

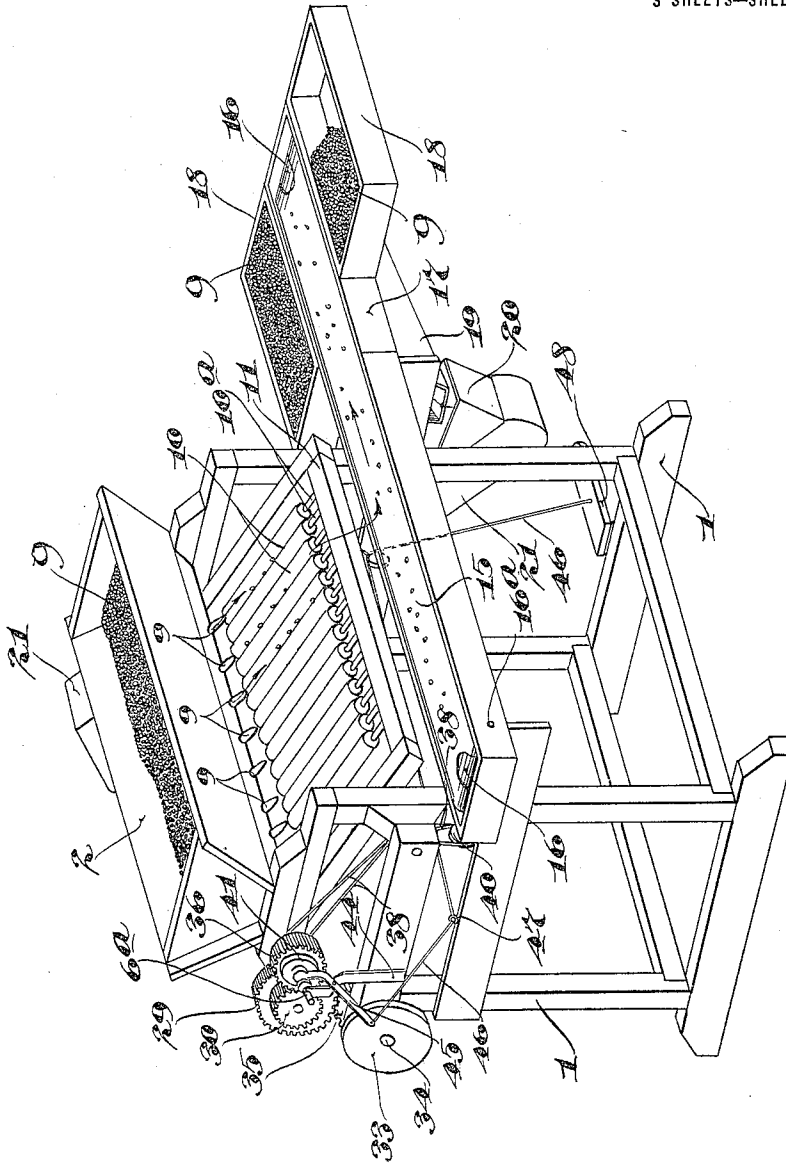
A. E. JOHNSON.  
 BEAN SORTING MACHINE.  
 APPLICATION FILED JAN. 19, 1914.

1,148,589.

Patented Aug. 3, 1915.

3 SHEETS—SHEET 1.

Fig. 1



Witnesses  
 E. C. Skinkle  
 Emily May King.

