March 26, 1929. J. C. SCHOFIELD 1,706,548

FRUIT GRADER

Filed Jan. 24, 1928

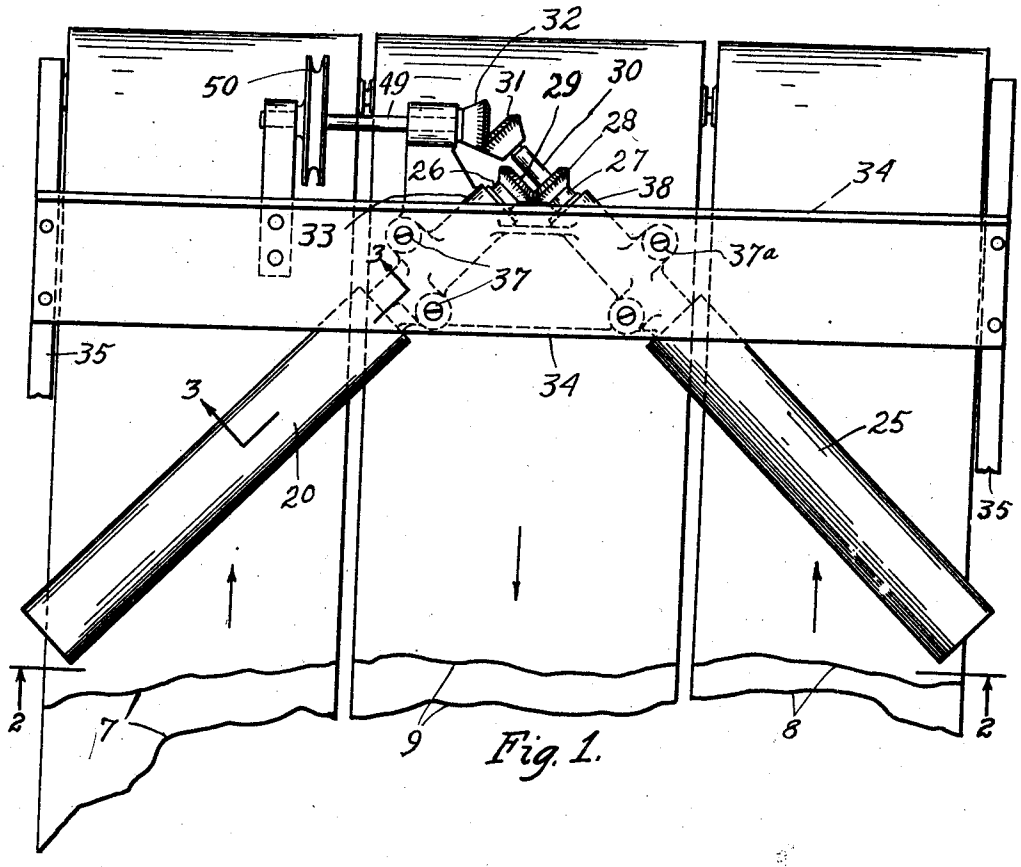


Fig. 1.

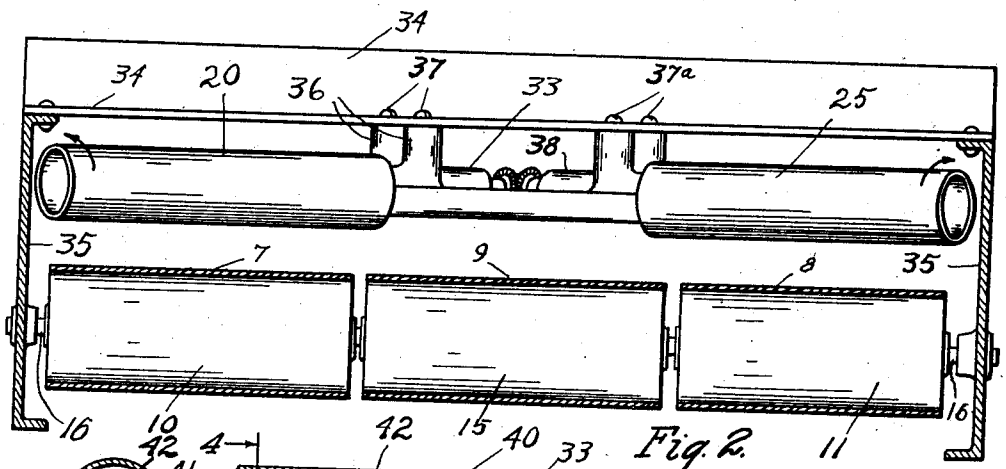


Fig. 2.

