Sept. 22, 1931. R. D. STREBY 1,823,995

AUTOMATIC FEED DEVICE

Filed Dec. 22, 1928 2 Sheets-Sheet 1

Fig. 1.

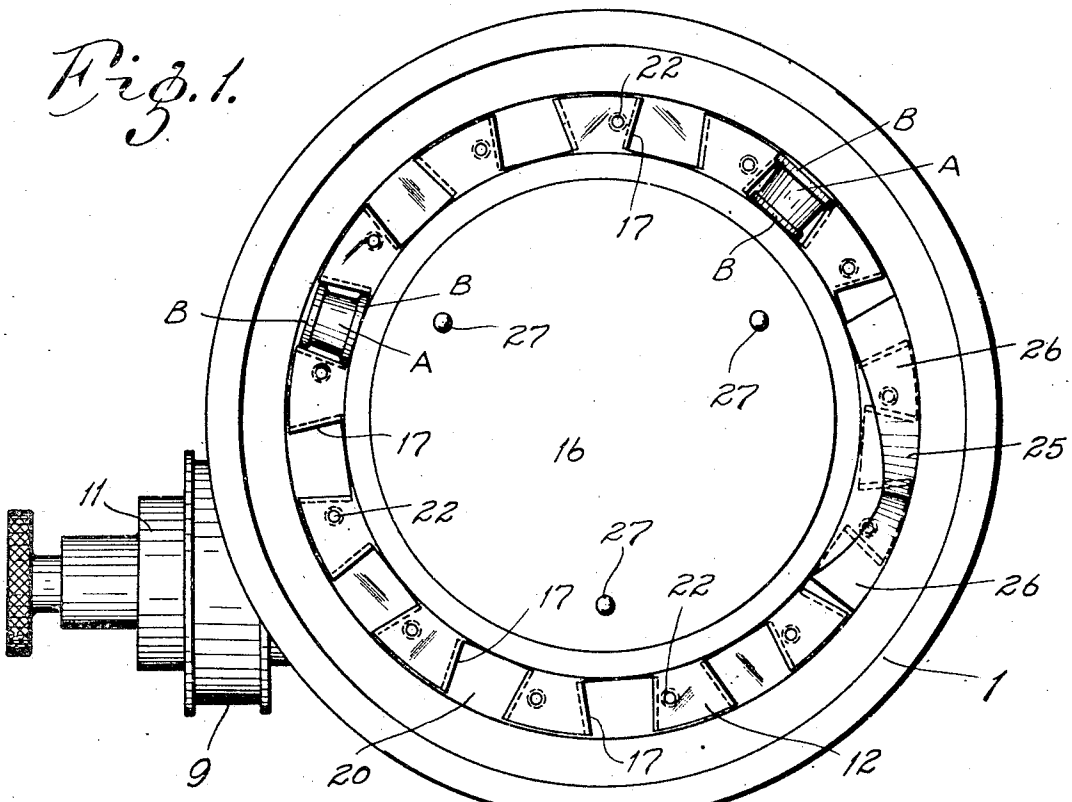
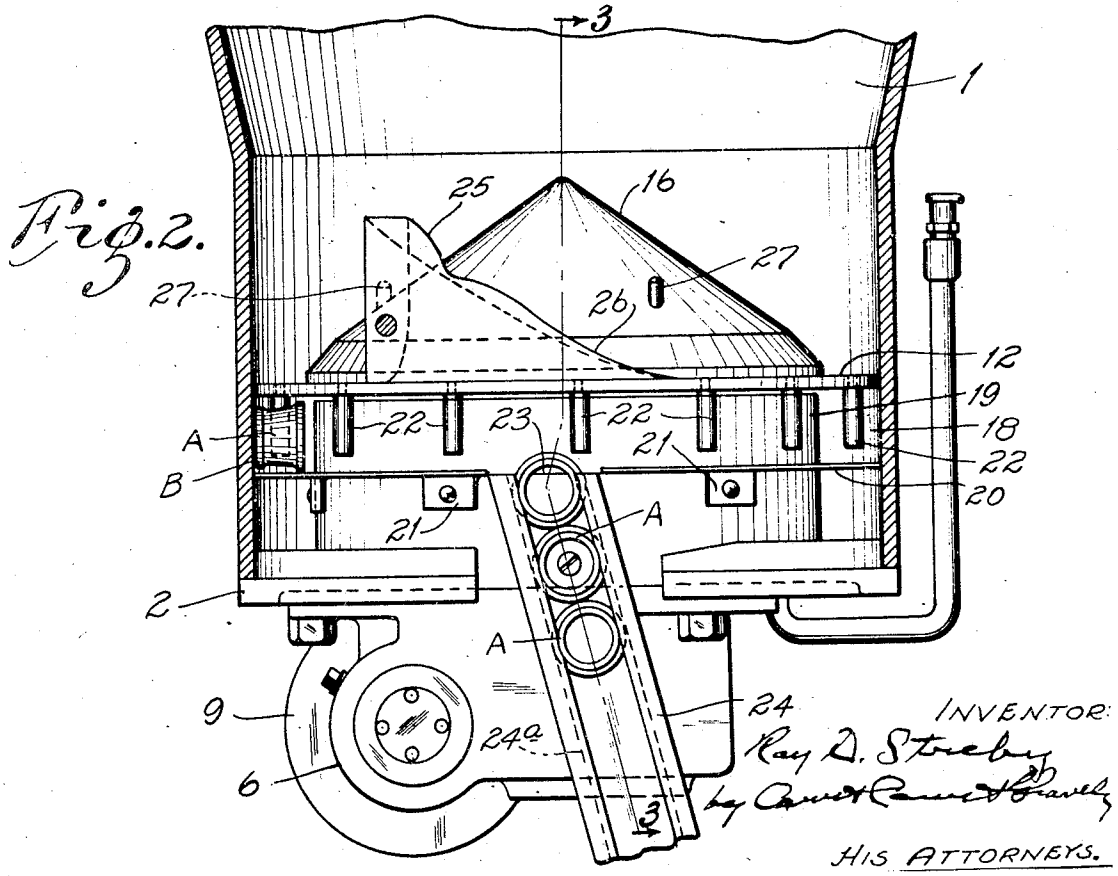


