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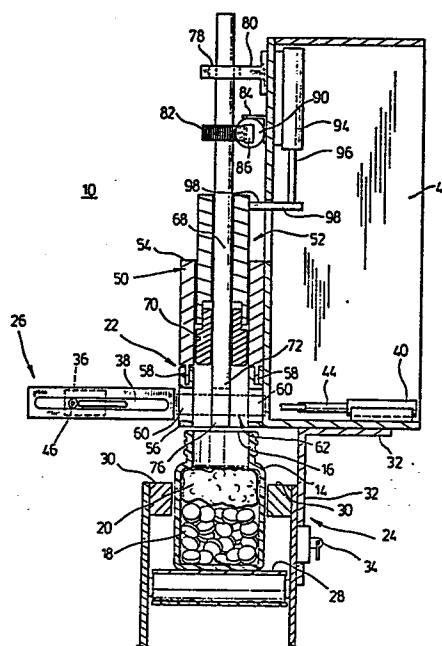
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54 **Automatic inserter.**

57 An apparatus (10) for inserting a flexible paper article (12) into a rigid container (14) having an aperture (16) is described. The apparatus includes a compression station (22) and a conveyor (28) for orienting the aperture of the container in alignment with the compression station. A paper dispensing tray (26) is provided for advancing the paper article to the compression station. The compression station includes an article orienting and limiting member (50) for orienting the paper article in a first predetermined position and limiting the paper article in a second predetermined position. The compression station further includes a rotatable shaft (68) and a plunger (70). The rotatable shaft cooperates with the orienting and limiting member to rotatably compress the paper article causing the paper article to move from the first position to the second position. The plunger urges the paper article in its second position into the container through the aperture. This novel apparatus provides automatic and reliable insertion of paper articles into containers.



- 1 -

AUTOMATIC INSERTER

The present invention relates to an apparatus for inserting a flexible article into a rigid container. In particular, it relates to a machine for compressing a paper article and inserting same into the container.

5 The insertion of paper into a rigid container has significant application in the pharmaceutical industry.

Government regulations require that a label, bearing information relating to the pharmaceutical product, accompany each container receptacle for that product. To comply with this regulation, paper labels are folded into squares and inserted into the container through a circular aperture of the container. While the folded labels for each pharmaceutical product are usually of a fixed size, the containers may be of varying size depending on the amount of product contained therein. In some instances, the size of the folded label is larger than the diameter of the aperture of the container. Consequently, it is extremely difficult to force the larger label through the smaller aperture. For the most part, paper label insertion is presently done manually and, as can be appreciated, manual insertion when the labels are larger than the aperture is difficult and tiring.

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While machines have been developed to fold a paper label into a square and insert the folded label into a

container, such machines are not reliable. When the folded label is larger than the container aperture, the machines frequently fail to properly insert the folded labels into the containers. Further, when the aperture of the container is larger than the folded paper, cotton batting, previously inserted into the container and compressed when the folded label is inserted, tends to expand pushing the label or a portion thereof above the aperture. As a result, the lid or cap of the container may not properly close the aperture.

Another method of providing a label with a pharmaceutical product involves inserting a folded label and its associated container into a cardboard package. While this method is more reliable, it is more expensive in terms of material costs.

It is therefor an object of the present invention to provide a device that inserts an article into a container.

Briefly, the present invention relates to an apparatus for inserting a flexible article into a rigid container having an aperture. The apparatus comprises a compression station and means for orienting the aperture of the container in alignment with compression station. Means for advancing the article to the compressing station is also provided. The compression station includes an article orienting and limiting member for orienting the article in a first predetermined position and limiting the article in a second predetermined position. The compression station further includes means cooperating with the orienting and limiting means for rotatably compressing the article and urging the article in its second limited position into the container through the aperture.

The orienting and limiting member limits the article to a second predetermined position wherein the size of the article is less than the size of the container aperture. Thus, the article can be readily inserted into the container. Because the inside diameter of the container is always larger than its aperture, the article once inserted into the con-

- 3 -

tainer is no longer limited to its second position. As a result, the article tends to expand to a size greater than or equal to that of the aperture reducing the chances of the cotton batting within the container, or other material displaced to make room for the article, pushing the article out of the container.

In accordance with a broad aspect of the present invention there is provided an apparatus for inserting a flexible article into a rigid container having an aperture. The apparatus comprises means for orienting the flexible article with the aperture, compression means for rotatably compressing the flexible article, and means for urging the compressed flexible article into the container.

For a better understanding of the nature and objects of the present invention, reference may be had to the accompanying diagrammatic drawings in which:

Figure 1 is a side sectional view of an automatic inserting machine embodying the apparatus of the present invention;

Figure 2 is a view similar to Figure 1 illustrating the rotatably compressing means and urging means of the present invention urging an article into a container;

Figure 3 is a three-dimensional schematic representation of the apparatus of the present invention;

Figure 4 is a three-dimensional partially exploded view of the compression station of the present invention;

Figure 5 is a schematic view illustrating the movement of the article through the apparatus including the rotatable compression of the article from its first predetermined position to its second predetermined position; and

Figure 6 is a view similar to Figure 2 except the means for urging the article moves independently of the rotatable compressing means.