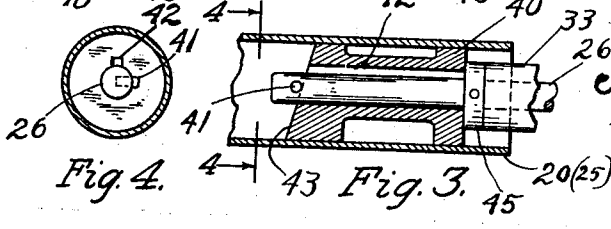


Fig. 4. Fig. 3.

INVENTOR.
John C. Schofield
BY
Robt. W. Pearson
ATTORNEY.

Patented Mar. 26, 1929. 1,706,548

UNITED STATES PATENT OFFICE.

JOHN C. SCHOFIELD, OF LOS ANGELES, CALIFORNIA.

FRUIT GRADER.

Application filed January 24, 1928. Serial No. 249,044.

This invention relates to apparatus for mechanical grading or sorting of citrus and other fruits.

An object of the invention is to combine with the ordinary fruit conveying belt used to facilitate sorting of fruit by hand, a mechanically operated device for grading the fruit according to size which will greatly expedite work of this character.

Among the objects of the invention are to provide an apparatus which will improve upon prior devices of its class with respect to gentle handling of the fruit, simplicity of construction, more dependable and more easily regulated control and adjustment together with various other objects and advantages which may appear hereinafter during the course of the following description.

Referring to the accompanying drawings, which illustrate a preferred embodiment of the invention,

Figure 1 is a plan view of the device with part broken away.

Figure 2 is a section on line 2—2 of Figure 1.

Figure 3 is an enlarged section detail on line 3—3 of Figure 1, illustrating the preferred means for removably attaching the fruit grading rollers to their shafts.

Figure 4 is a vertical cross section on line 4—4 of Figure 3.

Referring in detail to the drawings, between the two side belts 7 and 8, which are mounted in spaced relation to each other, is mounted an intermediate belt 9, said belts 7 and 8 being provided with means for driving them in the same direction, and belt 9 being mounted for being simultaneously driven in the opposite direction, the large arrows in Figure 1 indicating the direction in which these belts are all to be driven.

The upper runs of these belts are on substantially the same level. 10 and 11 designate the rollers whereby belts 7 and 8 are supported and driven. 15 designates a roller which supports the intermediate belt 9, all of these rollers being supported by a common shaft 16, it being understood that a like set of rollers (not shown) will be located at the other end of the machine.

Above the outside belt 7, at one side of the machine is mounted a grading roller 20 in parallel spaced relation to said belt 7 and extending on the bias from the outer edge thereof to a point beyond the inner edge thereof as clearly shown in Figure 1. Over the belt 8 is mounted a corresponding roller 25 which is likewise slightly spaced above the belt 8 and is on the bias with relation thereto, and like the roller 20 is so positioned as to extend from the outer edge of the belt which it overlies to a point beyond the inner edge of said belt. This relative arrangement of the sleeve rollers 20 and 25 makes it possible to respectively support them upon shafts 26 and 27, the shaft 27 having fixed thereto a driving bevel gear 28 and the shaft 26 having fixed to it a driven bevel gear 29. The shaft 27 is provided with an extension 30 having fixed thereto a driving gear 31 in mesh with a gear 32 of the motor (not shown).

Shaft 26 is supported by bearing sleeve 33 which is secured to the lower side of an angle iron support 34 which extends from side to side of the machine, being at its ends attached to and supported by the side pieces 35 of the frame. Said bearing sleeve 33 may be attached to said bar 34 by any suitable means as by the upward extensions 36 and attaching screws 37 which cooperate therewith. A bearing sleeve 38 supports the other roller shaft 27 and is likewise attached to bar 34 by means of screws 37[a]. By providing the relatively long bearing sleeves 32 and 38 each of the rollers 20 and 25 are supported in a stable manner from its inner end only.

