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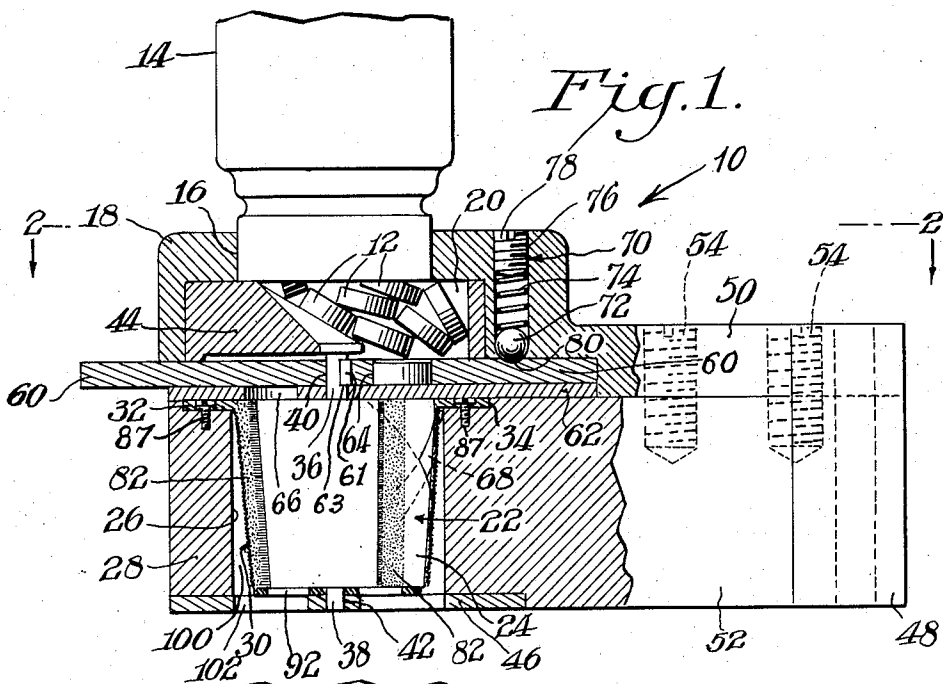
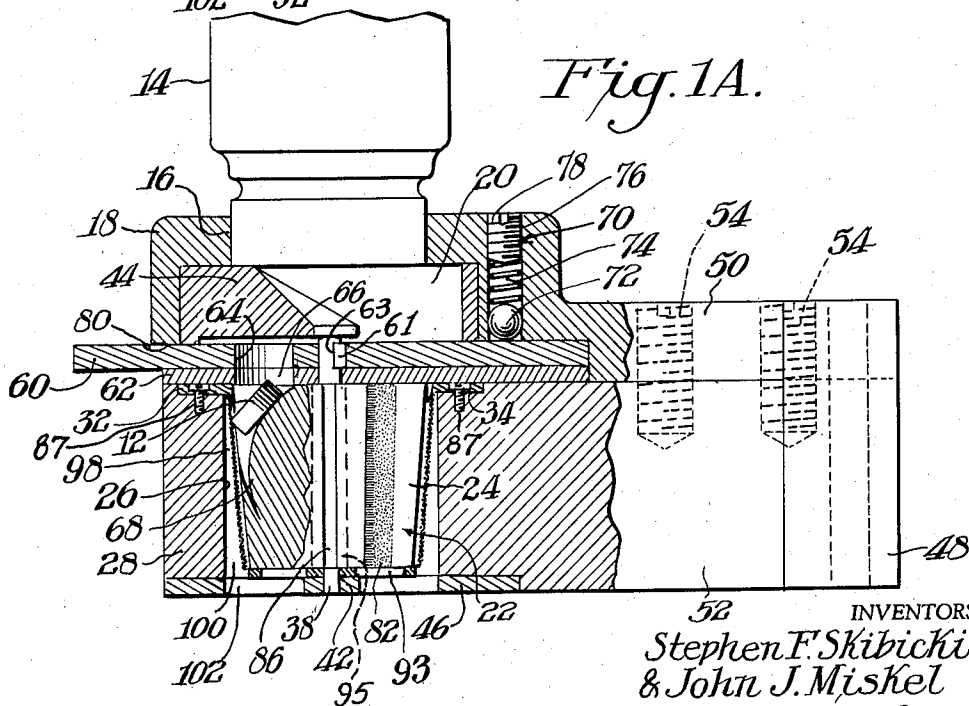
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TABLET PULVERIZING AND DISPENSING DEVICE

