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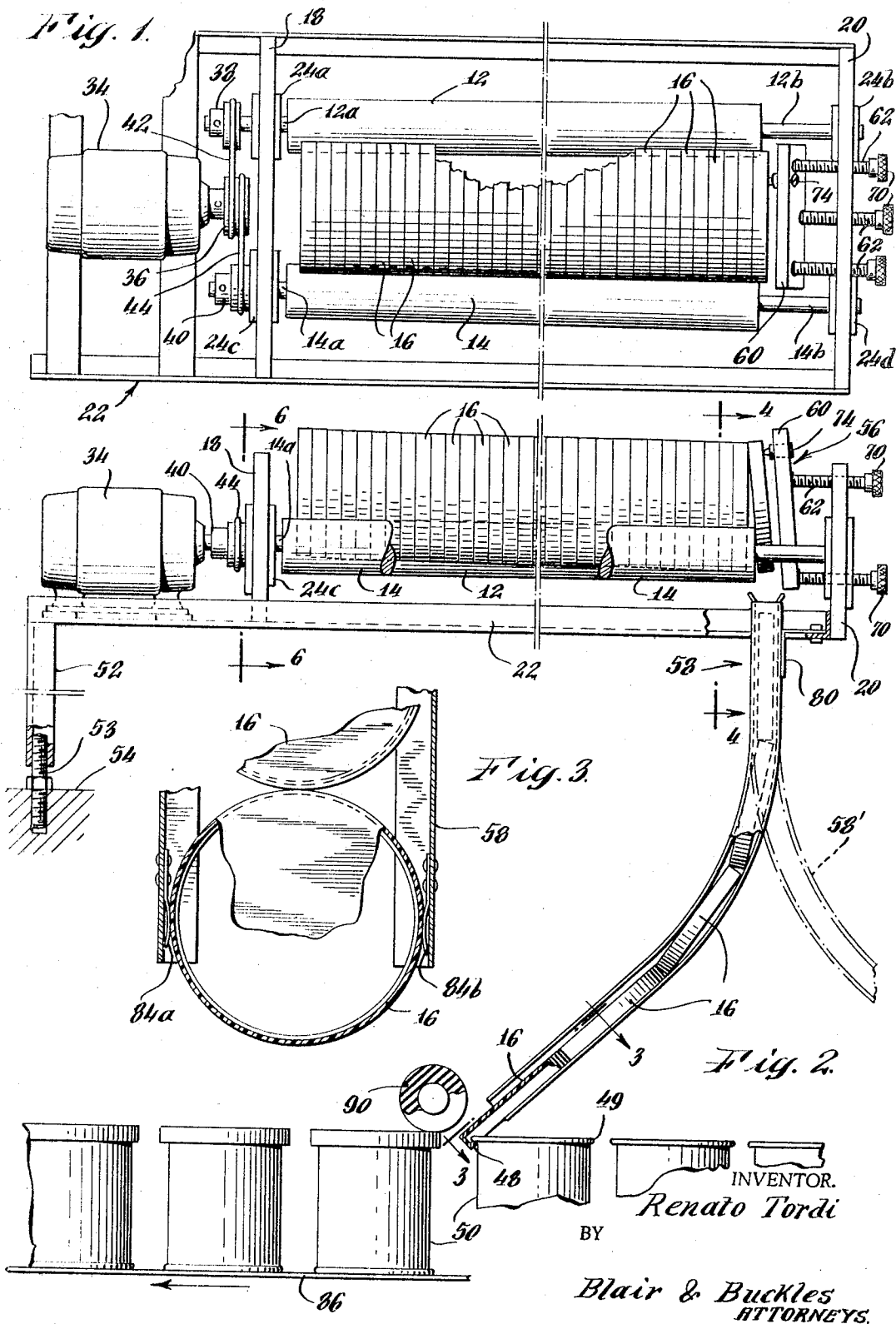
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CLOSURE DISPENSER