Referring to the drawings, a preferred embodiment of the present invention will be described.

An apparatus 10 for inserting flexible articles 12 into a rigid container 14 is shown in detail in Figures 1 to 3. The container 14 is provided with an aperture 16 through which pills or tablets 18 and cotton batting 20 have been previously inserted.

The apparatus 10 includes a compression station 22, a means 24 for orienting the aperture 16 of the container 14 in alignment with the compression station 22, and a means 26 for advancing the flexible articles 12 to the compression station 22.

The flexible articles 12 are illustrated as elongated pieces of paper which are folded into the rectangular strip and are better illustrated in Figures 4 and 5.

The means 24 for orienting the container aperture 16 in alignment with the compression station 22 is illustrated as a conveyor mechanism having a conveyor belt 28 and guide means or rails 30. The compression station 22 is supported above conveyor 24 by adjustable bracket 32 having a height adjustment handle 34. Thus, the height of the compression station above conveyor 24 can be adjusted to accommodate containers of different sizes.

The means 26 for advancing the paper articles 12 to the compression station 22 is illustrated as a paper dispensing tray. Paper dispensing tray 26 has a bracket 36 movable toward compression station 22 along slot 38. Movement of bracket 36 is controlled by an actuating means or a first air actuated piston 40 housed in casing 42. The piston 40 has its piston rod 44 mechanically coupled to movable bracket 36 so as to urge bracket 36 to the right when piston 40 draws rod 44 back into its cylinder. Bracket 36 is provided with an aperture 46 into which tube 48 is inserted. Tube 48 has its other end connected to a vacuum generator or pump (not illustrated) housed in casing 42. The tube 48 holds one paper article 12 against aperture 46 of bracket 36 such that only one paper article 12 is advanced to compression station 22 when bracket 36 moves to the right.

- 5 -

The compression station 22 includes an orienting and limiting member 50 and a rotatably compressing and urging means 52 (see also Figure 4).

5 The orienting and limiting member 50 includes upper and lower portions 54, 56 interconnected by pins 58 of the upper portion 54 seated in corresponding holes of the lower portion 56. The lower portion 56 is provided with two slotted apertures 60 which receive and orient the paper article in a first predetermined position as illustrated at 62 in
10 Figure 1. The lower portion 56 is provided with a central aperture 64 which limits the paper in a second predetermined position as partially illustrated at 66 in Figure 2. This illustration is partial because the paper article 12 is also shown in the process of being inserted into the container 14.
15 The orienting and limiting member 50 limits the size of the paper article 12 in the second position 66 to be less than the size of container aperture 16. If the size of aperture 16 of container 14 is changed, the lower portion 56 of member 50 can be replaced with a new lower portion having a central
20 aperture of appropriate size to allow the paper article 12 in its second position to be inserted through the different sized aperture.

The rotatably compressing and urging means 52 includes a rotatable shaft 68 for rotatably compressing the
25 paper article 12 and a plunger 70 for urging the article 12 into the container 14. The movement of the rotatable shaft 68 or plunger 70 illustrated in Figure 6 is mutually exclusive of the other. That is to say, plunger 70 moves downwardly to insert the article while shaft 68 maintains its
30 position. In the embodiment of Figure 2, both the rotatable shaft 68 and plunger 70 move downwardly to insert the article.

The rotatable shaft 68 has an end 72 that is notched at 74 to provide two spaced apart prongs 76. Notch
35 74 is aligned with slotted apertures 60 of member 50. As

shaft 68 is rotated, the paper article 12 wraps initially around one of the prongs 76 and spirals out from the shaft 68 in a shape as shown in Figure 5. The shaft 68 and central aperture 64 of member 50 co-operate to rotatably compress the paper article 12 into this shape.

The shaft 68 is supported at its upper end by bearing 78 and bracket 80 as illustrated. Bracket 80 is mounted to casing 42. Below bracket 80 and attached to shaft 68 is a pinion 82. Another bracket 84 maintains the teeth of rack 86 in meshing relation with the teeth of pinion 82. The rack 86 is connected to piston rod 88 of a second air actuated piston or actuating means 90. Piston 90 is mounted to casing 42 as illustrated. Movement of piston rod 88 outwardly from the cylinder of piston 90 causes rack 86 and pinion 82 to rotate shaft 68 about axis 92.

