May 16, 1950 E. A. BRAATEN 2,507,757

COUNTING MACHINE FOR TABLETS WITH INTERMITTENTLY ROTATABLE COUNTING MEMBER AND ADJUSTABLE MEANS FOR VARYING THE DEGREE OF MOVEMENT OF THE COUNTING MEMBER

Filed Dec. 18, 1944 4 Sheets-Sheet 1

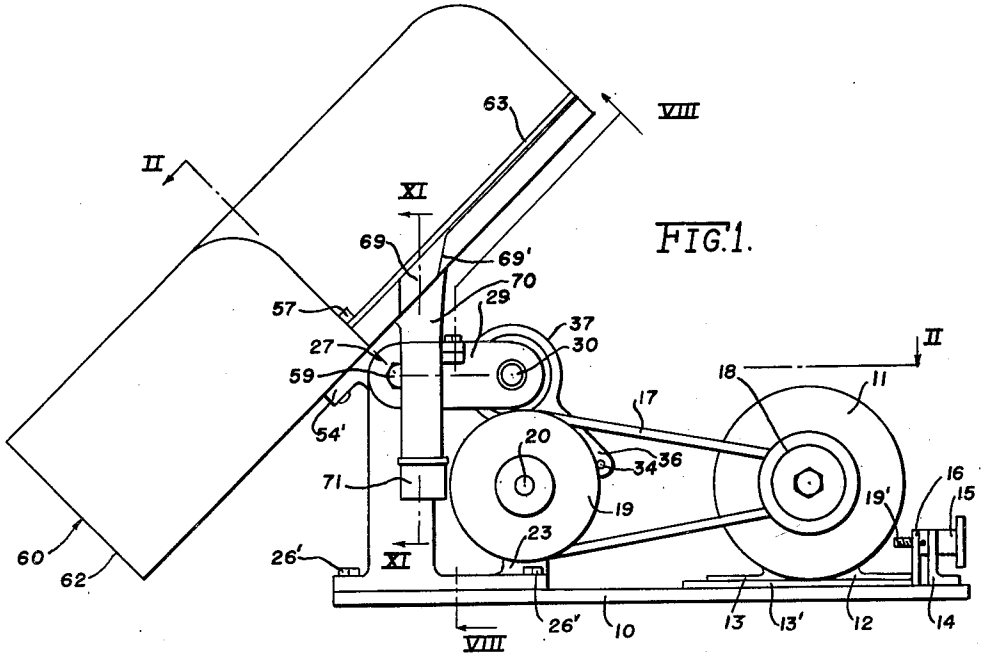


FIG. 1.

