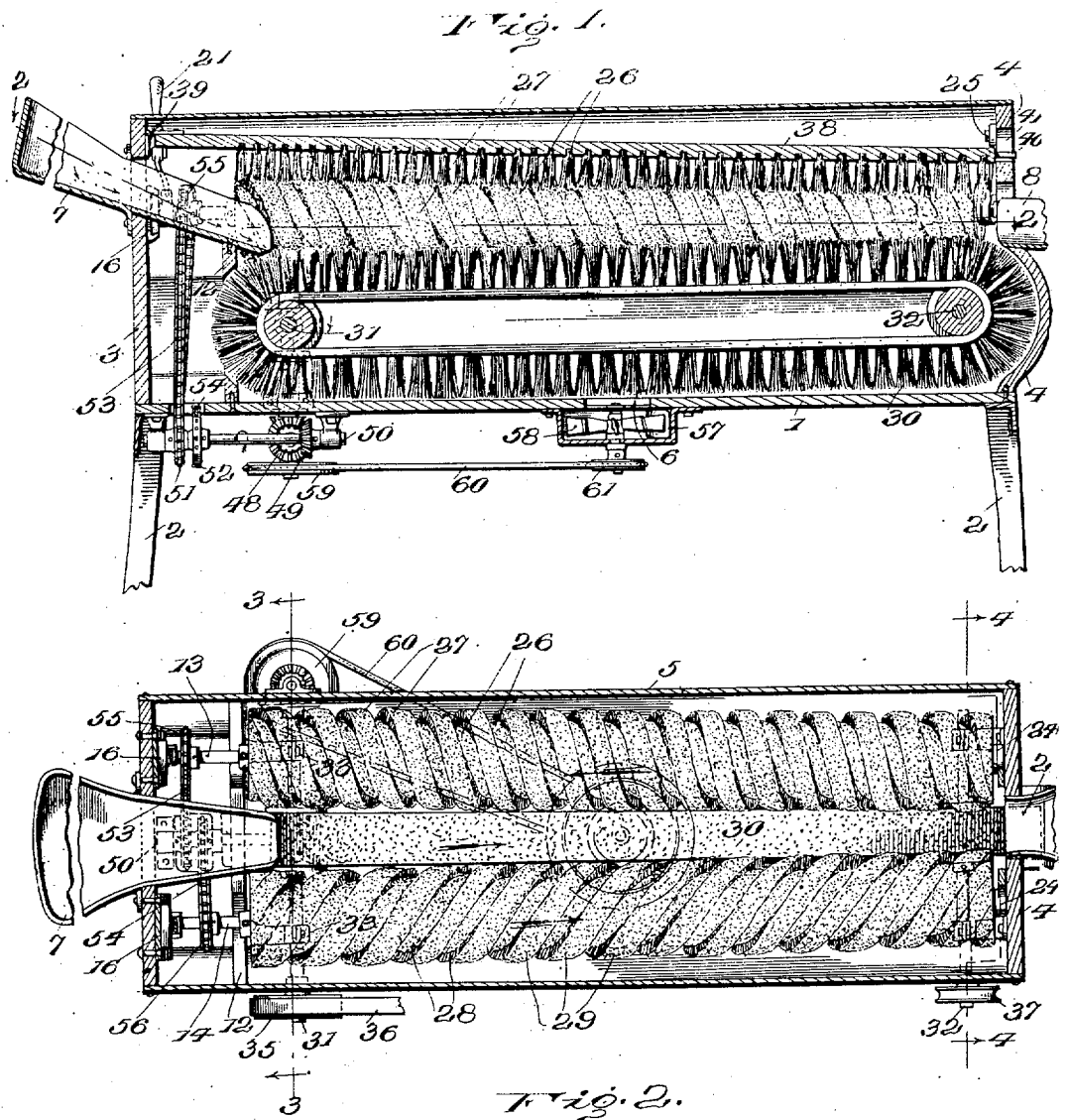


1,058,460.

Patented Apr. 8, 1913.

2 SHEETS—SHEET 1.



Inventor

Gordon R. Porter
Robertson Johnson

Attorneys

Witnesses
W. A. Williams
H. L. Mire

By

O. K. PORTER.
 FRUIT CLEANER.
 APPLICATION FILED MAR. 16, 1912.

1,058,460.

Patented Apr. 8, 1913.
 2 SHEETS—SHEET 2.

Fig. 3.

