

Feb. 26, 1929.

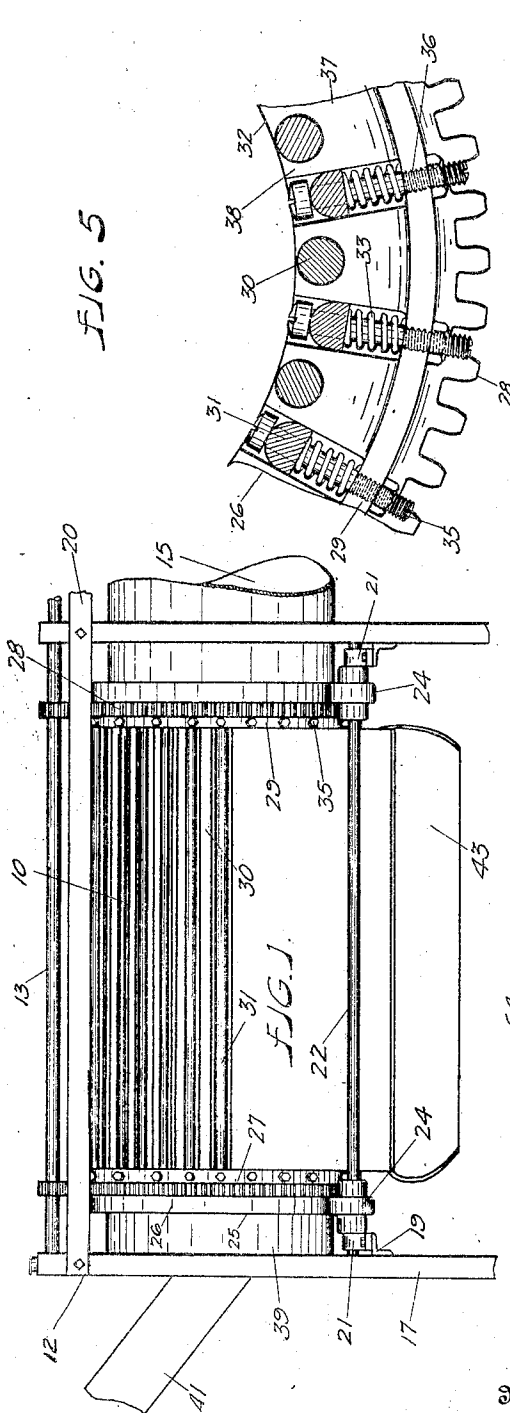
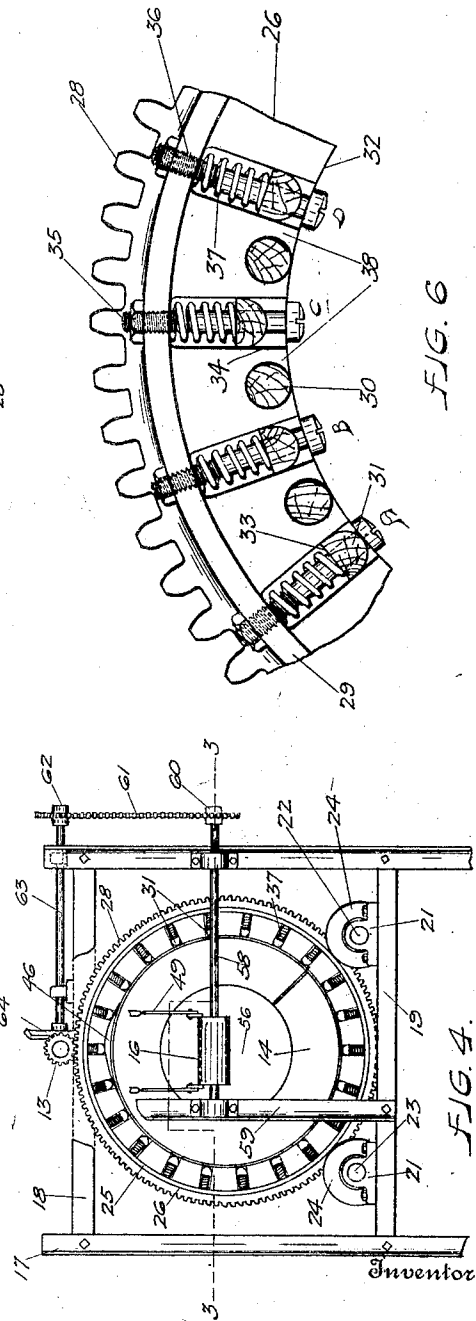
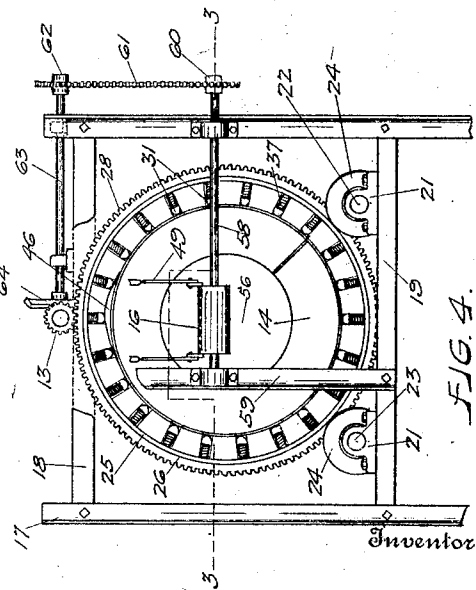
1,703,591

