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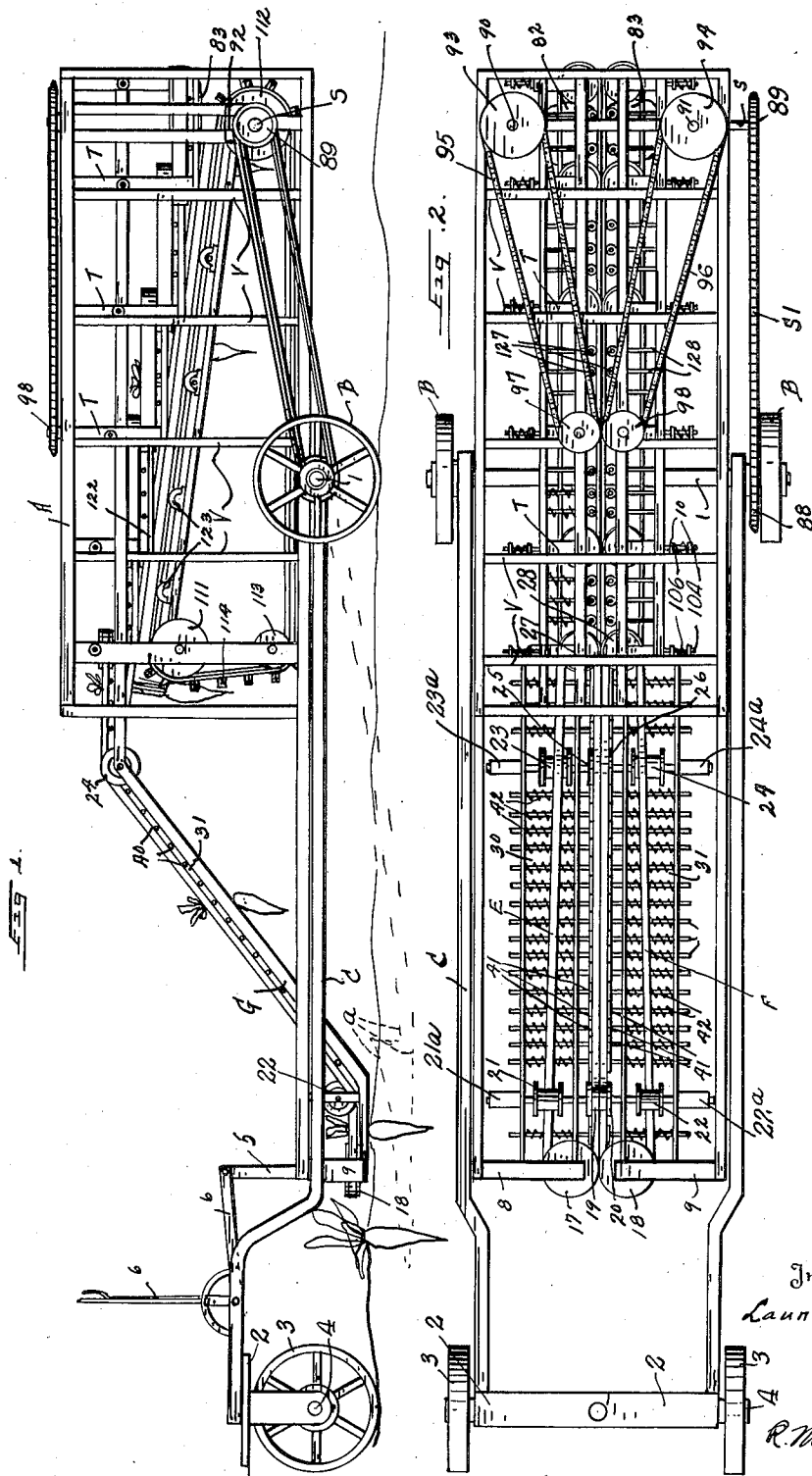
L. R. MORGAN