Filed Dec. 2, 1964

2 Sheets-Sheet 1



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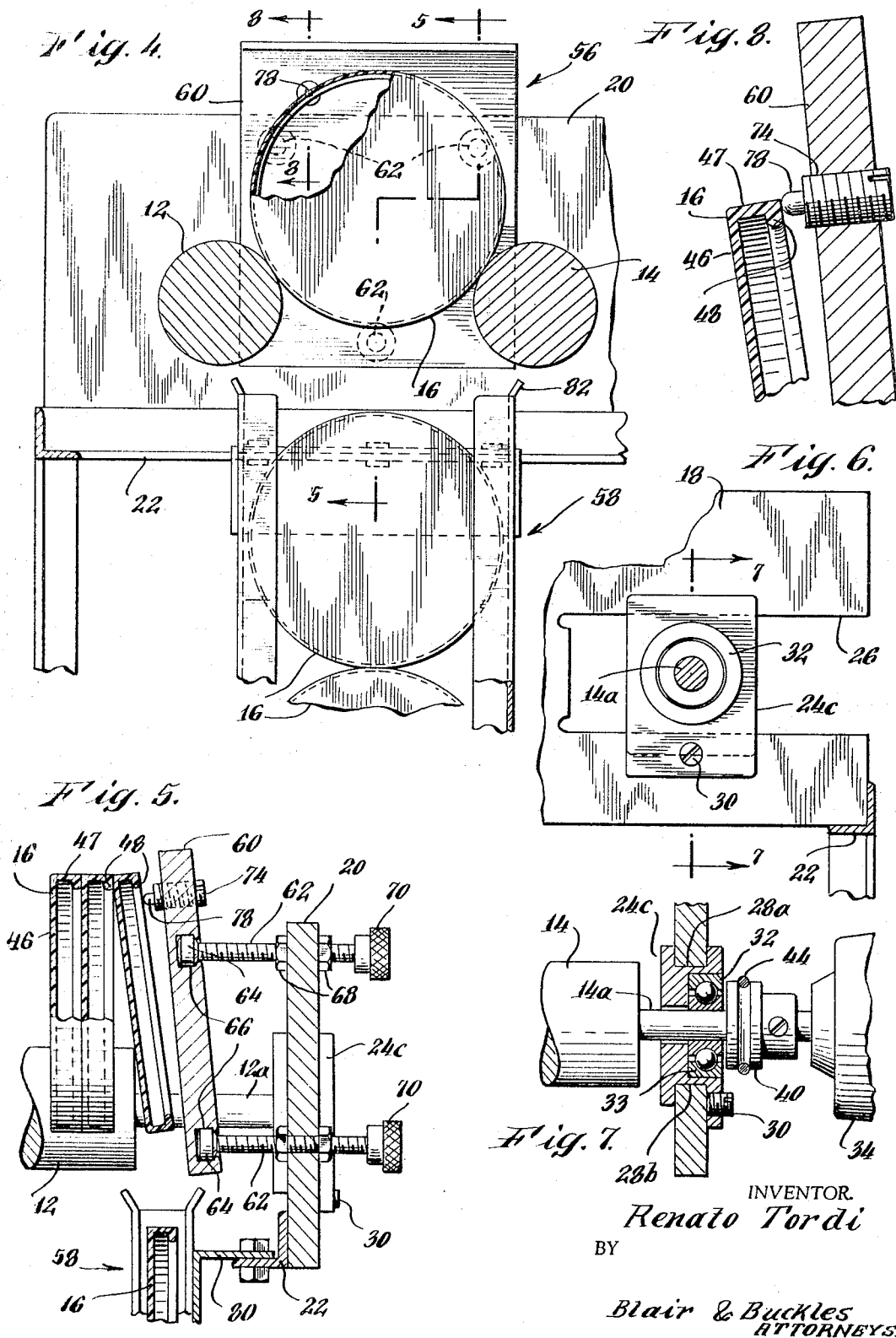
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CLOSURE DISPENSER

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6 Claims. (Cl. 53—316)

The present invention relates broadly to dispensing apparatus, and more particularly to apparatus for dispensing disk-shaped objects in ordered fashion. Specifically, the invention is directed to a dispensing apparatus for feeding container closure lids serially and on demand into position for ready application to a succession of containers.

