

June 5, 1945.

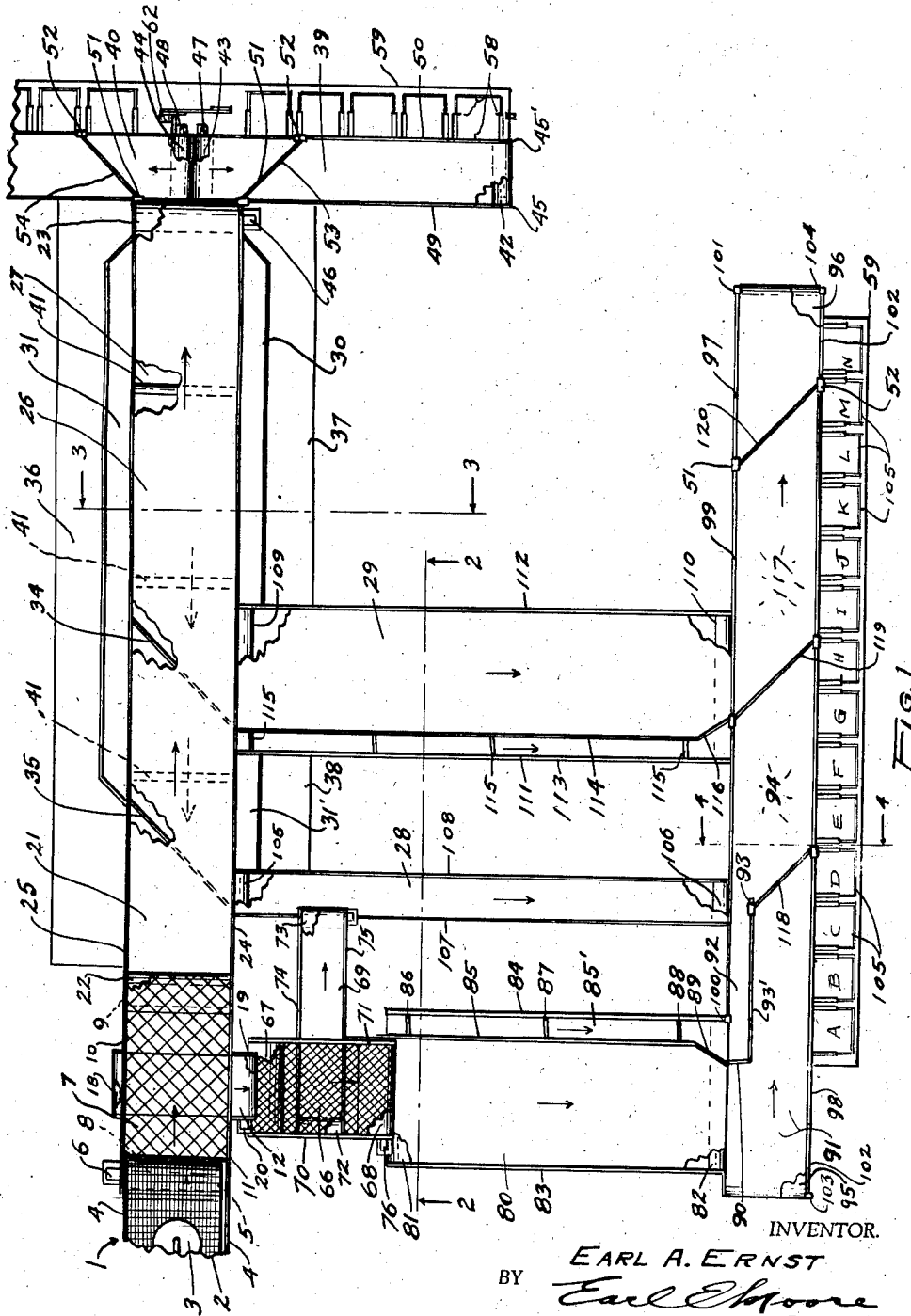
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2,377,619

