April 30, 1935. I. W. HOOVER 1,999,875

SORTING APPARATUS

Original Filed June 25, 1931 2 Sheets-Sheet 1

Fig. 1

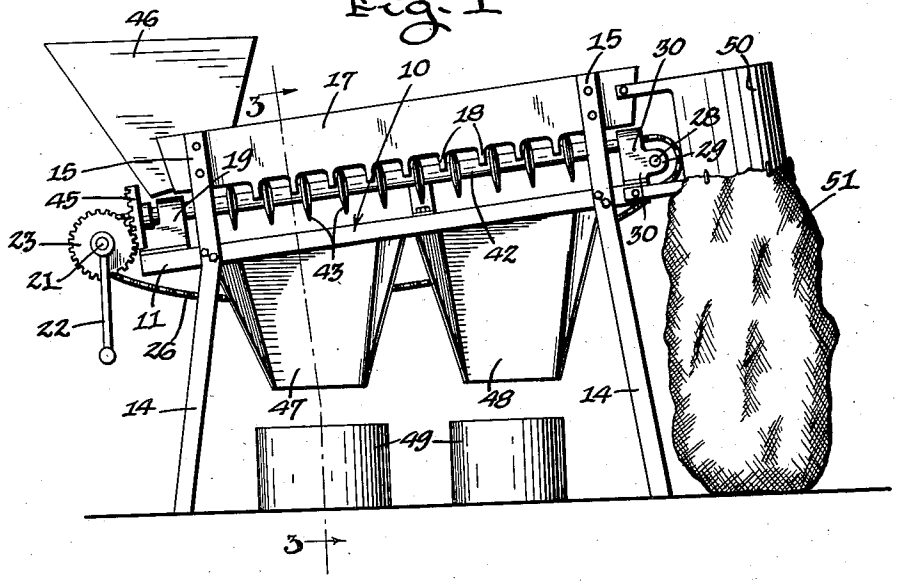


Fig. 2

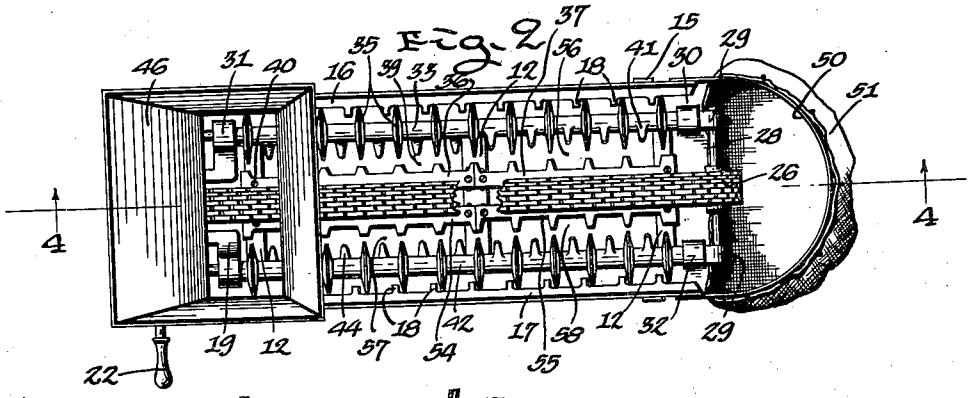
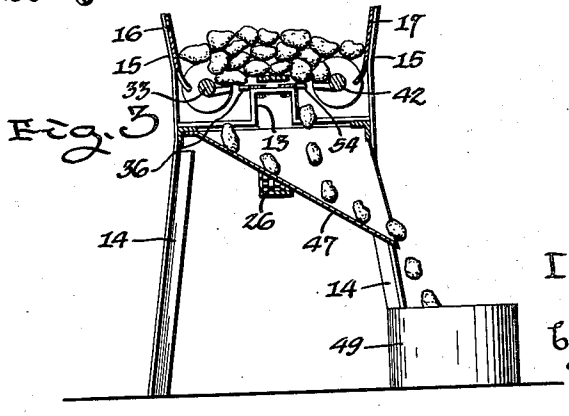