G. J. OLNEY

SORTING MACHINE

Filed Dec. 30, 1927

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

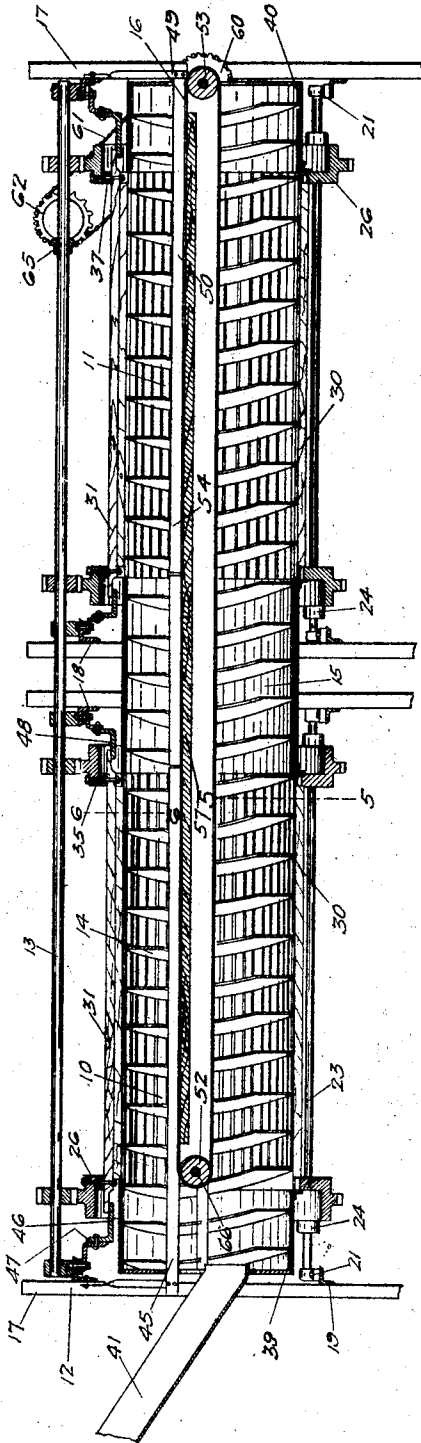


FIG. 2.

