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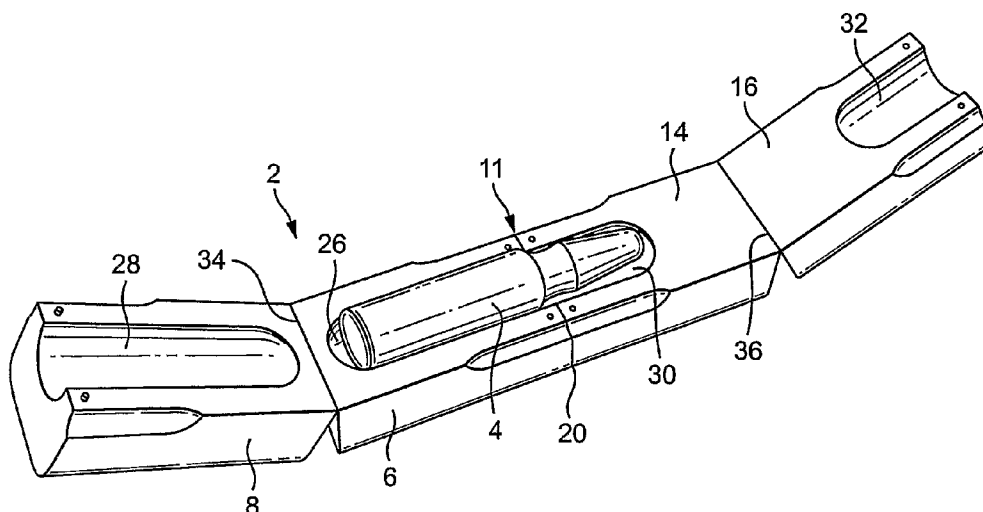
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(54) Title: DEVICE FOR BREAKING AN AMPOULE



(57) Abstract: A device for breaking an ampoule comprises first and second parts for together receiving the ampoule in a space within the device. The parts are relatively movable between open and closed positions, such that relative movement causes the ampoule within the device to be broken. The open ampoule is then accessible for use, with the broken parts retained in the device for safe disposal.

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DEVICE FOR BREAKING AN AMPOULE

This invention relates to a device for breaking an ampoule in a convenient and safe manner.

5 Ampoules generally comprise a sealed glass tube in which is provided a dose of liquid such as a medicine. Such ampoules have an elongate hollow tubular portion for containing the liquid, terminating in a thin neck portion which is intended to be broken off to provide access to the liquid. Generally, a small saw is used to weaken the material between the tube end and the neck portion before snapping the neck off,
10 withdrawing the liquid, for example into a syringe, and disposing of the two broken parts of the ampoule. With this method there is a risk of the user sustaining cuts and abrasions from the exposed glass edges of the broken ampoule. Therefore the use of ampoules is usually confined to trained staff in a medical environment, and use by those who are not medically trained is discouraged.

15 This invention aims to provide a more convenient and safer way of breaking ampoules, for example such that they may be used by untrained people outside the medical environment, such as those administering a medicine or drug to themselves.

 Accordingly, the present invention provides a device for breaking an ampoule comprising first and second portions together defining a space for receiving the
20 ampoule, the space being shaped so as to align a weakened portion of an ampoule with an abutment region between the first and second portions, the portions being relatively movable between a closed abutting position and an open position, such that relative movement from the closed position to the open position causes an ampoule received therein to break open at the weakened position.

25 Thus the user may place an ampoule in the device, and break it open by moving the portions to the open position, without the need to touch the ampoule.

 Preferably the first and second portions are pivotally movable, for example being joined by a hinge. The portions may together completely enclose the ampoule in the closed position of the device. For example the portions may respectively include
30 first and second parts of a cavity for receiving the ampoule. The cavity may be continuous across the abutment region between the portions in the closed position of the device, the first and second parts being separated in the open position of the device. Thus the user may grasp one portion of the device in each hand, and open it with a hinging movement, preferably away from the body.

The open tube of the ampoule may then be presented inside the cavity part of one portion, with the broken off neck in the cavity part of other portion. Thus the hazard associated firstly with breaking the ampoule, and secondly with handling the broken parts is alleviated.

5 One or both of the first and second portions are preferably arranged to retain the respective part of the ampoule therein. For example it or they may comprise a cavity part which is narrower at or adjacent the abutment region with the other part of the cavity. This aids the retention of the respective broken part of the ampoule therein after the device has been opened.

