To all whom it may concern:

Be it known that I, Carl Walker Kendall, a citizen of the United States, residing at Edgewater Heights, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in a Feeding Device for Sealing-Disks, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to feeding devices for sealing disks and relates more particularly to devices for feeding cork or other suitable sealing disks to an assembling machine employed in making bottle caps, and particularly those bottle caps which are commonly known as the “Crown” cap. Owing to the nature of these sealing disks, which are commonly either of cork or of cork composition, difficulty has been experienced in feeding them regularly and continuously without clogging, to the assembling machine for the bottle caps. An object of my invention is to produce a machine which will feed these sealing disks continuously as fast as they are used without clogging of the disks, and to accomplish this result in a machine which is simple in construction, inexpensive of manufacture, durable, dependable, and which in operation requires very little attention. Other objects and advantages of my invention will hereinafter appear.

My invention includes features of construction and combinations of parts, as will appear from the following description.

I shall now describe the feeding device for sealing disks embodying my invention illustrated in the accompanying drawings and shall thereafter point out my invention in claims.

Figure 1 is a central vertical section of the complete machine, with parts omitted at the top and bottom thereof.

Fig. 2 is an enlarged partial vertical section on a plane indicated by the line 2—2 of Figs. 1 and 3 as viewed from the left.

Fig. 3 is a similarly enlarged horizontal section indicated by the line 3—3 of Figs. 1 and 2 as viewed from above in Fig. 1, with parts omitted.

In the feeding device for sealing disks embodying my invention illustrated in the accompanying drawings, these disks are poured loosely into a hopper shown as comprising an upper cylindrical part 1, the upper part of which is omitted from the drawings, a lower tapering or funnel-shaped part 2, and a base ring 3. The base ring 3 of the hopper is supported upon a frame 4, which in turn is supported upon the upper end of a supporting column 5, the lower part of which is omitted from the drawings. The hopper has a slightly concave substantially dish-shaped bottom 6, shown as provided with comparatively small openings 7 for the escape of dirt, broken pieces of cork, and the like. The bottom disk 6 has on its lower side a central boss 8 through which there is a tapering outlet opening 9.

The bottom disk 6 has horizontal vibratory shaking movement imparted thereto at a comparatively rapid rate but through a small amplitude. A pair of similar agitating bars 10, which have horizontal vibratory shaking movement imparted thereto transversely to their length, have their lower surfaces shaped to conform with the upper surface of the concave bottom disks 6 and are spaced above the bottom disk a distance which is greater than the thickness of a single sealing disk but which is less than the width or diameter of a sealing disk, so that the sealing disks must lie flat upon the bottom in order to be able to pass under the agitating bars 10. In the construction shown in the drawings, the agitating bars 10 are spaced above the bottom 6 a distance which at its minimum is only slightly greater than the thickness of a sealing disk. The agitating bars 10 are located adjacent to and on opposite sides of the outlet, and these bars 10 extend transversely below and are carried by an operating bar 11, which is guided in the machine frame 4 and notched into the lower edge of the lower funnel part of the disk-containing hopper.

The operating bar 11 has reciprocating vibratory longitudinal shaking movement imparted thereto at a comparatively rapid rate and through a comparatively small amplitude of movement, and such rate may be the same as the rate of vibration of the bottom 6, and the amplitude of movement of the operating bar 11 may be somewhat greater than that of the bottom disk 6. The relative vibratory shaking movement of the bottom 6 and of the agitating bars 10 should be
such that at times these parts will be moving in different directions, and in the machine illustrated in the drawings, as will presently clearly appear, the relationship of these two vibratory movements is such that the vibrating bottom 6 and the vibrating agitating bars 10 are at times moving substantially in opposite directions. The agitating bars 10 are of substantial assistance in feeding the sealing disks from the bottom 6 into the upper end of the outlet 9, as well as in assuring that these disks assume a flat or horizontal position.

The above mentioned vibratory shaking movement is imparted to the bottom 6 by means of an operating link 12 to the inner end of which the boss 8 is shown as fixed by a set screw 13. This operating link at its inner end is provided on its lower side with a cylindrical tubular extension 14 which is guided rectilinearly between a pair of standing guide lugs 15 formed on the flange of a flanged bearing sleeve 16 rigidly supported within and upon a central supporting boss 16 formed on the frame 4. The lower end of the extension 14 rests upon the upper surface of the bearing sleeve 16 for thereby supporting the hopper bottom 6. The guide sleeve or bearing sleeve 16 is made as a separate piece from the boss 16 of the frame 4 in order to provide for easy renewal in case of wear. The outer end of the operating link 12 is provided with a detachable eccentric strap 17, and this link 12 is operated by an eccentric 18 carried by the upper end of an operating shaft 19 journaled in a bearing on the frame 4, and shown as provided at its lower end with a driving pulley 20.

It is to be noted that two movements are imparted to the dished hopper bottom 6 by the operating link 12. One of these is a straight line bodily reciprocating movement, in which the link extension 14, carrying with it the central boss 8 of the bottom 6, is guided between the flat parallel guiding surfaces of the guide lugs 15. The other movement of the bottom 6 is a rocking or oscillating movement on a central vertical axis, due to the angular movement of the link 12 as its outer end is moved in a circle by the eccentric 18, and by reason of the fact that the boss 8 is fixed to the inner end of the link 12 by the set screw 13. This oscillating movement takes place about the center line of the base 8 and outlet 9 as an axis.

For imparting vibratory shaking movement to the agitating bars 10 in a direction transversely to their length, the operating bar 11 is reciprocated by means of a crank disk 21, carried by the outer end of the eccentric 18, a crank-pin 22, a connecting link 23, and a pivot stud 24 carried by the operating bar 11.