GRADING AND SACKING DEVICE

Filed Feb. 26, 1943

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

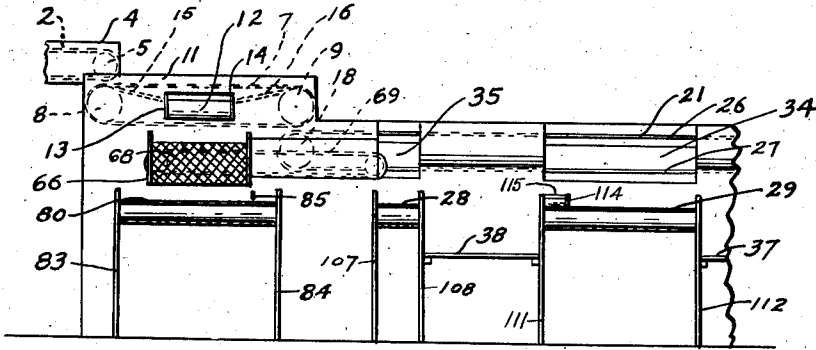


FIG. 2

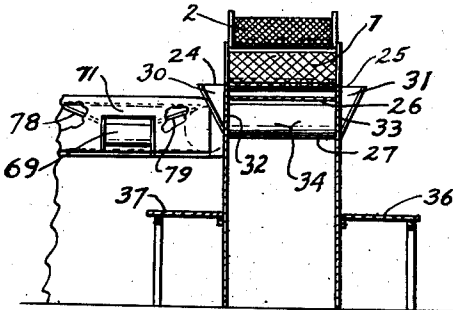


FIG. 3

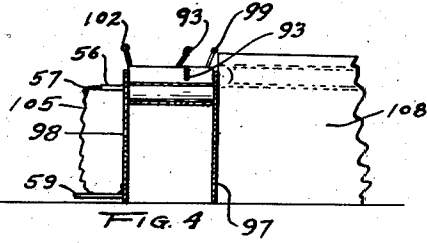


FIG. 4

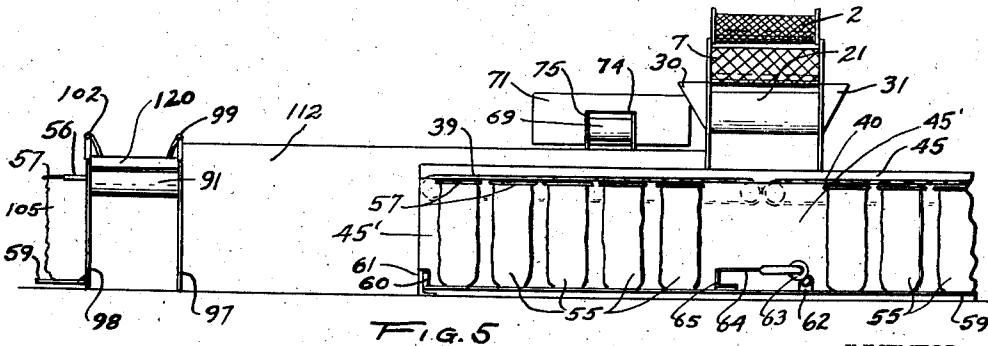


FIG. 5

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GRADING AND SACKING DEVICE

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Application February 26, 1943, Serial No. 477,234

6 Claims. (Cl. 209—71)

This invention is for means and methods of grading and sacking articles which may be almost any articles of commerce, but in this particular case, the articles are vegetables and fruits, and especially potatoes.

The invention includes a washer and a device for holding sacks in open position, and a series of intermediate endless belts to carry the articles from the washer to the sack holding devices; as well as means for grading the articles and carrying the low grade articles to particular sacks.

So far as known, there are no automatic washers, graders, and sacking devices, and especially none which are capable of receiving the field vegetables and fruits direct from carts and trucks at one end of the apparatus and delivering the vegetables and fruits to a freight car loading platform at the other end in containers, such as sacks, bags, crates or boxes.

One of the principal objects of the invention is to present a single unit apparatus for automatically washing, grading, and sacking articles, an apparatus that is economical to make and operate, simple in construction, and safe for unskilled hands to operate and control.

Another object is to provide a direct runway for high grade articles with offshoot runways to carry away lower grade articles and sack them.

Other objects, advantages and features of my invention will appear from the accompanying drawings, the subjoined detailed description, the preamble of this specification, and the appended claims.

Applicant is about to illustrate and describe one of the forms of his invention in order to teach one how to make and use the same, but it is to be understood that the drawings and description thereof are not to limit the invention in any sense whatsoever, except as limited by the appended claims.

In the drawings:

Fig. 1 is a plan view of the apparatus of the invention.

Fig. 2 is a vertical sectional view thereof taken substantially along the line 2—2 of Fig. 1.

Fig. 3 is another vertical sectional view taken substantially along the line 3—3 of Fig. 1.

Fig. 4 is still another vertical sectional view taken substantially along the line 4—4 of Fig. 1.

Fig. 5 is an elevational view of one side of the apparatus.