Inventor  
 Anton Eger Johnson  
 By his Attorneys  
 Williamson Merchant

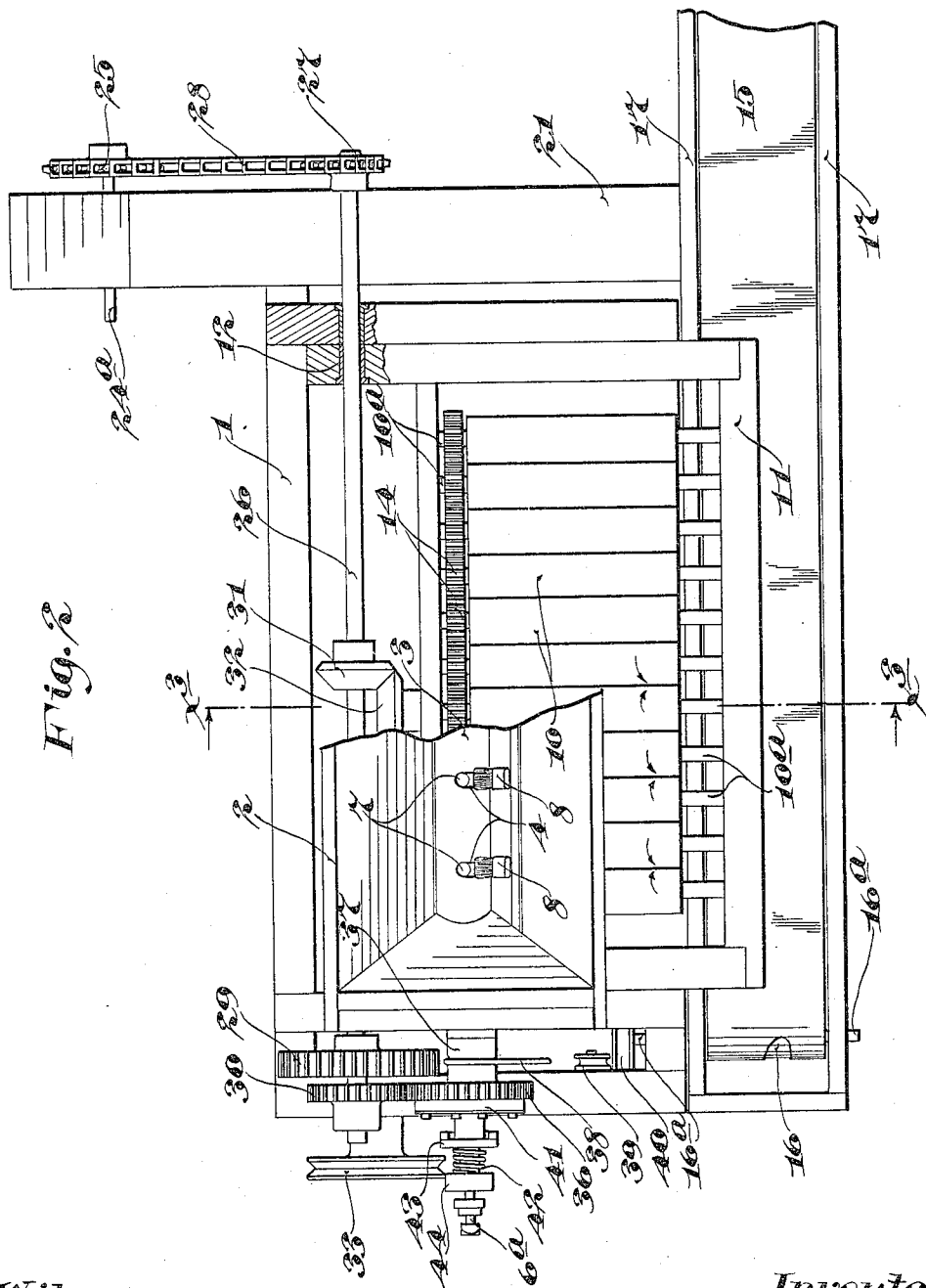
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Fig. 2



