Oct. 30, 1928. 1,689,254

F. P. RYDER

STRING BEAN GRADER

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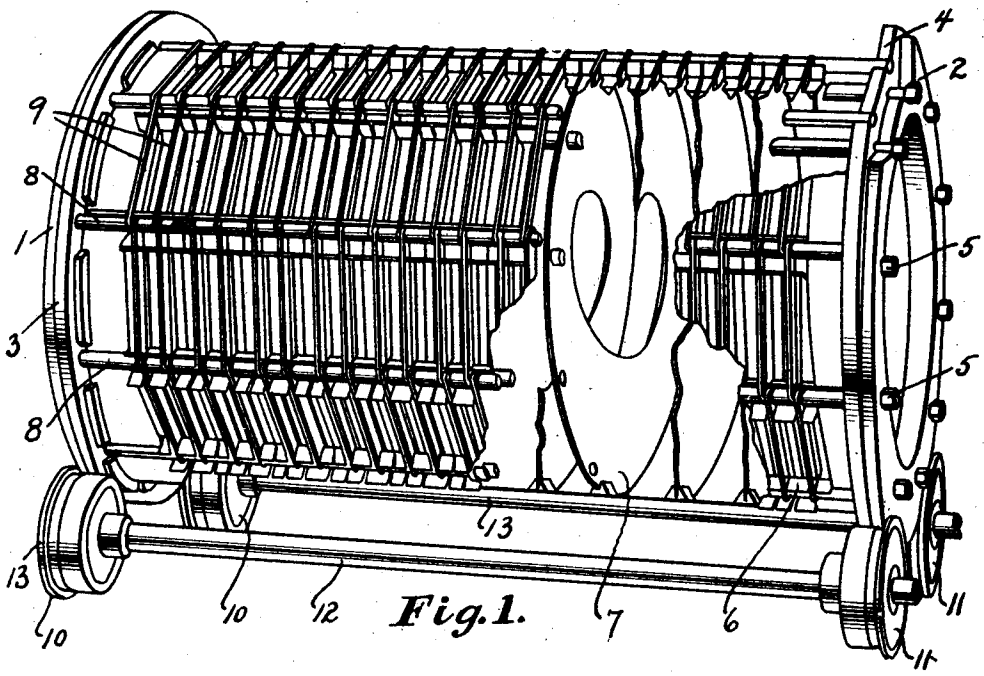



Fig. 1.

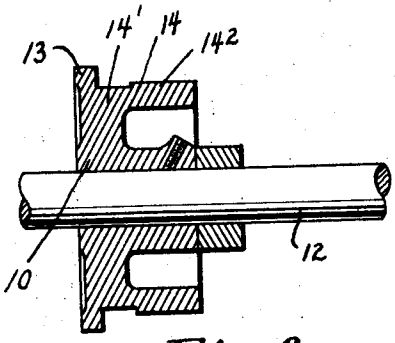



Fig. 2.

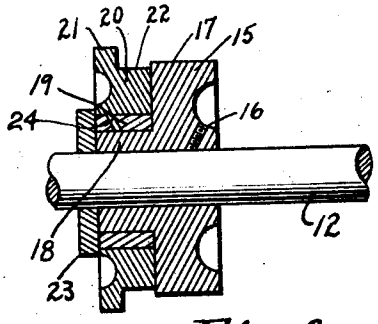



Fig. 3.

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# UNITED STATES PATENT OFFICE.

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## STRING-BEAN GRADER.

Application filed May 13, 1927. Serial No. 191,090.

My invention relates to string bean graders of the type in which two interlaced or interlocking cylindrical members of different diameters are used, one carrying pockets and the other carrying links, as shown in United States patent to William F. Urschel, No. 1,295,642, dated Feb. 25, 1919. In the machine described in this patent to Urschel the cylindrical members are provided with rings which rest on and are driven by travelers, that is, wheels carried by a driven shaft, the peripheries of the rings of the pocket and link members resting on the peripheries of the travelers.

The interlocking or interlacing of the two cylindrical members is such that the rotation of one rotates the other by contact of the end portions of the pockets and links but the pressure exerted by the driven cylindrical member must not, for proper operation of the machine, be such as to result in wear of the contacting parts. The end rings by which the cylindrical members are carried being of different diameter and, of course, differing in the length of their peripheries it was deemed advisable in order to compensate for the difference and to make the contact of the parts by which one cylindrical member is driven by the other as light as possible, to provide the travelers with two faces corresponding in diameter with the differing diameters, and differing peripheries, of the outer rings of the cylindrical members, the portion of the traveler on which the ring of less diameter being of less diameter than the portion on which the ring of greater diameter rests, the two rings being both positively driven. While this would be effective if there were no slipping between the peripheral faces of the traveler and the peripheries of the rings and no wear of their faces it is found that because of such slipping and the wear of the contacting faces, the pressure of the engaging parts of one cylindrical member with the parts of the other member is increased to such an extent as to cause wear and to move the pockets and links out of line to such an extent as to result in such wear as to change the size of the openings which determine the size of the beans these openings becoming large enough to permit larger beans than the size wanted to pass through the machine thus failing to effect a proper grading.