Following, is a description of the invention as employed for washing, grading and sacking potatoes, but the invention is not limited to han-

dling potatoes, for it will become apparent that the same apparatus, as described, can be used for handling other vegetables, as well as fruits and various articles of commerce.

5 The apparatus, at its feed end has a washer 1, the bottom of which is the upper surface of an endless belt 2 that is formed of a reticulated material such as, for instance, a wire mesh. The reticulated material being employed so that water can readily pass therethrough and carry away field dirt from the potatoes. The water is forced onto the potatoes by any suitable overhead spray such as the one designated 3 which is connected to a suitable source of water supply. The washer has sides 4 to prevent loss of potatoes. At each end of the endless belt there is a roller 5 fixed to a shaft and journaled in the sides 4, one of the rollers having its shaft turned by an electric motor 6. The dirty potatoes are dumped onto this endless belt, washed, and then carried 15 onto the endless belt 7 and dumped onto it. Any suitable structural means are employed to hold the rolls 5 and sides 4 in elevated position, and this is also the case in other parts of the apparatus to be explained; since the means of supporting the apparatus forms no part of this invention; it is believed unnecessary to burden this application with needless structural details.

20 The endless belt 7 is also made of reticulated material, preferably a wire mesh which is linked to the end rollers 8 and 9, the rollers being fixed to their respective shafts and journaled in the sides 10 and 11, a frame work which extends a little above the endless belt to prevent lateral spillage of the potatoes. The motor 6 may be geared to the roller 8 to turn it in the same direction as roller 5.

30 The rollers 8 and 9 are of greater diameter than rollers 5 so as to provide sufficient space between the horizontal portions of the endless belt 7 to accommodate a cross directed endless belt 12 having sides 13 and 14. These sides are cut to receive the inclined floors 15 and 16 which are supported by the sides 10 and 11 and extend close to the end rollers 8 and 9, see Fig. 2. The endless belt 7 has perforations with a diameter of about $1\frac{3}{8}$ inches so that all potatoes having a size small enough to pass through these perforations will fall onto the belt 12 and carried along as No. 1B size whereas the larger potatoes will continue along the main path as size I potatoes. The belt 12 is linked to the end rollers 18 and 19 which are fixed to shafts journaled in the sides 13 and 14. The roller 18 may be turned by gears 40 45 50 55

connected with the motor 6, or have its individual motor 20.

The size I potatoes will roll from the belt 7 onto a long grading table belt 21 which is linked to the end rollers 22 and 23, these rollers having shafts journaled in the side walls 24 and 25 which extend the length of the belt 21 and are continuous except for cut-out portions to be explained later. The rollers 22 and 23 are of large diameter in order to space the upper and lower horizontal portions 26 and 27 thereof far enough apart to make the lower portion 27 usable as a return carrier of potatoes. The inferior potatoes that are taken from the upper belt by the worker, or grader, are placed onto the lower belt to be offshot onto either the belt 28 or belt 29. For convenience in getting the rejected potatoes onto the lower belt portion 27, side pockets 30 and 31 are provided along the greater length of the table. Longitudinal openings 32 and 33 are provided along the sides 24 and 25 respectively in registration with their respective pockets; by this construction, rejected potatoes from the top belt portion 26 can easily be shifted to the lower portion 27 via pockets 30, 31 and 31'.

Baffle plates, or shearers, 34 and 35 are provided, as shown, between the portions 26 and 27 of the endless belt 21 for shifting potatoes from 27 to belts 28 and 29. These shearers have their ends attached to the side walls 24 and 25 and have a height almost the distance between the belt portions 26—27. The graders stand on the raised platforms 36, 37 and 38 and remove all non-grade I potatoes, placing the culls in pockets 31' and the left end of pocket 31, Fig. 1, so that they will find their way to belt 28, and placing the No. 2 grade potatoes in pocket 30 and the right side of pocket 31 so that these potatoes will find their way to belt 29. The first grade potatoes continue on belt 21 and roll off the end thereof onto belts 39 and 40. To aid in upper belt portion 26, and also the lower belt portion 27 to maintain a substantially straight and horizontal plane, a plurality of small diameter rollers 41 are provided just under the belts, the ends of the rollers being journaled in the side walls 24 and 25.

The belts 39 and 40 move in opposite directions, the endless belt 39 having the end rollers 42 and 43, and the endless belt 40 having similar end rollers, one of which is shown at 44. A rear wall 45 prevents potatoes from rolling off the rear portion of the belts 39 and 40. These belts 21, 39 and 40 may all have their rollers connected to receive their rotary power from a single motor, or each belt may have one of its rollers connected to an individual electric motor, such as the motors 46, 47 and 48 respectively. Wherever motors are employed for turning the rollers, they may be slow speed motors, or high speed motors with necessary reduction gears so that the belts will not travel too fast.