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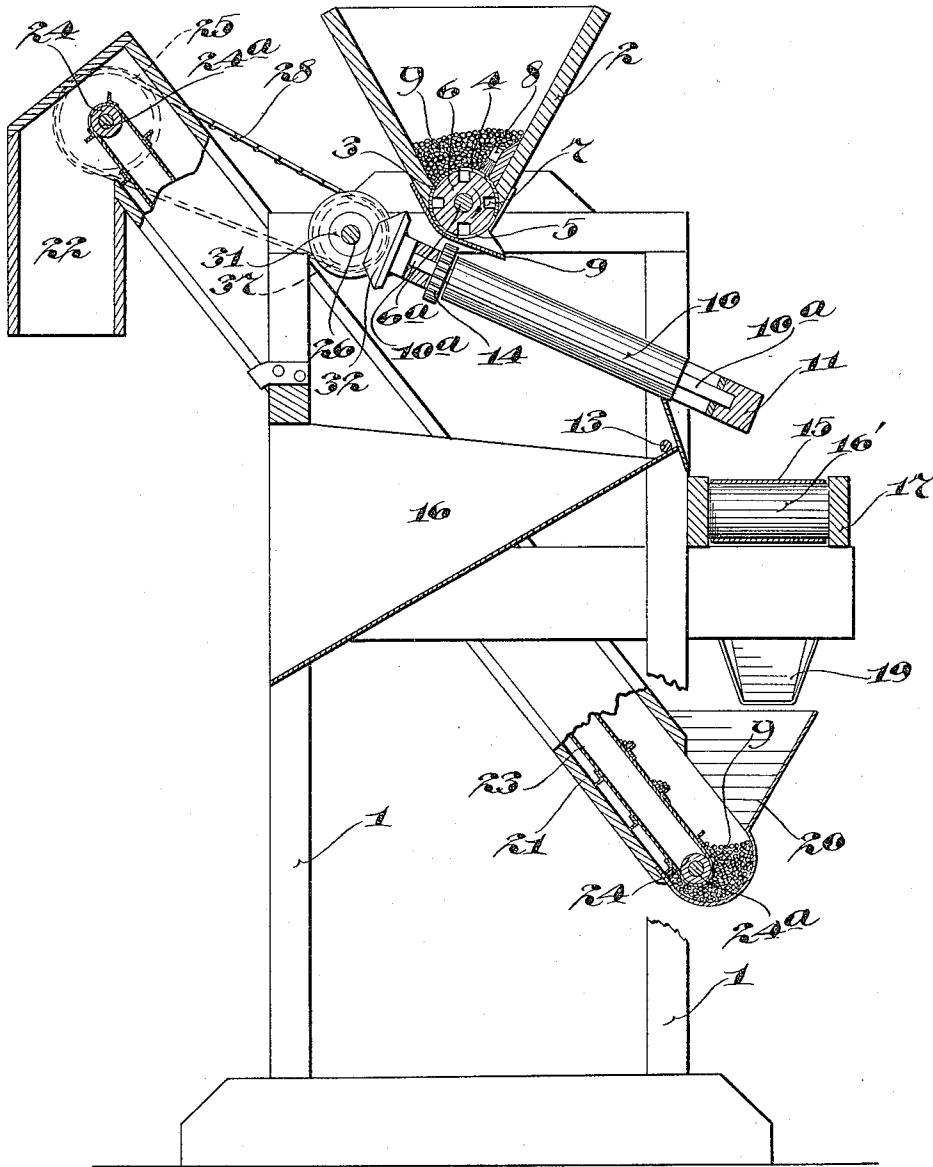
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3 SHEETS—SHEET 3.

Fig. 3



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# UNITED STATES PATENT OFFICE.

ANTON EJNER JOHNSON, OF CAMBRIDGE, MINNESOTA.

## BEAN-SORTING MACHINE.

1,148,589.

Specification of Letters Patent.

Patented Aug. 3, 1915.

Application filed January 19, 1914. Serial No. 812,867.