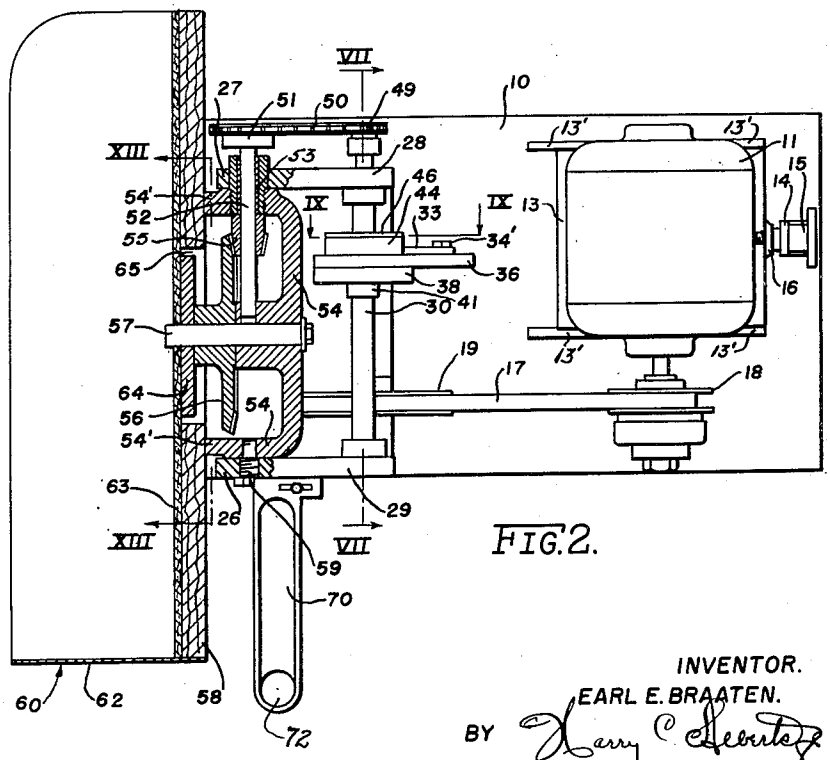


FIG. 2.

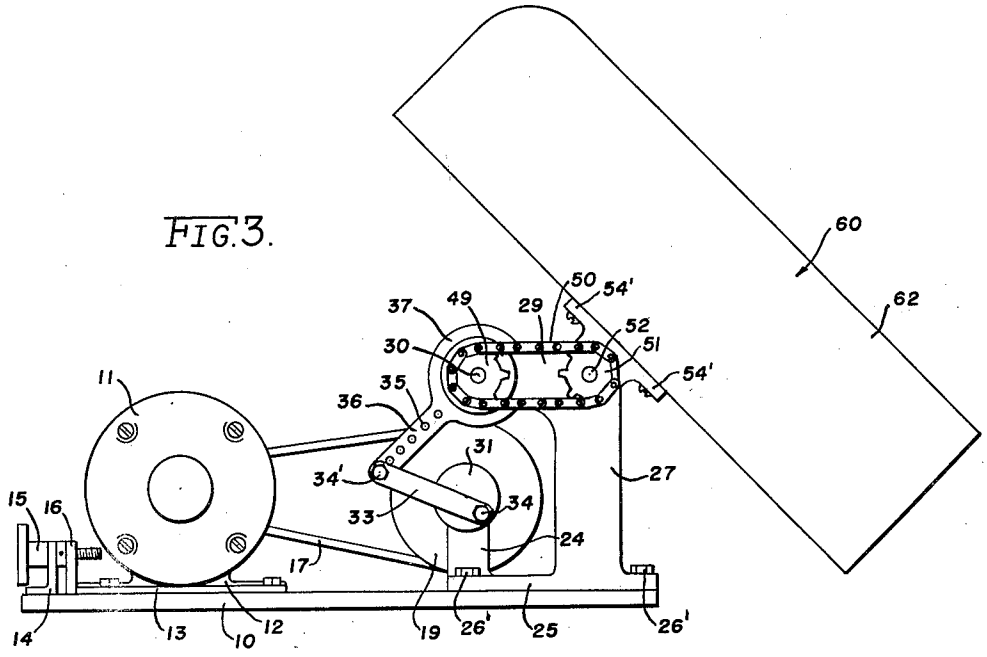
INVENTOR.
EARL E. BRAATEN.
BY Harry C. Hebertz.
ATTORNEY.

May 16, 1950 E. A. BRAATEN 2,507,757

COUNTING MACHINE FOR TABLETS WITH INTERMITTENTLY ROTATABLE COUNTING MEMBER AND ADJUSTABLE MEANS FOR VARYING THE DEGREE OF MOVEMENT OF THE COUNTING MEMBER

Filed Dec. 18, 1944 4 Sheets-Sheet 2

FIG. 3.



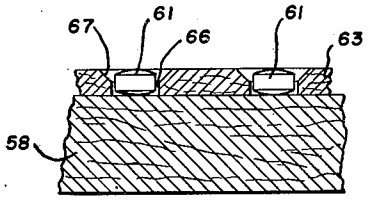


FIG. 5.

