July 6, 1926. 1,591,532

H. INGRAM

SEALING MACHINE FOR JARS, TUMBLERS, AND THE LIKE

Filed Feb. 23, 1922 3 Sheets-Sheet 1

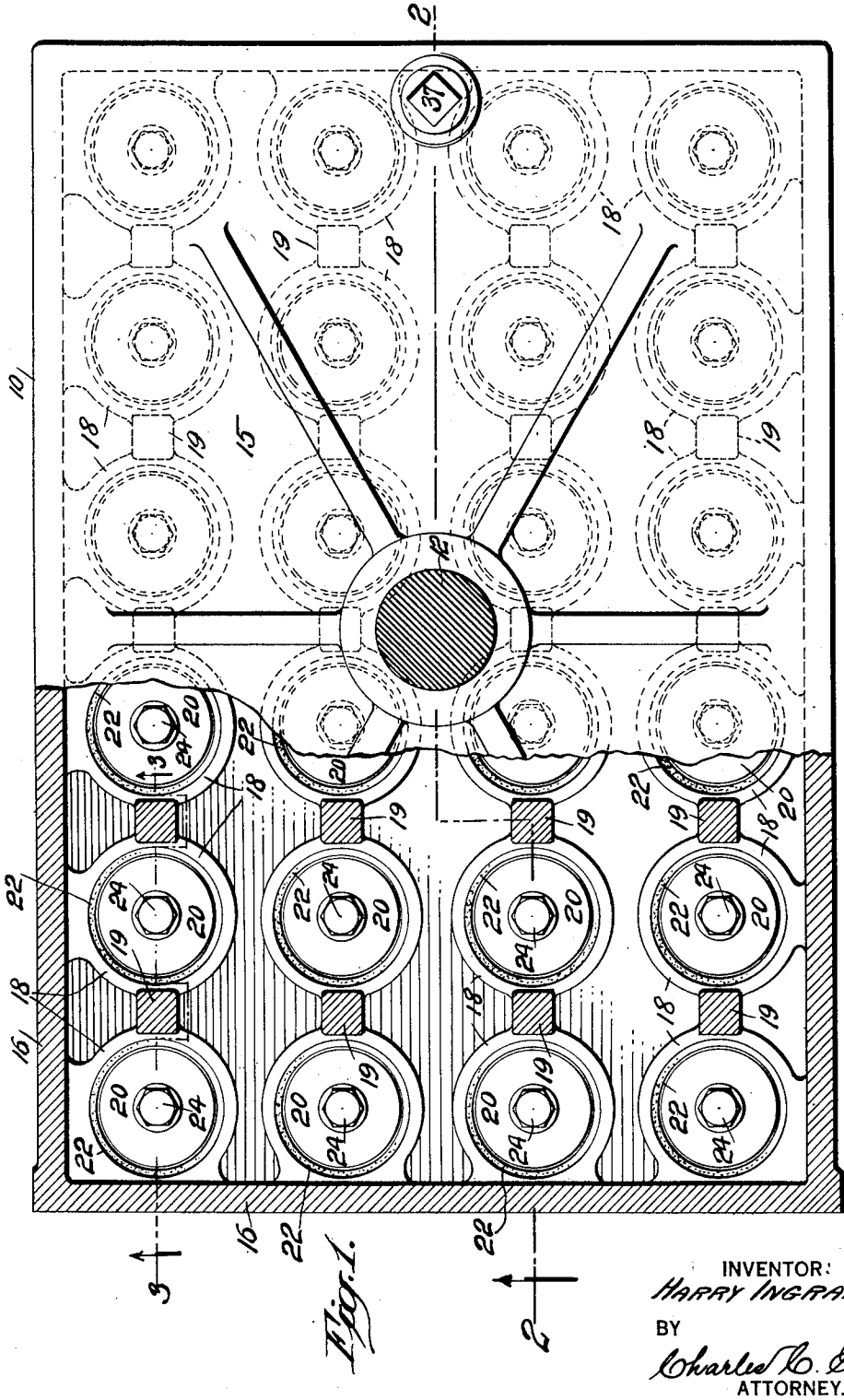


Fig. 1.