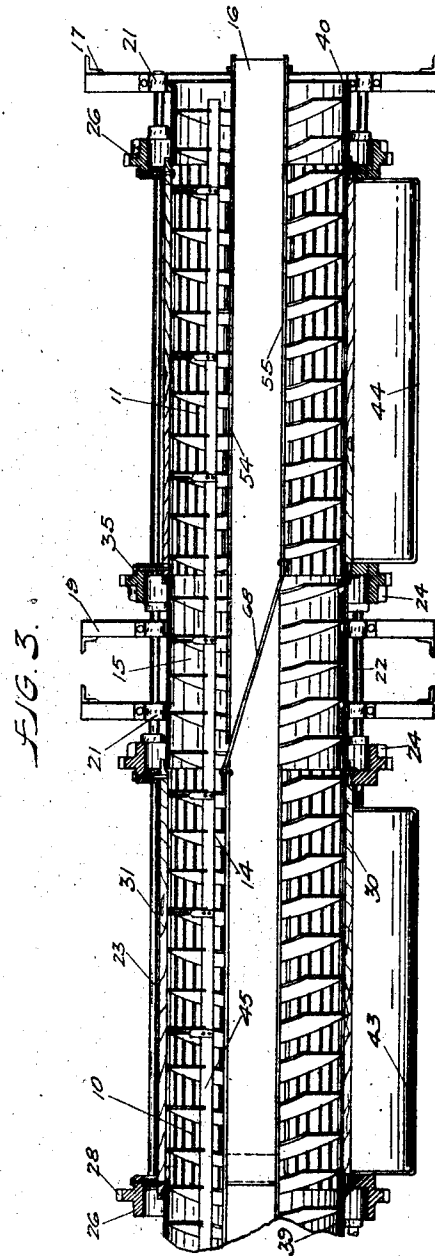


FIG. 3.

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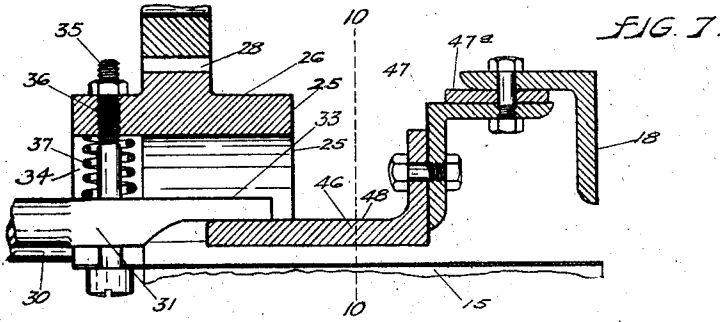
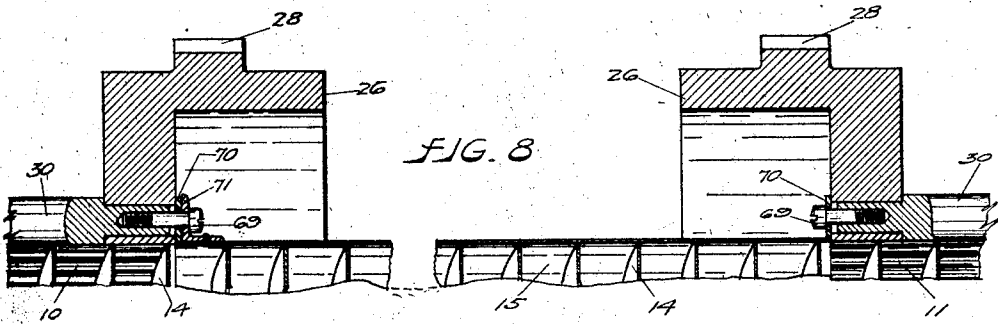
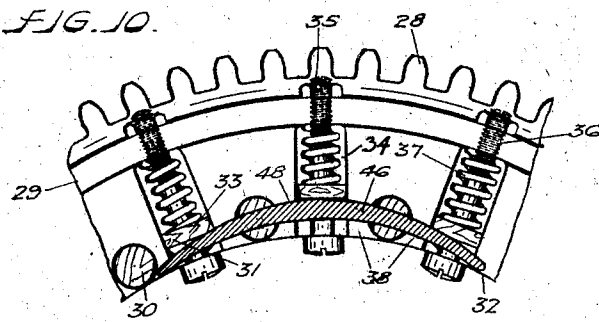
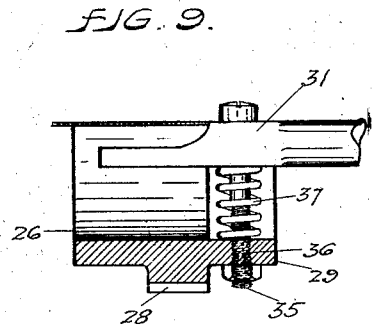
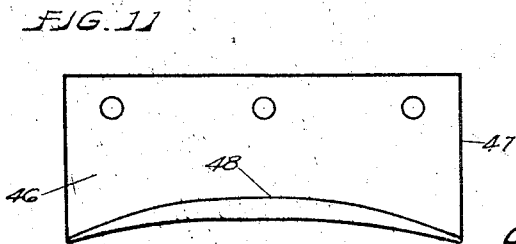
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G. J. OLNEY

SORTING MACHINE

Filed Dec. 30, 1927

3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE.