The plunger 70 is housed within member 50. Downward movement of plunger 70 relative to shaft 68 (Figure 6) urges the paper article 12 in its second predetermined position into the container 14 through aperture 16. Movement of plunger 70 is controlled by actuating means or a third air actuated piston 94 housed within casing 42 as illustrated. Piston rod 96 of piston 94 is mechanically coupled to plunger 70 by an interconnecting member 98. As piston rod 96 moves out of the cylinder of piston 94, interconnecting member 98 moves downwardly causing plunger 70 to move against the paper article 12 and urge it out through the control aperture 62 of lower portion 56 and into the container 14. Operation of plunger 70 in the embodiment of Figure 2 is much the same as the embodiment of Figure 6 except that the shaft 68 moves with the plunger. Since the diameter of the inside of the container 14 is larger than the diameter of its aperture 16, the spiralled paper expands engaging the interior wall(s) of the container and/or neck of the container.

While the foregoing description has been for an apparatus that inserts one article into a container, it should

- 7 -

be understood that the present invention further provides an apparatus that may insert a plurality of flexible articles into a series of containers.

5 To ensure that the machine 10 operates in a sequential fashion to insert paper labels 12 into each container 14 of the series of containers, sensing means or photoelectric cells 102, 104, 106, 108 are linked via communication wires to electronic controller 110 housed in casing 42. Electronic controller or control means 110 controls the air valves associated with each of the air actuated pistons 40, 90 and 94.

10 For a better understanding of the principle and sequential operation of apparatus 10, one cycle of operation of the apparatus is described below.

15 As a container 14 moves under compression station 22, photoelectric cell 102 senses the presence of the bottle 14 and sends a signal to controller 110. In response to this signal, controller 110 de-activates piston 40 through its associated valve. This causes piston rod 44 to move bracket 36 and one label 12 attached to bracket 36 to the right and into slots 60 of member 50. The second photoelectric cell 104 detects when bracket 36 has moved to the right and sends a second signal to controller 110.

20 In response to the second signal, controller 110 activates piston 40 moving bracket 36 back into its original position and controller 110 activates piston 90. Suction, provided through tube 48 to the paper article, is temporarily stopped so that the article remains at the compression station 22. Upon activation of piston 90, piston rod 88 and rack 86 rotate pinion 82 and shaft 68. The initial positioning of rack and pinion gearing is chosen such that notch 74 of shaft 68 aligns with slots 60 of member 50 so as to receive and orient the paper label 12 in its first predetermined position. As the shaft 68 rotates, the paper label 12 is rotatably compressed.

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A third photoelectric cell 106 senses when the rack 86 has stopped moving and sends a third signal to the controller 110.

5 In response to the third signal, controller 110 activates piston 94 causing piston rod 96, interconnecting member 98 and plunger 70 to move in a direction parallel to axis 92 and urge the spiralled label 12 (in its second predetermined position) into the container 16 through its aperture 16.

10 A fourth photoelectric cell 108 senses when the plunger 70 has stopped and transmits a fourth signal to controller 110.

15 In response to the fourth signal, controller 110 returns pistons 90 and 94 to their original position to complete the cycle. Depending upon the time taken by the apparatus to complete a cycle and upon the speed of the conveyor, the final and fourth signals may also be used to respectively stop and start up the conveyor. An air bottle 112 is provided to supply air to the pistons.

20 The foregoing has been a description of a preferred embodiment of the present invention. It should be understood that alternate embodiments of the present invention may be readily apparent to a man skilled in the art.

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CLAIMS

1. An apparatus for inserting a flexible article into a rigid container having an aperture, said apparatus comprising:

a compression station;

means for orienting said aperture of said container in alignment with said compression station; and

means for advancing said article to said compression station;

said compression station including: an article orienting and limiting member for orienting said article in a first predetermined position and limiting said article in a second predetermined position and means co-operable with said orienting and limiting member for rotatably compressing said article and urging said article in said second position into said container through said aperture.

2. An apparatus according to claim 1 wherein said means for rotatably compressing and urging said article includes a rotatable shaft for rotatably compressing said article and a plunger for urging said article into said container.

3. An apparatus according to claim 2 wherein movement of either of said shaft or said plunger is mutually exclusive of the other.

4. An apparatus according to claim 2 wherein said shaft is provided with two spaced apart prongs defining an article receiving notch therebetween.

5. An apparatus according to claim 4 wherein said orienting and limiting means has two aligned slots to receive and orient the article and a central aperture to limit the size of the article.

6. An apparatus according to claim 1 wherein said orienting means comprises a conveyor mechanism having guide means for positioning said aperture of said container in alignment with said compression station.

7. An apparatus according to claim 1 wherein said means for advancing said article to said compression station includes a paper tray dispenser having a slotted aperture toward said compression station, and means connected to said bracket for drawing said article towards said bracket whereby said article moves as said bracket moves.

8. An apparatus for inserting flexible articles into a series of rigid containers each having an aperture, said apparatus comprising:

a compression station;

means for sequentially orienting one of said series of containers with its aperture in alignment with said compression station; and

means for advancing one of said articles to said compression station when said container has its aperture aligned with said compression station;

said compression station including an article orienting and limiting member for orienting said one article in a first predetermined position and limiting said one article in said second predetermined position, and means cooperable with said orienting and limiting member for rotatably compressing said one article and urging said one article in said second position into said one container through its aperture.