Although the well-known tin can container is used to package a vast variety of commodities, it has a principal drawback in that, once the container is opened, it cannot be satisfactorily reclosed. In so many instances, the can could serve to store for future consumption the leftover portion of the commodity originally packaged therein. One end section of the can is typically cut away with a can opener to provide access to the commodity sealed therein. This severed end section then becomes useless as a practical can closure and is typically discarded. A frequent practice of the consumer is to only partially sever the can end section leaving a metal hinge portion joining the end section to the body of the can. The partially severed end section is then swung about this hinge portion to provide access to the contents of the can and then swung back again to partially close off the end of the can. This technique is far from satisfactory since the end section in its partially severed condition cannot completely close off the end of the can thereby permitting the contents to dry out or otherwise deteriorate.

Recognizing this drawback of the typical tin can container, the coffee industry, for one, has for many years used a specially constructed can container. This type of can is provided with a tear strip situated completely about the cylindrical portion of the can and spaced from the end section. The tear strip is manipulated in a well-known manner to open the can. Severance of the tear strip leaves a closure lid consisting of the can end section and a conjoined rim. This lid simply telescopes freely over the can body in opening and closing the can.

A reclosable tin can container of this type is obviously considerably more expensive than the typical tin can. Moreover, manipulation of the tear strip can be a tedious and rather precarious operation. A further disadvantage is that the closure is not particularly air tight and thus storage of the contents for a considerable length of time after the can has been originally opened is not advisable. Also, the rim of the closure lid is quite sharp so as to require careful handling by the consumer.

A packaging innovation which has recently appeared on the scene promises to overcome all of the above noted drawbacks of the coffee can type of metal container. The commodity, such as coffee, is sealed in the conventional tin can container designed to be opened by a can opener. However, included with the can is an auxiliary closure lid formed of a suitable plastic material. When the commodity is purchased by the consumer, this auxiliary closure lid comes fitted over one end of the can but, at this point, is serving no closure function. The consumer severs one end section of the can with a can opener to gain access to the contents. The severed end section is discarded and the plastic lid is then used to reclose and substantially seal the container. This auxiliary closure lid, being formed of pliable plastic material can be readily removed and reapplied to the can, thus permitting the consumer to store the commodity in its original tin can container.

Since the introduction of this plastic closure lid for tin

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cans, various attempts have been made to develop apparatus for applying them to the cans on a substantially automated assembly line basis. The results of these attempts have been expensive, complex assemblies requiring frequent attention and maintenance. The principal problem has been to devise means for sustaining a large number of the closure lids in readiness while feeding them one by one into position for application to the cans passing by on a conveyor or the like.

It is accordingly an object of the present invention to provide apparatus for dispensing one by one disk-shaped objects.

A further object is to provide apparatus of the above character for feeding closure lids serially into position for ready application to a succession of containers and for successively applying the closure lids to the containers.

An additional object is to provide apparatus of the above character capable of maintaining a large number of closure lids in readiness and feeding the closure lids serially into position for application to a moving succession of containers.

A still further object is to provide apparatus of the above character which is of simple and inexpensive construction, provides rapid and trouble-free operation, and which may be attended by relatively unskilled personnel.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the features of construction, combination of elements, and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the invention will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

FIGURE 1 is a top plan view, partially broken away, of a closure lid feeding apparatus constructed according to my invention;

FIGURE 2 is a side elevational view, partially broken away, showing the essential features of my invention for feeding closure lids one by one into position for application to a succession of containers;

FIGURE 3 is a sectional view taken along line 3—3 of FIGURE 2;

FIGURE 4 is an enlarged sectional view taken along line 4—4 of FIGURE 2;

FIGURE 5 is a sectional view taken along line 5—5 of FIGURE 4;

FIGURE 6 is an enlarged sectional view taken along line 6—6 of FIGURE 2;

FIGURE 7 is a sectional view taken along line 7—7 of FIGURE 6; and

FIGURE 8 is an enlarged sectional view taken along line 8—8 of FIGURE 4.