Referring now to the means for removably clamping in place the fruit grading rollers 20 and 25, in Figure 3 is shown the form of clamping device for this purpose which is used in connection with both of said rollers. In this view 40 designates a spool which is secured within the end portion of sleeve 26 in fixed relation to said sleeve. Said spool is adapted to telescope on to shaft 26 which is provided near its end with a key 41, the projecting portion of which is adapted to pass through an internal keyway 42 with which spool 40 is provided, so that spool 40 may readily be placed upon shaft 26 and then turned to the position shown in Figure 3. One end of spool 40 is provided with a cam face 43 adapted to cooperate with key 41 to force the other end of spool 40 against a collar 45 which is attached to shaft 26. Said key 41 is thus wedged against cam face 43 in such a manner as to clamp sleeve 20 (or 25). 49 designates the driving shaft and 50 the driving pulley fixed thereto.

With regard to assembling and operating, as clearly shown in Figure 2 the clearance

between the lower sides of rollers 20 and 25 and the upper surfaces of the belts located therebeneath, is such as to permit the smallest size of fruit to be conveyed underneath said rollers and discharged at the front end of the machine by the outer belts. But by rotating the grading rollers in the direction indicated by arrows in Figure 2, fruit which is too large to pass under said rollers will be brushed back and at the same time gradually worked in toward the middle belt 9, and when picked up by said middle belt will be transported back toward the other end of the machine. The operatives who are seated at each side of the machine will thus be relieved from that part of the work of sorting the fruit which would be required in eliminating the smallest size. It is to be understood that all fruit under the minimum size must always be excluded as falling below the required standard, and therefore such fruit need not be manually handled in order to sort it according to color, firmness of texture, state of maturity, etc.

When it is desired to exclude only fruit that is still smaller, the rollers 20 and 25 will be loosened by rotating them till the key 41 aligns with the key-way 42 (Figure 3) and then said rollers will be removed and larger rollers also equipped with spools 40, will be replaced upon the roller shafts; or if it is desired to allow larger fruits to be excluded by the machine, smaller rollers will be mounted upon the roller shafts.

It will be observed that the grading rollers and their supporting shafts form a V-shaped structure the apex of which is directed towards the front end of the machine.

I claim:

1. In a fruit grader, in combination, a belt having an upper run adapted to support and convey fruit, a roller above said upper run in parallel spaced relation thereto extending to a lateral edge thereof and on the bias with relation to the upper run of said belt, and means for rotating said roller in a direction tending to brush back fruit conveyed thereagainst by said belt, said roller being constructed and arranged to deliver one size of fruit over said lateral edge of the belt while permitting another size of fruit to be conveyed beneath it by said belt.

2. In a fruit grader, in combination, two parallel belts arranged in spaced relation to each other, means for supporting and rotating said belts to convey fruit therealong in the same general direction, and a pair of grading rollers each of which is mounted above one of said belts and in parallel spaced relation thereto on the bias with relation to the belt which it overlies, and means for simultaneously rotating said rollers in a direction tending to brush back fruit brought in contact therewith by said belts and to move the fruit toward and deliver it to the space between said belts.

3. In a fruit grader, in combination, two parallel belts arranged with their adjacent edges in spaced relation to each other and with their upper runs on substantially the same level, means for supporting and rotating said belts to convey fruit therealong in the same general direction, a pair of grading rollers each of which is mounted above one of said belts in parallel spaced relation thereto and on the bias with relation to the belt which it overlies, means for rotating one of said rollers in a direction tending to brush back fruit brought in contact therewith by the belt which it overlies and tending also to move the fruit into the space between said belts, a bevelled gear in fixed relation to said roller, another beveled gear in mesh with the first mentioned beveled gear and also in fixed relation to the other roller, and a third belt occupying the space between the two first mentioned belts and positioned to convey away the fruit delivered thereto by said rollers.

4. In a fruit grader, the combination with a fruit transporting belt, of a fruit grading roller mounted above said belt, a shaft to which said roller is removably secured, and an elongated bearing for said shaft, said bearing forming a stable support for said roller, said support being located solely at one end of said roller in order to leave a clear space under the other end of said roller.

In testimony whereof I affix my signature.

JOHN C. SCHOFIELD.