June 16, 1959 H. W. GREER ET AL 2,890,557

CAPSULE FILLING MACHINE

Filed Sept. 28, 1956

5 Sheets-Sheet 1

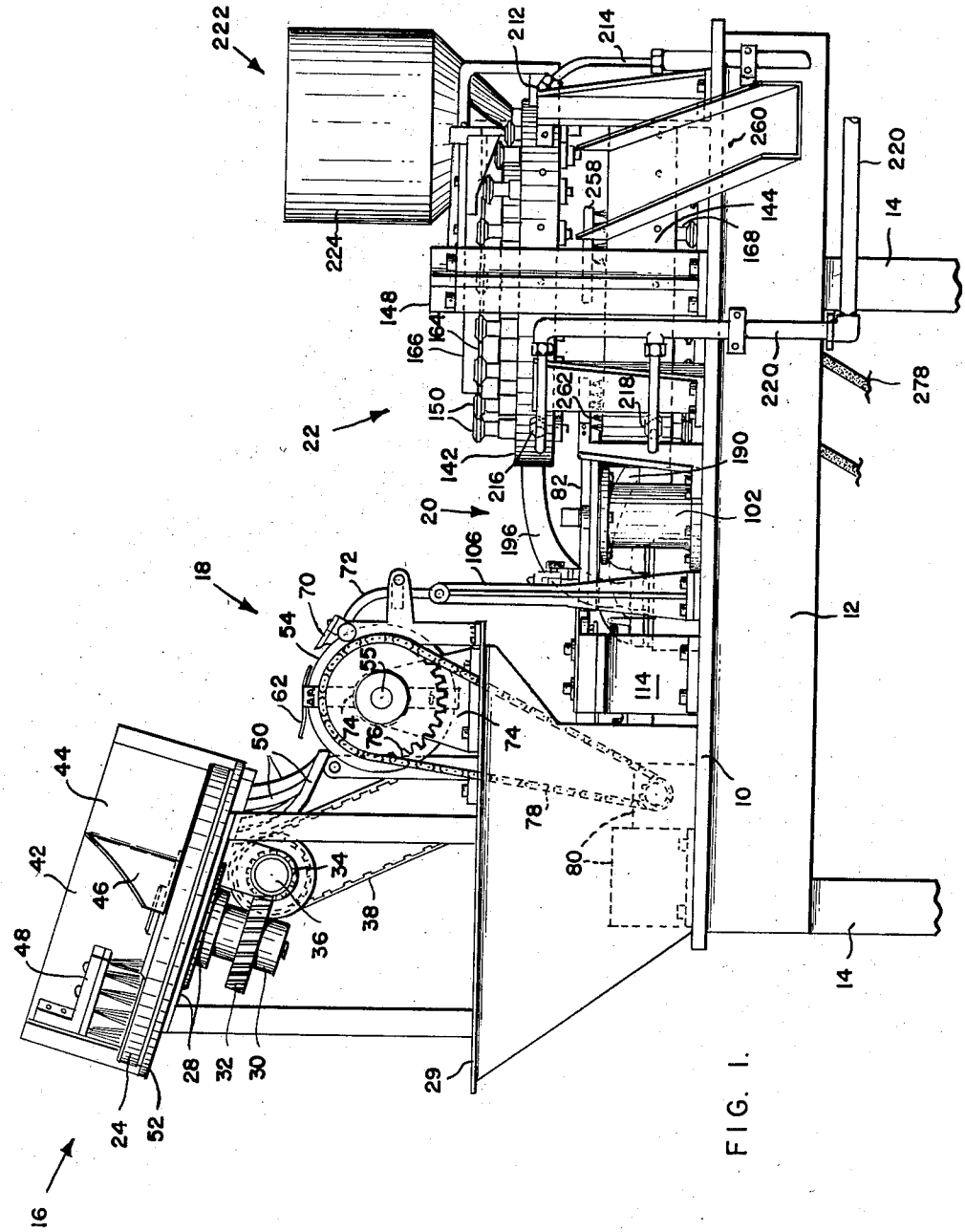


FIG. 1.

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CAPSULE FILLING MACHINE

Filed Sept. 28, 1956 5 Sheets-Sheet 2

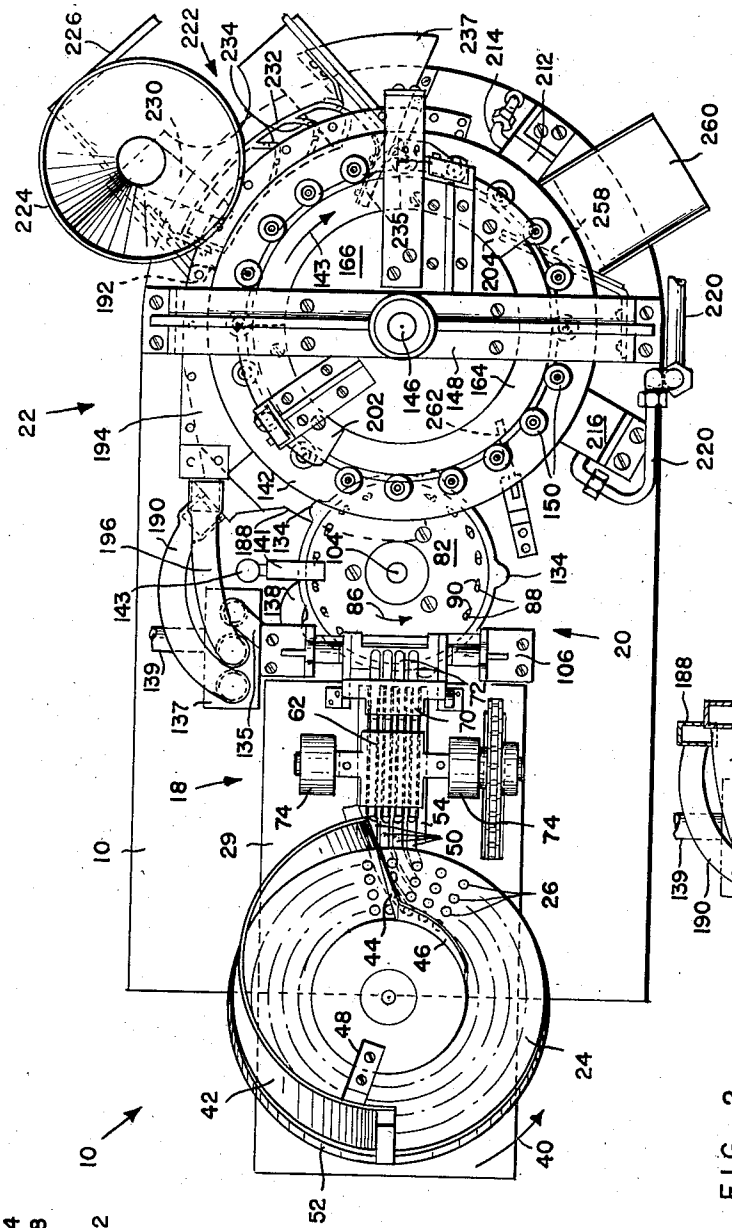


FIG. 2.