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2 Sheets-Sheet 1



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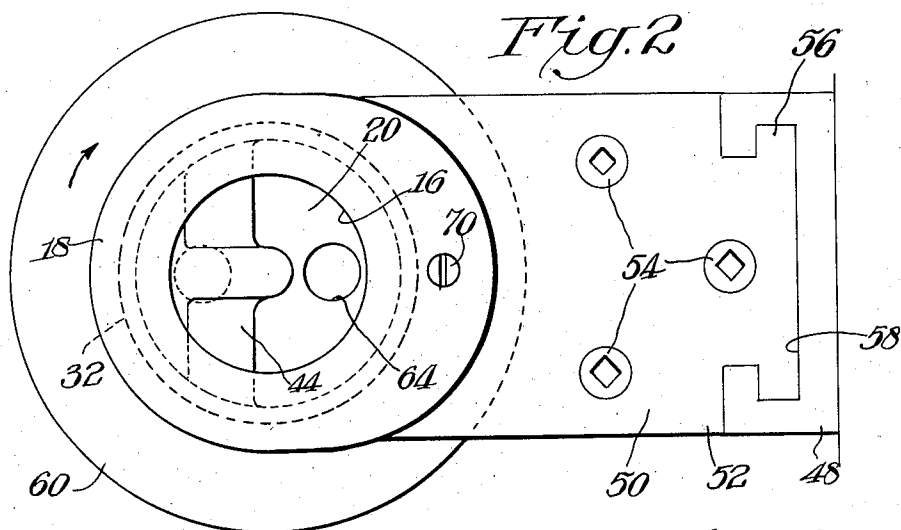
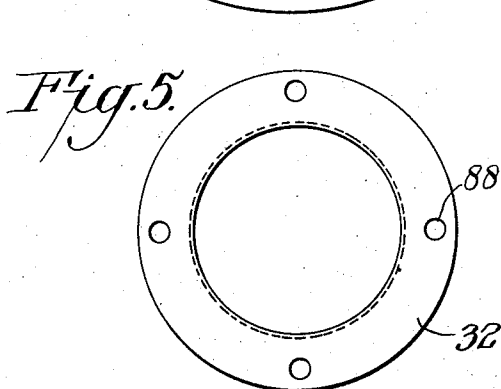
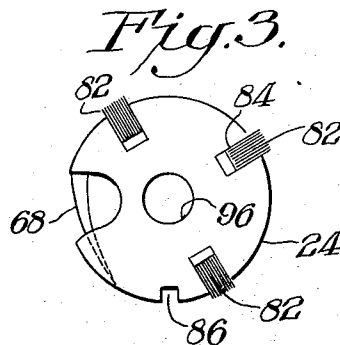
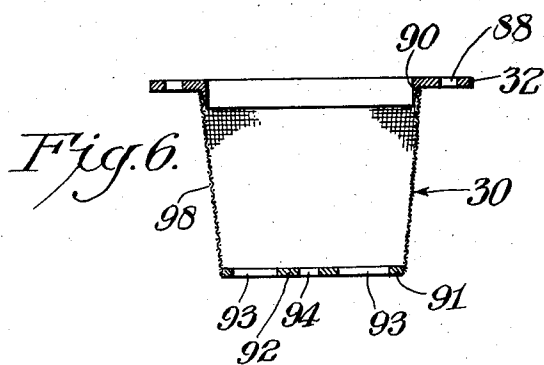
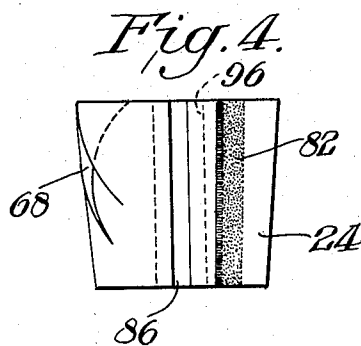
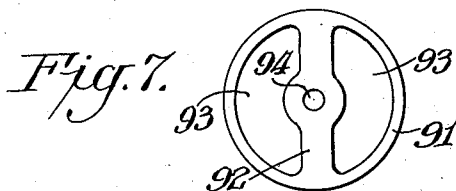
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TABLET PULVERIZING AND DISPENSING DEVICE

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2 Sheets-Sheet 2



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TABLET PULVERIZING AND DISPENSING DEVICE

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5 Claims. (Cl. 241—63)

This invention relates to a device for pulverizing or crushing tablets and dispensing the resultant powder, and more particularly relates to such a device which can be conveniently used for adding a powder formed from these tablets to solutions such as beverages.