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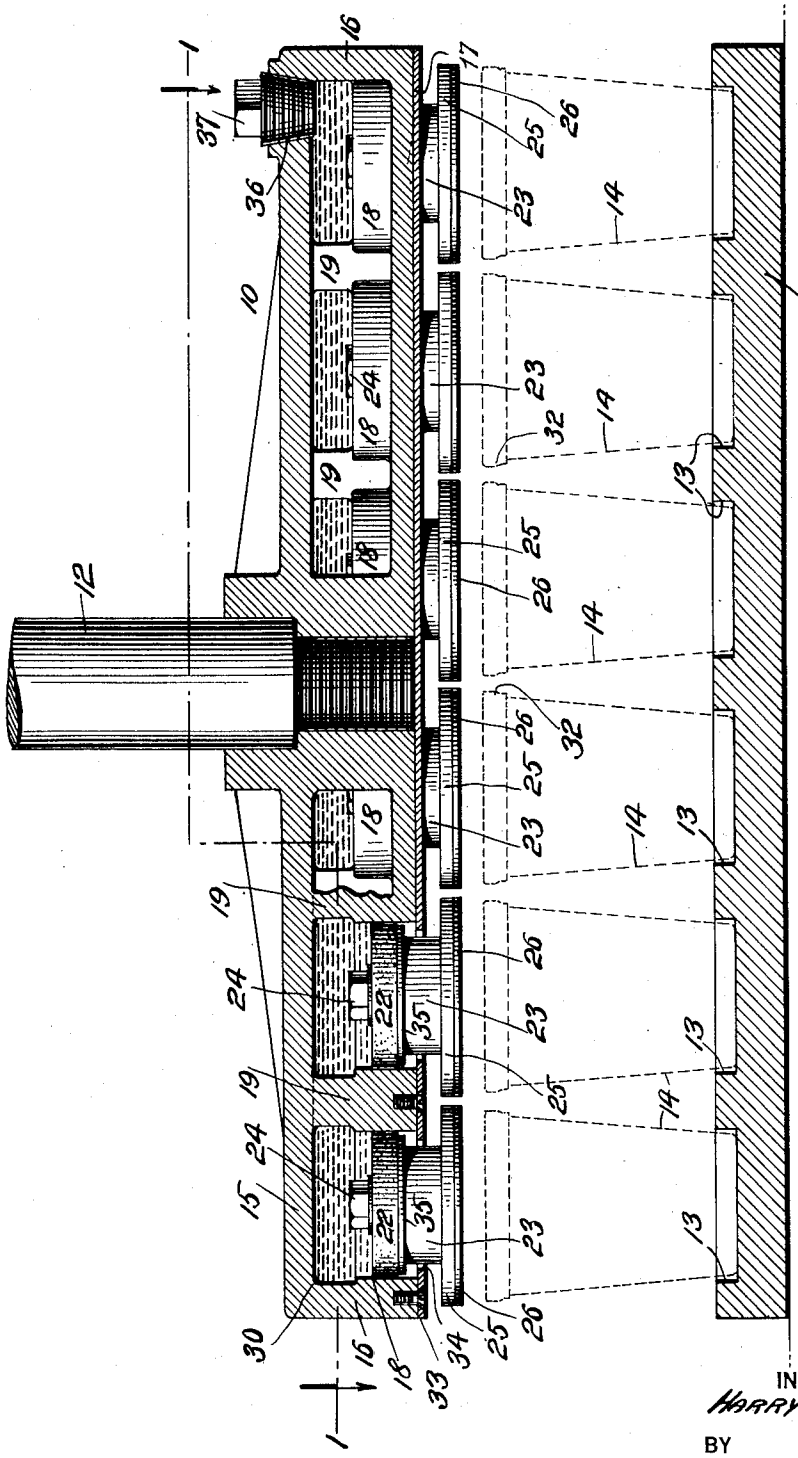


Fig. 2.