GEORGE J. OLNEY, OF WESTERVILLE, NEW YORK.

SORTING MACHINE.

Application filed December 30, 1927. Serial No. 243,635.

My present invention relates to a machine generally adapted for sorting articles according to size and particularly adapted to sort green string beans preliminary to canning.

The purpose of my invention is to provide a machine of new and improved construction and one which readily and quickly sorts the beans or other articles according to the desired standard.

Further purposes are to provide a machine of such construction that the beans may be closely sorted but will be handled with a minimum of breakage or crushing by reason of having improved means to release the beans that have become caught between the sorting slats of the barrel of the machine; to provide a machine where the normal size of the sorting slots between the slats of the barrel may be readily and accurately adjusted to any one of several sizes or standards and to have such adjustment not interfered with by the temporary movement of certain of the slats to release the beans that have become caught in the barrel; and to provide in a machine of the type described not only the usual screw conveyor for transmitting the articles slowly through the barrel for the regular sorting operation but also to provide a second conveyor preferably in the form of an endless belt which will receive the articles released from the top of the barrel and transport them longitudinally of the barrel as far as needed. This second or supplemental conveyor operates to greatly speed up the action of the sorting machine and may be used either to carry the articles received thereon to a subsequent part of the barrel or to a subsequent barrel in a set or to a point entirely outside of the barrel.

A further purpose is to provide a machine having the general features mentioned which can be variously combined or adjusted as by having two sorting barrels mounted in tandem fashion with one secondary conveyor extending through both barrels.

Further purposes and objects will appear from the specification and claims herein.

Fig. 1 is a side elevation of the first half of a machine embodying my invention.

Fig. 2 is a vertical central sectional view through the entire machine.

Fig. 3 is a horizontal longitudinal sectional view of the machine on line 3—3 of Fig. 4.

Fig. 4 is an end view of the delivery end of

the machine with parts of the frame-work broken away.

Fig. 5 is a detail vertical sectional view on an enlarged scale on line 5—5 of Fig. 2, but with the movable slats adjusted somewhat inwardly.

Fig. 6 is a similar sectional view on line 6—6 of Fig. 2, but with the movable slats in inward position.

Fig. 7 is a vertical longitudinal sectional view on an enlarged scale through the slat lifting cam and adjacent parts.

Fig. 8 is a longitudinal horizontal sectional view on an enlarged scale showing the drum connecting the adjacent heads of the two barrels.

Fig. 9 is a detail longitudinal sectional view showing a movable slat mounted in its outmost position in a barrel head.

Fig. 10 is a detail sectional view on line 10—10 of Fig. 7.

Fig. 11 is a side view of the cam plate.

Referring to the drawings in a more particular description it will be seen that I have shown and will describe a machine having two similarly constructed sorting barrels, namely a first barrel 10 and a second barrel 11 mounted tandem fashion, that is on the same axis and mounted within the same main frame 12 driven from the same drive shaft 13 and with one primary or screw conveyor 14 extending continuously through the two barrels and the intervening passageway 15 therebetween and with one secondary or belt conveyor 16 operating within said two barrels. As the construction of the two barrels 10 and 11 are alike, detailed description of only the first barrel will be necessary. It will be obvious, furthermore, that my invention is not limited to a machine having two barrels but that the two-barrel-machine is simply illustrative of my invention which may be as to most of its combinations embodied in a machine having only one barrel or in a machine having more than two barrels.

The main frame 12 may conveniently be formed from angle iron and consists of pairs of spaced uprights 17, upper and lower cross pieces 18 and 19 respectively and horizontal top bars 20 extending the length of the machine. On each lower cross bar 19 are two bearings 21 spaced apart and having mounted therein the front and rear shafts 22 and 23 respectively. Each shaft carries a roller 24 against which rests and rotates the outer sur-

face 25 of the two end heads 26 of the barrels 10 and 11. For convenience only the first barrel 10 will be described in detail. The heads 26 consist of a main cylindrical portion 27 on the outer side of which is the surface 25 engaging the rollers 24 and to one side thereof and projecting therebeyond is formed an exteriorly facing toothed wheel 28. At the inner end of each head there is an inwardly extending flange 29 to which are secured or connected the opposite ends of the fixed slats 30 and the movable slats 31. The fixed slats are alternately arranged in the barrel with their ends suitably rigidly secured to said barrel heads as by screws 69 and washers 70 as shown in Fig. 8 with the inner sides of said fixed slats 30 substantially in line with the inner edge 32 of the inwardly extending flange 29 of the heads.