*To all whom it may concern:*

Be it known that I, ANTON EJNER JOHNSON, a citizen of the United States, residing at Cambridge, in the county of Isanti and State of Minnesota, have invented certain new and useful Improvements in Bean-Sorting Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its object to provide an extremely simple and highly efficient machine for sorting beans or similar articles which, when in perfect form, have smooth surfaces and which, when in perfect form have shriveled or rough surfaces, and to such ends, generally stated, the invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

In the accompanying drawings which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings, Figure 1 is a perspective view showing the complete machine; Fig. 2 is a plan view of the machine with some parts broken away; and Fig. 3 is a transverse vertical section taken through the machine approximately on the line  $w^3 w^3$  on Fig. 2, some parts being broken away.

The various parts of the machine are supported directly or indirectly from an approximately rectangular skeleton framework 1, which, at its top, supports an elongated hopper or feed box 2 adapted to contain the beans  $y$  or other articles to be separated. Set into the bottom of the hopper 2 and extending from end to end thereof, is a thin sheet metal cylinder 3 that is fixed against rotation, and at its upper portion has a plurality of longitudinally spaced circumferentially extended slots or ports 4, and at its lower portion has corresponding elongated discharge slots or ports 5. Working within the cylinder 3 is a feed roller 6 provided with longitudinally and circumferentially spaced pockets 7 adapted to move from registration with the receiving ports 4 into registration with the discharge ports 5. Small brushes 8 are secured to one side of the hopper with the bristles directly overlying the lower edges of the inlet ports 4. When the roller 6 is rotated in the direction of the arrow marked thereon on Fig. 3, the beans will drop through the ports 4 into the

pockets 7 and will be carried thereby to the discharge ports 5 where they will be dropped into inclined discharge spouts 9 secured to the bottom of the hopper. The brushes 8 sweep back beans and prevent them from being caught between the walls of the roller pockets 7 and the lower extremities of the inlet ports 4, and thus the beans are prevented from being cut in two, or from clogging the rotation of the roller. The feed roller 6 is provided with a shaft 6<sup>a</sup> that projects at one end, to-wit, as shown, at the left hand end of the machine.

The beans fed from the hopper 2 by the roller 6 and delivered to the discharge spouts 9 are, by the latter, delivered to cooperating pairs of inclined rollers 10, the shafts 10<sup>a</sup> of which are journaled in a rectangular frame 11, the upper portion of which, as shown, is journaled on tubular trunnions 12 fixed to the upper portion of the frame 1. The lower portion of this frame 11 is preferably made vertically adjustable, so as to vary the inclination of the rollers, and as shown, this is accomplished by a transverse clamping rod 13 which, when tightened, clamps the upper portions of the sides of the frame 1 against the ends of the frame 11 so as to frictionally hold the same where set. The rollers 10 are provided with very smooth pliable faces. Preferably, the bottom, or at least the face of the said rollers 10 are made of rubber, such as generally employed in the rollers of the clothes wringers. The roller shafts 10<sup>a</sup> just above the upper portion of the rollers, are provided with intermeshing spur pinions 14 which connect the said rollers to work in pairs, rotating as indicated by arrows marked thereon in Fig. 2; and here it is important to note that the discharge spouts 9 are arranged to direct the beans to the downwardly moving surfaces of the several of cooperating pairs of rollers.

By the action of the rollers 10, all of the perfect beans, that is, beans that have hard and smooth exterior surfaces, will run downward on the rollers and be discharged onto a horizontal carrier in the form of an endless belt 15, while all of the beans that have rough, shriveled or unsmooth exterior surfaces, will be caught by the rollers and fed between the same downward onto a backwardly inclined discharge deck 16, which is supported by the frame 1 and is adapted to deliver such imperfect beans either onto the floor or into any suitable receptacle. Also,

any particles of straw, dirt, sand, or, in fact, anything but the smooth surface beans, will be passed between the rollers and discharged with the imperfect beans.

5 The conveyer belt 15 runs over rollers 16' mounted in a supplemental frame 17 secured on the main frame and extended at one end, to-wit, as shown, at its right hand end, beyond the right hand side of the machine, and preferably, between a pair of laterally spaced catch boxes 18 secured on the sides of the said supplemental frame.

