beet-receiving space between one end of said container and the adjacent peripheral portion of said table, a divider carried by said container in rigid relation and disposed above said table generally midway between said central opening and the edge of the table and having means serving to deflect some of the beets to said central opening and the other beets to the of the table adjacent said beet-receiving space, means for delivering beets to said table at a point generally opposite said divider, and a beet-flow-adjusting member carried by said container and comprising a member overlying said table and extending generally in the direction of rotation of said table, the down-stream end of said member being adjustable generally radially of said table for causing a relatively even distribution of beets on said table, said beet-flow-adjusting member being located generally between the point of beet discharge onto said table and said divider.

9. In a beet harvester, a beet-receiving sorting table construction, comprising a supporting frame, a generally circular sorting table, a plurality of track segments fixed in circular alignment to a lower part of said table and having generally radially disposed roller-receiving portions, and a plurality of flanged rollers carried by said frame and each mounted for rotation about an upwardly and laterally inwardly extending axis, said track segments being supportingly received by said rollers and said rollers having track-engaging flanges and said rollers being disposed for rotation in planes extending downwardly and inwardly relative to the axis of rotation of said table so that the upper flanges of the rollers at least partially engage around the upper portions of said track segments, whereby the upper flanges on said rollers act to prevent upward displacement of the table from said rollers.

10. In a beet harvester, a receptacle for harvested beets including a beet hopper, a rotatable sorting table carried by said hopper and including a central opening through which beets may be delivered to the generally central por-

tion of said hopper, there being sufficient space between an outer edge of the rotatable sorting table and one end of said hopper to provide for the passage of beets through said space toward said one end of the hopper, means carried by said hopper providing a sorter's station thereon, a clod chute carried by said hopper generally at the side thereof opposite said sorter's station, a scraper carried by said hopper above said sorting table and located at such an angle that material left on said table after the beets have been taken therefrom is delivered into said clod chute, and a curved sheet connected to the radially inner end of said scraper and extending generally in the direction of rotation of said table and lying generally between the central opening of said sorting table and a point at which beets, clods and other material are discharged onto said sorting table.

11. In a beet harvester, a mobile container for beets open at its top portion, a rotary sorting table mounted on the upper portion of said beet container, said table having a central opening and said top portion of the container being larger in area than said table, whereby there is a space between one upper marginal portion of the container and the adjacent portion of said rotary table and beets moving off the table both through said central opening and over the outer margin of the table fall into said container, means for delivering harvested beets to said table, and means carried at the upper side of said rotatable table for deflecting beets thereon off the outer

edge of said table and into said space and also inwardly of the table into said central opening.

12. In a beet harvester, a receptacle for harvested beets including a beet hopper, a rotatable sorting table carried by said hopper and including a central opening through which beets may be delivered to the generally central portion of said hopper, means carried by said hopper providing a sorter's station thereon, a clod chute carried by said hopper generally at the side thereof opposite said sorter's station, a scraper carried by said hopper above said sorting table and located at such an angle that material left on said table after the beets have been taken therefrom is delivered into said clod chute, and a curved sheet connected to the radially inner end of said scraper and extending generally in the direction of rotation of said table and lying generally between the central opening of said sorting table and a point at which beets, clods and other material are discharged onto said sorting table.

References Cited in the file of this patent

UNITED STATES PATENTS

1,288,375	Bickley	Dec. 17, 1918
1,473,365	Vogel	Nov. 6, 1923
2,529,023	Helms	Nov. 7, 1950

FOREIGN PATENTS

551,601	France	Jan. 11, 1923
592,230	Great Britain	Sept. 11, 1947

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 2,842,265 July 8, 1958

Virgil F. Bozeman et al.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 6, line 27, after "adjacent" insert -- the --; line 44, before "of" insert -- edge --.

Signed and sealed this 23rd day of September 1958.

(SEAL)
Attest:

KARL H. AXLINE
Attesting Officer

ROBERT C. WATSON
Commissioner of Patents