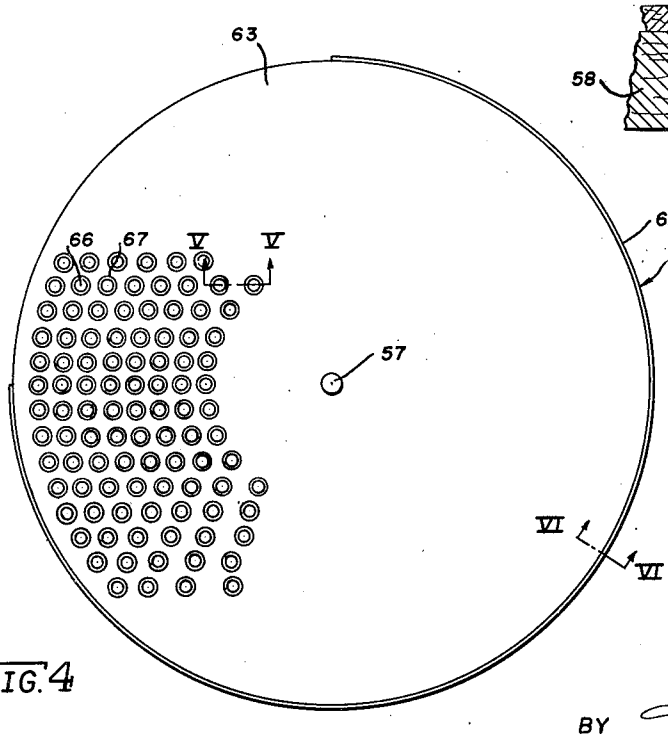


FIG. 4

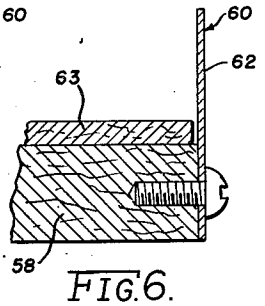


FIG. 6.

INVENTOR.
EARL E. BRAATEN.
BY Harry C. Siebert
ATTORNEY.

May 16, 1950 E. A. BRAATEN 2,507,757

COUNTING MACHINE FOR TABLETS WITH INTERMITTENTLY ROTATABLE COUNTING MEMBER AND ADJUSTABLE MEANS FOR VARYING THE DEGREE OF MOVEMENT OF THE COUNTING MEMBER

Filed Dec. 18, 1944 4 Sheets-Sheet 3

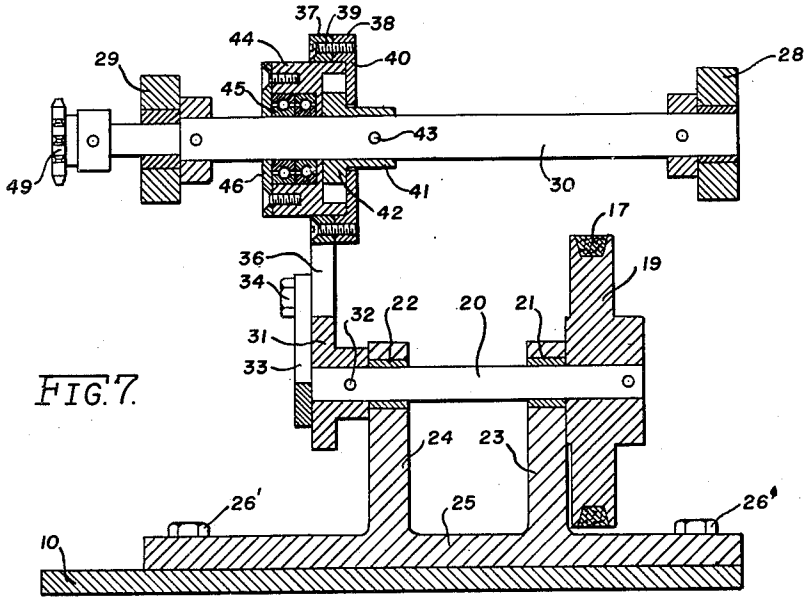


FIG. 7.