10 Ampoules typically have an indentation between the tubular part and the neck part to serve as a weakening around which the neck part will tend to snap off. Thus the narrower end of the or each cavity part may be shaped to locate in the indentation so as to align the weakened portion with the abutment region. Alternatively or in addition, the first part of the cavity may be sized to receive the tubular part of the
15 ampoule, and the second part of the cavity may be sized to receive the neck part of the ampoule. This may also serve to align the weakened portion with the abutment region. The cavity parts are preferably slightly longer than the ampoule parts, such that the broken parts of the ampoule will seat downwardly into the respective cavity parts after opening, thus ensuring the broken edges are recessed to avoid presenting a hazard to
20 the user. Preferably, in the open position the device may stand with the abutment region uppermost. The first and second portions may include cooperating catch members for securing the device in the open position. This may provide a stable base for withdrawal of the ampoule contents.

25 Preferably, at least one of the portions of the device may be disassembled so as to expose the space such that the ampoule may be inserted therein. Preferably, both of the portions may be disassembled. For example, the or each portion may comprise first and second leafs connected by a hinge. With this arrangement, the two leafs of each portion may include cooperating locating lugs and apertures respectively to retain the leafs together for use.

30 The invention will now be described with reference to the accompanying drawing, in which:

Figure 1 is a perspective view of a device according to one embodiment of the invention with the portions dissembled and with an ampoule inserted therein;

Figure 2 is a perspective view of the device with one portion assembled;

Figure 3 is a perspective view of the device in the closed position ready for use;

Figure 4 is a perspective view of the device after breaking open the ampoule;

Figure 5 is a perspective view of the device fully open with the ampoule
5 broken;

Figure 6 is a further perspective view of the device with the housing parts disassembled for removal of an ampoule;

Figure 7 is a perspective view of a device according to another embodiment of the invention, with the portion disassembled;

10 Figure 8 is a perspective view of a device according to another embodiment of the invention, with the device opened; and

Figure 9 is a perspective view of the device of Figure 8 with one portion disassembled.

Figure 1 shows the device, indicated generally at 2, which is disassembled for
15 inserting an ampoule 4 to be opened. Such an ampoule typically holds about 2ml of, for example, sterile water. In this example the device is in the form of a four leafed triple hinged clamp which folds to form an elongate substantially cuboid container encasing the ampoule completely as will be described below (see Figures 2 and 3). The device when closed may for example be about 65mm long and 20mm wide.

20 As best seen in Figure 3, the device comprises two substantially cuboid portions 10, 12 abutting each other at a central abutment region 11. Each portion is formed of two leafs 6 and 8, 14 and 16. The pairs of leafs are each hinged together about a hinge 34, 36 respectively extending along the end 44, 46 of the respective housing portion remote from the abutment region 11. Each pair of leafs have
25 cooperating channels 26, 28; 30, 32 to form a first 22 and second 24 part of a cavity for receiving the ampoule when assembled (see Figure 5).

The two housing portions 10 and 12 are joined at a hinged edge 20 extending along one outer side of the device 2 at the abutment region 11, as is most clearly seen in Figure 4. The device as shown in Figure 1 is in the closed position (ie. the hinge 20
30 is closed), but each portion 10, 12 is disassembled by the upper leafs 6 and 14 respectively being lifted. It can be seen that in this closed disassembled position of the device, the ampoule 4 may be placed in a continuous channel formed of abutting lower blind channels 26, 30 in the lower leafs 6, 14. Where the ampoule 4 has a score line along one side of the neck, this is indicated on the ampoule, for example with a

dot adjacent the score line, and the ampoule should be placed with the score indicator outermost in the channel.

When the ampoule 4 has been inserted, the upper leafs 8 and 16 of each portion 10 and 12 can be folded over about the hinges 34 and 36 respectively. Figure 2 shows the container partly assembled, with the leafs 6 and 8 of the first portion 10 assembled, and the upper leaf 14 of the second portion 12 disassembled. The ampoule is supplied to the user contained within the closed device as shown in Figure 3. As can be seen from Figure 6, the first and second leafs of each portion comprise, near the boundary edge 40, 42 of each portion, a pair of lugs 50 for locating in respective apertures 52 on the other leaf. This ensures that the device closes securely and in the correct position.

