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MEANS FOR HANDLING BEETS

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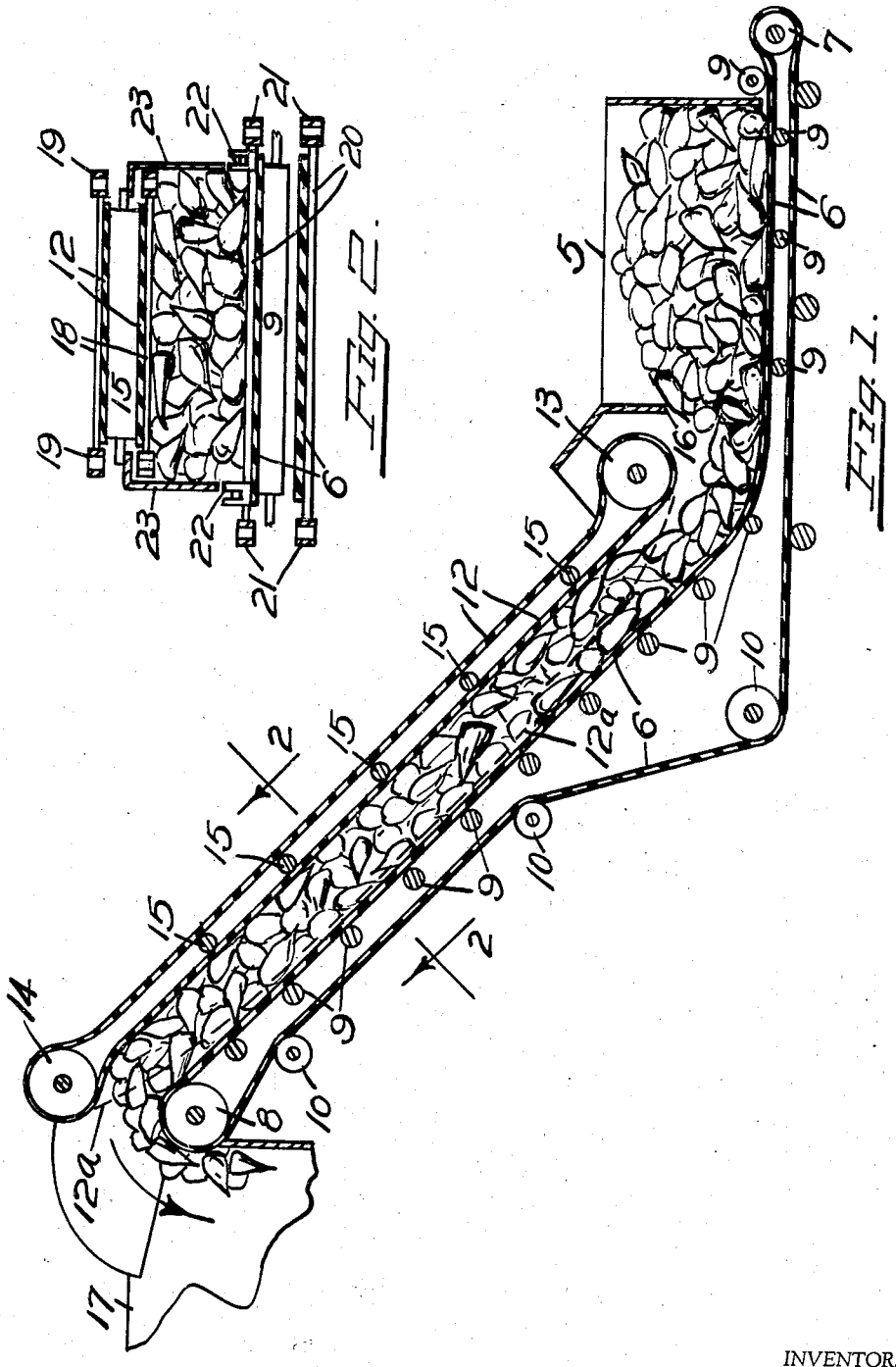


Fig. 1.

Fig. 2.

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MEANS FOR HANDLING BEETS

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Continuation of application Serial No. 45,693, October 19, 1935. This application February 19, 1940, Serial No. 319,677

2 Claims. (Cl. 259—2)

This invention relates to certain improvements in apparatus for handling sugar beets or the like, as originally disclosed in my pending application Serial No. 45,693, filed October 19, 1935, of which this present application is a continuation.