2,056,286

BEET HANDLING MACHINE

Filed May 13, 1935

4 Sheets-Sheet 1



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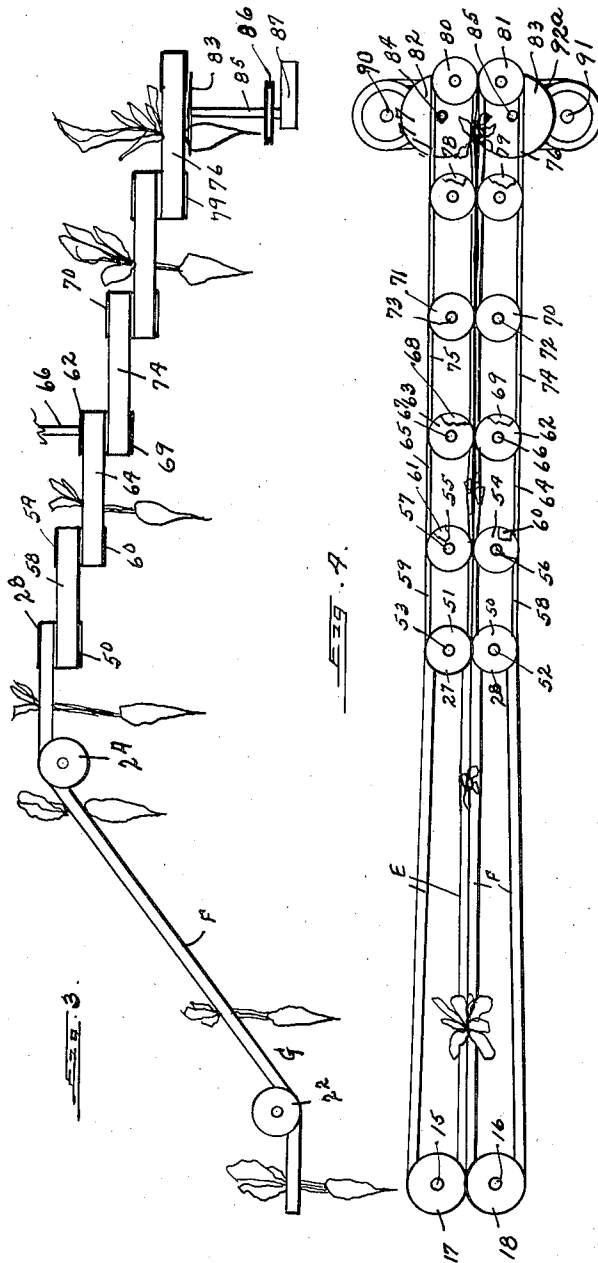
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BET HANDLING MACHINE