Fig. 3



Isaac W. Hoover
Inventor
by Smith and Freeman
Attorneys

April 30, 1935. I. W. HOOVER 1,999,875

SORTING APPARATUS

Original Filed June 25, 1931 2 Sheets-Sheet 2

Fig. 4

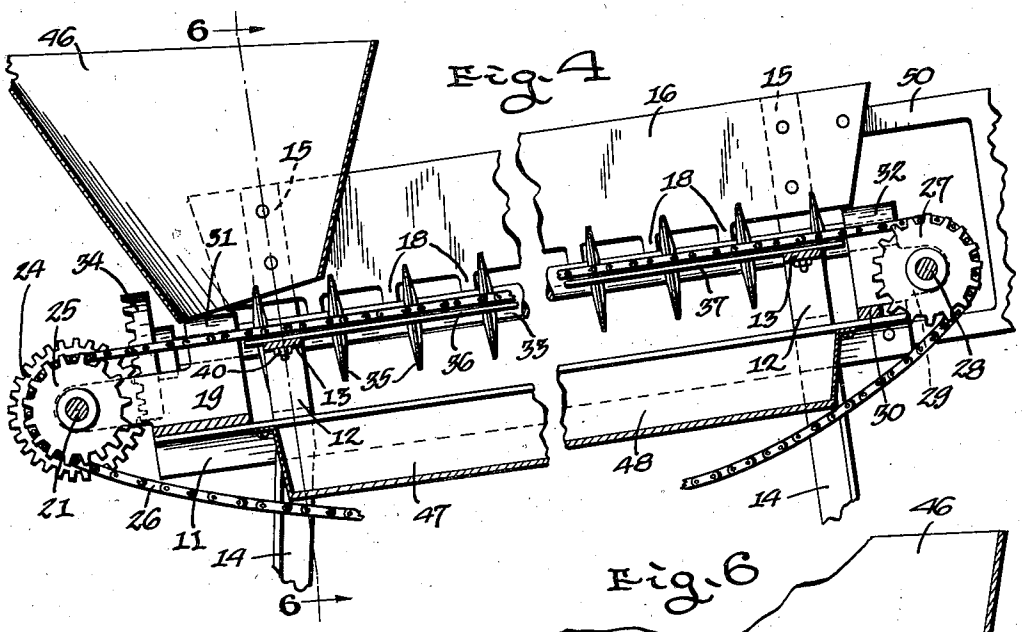


Fig. 5

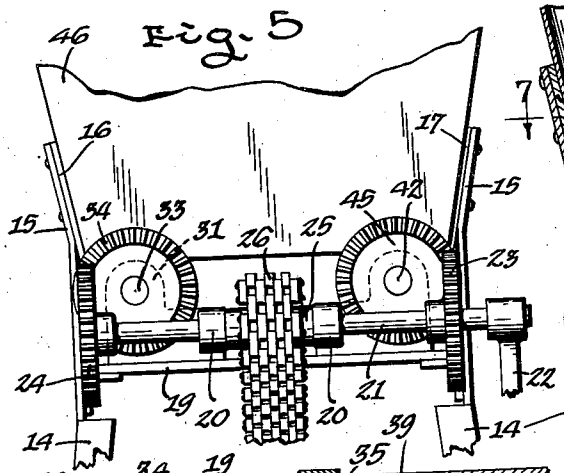


Fig. 6

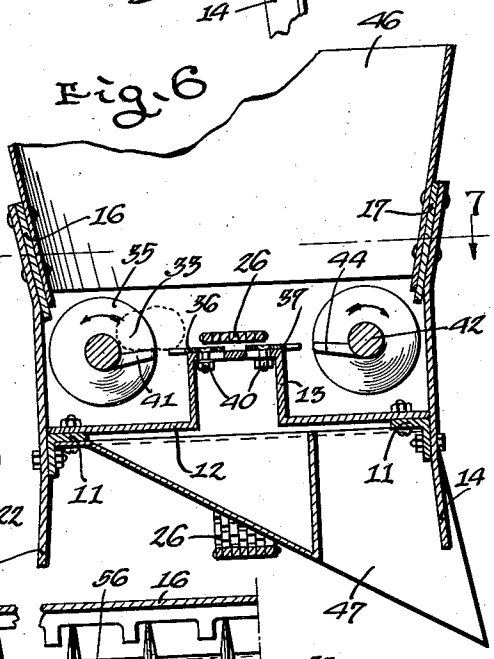
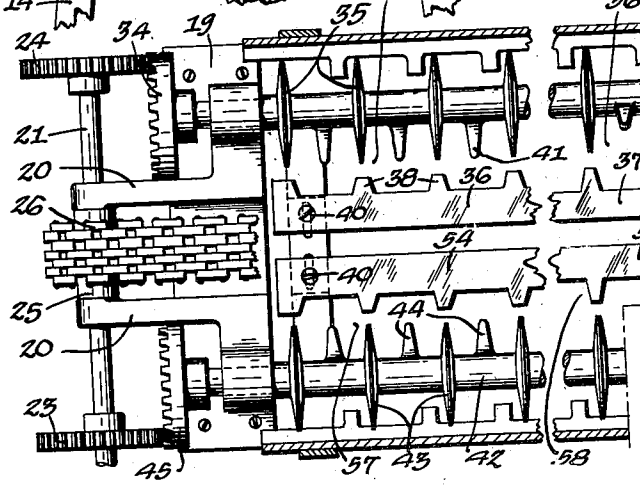


Fig. 7



Isaac W. Hoover
Inventor
by Smith and Freeman
Attorneys

Patented Apr. 30, 1935

1,999,875

UNITED STATES PATENT OFFICE

1,999,875

SORTING APPARATUS

Isaac W. Hoover, Avery, Ohio

Application June 25, 1931, Serial No. 546,729
Renewed October 13, 1934

8 Claims. (Cl. 209—101)

This invention relates to sorting apparatus, more particularly adapted for use in sorting fruits, vegetables, and the like, and an object of the invention is to provide a new and improved apparatus of this character.

In the drawings accompanying this specification and forming a part of this application, I have shown for purposes of illustration, one form which my invention may assume, and in these drawings:

Figure 1 is a side elevational view of an embodiment of the invention,

Figure 2 is a top plan view of the embodiment shown in Figure 1, partly broken away to disclose certain of the mechanism,

Figure 3 is a vertical sectional view, corresponding substantially to line 3—3 of Figure 1,

Figure 4 is an enlarged, broken, vertical sectional view, corresponding substantially to line 4—4 of Figure 2,

Figure 5 is an enlarged fragmentary elevational view showing the gear construction,

Figure 6 is a vertical sectional view, corresponding substantially to line 6—6 of Figure 4, while

Figure 7 is an enlarged fragmentary, horizontal sectional view, corresponding substantially to line 7—7 of Figure 6, parts thereof being broken away to more clearly disclose the construction.

The embodiment of the invention herein disclosed comprises a frame 10, having longitudinally extending frame members 11 and transverse frame members 12, suitably secured together, the transverse frame members 12 having upwardly offset portions 13 adapted to serve a purpose hereinafter described, and the frame 10 is supported in an inclined position upon legs 14, having extensions 15 forming side supports to which are attached longitudinally extending side plates 16 and 17, each provided along its lower edge with a plurality of spaced fingers 18.

