Oct. 20, 1936. H. C. SHARP 2,057,849

SORTING AND POLISHING DEVICE

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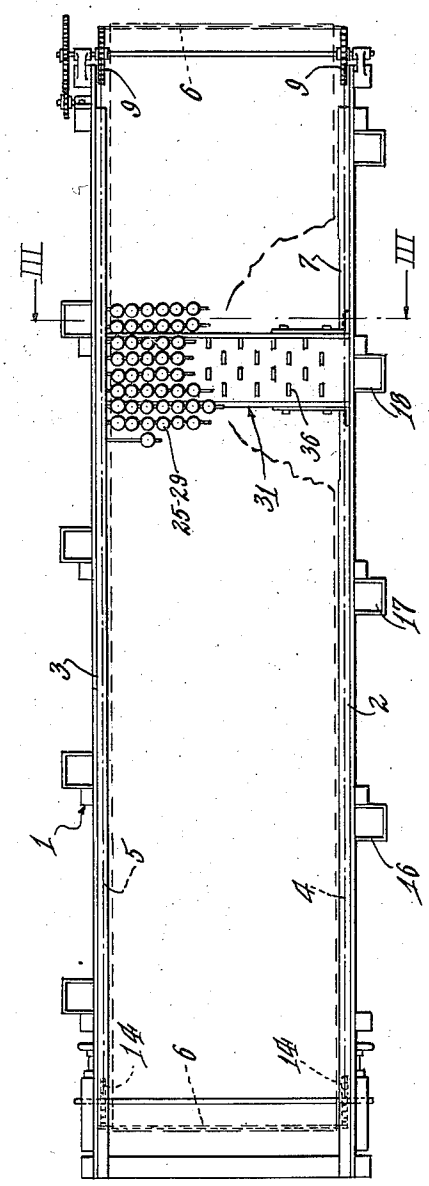


Fig. 2.

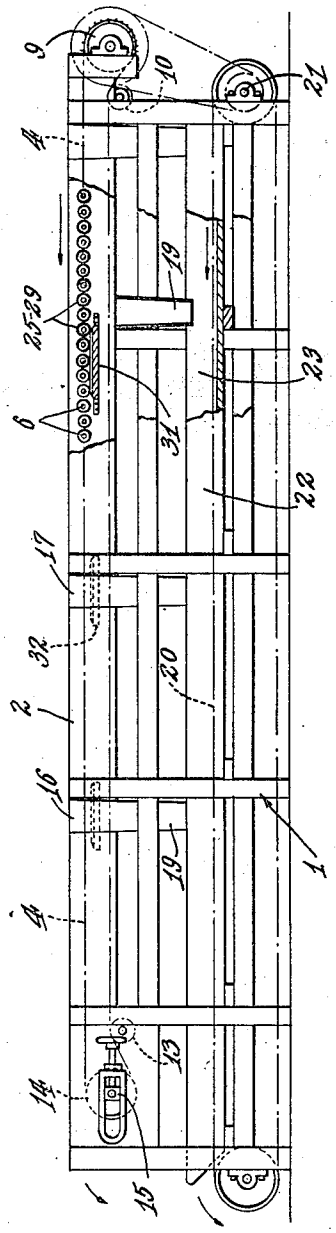


Fig. 1.

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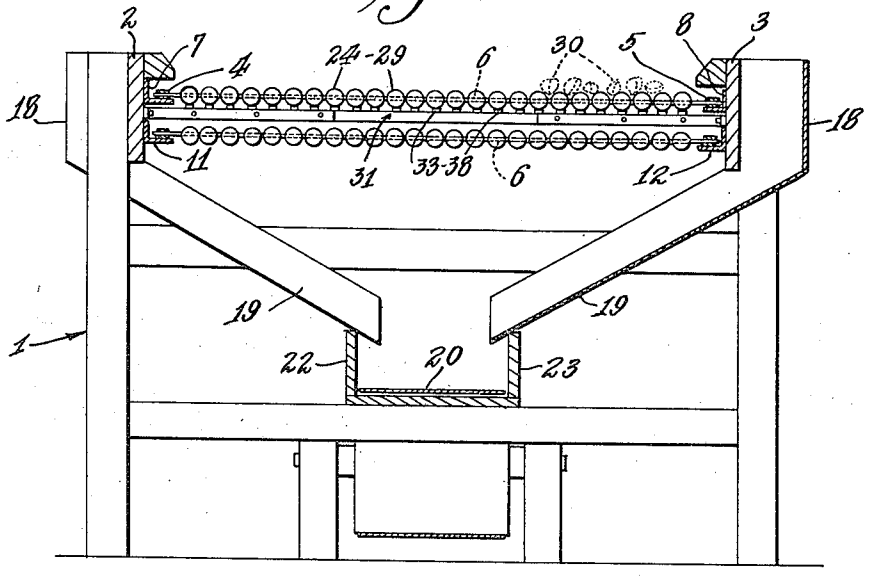
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Fig. 3.