My present invention is intended to provide means by which the difference in diameters of the rings of the two cylindrical members will be compensated for and one may be driven by the other without substantial wear on the contacting parts by which the driving is effected so that in continued operation of the machine the openings which permit beans of desired size, and only those not larger than the desired size, to pass.

With the object thus indicated and other objects hereinafter explained in view, my invention consists in the construction and combination of elements hereinafter described and claimed.

Referring to the drawings:

Figure 1 is a perspective view partly broken away of a string bean grader having my present improvement applied thereto.

Figure 2 is a vertical sectional view of the traveler heretofore used for supporting and rotating the cylindrical members of the grader, and

Figure 3 is a vertical sectional view of the improved traveler of my present invention.

In the drawings, 1 and 2 indicate the end rings of the inner or pocket cylindrical member of a string bean grader of the type shown and described in the patent to Urschel, #1,295,642, above referred to, and 3 and 4 indicate the end rings of the outer or link cylindrical member. As pointed out in the Urschel Patent, No. 1,295,642 referred to, the end rings 1, 2, of the pocket cylindrical member and the end rings 3 and 4 of the link cylindrical member are of different diameters, the rings 1 and 2 of the pocket member being of less diameter than the rings 3 and 4. The rings 1 and 2 are connected by longitudinal rods 5 which carry the pockets 6 and also carry the helical feed member 7 by which the beans to be graded are fed through the machine from the left hand end of the machine as shown in Figure 1, to the right hand end. The rings 3 and 4 are connected by longitudinal rods 8 which carry the links 9.

The rings 1, 2, 3 and 4 rest on and are rotated by travelers 10 and 11 carried by shafts 12 and 13, arranged below and at suitable distances from the vertical plane of the axis of the machine. These travelers are shown in the Urschel patent as provided with flanges 13, and cylindrical peripheral faces 14 on which the rings 1, 2, 3 and 4 rest, the frictional contact of the rings with the rotating travelers being sufficient to cause the rings

with the pockets and links carried by them to rotate.

The mechanism thus far described is that of the bean grader shown and described in the Urschel patent referred to except as regards the helical feed member which though not shown in said patent forms a part of the bean grader as manufactured and used, and forms no part of my present invention.

In the bean graders as manufactured and used the travelers have been constructed with peripheral faces 14′ and 14², as shown in Figure 2, the portions 14′ on which the rings 1 and 2 rest being of less diameter than the portions 14² on which the rings 3 and 4 rest, it being considered that the distance about the periphery of portion 14² should be sufficiently greater than the distance about the periphery of portion 14′ to compensate for the greater distance about the periphery of the larger rings 3 and 4 than about the periphery of the smaller rings 1 and 2 so as to positively drive both sets of rings at the same speed, and this has been found satisfactory so long as the diameters of the portions 14′ and 14² as sent out from the factory are unchanged by wear.

But it has been found that the peripheral face portions 14′ and 14² are subject to considerable wear particularly as, the travelers being below the mass of beans within the grader, sand or dirt carried by the beans tends to drop onto the travelers and cause a grinding action by which the wear on the periphery of the travelers is greatly increased. Changes in the driving faces of portions 14′ and 14² tend to change the speeds at which the rings 1, 2, 3 and 4 are driven and to cause a shift in the relative position of the ends of the pockets of the one cylindrical member with reference to the ends of the link openings of the other member. This results in not only throwing upon the contacting parts of the two cylindrical members the entire duty of doing the driving but also of increasing the strain and wear, on these parts because of the resistance to rotation which results from the non-slipping between the ring of the member which is to be driven and the portion of the periphery of the traveler on which it rests.

While it is essential that the two cylindrical members, the pocket member and the link member, be supported in definite relative position, it is not only not necessary to drive both sets of rings by the travelers as if one is positively driven the other will be rotated satisfactorily by the positively driven member, but with the construction heretofore used the driving of one member by the other is an inevitable result and the effect of attempting to drive both positively makes it more difficult to secure proper compensation than if only one is positively driven. My present invention is concerned with the means by which the two sets of rings may be supported in definite relation while only one of the sets of rings is positively driven by the travelers, and I have devised for this purpose the split traveler shown in Figure 3 as a means for supporting the sets of rings in definite position and overcoming the effects due to wear of the driving faces when both sets of rings are attempted to be positively driven.