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4 Sheets-Sheet 2



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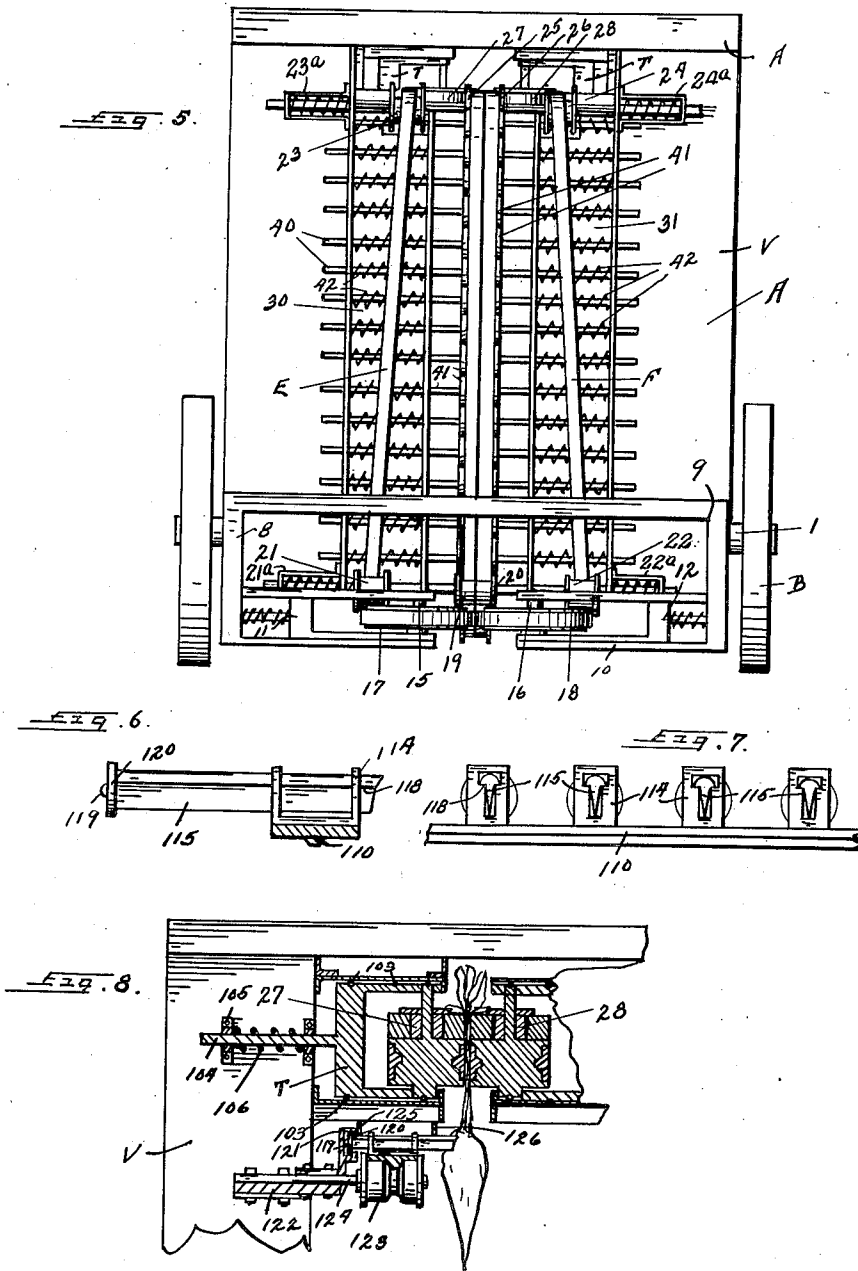
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BEET HANDLING MACHINE

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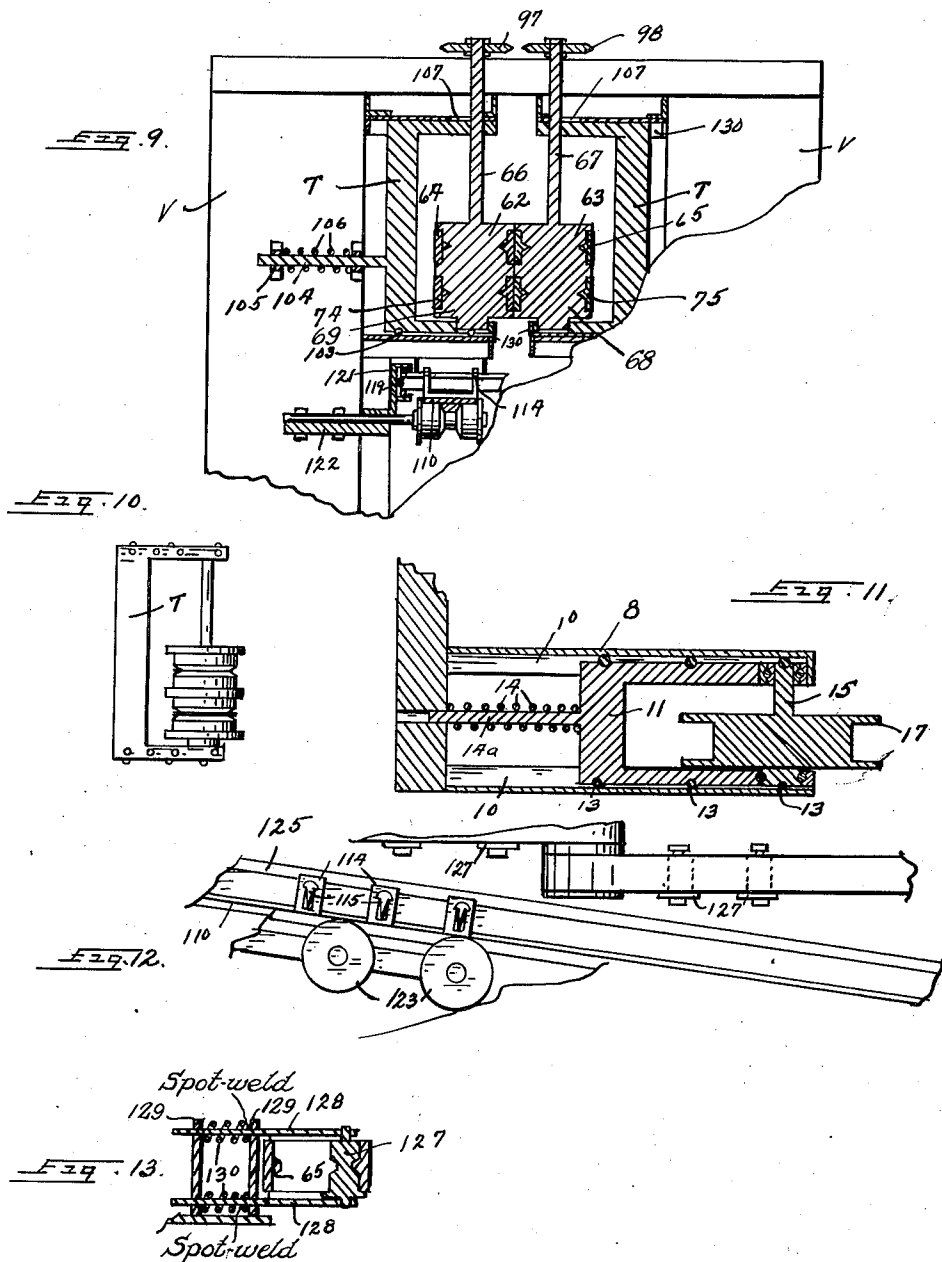
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BEEF HANDLING MACHINE