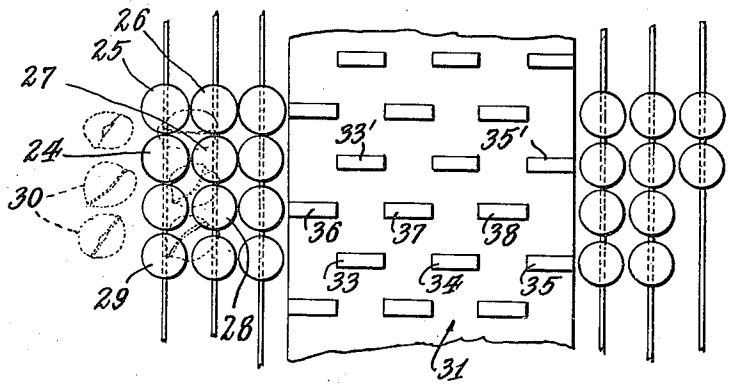


Fig. 4.

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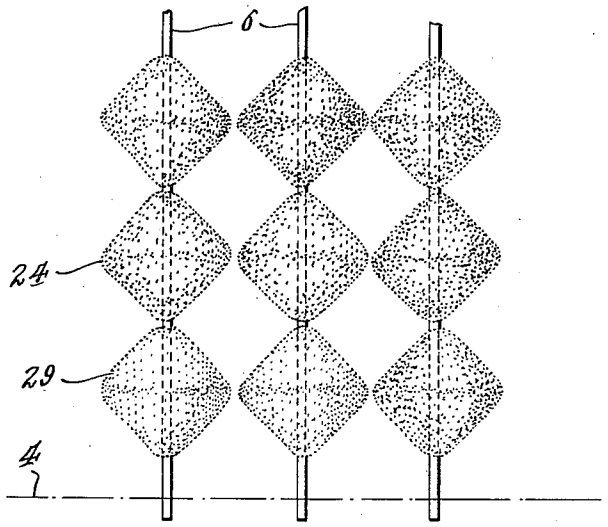
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SORTING AND POLISHING DEVICE

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Fig. 5.



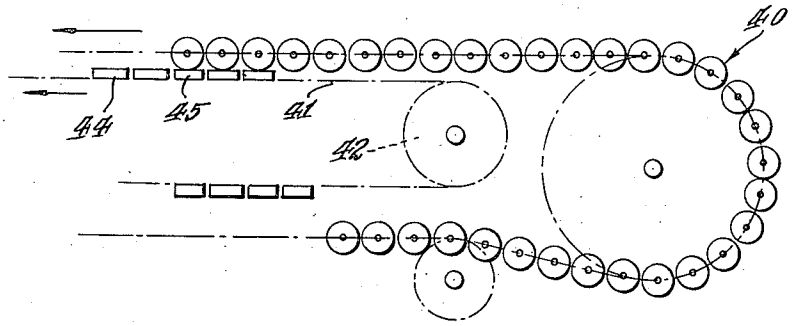


Fig. 6.

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UNITED STATES PATENT OFFICE

2,057,849

SORTING AND POLISHING DEVICE

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Application January 7, 1935, Serial No. 607

10 Claims. (Cl. 146—193)

This invention relates to methods and means whereby objects having an elliptical, spherical, globular or pear shape may be turned so as to assume various positions. The invention also relates to methods and means whereby globular or irregularly shaped objects or articles may be uniformly brushed, waxed or polished in a rapid and economical manner.

In the handling of various objects, such as nuts and fruits, the objects are often sorted for color and/or imperfections. In the sorting of walnuts, for example, it is necessary to carefully examine the stem end of the nut in order to determine whether the nut had been ravaged by the codling moth or its worm. Because of their irregular, generally elliptical, shape, the nuts tend to revolve about their major or long axis when such nuts are supported upon adjacent rotating rolls. While in such position it is difficult to examine the stem ends. The present invention discloses and provides means whereby the nuts may be caused to assume various positions and rotated on different axes so as to assume positions in which the major axis is substantially vertical. While in this position, the sorting operators can readily examine the stem end of the nut, thereby facilitating the sorting operations.