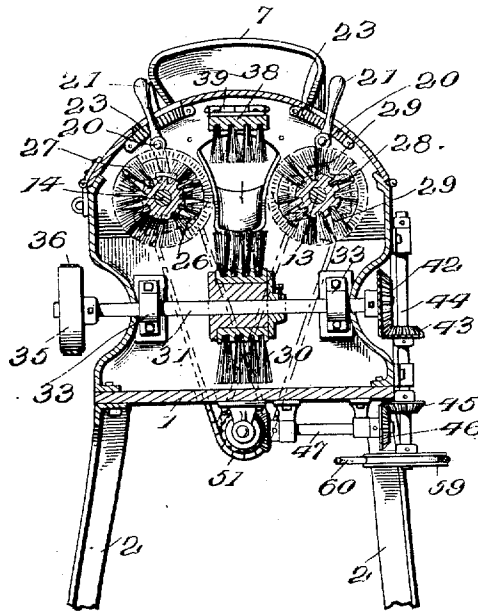


Fig. 4.

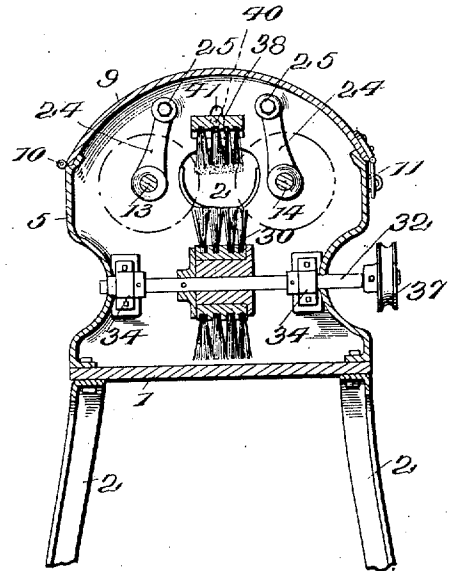
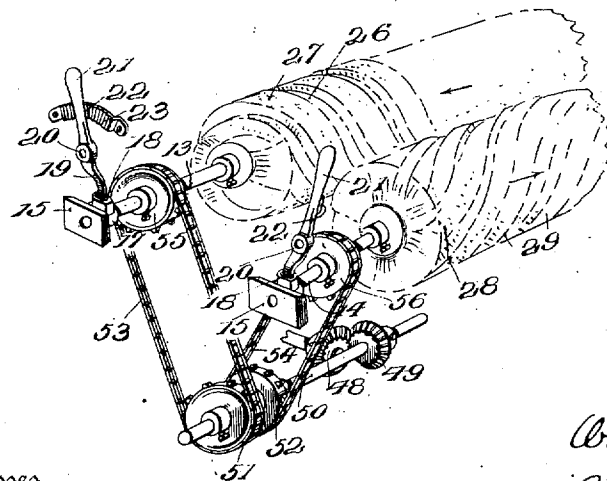


Fig. 5.



Witnesses
 W. A. Williams
 H. L. Mire

By

Inventor
 Oron K. Porter
 Robertson Johnson
 Attorney

UNITED STATES PATENT OFFICE.

ORSON K. PORTER, OF THE DALLES, OREGON, ASSIGNOR TO OREGON FRUIT CLEANER COMPANY, OF THE DALLES, OREGON, A CORPORATION OF OREGON.

FRUIT-CLEANER.

1,058,460.

Specification of Letters Patent.

Patented Apr. 8, 1913.

Application filed March 16, 1912. Serial No. 684,121.

To all whom it may concern:

Be it known that I, ORSON K. PORTER, a citizen of the United States of America, and a resident of The Dalles, in the county of Wasco and State of Oregon, have invented certain new and useful Improvements in Fruit-Cleaners, of which the following is a specification.

My invention relates to cleaners for fruits of various kinds and particularly to fruits such as apples which are readily bruised and therefore require careful handling.