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4 Sheets-Sheet 4



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BEET HANDLING MACHINE

Launcelot R. Morgan, Tucson, Ariz.

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4 Claims. (Cl. 55—108)

My invention relates to beet handling devices and has for its object to provide a new and efficient method of lifting beets from any suitable plow and carrying them through a series of belts to place them at the topping knives at a proper level so that each beet will be topped evenly with no waste and with no crown left thereon.

A further object is to provide means for handling beets which will be highly efficient, and which will raise the beet so that when it is topped it will be correctly topped, thereby, eliminating much expense to the present method of handling beets and eliminating the costly labor of topping the beets after they have been plowed.

A still further object is to provide a device for handling beets by the tops or leaves so that when the beet has been raised and is ready to be topped, the tops or leaves of the beet will be so held that the crown of the beet will be in the proper position for the cutting knives.

These objects I accomplish with the device illustrated in the accompanying drawings in which similar numerals and letters of reference indicate like parts throughout the several views and as described in the specification forming a part of this application and pointed out in the appended claims.

In the drawings

Figure 1 is a side elevation of the topper with the beet plow only shown in dotted lines.

Figure 2 is a plan view of Figure 1 with the elevating levers left off.

Figure 3 is a side diagrammatic view of the beet elevating belts and topping knives.

Figure 4 is a diagrammatic view of Figure 3.

Figure 5 is a front view of the body of the machine with the front wheels and the elevating parts removed.

Figure 6 is a side view of the leveling fingers or knives.

Figure 7 is a face view of the leveling fingers shown with a section of the belt on which they operate.

Figure 8 is a sectional view of the top sheave wheels for driving the elevating belt and a portion of the carrying belts.

Figure 9 is a sectional view of a portion of the machine taken through the vertical shafts 66 and 67 which drive the belts.

Figure 10 is a side view of two of the leveling or lowering belt sheave wheels.

Figure 11 is a section of the one side bracket at the front lower end of the device where the beet tops are engaged showing the construction of the mounting for the front sheave wheels.

Figure 12 is a side view of the belt used to carry the leveling fingers and part of the lowering leveling belts in their relative position.

Figure 13 is a section of the device used to hold the lowering or leveling belts in tension relative to the beet tops.

In the drawings I have shown my machine as a frame work A, suspended on an axle 1 with wheels B to support the axle, and extending front from the axle I provide a frame work C with the front end thereof curved upward to a front support bracket 2, with wheels 3 supporting the bracket 2 on an axle 4.