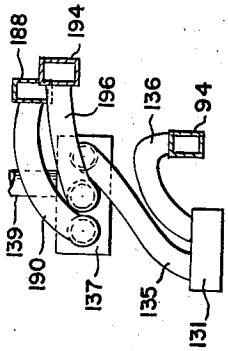


FIG. 9.

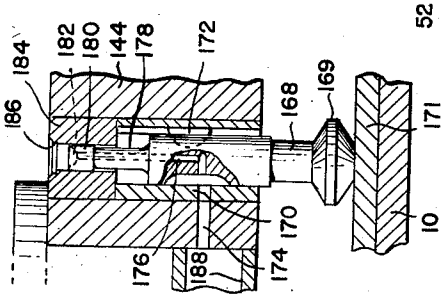


FIG. 8.

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CAPSULE FILLING MACHINE

Filed Sept. 28, 1956 5 Sheets-Sheet 3

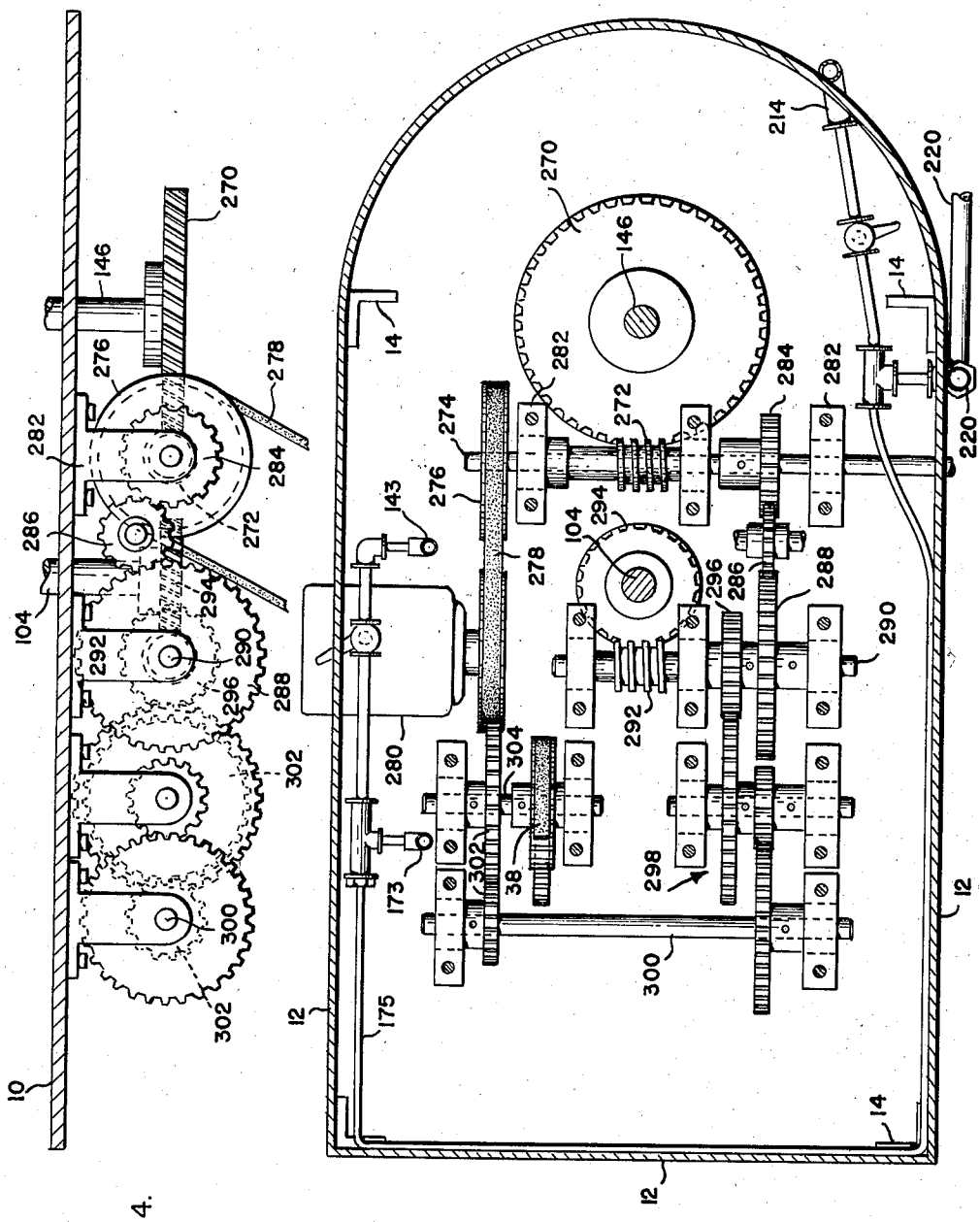


FIG. 4.

FIG. 3.

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CAPSULE FILLING MACHINE

Filed Sept. 28, 1956

5 Sheets-Sheet 4

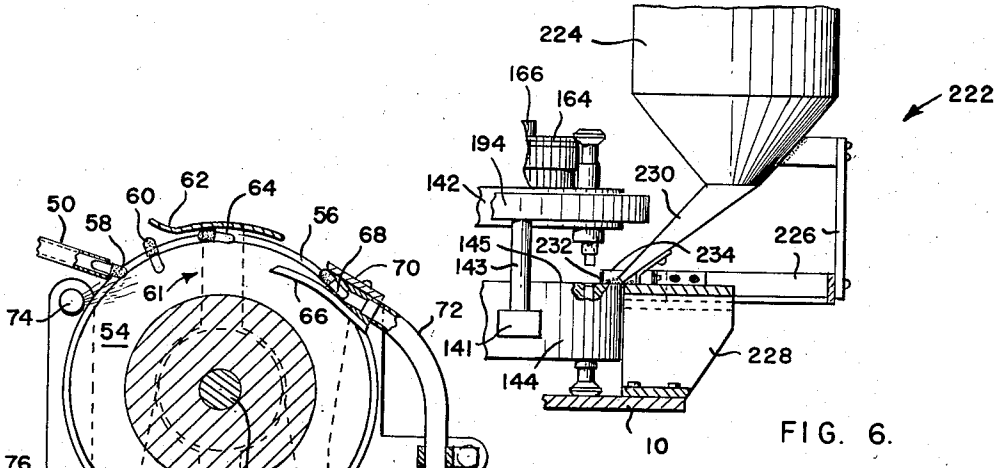


FIG. 6.