At one end of the frame 10 beyond the outermost transverse member 12 is a casting 19, suitably secured at its ends to the frame members 11, and provided with angularly disposed arms 20 in which is journaled a shaft 21 carrying a crank 22 by means of which the shaft 21 may be rotated, and the shaft 21 outwardly of the arms 20 carries driving pinions 23 and 24, and between the arms 20 carries a sprocket-wheel 25, over which is trained one end of a chain conveyor 26, the opposite end of the conveyor being trained over a sprocket-wheel 27 carried by an axle 28 rotatably supported in bearings 29 forming part of a casting 30 located at the opposite end of the frame 10 and suitably secured to said frame.

Rotatably journaled in bearings 31 and 32, formed respectively upon the castings 19 and 30, is a shaft 33, extending substantially parallel with the conveyor 26, spaced laterally therefrom a suitable distance, and lying at a somewhat lower level than the uppermost run of the conveyor 26, and the shaft 33 is provided with a gear-wheel 34 meshing with, and adapted to be driven by the pinion 24 on the shaft 21. Arranged along the shaft 33 at spaced intervals is a plurality of spaced partitions 35, each in the form of a disk movable with the shaft 33, and each tapering outwardly, so that the space between adjacent partitions 35 diverges outwardly from the shaft 33. The movable partitions 35 are adapted to cooperate with plates 36 and 37, each having a plurality of fingers 38 disposed in alignment with the partitions 35, spaced from said partitions 35, and tapering in a direction opposite to the partitions 35, thereby defining spaces between the fingers 38 which diverge toward the partitions 35, and in conjunction with the partitions 35, form sorting openings 39 through which the articles to be sorted may be passed. The plate 36 is of somewhat greater width than the plate 37 so that the openings 56 provided by the partitions 35 and the fingers 38 of the plate 37 are somewhat larger than the openings 39, so that at least two groups of different sized openings are provided along the length of the apparatus. The plates 36 and 37 are laterally adjustable through provision of a slot and bolt connection 40 with each of the offset portions 13 of the transverse members 12, and the plates 36 and 37 are independently adjustable, so that the sizes of the sorting openings of the groups of openings may be independently adjusted.

The shaft 33 also carries a plurality of clearing fingers 41, projecting laterally from the shaft 33, located one between each pair of partitions 35, and adapted to enter each sorting opening to clear the same of articles too large to pass therethrough and to impel such articles toward the conveyor 26.

At the opposite side of the conveyor 26 there is provided a shaft 42 having partitions 43, clearing fingers 44 and a gear-wheel 45, all identically similar to the shaft 33, partitions 35, and clearing fingers 41, respectively, defining openings 57 and 58 similar to openings 39 and 56, and the gear-wheel 45 is driven by the pinion 23 on the shaft 21 and rotated in a direction opposite to the rotation of the shaft 33. Sorting plates 54 and 55, similar to the plates 36 and 37, respec-

tively, are provided for cooperation with the shaft 42 and the elements associated therewith.

A feed hopper 46 is secured to the side members 16 and 17 and is open at the bottom to deliver articles onto the sorting mechanism. Delivery chutes 47 and 48 are secured to the frame member 11 for the purpose of directing different sized sorted articles into predetermined locations where they may be collected in suitable receptacles 49. An end chute 50 is also provided at the discharge end of the apparatus for directing the larger articles into a bag or other receptacle, as indicated at 51.

In operation a number of articles, such as potatoes, or the like, of different sizes, are fed to the sorting apparatus through the hopper 46, and the operation of the machine commenced, or continued, by rotation of the crank 22, resulting in rotation of the shaft 21 and of the sprocket-wheel 25, and of the gears 23 and 24, rotation of the sprocket-wheel 25 causing longitudinal travel of the conveyor 26, and rotation of the gears 23 and 24 causing rotation of the shafts 33 and 42 in opposite directions outwardly away from the conveyor 26. Movement of the conveyor 26 advances the articles and by reason of its slightly elevated position with reference to the elements defining the sorting openings 39 and 57, the articles will roll or slide laterally off of the conveyor and gravitate toward the sorting openings, and articles of sufficiently small size will pass between the fingers and partitions defining the openings 39 and 57, and will fall through, and into the chute 47, to be delivered to the receptacle placed therebeneath. Larger articles presented at the sorting openings 39 and 57 can not pass therethrough, and rotation of the shafts 33 and 42 causes the clearing fingers 41 and 44 to traverse the sorting openings 39 and 57 and expel the larger articles toward the conveyor 26, which then advances them farther along. As the articles advance through the apparatus those of somewhat larger size reaching the sorting openings 56 and 58 will pass through into the chute 48, and the articles which are too large to pass through any of the sorting openings, by reason of movement of the conveyor and movement of the clearing fingers, will eventually reach the end of the apparaus and be discharged into the chute 50 and into the bag 51.