The front end of the frame work A is suspended between the frame work C and is connected adj- justably thereto by a link bar 5 and level adjusting or raising and lowering lever 6, with a knotted rack and dog to control and hold the frame work at the desired level.

At the front end of the frame work A I provide two depending bracket frames 8 and 9 on each side of the frame work A extending inwardly to near the center of the machine, one frame on each side. The ends of these two frames are bifurcated alike and as each frame is identical, I will describe but one. The inner faces of each leg of the bracket frames 8 and 9 are made of channels 10 to carry laterally movable U-shaped brackets 11 and 12 therein. The brackets 11 and 12 are provided with balls 13 on which the brackets ride within the channels 10, some of the balls being on the underside of the brackets and some of them being along the sides, so that the brackets move laterally in the channels of the frames 8 and 9 and each bracket is provided with a retention spring 14 carried on a rod 14a to normally hold the brackets toward each other at the center of the machine. Through the brackets I then mount the vertical shafts 15 and 16 on which the two sheave wheels 17 and 18 are mounted and carried with the ends of the shafts rotating in the sockets in the brackets in which they are mounted. Thus, the two sheave wheels 17 and 18 are mounted for rotation and at the same time mounted for lateral or side movement integral with the side movement of the brackets. These two wheels carry belts E and F therearound preferably of a square type as shown in the drawings. These two belts extend back parallel to the ground and front end of the frame work A and spaced apart guide rollers 19 and 20 and rider wheels 21 and 22 are provided to turn the belt up at an incline G as shown in Figures 1 and 10. There the belts are passed over the top of other spaced apart rider wheels 23 and 24,

and guide rollers 25 and 26 and again parallel to encircle two sheave wheels 27 and 28. Onto the frame work A I then mount flanged plates 30 and 31, one on each side of the incline and bent at the top end to be parallel to the belts. Through these flanges on plates 30 and 31 I pass shafts 40 with the inner ends of the shafts carrying pressure guide flanged rollers 41, said rollers to ride with and hold the belts continuously in frictional contact, and springs 42 are carried on each shaft 40 between the flanges on the plates 30 and 31 to normally hold these two belts together during the upward travel on the friction engaging portion of their travels during their use as beet top lifters. Thus, by this construction the engaging portions of the two belts E and F are held together in frictional contact with each other at all times by the pressure exerted by the springs. Also the two front sheave wheels 17 and 18 being mounted with spring pressure behind them aid in holding the belts together during their upward travel.

The two back sheave wheels 27 and 28 are also spring held as will be later described to normally hold them in frictional contact.

The beets are dug from the ground or loosened therefrom by any suitable plow as indicated by dotted lines *a* in Figure 1 and are in such a raised position that when the two front sheaves pass thereover, they engage some of the leaves and as the belt engages the leaves it raises the beet through the space behind the belt and to its highest point of elevation with the beet suspended down from the tops. As the position of the beet in relation to the tops will vary and as the belt may grasp the top at different distances from the beet they are then leveled off to a uniform position at the rear of the machine by passing through a series of endless belts and gripped by fingers to finally make each beet pass into the cutting knives at the proper level so that no waste will take place.

These belts are shown as endless belts and commence with sheave wheels 50 and 51 being mounted on or formed on the shafts 52 and 53 of the sheave wheels 27 and 28, just below the level of the wheels 27 and 28, and another pair of coacting and corunning wheels 54 and 55 is mounted rearwardly of the machine on shafts 56 and 57 on a plane level with the wheels 50 and 51. The belts 58 and 59 are then carried on the wheels 50 and 54, and 51 and 55 respectively.