Similar reference characters refer to similar parts throughout the several views of the drawings.

Broadly stated, the closure lid feeding apparatus of my invention includes a pair of substantially parallel, elongated sustaining rollers for supporting and handling a large number of closure lids. The sustaining rollers are rapidly rotated in the same rotational direction so as to impart spinning motion to the plurality of closure lids. The resulting gyroscopic forces associated with the spinning closure lids serve to sustain them substantially upright and supported edgewise on the rotating sustaining rollers. The sustaining rollers are spatially oriented to establish effective downward gradient so that the spinning closure lids migrate en masse along the sustaining rollers under gravity. A guide situated at the end of the sustaining rollers toward which the closure lids are migrating func-

tions to successively drop the leading closure lid from the sustaining rollers and into a chute. The closure lids pass serially downwardly through the chute. Each closure lid on reaching the lower end of the chute is releasably detained in an intercept positional relationship with an upright container passing by on a conveyer belt or the like. The container moves into intercepting engagement with the closure lid detained at the lower end of the chute. Continued movement of the container withdraws the closure lid from the end of the chute. A roller positioned beyond the end of the chute and adjacent the moving container rolls down over the top surface of the closure lid to securely apply it to the container. As each closure lid is withdrawn by a container passing by, the next closure lid in the chute moves downwardly into the detained position at the end of the chute for intercepting engagement with the next container passing by on the conveyer belt. Space at the top of the chute is then provided, as the closure lids advance downwardly through the chute, to receive the next closure lid dropped from the sustaining rollers.

Referring now to FIGURES 1 and 2 in the drawings, a closure lid feeding apparatus constructed according to my invention includes a pair of spaced, substantially parallel sustaining rollers 12 and 14 serving to support, in edgewise fashion, a plurality of closure lids 16. The sustaining rollers 12 and 14 are mounted for rotation in spaced end plates 18 and 20 affixed to a support frame, generally indicated at 22. Sustaining roller 12 is provided with coaxially extending stub shafts 12a and 12b, which are journaled in bearing blocks 24a and 24b adjustably mounted by the end plates 18 and 20, respectively. Similarly, sustaining roller 14 is provided with coaxially extending stub shafts 14a and 14b, which are journaled in bearing blocks 24c and 24d also adjustably mounted by end plates 18 and 20, respectively.

The mounting for stub shaft 14a of sustaining roller 14 is seen more clearly in FIGURES 6 and 7. It will be understood that the mountings for stub shaft 14b of sustaining roller 14 and stub shafts 12a and 12b of sustaining roller 12 are constructed in a similar manner. End plate 18 is provided with a horizontally extending slot 26. The bearing block 24c is provided with upper and lower grooves 28a and 28b to engage the end plate 18 while sliding in the slot 26. The bearing block 24c is slidably positioned, as desired, in the slot 26 and locked in place by a set screw 30. Thus, adjustments in the relative spacing of the sustaining rollers 12 and 14 can be readily made for differing sizes of closure lids 16. Self aligning bearings 32, affixed in a groove 33 formed in the bearing block 24c, journal the stub shaft 14a of sustaining roller 14 for rotation.

Returning to FIGURES 1 and 2, an electric motor 34, mounted on the support frame 22, drives a pulley 36 keyed to the motor output shaft. A pulley 38 is keyed to the stub shaft 12a for sustaining roller 12 while a pulley 40 is keyed to the stub shaft 14a for the sustaining roller 14. An O-ring 42 transmits the drive of pulley 36 to pulley 38 while an O-ring 44 transmits the drive of pulley 36 to pulley 40 so as to rotate sustaining rollers 12 and 14 in the same rotational direction.

