

H. H. HARDIE.
FRUIT GRADER.
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1,148,165.

Patented July 27, 1915.

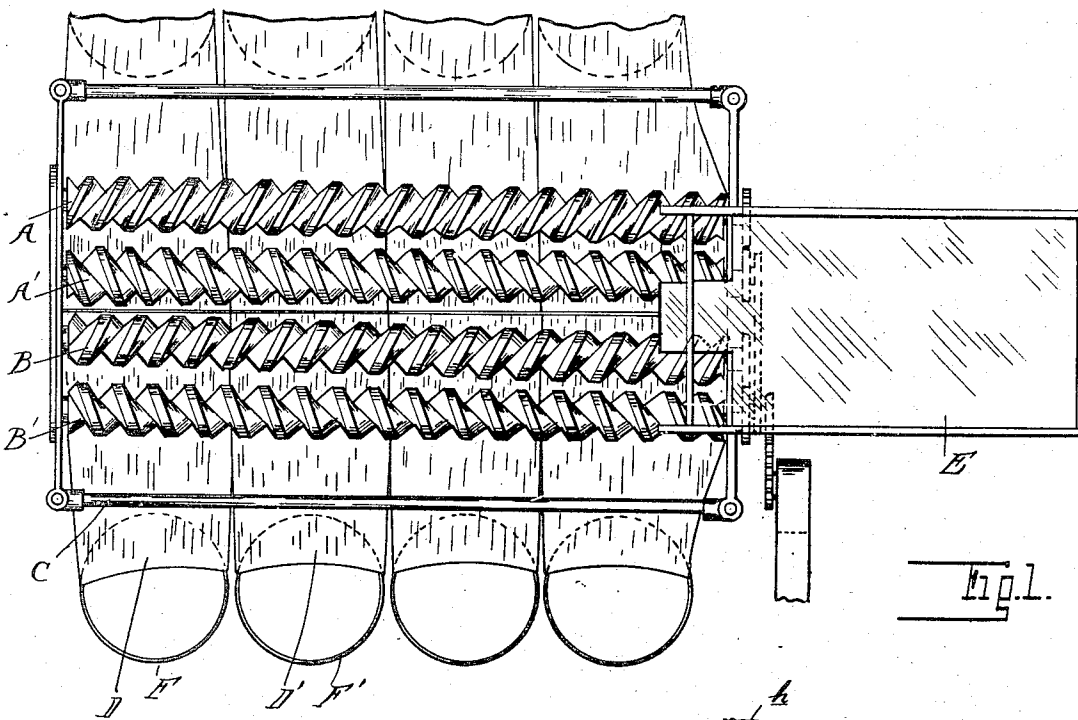


Fig. 1.

Fig. 3.

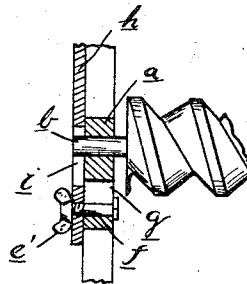
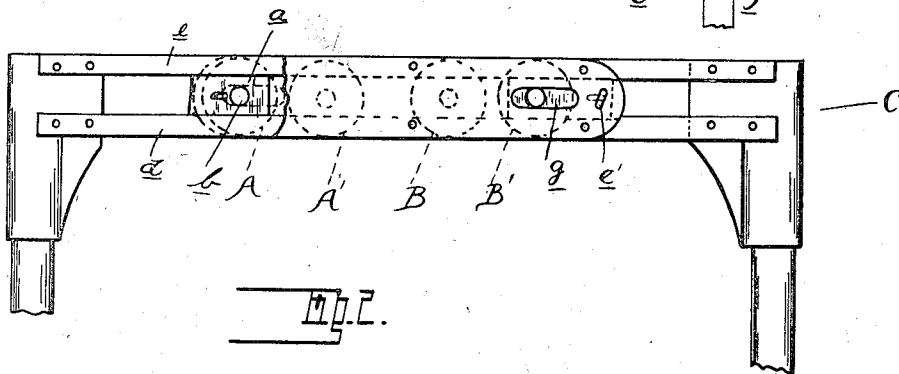


Fig. 2.

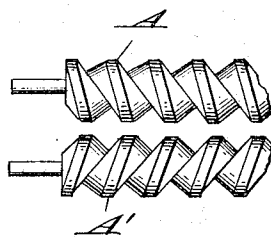


Fig. 4.

WITNESSES:

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FRUIT-GRADER.

1,148,165.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HENRY H. HARDIE, a citizen of the United States of America, residing at Hudson, in the county of Lenawee and State of Michigan, have invented certain new and useful Improvements in Fruit-Graders, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to grading machines designed for sorting and distributing different sizes of articles in a miscellaneous lot, and being particularly designed for the grading of fruit.

It is the primary object of the invention to effect the grading without any injurious action upon the articles, such as the squeezing or bruising thereof.

It is a further object to avoid clogging of the machine.

These and other minor objects are accomplished by the construction as hereinafter set forth.

In the drawings:—Figure 1 is a plan view of the machine; Fig. 2 is an end elevation, partly in section, showing a detail of construction; Fig. 3 is a section illustrating the mounting for adjusting the rolls. Fig. 4 is a section illustrating the slightly modified form.