10 The rollers 10 sort the beans, except for color, but the black or discolored beans must be picked out by hand, but this operation, however, is delayed until after all of the otherwise imperfect beans have been removed, and hence, is made an easier matter than would otherwise be the case. The operator removes the black or discolored beans by hand from the belt 15, so that the said belt may be designated as the sorting belt. The discolored beans may be conveniently knocked from the sorting belt into one or the other of the catch boxes 18. The good beans are carried by the sorting belt 15 and dropped into discharge spout 19 located at the projecting end of the frame 17 and by the latter they are dropped into the hopper or lower end 20 of an inclined elevator leg 21 which is supported by the framework 1 and at its upper end has a discharge spout 22. Working within the elevator leg 21 is an endless elevator belt 23 which works over 15 rollers 24 journaled in the upper and lower ends of the said leg. The upper roller 24 has a projecting shaft 24<sup>a</sup> provided with a sprocket 25 at one end. The longitudinal shaft 26 is journaled in tubular trunnions 20 40 12, already noted, and at one end, this shaft 26 is provided with a sprocket 27 over which, and the sprocket 25, runs a sprocket chain 28. At its other end, the shaft 26 carries two spur gears 29 and 30. At its intermediate portion, said shaft is provided with a beveled gear 31 that meshes with a beveled gear 32 on one of the roller shafts 10<sup>a</sup>, so that all of the rollers 10 are driven from the shaft 26 through said beveled gears 31 and 32, and the heretofore noted spur gears 50 14. The shaft 26 is driven from a pair of driven belts not shown, which will run over a pulley 33, the shaft 34 of which is journaled in suitable bearings on the left hand end of the frame 1 and is provided with a spur gear 35 (see Fig. 1) that meshes with a gear 29. The gear 30 of the shaft 26 meshes with a spur gear 36 that is loose on the projecting end of the feed roller shaft 60 6<sup>a</sup>, and on its hub carries a pulley 37. A belt 38 runs over the pulley 37, over an idle guide pulley 39 and over a pulley 40, which latter is secured on the rearwardly projecting inner end of the shaft 16<sup>a</sup> of the left 65 hand roller 16.

By the connections already described, the sorting rollers 10, the sorting belt 15 and the elevator belt 23 will be constantly driven when the driving pulley 23 is driven. The feed roller 6, however, is arranged to be 70 thrown into and out of action at will of the operator, and as shown, this is accomplished by the following connections and devices:

The numeral 41 indicates a face friction wheel that is keyed, or otherwise secured to rotate with the feed roller shaft 6<sup>a</sup>, but is free to slide thereon. This friction wheel 41 is normally held in frictional driving engagement with the adjacent face of the gear 36, by a coiled spring 42 compressed between a flange 43 on the outer end of the hub of the friction wheel or disk 41 and the upper end of a shaft bearing or bracket 44, the lower end of which is rigidly secured to the frame 1. Normally, therefore, the gear 36 which is constantly driven, will drive the feed roller 6, but when the said friction wheel 41 is moved laterally out of engagement with the said gear 36, said feed roller will stop. To accomplish this, a clutch releasing lever 45 is intermediately pivoted to the bearing 44 and provided with a pronged upper end that engages against the flange 43 of the hub of the friction wheel 41, and the free end of this lever 45 is connected to one end of a clutch releasing cable 46 that runs over suitable guides 47 on the frame 1 and is attached at its lower end to a foot pedal 48 shown as hinged to the lower portion of the frame 1 and projecting at the right hand side thereof, where it may be engaged by a foot of the operator while he stands or is seated in position to pick the discolored beans from the sorting belt 15 and deposit the same in the catch boxes 18. 105