The closure lids 16, seen most clearly in FIGURE 5, are integrally formed from a suitable plastic material with a substantially flat top 46 and an annular rim 47 arranged substantially at right angles to the top. A continuous bead 48 extending about the inside edge of the rim 47 interlocks with a bead 49 about the ends of containers 50 (FIGURE 2) when the closure lids 16 are applied over the ends of the containers in a manner to be described.

Returning to FIGURES 1 and 2, the closure lids 16 are arranged on the sustaining rollers 12 and 14 by an attendant so that they all face in the same direction. In the embodiment specifically illustrated in FIGURE 2, the closure lids 16 are arranged such that their rims 47 extend to the right. The sustaining rollers 12 and 14 are

rotated by the motor 34 so as to set the plurality of closure lids 16 to spinning. The direction of spin of the closure lids is immaterial. The closure lids 16, due to the gyroscopic forces associated with their spinning motion, are sustained in a substantially edgewise fashion supported by the sustaining rollers 12 and 14. Referring to FIGURE 4, the sustaining rollers 12 and 14 are typically physically arranged such that they contact the closure lids 16 at points 120° apart along the rims 47. However, this is not a critical spacing arrangement. It will be understood that the rotating speed of the sustaining rollers must be adequate to sustain the closure lids in this edgewise stance.

In order to achieve the requisite mass migration of the closure lids 16 to the right as seen in FIGURES 1 and 2, the sustaining rollers 12 and 14 are spaced slightly wider apart at the right end by adjustably positioning the bearing blocks 24a-24c in the slots 26 formed in the end plates 18 and 20. Alternatively, the support frame may be slightly tilted by a simple adjustment of the effective height of the support frame legs, one being shown at 52 in FIGURE 2. Specifically, a stud bolt 53 threaded into each leg 52 of the support frame 22 and also into a base 54 may be turned to produce the desired tilt of the support frame 22 so as to make the right end slightly lower than the left end. It will be understood that the migration of the closure lid 16 can be obtained by either or a combination of both of the above adjustments in order to produce the desired downward gradient of the migrating path for the closure lids.

As the closure lids 16 reach the right end of the sustaining rollers 12 and 14 as seen in FIGURES 1 and 2, they are dropped, one by one, from the rollers downwardly into a chute, generally indicated at 58, by a guide generally indicated at 56. As best seen in FIGURES 4 and 5, the guide 56 includes a plate 60 disposed between and beyond the ends of the sustaining rollers 12 and 14. The plate 60 is adjustably mounted in cantilever fashion at the ends of shafts 62, typically three in number as seen in FIGURE 1, which are threaded through the end plate 20. The end of each shaft 62 is fitted with a toggle pad 64 received in sockets 66 formed in the plate 60. The plate 60 is tilted typically three to five degrees from the vertical by turning knurled knobs 70 formed on the other ends of the shafts 62. A pair of lock nuts 68 threaded on each of the shafts 62 against front and back of the end plate 20 serve to prevent rotation of the shafts once the proper orientation of the plate 60 is achieved. As best seen in FIGURE 8, a plug 74 threaded through the plate 60 carries a projection 78 so positioned to contact the leading closure lid 16 shortly before it reaches the ends of the sustaining rollers 12 and 14. The rounded end portion of the projection 78 contacts the closure lids 16 along their leading outer edges at a point approximately 30° from the vertical as seen in FIGURE 4.

Returning to FIGURE 5, as the leading closure lid 16 comes into contact with the projection 78, the spinning motion of the closure lids 16 is somewhat retarded. More significantly, however, it is found that the leading closure lid 16 is separated from the migrating mass, as shown in FIGURE 5, and dropped into the chute 58. Specifically, when the leading closure lid 16 contacts the projection 78, the direction of the axis of the spinning closure lid is altered thereby giving rise to certain gyroscopic forces tending to swing the bottom of this closure lid off of the ends of the sustaining rollers 12 and 14. This closure lid is then free to drop between the stub shafts 126 and 146 into the chute 58.