The present invention relates particularly to improved apparatus for elevating sugar beets or the like, for loading into a railway car or for piling, and at the same time loosening dirt that may be adhering to the beets.

There is a step in the handling of sugar beets where they are elevated either for piling or for loading into a railway car, at which time it is highly desirable to loosen and separate dirt and trash from the beets. Dirt removed from the beets preferably is collected and weighed in order to determine accurately the net weight of the beets that are being handled.

A principal object of this invention is to provide an improved apparatus of this character, whereby sugar beets or the like may be elevated efficiently, and at the same time rolled and tumbled upon themselves to loosen and to remove adhering dirt therefrom.

Another object is to provide in combination with such elevating and dirt-loosening apparatus, screening means whereby dirt loosened but not completely removed during the elevating stage, may be separated from the beets in a subsequent step of the process.

Other objects and advantages reside in details of design and construction which will be more fully disclosed in the following description and in the drawing wherein like parts have been similarly designated and in which:

Figure 1 is a diagrammatic vertical sectional view illustrating the operating principles and main structural features of apparatus that is built according to this inventive concept; and

Figure 2 is a diagrammatic illustration of a cross section taken approximately along the line 2—2 of Figure 1.

In order to disclose a typical reduction to practice of this invention, it will be described as pertaining to the handling of sugar beets, but it will be manifest that other similar material requiring similar treatment may be handled advantageously according to these teachings. The instant example herewith set forth should be considered as a typical illustration that does not express or imply any limitation to the scope of the invention, which, in reality, is measured by the appended claims.

Briefly stated, the improved apparatus includes means for feeding sugar beets or the like through a restricted opening to a conveyor of the belt type that has an upwardly inclined portion in spaced relationship with a similarly inclined hugger belt. The feed of the beets to this conveying and elevating apparatus is so restricted that the beets fed are less in volume than the full volumetric capacity of the elevator.

As a consequence of this particular relationship, the beets as they are elevated between the conveyor belt and the hugger belt, roll and tumble upon themselves because the tendency is for them to fall and roll back to completely fill the space between the conveyor and the hugger belt.

If the feed to the elevator was the same as its cross sectional volumetric capacity, then the beets would be held tightly between the two cooperating conveyor members and be continuously elevated as a mass without the desirable rolling and tumbling action.

As a direct result of my arrangement, the beets are so rolled and tumbled upon themselves and with reference to the conveying means that dirt adhering to them is well loosened, some of it being entirely removed to be caught by the elevator and delivered to suitable collection means.

From the upper end of the elevator the beets are discharged into screening means, which means are being disclosed and claimed in my co-pending application of even date. Dirt remaining on the beets at the time of their discharge into the screen element is much more readily separated in said screen element because it has been loosened in the elevator.

Referring to the drawing, reference character 5 denotes a hopper having an open bottom corresponding generally to the width of an endless conveyor belt 6, which is reeved over suitable terminal rollers 7 and 8 and guided and supported by a plurality of supporting idle rollers 9. This conveyor belt 6 passes horizontally under the hopper 5 to receive beets therefrom through the open bottom thereof. Thence it passes up over supporting rollers 9 to head roller 8, and back over idlers 10 to lower terminal roller 7.

An endless hugger belt 12 is slackly reeved over terminal rollers 13 and 14 and supported by a plurality of suitably spaced idle rollers 15. The rollers 13, 14 and 15 are positioned with reference to supporting rollers 9 and head roller 8 of the conveyor element, in predetermined perpendicular relationship thereto so that the conveyor belt 6 and the hugger belt 12 are in substantially constant predetermined perpendicular relationship to each other during operation, when the

space between the belts is well filled with beets.

An opening 16 in the end wall of the hopper 5 that is next adjacent the elevating portion of the apparatus, corresponds in width with the elevator belt 6 and is so limited in height that the volumetric movement of beets therethrough is less than the full cross sectional volumetric capacity of the elevator apparatus.

The top of the opening 16 may be above, in alinement with or below the lowermost portion of the hugger belt 12, the exact height of the opening 16 being determined by circumstances. Since beets do not flow readily as fluid would, it is desirable under some circumstances to have the top of the opening 16 about as illustrated in Figure 1, because the beets themselves interfere with their own movement and the arrangement shown in Figure 1 restricts the flow of beets to the elevator to a volume that is substantially less than the full handling capacity of the two co-acting belts.