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Filed Feb. 23, 1922 3 Sheets-Sheet 3

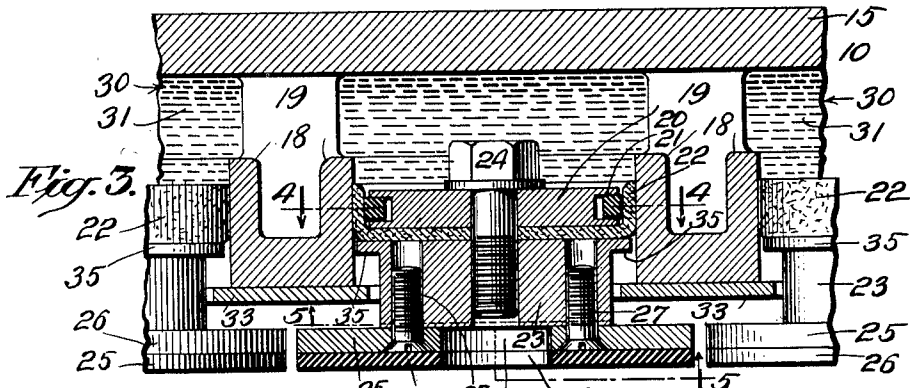
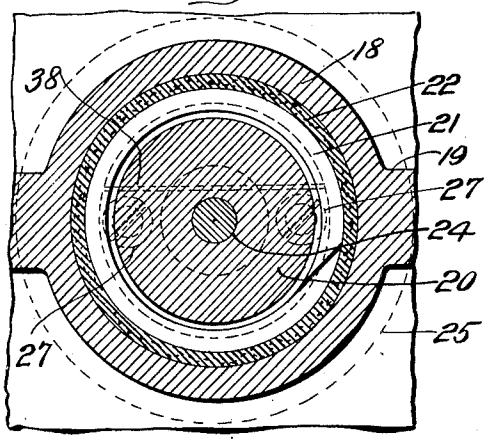


Fig. 3.

Fig. 4.

Fig. 5.



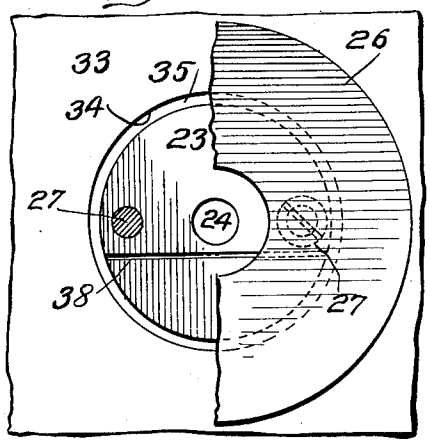
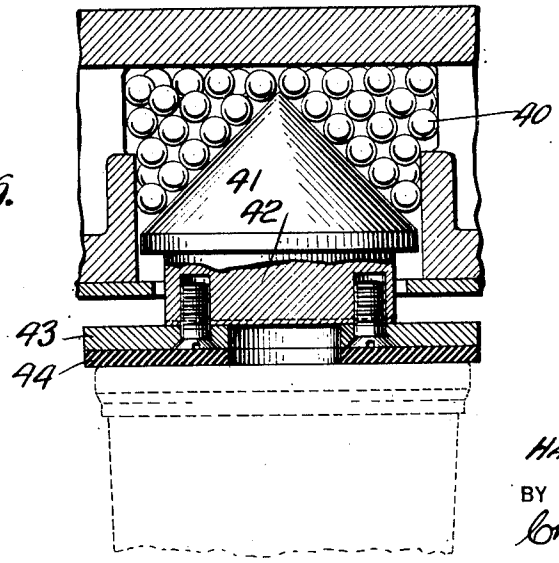


Fig. 6.



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UNITED STATES PATENT OFFICE.

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SEALING MACHINE FOR JARS, TUMBLERS, AND THE LIKE.

Application filed February 23, 1922. Serial No. 538,807.

The invention relates to machines for applying sealing caps to jars, tumblers and the like usually containing food products. In the use of many of the machines, the jars containing their products and with the caps loosely placed thereon are introduced into a chamber below a vertically movable head and thereupon the air is exhausted from the chamber and jars, whereupon the said head is depressed against the caps on the jars to force said caps to sealing position, after which air is admitted to the chamber with the result that the atmospheric air pressure on the caps preponderating over the reduced pressure or partial vacuum within the jars effectually retains the caps securely upon the jars, as in the vacuum process of sealing jars and the like.