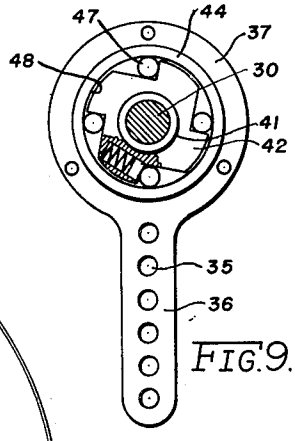


FIG. 9.

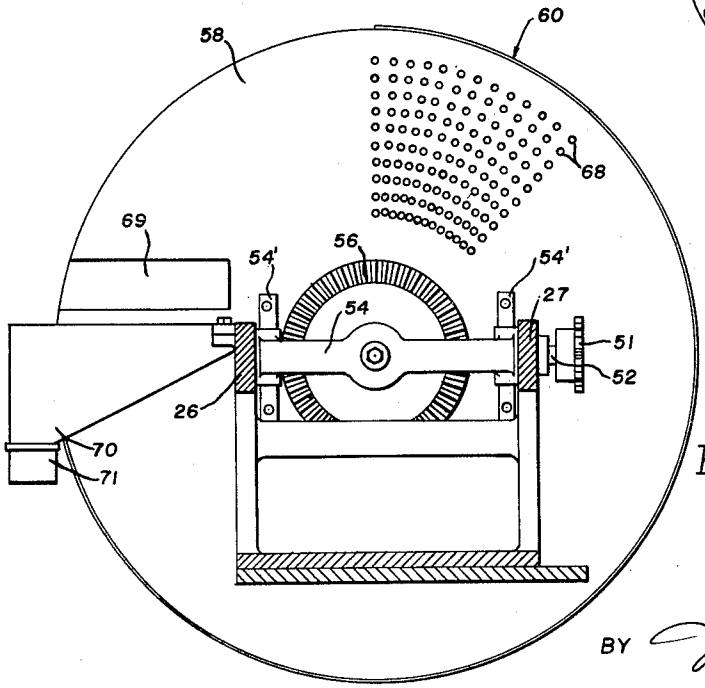


FIG. 8

INVENTOR.
EARL E. BRAATEN.
BY Harry C. Demetz
ATTORNEY

May 16, 1950 E. A. BRAATEN 2,507,757

COUNTING MACHINE FOR TABLETS WITH INTERMITTENTLY ROTATABLE COUNTING MEMBER AND ADJUSTABLE MEANS FOR VARYING THE DEGREE OF MOVEMENT OF THE COUNTING MEMBER

Filed Dec. 18, 1944 4 Sheets-Sheet 4

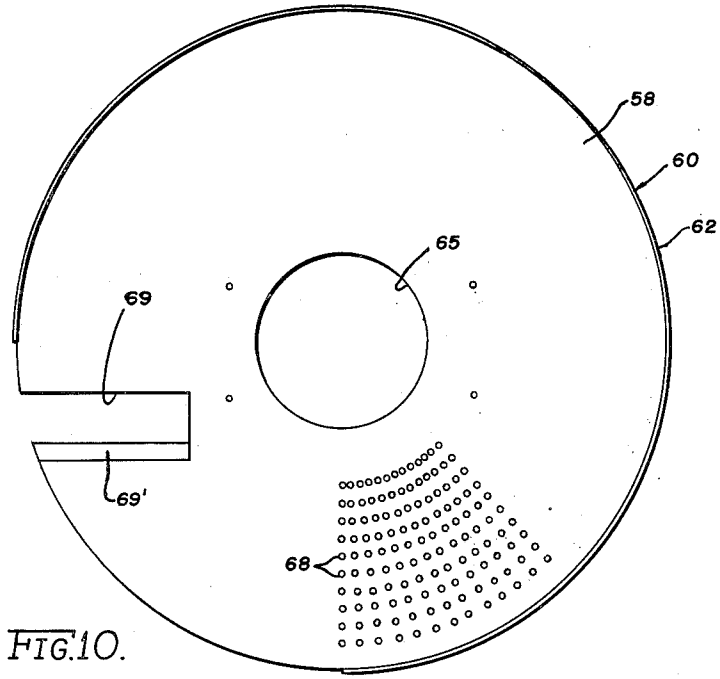


FIG. 10.