It has been discovered that if an elliptical or other irregularly shaped object is supported at a plurality of points and diagonally related points or surfaces on which the object is supported are rotated in unison, the object is caused to twist and turn so as to position the major or long axis of the object in a generally vertical direction.

This discovery has been embodied in sorting tables capable of being used for the sorting of walnuts, lemons and other fruits and nuts, either as to color or imperfections, and in brushing and waxing devices capable of subjecting the entire surface area of an irregularly shaped object to a brushing or polishing operation.

Although the invention will be described hereinafter with particular reference to its use in the sorting of walnuts, it is to be understood that the invention may be adapted to sorting and polishing or waxing tables and devices for use on numerous other objects, such as lemons and other fruits.

An object of this invention, therefore, is to disclose and provide a method whereby irregularly shaped objects may be automatically and quickly turned so as to present various sides and portions thereof to view.

Another object is to disclose and provide means whereby irregularly shaped objects may be rapidly and quickly turned into various positions.

Another object is to disclose and provide a sorting table capable of presenting various portions of irregularly shaped objects to view and examination.

A still further object is to disclose and provide a walnut sorting table.

A further object is to disclose and provide means for polishing irregular shaped objects, such as lemons.

These and other objects, uses, modifications and adaptations of the invention will become apparent to those skilled in the art from the following detailed description of an illustrative embodiment of the invention.

In describing such embodiment, reference will be had to the appended drawings, in which:

Fig. 1 is a side elevation, partly broken away, of one form of sorting table.

Fig. 2 is a plan view, partly broken away, of the table shown in Fig. 1.

Fig. 3 is a vertical section taken along the plane III—III of Fig. 2.

Fig. 4 is an enlarged, partly diagrammatic view of a portion of the turning and progressing means.

Fig. 5 is an enlarged view of a modified form of progressing, turning and brushing means.

Fig. 6 is a side elevation, partly broken away, of a modified form of sorting device.

As shown in Figs. 1, 2 and 3, a sorting table embodying this invention may include a frame 1, suitably braced. The frame may be provided with side members 2 and 3 having means adapted to guidingly receive continuous chains 4 and 5 to which are connected the rods 6. The guiding means may comprise angle irons 7 and 8 attached to the side members 2 and 3 respectively. The continuous chains 4 and 5 may pass over sprockets 9 and then pass over an idler sprocket 10. The sprocket 9 may be driven in any suitable manner, the driving means being not shown. The chains 4 and 5 may then pass through another guide, such as the angle irons 11 and 12, to the opposite end of the machine, an idler sprocket 13 being there journaled. The chains may pass over said sprocket and then over the large sprocket 14 which may be journaled in an adjustably positioned bearing block 15 whereby the tension of the chain may be regulated. The chains 4 and 5, together with their connecting rods 6, thus form a continuous conveyor which may be either continuously or intermittently driven, although the former is preferred. At various spaced points along the sides of the table hoppers 16, 17, 18, etc.,

are provided, these hoppers discharging into conduits or chutes 19 leading to a longitudinally disposed continuous conveyor belt 20 driven by a shaft 21. Side guards 22 and 23 may be provided for the conveyor 20.

Each of the rods 6 of the conveyor carries a plurality of substantially spherical members 24, 25, 26, 27, etc. These spherical members 24–27 are preferably freely journaled upon the rods 6 and are arranged in alignment longitudinally of the conveyor as a whole. Instead of being spherical as shown in Fig. 4, the members may assume a conical form, as shown in Fig. 5. When the apparatus is to be used for sorting walnuts, the members 24—27 are preferably similar in size to the nuts being sorted, that is, they may be from 2.5 to about 6 centimeters in diameter. The spherical members on one rod are preferably spaced from the spherical members on another rod a distance of from but a few millimeters to 1 centimeter. A nut or other object resting upon the members 24—27 will be supported thereby as indicated at 30, four adjacent members cooperating to support the object 30.

In the event the conveyor comprising the rods 6 and the members 24—27 carried thereby were to move down the runway, objects supported by the members 24—27 would remain immovable thereon and simply progress from one end of the table to the other. In order to cause the objects or nuts 30 to assume different positions upon the conveyor, means are provided for intermittently rotating the members 24—27. Furthermore, those members which are diagonally related to each other (with respect to the longitudinal axis of the runway or conveyor) are preferably rotated, the remaining member of a quartet being permitted to remain stationary.