The operation of the apparatus illustrated is clearly understandable. Beets or the like as they come from the field are dumped into the hopper 5 and are moved toward the upwardly inclined portion of the conveyor belt 6 in a restricted volume through opening 16 in the end of the hopper 5.

Next the beets begin to travel upwardly along the inclined portion of the conveyor 6. At the start of the elevating operation, the slack in the hugger belt 12 permits it to sag along its lower side as indicated by the dotted line 12*a*, so that it may come in substantial conforming contact with portions of the conveyor belt and the first beets that begin to travel therealong.

Since the lower portion of the hugger belt 12 is not held in the slack position indicated by the dotted line 12*a*, the beets will begin to roll and tumble back upon themselves, crowding the hugger belt upwardly until it reaches its supporting idle rollers 15, which limit its perpendicular movement away from the inclined portion of the conveyor belt, whereupon the slack is transferred to the upper run of the belt, as illustrated in Figure 1. The lower roller 13 is free to permit this transference of the slack from one side to the other side of the hugger belt 12.

Since the movement of the beets into the elevating portion of the apparatus is restricted as hereinbefore set forth, the beets will continue to roll and tumble back upon themselves as they are elevated between the two co-acting belts, constantly crowding the hugger belt 12 away from the conveyor belt 6 and against the supporting rollers 15.

The volume of beets that reaches the top of the elevator is, of course, equal to the volume being fed into the lower end of the elevator after the apparatus is in full operation.

From the top of the elevator, the bees are discharged into a screening element 17, hereinabove referred to.

In actual practice, the hopper 5 preferably is made considerably longer in proportion than the hopper illustrated in Figure 1.

Figure 2 illustrates certain specific details that have been purposely omitted from Figure 1 in order to avoid confusing the general operating principles involved in this inventive concept.

In Figure 2, cleats 18 are shown attached to the hugger belt 12 and are suitably spaced along the belt. These cleats are attached to sprocket chains 19 which drive the belt, the chains being driven by sprockets located adjacent the head roller 14, but not shown.

Cleats 20 are positioned transversely across the conveyor belt 6 at spaced intervals, and are attached to another sprocket chain 21 which passes around suitable driving sprockets located adjacent head roller 8, but not shown.

Dirt seals 22 are carried upon the conveyor belt 6 in a position to cooperate with the lower edges of chute-like side plates 23. The side plates 23 and the seals 22 cooperate to form a substantially well closed conveyor chute that prevents lateral escape of the beets and dirt separated therefrom.

Sprocket chains 19 and 21 that drive the two co-acting belts are driven at substantially the same speed through the intermediary of suitable mechanism not herein illustrated in detail, since such mechanism is well-known to skilled mechanics. In that portion of the conveyor belt 6 where it turns from its horizontal portion to its upwardly inclined portion, suitable guide rollers are to be positioned above the chains 21 to hold the conveyor belt in a shape and position substantially as illustrated in Figure 1.

Thus the stated objects of this invention are well fulfilled in that sugar beets or the like are efficiently elevated and at the same time are rolled and tumbled to loosen dirt and trash therefrom, the dirt and trash being removed either during the elevation or in a subsequent screening step, and collected for the purpose of weighing.

The invention is considered to be defined clearly and correctly in the following claims. What I claim and desire to secure by Letters Patent is:

1. Apparatus of the character disclosed comprising a conveying and elevating belt having a substantially horizontal portion and having an upwardly inclined portion, a slack upwardly inclined hugger belt positioned to cooperate with the upwardly inclined portion of said conveying and elevating belt, an open-bottom hopper positioned immediately above the horizontal portion of said conveying and elevating belt, and means for feeding sugar beets or the like from said hopper to the upwardly inclined portion of the conveying and elevating belt inclusive of means for restricting such feed to less than the elevating capacity of the cooperating belts.

2. Apparatus of the character disclosed comprising a conveying and elevating belt having a substantially horizontal portion and an upwardly inclined elevating portion, an upwardly inclined slack hugger belt positioned to cooperate with the upwardly inclined elevating portion of said conveying and elevating belt, means for limiting the movement of said slack hugger belt perpendicularly away from the inclined portion of said conveying and elevating belt, an open-bottom hopper positioned above and adjacent to the horizontal portion of said conveying and elevating belt, and means for feeding sugar beets or the like from said hopper to said cooperative elevating belts at a rate which is less than the elevating capacity of said belts.

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