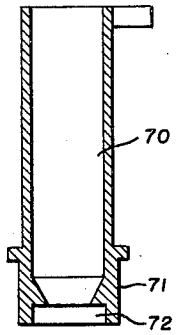


FIG. 12.

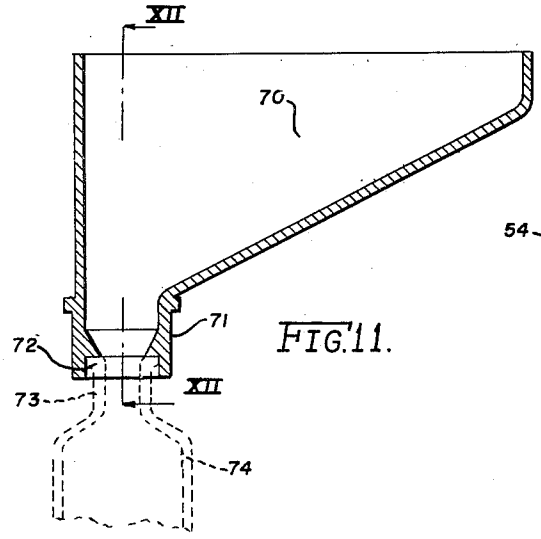


FIG. 11.

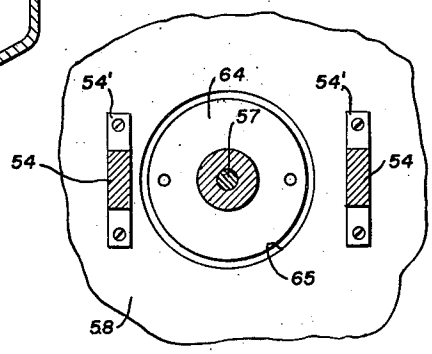


FIG. 13.

INVENTOR.
EARL E. BRAATEN.
BY Harry C. Sheridan.
ATTORNEY.

Patented May 16, 1950 2,507,757

UNITED STATES PATENT OFFICE

2,507,757

COUNTING MACHINE FOR TABLETS WITH INTERMITTENTLY ROTATABLE COUNTING MEMBER AND ADJUSTABLE MEANS FOR VARYING THE DEGREE OF MOVEMENT OF THE COUNTING MEMBER

Earl E. Braaten, Chicago, Ill., assignor to Valentine Laboratories, Inc., Chicago, Ill., a corporation of Illinois

Application December 18, 1944, Serial No. 568,659

3 Claims. (Cl. 226—2)

1

This invention relates to counting machines and more particularly to tablet counters, although it may be employed with equal advantage for other purposes.

It contemplates more especially the provision of a simple and more effective counting machine construction which will segregate preformed units such as pharmaceutical tablets and place them into a container, so that a predetermined number thereof will be uniformly packed.

Numerous types of counting machines for coins and the like have heretofore been proposed, but these are not adaptable for efficacious use in connection with readily destructible units such as preformed pharmaceutical pills or tablets which are easily injured by abrasion, impact or friction thereon.

This is highly important in the handling of pharmaceutical tablets owing to the fact that they are internally consumed and must present a perfect appearance to the consumer. Then, too, counting machines for the purpose mentioned must be sufficiently flexible so that the number of pills or tablets that are successively segregated and packed into a container may be varied within a wide range depending upon the dictates of commercial practice and the size of containers which confine different quantities.

One object of the present invention is to simplify the construction and improve the operation of devices of the character mentioned.

Another object is to provide an improved counting mechanism which can be readily adjusted to adapt itself to units of different size and shape as well as count the different numbers thereof for packing into containers.