Very great difficulties have constantly arisen in meeting with uniform success in carrying on the vacuum process of sealing jars and also in applying the caps commercially to jars in the absence of the vacuum process, due to the imperfections and lack of uniformity in the jars themselves, said jars varying in height and having slanted lip edges and other imperfections when intended to be perfectly uniform in every particular. The difficulties referred to arising from the irregularities in the jars are well understood and have been and are a source of considerable loss and annoyance. The purpose of my invention is to provide a sealing head or platen for use in the vacuum chamber of sealing machines which will render the action of the machine uniformly successful regardless of the usual imperfections and irregularities in the jars to be capped and sealed.

In accordance with my invention, in the preferred construction, I provide a hollow head containing oil or other flowable or displaceable substance and equipped with a series of vertical plungers all exposed at their upper ends to the oil and carrying at their lower ends individual platens to independently engage and press the caps onto the jars, each plunger, with its platen, being independently yieldable vertically and otherwise to the jar below the same and adapted to press the cap onto the jar with proper sealing effect even though the jar be less or greater in height than its companion jars or possess any of the other irregularities common to jars used for food products.

My invention therefore resides in a novel pressure or sealing head for use in sealing machines of otherwise usual or any suitable construction, and the head of my invention may be efficiently employed in simultaneously pressing caps on a large number of jars, as, for illustration, twenty-four jars at a time, or on all the jars that may be accommodated in the sealing chamber of the machine. My invention is also applicable of use in machines in which jars are singly or in small multiples capped, and also in machines in which caps are applied without the employment of the vacuum process.

The head of my invention possesses many features of novelty and practical advantage, and said invention will be fully understood from the detailed description hereinafter presented, reference being had to the accompanying drawings, in which:

Fig. 1 is a top elevation, partly in section and partly broken away, of a head constructed in accordance with and embodying my invention, the sectional portion of Fig. 1 being on the dotted line 1—1 of Fig. 2;

Fig. 2 is a vertical longitudinal section through the same, taken on the dotted line 2—2 of Fig. 1;

Fig. 3 is a longitudinal section, on a larger scale and partly broken away, through a portion of the head taken on the dotted line 3—3 of Fig. 1;

Fig. 4 is a horizontal section through a portion of the same, partly broken away, taken on the dotted line 4—4 of Fig. 3;

Fig. 5 is a sectional view, partly broken away, through a portion of the same, taken on the dotted line 5—5 of Fig. 3, and

Fig. 6 is a vertical section through a portion of a head of modified construction embodying some of the features of my invention.

In the drawings, 10 designates the head as a whole, 11 a tray employed to support the individual jars and to be inserted into the vacuum chamber of a sealing machine with the jars properly positioned with respect to said head, and 12 a rod of the character usually employed for the elevation and depression of the head 10, the tray 11 being of usual type and having sockets 13 to re-

ceive the lower ends of and position the jars 14. In the present instance I illustrate a tray 11 and head 10 adapted for the capping and sealing of twenty-four jars 14 at one operation.

The hollow head 10 presents the novel features of my invention and this head will preferably mainly be formed of a casting presenting a top 15, vertical sides and ends 16 defining a rectangular outline and a bottom 17 in which is formed a series of vertical cylinders 18 which are open at their upper and lower ends and connected in longitudinal series by vertical studs 19 which are integral with the top 15 and bottom 17. The studs 19 are of rectangular cross-section, as shown in Fig. 1, and are between and integral with the cylinders 18. The cylinders 18 have plain vertical walls, as shown in Fig. 3, and within each of these cylinders is located a piston head 20 equipped with a packing ring 21 and cupped piston proper 22, the piston 22 hugging the walls of the cylinder 18 and the ring 21 serving to keep said cupped piston in firm engagement with said walls. Each piston head 20 has secured to its lower side a depending body portion or neck 23 which is held securely pressed against the bottom of the cupped piston 22 by means of a screw or bolt 24, and the neck or body portion 23 of each piston has secured to its lower end a metal disk 25 which is faced on its lower surface with a disk of rubber or the like 26. The disk 25 is fastened to the neck or body-portion 23 by means of screws 27 whose heads are counter-sunk within the lower surface of the disk 25 and concealed by the rubber disk 26. The disk 25 and rubber disk 26 are formed with central vertical aligned openings 28, 29, respectively, as shown in Fig. 3. Each cylinder 18 is thus provided with a plunger composed of the piston head 20, cup-piston 22, neck or body 23, disk 25 and facing disk 26, and each plunger is independent of all the other plungers of the head 10, and all of these plungers are alike and each is fitted to one of the cylinders 18. In the head shown there are, therefore twenty-four cylinders 18 and twenty-four of the plungers, one plunger being confined to each cylinder.