Between each two adjoining fixed slats there is movably mounted a movable slat 31. The movable slats are mounted in the opposite heads of the barrel so that said movable slats may be positioned in the same circle as the fixed slats 30 or may be moved radially from the center of the barrel. In order to conveniently accomplish this motion the end portions 33 of the said slats 31 opposite the head flanges 29 are of square or rectangular formation and slidingly fit into slots 34 formed in the flanges 29 and extending into said flanges from their inner edge 32. Through each squared portion 33 extends the smooth portion of the shank of cap screw 35.

The outer end of this shank extends through screw threaded holes 36 in the cylindrical portion 27 of the head with the screw head normally engaging the inner surface of the slat 31. About the central portion of each screw 35 is a coiled expansion spring 37 operating to yieldingly force the ends of these movable slats as far inwardly as will be allowed by the adjustment of the screws 35. As will be seen from Figs. 5 and 6 the outer ends of these springs engage against the inner surface of the cylindrical portion of the head and the inner end of the springs engage against the outer surface of the squared portion 33 of the slats. The arrangement of these parts is such that the movable slats 31 may be adjusted to be on the same circle with the fixed slats 30. The movable slat farthest to the right in Fig. 5 shows this extreme inward position of the movable slats in line with the fixed slats.

When the movable slats are in this position it will be seen that the sorting slots 38 formed between each adjacent pair of slats namely a fixed and a movable slat will be the narrowest slot to which the sorting machine can be adjusted. By adjusting the screw-threaded connection between each screw and the end of a movable slat it will be obvious that the movable slats may be forced outwardly to successive positions beyond the circle of the fixed slats. As the movable slats are so adjusted

outwardly the sorting slots 38 will gradually and regularly increase in width and thus adjust the barrel to let pass through the sorting slots a larger size of bean or other article being worked upon. By this screw-threaded adjustment the machine may be very accurately set to sort any one of a great variety of closely approaching standards or sizes of beans or other articles.

At the front or left hand end of the first barrel 10 there is provided an outwardly extending drum 39 extending from the head outwardly or to the left and in line with the inner surface of the slats of the barrel. Where, as in the machine shown in Figs. 1, 2 and 3, a first and a second barrel are mounted in tandem fashion, the two barrels are connected by a similar drum forming the intervening passageway 15. At the delivery end, namely the right hand end of the second barrel 11, there is a similar drum 40 extending outwardly for convenience in delivering the beans or other articles that have not theretofore been delivered from the barrel. The beans or other articles are conducted to the front or left hand end of the machine through a suitable chute 41. Closely fitting within the two barrels and within the drum extensions 39 and 40 and the intervening passageway 15 is a screw conveyor 42. The successive wings of the screw-conveyor are spaced far enough apart lengthwise of the barrels so as to give full chance for long articles like green string beans to arrange themselves longitudinally of the barrel and so in line with the sorting slots 38 as the rotating movement of the machine causes the beans to slide or tumble down along the ascending inner surface of the barrel. The beans or other articles that are small enough to pass through the said sorting slots 38 fall from the lower portion of the barrel through said slots into the receiving chutes 43 under the first barrel and 44 under the second barrel. As the machine and particularly the screw conveyor 14 is shown the barrels are rotated counter-clockwise as viewed from the delivery-end in Fig. 4.

The screw conveyor is of the type having a left hand complete plate 14 and simply one continuous spiral without any central shaft or cylinder. The outer edges of this worm engage closely the fixed slats and are braced and strengthened by two longitudinally extending rods 45 secured to the inner edges of each wing of the spiral as by having transversely extending slots cut in said rods into which fit the inner edges of the opposite sides of the worm. Radially extending braces go from the rods along the back side of the conveyor to certain of the fixed slats.

The fixed slats are circular in form and the inner half of the operating length of the movable slats are circular in form so that the beans or other similar long articles are

aided into alignment with the sorting slots by the trough-like or funnel-like formation of the spaces between any two slats leading to the smallest part of the sorting slots which is of course the determining factor for the size of articles sorted.