Fig. 2.



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Fig. 3.

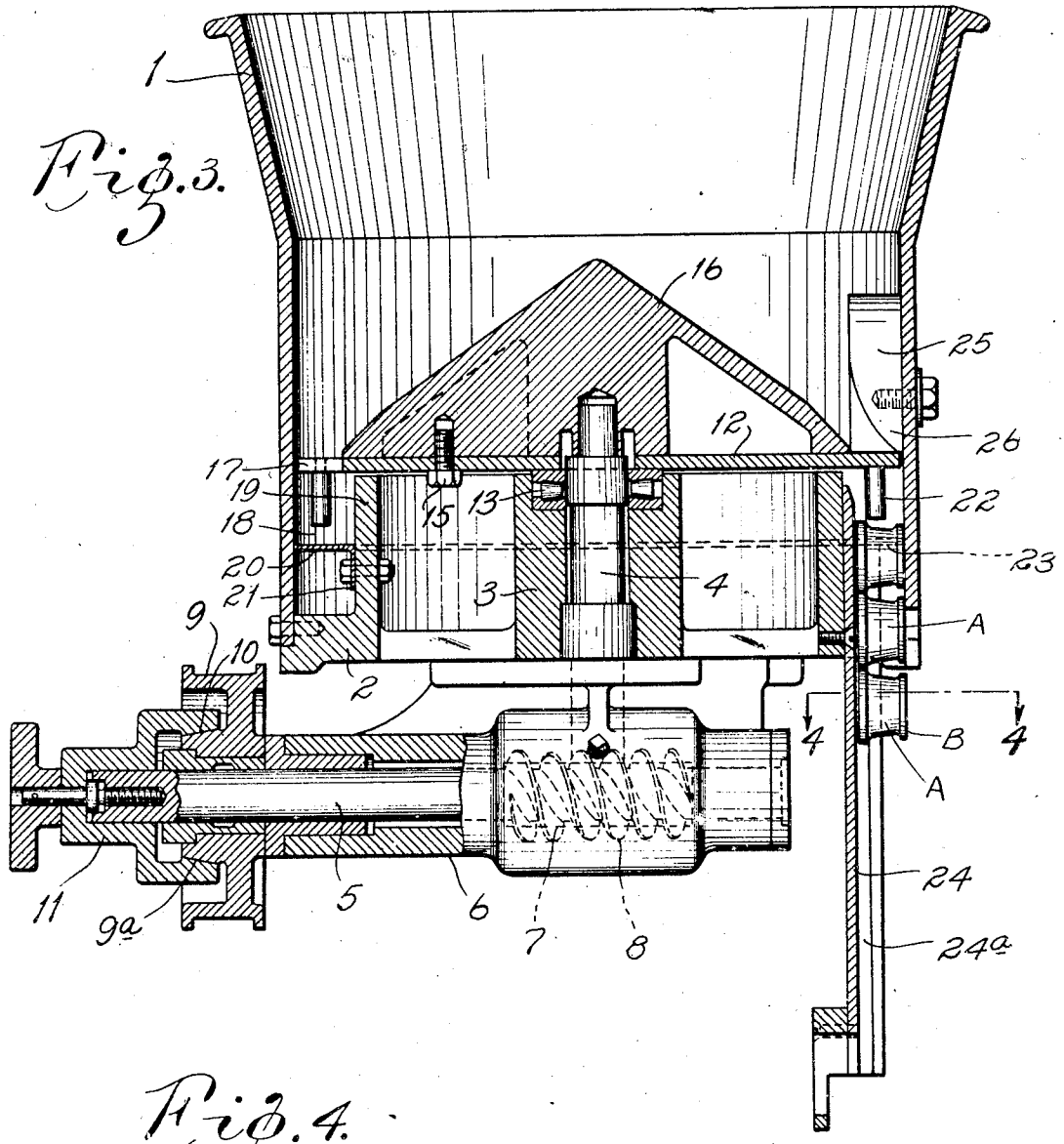
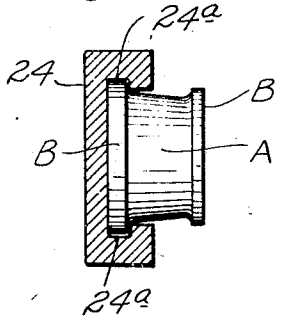