9. An apparatus according to claim 8 wherein said means for rotatably compressing and urging said one article includes a rotatable shaft for rotatably compressing said article and a plunger for urging said article into said container.

10. An apparatus according to claim 9 wherein movement of either said shaft or said plunger is mutually exclusive of the other.

11. An apparatus according to claim 9 wherein said shaft is provided with two spaced apart prongs defining an article receiving notch therebetween.

12. An apparatus according to claim 11 wherein said orienting and limiting means has two aligned slots to receive and orient said one article and a central aperture to limit the size of said one article.

13. An apparatus according to claim 8 wherein said orienting and limiting means comprises a conveyor mechanism having guide means for positioning the aperture of said one container in alignment with said compression station.

14. An apparatus according to claim 9 wherein said means for advancing said one article to said compression station includes a paper tray dispenser having a plurality of said flexible articles arranged adjacent one another, a slotted aperture and a bracket movable along said slotted aperture to said compression station, and means connected to said bracket for drawing said one article towards said bracket whereby said one article moves with said bracket.

15. An apparatus according to claim 14 comprising first, second and third actuating means for respectively moving said bracket, said rotatable shaft and said plunger.

16. An apparatus according to claim 14 wherein said means for advancing said one article includes first actuating means connected to said bracket and in response to a first signal moving said bracket toward said compression station, said rotatably compressing and urging means includes second actu-

ating means connected with said rotatable shaft for rotating said shaft in response to a second signal and a third actuating means connected with said plunger to move said plunger in response to a third signal.

17. . An apparatus according to claim 16 further including control means having sensing means, said sensing means sensing when said one container is in alignment with said compressing station and causing said control means to transmit said first signal to said first actuating means whereby said one article is advanced to said compression station, said sensing means sensing the presence of said one article at said compression station and causing said control means to transmit said third signal to said third actuating means whereby said plunger urges said one article into said one container.

18. An apparatus according to claim 2 or 9 wherein said rotatably compressing and urging means includes a movable rack and a pinion connected to said shaft, said rack and pinion having teeth engaged in meshing relation.

19. An apparatus for inserting a flexible article into a rigid container having an aperture, said apparatus comprising:

means for orienting said flexible article with said aperture of said container;

compression means for rotatably compressing said flexible article; and

feed means for urging said compressed flexible article into said container through said aperture.

20. An apparatus according to claim 19 wherein said compression means includes said feed means.

21. An apparatus according to claim 19 further including

means for maintaining said flexible article in its compressed condition.

22. An apparatus according to claim 20 further including means for maintaining said flexible article in its compressed condition.

23. An apparatus according to claim 19 wherein said means for orienting said flexible article with said aperture of said container comprises means for advancing said article to said compression means and means for aligning said aperture of said container with said article advanced to said compressing means.

24. An apparatus according to claim 21 wherein said compression means includes a shaft having a notch therein for receiving said article, said shaft rotating to compress said article within a central aperture of said maintaining means.

25. An apparatus according to claim 24 wherein said feed means includes a plunger which moves relative to said shaft.

26. An apparatus for inserting flexible articles into a series of rigid containers each having an aperture, said apparatus comprising:

means for sequentially orienting each of said flexible articles with a corresponding container;

compression means for rotatably compressing said flexible article; and

feed means for urging said compressed flexible article into said corresponding container through its aperture.

27. An apparatus according to claim 26 wherein said compression means includes said feed means.

28. An apparatus according to claim 26 further including

- 14 -

means for maintaining said flexible article in its compressed station.

29. An apparatus according to claim 27 further including means for maintaining said flexible article in its compressed condition.

30. An apparatus according to claim 26 wherein said means for sequentially orienting said flexible article with said aperture of said one container comprises means for advancing said article to said compression means and means for aligning said aperture of said one container with said article advanced to said compressing means.

31. An apparatus according to claim 29 wherein said compression means includes a shaft having a notch therein for receiving said article, said shaft rotating to compress said article within a central aperture of said maintaining means.