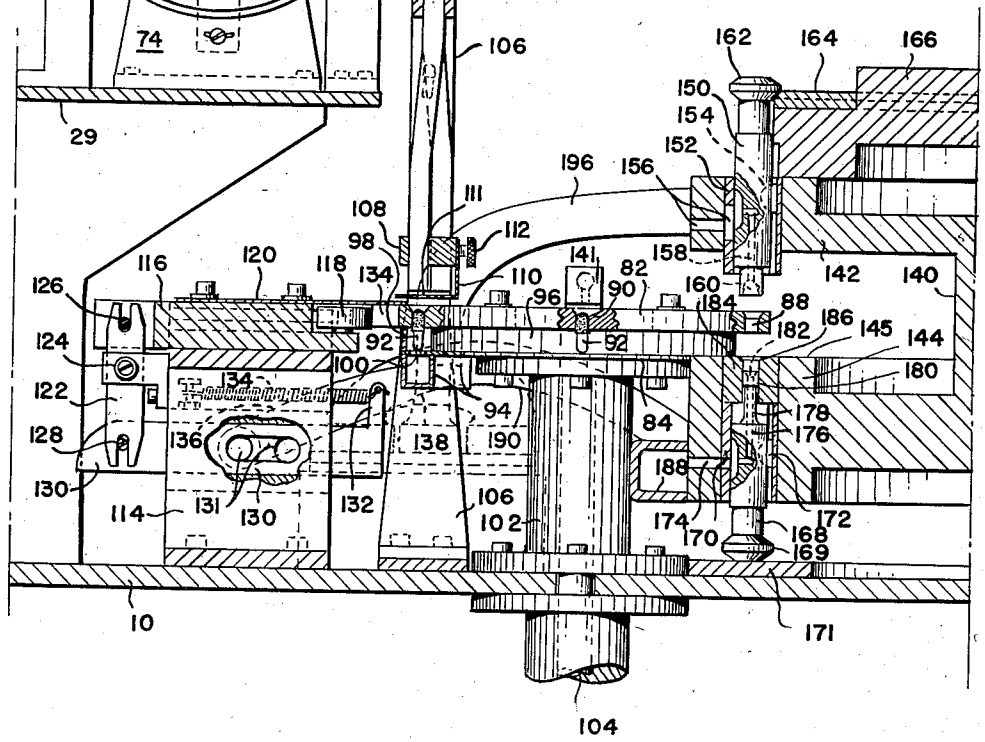


FIG. 5.

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CAPSULE FILLING MACHINE

Filed Sept. 28, 1956 5 Sheets-Sheet 5

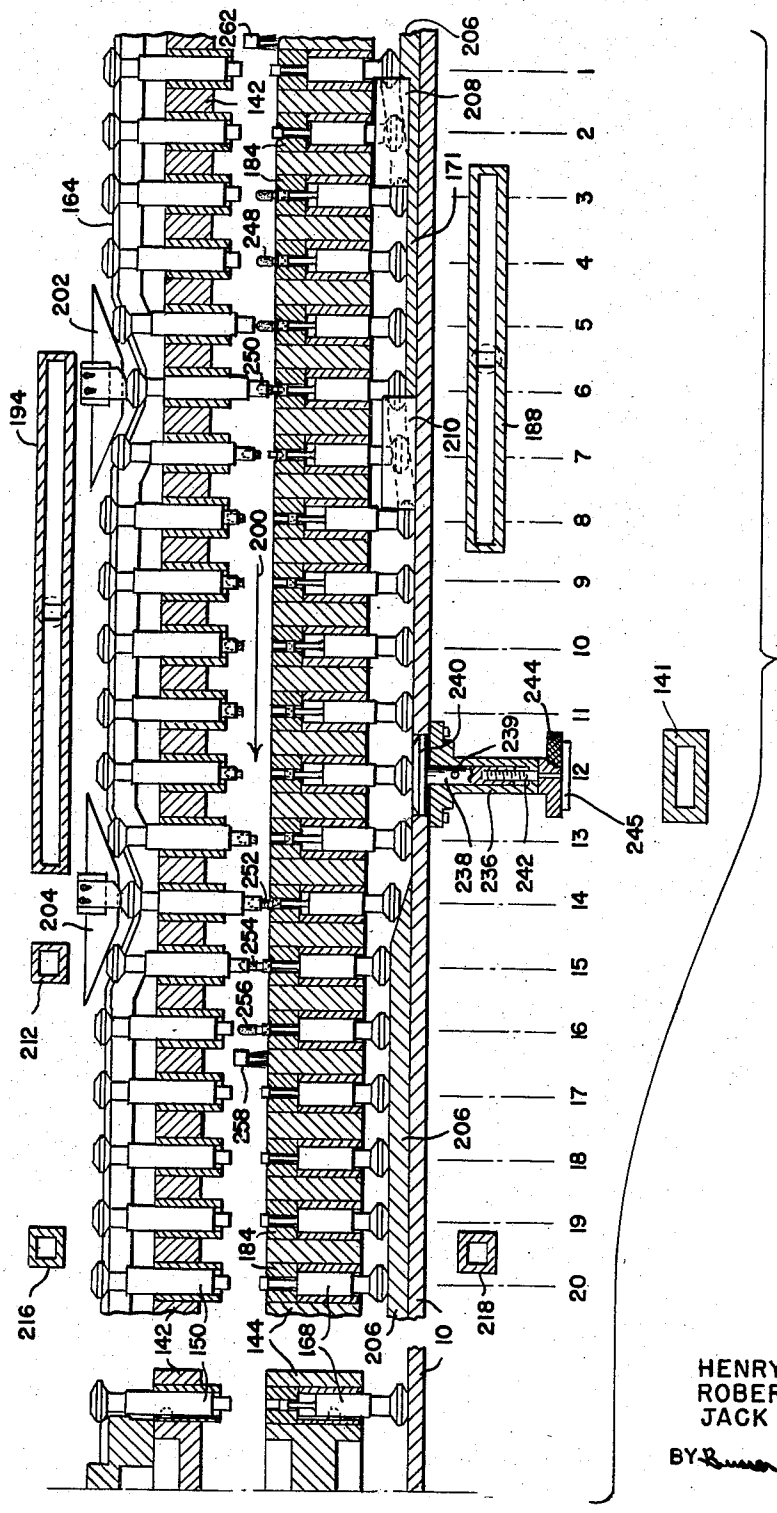


FIG. 7.

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United States Patent Office 2,890,557
Patented June 16, 1959

2,890,557

CAPSULE FILLING MACHINE

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Application September 28, 1956, Serial No. 612,706

16 Claims. (Cl. 53—281)

This invention relates to a machine for filling capsules and more particularly to a machine for automatically positioning, opening, filling, and closing the telescoping body and cap portions of a conventional capsule.