To secure a thorough cleaning action in a compact machine I have provided differential cleaning and feeding mechanism in the form of a pair of brushing rollers located adjacent the path of the fruit through the cleaner and provided with brushing spirals of a material rather soft in quality. The nature of the action of the apparatus is determined by the direction of the spirals, their pitch and the direction of rotation of the rollers. Where the rollers are rotated at the same speed there must be a difference in the pitch of the spirals in order to secure the desired differential feeding action. Where, on the contrary, the rollers are driven at different speeds the spirals on the two rollers need not differ in pitch. Where the rollers rotate in the same direction the spiral or spirals on one roller must be left handed, while those on the other are right handed, whereas if the rollers rotate in opposite directions the direction of the spirals on both rollers may be the same. In any case the construction and manner of driving should be such as to secure the prolonged cleaning and differential feed toward the outlet of the machine. I find it advantageous also to provide a support for the fruit as it passes through the cleaner while being subjected to the action of the rollers and prefer to make this support an endless brushing draper or belt. While it is not necessary to drive the upper flight of this draper toward the foot of the cleaner, I prefer to do this and have found it desirable, while of course not indispensable, to drive the draper at the resultant feeding speed given fruit by the rollers which may suitably be provided with spirals, the pitches of which are in the ratio of two to one, the fast feeding spiral tending to feed toward the foot of the machine. As explained above this result may be se-

cured by a difference in speed instead of by a difference in pitch.

Various other features as for instance the manner in which the rolls are mounted will hereinafter appear.

Referring to the drawings: Figure 1 is a longitudinal section through the center of the cleaner. Fig. 2 is a plan view, the top of the casing being omitted. Fig. 3 is a transverse section on the line 3-3, Fig. 2, looking in the direction of the arrows. Fig. 4 is a transverse section on the line 4-4, Fig. 2, looking in the direction of the arrows. Fig. 5 is a detail perspective view showing the construction of the brushing rollers, the manner in which their head ends are mounted and details of the driving mechanism.

The bottom 1 of the casing of my cleaner is supported by suitable means as legs 2 and has secured to it an outer head 3 and a foot 4 which, with the casing 5, are secured in any suitable manner to the bottom 1. The bottom 1 is provided with a suction hole 6, the outer head 3 with an opening through which passes the feed chute 7 and the foot 4 with an opening through which passes the delivery chute 8. The feed and delivery chutes may both be provided with lamb's wool or other soft material if desired. The top 9 of the casing may be hinged as at 10 and fastened as at 11 by a hasp or otherwise. The framework thus described is supplemented by an inner head 12 forming with the outer head 3 a double head which provides a suitable space for driving mechanism and for the inner end of the feed chute 7 which is supported on the top of the inner head 12.

I prefer to locate the cleaning mechanism within a casing since this facilitates the removal of dust and dirt as well as serves as a protection to the parts but it will be obvious that a casing is not absolutely essential. In the embodiment of my invention illustrated herein a pair of brushing and feeding rollers having shafts 13 and 14 respectively is rotatably mounted in the casing. Before discussing the construction of these rollers I will describe the manner in which I prefer to mount them.

Slide blocks 15 receiving the head ends of the shafts 13 and 14 are mounted in undercut grooves 16. Each of these blocks is pro-

vided with a collar 17 in which the shaft rotates and which has a socket 18 to receive the lower arm 19 of a lever pivoted at 20 and having a flexible handle 21 having a projection 22 for coaction with a toothed locking plate 23. The construction is the same in the case of each roller. It will thus be apparent that the distance between the two rollers may be adjusted by moving one or both of them. The manner in which the other ends of the shafts 13 and 14 are mounted is even more simple. The said ends are carried in bearings formed in the lower end of swinging arms 24 which are secured at their upper ends by bolts 25 so that they may either turn freely around said bolts or, when the bolts are tightened, be held firmly against movement. It is thus clear that the lower ends of both rollers or of either roller may be left free to automatically adjust themselves to varying conditions as fruit of different sizes passes through or, if preferred, one or both of them may be rigidly fastened. The movement of the head ends of the shafts caused by this automatic adjustment is comparatively slight and is provided for by giving the shafts a little extra play in their bearings at the head of the machine. The brushing and cleaning material on these rollers is arranged in a spiral or spirals and is of comparatively soft material, a rush of suitable quality being satisfactory. I provide each roller with two or more spirals of brushing material, said spirals being of different depths. This results in a feeding screw and also secures more efficient cleaning action. In order to avoid danger of bruising the fruit it is best to clothe the rollers with the spirals substantially completely. To secure sufficient resistance to give the desired feeding action I prefer to make the spirals, which are of greater depth, of greater width also, a convenient arrangement being to employ a single row of tufts in the shallow spirals and a double row in the deeper spirals. In the embodiment of my invention illustrated in the drawings, I have shown the left hand roller as provided with two spirals 26—27, the latter being deeper than the former. In this embodiment of the invention the rollers are driven in the same direction at the same speed in a manner to be hereinafter described. Accordingly, I provide the other roller, *i. e.*, the roller having the shaft 14, with a plurality of spirals having a lesser pitch and therefore capable, when rotated at the same speed, of feeding more rapidly than the spirals of the first roller. The ratio illustrated is two to one, although obviously it might be different and the direction of the spirals is opposite the spirals on the roller on the shaft 13 being right handed and the spirals on the roller mounted on the shaft

14 being left handed. The latter roller is substantially clothed by its spirals of which it has four, two 28—28 shallow and two 29—29 deep.