32. An apparatus according to claim 31 wherein said feed means includes a plunger which moves relative to said shaft.

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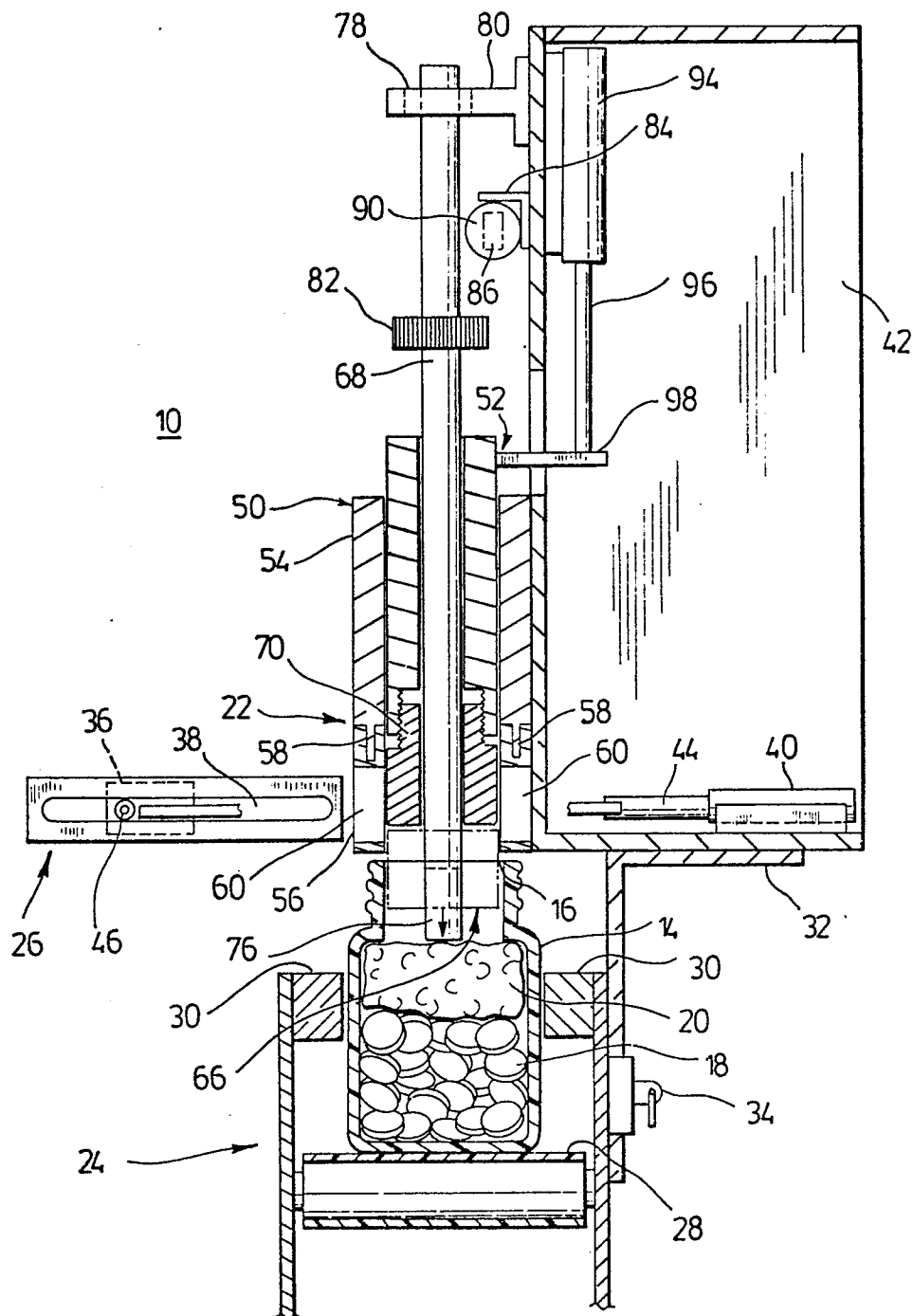