Returning to FIGURE 2, the chute 58 is affixed to the support frame 22 by a bracket indicated at 80. The upper end of the chute 58 is provided with a flared mouth 82 to guide the closure lids 16 one by one into the chute. Referring to FIGURE 3, a pair of detent springs 84a and 84b adjustably mounted along each side of the chute 58 adjacent its bottom end serve to releasably detain each closure lid 16 in a position to be intercepted by the containers 50 moving from right to left in FIGURE 2 on a conveyor

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belt indicated at 86. As each container 50 moves under the end of the chute 58, the leading portion of the bead 49 on the container 50 interlocks with the lower portion of the bead 48 formed on the inside of the rim 47. As the container 50 continues by, the closure lid 16 is withdrawn from the bottom end of the chute. A pressure roller 90 positioned just beyond the end of the chute 58 rolls down on the top 46 of the closure lid 16 forcing the closure lid over the top of the container such that the bead 48 interlocks with the bead 49 around the full circumference of the container.

As each closure lid 16 is withdrawn from the bottom end of the chute 58 by a passing container 50, the next closure lid in the chute falls to the end of the chute where it is detained by the detent springs 84a, 84b in intercepting positional relationship with the next container to come along on the conveyer belt.

In practice, the chute 58 is generally completely filled with closure lids 16 as shown in FIGURE 2. Thus, as each closure lid is withdrawn from the bottom of the chute, a vacancy is created at the top of the chute to accept another closure lid. When the chute 58 is full of closure lids, the closure lids on the sustaining rollers 12 and 14 will gang up against the guide 58. In fact, one closure lid, having dropped from the sustaining rollers, will be poised edgewise on the closure lid in the top of the chute 58 waiting to enter the chute when a closure lid is withdrawn from the bottom of the chute.

In order to maintain the apparatus 10 supplied with closure lids, an attendant periodically stacks additional closure lids edgewise on the sustaining rollers behind the migrating closure lids already supported on the sustaining rollers. By virtue of this edgewise stacking, a large number of closure lids are maintained in readiness to be delivered one by one into position for application to the containers 50. It will be understood that the closure lids may be stacked edgewise on the sustaining rollers so as to face in the opposite direction from that shown in FIGURE 5. In this situation, the chute 58 must be arranged to curve in the opposite direction such as shown at 58' in FIGURE 2 in order that the closure lids will be positioned with their rims 47 extending downward in intercepting positional relationship with the containers 50. In some cases, the rims 47 of the closure lids 16 may not be formed at right angles to the tops 46. Consequently, the closure lids, when stacked edgewise on their rims, will all lean in one direction or the other. The positional relationship of the sustaining rollers 12 and 14, and the tilt of the frame 22 are appropriately adjusted to account for the lean of the closure lids so as to provide the desired mass migration of the closure lids to the end of the sustaining rollers where the guide 56 is positioned. Simple positional adjustments of the sustaining rollers and the guide adapt the apparatus 10 to various sized closure lids 16. Different chutes 58 of dimensions conforming to the size of the closure lids are readily interchanged. The apparatus 10 may be operated intermittently or continuously without jamming of the feeding of the closure lids 16.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above construction without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A dispensing apparatus for feeding closure lids serially into position for application to a succession of containers, said apparatus including, in combination:

A. a pair of elongated rollers positioned side by side, said rollers

(1) rotating so as to impart spinning motion to a

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plurality of said closure lids supported edgewise thereon,

(a) said plurality of closure lids being sustained edgewise by their spinning motion, and

(2) spatially oriented so as to produce mass migration of said plurality of closure lids in one direction;

B. a guide station between said rollers at a point substantially beyond the ends of said rollers, said guide including

(1) a projection situated to successively contact the outer marginal portion of each leading closure lid on said rollers at a point above the center and angularly spaced from the vertical so to separate each leading closure lid from the plurality of closure lids supported on said rollers, and

(2) at the same time causing the lower portion of each leading closure lid to swing beyond the ends of said rollers thereby permitting each leading closure lid to fall from said rollers; and

C. delivery means for delivering said closure lids falling one by one from said rollers into position for successive application to said succession of containers.