Within the head 10 above all of the plungers and cylinder and about the upper portions of said cylinders and the lugs 19 is a chamber 30 within which I place oil or other flowable or displaceable substance 31 upwardly against which all of the plungers act when the head 10 is finally lowered to press the caps 32 securely upon the jars 14, as pointed out more fully hereinafter.

On the bottom of the head 10 is secured a plate 33 which has free openings 34 in it to accommodate the neck portions or bodies 23 of the plungers, there being a free space left between the inner edges of said openings 34 and the exterior surfaces of said necks 23, as shown in Fig. 3. The plate 33 may be of sheet metal and fastened to the head 10 by means of screws, as indicated in Fig. 2. The openings 34 in the plate 33 are of less diameter than the flanges 35 and disks 25 and thus the escape of the plungers when assembled, from the cylinders is prevented. When it is desired to remove the plungers from the head 10, the plate 33 may be detached and thereupon all of the plungers may be withdrawn downwardly from the cylinders 18. In applying the plungers to the head 10, said plungers, less the disks 25, 26, will be inserted into the cylinders and thereafter the plate 33 will be secured in position and after that the disks 25, 26 will be fastened to the lower ends of the necks 23.

The head 10 will be equipped with a suitable filling orifice 36, which, after the oil or other substance has been introduced into the chamber 30, will be closed by means of a plug 37 of ordinary type.

The lower end of each neck 23 of the plungers is formed with a shallow groove 38 indicated by dotted lines in Figs. 3 and 4 and solid lines in Fig. 5, and this groove 38 crosses the openings 28, 29 in the respective disks 25, 26 and cooperates therewith in preventing the formation of either an air cushion or a vacuum within said openings 28, 29 when the plungers are depressed against the caps on the jars under conditions in which the sealing is being effected in the absence of a vacuum. In cases in which the vacuum process is being followed, the presence of the grooves 38 and openings 28, 29 in the disks 25, 26 permits the entrance of atmospheric air to the tops of the caps, while the plungers are in their lower position pressing the caps onto the jars, this atmospheric air being permitted to reach the caps after the first stages of the vacuum sealing process have been completed and air is permitted to enter the vacuum chamber for finally securing the caps by atmospheric pressure upon the jars.

The oil 31 should not completely fill the chamber 30 in the head 10 when all of the plungers are in their lowermost position, but should fill said chamber 30 when the piston heads and pistons 22 are in about their midway position in the cylinders 18. The practice I follow in introducing the oil 31 into the chamber 30 and to obtain the most advantageous results, is by moving one-half of the number of plungers to their lowermost position and the other half of the number of plungers to their uppermost position and then entirely fill the chamber 30 with the oil, this method permitting of a proper quantity of oil to be introduced within the chamber 30 for securing an equalization of pressure on all of the piston heads 20 during

the use of the machine. The flanges 35 on the necks 23 cooperating with the plate 33, limit the downward movement of the plungers, and the disks 25 cooperating with the plate 33, limit the upward movement of said plungers. After the chamber 30 has been filled with oil in the manner described, the first depression of the head 10 against the jars 14 will result in all of the plungers taking their operative positions, the plungers which had been lowered to their extreme limit then moving upwardly and causing the oil to act against the plungers which had been moved to their upper position and causing said plungers to descend, the result being that all of the plungers will take their operative positions and act uniformly against the series of caps 32 on the jars 14 even though said jars may present irregularities as to height and lip formation.