Fig. 4.



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Patented Sept. 22, 1931 1,823,995

UNITED STATES PATENT OFFICE

RAY D. STREBY, OF CANTON, OHIO, ASSIGNOR TO THE TIMKEN ROLLER BEARING COMPANY, OF CANTON, OHIO, A CORPORATION OF OHIO

AUTOMATIC FEED DEVICE

Application filed December 22, 1928. Serial No. 327,910.

My invention relates to devices for automatically changing articles, such, for instance, as the conical raceway members of tapered roller bearings, from a promiscuous mass to a uniform position for delivery to another machine for further treatment. The invention has for its principal objects to produce an automatic positioning and feeding device that is simple, inexpensive, compact and easily operated. The invention consists in the automatic feed device and in the construction, combinations and arrangements of parts hereinafter described and claimed.

In the accompanying drawings, which form part of this specification and wherein like symbols refer to like parts wherever they occur,

Fig. 1 is a plan view of an automatic feed device embodying my invention;

Fig. 2 is a side elevation of the discharge at the side of the device, the hopper being shown in vertical section;

Fig. 3 is a vertical section on the line 3—3 in Fig. 2; and

Fig. 4 is a horizontal cross-section through the discharge chute on the line 4—4 in Fig 3.

The automatic feed device shown in the accompanying drawings is intended to receive a promiscuous mass of roller bearing cones and deliver them in a uniform position to a grinding machine (not shown). As shown in the drawings, the cones A are provided at their large and small ends with annular thrust ribs B. The automatic cone feeding device comprises a hopper 1, in which the cones A are deposited promiscuously, and a suitable base 2 for attaching the device to the grinding machine. Journaled in a central vertical bore in an upright bearing 3 at the center of the base member 2 of the hopper 1 is an upright shaft 4. The shaft 4 is driven preferably by means of a horizontal shaft 5 journaled in a housing 6 bolted to the bottom of the base member 2. The lower end of the shaft 4 extends into the housing 6 and has a worm gear 7 fixed thereto which meshes with a worm 8 on the inner end of the horizontal shaft 5. The outer end of the horizontal shaft 5 has a drive pulley 9 journaled thereon provided with conical clutch surface 9a adapted to cooperate with a similar clutch surface 10 on a clutch sleeve 11 splined on the shaft 5. By this arrangement the shaft 5 may be connected to and disconnected from the continuously rotating drive pulley 9 by sliding the clutch sleeve 11 along the shaft 5.