Still another object is to provide an endless carrier construction which is capable of movement for counting units of different characteristics most responsive thereto.

A further object is to provide a movable carrier having a predetermined number of perforations of a size corresponding to the units to be counted for movement relative to a supporting surface to effectively count and discharge the desired number into containers,

A still further object is to provide a perforated carrier for transferring a predetermined number of preformed units to a container and to successively repeat the operations for counting purposes.

Still a further object is to provide a perforated carrier for movement below a hopper to successively count predetermined batches of preformed units therefrom and effect the transference thereof to containers for packaging.

2

Other objects and advantages will appear from the following description of an illustrative embodiment of the present invention.

In the drawings:

Figure 1 is a side view in elevation of a device embodying features of the present invention.

Figure 2 is a sectional plan view taken substantially along line II—II of Figure 1.

Figure 3 is a side view in elevation of the device shown in Figure 1 when viewed from the opposite side thereof.

Figure 4 is an axial plan view of the hopper with its detachable counting disc.

Figure 5 is a fragmentary sectional view taken substantially along line V—V of Figure 4.

Figure 6 is a fragmentary sectional view of the hopper taken substantially along line VI—VI of Figure 4.

Figure 7 is a sectional view taken substantially along line VII—VII of Figure 2.

Figure 8 is a sectional view taken substantially along broken line VIII—VIII of Figure 1.

Figure 9 is a sectional view of the clutch mechanism taken substantially along line IX—IX of Figure 2.

Figure 10 is an axial plan view of the hopper similar to Figure 4, but with the counting disc removed.

Figure 11 is a sectional view of the discharge housing taken substantially along line XI—XI of Figure 1.

Figure 12 is a sectional view taken substantially along line XII—XII of Figure 11.

Figure 13 is a fragmentary bottom plan sectional view of the hopper central region taken substantially along line XIII—XIII of Figure 2.

The structure selected for illustration is not intended to serve as a limitation upon the scope or teachings of the invention, but is merely illustrative thereof. There may be considerable variations and adaptations of all or part of the teachings depending upon the dictates of commercial practice. The present embodiment comprises a base plate 10 having an electric motor 11 fixed to a plate 12 which is connected to a confronting lower plate 13. The lower plate 13 is mounted in confronting complemental guides 13' of any suitable or standard construction provided in the base 10 so that it may be displaced relative to a bracket 14 fixed to the base 10. An adjusting knob 15 is journalled in the bracket 14 which confronts a bracket 16 movable with the base plate 13. To the end of adjusting the tension in the driving belt 17 that frictionally engages the motor pulley 18, the adjusting knob 15 has a threaded shank 19' that threadedly engages the

movable bracket 16 to displace the motor 11 and its base plates 12—13, the latter being fixed to the movable bracket 16.

The drive belt 17 frictionally engages a pulley 19 fixed to a stub shaft 20 journalled in bearings 21—22 provided in spaced vertical plates 23—24 formed integral with a base 25 fixed to the base plate 10 (Figure 7) by means of suitable fasteners such as the bolts 26'. The bracket base 25 has another pair of upstanding bracket plates 26—27 which extend upwardly above the bracket plates 23—24 to provide horizontally offset arms 28—29 for effecting the support of instrumentalities thereon as will appear more fully hereinafter. The bracket plate arms 28—29 carry a shaft 30 which is journalled therein for rotation above the shaft 20 (Figure 7). The shaft 20 has a crank wheel 31 fixed to the extremity thereof beyond the bracket plate 24 by means of a pin 32 for rotation therewith.

The crank wheel 31 has a lever arm 33 eccentrically pivoted thereto by means of a stud 34 so that rotation of the crank wheel 31 responsive to the rotation of the pulley 19 will impart oscillatory movement to the lever 33. The lever 33 has its other extremity pivotally connected through a bolt 34' to any one of a series of apertures 35 that are linearly spaced in an arm 36 which is integrally formed with a circular plate 37. The circular plate 37 is attached to a confronting rim 38 by means of circumferentially spaced screws 39. The rim 38 has an inwardly extending face plate 40 that is journalled over the tubular hub 41 of a ratchet wheel 42. The tubular hub 41 is attached to the shaft 30 by means of a diametrically extending pin 43 that projects therethrough.