In the employment of the invention the jars or tumblers 14 will be placed upon the tray 11, and the tray introduced into the vacuum chamber of the sealing chamber of the cap-applying and sealing machine in the customary manner, the tray 11 being so placed in said chamber that the series of jars or tumblers 14 are in vertical alignment with and below the disks 26 forming a part of the plungers. If the machine should be a vacuum-sealing machine the air will be exhausted from the aforesaid chamber, as usual, and thereupon the head 10 will be caused to lower and firmly press all of the caps 32 upon the tumblers or jars 14.

After this stage of the process has been completed atmospheric air will be admitted to the chamber, the head 10 will be elevated and the chamber will be opened, and the tray 11, with the tumblers or jars thereon, removed. The main point of the present invention resides in the fact that the plungers are capable of independent action and of accommodating themselves to the height of the tumblers or jars even though the jars or tumblers lack uniformity in height or possess other irregularities in the lip formation thereof. If all of the jars or tumblers 14 should be precisely alike, all of the plungers will have a uniform movement, but this ideal condition is rarely met with, and hence the head 10 is adapted for jars which lack uniformity in height and other characteristics. Some of the jars 14 may be of one height and others of a different height, and to effectually seal all of the jars regardless of this condition, is the object of the present invention. If we assume that the jars 14 vary in height and the head 10 is caused to descend, the pressure exerted by the higher jars on the certain plungers above them, will cause said plungers to move slightly upward, and the result of this is that these plungers will displace to some extent the oil or other liquid above them and cause a surplus of liquid to flow above and against the pistons 20 of the plungers located over the jars of lower height, whereby said plungers will be caused to have a greater descending movement than the first-mentioned plungers and will reach and correctly apply the caps on the jars below them. If there should be only one short jar 14 in the set of twenty-four, the plunger above that one jar would have a greater descent than the other plungers held up by the other jars due to the displacement of the oil and the surplus passing above and acting against the piston of said plunger. If one-half of the jars 14 scattered about should be less in height than the remaining jars, the plungers above said remaining jars, by being caused to move upwardly against the liquid to a greater extent than the plungers above the lower jars, will displace the liquid from above them to above the plungers above the lower jars and not only permit said plungers to reach the lower jars but apply the caps thereon with the same degree of pressure that the caps are applied on the taller jars. If any of the jars should have an inclined lip edge instead of a true horizontal edge, the plungers will properly apply the caps upon them since in that instance the plungers may tilt to a sufficient extent to carry the disks 26 against the whole lip of the jar and the liquid will exert a resisting pressure against the plunger to distribute an equal pressure on the cap entirely around the lip of the jar.

My invention is not limited to the head 10 adapted for the capping and sealing of any special number of jars at a time, and hence the head will be adapted to the size of the machine in which it may be employed and be equipped with the requisite number of plungers consistent with the size of the machine. My invention is entirely useful for capping and sealing two or three jars at a time, or only one jar at a time, since in either case the plunger or plungers will yield to the irregularities of the jar and distribute an equal pressure around the lip edge of the same.

I do not illustrate in the drawings the details of a capping and sealing machine whether of the vacuum or other type, since my invention pertains to a sealing head applicable to many constructions of machines used for applying the caps to jars.

I show in Figs. 1 to 5 inclusive the preferred embodiment of my invention, but I am aware that the invention is subject to modification in many of its details, and therefore I do not limit my invention to the details of form and construction further than the appended claims and the prior art may require.

I prefer the employment of a fluid within the chamber 30 of the head 10, but with

possibly less advantage the displaceable substance within the chamber of the head 10 may consist of steel balls 40, as shown in Fig. 6, which presents a modification of my invention. When the steel balls 40 are made use of the top of the piston head will be of cone-shape, as at 41, and in this instance the cup packing 22 may be omitted. In Fig. 6, being a modification, I number the piston 41 and its neck 42, and upon the lower end of this neck is secured the metal disk 43 and rubber disk 44 corresponding with the disks 25, 26 of Fig. 3. When the piston 41 with its disks 43, 44 descend upon a high jar while an adjacent piston 41 with its disks is descending on a low jar, the conical shape of the piston above the high jar will displace the balls 40 to move above the piston located above the low jar, and in that way the piston above the low jar will be enabled to exert the same pressure on said jar that the other piston exerts against the high jar. The oil 31 or other easily flowable liquid or fluid is preferable to the use of the steel balls 40 on account of its more readily flowable character and its adaptability to quickly distribute itself over the series of plungers in accordance with the requirements of each plunger.