Fixed to the upper end of the vertical shaft 4 above the bearing 3 therefor is a horizontally disposed circular plate 12 which is rotatably supported on a tapered roller bearing 13 mounted in a recess provided therefor in the upper end of the bearing 3. Secured to the upper surface of the circular plate 12 by means of cap screws 15 is an upstanding cone 16, whose apex terminates below the upper edge of the hopper 1. The cone is disposed concentric with the circular plate or disk 12 and has a base of smaller diameter than the diameter of said plate. Located in the circular plate 12 between the base of the cone 16 and the inner wall of the hopper 1 is a series of annularly spaced openings 17, each of which is shaped to permit a cone A to pass therethrough in one position only. Located directly below the openings 17 in the rotary disk or plate 12 is an annular cone receiving recess 18, whose outer wall is formed by the wall of the hopper and whose inner wall is formed by an upstanding annular rib 19 formed integral with the base member 2 of the hopper. The bottom of the annular recess 18 is formed by means of an annular plate or trackway 20 provided at its inner margin with depending flanges 21 that are bolted or otherwise rigidly secured to the outer face of the upstanding annular rib 19 on the base member 2 of the hopper 1. The annular recess 18 is concentric with the rotary plate 12 and has sufficient width and depth to accommodate the cones deposited therein. As shown in the drawings, the shape of the openings 17 in the plate 12 is such that the cones that drop therethrough are disposed in the annular recess 18 with their axes disposed radially with respect to the center of the plate and with their small ends facing outwardly. Secured to the underside of the rotary plate 12, adjacent to the rear edge of each of the article receiving openings 17 therein, is a pin 22, which projects down-

wardly into the annular recess 18 located below said openings and serves to push or drive the cones A along the trackway 20 of said annular recess. The pins 22 also serve to hold the cones A immediately beneath the openings 17, thereby preventing other cones from dropping through said openings until the space therebeneath is empty.

The bottom or trackway 20 of the annular recess 18 is provided with a discharge opening 23, which registers with the upper end of the downwardly extending discharge chute or slideway 24. The discharge opening 23 in the trackway 20 is of the same size and shape as the openings 17 in the rotary plate 12 located thereabove; and the discharge chute has its side walls undercut to form longitudinal grooves 24*a* which cooperate with the annular ribs B at the large ends of the cones and thus serve to retain the cones in said slideway. Secured to the inner side wall of the hopper 1 above the plate 12 is an inverted V-shaped turning block 25, whose oppositely inclined faces 26 terminate at their lower ends adjacent to the upper surface of said rotary plate.

With this arrangement of turning block, cones that lodge in the openings 17 in the plate 12 in a position which will not permit them to drop through the openings are carried around in the openings until they strike the inclined face of the turning block 25; whereupon the rotating cone 16 operates to force such incorrectly positioned cones up the inclined surface of the turning block to the peak thereof where they are then turned over upon the rotating cone in position to pass through the first empty opening which they encounter. As shown in the drawings, the rotary cone may be provided with upstanding pins 27 adapted to engage the incorrectly positioned cones and force them up the inclined surface of the turning block.

The operation of the hereinbefore described automatic cone feeding device is as follows: The cones A are deposited promiscuously in the hopper and are carried around in said hopper on the rotating cone 16 and plate 12. During this movement the cones that are correctly positioned with reference to the openings 17 in the plate 12 will drop through said openings into the annular recess located therebelow and be pushed or driven by depending pins 22 on the plate 12 around the trackway 20 to the discharge opening 23 in the bottom thereof. Upon reaching said discharge opening, such cones fall through said openings into the discharge chute or slideway 24 in the desired position. In the event that spaces beneath the openings 17 are occupied by cones, and in case the discharge chute is filled with cones, the cones in the annular recess 18 will continue to roll around in said recess over the uppermost cone in the discharge chute. Cones that lodge in the openings 17 but are not in a position to drop therethrough are carried in said openings to the turning block 25, and, upon engagement with the inclined surface thereof, are lifted out of the openings and carried up the inclined surface of the turning block until they reach the peak thereof and are thrown inwardly onto the rotating cone. The shape of the peak of the turning block is such that it operates to deposit the cone upon the rotating cone in position which will permit it to drop through the first empty opening it encounters. The turning block is provided with two inclined surfaces so that it will operate to turn the cones regardless of the direction of rotation of the rotary cone and plate.

The hereinbefore described feeding device is designed particularly for feeding and positioning cones for tapered roller bearings; but the device can be used for feeding other articles whose end portions are shaped differently by shaping the openings 17 so that such articles will pass through said openings only when they are properly positioned with reference thereto.

What I claim is:

1. An automatic feed device comprising a receptacle for containing a promiscuous mass of articles, a movable bottom plate for said receptacle, said bottom plate being provided with a series of openings that are shaped to permit said articles to drop therethrough only in one position, a way located beneath said openings in position to receive articles which drop therethrough, said way being spaced far enough below said movable bottom plate to bring the tops of the articles deposited on said way below said movable bottom plate, a discharge chute communicating with said way, and means on the underside of said movable bottom plate for moving the articles along said way to said discharge chute.