It is the primary object of the invention to provide a machine which will receive capsules in bulk quantities and without further handling by an operator produce filled, closed capsules.

More specifically the invention contemplates feeding capsules from a hopper successively and in predetermined end-to-end relationship for delivery to feeding apparatus which provides the continuous flow of capsules to filling apparatus in which they are opened, filled and closed, and discharged from the machine.

The foregoing broad general objects and further specific objects relating particularly to details of construction of the apparatus will become evident from the following description when read in conjunction with the accompanying drawings in which:

Figure 1 is a side elevation of the apparatus;

Figure 2 is a top view of the apparatus;

Figure 3 is a horizontal section through the apparatus looking downwardly thereon;

Figure 4 is a fragmentary vertical section through the apparatus shown in Figure 3;

Figure 5 is a fragmentary vertical section through the apparatus shown in Figure 1;

Figure 6 is a vertical elevation partly in section of a fragmentary portion of the apparatus shown in Figure 1;

Figure 7 is a diagrammatic drawing of the successive steps of capsule opening, filling, and closing, as accomplished by apparatus shown in Figures 1–6;

Figure 8 is an enlarged fragmentary section of the apparatus shown in Figure 5; and

Figure 9 is a diagrammatic showing of a portion of the apparatus shown in Figure 2.

The apparatus includes a horizontal base plate **10** affixed to the upper edges of vertically extending side plates **12**. Vertically extending angle legs **14** support the base plate **10** from a suitable supporting surface not shown.

Referring to Figures 1 and 2 the machine includes means indicated generally at **16** for feeding capsules successively from the bulk quantity thereof, means indicated generally at **18** for positioning successive capsules with the capsule body portion forward, means indicated generally at **20** for transferring successive capsules from the means **18** to the means **22** and the means indicated generally at **22** provides for opening, filling, closing and discharging the capsules from the machine.

The feeding means indicated generally at **16** includes a rotatable disc **24** provided with a plurality of annular arrays of bores **26** extending longitudinally through the disc. The disc is mounted for rotation on supporting means **28** and is affixed to a shaft **30** mounting a gear **32** driven by a gear **34** affixed to a shaft **36** driven by a belt **38** which is in turn driven by means which will be hereafter described.

The disc **24** which rotates in the direction indicated by the arrow **40** in Figure 2 is provided around approximately half of its periphery with an upstanding retainer plate **42**. The retainer plate is provided at its lower or right-hand portion as viewed in Figures 1 and 2 with a radially inwardly turned portion **44** which extends across the face of the disc **24** and terminates in an arcuated formed portion **46**. The plate **42**, **44**, **46** serves to retain a plurality of capsules in random relation above the disc **24** while the disc rotates. As the disc rotates capsules will drop into the bores **26** and be carried generally upwardly as viewed in Figure 1 and pass under a brush **48** arranged to sweep the surface of the disc **24** and to prevent capsules which have not entered the bores **26** from being carried upwardly past the brush. If an adequate quantity of capsules is maintained within the retainer plate each of the bores **26** will have received a capsule from the random supply and will carry the capsule past the brush **48** as the plate **20** rotates, the brush, however, preventing the disc from carrying any capsules therepast which are not positioned in bores **26**.

A plurality of tubes **50** are positioned below the plate **24** in generally radial alignment and in vertically extending arrangement with their uppermost ends in alignment with the annular arrays of bores **26**. A stationary plate **52** is positioned immediately below the rotating disc **26** and prevents capsules from falling through the bores **26** except into the tubes **50**. The tubes **50** pass through bores in the plate **52** and thus as the bores **26** in the disc **24** pass over the upper end of the tubes **50** the capsules contained within the bores **26** will drop downwardly into the tubes **50**.

The apparatus indicated generally at **18** in Figures 1 and 2 for arranging the capsules in proper end-to-end relation is shown more clearly in Figure 5 and includes a plurality of adjacently positioned discs **54** fixedly mounted on a shaft **55** and having their peripheries beveled as indicated at **56** and spaced apart so as to receive capsules **58** passing from the lowermost ends of the tubes **50**. The spacing between the discs is selected to permit the body portions of the capsules to fall between the discs while preventing the cap portions of the capsules from passing between the discs thus positioning the capsules as indicated by the capsule **60** in Figure 5.

The discs rotate in the direction of the arrow **61** in Figure 5. The successive capsules are carried by the rotating discs under a plate **62** which deflects the cap portions of the capsules downwardly or backwardly and causes the capsules to advance in a generally horizontal position as is indicated by the capsule **64** in Figure 5. The capsules advancing to the right as viewed in Figure 5 pass with their leading or body ends above plates **66** extending between the discs **54** which position the capsules for passage under a plate **70** and for entry into tubes **72** with the body end of the capsule leading as indicated by the capsule **68** in Figure 5.

An air tube **74**, supplied with compressed air from pipe **173** shown in Figure 3, is mounted on a suitable bracket **76** positioned on the plate **29** and is provided with bores directing jets of compressed air under the capsules **58** emerging from the tubes **50**. These air jets assist in properly positioning the capsules and causing the capsules in the position of capsule **68** to rotate and assume the position of the capsule **60** as shown in Figure 5.

The shaft **55** mounting the discs **54** is supported by conventional bearing blocks **74** mounted on the plate **29**. A gear **76** affixed to the shaft **55** is driven by a chain **78** which is in turn driven by a speed reducer and motor assembly **80** mounted on the base plate **10** below the plate **29**.

It will be evident from the foregoing that each of the annular arrays of the bores **26** in the plate **24** discharges

a succession of capsules to a tube 50 and each tube 50 discharges its capsules to a groove between adjacent discs 54. These capsules are positioned and each succession of capsules is discharged to a corresponding tube 72. Thus, there occurs a plurality of adjacently arranged lines of capsules being conducted downwardly by the tubes 72.

The apparatus for transferring capsules from the tubes 72 to the capsule filing apparatus located generally at 22 in Figures 1 and 2 is indicated at 20 and includes a rotatable disc 82 positioned in spaced relation above a fixed disc 84. The rotatable disc 82 rotates in the direction indicated by the arrow 86 in Figure 2, and is provided with an annular array of bores 88 having bevelled leading edges as indicated at 90. The bores 88, several of which are shown in section in Figure 5, are adapted to receive capsules as indicated at 92 which have dropped through the tubes 72. The lower ends of the tubes 72 are in arcuate arrangement such as to position the ends of the tubes above the line of travel of the bores 88 in the rotating disc 82.