Expressed differently, every other member along a given rod of the conveyor is partially rotated, such as for example, the members 26 and 28. If the members 26 and 28 are being rotated, then preferably the members 24 and 29 of the adjacent rod are also rotated in the same direction. Attention is called to the fact that the members 24 and 26 and the members 28 and 29 are diagonally related to one another.

One means of accomplishing such intermittent rotation of diagonally related supporting members carried by the rods of the conveyor is shown in Figs. 1 and 2. Such means may include stationary table means 31, 32, etc., extending transversely beneath the conveyor. The stationary table means 31, 32, etc., are longitudinally spaced from each other. The table members 31, 32, etc., may be provided on their upper surfaces with suitable cleats arranged in longitudinally directed rows. It will be noticed that the cleats 33, 34 and 35 are longitudinally arranged but spaced from one another. Moreover, such cleats 33–35 are in alignment with the members 29 of the conveyor. The table member 31 is also provided with cleats 36, 37 and 38, these cleats being staggered with respect to the cleats 33—35 and 33'—35'.

All the cleats carried by the table are capable of frictionally engaging the members 24—29 carried by the conveyor so as to cause these members to partially rotate during that period of time that the members are in contact with the cleats. As a result, alternate members carried upon a given rod of the conveyor will be caused to intermittently rotate while the conveyor is passing over the table 31, the members carried on an adjoining rod of the conveyor being similarly intermittently rotated. When the arrangement of cleats shown in Fig. 4 is used, diagonally related members will be rotated in the same general direction simultaneously. In addition, those alternate supporting members which are not being rotated may be positively restrained from rotation by suitable friction means.

The cleats carred by the stationary tables 31, 32, etc., may be made of any suitable material such as wood, rubber composition, fabric, belting, leather, etc. If desired, the stationary tables 31 may be mounted upon a yielding suspension capable of being brought into yielding contact with the conveyor.

In the application of the device and method described hereinabove to the walnut industry, it is to be remembered that walnuts, after being hulled and dried, are sorted for the purpose of removing blanks or empty nuts, then culled for external appearance, bleached, graded and sized, and finally culled or sorted for the purpose of removing the nuts containing worms. It is at this stage of the operation that the nuts may be fed upon a table of the character described hereinabove and moved longitudinally by the conveyor. Operators may be stationed on both sides of the table between portions thereof occupied by the rotating means, such as the table portions 31, 32, etc. Nuts showing the effects of coddling moth or other imperfections may be readily picked out by the operators and thrown into the hoppers 16—18 which direct such undesirable nuts to the discharge conveyor 20. The carefully sorted and hulled nuts are then discharged from the end of the table into a suitable bin. Means for supplying nuts and discharging nuts from the table are not shown.

Instead of using substantially spherical supporting members on the rods 6, these supporting members may assume the form of two cones with their bases in contact, as shown in Fig. 5. Although these supporting members may be made of various materials, wood has been found very satisfactory and economical. In the event it is desired to impart a brushing or polishing action to the objects being treated, then the supporting members may well be of the conical shape indicated in Fig. 5. In all events, each of the supporting members should be of a progressively varying diameter with respect to its axis of rotation.

Various means for imparting partial rotation to the supporting members may be employed. As shown in Fig. 6, the conveyor, generally indicated by the numeral 40 and moving in the direction of the arrow, may have a continuous belt 41 positioned therebelow, the belt passing over suitable pulleys 42, one of said pulleys being driven either in the same direction that the conveyor 40 is driven or in an opposite direction. The belt 41 may be provided with sections carrying the cleats 44, etc., said section of cleats being separated from the following section of cleats 45 by a length of plain belting.

In the event the belt 41 is driven in the same direction as the conveyor 40, the belt 41 is preferably driven at a faster linear speed than the conveyor. In the event the belt 41 is driven in a direction opposed to that of the conveyor 40, it is preferably driven at a slower linear speed than the conveyor. In this manner, the supporting members of the conveyor are intermittently rotated, operators selecting or sorting the nuts and/or fruits during periods of rest.

In the event the method and apparatus of this invention are to be used in brushing, waxing or

polishing, then the conveyor may pass over a table provided with cleats, said table being practically coextensive with the runway of such conveyor. The belt 41 may be completely covered with the cleats (in the event a belt drive is used) as in such brushing or waxing operations it is not necessary to examine the fruit while they are stationary.