As preferably constructed, my improved machine comprises a plurality of spiral rolls arranged in substantially parallel pairs and adapted to be rotated in opposite directions. The articles to be sorted are fed between the rolls so as to engage the spiral groove thereof, and are then fed by the rotation of the spirals longitudinally thereof. At the same time there is a progressive enlargement or widening of the grooves, which may be produced either by an enlargement in the dimensions of the groove or by arranging the axes of the rolls to be slightly divergent. Thus an article which is too large to fall between the rolls at the small end of the groove will be advanced to a position where clearance is provided, and during this advancement will be changed from registration with the compartment for the smaller to that for the larger grade.

In detail, A A' and B B' are parallelly arranged pairs of spiral rolls rotated at uniform speed by any suitable means. These rolls are mounted on a suitable frame C beneath which are placed a plurality of

delivery chutes D D', etc., which lead to the different barrels or receptacles for the respective grades of fruit.

E is a hopper or feed chute, from which the miscellaneous lot is fed to the trough-shaped grooves between pairs of rolls.

In operation each pair of rolls is so rotated that the adjacent surfaces are moving upward, and thus there is no tendency to wedge an article between the rolls, but on the contrary, there is a constant action tending to loosen or dislodge the article. At the same time the rotation of the spirals will produce a longitudinal progression of the articles supported thereby, and as the spaces between the rolls are constantly enlarging, a point will be reached at which sufficient clearance is provided for the passage of the article whatever its size. The different grades fall into different troughs D D', etc., from which they are conducted into separate receivers, such as the barrels F F', etc. The troughs D D' are preferably formed of canvas or some other soft material so as to avoid bruising of the articles. Thus choice fruit may be graded by my improved apparatus without injury thereto.

As will be noted from Fig. 1, the openings between the grooves of the spirals are square, and as the articles are turned over and over, grading of slightly elongated articles by their thickness rather than their length is accomplished. In order to readily adapt the machine to large or small articles, such as different varieties of fruits, the pairs of rolls are made adjustable toward and from each other so as to vary the size of the openings between the grooves of the spirals. In all positions of adjustment, however, the openings are square, insuring the result before mentioned. The adjustment of the rolls may be accomplished in any desirable manner, but in the drawing I have illustrated a novel and suitable construction for adjusting one member of the pair toward and from the other. Thus *a* designates a block within which one end *b* of the shaft of the roll A is journaled. This block *a* is slidably arranged intermediate spaced members *c d* at one end of the frame and is clamped in its different positions of adjustment by means of a thumb-nut *e* and a bolt *f*. The latter engages a longitudinal slot *g* in the block *a* and also passes through an aperture in a plate *h* that is secured to the

members *e d*. Thus by loosening the thumb-nut *e* the block *a* may be longitudinally adjusted and then secured in its adjusted position by tightening the nut *e*. The plate *h* is preferably longitudinally apertured at *i* to receive the end *b* of the shaft of the roll A. The end of the roll B' is similarly mounted in an adjustable block. This arrangement forms a very simple and efficient means of adjusting the rolls.

In Fig. 4 I have illustrated a slightly modified form of rolls in which the diameter of the rolls A and A' and also the depth of the groove in such rolls is progressively increased, the construction otherwise being the same as shown in Fig. 1.

What I claim as my invention is—

1. A grading machine, comprising a pair of spirally grooved rotatable members arranged adjacent to each other with their grooves opposite to form a series of apertures, said apertures being progressively enlarged from one end of the series to the other, and said grooves being so shaped as to form square apertures.

2. A grading machine, comprising a pair of spirally grooved rotatable members arranged adjacent to each other with the grooves in said members opposite to form a series of apertures, said apertures being progressively enlarged from one end of the series to the other, and said spirally grooved members being relatively adjustable to vary the size of the apertures, said apertures being substantially square in all positions of adjustment of said members.

3. A grading machine comprising a pair of spirally grooved rotatable members arranged adjacent to each other with their grooves positioned to form a series of ap-

ertures, said apertures being progressively enlarged from one end of the series to the other, and said spirally grooved members being relatively adjustable to vary the size of the apertures, said apertures being of substantially equal length and breadth in all positions of adjustment of said members.

4. A grading machine comprising a pair of spirally grooved rotatable members arranged adjacent to each other with the grooves in said members positioned to cooperatively form a series of apertures, said apertures being progressively enlarged from one end of the series to the other, and said spirally grooved members being relatively adjustable to vary the size of the apertures; the said spirally grooved rotatable members being constructed and arranged to maintain the relative proportion of the breadth and length of each of the apertures irrespective of the size.

5. A grading machine comprising a pair of spirally grooved rotatable members arranged adjacent to each other with their grooves being of progressively increasing depth and positioned to form a series of apertures of progressively enlarged size from one end of the series to the other, and said spirally grooved members being relatively adjustable to vary the size of the apertures, said apertures being of substantially equal length and breadth in all positions of adjustment of said members.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY H. HARDIE.

Witnesses:

JAMES P. BARRY,
HENRIETTA E. BOWMAN.