An air manifold 94 of arcuate formation is positioned below the disc 84 in the region of the lower ends of the tubes 72. The space between the upper surface of the manifold 94 and the lower surface of the disc 88 is closed on three sides by the recessed lower portion 96 of the disc 88 and by a plate 98 extending upwardly from the manifold 94. The upper portion of the manifold within the space and below the tubes 72 is provided with an arcuate array of bores 100 and the manifold is connected to a suitable vacuum line as will hereafter be described.

The rotatable disc 82 is mounted on a suitable support column 102 and affixed to a vertically extending shaft 104 which is driven by means hereafter described to rotate the disc 82 to cause the progression of bores 88 to pass below the lower ends of the tubes 72.

The lowermost ends of the tubes 72 are positioned between a pair of vertically extending support members 106 mounted on the base plate 10 by means of a transversely extending member 108. An angular shaped guide plate 110 is affixed to the plate 108 by means of a thumb screw 112 passing through a slotted bore in a vertically extending flange thereof. A horizontal flange positioned below the ends of the tubes 72 and is provided with bores 111 positioned below and in alignment with the lower ends of the tubes 72 and spaced above the upper surface of the disc 82.

A mounting block 114 is affixed to the base plate 10 to the left of the disc 82 as viewed in Figures 1 and 5. A slidable member 116 is mounted in the block 114 and mounts at its right-hand side as viewed in Figure 5 a roller 118 and mounts on its upper surface a plate 120 which extends between the lower flange of the angle 110 and the upper surface of the disc 82 as will hereafter be more fully described. At the left of the member 116 is a vertically extending member 122 pivoted to a support angle 124 affixed to the left-hand side of the support block 114 as viewed in Figure 5. The upper and lowermost ends of the member 122 are slotted. The upper end slot embraces a pin 126 affixed to the block 116 and the lower end slot embraces a pin 128 affixed to a slidable member 130 also mounted in the block 114 for horizontal sliding motion. The right-hand end of the member 130 is provided with upturned finger 132 and a spring 134 acts between the block 114 and the finger 132 to urge the member 130 to the left and to thus urge the member 116 to the right for engagement of the roller 118 with the peripheral surface of the disc 82.

The disc 82 is provided with five cam lobes 134 adapted to engage the roller 118 and move the member 116 to the left and move the member 130 to the right against the urging of the spring 134. Between each of the cam lobes 134 are four bores 88. Thus, as the disc 82 rotates at a uniform rate of speed the plate 120 will normally be positioned below the lowermost ends of the tubes 72 preventing capsules therein from dropping into the bores 88 of disc 82. However, upon engagement of a cam 134 with the roller 118 the plate 120 will be moved to the left, i.e., to the position shown in Figure 5, permitting capsules to drop from the tubes 72 into bores 88 thus filling four bores. Immediately upon the filling of the four bores further rotation of the plate 82 will carry the cam 134 beyond the roller 118 permitting the plate 120 to be moved under the tubes 72 preventing the passage of further capsules downwardly therein until the next cam lobe 134 engages the roller 18 at which time four empty bores 88 will be in position below the tubes 72. The disc 82 rotates continuously and while the plate 120 is retracted for only a relatively short time interval this is sufficient for capsules to drop out of the tubes 72 into bores 88 and this dropping is accelerated by the existence of a partial vacuum in the space below the disc 82. It will be evident that the relative rotation of the disc and stationary condition of the capsules requires that the capsules enter the bores 88 quite rapidly. The bevelled leading edges of the bores 88 as indicated at 90 in Figure 5 facilitate this entry. Thus, during rotation of the disc 82 the bores passing below the lower ends of the tubes 72 are filled four at a time.

In order to limit the demand on the vacuum source, the support block 114 and the sliding member 130 are bored as indicated at 131 to provide an air valve which is open when the parts are in the position shown with the plate 120 retracted and which is closed when the plate 120 is moved to the right as viewed in Figure 6 and capsules are prevented from dropping downwardly. As is best shown in Figure 9, a vacuum line 136 extends between the valve 131 and the manifold 94 and a vacuum line 135 extends between the valve 131 and a vacuum distributor 137 which will hereinafter be described.

An air tube 141, supplied with compressed air from pipe line 143, is positioned over the disc 82 and directs a jet of compressed air onto the disc in the region where the disc is moving toward the tubes 72 and where the fixed disc 84 does not occur in order to insure the removal of any improperly remaining capsule parts from the bores 88 which were not passed into the filling apparatus. The filling apparatus will now be described.

Positioned to the right of the rotatable disc 84, as viewed in Figures 1 and 2, is the capsule opening, filling, and closing apparatus indicated generally at 22. This apparatus includes a rotatable member 140 having upper and lower discs 142 and 144 respectively extending therefrom. The rotatable assembly 140, 142, 144 is mounted on a vertically extending shaft 146 the upper end of which is positioned by a frame member 148 mounted on the base plate 10 and the lower end of which extends through the base plate 10 into drive means which will hereinafter be described. The rotatable assembly 140, 142, 144 rotates in the direction indicated by the arrow 143 in Figure 2.

The upper disc 142 mounts an annular array of punches 150 which are positioned within bushings 152 mounted in the disc 142. The punches are mounted for vertical motion and prevented from rotating in their sleeves by means of keys 154. The disc 142 and the sleeves 152 are provided with aligning bores 156 communicating with bores 158 in the punches each of which communicates with a recess 160 in the lowermost end of the punch adapted to receive the cap end of a capsule.

The upper end of each of the punches is provided with a dome-like head 162 which is engaged by the upper edge of the cam plate 164 mounted on a fixed disc 166 positioned above the rotatable disc 142 and supported by the support bracket 148.

An annular array of lower punches 168 are slidably mounted in sleeve bushings 170 mounted in the lower disc 144. Keys 172 prevent the punches from rotating in the sleeves 170. The sleeves 170 and the rotatable disc 144 are provided with aligning bores 174 communicating with bores 176 within the punches extending upwardly through the reduced upper end portions 178 thereof and into upper cap portions 180 thereof recessed at 182 to receive the rounded lower ends of capsule bodies. A sleeve 184 is positioned above each of the sleeves 170 and is of such diameter as to provide for sliding fit of the punch cap 180 and the wall of a capsule body. The uppermost end of the bore in each of the sleeves 184 is recessed as indicated at 186 to receive the rim of a capsule cap and to position the rim for entry of the capsule body portion therein as will hereinafter be described.

A manifold 188 is connected by means of a line 190 to the vacuum distributor block 137 and extends in a region of the disc 144 as will become evident upon viewing Figures 2, 5 and 7, and as will be described. The manifold 188 has an open face adjacent to the rotating disc 144 and the ends of the passages 174 pass in alignment with the manifold 188. Thus, those punches passing in the region of the manifold 188 will have their central bores connected to the source of vacuum.

