APPARATUS FOR FILLING CAPSULES


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5 Claims. (Cl. 226—41)

This invention relates to apparatus for filling simultaneously a plurality of capsules.

An object of this invention is to provide an apparatus suitable for use in pharmacies and drug houses for conveniently filling a number of capsules to make them ready for administration.

A further object of this invention is to provide apparatus of the type described in which the charge of powder for each capsule is readily and quickly measured.

The apparatus of this invention includes a cylinder block providing a plurality of substantially horizontal cylinders and comprising a lower part having a plurality of horizontal grooves therein, said grooves having a depth substantially greater than the depth of said cylinders, and a complementary upper part having a plurality of tongues complementary to said grooves and depending therein, said tongues interlocking with said grooves to provide said plurality of substantially horizontal cylinders, a discharge port for each cylinder in the vertical face of said block, means for holding a capsule bottom in filling engagement with each of said cylinder discharge ports and means for simultaneously discharging powdered material from said cylinders through said ports into said capsule bottoms.

The means for holding the capsule bottoms in filling engagement with said cylinder discharge ports cooperates with a mechanism for removing, holding and replacing the tops of said capsules.

In the drawings:

Fig. 1 is a plan view of the apparatus, partly broken away;

Fig. 2 is a front elevation of the apparatus shown in Fig. 1, also partly broken away;

Fig. 3 is a left side elevation of the apparatus of Figs. 1 and 2;

Fig. 4 is an enlarged perspective view of a portion of the lower part of the cylinder block showing a comp positioned in the grooves;

Fig. 5 is a partial plan view, enlarged, of the capsule-bottom holding mechanism;

Fig. 6 is a bottom view of a portion of the capsule-top holding device on the same scale as Fig. 5;

Fig. 7 is a front elevation, partly broken away, of the elements of Figs. 5 and 6 assembled and showing capsules in position therein;

Fig. 8 is a left-hand side elevation of the assembly shown in Fig. 7;

Fig. 9 is a reduced plan view of the apparatus mounted upon a carrying or storage box; and

Fig. 10 is a right-hand side view of the apparatus shown in Fig. 9.

Referring to Figs. 1, 2 and 3, 1 is the cylinder block composed of lower part 2 and complementary upper part 3. The capsule-bottom holding mechanism 4 is shown laid on its side with the capsules 5 in filling relation to the cylinders 6. Each cylinder is provided with a piston 7 connected by piston rod 8 to piston bar 9. As best shown in Fig. 3, piston bar 8 is fixed to the top of box 10 by means of screw 11 and bushing 12. Conveniently, the screw is provided with a winged head 13. Also affixed to the box top are rails 14 upon which the cylinder block assembly slides. These rails are engaged by slots 15 formed in the bottom part of the cylinder block. With this arrangement, the cylinder block assembly may be reciprocated with respect to the piston assembly to force powdered material contained in cylinders 6 through discharge ports 7 into capsule bottoms 5.

The capsule-bottom holding mechanism 4 is provided with trunnions 16 journalled in slides 17. Slide 17 is provided with overturned flanges 18 and reciprocable catch 19 which engages trunnion 16 to retain the capsule-bottom holding mechanism journalled in the slide. Sliding catch 19 is reciprocable in slide 17 and its movement is limited by pin 20 cooperating with slot 21. Slide 17 is affixed to the bottom part of the cylinder block by means of screws 22 and 23, which latter is provided with knurled head 24. These two screws are horizontally disposed and engage slot 25 of the slide, retaining the latter in horizontal position. The capsule-bottom holding mechanism may be reciprocated with respect to the cylinder block by adjustment of slides 17 and may be rotated in the journals provided by slides 17 so as to change the position of the capsules from vertical to horizontal, as desired.

The bottom part 2 of the cylinder block is provided with a plurality of grooves 26 having a depth substantially greater than the depth or diameter of cylinders 6. The upper part 3 of the cylinder block is provided with depending tongues 27 which engage with grooves 26 to provide said cylinders when the two halves of the cylinder block are closed. The upper part of the cylinder block is hinged to the lower part along the back by means of hinges 28.

The movement of the cylinder block assembly with respect to the piston assembly is limited by screws 29 affixed to the back part of the cylinder block and slidable through piston bar 9.
Springs 33 tend to maintain the cylinder block assembly in a position away from the piston bar 8 as shown in Fig. 1. Referring to Figs. 5 to 8 which show the capsule-holding apparatus, 31 is the base or frame of the capsule-bottom holding mechanism. Recesses 32 are provided in the base for the reception of the rounded end of the capsule bottom. The open top of the capsule bottom is engaged by a gripping mechanism 33 comprising an upper plate 34 having turned-over flanges 35 which engage a lower plate 36. The diameter of the holes 37 in the upper and lower plates is substantially equal to the outside diameter of the capsule bottom. Between the upper and lower plates is a slide 38 provided with corresponding holes 39 having a diameter slightly larger than the diameter of holes 37. This slide is laterally reciprocable between plates 34 and 36 and its holes 39 working in cooperation with holes 37 in the upper and lower plates serve to grip a capsule bottom and to hold it securely in capsule-gripping mechanism 33. Reciprocation of slide 38 is effected by handle 48.