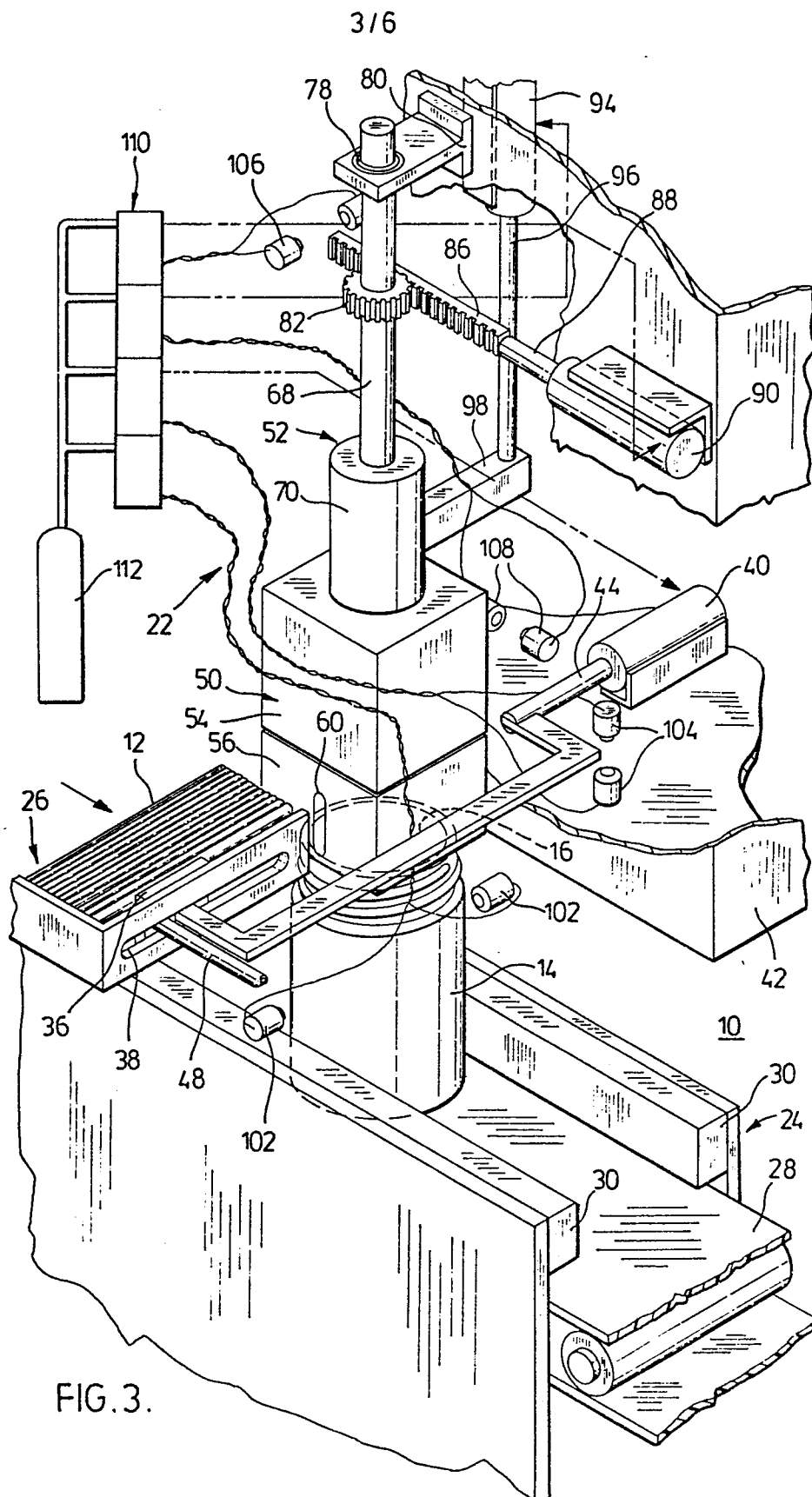
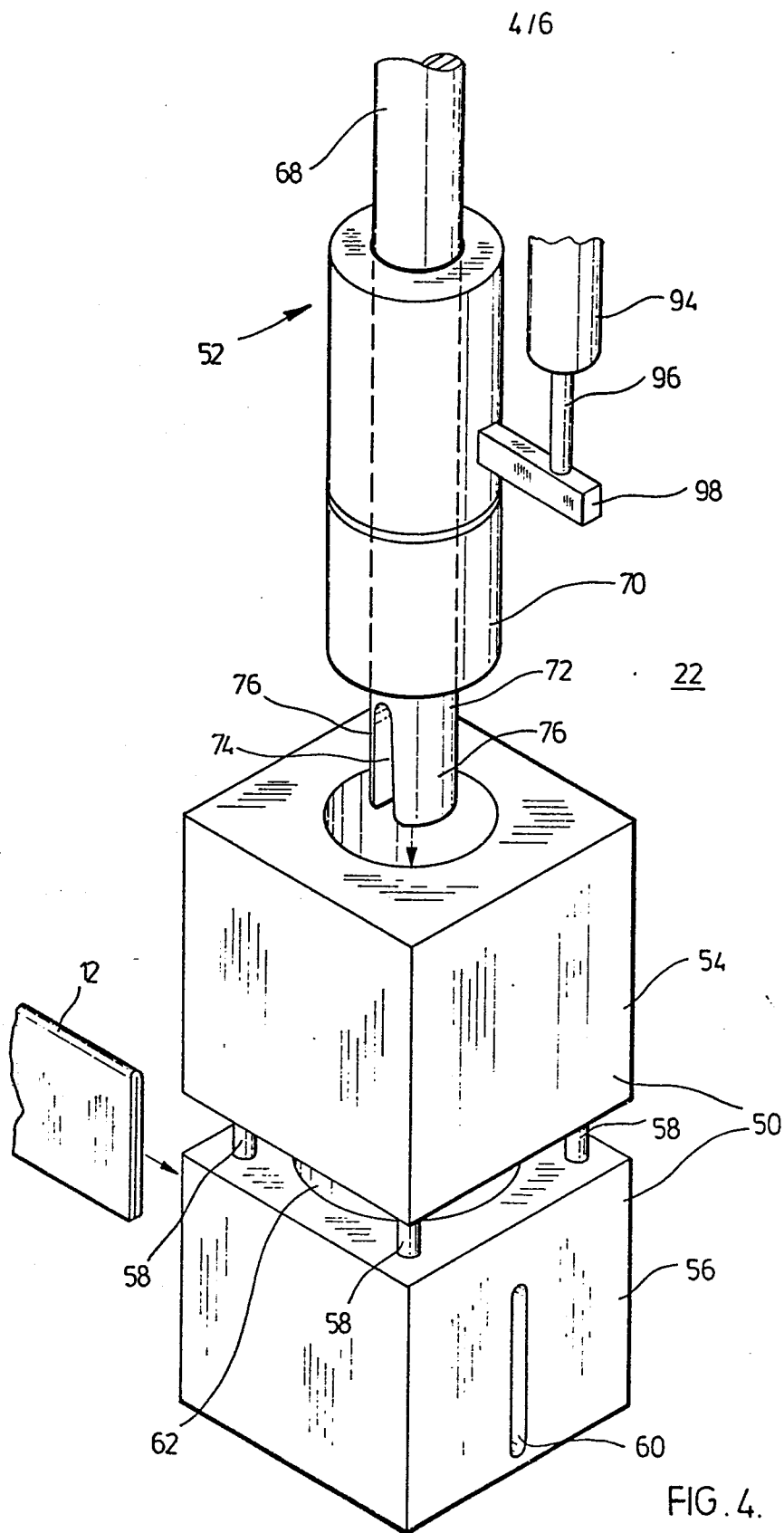
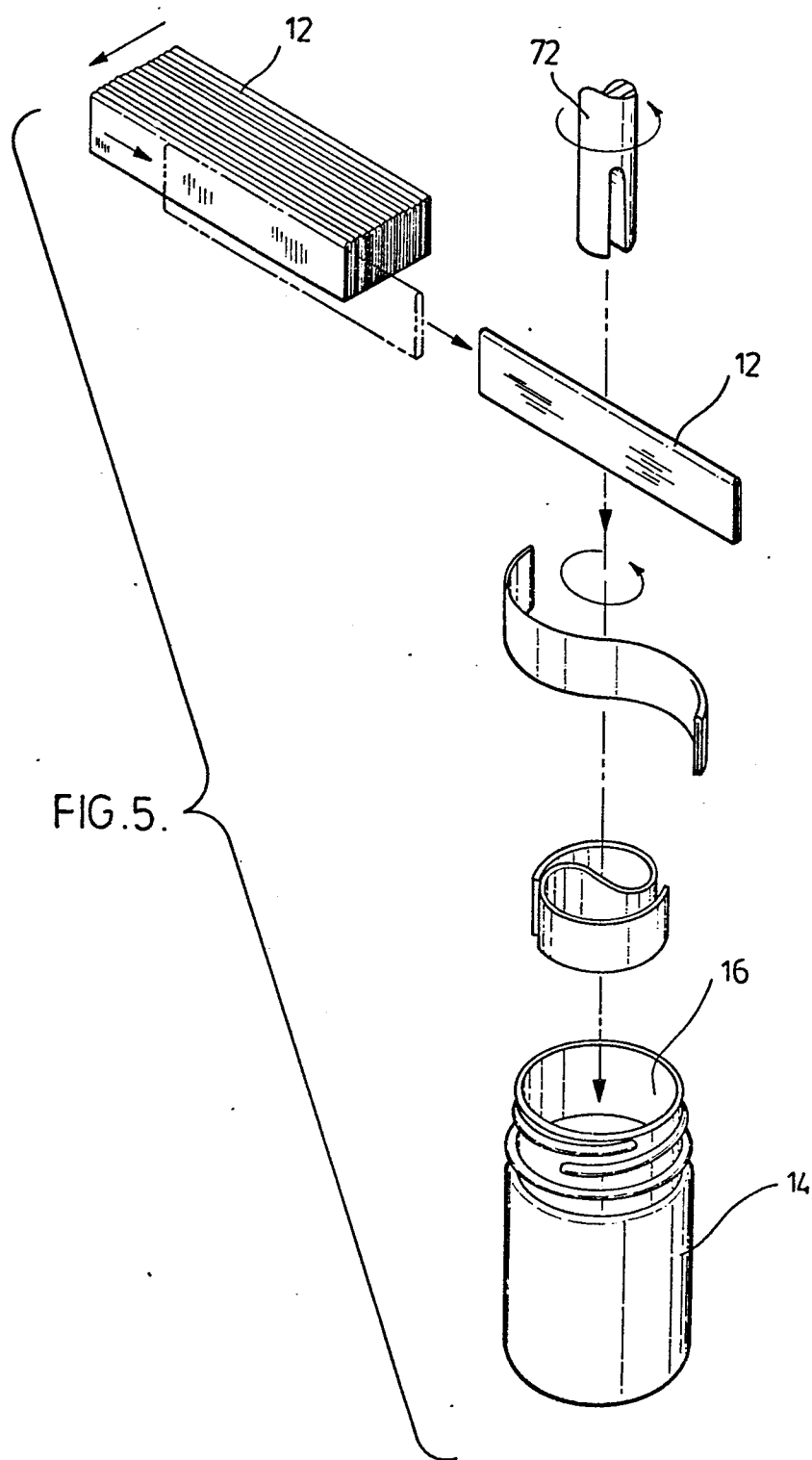