The fixed plate 84 positioned below the rotatable disc 82 extends from the manifold 94 to the rotatable disc 144 and extends under the rotatable plate 82 and the recessed portion 96 thereof in such a manner as to position the lower ends of capsules such as the capsule 92 carried by the disc 82 for passage of their lower ends over the surface 145 of the disc 144. With proper synchronization between the two rotatable discs 82 and 144, a bore 88 will be in alignment with each punch 168 for at least a brief interval of time. The disc 82 is provided with twenty bores and the disc 144 carries twenty punches. Thus these discs will each travel at the same rotational speed but at different peripheral speeds. However, regardless of the number of bores and punches, if the speeds of the two rotatable discs are so controlled that there exists a period of crossing of each successive bore 88 with each successive aligned pair of punches, a capsule sliding over the upper surface 145 of the rotatable member 144 after leaving the fixed plate 34 will upon crossing the bores above the punches 168 be drawn downwardly into the sleeves 184 by the vacuum applied thereto through the manifold 188. This operation will be described hereinafter in greater detail.

A manifold 194 extends around the peripheral face of the upper rotatable disc 142 as shown in Figures 2, 6 and 7 for a distance which will hereinafter be described in greater detail and is connected by means of a conduit 196 to the distributor block 137. The manifold 194 connects the vacuum supply to the punches 150 in the region of the manifold.

Fig. 7 shows diagrammatically the two annular arrays of punches in which they are shown for simplicity in linear array. The punches are numbered 1–20 in Figure 7 to indicate stations. Station 3 in Figure 7 being the section shown in Figure 5 and the direction of motion of punches in Figure 7 is indicated by the arrow 200. The manifold 188, as indicated in Figure 7, extends from station 3 to station 8 and the manifold 194 extends from station 6 to station 13.

The upper cam plate 164 includes depressed regions within which there are mounted depressing cams 202 and 204. These cams are affixed to the stationary disc 166 as shown in Figure 2.

The lower cam plate 171 as shown in Figure 5 exists in the region of stations 2 to 6 as indicated in Figure 7. In the region of stations 8 to 13 the lower punches ride on the bed plate 10. In the region of stations 15 to 1 there is provided an elevated cam plate 206, and in the region of stations 2 and 7 there are provided depressing cams 208 and 210 respectively to insure downward movement of the punches from the upper cam level to the lower cam level.

The material with which the capsules are to be filled is handled by apparatus indicated generally at 222 in Figures 1, 2 and 6. This apparatus includes a suitable hopper 224 mounted on a supporting frame 226 which is slidably mounted for motion radially of the rotatable cam discs in a mounting block 228 affixed to the base plate 10. A spout 230 extending downwardly from the hopper 224 delivers the material to the surface 145 of the disc 144. It should be noted that in the figures, the material supplying apparatus is in a retracted position, that is in a radially outward position. When the apparatus is in operation the material supplying apparatus will be moved radially inwardly as will be hereinafter described. Material passing downwardly through spout 230 enters within a retaining framework 232 which is also mounted on the supporting framework 226 and is adapted to slide over and upon the surface 145 of the disc 144 as the hopper 224 and spout 230 are moved radially inwardly and outwardly. The retaining framework 232 is of a well-known type and includes a plurality of baffles 234 provided with small grooves or recesses on their under edges permitting a limited amount of the material to pass the successive baffles 234 as the disc 144 rotates. When the material supplying apparatus is in normal operating position the framework 232 is positioned directly over the array of lower punches in the region of stations 10, 11 and 12 and the baffles 234 extend across the bores above the punches in the disc 144. Thus, the arrangement of retainer and baffles maintains a quantity of material positioned above the surface 145 of the disc 144 in order that capsules passing thereunder, as will be hereinafter described, receive material.

A stationary scraper 235 is positioned across and in contact with the surface 145 immediately following the material supplying means and serves to scrape from the surface 145, excess material and the material passing through the groove in the last baffle 234.

The scraper directs material in engagement therewith into a container 137 positioned adjacent to the disc 144.

As will hereinafter be made more evident, the amount of material retained in the finally closed capsule will depend upon the amount of material received in the opening passing below the material distributing baffles 234. In order to accurately position each punch of the lower punch disc as it passes the last baffle 234 and the scraper 235 there is provided an accurately positionable punch adjusting means. A retainer 236 is suspended below the base plate 10. A rod 238 having an internally threaded bore extending upwardly from its lower end is mounted vertically and for vertical motion in the retainer 236. Affixed to the top of the rod 238 is a mushroom-like plate 240 over which the heads 169 of the lower punches pass. A screw 242 extends upwardly into the threaded bore 238 and by rotation of a knurled disc 244 affixed to the lower end of the screw acting against a fixed plate 245 the height of the mushroom plate 240 can be accurately adjusted thus accurately adjusting the position of the punches in station 12 and thus accurately dimensioning the space existing between the capsule and the material distributing baffles 234 under which the lower punch disc passes.

A vacuum manifold 141 is provided against the lower disc 144 in the region of station 12 in order to insure seating of each capsule body in each punch passing over the plate 240. The manifold 141 is connected to the vacuum supply through a line 143 connected to the manifold 196 as shown in Figure 6.

As previously described, the capsule feeding means indicated at 16, the capsule end positioning means indicated at 18 and the transfer means indicated at 20

serve to deliver a succession of capsules to the bores within the bushings **184** in the lower punch disc **144**. In the region of the disc **82** the vacuum manifold **188** provides a constant negative pressure in the sleeves **184** thus insuring the dropping of capsules from the bores **88** in the disc **82** into the sleeves **184**. As indicated in Figure 5 which is shown in Figure 7 as station **3**, the progression of lower punches **168** passing station **3** receive capsules positioned therein with the body portion of the capsule extending downwardly and the cap portion of the capsule positioned above the surface **145** of the plate **144**. In stations **3**—**6**, the lower cam plate **117** is of the such a thickness to position the capsule as described and indicated at **248** in Figure 7. The depressing cam **202** on the upper cam disc commences operation at station **5** and fully depresses the upper punches **150** at station **6**. As the progression of punches pass this station the upper punches are moved downwardly and engage the capsule caps as indicated at **250** in Figure 7. The upper vacuum manifold **194** connects the vacuum supply to the punches in station **6** and as the punches rise passing through station **7**, the condition of negative pressure within the punches insures the lifting of the capsule cap. The manifold **188** insures the retention of the capsule body in the lower punch through station **6** and through station **7** into station **8** as the lower punches move downwardly drawing the capsule body downwardly into the sleeves **184** with the uppermost rims of the capsules positioned flush with or slightly below the surface **145** of the lower disc **144**.