A circular clutch element 44 is press fitted into the circular plate 37 for oscillation therewith and support by the shaft 30 through ball bearing raceways 45 interposed therebetween. A face plate 46 retains the ball bearing raceways 45 in position. Spring impelled spherical detents 47, in this instance four, are provided in the annular track 48 to confront the teeth of the ratchet 42 for cooperation therewith to engage the clutch element 44 in one direction of oscillation and permit the disengagement in its reverse stroke of oscillation so that the rotation of the crank wheel 31 will impart intermittent rotation to the shaft 30.

The shaft 30 carries a sprocket wheel 49 at its extremity to mesh with a chain 50 which is in meshing engagement with another sprocket 51 carried by a stud shaft 52 journalled in a bearing 53 carried by an arcuate bracket 54 (Figure 2). The stud shaft 52 has a bevelled pinion 55 fixed to an intermediate portion thereof to mesh with a bevelled gear 56 fixed to a stud shaft 57 journalled centrally within the circular bearing bracket 54 that is fixed between the laterally offset arms 28—29 of the upstanding brackets 26—27.

The arcuate bracket 54 supports the circular bottom hopper plate 58 that is disposed at a substantially 45° angle with the bracket 54 serving as a support therefor through attaching bracket flanges 54'. The bracket 54 is connected between the offset bracket arms 28—29 by means of trunnions or any other suitable fastening expedients 59, together with the bearing 53 that extends between the offset bracket arm 28 and the arcuate bracket 54. The bottom circular plate 58 constitutes part of a hopper 60 wherein suitable units, such as preformed tablets 61 (Figure 5), are confined so that they accumulate

along the lower circular meeting edge between the hopper bottom 58 and its upstanding sides 62 that does not extend around the entire circumference thereof (see Figures 4 and 8) so as to provide more ready access from the upper region for charging the hopper 60 with tablets, pills or other preformed units 61.

A rigid circular plate 63 is disposed within the hopper 60 for attachment to the stud shaft 57 for rotation therewith responsive to the rotation of the bevelled gear 56. A circular plate 64 is disposed around the stud shaft 57 between the rotating plate 63 and the bevelled gear 56 to assist in supporting the circular counting plate 63 in the region of the circular orifice 65 provided in the hopper bottom 58 to provide access to the gear 56 and the stud shaft 57, that intermittently rotates the circular disk or counting plate 63.

In order to discharge a predetermined number of units or tablets 61 with each complete or fractional revolution of the counting disk 63, a plurality of apertures 66 are provided therethrough. In the present embodiment, there are one hundred apertures so arranged, and these have counter-sunk tapering orifices 67 to provide enlarged entrant orifices that more readily admit the preformed units or tablets 61 to the apertures 66 for reception therein. The apertures 66 are slightly larger than the units 61 that are to be counted. A plurality of small apertures 68 in the hopper bottom plate 58 permits the dust from the tablets 61 to pass therethrough.

The circular counting disk 63 intermittently rotates to bring the tablet receiving apertures 66—67 in registry with a comparatively wide slot 69 provided in the bottom plate 58 of the hopper 60 so that the units or tablets 61 can fall therethrough against a tapered edge 69' thereon to avoid crushing or abrasion. A funnel housing 70 is fixed to the underside of the hopper bottom 58 (Figure 1) to guide the tablets discharged from the apertures 66—67 to a discharge funnel 71 which has an interiorly counter-sunk discharge orifice against which the open neck 73 of the container 74 can be held by the attendant (Figure 11). In the case of a wide mouthed container it would be telescoped over the discharge funnel 71 rather than within the counter-sunk discharge orifice 72 depending upon the requirements of any particular type of container. The funnel housing 70 is underneath the discharge slot 69.