The action thus described results in quickly and efficiently sorting the articles, and adjustments of the plates 36, 37, 54 and 55 may be readily made to vary the sizes of the sorting openings. Due to the oppositely diverging defining portions of the sorting openings, as provided by the tapered partitions and oppositely tapered cooperating fingers, the apparatus is rendered particularly efficient in sorting articles of irregular outline, such as potatoes, as only substantially point contact with the articles sorted is provided by the construction described.

It will be understood by those skilled in the art that the embodiment of the invention discloses at least the principal object thereof, and the invention is adaptable to uses and has advantages other than those herein described; furthermore it will be apparent to those skilled in the art that the apparatus may be power driven, if desired, and the partitions 35 and 43 under some circumstances may be made stationary by securing them to the side plates 16 and 17, and various other changes and modifications may be made without departing from the spirit of the invention; accordingly it will be understood that the embodiment herein described is illustrative only and the invention is not limited thereto.

I claim:

1. A sorting apparatus, comprising: an upwardly inclined support along which a series of articles is adapted to move from a receiving station; a plurality of spaced partitions arranged longitudinally of said support and cooperating therewith in defining a plurality of openings of different sizes; means for moving said partitions in a direction transverse to the movement of said articles along said support to facilitate the passage of said articles through said openings; and a conveyor for moving said articles upwardly along said inclined support, the inclination of said support preventing the movement of articles upwardly therealong which are not in actual engagement with said conveyor.

2. A sorting apparatus, comprising: an inclined stationary support along which a series of articles is adapted to move; a plurality of spaced members arranged longitudinally of said support and cooperating therewith in defining a plurality of openings of different sizes; means for moving said members in a direction transverse to the movement of said articles along said support to facilitate the passage of said articles through said openings; and a movable conveyor for moving said articles upwardly along said inclined stationary support.

3. A sorting apparatus, comprising: elongated supporting means having advancing means extending longitudinally along the center of said supporting means and operable to effect advance of articles, entering the center of said supporting means, from one end of the apparatus toward the other; a rotatable shaft extending substantially parallel with respect to said advancing means and spaced therefrom, and provided with a plurality of disk-like partitions projecting laterally from said shaft and rotatable therewith; recess defining means arranged between said shaft and said advancing means and cooperating with said partitions to define a plurality of sorting recesses at a lower level than said advancing means, said sorting recesses adapted to be occupied by articles rolling laterally from said advancing means; and clearing fingers mounted on said shaft, extending substantially at right angles to said shaft, and adapted to traverse said sorting recesses to eject an oversize article from each sorting recess and deliver the same laterally to said advancing means for advancement toward the next sorting recess.

4. A sorting apparatus, comprising: elongated supporting means having advancing means extending longitudinally along the center of said supporting means and operable to effect advance of articles, entering the center of said supporting means, from one end of the apparatus toward the other; a rotatable shaft extending substantially parallel with respect to said advancing means and spaced therefrom, and provided with a plurality of disk-like partitions projecting laterally from said shaft and rotatable therewith; a plurality of adjustable recess defining means arranged between said shaft and said advancing means and cooperating with said partitions to define a plurality of groups of different size sorting recesses at a lower level than said advancing means, said sorting recesses adapted to be occupied by articles rolling laterally from said advancing means, and said recess defining means being independently adjust-

able with respect to each other to vary the size of said sorting recesses; and clearing fingers mounted on said shaft, extending substantially at right angles to said shaft, and adapted to traverse said sorting recesses to eject an oversize article from each sorting recess and deliver the same laterally to said advancing means for advancement toward the next sorting recess.