Certain pulverulent solid preparations which are, for example, dissolved in beverages immediately before they are used or consumed, are conveniently assembled in tablet or pill form. This facilitates the consistent dispensing of standard and uniform quantities of these preparations. Examples of preparations dispensed in this manner are, for example, effervescent tablets for making carbonated drinks, various stomach alkalizers, and medicinal preparations such as vitamin pills.

Various types of crushing and dispensing devices have been proposed, but existing devices are complicated by the provision of separate means for feeding tablets one at a time and for pulverizing. Another disadvantage of the aforementioned type of dispenser is the possibility that more than one tablet may be delivered to the crusher upon faulty operation of the tablet releasing mechanism.

An object of this invention is to provide a pulverizing and dispensing device which is simple and economical in structure and simple and dependable in operation.

Another object is to provide such a device which cannot crush and dispense more than one tablet in each cycle of operation.

In accordance with this invention, a simple and dependable tablet dispensing and pulverizing device includes a transfer chamber interposed between a storage container and a pulverizing means. This pulverizing means is constructed and arranged to receive only one tablet at a time from the transfer chamber in an initial stage of movement, and it crushes this tablet as it is moved through the remainder of its cycle of operation. This eliminates the necessity for a means for releasing one tablet at a time to the crushing device, and makes it impossible for more than one tablet to be crushed and discharged during each cycle of operation.

Novel features and advantages of the present invention will become apparent to one skilled in the art from a reading of the following description in conjunction with the accompanying drawings wherein similar reference characters refer to similar parts and in which:

Fig. 1 is a cross-sectional view in elevation of one embodiment of this invention in one phase of operation;

Fig. 1a is a cross-sectional view in elevation of the embodiment shown in Fig. 1 in another phase of operation;

Fig. 2 is a plan view of the embodiment shown in Fig. 1 with a portion removed;

Fig. 3 is a plan view of a portion of the embodiment shown in Fig. 1;

Fig. 4 is a front view in elevation of the part shown in Fig. 3;

Fig. 5 is a top plan view of the portion of the embodiment shown in Figure 6;

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Fig. 6 is a cross-sectional view in elevation of another portion of the embodiment shown in Fig. 1; and

Fig. 7 is a bottom view of the part shown in Fig. 5.

In Fig. 1 is shown a tablet pulverizing or crushing and dispensing device 10 for use in crushing and dispensing tablets 12, for example, incorporating a vitamin preparation for addition to soft drinks or milk shakes dispensed, for example, in soda fountains.

Tablets 12 are stored, for example, within an inverted transparent container 14, for example, made of glass to conveniently display the condition and amount of its contents. Container 14 is mounted, for example, within an aperture 16 in the top of a hollow casing 18 enclosing a transfer chamber 20.

A combination pulverizing and pick-up device 22 is mounted, for example, below transfer chamber 20. Combination pulverizing and pick-up device 22 includes a rotatable crushing cylinder 24 mounted to rotate about a vertical axis, for example, within a cylindrical cavity 26 disposed within a housing 28 which forms, for example, the lower portion of device 10. Pulverizing cylinder or drum 24 made, for example, in frusto-conical form rotates intimately within a frusto-conical screen assembly 30 which is held in a fixed position within cavity 26 by upper flange 32 which is received within a suitable recess 34 cut into the upper surface of housing 28. Drum 24 and screen 30 have the form of surfaces of revolution; and they are herein, for example, made in frusto-conical form.

Drum 24 includes upper spindle 36 and lower spindle 38 which rotate respectively within bearings 40 and 42 respectively incorporated, for example, within a shield structure 44 extending within transfer chamber 20 from the inner wall of hollow casing 18, and within bottom plate 46 which is disposed at the bottom of cylindrical pulverizing chamber 26.

In Fig. 1 and Fig. 2 are shown details of a bracket 48 which, for example, is mounted on a vertical panel or wall (not shown), and these figures also show extension 50 of casing 18 and extension 52 of lower housing 28 which are connected together, for example, by means of cap screws 54. Upper and lower arms or extensions 50 and 52 are detachably connected to wall-mounted bracket 48 by means of a T-shaped terminal structure 56 and a correspondingly shaped recess 58 in bracket 48.