While any number of separated series of apertures 66—67 can be provided around the circumference of the counting disk 63, this will depend largely upon the size thereof, the rotary speed, and the ability of the attendant to provide container 74 beneath the discharge housing 70 so that enough time is provided for full discharge and repeated placement of empty bottles to the funnel 71 of the housing 70. The slight vibratory effect produced by the intermittent rotation of the counting disk 63 insures the filling of all the apertures 66—67 and the consequent discharge thereof through the slot 69 in the hopper bottom 58. With the arrangement of parts above described, a very simple, effective and dependable counting device has been provided for preformed units such as tablets which must be counted without injury or abrasion. A variety of counting disks or plates 63 with different numbers of counting apertures 66—67 may be substituted.

While I have illustrated and described a preferred embodiment of this invention, it must be understood that the invention is capable of con-

siderable variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

I claim:

1. In a counting machine, the combination with a frame, of a hopper mounted on said frame to receive articles to be counted, a counting member mounted for movement in said hopper to support the articles therein, there being a predetermined number of article receiving apertures to receive articles therein for support by the bottom of said hopper, gear means operatively connected to said counting member, a driver shaft on said frame, power means for rotating said driver shaft, a countershaft on said frame, means for rendering said gear means responsive to said countershaft, and crank operated clutch means on one of said shafts, adjustable means interposed between said clutch means and the other of said shafts for rendering said countershaft responsive to the operation of said driver shaft through said clutch means for intermittently rotating said counting member relative to the bottom of said hopper to receive and discharge the articles from said counting member apertures.

2. In a counting machine, the combination with a frame, of a hopper mounted on said frame to receive articles to be counted, a circular counting member mounted for rotary movement in said hopper to support the articles therein, there being a predetermined number of article receiving apertures to receive articles therein for support by the bottom of said hopper, there being an opening in said hopper bottom in the path of the article receiving apertures in said counting member, gear means operatively connected to said circular counting member, a driver shaft on said frame, power means for rotating said driver shaft, a countershaft on said frame, means for rendering said gear means responsive to said countershaft, and crank operated clutch means on one of said shafts, means interposed between said clutch means and the other of said shafts for rendering said countershaft responsive to the operation of said driver shaft through said clutch means for intermittently rotating said counting member relative to the bottom opening in said

hopper to receive and discharge the articles from said counting member apertures, said crank operated clutch means including an adjustable crank arm for varying the intermittent stroke of said counting member.

3. In a counting machine, the combination with a frame, of a circular open top hopper mounted on said frame to receive articles to be counted, a circular counting member detachably mounted for rotary movement in said hopper to support the articles therein, there being a predetermined number of article receiving apertures to receive articles therein for support by the bottom of said hopper, there being an opening in said hopper bottom in the path of the article receiving apertures in said counting member, gear means operatively connected to said circular counting member, a driver shaft on said frame, power means for rotating said driver shaft, a countershaft on said frame parallel to said driver shaft, chain means for rendering said gear means responsive to said countershaft, and crank operated clutch means on one of said shafts, means interposed between said clutch means and the other of said shafts for rendering said countershaft responsive to the operation of said driver shaft through said clutch means for intermittently rotating said counting member relative to the bottom opening in said hopper to receive and discharge the articles from said counting member apertures, said crank operated clutch means including an adjustable crank arm for varying the movement of said counting member.

EARL E. BRAATEN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
453,873	Upjohn	June 9, 1891
911,556	Froggatt, Jr.	Feb. 2, 1909
1,115,758	Whitton	Nov. 3, 1914
1,513,021	Allen	Oct. 28, 1924
2,060,645	Suppiger et al.	Nov. 10, 1936
2,111,529	Dalton	Mar. 15, 1938
2,304,952	Peterkin, Jr.	Dec. 15, 1942
2,402,828	Michael	June 25, 1946