As previously noted, stations **10**, **11**, and **12** are the capsule filling stations and in these stations the capsule bodies receive material from the retainer and baffle assembly **232**, **234**. The capsules in punches passing over the plate **240** are accurately positioned by the plate **240** positioning the punches and vacuum from the manifold **141** positioning the capsules in the punches. The scraping of the baffles **234** insures the provision of an accurate level of the material in the capsules and in the bores above the capsules.

Filled capsules leaving station **12** pass through stations **13** and **14** at which time the upper punch is moved downwardly until in station **14** the capsule cap has its lower rim positioned in the recess **186** shown in Figure 5. Punches moving through the station **15** have the lower punches moved upwardly raising each capsule body and moving the capsule body into its capsule cap. At the same time, the upper punches are riding upwardly behind the cam **204**.

In order to insure closure of the capsules and to prevent the capsules from being crushed a compressed air manifold **212** is positioned adjacent to the periphery of the upper cam disc at station **15** and supplied with compressed air through pipe line **214**. The compressed air urges the capsule cap downwardly and insures tight closure of the capsule without requiring absolute accuracy of cam positioning. Furthermore, due to the fact that the machine is operating at a fairly high rate of speed, the capsules are closed so rapidly that the air does not discharge immediately and completely from the capsule. The discharge occurs gradually and there is a tendency for the capsule cap and body portions to be urged apart. The air manifold in this station makes possible a yielding closure providing a time delay for the air to escape, thus insuring complete and permanent closure of the capsules. By the time the punches have reached station **16**, the upper punches are completely retracted, the compressed air has blown the capsule cap out of the upper punch and the capsule remains with the capsule body supported in the lower punch which at this time has risen upwardly on the cam plate **206** until the entire capsule is positioned above the surface **145** of the disc **144** as indicated at **256** in Figure 7.

A brush **258** is mounted in fixed position to sweep over the surface **145** of the disc **144** and discharge closed capsules radially outwardly to a chute **260** by which they are discharged from the machine.

Air manifolds **216** and **218** are positioned adjacent to the peripheries of the upper and lower cam discs respectively between stations **18** and **19** and are supplied with compressed air from a supply line **220**. These manifolds serve to blow air through the punches to insure removal of any capsule parts or foreign matters therefrom before the punches again pass to station **3** and receive capsules from the disc **82**. A brush **262** is additionally provided between stations **20** and **1** to sweep the surface **145** of the disc **144**.

The various compressed air lines **143**, **173** and **214** previously described are connected together through pipe line **175** and to the compressed air line **220** which is connected to any suitable source of compressed air. The vacuum manifold **137** is connected to a suitable vacuum pump by means of a pipe line **139**.

As previously noted, the shaft **146** mounting the punch discs and the shaft **104** mounting the disc **86** extend downwardly through the base plate **10** to driving mechanism. Referring to Figure 3, it will be seen that the shaft **146** has affixed thereto below the base plate **10** a gear **270** in mesh with a worm gear **272** mounted on a transverse shaft **274** which carries a pulley **276** driven by means of a belt **278** which is in turn driven from a motor **280** positioned on suitable mounting means not shown.

The cross shaft **274** is supported under the base plate **10** by conventional bearing pads **282** and has affixed thereto a gear **284** in mesh with an idler gear **286** which drives a gear **288** affixed to a cross shaft **290**. The cross shaft **290** mounts a worm **292** in mesh with a gear **294** affixed to the lower end of the shaft **104** driving the disc **82** above the base plate **10**.

The shaft **290** has affixed thereto a gear **296** which drives, through a gear train indicated at **298**, a cross shaft **300** which through a pair of mating gears **302** drives a cross shaft **304** mounting a pulley driving the belt **38** extending upwardly to the capsule feed means indicated generally at **16** and described in connection with Figures 1 and 2. The motors **80** and **280** are controlled by conventional electrical apparatus which need not be described herein.

From the foregoing, it will be evident that the apparatus provides complete automatic capsule filling means to which capsules and filling material may be supplied in bulk and from which there is received completely filled capsules. It will also be evident that while the foregoing embodiment of the invention has been described in the form of a capsule filling machine the details of the invention may be employed in connection with the filling of various types of containers other than capsules in which the container is provided with a cap portion and a body portion. In all cases, it will not be essential that the cap fit over the body portion. It is entirely conceivable that the cap may be of a type which enters the body portion through the over-fitting cap as preferably employed.

What is claimed is:

1. Container filling apparatus comprising means for delivering a plurality of parallel successions of uniformly positioned closed containers from a random supply thereof, means for filling containers, means for receiving the plurality of successions of containers and for delivering a single succession to said filling means, and said filling means including means for receiving the succession of containers and successively opening, filling and closing containers of the succession and discharging closed filled containers from the apparatus.

2. Container filling apparatus comprising means for delivering a plurality of parallel successions of uniformly positioned closed containers from a random supply thereof, means for filling containers, means for receiving the

plurality of successions of containers and for delivering a lesser number of successions to said filling means, and said filling means including means for receiving a succession of containers and successively opening, filling and closing containers of the succession and discharging closed filled containers from the apparatus.

3. Apparatus for filling containers having body parts and cap parts, said apparatus comprising means for separating a plurality of parallel successions of closed containers from a random supply thereof, means for positioning the individual containers in each succession with their body parts leading their cap parts, means for delivering the successions of containers from said separating means to said positioning means, means for filling containers, means for receiving the plurality of successions of containers and for delivering a lesser number of successions to said filling means, and said filling means including means for receiving a succession of containers and successively opening, filling and closing containers of the succession and discharging closed filled containers from the apparatus.

4. Apparatus for filling containers having body parts and cap parts, said apparatus comprising means separating a plurality of successions of closed containers from a random supply thereof, means receiving said plurality of successions of containers and positioning the individual containers of each succession with their body parts and cap parts uniformly arranged, means receiving said plurality of successions and converting them into a horizontally moving succession, and means receiving the horizontally moving succession of positioned containers and filling the containers of the succession.

5. Apparatus for filling containers having body parts and cap parts, said apparatus comprising means separating a plurality of successions of closed containers from a random supply thereof and dropping the successive containers, means receiving said plurality of successions of dropped containers and positioning the individual containers of each succession with their body parts and cap parts uniformly arranged and dropping the successive positioned containers, rotating means for opening, filling and closing containers, and rotating means simultaneously receiving a dropped container from each of said plurality of successions and horizontally delivering said simultaneously received containers successively to said rotating means for opening, filling and closing containers of the succession.

6. Container filling apparatus comprising means for delivering a plurality of parallel successions of uniformly positioned closed containers from a random supply thereof, means for filling containers, means including a disc having a circular array of longitudinally extending bores, vacuum means for inducing movement of containers into said bores and gating means for controlling movement of containers into said bores for receiving containers from each of said plurality of successions of containers from said delivering means and transferring a succession of positioned containers to said filling means, and said filling means opening, filling and closing the containers.