I prefer to support the fruit while it is passing through the machine and find it best to use an endless draper or brushing belt 30 which extends lengthwise between the rolls and slightly below the plane in which their axes are mounted. As suggested above, I prefer to drive this draper so that its upper or fruit supporting flight moves from the head toward the foot of the cleaner. This draper is mounted on transverse shafts 31—32, the former supported in brackets 33 on the inner head 12 and the latter in brackets 34 on the foot 4. The shaft 31 is provided with a pulley 35 driven by a belt 36. The shaft 32 is provided with a pulley 37 from which a grader may be driven where one is employed.

In addition to the brushing devices already described, I prefer to mount a yieldable but otherwise stationary longitudinal brushing member 38 above the path of the fruit through the cleaner. This brushing member is hinged at 39 to the inner side of the outer head 3 near its top and has at its lower end a projecting finger 40 freely movable in a vertical slot 41 in the foot 4. Obviously the beginning of the passage into which the fruit is delivered by the feed chute should be large enough to take freely any fruit which may be handled by the machine, whereas the portions of the passage nearer the foot of the machine should embrace the fruit closely but yieldingly. It will be clear that this is accomplished by the construction referred to.

The rollers may be driven by any suitable means, the driving connections illustrated herein being as follows: The driving shaft 31 above referred to carries a bevel gear 42 which drives a bevel gear 43 on the vertical shaft 44 mounted in suitable bearings on the side of the casings which shaft 44 through the bevel gears 45, 46 drives the shaft 47 mounted in suitable bearings on the under side of the bottom 1. This shaft 47 by the bevel gears 48, 49 drives the shaft 50 mounted in bearings on the under side of the bottom and carrying the sprocket wheels 51, 52 which by sprocket chains 53, 54 and sprocket wheels 55, 56 drive respectively the rollers mounted on shafts 13 and 14. The relative speed may of course be varied by changing the relations of the various bevel gears and sprocket wheels. The relation shown is such that both rolls are driven in the same direction at the same speed, the draper being driven toward the foot of the machine at substantially the resultant feeding speed of the substantial cleaning and feeding mechanism constituted by the two rollers. On the under side of the bottom

1 is secured the casings 57 of the suction fan 58 which is driven from the vertical shaft 44 through a pulley 59, belt 60 and pulley 61.

5 When one of the rollers turns toward the draper it obviously has a tendency to press the fruit onto the draper and if the fruit is small enough and there is a sufficient space between the roller and the
10 draper to crowd it through the said space, it follows therefore that a roller so driven should be mounted near the draper preferably so that its surface will just clear the upper corner of the draper and that it
15 should be adjusted permanently in this position until fruit of a larger size is to be handled. Where the other roller is being driven away from the said draper so that it has no tendency to move the fruit toward
20 the draper, a considerable space between the draper and the roller is permissible and the lower end of this roller may be left to yield freely, being held to its work only by its weight which is not great. There is sufficient play between the parts as mounted at
25 the upper end of the rollers to permit this yielding movement at the foot. It will be obvious that similar results might be secured by mounting the rollers yieldably at
30 the bottom and adjustably at the top by other suitable and well known means.

The operation of the machine is probably clear from what has already been said but may here be briefly recapitulated. The
35 fruit rolls down the feed chute 7 onto the draper 30 between the cleaning and brushing rollers whose spirals 26, 27, 28 and 29 simultaneously acting upon it, give it a thorough brushing and turn it about in
40 various directions, the differential feed by which the roller on the shaft 13 tends to feed it back toward the head of the cleaner while the roller mounted on the shaft 14 tends to feed it more rapidly toward the
45 foot of the cleaner obviously gives a turning movement. The rotation of the rollers also tends to turn the fruit in a plane or planes approximating the vertical so that the resultant movement is exceedingly varied.
50 The top brush serves to assist in the cleaning and to prevent the fruit from being carried out of the cleaning passage. The draper traveling toward the foot of the cleaner preferably at substantially the resultant feeding speed given the fruit carries it to the delivery chute 8. In the meantime, the suction fan has been drawing air in through the openings at the head and
60 foot of the cleaner and drawing it down through the brushing apparatus so as to carry the dust out of the machine, the opening in the bottom being preferably displaced somewhat toward the foot of the machine, thus producing an increased air current through that portion of the apparatus.
65