In Figs. 1 and 2 are also shown details of an actuating means or lever 60 for operating or rotating drum 24 through one cycle of operation. Lever 60 is, for example, shaped in the form of a disc and is secured to spindle 36, for example, by a key 61 and slot 63 or splines (not shown). A stationary transfer plate 62 is mounted between disc 60 and the entrance to cylindrical chamber 26. Discs 60 and plate 62 respectively include apertures 64 and 66 which are large enough to receive a single tablet 12. Aperture 66 is disposed under the portion of disc 60 which is shielded by shielding element 44, and aperture 64 in disc 60 is aligned with a substantially longitudinally disposed passage 68 cut into the surface of pulverizing drum 24. Passageway 68 is made just large enough at the entrance thereto adjacent transfer chamber 20 to fully receive a single tablet 12.

In the position shown in Fig. 1, a single tablet 12 has been deposited within pocket 64 but it is prevented from dropping or entering into passageway 68 aligned with pocket 64 by the blank portion of plate 62 disposed between pocket 64 and passageway 68. In the position shown in Fig. 1a, tablet 12 has dropped into passageway 68 through aperture 66 in plate 62. Only one tablet can be fed at a time to passageway 68 because the transfer from disc 60 to passageway 68 can occur only under shielding plate 44 which prevents additional tablets from passing into passageway 68.

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A cycle indexing device 70 including, for example, a ball 72 is resiliently forced into contact with plate 60 by means of a compression spring 74 which is disposed within a passageway 76. Passageway 76 is closed, for example, by a threaded plug 78. A depression 80 is formed, for example, within contacting surface of disc 60 radially in line, for example, with the center of aperture or pocket 64. Resiliently mounted ball 72 and depression 80 cooperate to provide a detent for indicating to the operator the start and finish of a cycle of operation or single rotation.

Figs. 3-7 show details of parts included in the pulverizing and crushing device 22. Figs. 3 and 4 show details of the pulverizing drum 24 which is, for example, tapered from top to bottom and includes a substantially longitudinally disposed passageway 68 which, for example, is spirally or helically formed within the lateral surface of drum 24. Passageway 68 spirals away from the direction of rotation of the drum to cooperate in crushing a tablet 12 in the manner later described. Brushes 82 are mounted, for example, in substantially longitudinally disposed slots 84 positioned, for example, at regular intervals about the lateral surface of drum 24. An additional relatively small vertical slot 86 is provided in the lateral surface to receive any larger particles of the tablet which are not immediately crushed to prevent jamming of the drum. Upper spindle 36 and lower spindle 38, for example, may be provided by a cylindrical rod 95 which is snugly inserted through axial hole 96 extending through drum 24.

Figs. 5, 6 and 7 illustrate details of the screen element 30 including upper flange 32 which is secured to recess 34 of lower housing 28, for example, by cap screws 87 which are inserted through holes 88 in flange 32. The entrance 90 to screen element 30 is fully unobstructed, but its bottom 91 includes a central brace 92 including a bearing aperture 94 for receiving lower spindle 38 of drum 24. Apertures 93 are formed in plate 91 on both sides of brace 92.

Illustrative materials for the various portions of the device are described in the following. The upper or transfer chamber casing 18 and lower housing 28 are, for example, conveniently made of relatively strong plastic, for example, a polystyrene resin. Plate 62 and shield element 44 may also be made of polystyrene for example. All of these aforementioned elements may also be conveniently manufactured, for example, of a diecasting alloy.

The top and bottom of screen element 30 are conveniently made of a noncorrosive metal, such as brass, bronze, or aluminum. The lateral frusto-conical screen surface 98 of element 36 is formed, for example, of a relatively stronger metal screen, for example, 36-40 mesh stainless steel screen. However, any size mesh allowing the proper size of tablet particles to pass therethrough can be utilized.

Pulverizing and crushing drum 24 is, for example, conveniently made of a substantially hard and shock resistant material, for example an acrylic resin, such as Plexiglas, a product of the Rohm and Haas Company, or nylon or Teflon compositions which are products of the Du Pont Company.