2. The apparatus defined in claim 1 wherein said succession of containers is moving and

C. (1) said delivery means is a chute, said chute having

(a) an upper end positioned beneath said guide for receiving one by one the closure lids falling from said rollers and

(b) a lower end positioned adjacent said moving succession of containers.

3. The apparatus defined in claim 2; and

D. means mounted adjacent the lower end of said chute for releasably detaining each said closure lid in intercepting positional relationship to one of said containers.

4. The apparatus defined in claim 3; and

E. a pressure roller disposed adjacent the bottom end of said chute for applying each said closure lid to one of said containers.

5. An apparatus for feeding closure lids serially into position for application to a moving succession of containers, said apparatus comprising, in combination:

A. a support frame including

(1) first and second spaced end plates;

B. a motor mounted on said frame;

C. a pair of elongated rollers, each said roller having (1) coaxial stub shafts extending beyond the ends thereof,

(a) said stub shafts being adjustably, rotatively mounted by and between said end plates such that said rollers are positioned in spaced, side by side relationship,

(2) being rotated by said motor so as to impart spinning motion to a plurality of said closure lids supported edgewise on said rollers,

(a) said plurality of closure lids being sustained edgewise by their spinning motion, and

(3) spatially oriented so as to produce mass migration of said plurality of closure lids toward said first end plate;

D. a guide adjustably mounted by said first end plate so as to be stationed between and substantially beyond the ends of said rollers, said guide including

(1) a projection so positioned to successively contact the marginal portion of each said closure lid supported by said sustaining rollers at a point above the center of said closure lids and angularly spaced from the vertical, said projection

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- (a) serving to successively separate the contacted closure lid from the plurality of closure lids supported on said rollers by causing the bottom portion of said contacted closure lid to swing beyond the ends of said rollers thereby permitting it to fall downward; 5
- D. a chute having
- (1) an open end situated immediately below said guide so as to receive said closure lids, one by one, falling from said rollers, and 10
- (2) a lower end positioned adjacent said moving succession of containers;
- E. detent means mounted adjacent the bottom end of said chute for releasably detaining each said closure lid falling through said chute in intercepting positional relationship with one of said containers such that each detained closure lid is engaged and withdrawn from the bottom end of said chute by a moving container; and 15 20
- F. a pressure roller stationed beyond the bottom end of said chute and operating to apply an engaged closure lid securely over the top of each container.
6. A dispensing apparatus for feeding disk-shaped objects serially to an output point, said apparatus including, in combination: 25
- A. a pair of elongated rollers positioned side by side, said rollers

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- (1) rotating so as to impart spinning motion to a plurality of said disk-shaped objects supported edgewise on said rollers,
- (a) said plurality of objects being sustained on their edges by their spinning motion,
- (2) oriented so as to produce mass migration of said plurality of objects in one direction;
- B. disengaging means positioned adjacent the ends of said rollers to which said plurality of objects are migrating, said means
- (1) carrying a projection so positioned to successively contact the marginal portion of each leading object above its center and to swing the bottom portion of each leading object off the ends of said rollers, and
- C. delivery means for accepting said objects as successively removed one by one from said rollers and serially delivering them to said output point.

References Cited

UNITED STATES PATENTS

2,343,042	2/1944	Barry	-----	209—107
3,137,982	6/1964	Decker et al.	-----	53—316

GRANVILLE Y. CUSTER, JR., *Primary Examiner.*