Sliding plate 38 is provided with projections 41 which engage the under surface of plate 42 affixed to the top of frame 31 by screws 43 to prevent the capsule-gripping mechanism from being forced out of the frame by spring 44 which tends to keep the capsule-gripping means 33 in raised position. Pin 45 is provided to maintain alignment of the capsule-bottom holding mechanism with the cylinder block when in the position shown in Fig. 1. Pin 45 engages socket 46 to maintain proper alignment.

Fig. 6 is a bottom view of the capsule-top holding device, shown assembled with the capsule-bottom holding mechanism in Figs. 7 and 8. A base 47 is provided with holes 48 of substantially the same diameter as the capsule top. To the bottom of this base is secured a plate 49, by means of screws 50, having holes 51 of a diameter substantially equal to the diameter of a capsule-bottom. A hood 52 is pivotally attached to base plate 47 by means of pivot screws 53 permitting rotation of the hood about the axis of the pivot. Plate 49 is further provided with pins 54 engaging recesses 55 in the capsule-bottom retaining device.

Fig. 9 is a plan view showing the apparatus mounted on top of a carrying or storage box 10 in operative position and Fig. 10 is a right-hand side elevation of the assembly shown in Fig. 9. The box is provided with a top hinged by means of hinge 56 along parting line 57.

In operation, beginning with the apparatus assembled as shown in Fig. 1, the capsule-bottom holding mechanism is slid away from the cylinder block after loosening knurled screws 23. The capsule-bottom holding mechanism is then rotated 90 degrees clockwise, as shown in Fig. 3, to present the openings 31 upwardly. Assuming there are no capsules in the apparatus, the capsule-top holding device is then placed upon the capsule-bottom holding mechanism, as shown in Fig. 7, and the hood 52 is rotated to one side. A complete capsule, i.e., comprising top and bottom assembled, is inserted in each of the holes 48 in the capsule-top holding device, the bottom of the capsules projecting downwardly through holes 37 and 39 in the capsule-bottom retaining mechanism. The hood 52 then is rotated to a vertical position to cover the tops of the capsules, as shown in Figs. 7 and 8. Each capsule rests in the assembly with the bottom edge of the cap-
parent to a skilled operator, the procedure described hereinbefore being merely exemplary of one method of operation.

The capsule-filling device herein described is adaptable to filling capsules having a diameter from somewhat larger to considerably smaller than the diameter of the discharge openings in the cylinder block, but each size of capsule requires a corresponding bottom-holding mechanism and top-holding device which may be provided as alternative elements of the apparatus.

The carrying or storage box is made sufficiently large to accommodate the capsule-filling apparatus together with auxiliary equipment such as alternative capsule-holding elements, a comb, a scraper, a brush and the like.

I claim:

1. An apparatus for simultaneously filling a plurality of capsules with powdered material which comprises a cylinder block providing a plurality of substantially horizontal cylinders and comprising a lower part having a plurality of horizontal grooves therein, said grooves having a depth substantially greater than the depth of said cylinders, and a complementary upper part having a plurality of tongues complementary to said grooves and depending therein, said tongues interlocking with said grooves to provide said plurality of substantially horizontal cylinders, a discharge port for each cylinder in a vertical face of said block, means for holding a capsule bottom in filling engagement with each of said cylinder discharge ports, a reciprocable piston in each of said cylinders and a piston bar to which said pistons are affixed, and means for moving said cylinder block with respect to said pistons.

3. A device for uncappping and recapping a plurality of two-part capsules which comprises a capsule-bottom holding mechanism and a complementary capsule-top holding device, said capsule-bottom holding mechanism comprising a frame including a base supporting the capsule-bottoms and side members upon said base, an element disposed between said side members, said element comprising spaced parallel plates having spaced aligned holes embracing the sidewalls of a capsule-bottom and a slidable plate between said parallel plates having corresponding holes in alignment with the holes in said parallel plates, spring means biasing said element away from said base, and stop means on said side members restraining movement of said element away from said base, said capsule-top holding device comprising an elongated member provided with capsule-top embracing holes having inturned shoulders at their lower openings and spaced at intervals corresponding to the spacing of said capsule-bottom embracing holes, and a hood pivotted upon said elongated member for engaging the closed ends of capsule-tops.

4. A device for simultaneously filling a plurality of capsules with powdered material which comprises a cylinder block having a plurality of cylinders for holding said powdered material, a discharge port for each of said cylinders, means for expelling powdered material from said cylinders through said ports and into said capsule bottoms.

5. An apparatus for simultaneously filling a plurality of capsules with powdered material which comprises a cylinder block providing a plurality of substantially horizontal cylinders and comprising a lower part having a plurality of horizontal grooves therein, said grooves having a depth substantially greater than the depth of said cylinders, and a complementary upper part having a plurality of tongues complementary to said grooves and depending therein, said tongues interlocking with said grooves to provide said plurality of substantially horizontal cylinders, a discharge port for each cylinder in a vertical face of said block, means for holding a capsule bottom in filling engagement with each of said cylinder discharge ports, a reciprocable piston in each of said cylinders and a piston bar to which said pistons are affixed, and means for moving said cylinder block with respect to said pistons.

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