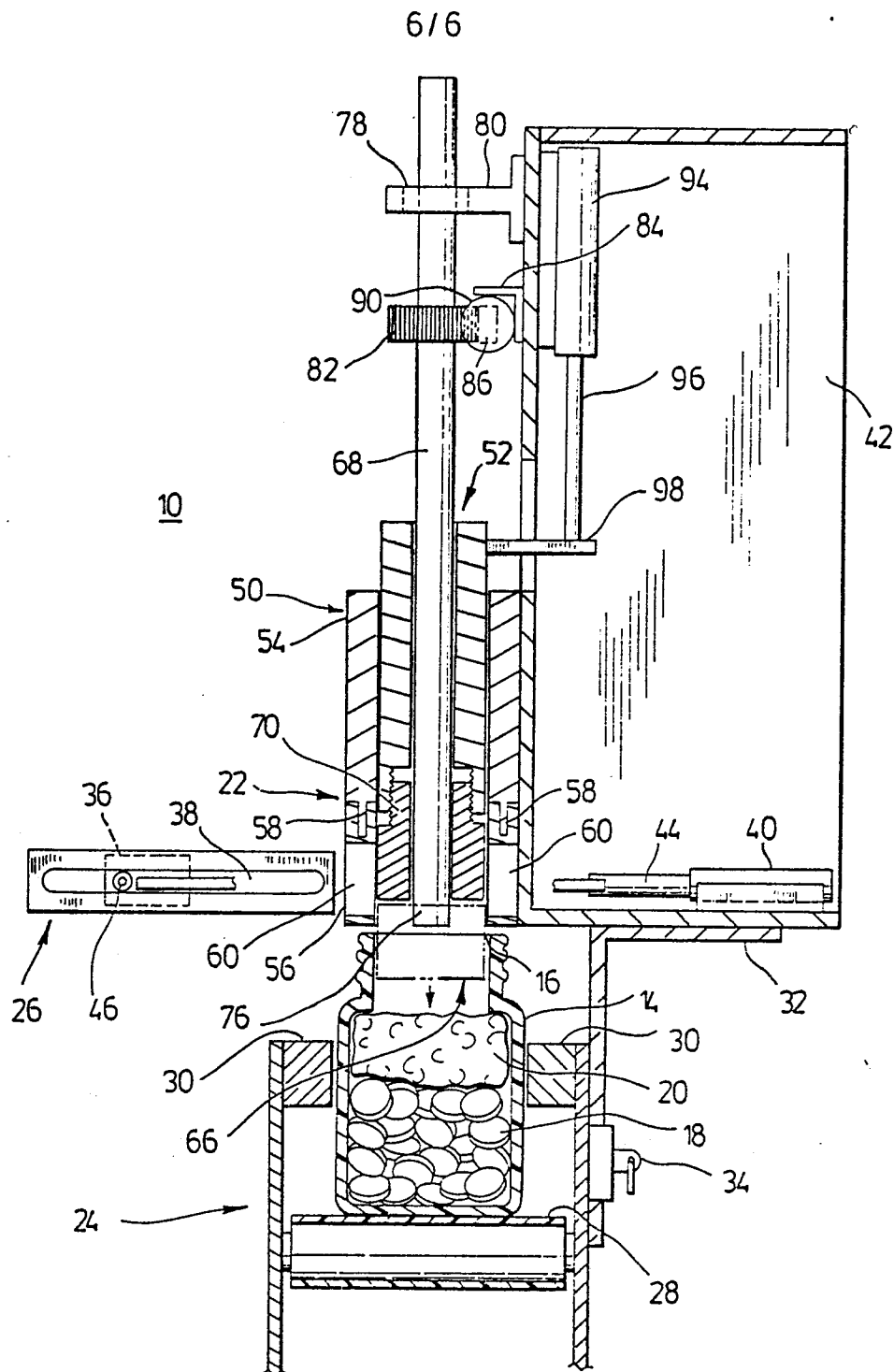
FIG. 2.





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EUROPEAN SEARCH REPORT

Application number

EP 84 30 3056

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 7)
X	US - A - 3 280 533 (HALL) * Column 1, lines 9-19; column 2, line 12 - column 4, line 29; column 5, line 40 - column 6, line 26; figures 1,2,6,7 * -----	1-6,8- 13,19- 32	B 65 B 61/20
			TECHNICAL FIELDS SEARCHED (Int. Cl. 4)
			B 65 B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 21-11-1984	Examiner CLAEYS
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			



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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ All claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for all claims.
- ☐ Only part of the claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claims:
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

X LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirement of unity of invention and relates to several inventions or groups of inventions, namely:

- 1) Claims 1-6, 8-13, 18-32: Inserting apparatus and compressing means + orienting means
- 2) Claims 1,7,14: Article advancing means
- 3) Claims 1,15,16,17: Actuating and control means.

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☒ None of the further search fees has been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims,

namely claims: 1-6, 8-13, 18-32