It is to be noted that the eccentric 18 and crank-pin 22 are arranged diametrically opposite to each other, as appears in Fig. 1, so that the reciprocating movements of the bottom disks 6 at the boss 8 and of the agitating bars 10 will be in opposite directions. In actual practice in machines as constructed, the eccentricity of the eccentric 18 has been made one-eighth of an inch, and the eccentricity of the crank 22 has been made one-fourth of an inch, or twice that of the eccentric 18. Therefore, it will be evident that the amplitude of reciprocating movement of the bottom 6 at its center or at the boss 8 will be about one-fourth of an inch, while the reciprocating movement, transversely thereof, of the agitating bars 10 will be in a path one-half an inch long, so that in the construction shown in the drawing the relative movement between the reciprocating agitating bars 10 and the moving bottom 6 at its center will be about three-fourths of an inch. In practice the operating shaft 19 has been driven at a rate of rotation of two thousand rotations per minute. The feeding of the sealing disks from the hopper flatwise into the outlet 9 has been very effective.

A stationary upright delivery tube 25, the upper end of which is spaced downward from the outlet 9 of the bottom 6, and the upper part only of which is shown in the drawings, is supported in any convenient way, and is adapted to contain a descending column of sealing disks stacked flatwise one upon the other. These sealing disks are taken one by one from the lower end of this tube 25 as needed, by means well understood in the art and forming no part of the present invention. A ferrule 26 fixed upon and projecting beyond the upper end of the delivery tube 25, at the inside of its upper end forms a fulcrum socket 27, and a similar socket 28 is formed in the lower end of the boss 8 below the outlet 9 of the bottom 6. A disk-conveying tube 29 is provided with a rounded bead 30 by means of which the lower end of this tube is stationarily fulcrumed within the socket 27 at the upper end of the delivery tube 25, and at its upper end this conveying tube 29 has a similar rounded bead 31 which is snugly but moveably received in the socket 28 of the boss 8, as shown in Figs. 1 and 2, so that while the lower end of this disk-conveying tube 29 is stationarily fulcrumed, the upper end thereof partakes of the to and fro vibratory shaking movement imparted by the operating link 12 to the boss 8 of the hopper bottom 6, so that this tube 29 will be rocked back and forth with its axis in a vertical plane. In Fig. 3 this disk-conveying tube 29 is omitted, for clearness of illustration.

A finger slot 32 is provided in the stationary delivery tube 25 through which a finger may be inserted for temporarily supporting
the descending sealing disks in initially filling or loading the delivery tube 25 and its upward extension formed by the movable disk-conveying tube 29. In thus filling the delivery tube 25 and the disk-conveying tube 29, any disks which may drop into the upper end of the tube 29 in an edgewise position will be shaken to the flat or horizontal position by the shaking movement imparted to the upper end of the tube 29. After the delivery tube 25, the conveying tube 29 and the outlet 9 have been filled, all of the sealing disks will enter the outlet 9 in a flat or horizontal position and will descend in this position through the tubes 29 and 25, these disks resting flat upon one another, the column of disks being supported at the lower end of the delivery tube 25 from which the disks are used, as hereinbefore mentioned.

It is obvious that various modifications may be made in the construction shown in the drawings, and above particularly described within the principle and scope of my invention.

I claim:

1. A feeding device for sealing disks, such device having, in combination, a hopper having a bottom provided with an outlet, and an elongated agitating member movably transversely of its length within said hopper adjacent to said outlet and spaced from said bottom a distance greater than the thickness and less than the width of a sealing disk, and means for moving said elongated agitating member transversely to its length.

2. A feeding device for sealing disks, such device having, in combination, a hopper having a substantially horizontally arranged dished bottom provided substantially centrally with an outlet opening, and agitating bars adjacent to opposite sides of said outlet opening and having their lower sides conform to the shape of said dished bottom and spaced above said bottom a distance greater than the thickness and less than the width of a sealing disk, and means for vibrating said agitating bars transversely to their length.

3. The invention claimed in claim 2 in combination with a disk-conveying tube movably connected at its upper end to said outlet to be moved thereby therewith and stationarily fulcrumed at its lower end.

4. The invention claimed in claim 3 in combination with a delivery tube which forms a downward continuation from the lower end of said disk-conveying tube.

5. A feeding device for sealing disks, such device having, in combination, a hopper having a bottom provided with an outlet for the sealing disks, and means for concurrently moving said bottom back and forth bodily in reverse directions and for oscillating said bottom back and forth rotatively about said outlet as an axis.

6. The invention claimed in claim 5 in combination with a disk-conveying tube movably connected at its upper end to said outlet to be moved back and forth thereby therewith and fulcrumed at its lower end for rocking movement.

7. The invention claimed in claim 6 in combination with a delivery tube which forms a downward continuation from the lower end of said disk-conveying tube.

8. The invention claimed in claim 5 in combination with an agitator in said hopper in cooperative relation with said bottom and its outlet, and operating means for moving said agitator in such manner that said agitator and said bottom at times will move in different directions.

9. A feeding device for sealing disks, such device having, in combination, a hopper having a bottom provided with an outlet, an agitator in said hopper in cooperative relation with said bottom and its outlet, means for imparting horizontal movement to said agitator, means for imparting substantially horizontal bodily reciprocating movement to said bottom at its outlet and for concurrently oscillating said bottom rotatively about its outlet as an axis, a disk-conveying tube movably connected at its upper end to said outlet to be moved thereby therewith and fulcrumed at its lower end for rocking movement, and a delivery tube forming a downward continuation from the lower end of said disk-conveying tube.

In testimony whereof, I have affixed my signature to this specification.

CARL WALKER KENDALL.