What I claim as my invention is:

1. A fruit cleaner comprising in combination differential brushing and feeding mechanism consisting of a pair of brushing rollers provided with cleaning spirals and located adjacent the path of the fruit through the cleaner for brushing contact therewith, and means for rotating said rollers in a direction and at a relative speed determined by the direction and pitch of the spirals to secure said differential action. 70
2. A fruit cleaner comprising in combination a pair of brushing rollers clothed substantially completely with cleaning spirals of comparatively soft material and located adjacent the path of the fruit through the cleaner for brushing contact therewith, the pitch of the spiral on one roller being different from the pitch of the spiral on the other, and means for driving said rollers. 75
3. A fruit cleaner comprising in combination a pair of brushing rollers located adjacent the path of the fruit through the cleaner for brushing contact therewith, both of said rollers being provided with brushing spirals, and means for driving said rollers, said spirals by virtue of their direction and pitch and the direction of rotation and speed of the rollers being operative one to feed the fruit toward the head of the machine and the other to feed it more rapidly toward the foot of the machine, the resultant actual feed being the algebraic sum of these two. 80
4. A fruit cleaner comprising in combination a pair of brushing rollers extending lengthwise at each side of the path of the fruit through the cleaner for brushing contact therewith, a plurality of brushing spirals of different depths clothing said rollers substantially completely, the brushing spirals on one roller differing in pitch from those on the other, means for supporting the fruit between said rollers, and means for driving said rollers. 85
5. A fruit cleaner comprising in combination a pair of brushing rollers extending lengthwise at each side of the path of the fruit through the cleaner for brushing contact therewith, a plurality of brushing spirals of different depths and widths clothing said rollers substantially completely, each of said rollers when suitably driven being operative to feed at a different rate, and means for driving said rollers. 90
6. A fruit cleaner comprising in combination a pair of brushing rollers extending lengthwise at each side of the path of the fruit through the cleaner for brushing contact therewith, a plurality of brushing spirals of different depths clothing said rollers substantially completely, the deeper spiral being wider than the shallower spiral, means for supporting the fruit between said rollers, 95

each of said rollers when suitably driven being operative to feed at a different rate, and means for driving said rollers.

7. A fruit cleaner comprising in combination an endless draper for supporting the fruit in its passage through the cleaner, means for driving said draper, a pair of screw brushing rollers extending lengthwise at each side of said draper to brush the fruit and feed it through the cleaner, and means for rotating said rollers in a direction and at a relative speed determined by the direction and pitch of the spirals to produce a differential brushing and feeding action.

8. A fruit cleaner comprising in combination a pair of brushing rollers extending lengthwise at each side of the path of the fruit through the cleaner for brushing contact therewith and each roller being provided with a brushing spiral, adjustable bearings for said rollers to permit their relative position to be varied, and means for supporting the foot end of one of the rollers for automatic lateral movement toward and from the other, a support for the fruit as it passes between said rollers, and means for driving said rollers.

9. A fruit cleaner comprising in combination a pair of brushing rollers extending lengthwise at each side of the path of the fruit through the cleaner for brushing contact therewith the end of the shaft of one of the rollers being yieldingly mounted at the foot of the cleaner for automatic lateral movement toward and from the other roller, and means for driving said rollers.

10. A fruit cleaner comprising in combination a pair of brushing rollers extending lengthwise at each side of the path of the fruit through the cleaner for brushing contact therewith, a support for the fruit as it passes between the rollers, a brushing member mounted above said support and capable of automatic vertical movement at its foot end, and means for driving said rollers.

11. A fruit cleaner comprising in combination a pair of brushing rollers extending lengthwise at each side of the path of the fruit through the cleaner for brushing contact therewith, a support for the fruit as it passes between the rollers, a longitudinal brushing member located above said support and having its head end hinged and its foot end freely movable vertically, and means for driving said rollers.

12. A fruit cleaner comprising in combination a draper clothed with brushing material on which the fruit rests in its passage through the cleaner, means for driving said draper, a pair of screw brushing rollers constituting differential cleaning and feeding mechanism mounted adjacent said draper and having their axes substantially

parallel with and somewhat above it, the lower end of one of said rollers being yieldingly mounted so that it is capable of automatic lateral movement, means for rotating said brushing rollers to give a differential cleaning and feeding movement to the fruit, and a brushing member yieldingly mounted above said draper and between said rollers for co-action with the fruit as it passes through the machine.