Over the longitudinal edges of the belts 39 and 40 are the pipes or bars 49 and 50 to accommodate the slidable sleeves 51 and 52 of the shiftable obliquely arranged shearers 53 and 54 which are placed having the upper corners thereof attached to their respective sleeves. These shearers are adapted to be moved along the pipes 49 and 50 and positioned so as to conduct the potatoes moving along the belts into any one of the plurality of sacks or bags 55. These sacks are supported in open position by U-shaped pipes 56 which are screwed to the front wall 45' and also held by the U-shaped pipes 57 which pipes are of a smaller diameter and the legs of which slide

into the legs of the pipes 56. Hooks 58 are provided on the inner sides of the sack holders for gripping the tops of the sacks; see patent application Serial Number 359,043 filed September 30, 1940, by applicant wherein this feature of supporting the sacks is explained in detail, now Patent #2,288,159, dated June 30, 1942.

The bottoms of the sacks rest upon a jigger platform 59, the ends of the platform being hingedly supported by the links 60 having their tops pivoted to the ends of a bracket 61 that is screwed to the front wall 45'. The platform is made to jiggle by the electric motor 62 having an eccentric disc 63 fixed to its shaft, the outer edge of the disc being pivoted to one end of a rod 64 and the other end of the rod having a pivoted connection with the top of the standard 65 that is fixed to the top of the jigger platform 59, intermediate hinged supports may be provided between the brackets 61 wherever desired to give further strength to the platform; see patent application Serial Number 438,705 filed April 13, 1942, by applicant for further details as to how the jiggle platform may be constructed and vibrated.

The No. 1B potatoes caught by the belt 12, are carried along, as indicated by the arrow, and dropped onto a wire mesh belt 66 which is linked to the end rollers 67 and 68, these rollers being of large enough diameter to provide sufficient space between the top and bottom portions of the belt 66 to accommodate a cross belt 69. The rollers 67 and 68 have their shafts journaled to the side walls 70 and 71 which have openings therein for the belt 69. Belt 69 has end rollers 72 and 73, the shafts of which are journaled in the side walls 74 and 75. The motor 20 may be gear connected to rollers 67 and 72 to turn them in the required direction or individual slow speed motors 76 and 77 may be coupled to the rollers 68 and 73 respectively. Inclined floors 78 and 79 are provided to guide potatoes falling through the mesh belt 66 onto the belt 69; these floors having their lateral edges fixed to the side walls 70 and 71, as shown, the walls 74 and 75 being cut away to allow the potatoes to roll onto the belt 69. This wire mesh belt 66 preferably has its apertures large enough to pass potatoes having a size of one and one half inches across.

The larger potatoes are carried by belt 56 and dropped onto an endless belt 80 which is linked to the end rollers 81 and 82, the rollers having their shafts journaled in the side walls 83 and 84. Spaced slightly above the belt 80 is a partition 85 which is supported in spaced relation with the wall 84 by the metal straps or angle irons 86, 87 and 88 each of which have a depending leg fastened to the outer side of the wall 84. One end of the partition has an angle portion 89 and a straight portion 90 that extends over the endless belt 91. The No. 1B potatoes fall onto the belt 91 from belt 80, and the culls selected by the grader from the main runway are placed in the trough 85' and carried by belt 80 onto a special part of belt 91 or into another trough 92 formed by the partition 93 and thus are carried by belt 91 to a shearing space 94.

The belt 91 is linked to the end rollers 95 and 96 which have their shafts journaled in the side walls 97 and 98 which run the length of the belt structure from roller 95 to roller 96. Directly over a portion of the length of the wall 97 is a pipe or rod 99 supported by the end fixed pipe sleeves 100 and 101 that are attached to standards that are fixed to the upper part of side wall 97. Another similar pipe or rod 102 is fixed

directly above the side wall 98 and supported by the fixed end pipe sleeves 103 and 104 which are supported by standards attached to the upper portion of side wall 98. These pipes 99 and 102 are spaced high enough over the top surface of the endless belt so as not to interfere with the passage of the potatoes from any of the belts leading to belt 91, or prevent the potatoes from passing to the sacks 105 alined on one side of belt 91; these sacks being supported in open position by the same means which were described for supporting the sacks 55.