Operation

When actuating lever or disc 60 is in the position shown in Fig. 1 with detent ball 72 engaged within depression 80, a single tablet 12 is picked up from transfer chamber 20. As the disc 60 is initially rotated by the operator in the direction of the arrows shown in Fig. 2, the tablet is moved under shield 44 into the position indicated in Fig. 1a where it is transferred through aperture 66 in plate 62 into the entrance portion of passageway 68.

As disc 60 is then rotated in the remaining 180° of its single revolution or cycle of operation, the tablet passes down spiral or helical passageway 68 which grad-

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ually approaches the surface of screen element 98 and forces the tablet through the perforations of screen 98 to pulverize it. Brushes 82 clean the screen of material as it is ground and insure that all of the particles of the tablet drop into the annular passageway 100 between screen 98 and the wall of cylindrical cavity 86. These particles drop through apertures 93 in the lower plate 91 of screen assembly 30 and through corresponding apertures 102 in plate 46 forming the bottom of cylindrical chamber 26.

Only one tablet is, therefore, delivered to pulverizing device 22 and subsequently crushed therein during each revolution or cycle of operation. Since the transfer from the pick-up disc 60 to pulverizing drum 24 is accomplished under shielding element 44, there is no possibility that more than one tablet could be transferred at a time to pulverizing drum 24. Furthermore, the entrance to pulverizing drum 24 is constructed and arranged to receive only one tablet at a time from actuating and pick-up disc 60 which prevents the transfer of more than one tablet even if a preceding tablet should become jammed within aperture 66 in transfer plate 62.

What is claimed is:

1. A tablet-dispensing and pulverizing device comprising a hollow casing enclosing a transfer chamber, a storage container mounted above said transfer chamber for feeding tablets thereto under the influence of gravity, a revolving crushing device including a drum inserted within a screened-sleeve element disposed below said transfer chamber for receiving said tablets therefrom under the influence of gravity, said revolving pulverizing device being rotatably mounted about a vertical axis, an apertured plate disposed between said transfer chamber and said pulverizing drum, a shielding element extending from the wall of said casing into transfer chamber in a position which shields the aperture in said apertured plate, said pulverizing drum including a spindle extending through said apertured plate and rotatably mounted within said shield, an apertured disc attached to said spindle above said apertured plate for transferring tablets thereto and extended outside of said casing for manually rotating said drum, said drum including a substantially longitudinally disposed passageway for receiving one tablet at a time from said aperture in said plate and for crushing it against said screen and discharging it during a single revolution of said drum, and the aperture in said disc being disposed out of line with said aperture in said plate a distance sufficient to permit the pick-up of single tablets from said transfer chamber and subsequent dropping through said aperture in said plate into said passageway in said pulverizing drum when said aperture is shielded by said shielding element.

2. A device as set forth in claim 1 wherein said drum and screened sleeve are of corresponding frusto-conical form with axes disposed substantially parallel to each other and both convergently taper from top to bottom; said drum and screened element being mounted within a substantially cylindrical chamber in said casing and said passageway being disposed in a spiral shape passing less than 360° around the surface of said drum and having an inner wall which approaches said screened element to crush said tablet completely and discharge it as said drum is revolved through a single cycle of operation.

3. A device as set forth in claim 2 wherein brushes are mounted about the surface of said drum to insure that all of the particles of a tablet crushed during a single revolution are dispensed from said device.

4. A device as set forth in claim 1 wherein indicating means are mounted to react between said disc and said casing for signalling the start and finish of a single revolution of said drum to an operator.

5. A tablet-dispensing and pulverizing device comprising a hollow casing enclosing a transfer chamber; a storage container connected to said transfer chamber for supplying tablets thereto; pulverizing means connected

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to said transfer chamber; said pulverizing means incorporating a pick-up means for abstracting one tablet at a time from said transfer chamber; a discharge conduit associated with said pulverizing means for dispensing said pulverized tablets; actuating means operatively associated with said pulverizing means and said pick-up means for operating them simultaneously through a cycle of operation; said pulverizing means being constructed and arranged to pick up, substantially crush and discharge the powder formed from only one tablet during each cycle of operation; said pulverizing device being rotatably mounted and being arranged to be rotated through a complete revolution in said single cycle of operation; said actuating means including a lever arm connected to said pulverizing device for rotating it; said pulverizing device including a rotatable drum having a surface of revolution mounted within a corresponding

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screen which is spaced from the walls of a cylindrical container; and a substantially longitudinally disposed passageway being incorporated within the surface of said drum which approaches the surface of said drum as it passes along the longitudinal axis thereof.

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