In a sorting machine of this type many of the beans or similar irregularly shaped articles become caught between the sorting slats as by having one end or one part of a bean small enough to go through the sorting slot but with the rest of the bean or other article too large to clear the same. As the barrels of the machine rotate these beans are carried to the upper part of the barrel and some of them are released by gravity. Many of the beans or other articles, however, have become firmly enough caught between the sorting slats that they will not drop of their own accord by gravity. To make sure of the release of these beans so caught I provide mechanism for temporarily increasing the size of the sorting slots at the upper part of the barrel. This means consists of a cam 46 at each end of each barrel suitably carried on a bracket 47 depending from the top cross bars 20 so that the sloping upper face 48 of the cam will engage and push upwardly the projecting ends of the movable slats 31. The position of the cam is adjustable as by inserting different thicknesses of plates 47^a between the bracket and its support.

As will be seen by reference to Figs. 2 and 3, the ends of the movable slats project outwardly beyond flange 29 of the heads 26 and have their inner sides cut away to give room for the cam 46. The shape and operation of the cam in effecting this release movement is shown in the detailed sectional view Figs. 6, 7 and 10. The left hand movable slat 31 further indicated by the letter A in Fig. 6 shows the normal or inward and working position of the movable slats. As the successive slats come to the cam face 48 they are moved radially outwardly through the positions shown by the movable slat by B, C and D and then back to normal position. As the alternate movable slats are thus temporarily moved outwardly from the fixed slats the distance between the fixed and movable slats is appreciably increased and effects a quick and definite release of any beans or other articles caught in the barrel. This clearing of the slats of the barrel from articles caught therein goes on continuously for the full length of the barrel or any number of barrels used and operates to increase the capacity and effectiveness of the sorting machine and a machine constructed as so far described has many points of advantage and improvement over machines heretofore devised.

A further purpose of my invention, however, is to provide means for catching the beans or other articles released at the top of

the barrel and transporting them longitudinally of the barrel an appreciable length or to a point outside the barrel or to the following barrel as may be desired. This mechanism located within the barrels and also within the space at the center of the screw-conveyor will now be described.

From the upper cross pieces 18 of the main frame and at the opposite ends of the barrel when only one barrel is used or at the opposite ends of the two barrels used as in the machine shown in Figs. 1, 2 and 3, there depend two spaced straps 49 each pair of which support the opposite ends of a belt-carrying frame 50 which in turn carries the endless belt 16 on rollers 52 and 53. The belt-carrying frame 50 consists of opposite side bars 54 and 55 extending longitudinally of the barrels of the machine and within the central opening 56 of the screw conveyor. The side bars 54 and 55 extend longitudinally the full length of the barrels but the left hand bar 54 as seen in Fig. 4 and which is the near side bar as seen in Fig. 3 is discontinued opposite the intervening passageway 15 for a purpose to be hereinafter described. Between the lower edges of the opposite side bars 54 and 55 there extends the platform 57 a little shorter than the upper length of the belt 51 and adapted to carry said belt without the belt sagging under its own weight or that of the beans carried thereby. The belt 16 is driven from the delivery end of the machine and for this purpose the roller 53 at that end of the machine is located on a shaft 58 horizontally carried by suitable bearings in an extra upright 59 at the delivery end of the machine closely towards the left of the belt as the parts are seen in Fig. 4 with the other end of the shaft extending through a bearing provided in the main upright 17 at the right hand of the machine. Beyond the frame of the machine this shaft 58 is provided with a gear 60 connected by chain 61 to gear 62 on counter-shaft 63 horizontally mounted in suitable bearings upon the top of the main frame of the machine and having a mitre gear 64 meshing with a suitable mitre gear 65 located upon the main drive shaft 13. It will be understood that the straps 49 are located close to but just beyond the outer edges of the drum extensions 39 and 40 of the barrels so as not to interfere with the rotation of the barrels. Similarly the belt and belt frame will be clear of the inner edges of the screw conveyor. The belt is, however, of a sufficient width to catch thereupon substantially all of the beans or other articles released from the upper portion of the barrel by the operations of the release cam.

The belt-supporting roller 52 near the receiving end of the machine is placed at the inner end of the drum 39 and just before the sorting slots of the first barrel begin so that the belt will catch released beans at the first

end of the barrel. The roller 52 is so supported within the barrel and drum by a shaft 66 mounted in two bearings 67 depending from the opposite side bars 54 and 55.