In addition to the means described hereinabove, those skilled in the art will readily appreciate that other means for intermittently driving the supporting members can be developed. The rods 6, for example, may be journaled in the conveyor chain and alternate supporting members keyed or otherwise attached to such rods, the intermediate supporting members being freely journaled thereon. The rods can then be periodically and intermittently rotated so as to rotate those members which are mounted on the rods whereas the alternate members are not rotated. These and other changes, modifications and adaptations of the invention will be apparent to those skilled in the art. All changes and modifications coming within the scope of the appended claims are embraced thereby.

I claim:

1. In a machine for treating fruits, nuts, and vegetables, a runway including a plurality of parallel spaced rods, a plurality of supporting members carried by each of said rods, each of said members being provided with sections of different diameter, said members being adapted to support objects thereon, and means for intermittently rotating alternate members on each of said rods.

2. In a machine for treating fruits, nuts, and vegetables, a runway including a plurality of parallel spaced rods, a plurality of substantially spherical supporting members journaled on each of said rods, adjacent supporting members being adapted to support objects resting therebetween and thereon, and means for rotating alternate supporting members on each of said rods, whereby diagonally related members are rotated whereas intermediate members are not.

3. A fruit, nut and vegetable sorting machine including a conveyor provided with transverse substantially parallel rods, a plurality of supporting members carried by each of said rods, each of said supporting members being provided with portions of different diameter with respect to its axis of rotation, and means for rotating alternate supporting members on each of said rods during movement of the conveyor, one series of members rotating on one rod and a different series of members rotating on an adjacent rod.

4. In a nut and fruit treating machine, the combination of a conveyor including a plurality of parallel rods, a plurality of supporting means carried on each of said rods, each of said supporting means being provided with sections of different diameter, means for driving the conveyor, and means for rotating alternate supporting means on each rod during movement of the conveyor, said means being adapted to rotate one series of members on one rod and a different series of members on an adjacent rod.

5. In a nut and fruit treating machine, the combination of a conveyor including a plurality of parallel rods, a plurality of supporting means carried on each of said rods, each of said supporting means being provided with sections of different diameter, means for driving the conveyor, and means for intermittently rotating alternate supporting means during movement of the conveyor, said means being adapted to rotate one series of members on one rod and a different series of members on an adjacent rod.

6. In a nut and fruit treating machine, the combination of a conveyor including a plurality of parallel rods, a plurality of supporting means carried on each of said rods, each of said supporting means being provided with sections of different diameter, means for driving the conveyor, and means for selectively and intermittently imparting rotation to alternate supporting means on a rod and for selectively imparting rotation to alternate supporting means on an adjacent rod, the supporting means rotated on one rod being diagonally related to the supporting means on the adjacent rod.

7. In a nut, fruit and vegetable treating machine, the combination of a conveyor including a plurality of parallel rods, a plurality of supporting members carried on each of said rods, each of said supporting members being provided with sections of different diameter with respect to axis of rotation of said members, means for driving said conveyor, and means positioned beneath said conveyor for rotating alternate supporting means carried by said rods, said means being adapted to rotate one series of members on one rod and a different series of members on an adjacent rod.

8. In a nut and fruit treating machine, the combination of a conveyor including a plurality of parallel rods, a plurality of supporting members carried on each of said rods, each of said supporting members being provided with sections of different diameter with respect to axis of rotation of said members, means for driving said conveyor, and means positioned beneath said conveyor for rotating alternate supporting means carried by said rods, said means being adapted to rotate one series of members on one rod and a different series of members on an adjacent rod, said means comprising cleats adapted to engage with the lower portions of said supporting means.

9. In a nut and fruit treating machine, the combination of a conveyor including a plurality of parallel rods, a plurality of supporting members carried on each of said rods, each of said supporting members being provided with sections of different diameter with respect to axis of rotation of said members, means for driving said conveyor, and means positioned beneath said conveyor for rotating alternate supporting means carried by said rods, said means including a driven belt positioned beneath said conveyor, said belt carrying spaced cleats adapted to engage with lower portions of said supporting members.

10. In a method of treating elliptical and geodic objects, the steps of progressively moving objects along a runway and moving said objects so as to place their axes into various positions by intermittently imparting rotation to the objects at points diagonally related with respect to the direction of travel of said objects while retarding rotation at points oppositely and diagonally related.

HUBERT C. SHARP.