On the shafts 56 and 57 under the wheels 54 and 55 I then provide another pair of like wheels 60 and 61 and back of this pair of wheels on the same level there is another like pair of sheave wheels 62 and 63 with endless belts 64 and 65 running around the wheels 60 and 62, and 61 and 63 respectively. These wheels 62 and 63 are on shafts 66 and 67 and on these shafts under the wheels 62 and 63 there is another pair of like sheave wheels 68 and 69. Another pair of wheels 70 and 71 are mounted on the same level as the wheels 68 and 69 on shafts 72 and 73 and endless belts 74 and 75 encircle these two pairs of wheels. In like manner two more sets of wheels and belts are provided to lower the beets to the cutting knives of the machine. The last set of endless belts 76 and 77 carried on the wheels 78 and 80, and 79 and 81 are those belts which end the carrying of the beet and bring it into contact with the cutting knives. The cutting knives 82 and 83 are mounted on vertical shafts 84 and 85, driven by sheave wheels 86 and supported by brackets 87. These knives are driven from a rear

cross drive shaft S mounted transversely of the frame work A and near the rear end of the machine with a drive chain S1 driving the shaft from the main axle sprocket 88 on the axle I and with a sprocket 89 on the shaft S to transmit the power thereto. The power is transmitted from the shaft S to vertical shafts 90 and 91 through bevel gears in the housing 92 and the power from the vertical shafts is transmitted to the shafts 84 and 85 by sheave wheels, and belts 92a transmit the power to the sheave wheels 86.

The power for moving the train of endless belts and the main belt is transmitted from the vertical shafts 90 and 91 by sprocket wheels 93 and 94 carrying chains 95 and 96 to the sprocket wheels 97 and 98 on the top ends of the shafts 65 and 67 and this power is then transmitted through the chain of endless belts.

Each set of double sheave wheels and the front set of sheave wheels 27 and 28, and 50 and 51 is carried in U-shaped brackets T, shaped similar to the brackets 11 and 12 at the front end of the machine, the only difference being that the center portion of the brackets is longer and the legs are shorter. These brackets are each alike except that the center portion of each set of two is longer as the rear end of the machine is reached to place the belts in the step like lowering positions. Two of these brackets are shown in Figures 8 and 9. These brackets T have suitable bearings or balls 103 on which they can run and each bracket is provided with a horizontally extended shaft 104 extending outwardly therefrom and these shafts are supported in bearings 105 with springs 106 carried between the bearings to normally hold the brackets toward the center of the machine and therefore hold the belts in frictional contact at all times.

The bearings are mounted on vertical spaced apart support boards V, secured in place by longitudinal struts or angle irons, and the other supports necessary to properly brace the frame work A and the component parts of the machine. The brackets, through which the shafts 66 and 67 are vertically extended for the drive sprockets 97 and 98, have the shafts passed up there-through with the longitudinal struts slotted at 107 to allow the side motion of the shafts caused by the top of the beets passing along their path of travel between the endless belts. The brackets T are carried in tracks 130, extending inwardly toward the center of the machine and each bracket is supported from the top and bottom ends alike. The tracks are mounted in the frame work A by suitable supports.

In order to bring the beets all to a common level at the introduction to the topping knives I then provide a belt 110 on each side of the machine which belt is carried back along the machine from a front sheave wheel 111, to a rear sheave wheel 112, thence front horizontal with the ground, parallel to the bottom of the frame over an idler sheave wheel 113 and back up to the wheel 111. This makes two triangular endless belts on each side of the machine and each belt is then provided with U-shaped brackets 114 on the outer side thereof each bracket being formed with T-shaped openings through the legs thereof through which aligning knife edge fingers or rods 115 are carried and operated. These fingers are made with the top beet engaging end T-shaped, with the top cross bar of the T rounded on the top surface and with the bottom leg of the T shaped to cut down through the leaves to comb or draw each beet down to

the level of the next engaging section of endless belts or to the level of the knives. When the base portion 118 of the fingers engages solid beet it cannot cut down any farther and therefore holds the beet at that level and as the top section of the endless belt is slanting down toward the rear of the machine, this naturally draws the beet tops down through the belts should the beet be too high or, will hold the tops rigid until the next step in the endless conveyor belts engages the beet top taking a grip thereon at a lower level.