In the construction shown in Figure 3 the split traveler comprises a main portion 15 secured on shaft 12 by set screw 16 and having peripheral driving face 17, this peripheral driving face having a width corresponding to the width of rings 3 and 4, and having a hub portion 18 of relatively small diameter extending towards the outer end of the shaft 12. This hub portion 18 is adapted to receive a bushing 19, preferably of bronze, on the outer periphery of which is carried a ring 20 provided with flange 21. The outer peripheral face 22 of ring 20 is of less diameter than the peripheral driving face 19. The width of the peripheral face of ring 20 corresponds to the width of rings 1 and 2. The ring 20 is held against the side of the main portion 15 by the bearing 23 of the shaft 12. An oil hole 24 extends through the hub portion of the ring 20 and the bushing 19 so that the bearing of the bushing on the hub portion 18 may be lubricated.

In operation the shafts 12 and 13 being rotated, rotate the main portions 15 of the travelers and these main portions 15 acting on the peripheries of the rings 3 and 4 rotate the link member which carries around with it the socket member, the peripheries of the rings 1 and 2 of the link member resting on the peripheries of the rings 20 which with their bushings 19 rotate freely on the hub portions 18 of the main portion 15. The rings 20 being thus free to rotate, whether their peripheries become worn or not, offer no resistance to the rotation of the rings 1 and 2 of the pocket member.

While in the construction shown and described the link member is positively driven carrying with it the pocket member, I do not desire to be limited to this arrangement as, if desired, the pocket member may be positively driven and carry with it the link member.

It is also to be understood that the invention is not to be limited to its use with machines for grading string beans as the machines may be used for sizing or grading other articles.

Having thus described my invention what I claim is:—

1. A string bean grader having in combination inner and outer cylindrical members of different diameters so interlocked that rotation of one will rotate the other, positively driven means for supporting and rotating

one of the cylindrical members and means carried by the positively driven means and mounted to rotate thereon for supporting the other cylindrical member in definite relation to the rotated member.

2. A string bean grader having in combination inner and outer cylindrical members of different diameters so interlocked that rotation of one will rotate the other, a positively driven shaft and means carried by it for supporting and rotating one of the cylindrical members and means carried by the positively driven shaft and mounted to rotate thereon for supporting the other cylindrical member in definite relation to the rotated member.

3. A string bean grader having in combination inner and outer cylindrical members of different diameters so interlocked that rotation of one will rotate the other, a traveler and means for rotating it for positively rotating one of the cylindrical members and means carried by the traveler mounted to rotate thereon for supporting the other cylindrical member in definite relation to the rotated member.

4. A string bean grader having in combination inner and outer cylindrical members of different diameters so interlocked that rotation of one will rotate the other, a traveler and means for rotating it for positively rotating one of the cylindrical members and means carried by the traveler for supporting the other cylindrical member in definite relation to the rotated member, said traveler comprising a positively driven portion for driving contact with one of the cylindrical members and a ring for contact with the other cylindrical member so mounted on the positively driven portion to rotate freely thereon.

5. A string bean grader having in combination inner and outer cylindrical members of different diameters so interlocked that rotation of one will rotate the other, a traveler and means for rotating it for positively rotating one of the cylindrical members and means carried by the traveler for supporting the other cylindrical member in definite relation to the rotated member, said traveler comprising a main portion secured on a driving shaft having its periphery adapted for contact with the ring of one of the cylindrical members and having a hub portion supporting and serving as a bearing for a ring, and a ring mounted to rotate on the hub portion having its outer periphery adapted for contact with the ring of the outer cylindrical member.

6. In a string bean grader in which are used inner and outer cylindrical members of different diameters so interlocked that rotation of one will rotate the other, a traveler and means for rotating it for positively rotating one of the cylindrical members and means carried by the traveler for supporting the other cylindrical member in definite relation to the rotated member, said traveler comprising a main portion secured on a driving shaft having its periphery adapted for contact with the ring of one of the cylindrical members and having a hub portion supporting and serving as a bearing for a ring, and a ring mounted to rotate on the hub portion having its outer periphery adapted for contact with the ring of the other cylindrical member, the outer diameter of the main portion and the outer diameter of the ring carried on said hub portion corresponding to the diameters of the cylindrical member rings resting on them.

In testimony whereof, I hereunto affix my signature.

FRANK PITTIS RYDER.