5 A convenient way of organizing or adjusting the machine is to set the first barrel 10 to sort out the smallest grade of green beans and to have the second barrel 11 have its sorting slots set as hereinabove described to the next size of beans that are to be separated. 15 As the machine is thus organized the first barrel will sort out the first size of beans by allowing that size of beans to fall through the sorting slots in the lower side of the barrel. The beans which become caught between the slats as being too large to pass through the slots will be released as already described at the top of the barrel and will fall down to the upper length of the belt 16 which 20 is traveling towards the delivery end of the machine. The beans so once caught and thus delivered to the belt are carried directly and relatively rapidly the length of this first barrel to the intervening passageway 15 between 25 the two barrels. At this point there is placed to engage the top of the belt the transfer cleat 68 arranged at an angle across the belt. This operates to push the beans off from the belt preferably onto the near side as shown in 30 Fig. 4 down into the spaces between the screw conveyor. From this point the released and belt-conveyed beans are conducted into the second barrel by the rotation of the barrels and there subjected to a second sorting operation. These beans are apt to be the ones that 35 will be sorted out by the second barrel as they were small enough to be caught in the slats of the first barrel but just too large to pass through the slots of the first barrel. It 40 will be understood of course that the beans that are not sorted out by falling through the slots of the first barrel and that do not become caught between the slats of the first barrel will be slowly but continuously moved 45 lengthwise of the first barrel and through the intervening passageway 15 where they will be joined by the beans pushed off of the first section of the belt and then the beans from both these sources will be conveyed into 50 the second barrel. In the second barrel the beans small enough to be sorted out by the adjustment of the slats therein will fall through the slats into the chute 44. Beans which become caught in the slats of this barrel 55 will be released at the top of the barrel and will drop onto the latter half of the upper part of the belt 16. The beans so reaching this part of the belt will be rapidly transported to the delivery end of the machine 60 where they may be taken into another chute or suitable receptacles. The remainder of the beans in the second barrel, namely those too large to be sorted out in this barrel and too large to even be caught in the slats will 65 be slowly but continuously pushed out from

the delivery end of this barrel. If desired the beans transported along the second half of the belt may be caught in a separate receptacle or chute from that receiving the beans from the barrel itself. The basis for this 70 separation is that the beans delivered from the second half of the belt will usually be smaller than the beans delivered from the delivery end of the second barrel itself.

What I claim as new and desire to secure 75 by Letters Patent is:

1. In a grading machine, the combination of a rotatably mounted barrel having separated slats forming therebetween the sorting openings, alternate slats being adapted to be 80 moved outwardly, means for rotating said barrel, means yieldingly holding said alternate slats in sorting position and means operating upon said slats in their upper position to temporarily shift said movable slats outwardly to increase the distance between adjacent slats and release the articles caught 85 between the slats.

2. In a grading machine, the combination of a rotatably mounted barrel having separated slats forming therebetween the sorting openings, alternate slats being adapted to be 90 moved outwardly, means for rotating said barrel, means yieldingly holding said alternate slats in sorting position, means operating upon said slats in their upper position to temporarily shift said movable slats outwardly to increase the distance between adjacent slats and release the articles caught 95 between the slats and means for progressing the articles longitudinally of the barrel. 100

3. In a grading machine, the combination of a rotatably mounted barrel having separated slats forming therebetween the sorting openings, alternate slats being adapted to be 105 moved outwardly, means for rotating said barrel, means yieldingly holding said alternate slats in sorting position, means operating upon said slats in their upper position to temporarily shift said movable slats outwardly to increase the distance between adjacent slats and release the articles caught 110 between the slats, and a screw conveyor mounted within said barrel for progressing the articles longitudinally of the barrel. 115

4. In a grading machine, the combination of a rotatably mounted barrel having separated slats forming therebetween the sorting openings, alternate slats being adapted to be 120 moved outwardly, means for rotating said barrel, means yieldingly holding said alternate slats in sorting position, means operating upon said slats in their upper position to temporarily shift said movable slats outwardly to increase the distance between 125 adjacent slats and release the articles caught between the slats and a screw conveyor mounted within and traveling with said barrel for progressing the articles longitudinally 130 of the barrel.