The rear end of each of these fingers is provided with a ball 119 and with a rotatable ring 120 with the ball and ring to run within and operate in a guide rail 121, there being two like guide rails on each side of the machine. These guide rails are bent to bring the fingers into contact with beet tops after they have been engaged between the two belts 58 and 59 at the front end of the machine and to be disengaged from the tops at the rear of the machine just before they engage cutting knives. The rails are supported on boards 122 which are a part of the frame work A and as additional support for the belt I provide support guide rollers 123 carried under the belt along the top from the front sheave to the rear sheave wheel to properly support the belt and hold it in alignment. These rollers are carried on shafts 124 which are also mounted onto the boards 122. Aligning bars 125 and 126 are secured to the frame work to engage the top side of the knife edge rods 115 and hold them to a line sloping downwardly toward the rear of the machine parallel to the belt and to prevent vibration of the rods 115.

As an additional tension means for the endless belts which are used to convey the beets back to the rear of the machine, I provide guide and tension rollers 127 supported by pairs of bracket rods 128 which in turn are supported on the same boards to which the support members for the sheave wheel brackets are supported. These bracket rods 128 extend back through vertical plates 129 with springs 130 carried on each bracket to normally hold the rollers 127 engaging the back side of the engaging face of all of the friction engaging endless belts in the step down flight.

The operation of the device is as follows:

The beets are picked up at the front by engaging the endless belts E and F with the tops and at the same time the beets are loosened in the ground. The endless belts E and F then elevate the beets to the top horizontal stretch of the belts where the tops are then engaged by the belts 59 and 58 and from this point back the beets are carried in the endless conveyor belts from one downward step to the next until the beets engage the topping knives. As an aid to the belts the fingers engage the tops and the crown of the beets and either hold them in the position in which they are being carried or lower them down, depending upon just where on the tops the belts are engaging. The belts and fingers then lower the crown or adjust the crown of the beet to meet the topping knives 82 and 83 at the proper place at the crown of the beet. This operation is continued as the machine is drawn forward along a row of beets.

Having thus described my invention, I desire to secure by Letters Patent and claim:

1. In a beet toppler, the combination of a suitable framework suspended on wheels; means to adjustably support the front end of the frame work; a pair of co-acting frictionally engaging endless belts mounted with the front end parallel to the ground and with the rear end raised and parallel to the ground with the belts to run from front to rear where they are frictionally engaged in the middle of the framework; pairs of step-like descending series of belts mounted for friction contact between pairs rotating in like manner to the first mentioned belts, the step-like pairs of belts to lower or raise the beet to a common level at the rear of the machine; and rotating disk knives for cutting off the tops of the beet when they have been brought to the common level desired.

2. In a toppler, the combination of co-acting beet lifting belts mounted to rotate toward each other and frictionally engage as they move back along the central engaging portions thereof, said belts to engage the beet top and raise the beet therewith; descending step-like series of pairs of co-acting endless belts mounted to carry the beet from the lifting belts and raise or lower the beet to a common level at the rear of the machine; means to top the beets at the rear of the machine; aligning knife-edged fingers mounted on endless belts to engage the beets or tops and aid the belts in carrying the beets to a common level.

3. In a beet handling machine, the combination of two co-acting frictionally engaging belts rotating toward each other and toward the back end of the machine when engaged said belts to grip the tops of beets and raise them from the ground; endless belts made in co-acting frictional engaging pairs mounted in downward step-like relation to each other to successively engage the tops of the beets to carry the beets to a final common level; aligning knife-edge fingers mounted on endless belts to engage the beets or tops and aid the belts in carrying the beets to the common level and means to top the beets when they reach this level.

4. In a beet handling machine, the combination of two co-acting frictionally engaging belts rotating toward each other and toward the rear of the machine when engaged together in the center of the machine, said belts to engage the tops of the beets and elevate them; means by spring tension to hold the belts in tension relation to each other and the beets; endless belts mounted in co-acting frictional engaging pairs mounted in downward descending step-like relation to carry the beet from the first pair of belts by successively engaging the tops at a higher level to draw the beet to a common level; top engaging aligned fingers mounted on endless belts on each side of the machine to aid the belts in aligning the beets; guide rods to engage the fingers into the beets or beet tops during their leveling travel and withdraw the fingers at the rear end of the machine; and cutting knives to top the beets when the fingers have been withdrawn and the beets are engaged with the knives on a common level commensurate with the crown of the beet before leaving the last pair of endless belts.

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