The potatoes carried by the belt 69, classed as culls, fall therefrom onto the top of the endless belt 28; this belt being linked to the end rollers 105 and 106, their shafts being journalled in the side walls 107 and 108. The potatoes (culls) from belt 28 fall onto belt 91 in that portion 94 which receives the culls from belt 80.

The No. 2 potatoes from the lower portion of belt 21 (main belt) are sheared into the belt 29; this belt being linked to the end rollers 109 and 110, the shafts of these rollers being journalled in the side walls 111 and 112. The culls from belt 29 are cast into a trough 113 formed by the partition 114 which is spaced slightly above the belt 29 by the angle irons 115 which are similar to the angle irons 86, 87 and 88. This partition also has the angle portion 116. The culls in trough 113 are carried to the portion 94 of the belt 91 whereas the No. 2 potatoes are carried to the portion 117 of the belt 91.

A plurality of shearers 118, 119 and 120 are employed along the top surface of belt 91 and have sleeves 51 and 52, like the shearers 53 and 54, which slide along their respective pipes or rods 99 and 102; the shearer 118, however, having one of its sleeves slide along the pipe 93'. By this arrangement, No. 1B potatoes can be fed into sacks A, B, C, D, all the culls fed into sacks E, F, G, H, and No. 2 potatoes fed into sacks I, J, K, L, M and N. Stops may be used on the rods 99 and 102 to limit the movement of the shearers, but such would not be generally required.

In accordance with the foregoing, the field potatoes are dumped into the washer and are graded and sacked ready for shipment to the retail trade, much of the work being automatic and efficiently done with a minimum of time and expense.

Having thus described my invention, what is claimed as new, and desired to be secured by Letters Patent is:

1. In a grading device for separating variously sized articles, a plurality of article receiving stations spaced from one another, an endless belt means, one of the stations being designated a first station and the other station a second station, said endless belt means comprising a main line series of endless belts leading from a starting point to the first station and a plurality of lateral endless belts leading from the starting point to the second station, the main line belts comprising a first belt having perforations of predetermined size and positioned to receive articles from a source of supply, and a second belt positioned to receive articles from the first belt and deliver them to the first station; a third endless belt beneath a portion of the first belt adapted to receive articles passed through the perforations of the first belt, a carrier belt means having its ends

positioned to receive articles from the third belt and deliver them to the second station, and a fourth endless belt having its ends proximate the second belt and the second station to receive articles from the second belt and deliver them to the second station, said stations each comprising an endless belt means having a plurality of frames along the sides thereof for holding sacks.

2. The grading device recited in claim 1 wherein a portion of the carrier belt means has perforations of predetermined size, and a fifth endless belt leading from beneath a portion of the perforated part of the carrier belt means to the fourth belt for delivery of articles thereto that have passed through the perforations of the carrier belt means, and shearers above the endless belts of the stations adapted to direct articles therefrom into sacks supported by the frames.

3. The grading device recited in claim 1 wherein another endless belt extending from a central portion of the second belt to the second station is provided with a trough along one longitudinal edge thereof to deliver articles at a locus at the second station at a different portion thereof than delivered by the main portion of said another belt, there being perforations in a portion of the carrier belt means, and a fifth endless belt leading from beneath a portion of the perforated part of the carrier belt means to the fourth belt for delivery of articles thereto that have passed through perforations of the carrier belt means.

4. The grading device recited in claim 1 wherein the second belt has upper and lower runs materially spaced apart, pocket means along the sides of this belt having communication with the top of the lower run thereof, and shearer means over the lower run to direct articles therefrom onto the fourth belt.

5. The device recited in claim 1 wherein the first station comprises a pair of endless belts end to end with their top surfaces moving in opposite directions, a platform under the frames thereof, and vibrating means at the longitudinal central locus thereof for shaking same.

6. In a grading device for sizing articles, a general distributing point at one portion of the device, a plurality of spaced apart article receiving stations spaced from said point, and a main line endless belt means connecting the point with a first station and a lateral endless belt means connecting the point with a second station, the main line belt means comprising a first belt having perforations of predetermined size and positioned to receive articles from the distributing point, and a second belt positioned to receive articles from the first belt and deliver them to the first station; a third endless belt beneath a portion of the first belt adapted to receive articles passed through the perforations of the first belt, a carrier belt means having its ends positioned to receive articles from the third belt and deliver them to the second station, and a fourth endless belt having its ends proximate the second belt and the second station to receive articles from the second belt and deliver them to the second station, each of said stations including an endless belt means having a plurality of sack holding means along the sides thereof.

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