5. In a grading machine, the combination of a rotatably mounted barrel having separated slats forming therebetween the sorting openings, alternate slats being adapted to be moved outwardly, means for rotating said barrel, means yieldingly holding said alternate slats in sorting position, means operating upon said slats in their upper position to temporarily shift said movable slats outwardly to increase the distance between adjacent slats and release the articles caught between the slats and means for adjusting the inner or sorting position of the movable slats.

6. In a grading machine, the combination of a rotatably mounted barrel having separated slats forming therebetween the sorting openings, alternate slats being adapted to be moved outwardly, means for rotating said barrel, means yieldingly holding said alternate slats in sorting position, means operating upon said slats in their upper position to temporarily shift said movable slats outwardly to increase the distance between adjacent slats and release the articles caught between the slats and means for separately adjusting the inner or sorting position of the movable slats.

7. In a grading machine, the combination of a barrel rotatably mounted and arranged substantially horizontally and having separated slats forming therebetween the sorting openings for the articles to drop therethrough at the lower side of the barrel, means for rotating said barrel, means for temporarily increasing the size of said sorting openings at the upper side of the barrel to release the articles caught between the slats, and a belt conveyor extending longitudinally within the barrel beneath the upper part thereof and adapted to receive the articles released from between the slats at the upper part of the barrel and to convey them longitudinally of the barrel.

8. In a grading machine, the combination of a barrel rotatably mounted and arranged substantially horizontally and having separated slats forming therebetween the sorting openings for the articles to drop therethrough at the lower side of the barrel, means for rotating said barrel, means for temporarily increasing the size of said sorting openings at the upper side of the barrel to release the articles caught between the slats, means for adjusting the working size of the sorting openings and a belt conveyor extending longitudinally within the barrel beneath the upper part thereof and adapted to receive the articles released from between the slats at the upper part of the barrel and to convey them longitudinally of the barrel.

9. In a grading machine, the combination of a barrel rotatably mounted and arranged substantially horizontally and having sep-

arated slats forming therebetween the sorting openings for the articles to drop therethrough at the lower side of the barrel, means for rotating said barrel, means adjacent the inner surface of the barrel for progressing the articles slowly longitudinally of the barrel, means for temporarily increasing the size of said sorting openings at the upper side of the barrel to release the articles caught between the slats and a belt conveyor extending longitudinally within the barrel beneath the upper part thereof and adapted to receive the articles released from between the slats at the upper part of the barrel and to convey them longitudinally of the barrel.

10. In a grading machine, the combination of a barrel rotatably mounted and arranged substantially horizontally and having separated slats forming therebetween the sorting openings for the articles to drop therethrough at the lower side of the barrel, means for rotating said barrel, a screw-conveyor within the barrel and adjacent the inner surface of the barrel for progressing the articles slowly longitudinally of the barrel, means for temporarily increasing the size of said sorting openings at the upper side of the barrel to release the articles caught between the slats, and a belt conveyor extending longitudinally within the barrel beneath the upper part thereof and adapted to receive the articles released from between the slats at the upper part of the barrel and to convey them longitudinally of the barrel.

11. In a grading machine, the combination of a rotatably mounted barrel having separated slats forming therebetween the sorting openings, alternate slats being adapted to be moved outwardly, means for rotating said barrel, means yieldingly holding said alternate slats in sorting position, means operating upon said slats in their upper position to temporarily shift said movable slats outwardly to increase the distance between adjacent slats and release the articles caught between the slats, a screw conveyor mounted within said barrel for progressing the articles longitudinally of the barrel and a belt conveyor extending longitudinally within the barrel beneath the upper part thereof and adapted to receive the articles released from between the slats at the upper part of the barrel and to convey them longitudinally of the barrel.

12. In a grading machine, the combination of a rotatably mounted barrel having separated slats forming therebetween the sorting openings, alternate slats being adapted to be moved outwardly, means for rotating said barrel, means yieldingly holding said alternate slats in sorting position, means operating upon said slats in their upper position to temporarily shift said movable slats outwardly to increase the distance between adjacent slats and release the articles caught between the

slats, a screw conveyor mounted within said barrel for progressing the articles longitudinally of the barrel and means for adjusting the inner or sorting position of the movable
5 slats and a belt conveyor extending longitudinally within the barrel beneath the upper part thereof and adapted to receive the arti-

cles released from between the slats at the upper part of the barrel and to convey them longitudinally of the barrel.

In witness whereof I have affixed my signature, this 28th day of November, 1927.

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GEORGE J. OLNEY.