2. An automatic feed device comprising a receptacle for containing a promiscuous mass of articles, a movable bottom plate for said receptacle, said bottom plate being provided with a series of openings that are shaped to permit said articles to drop therethrough only in one position, a way located beneath said openings in position to receive articles which drop therethrough, said way being spaced far enough below said movable bottom plate to bring the tops of the articles deposited on said way below said movable bottom plate, a discharge chute communicating with said way, and means depending from the underside of said bottom plate for moving the articles along said way to said discharge chute, said means operating to maintain the articles beneath said opening during their movement along said way.

3. An automatic feed device comprising a receptacle for containing a promiscuous mass

of articles, a movable bottom plate for said receptacle, said bottom plate being provided with a series of openings that are shaped to permit said articles to drop therethrough only in one position, a way spaced beneath said openings in position to receive articles which drop therethrough, the distance between said movable bottom plate and said way being greater than the height of the articles deposited on the latter, said way being provided with a discharge opening, and means depending from the bottom of said bottom plate in line with the openings therein for moving the articles along said way to the discharge opening therein.

4. An automatic feed device comprising a receptacle for containing a promiscuous mass of articles, a movable bottom plate for said receptacle, said bottom plate being provided with a series of openings that are shaped to permit said articles to drop therethrough only in one position, a way located beneath said openings in position to receive articles which drop therethrough, a chute leading from said way, and pins depending from said bottom plate adjacent to the openings therein for moving the articles along said way to said chute and for maintaining them beneath said openings during such movement.

5. An automatic feed device comprising a hopper for containing a promiscuous mass of articles, a rotary bottom plate for said receptacle, said bottom plate being provided with a circular series of openings that are shaped to permit articles to pass therethrough only in one position, a circular way located beneath the circular series of openings in said rotary plate in position to receive articles which drop therethrough, said way being spaced far enough below said movable bottom plate to bring the tops of the articles deposited on said way below said movable bottom plate, said circular way being provided with a discharge opening, and means projecting from said rotary bottom plate into said circular way for moving articles that are deposited on said way along said way to the discharge opening therein while maintaining such articles beneath said openings.

6. An automatic feed device comprising a hopper for containing a promiscuous mass of articles, a rotary bottom plate for said receptacle, said bottom plate being provided with a circular series of openings that are shaped to permit articles to pass therethrough only in one position, a circular way located beneath said circular series of openings in position to receive articles which drop therethrough, said way being spaced far enough below said movable bottom plate to bring the tops of the articles deposited on said way below said movable bottom plate, said circular way being provided with a discharge opening, and means depending from the underside of said rotary bottom plate adjacent to each opening therein for moving said articles along said way to the discharge opening therein.

7. An automatic feed device comprising a hopper for containing a promiscuous mass of articles, a rotary bottom plate for said receptacle, said bottom plate being provided with a circular series of openings that are shaped to permit articles to pass therethrough only in one position, a circular chamber located beneath said circular series of openings in position to receive articles which drop therethrough, said circular chamber being provided with a discharge opening, and means carried by said rotary bottom plate and extending into the chamber located therebelow for moving said articles along said chamber to the discharge opening therein.

8. An automatic feed device comprising a hopper for containing a promiscuous mass of articles, a rotary disk for the bottom of said receptacle, an upright cone mounted on said disk for rotation therewith, said cone having a base of smaller diameter than the diameter of said rotary disk, said disk being provided between the base of the cone therein and the wall of said hopper with a series of annularly spaced openings that are shaped to permit articles in said hopper to drop through said opening only in one position, said device being provided below the openings in said disk with an annular chamber adapted to receive articles which drop through said openings, said annular chamber being provided with a discharge opening, and means projecting downwardly from said rotary disk into said annular chamber for moving the articles in said annular chamber towards the discharge opening therein.

9. An automatic feed device comprising a hopper for containing a promiscuous mass of articles, a rotary disk for the bottom of said receptacle, an upright cone mounted on said disk for rotation therewith and having a base of smaller diameter than the diameter of said disk, said disk being provided between the base of the cone and the wall of the hopper with a series of annularly spaced openings that are shaped to permit the articles to drop therethrough only in one position, said device being provided below the openings in said disk with an annular chamber adapted to receive the articles which drop through said openings, said annular chamber being provided with a discharge opening, and pins depending from said rotary disk adjacent to the openings therein for moving the articles in said annular chamber towards the discharge opening therein while maintaining such articles beneath said opening during such movement.

Signed at Canton, Ohio, this 18th day of December, 1928.

RAY D. STREBY.