As is evident, the friction wheel or disk 41 and the cooperating face of the gear 36 afford a friction clutch for driving the feed roller. As is also evident, the operator can instantly throw the feed belt out of action simply by depressing the pedal 48. This will often become necessary in order to let the operator catch up to the machine. More definitely stated, the machine will be driven to meet the highest sorting capacity of the operator under ordinary conditions of the beans, and it will frequently happen that the operator will not be able to pick all of the discolored beans from the sorting belt with the normal rate of feed, and at such times, he simply throws the feed roller out of action to temporarily cut off further supply until he catches up in the sorting action. Obviously, the throwing of the feed roller out of action, while it stops the supply of beans from the hopper does not interrupt the moving of the sorting rollers or of the sorting belt, nor of the elevator belt. 120 125

This machine, while extremely simple, has in actual practice been found highly effi- 130

cient for the purposes had in view. It has been found that by far the greatest part of the work required in sorting defective beans from the good or perfect beans, may be accomplished automatically by the sorting rollers. The tendency of the beans to slide or roll down the feed rollers and off from the lower ends thereof may be varied by adjusting the frame 11 to vary the inclination of the said rollers, and hence, this adjustment is important in order to adjust the machine for the right separating action. It will, of course, be understood, that the greater the inclination of the feed rollers, the less is the chance given the rollers to feed beans between them. In fact, most discolored beans will be found shriveled or with such rough surface that they will be picked out from the main good stock by the said rollers leaving only a comparatively small amount of work to be done by way of picking out by hand the remaining and very small number of beans which are discolored, but otherwise perfect.

As clearly shown in Fig. 2, not only the cooperating members of each pair of rollers 10 run in close engagement, but the members of adjacent pairs also run in such close engagement that beans cannot pass downward between the upwardly moving sides thereof, and so that the inclined rollers, taken as a group or series, make up an approximately continuous apron with the upper half surfaces of all of the rollers so exposed that the beans can drop directly thereon.

What I claim is:

1. In a sorting machine of the kind described, inclined reversely driven pairs of rollers having smooth pliable faces adapted to cause articles having rough surfaces to pass between them, and to permit articles having smooth surfaces to move downward off from the lower ends thereof, all of the said rollers running in close contact, so that the said articles to be separated cannot pass downward between upwardly moving surfaces of the rollers of adjacent pairs, and the upper half surfaces of the said several rollers being exposed so that the articles to be separated can drop thereon.

2. In a sorting machine of the kind described, inclined reversely driven pairs of rollers having smooth pliable faces adapted

to cause articles having rough surfaces to pass between them, and to permit articles having smooth surfaces to move downward off from the lower ends thereof, all of the said rollers running in close contact, so that the said articles to be separated cannot pass downward between upwardly moving surfaces of the rollers of adjacent pairs, the upper half surfaces of the said several rollers being exposed so that the articles to be separated can drop thereon, and means supporting the said rollers for simultaneous adjustments to vary their inclination.

3. In a sorting machine of the kind described, inclined reversely driven pairs of rollers having smooth pliable faces adapted to cause articles having rough surfaces to pass between them, and to permit articles having smooth surfaces to move downward off from the lower ends thereof, all of the said rollers running in close contact, so that the said articles to be separated cannot pass downward between upwardly moving surfaces of the rollers of adjacent pairs, the upper half surfaces of the said several rollers being exposed so that the articles to be separated can drop thereon, and a hopper arranged to deliver the articles to be separated onto the upper surfaces of the upper end portions of said rollers.

4. In a sorting machine of the kind described, inclined reversely driven pairs of rollers having smooth pliable faces adapted to cause articles having rough surfaces to pass between them, and to permit articles having smooth surfaces to move downward off from the lower ends thereof, all of the said rollers running in close contact, so that the said articles to be separated cannot pass downward between upwardly moving surfaces of the rollers of adjacent pairs, the upper half surfaces of the said several rollers being exposed so that the articles to be separated can drop thereon and means delivering beans to the upper ends of the rollers in the direction of the inclination of said rollers.

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

ANTON EJNER JOHNSON.

Witnesses:

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PAUL DAHLGREN.