7. Apparatus for filling containers having body parts and cap parts, said apparatus comprising means for delivering a succession of uniformly positioned closed containers from a random supply thereof and means for receiving the succession of containers and filling the containers of the succession, said receiving and filling means including a pair of spaced rotatable discs longitudinally aligned on their axes of rotation, a circular array of longitudinally movable container cap receiving means mounted in a first of said discs, a circular array of longitudinally movable container body receiving means mounted in the second of said discs each in alignment with a corresponding cap receiving means in said first disc, means for rotating said discs in unison, means actuating said body and cap receiving means during rotation of said discs to successively receive containers, open received containers, close opened containers and discharge closed containers, and means for filling the body parts of open containers.

8. Apparatus for filling containers having body parts and cap parts, said apparatus comprising means for delivering a succession of uniformly positioned closed containers from a random supply thereof and means for receiving the succession of containers and filling the containers of the succession, said receiving and filling means including a pair of spaced rotatable discs longitudinally aligned on their axes of rotation, a circular array of longitudinally movable container cap receiving means mounted in a first of said discs, a circular array of longitudinally movable container body receiving means mounted in the second of said discs each in alignment with a corresponding cap receiving means in said first disc, means for conducting flows of air through said body and cap receiving means, means for rotating said discs in unison, means actuating said body and cap receiving means during rotation of said discs and selectively providing air flows therethrough to successively receive containers, open received containers, close opened containers and discharge closed containers, and means for filling the body parts of open containers.

9. Apparatus for filling containers having body parts and cap parts, said apparatus comprising means for delivering a succession of uniformly positioned closed containers from a random supply thereof and means for receiving the succession of containers and filling the containers of the succession, said delivering means dropping successive containers with their body parts positioned below their cap parts, said receiving and filling means including a pair of spaced horizontally extending rotatable discs longitudinally aligned on their axes of rotaton, a circular array of longitudinally movable container cap receiving means mounted in the upper of said discs, a circular array of longitudinally movable container body receiving means mounted in the lower of said discs each in alignment with a corresponding cap receiving means in the upper disc, means for rotating said discs in unison, means actuating said body and cap receiving means during rotation of said discs to successively receive dropped containers, open received containers, close opened containers, and discharge closed containers and means for filling the body parts of open containers.

10. Apparatus for filling containers having body parts and cap parts, said apparatus comprising means for delivering a succession of uniformly positioned closed containers from a random supply thereof and means for receiving the succession of containers and filling the containers of the succession, said receiving and filling means including a pair of spaced rotatable discs longitudinally aligned on their axes of rotation, a circular array of longitudinally movable container cap receiving means mounted in a first of said discs, a circular array of longitudinally movable container body receiving means mounted in the second of said discs each in alignment with a corresponding cap receiving means in said first disc, means for conducting flows of air through said body and cap receiving means, means for rotating said discs in unison, means actuating said body and cap receiving means during rotation of said discs to successively receive containers in body receiving means under negative pressure, open received containers by opposed cap and body receiving means both under negative pressure, close opened containers by opposed cap and body receiving means with the cap receiving means under positive pressure, and discharge closed containers, and means for filling the body parts of open containers.

11. Apparatus for filling containers having body parts and cap parts, said apparatus comprising means for delivering a succession of uniformly positioned closed containers from a random supply thereof and means for receiving the succession of containers and filling the containers of the succession, said delivering means dropping

successive containers with their body parts positioned below their cap parts, said receiving and filling means including a pair of spaced horizontally extending rotatable discs longitudinally aligned on their axes of rotation, a circular array of longitudinally movable container cap receiving means mounted in the upper of said discs, a circular array of longitudinally movable container body receiving means mounted in the lower of said discs each in alignment with a corresponding cap receiving means in the upper disc, means for conducting flows of air through said body and cap receiving means, means for rotating said discs in unison, means actuating said body and cap receiving means during rotation of said discs and selectively providing air flows therethrough to successively receive dropped containers in body receiving means under negative pressure, open received containers by opposed cap and body receiving means both under negative pressure, close opened containers by opposed cap and body receiving means with the cap receiving means under positive pressure and discharge closed containers, and means for filling the body parts of open containers.

12. Apparatus for filling containers having body parts and cap parts, said apparatus comprising means for delivering a succession of uniformly positioned closed containers from a random supply thereof and means for receiving the succession of containers and filling the containers of the succession, said receiving and filling means including a pair of spaced rotatable discs longitudinally aligned on their axes of rotation, a circular array of longitudinally movable container cap receiving means mounted in a first of said discs, a circular array of longitudinally movable container body receiving means mounted in the second of said discs each in alignment with a corresponding cap receiving means in said first disc, means for rotating said discs in unison, means actuating said body and cap receiving means during rotation of said discs to successively receive containers, open received containers, close opened containers and discharge closed containers, means for filling the body parts of open containers, and means providing flow of air through empty receiving means prior to the receipt of container parts therein to insure clean receiving means for the receipt of container parts.

13. Container filling apparatus comprising means including a plurality of chutes for delivering a plurality of parallel successions of uniformly positioned containers from a random supply thereof, means providing an endless array of openings positioned to provide openings for simultaneously receiving a container from each of said chutes, means for simultaneously releasing one positioned container from each chute into a respective opening, filling means positioned to receive containers from said endless array of openings, said filling means including means for receiving the succession of containers from said endless array of openings and for successively opening, filling and closing containers of the succession, and means for discharging closed filled containers from the apparatus.

14. Container filling apparatus comprising means including a plurality of chutes for delivering a plurality of parallel successions of uniformly positioned containers from a random supply thereof, means providing only a single endless array of openings positioned to provide openings for simultaneously receiving a container from each of said chutes, means for simultaneously releasing one positioned container from each chute into a respective opening, filling means positioned to receive containers from said endless array of openings, said filling means including only a single endless array of means for receiving the succession of containers from said endless array of openings and for successively opening, filling and closing containers of the succession, and means for discharging closed filled containers from the apparatus.

15. Apparatus for filling containers having body parts and cap parts, said apparatus comprising means separating a succession of closed containers from a random supply thereof, means including a pair of spaced rotating discs for positioning and advancing a succession of containers with their body parts extending substantially radially inwardly of said discs and with their cap parts extending substantially radially outwardly of said discs, and a stationary plate deflecting successive containers and positioning the individual containers of the succession with their body parts and cap parts aligned longitudinally and uniformly along their path of advance, and means receiving the succession of uniformly positioned containers and filling the containers of the succession.

16. Apparatus in accordance with claim 15 in which said positioning and advancing means includes an air jet cooperating with said spaced discs for positioning said succession of containers.

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