13. A fruit cleaner comprising in combination an inclosed casing having a hole in its bottom and provided with a foot and with a double head, an endless brushing draper mounted in said casing, means for driving the same, a pair of brushing rollers rotatably mounted at each side of and slightly above said draper, means for driving said rollers having connections in the casing located in the space between the parts of the double head, a suction fan for withdrawing dust through the hole in the bottom of the casing, and means for driving the fan.

14. A fruit cleaner comprising a support for the fruit in its passage through the machine clothed with soft material, a pair of brushing and feeding rollers provided with brushing spirals and having their axes substantially parallel with said support and on each side of and above the same, the spiral of one of said rollers being left handed and that of the other right handed, means for rotating both said rollers in the same direction and at relative speeds depending on the relation of the pitch of the respective spirals, thus giving the fruit a differential brushing and feeding movement.

15. A fruit cleaner comprising a pair of differential cleaning and feeding rollers extending lengthwise at each side of the path of the fruit and acting simultaneously thereon, means for rotating the said rollers, a draper located between said rollers and below the plane of their axes, and means for driving said draper at substantially the resultant feeding speed of said rollers and toward the foot of the machine.

16. A fruit cleaner comprising in combination, a casing having an outer head and an inner head, brushing and feeding devices located in said casing, a feed chute supported by said inner and said outer head and passing through an opening in the former, and driving devices for said cleaning and feeding mechanism located in part in the space between the inner and the outer head.

17. A fruit cleaner comprising in combination an endless draper clothed with brushing material for sustaining the fruit in its passage through the cleaner, a pair of brushing and feeding rollers extending lengthwise at each side of said draper and having their axes above the same, a brushing spiral on one of said rollers, and a

brushing spiral on the other of said rollers having its pitch twice that of the spiral on the first named roller, means for driving the said rollers, the direction of the spirals
 5 and the direction of rotation of the rollers being such that the spiral of lesser pitch feeds the fruit toward the foot of the cleaner while the spiral of greater pitch feeds it toward the head of the cleaner, and means
 10 for driving the draper toward the foot of

the cleaner at substantially the speed which is the resultant of the differential feeding movement caused by the rollers.

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

ORSON K. PORTER.

Witnesses:

JOHN L. FLETCHER,
 MARGARET E. DILLER.

Corrections in Letters Patent No. 1,058,460.

It is hereby certified that in Letters Patent No. 1,058,460, granted April 8, 1913, upon the application of Orson K. Porter, of The Dalles, Oregon, for an improvement in "Fruit-Cleaners," errors appear in the printed specification requiring correction as follows: Page 2, line 32, for the word "rush" read *brush*; same page, line 111, for the word "casings" read *casing*; and line 128, for the word "substantial" read *differential*; page 3, line 1, for the word "casings" read *casing*; and same page, line 5, for the word "When" read *Where*; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 3rd day of June, A. D., 1913.

[SEAL.]

C. C. BILLINGS,
Acting Commissioner of Patents.

brushing spiral on the other of said rollers having its pitch twice that of the spiral on the first named roller, means for driving the said rollers, the direction of the spirals
 5 and the direction of rotation of the rollers being such that the spiral of lesser pitch feeds the fruit toward the foot of the cleaner while the spiral of greater pitch feeds it toward the head of the cleaner, and means
 10 for driving the draper toward the foot of

the cleaner at substantially the speed which is the resultant of the differential feeding movement caused by the rollers.

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

ORSON K. PORTER.

Witnesses:

JOHN L. FLETCHER,
 MARGARET E. DILLER.

Corrections in Letters Patent No. 1,058,460.

It is hereby certified that in Letters Patent No. 1,058,460, granted April 8, 1913, upon the application of Orson K. Porter, of The Dalles, Oregon, for an improvement in "Fruit-Cleaners," errors appear in the printed specification requiring correction as follows: Page 2, line 32, for the word "rush" read *brush*; same page, line 111, for the word "casings" read *casing*; and line 128, for the word "substantial" read *differential*; page 3, line 1, for the word "casings" read *casing*; and same page, line 5, for the word "When" read *Where*; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 3rd day of June, A. D., 1913.

[SEAL.]

C. C. BILLINGS,
Acting Commissioner of Patents.