I believe my invention to be generically new and desire to receive adequate protection therefor.

What I claim as my invention and desire to secure by Letters Patent, is:

1. In a machine of the character described, a platen-head for applying caps to jars and the like having therein a chamber confining a body of flowable substance displaceable to a limited extent therein, and a plurality of independent plungers depending from said head collectively exposed at their upper ends to said body of flowable substance and at their lower ends being adapted to independently engage and press the caps onto the jars, said head having cylinders for said plungers, and said plungers when the head is lowered to press them against the caps, being adapted at their upper ends to independently act against and be collectively acted on by said body of flowable substance, and said plungers being independently capable of limited tilting action to accommodate themselves to jars whose lip edges may be out of horizontal.

2. In a machine of the character described, a platen-head for applying caps to jars and the like having therein a chamber confining a body of flowable substance displaceable to a limited extent therein, and a plurality of independent plungers depending from said head exposed at their upper ends to said substance and at their lower ends being adapted to engage and press the caps onto the jars, said head having cylinders for said plungers, and said plungers when the head is lowered to press them against the caps, being adapted at their upper ends to independently act against and be likewise acted on by said substance, and said plungers each consisting of an upper head, a neck depending therefrom and a presser-plate on the lower end of said neck and being open at its central vertical portion to form a chamber from which an air-channel leads into the sealing chamber of the machine.

3. In a machine of the character described, a platen-head for applying caps to jars and the like having therein a chamber confining a body of pressure resisting substance displaceable to a limited extent therein, and a plunger depending from said head exposed at its upper end to said substance and at its lower end being adapted to engage and press the cap onto the jar, said head having a cylinder for said plunger, and said plunger when the head is lowered to press it against the cap, being adapted at its upper end to act against and be acted on by said substance, and said plunger consisting of an upper head, a neck-portion depending therefrom and a presser-plate on the lower end of said neck and having an open central portion forming a chamber to be closed at its lower end by the engagement of the presser plate with the cap being applied, an air-channel being provided to establish communication between said chamber and the sealing chamber of the machine.

4. In a machine of the character described, a platen-head for applying caps to jars and the like having a top, sides, ends and bottom and forming therein a chamber for a confined body of pressure resisting substance displaceable to a limited extent within said chamber, said bottom being formed with a plurality of vertical cylinders open at their upper and lower ends, a series of plungers fitted to said cylinders and having depending neck-portions carrying at their lower ends removable presser plates to engage the caps and being greater in diameter than said neck-portions and a plate fastened to said bottom and having a series of openings through which said neck-portions freely extend and which are less in diameter than said presser-plates and said cylinders and at their edges afford stops to limit the upward movement of said plungers, said plungers at their upper portion being adapted to engage said plate for limiting the downward movement of said plungers, and said plungers when the head is lowered to carry said presser plates against the caps being adapted at their upper ends to independently act against and be likewise acted on by said substance.

5. In a machine of the character described, a platen-head for applying caps to jars and the like having a top, sides, ends and bottom and forming therein a chamber for a con-

fined body of pressure resisting substance displaceable to a limited extent within said chamber, said bottom being formed with a plurality of vertical cylinders open at their upper and lower ends, a series of plungers fitted to said cylinders and having depending neck-portions carrying at their lower ends removable presser-plates to engage the caps and being greater in diameter than said neck-portions and a plate fastened to said bottom and having a series of openings through which said neck-portions freely extend and which are less in diameter than said presser plates and said cylinders and at their edges afford stops to limit the upward movement of said plungers, said plungers at their upper portion being adapted to engage said plate for limiting the downward movement of said plungers, and said plungers when the head is lowered to carry said presser plates against the caps being adapted at their upper ends to independently act against and be likewise acted on by said substance, and said plungers being capable of independent limited tilting action to accommodate themselves to jars whose lip edges may be out of horizontal.

Signed at Wheeling, in the county of Ohio and State of West Virginia, this 16th day of January, A. D. 1922.

HARRY INGRAM.