5. A sorting apparatus, comprising: elongated supporting means having advancing means extending longitudinally along the center of said supporting means and operable to effect advance of articles, entering the center of said supporting means, from one end of the apparatus toward the other; a rotatable shaft extending substantially parallel with respect to said advancing means and spaced therefrom, and provided with a plurality of disk-like partitions projecting laterally from said shaft and rotatable therewith, and of uniform depth and spacing; recess defining means, normally stationary, arranged between said shaft and said advancing means and cooperating with said partitions to define a plurality of sorting recesses at a lower level than said advancing means and adapted to be occupied by articles rolling laterally from said advancing means, said recess defining means being adjustable with respect to said partitions to vary the size of said sorting recesses; and clearing fingers mounted on said shaft, extending substantially at right angles to said shaft, and adapted to traverse said sorting recesses to eject an oversize article from each recess and deliver the same laterally to said advancing means for advancement to the next sorting recess.

6. A sorting apparatus, comprising: a rotatable shaft having a plurality of disk-like partitions projecting laterally from said shaft and rotatable therewith, said partitions being spaced from each other longitudinally along said shaft, the adjacent partitions and said shaft cooperating to form recesses; a plurality of members arranged longitudinally in line with respect to each other and laterally spaced from said shaft, said members each having a group of recesses arranged longitudinally therealong, the defining edges of said recesses cooperating with said spaced partitions to define a plurality of sorting openings, through which articles to be sorted may pass; each of said members being independently adjustable with respect to each other and with respect to said cooperating spaced partitions, to thereby independently define a plurality of groups of different size sorting openings; and means for rotating said shaft to agitate the articles to be sorted, to thus effect sorting of said articles.

7. A sorting apparatus, comprising: a rotatable shaft having a plurality of disk-like partitions projecting laterally from said shaft and rotatable therewith, and spaced from each other longitudinally along said shaft, the adjacent partitions cooperating to form recesses; a plurality of members arranged longitudinally in line with respect to each other and laterally spaced from said shaft, said members each having a group of recesses arranged longitudinally therealong, the defining edges of said recesses cooperating with said spaced partitions to define a plurality of sorting openings, through which articles to be sorted may pass; each of said members being independently adjustable with respect to each other and with respect to said cooperating spaced partitions, to thereby independently define a plurality of groups of different size sorting openings; conveying means, superposed with respect to said members, for presenting the articles to be sorted to said sorting openings; and means for operating said conveying means and for rotating said shaft, to thus effect sorting of said articles.

8. A sorting apparatus, comprising: a rotatable shaft having a plurality of disk-like partitions projecting laterally from said shaft and rotatable therewith, said partitions being spaced from each other longitudinally along said shaft, the adjacent partitions and said shaft cooperating to form recesses; a plurality of members arranged longitudinally in line with respect to each other and laterally spaced from said shaft, said members each having a group of recesses arranged longitudinally therealong, the defining edges of said recesses cooperating with said spaced partitions to define a plurality of sorting openings, through which articles to be sorted may pass; each of said members being independently adjustable with respect to each other and with respect to said cooperating spaced partitions, to thereby independently define a plurality of groups of different size sorting openings; conveying means, superposed with respect to said members, and movable transversely with respect to said sorting openings for presenting the articles to be sorted to said sorting openings; clearing fingers mounted on said shaft between said partitions, and adapted to traverse said sorting openings to eject an oversize article from each sorting opening and deliver the same laterally to said advancing means for advancement to the next sorting opening; and means for operating said conveying means and for rotating said shaft, to thus effect sorting of said articles.

ISAAC W. HOOVER.