In order to open the ampoule, the user grasps the first and second portions 10 and 12 of the device, and levers them apart about the hinge 20, as shown in Figure 4, preferably in a direction away from the users body. This causes first and second parts of the cavity to move apart such that the ampoule breaks about a position adjacent the abutment region 11 formed by the abutting edges 40, 42 of the two portions. When fully opened, the device may rest on the ends 44, 46 of each portion such that the two parts 22, 24 of the cavity are presented with the open ends upper most. The open tubular part 48 of the ampoule 4 is then accessible for withdrawing the liquid from within. The two portions may be subsequently disassembled, and the broken parts of the ampoule may be disposed of safely.

Referring to Figures 8 and 9, in another embodiment the two portions 86, 88 of the device include cooperating catch members in the form of a projection 90 and a recess 92. These extend across the abutting outer surfaces of the respective portions and serve to secure the portions together to provide a stable base for the device in the open position. For example, the projection 90 is a push fit or a snap fit in the recess 92. After the contents of the ampoule have been drawn up, the device is turned over, and the first portion 86 may be disassembled as shown in Figure 9 to release the used part 94 of the ampoule. In the same way, the second portion 88 may be emptied straight into a sharp bin without the need to touch the glass. The device may then be reused with another ampoule. For example, the device is intended to be usable at least about fifty times.

As shown in Figure 6, it is also possible to hinge open the portions 10 and 12 when the two leafs of each portion are disassembled. This causes one part (in this case

the neck 49) of the ampoule 4 to be raised out of the corresponding channel 30, such that an unused ampoule may be removed from the cavity.

The embodiment shown in Figure 7 is similar to that shown in Figures 1 to 6, but the first and second parts 60 and 62 of the cavity narrow towards the boundary 64
5 between the two portions 66, 68. This is achieved by a lip 70, 72 around the periphery of the open end of each cavity part 60, 62, formed in both of the leafs 74, 76; 78, 80 of the respective portion 66, 68. Therefore when an ampoule is placed in the cavity the lips 70, 72 locate within an indentation 78 (see Figure 6) between the tubular part 48 and the neck part 49 of the ampoule. Furthermore the length of each cavity portion 60,
10 62 is greater than that of the associated part of the ampoule, such that when the ampoule is broken, each part 48, 49 of the ampoule may slip down towards the blind end 61, 63 of the respective cavity 60, 62 such that the broken edges are recessed within the cavity to avoid presenting a hazard to the user.

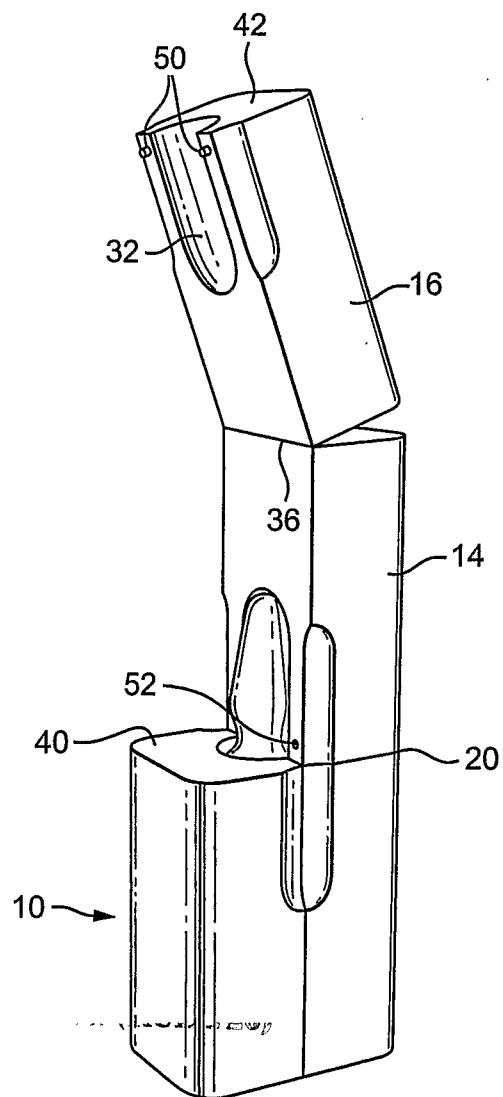
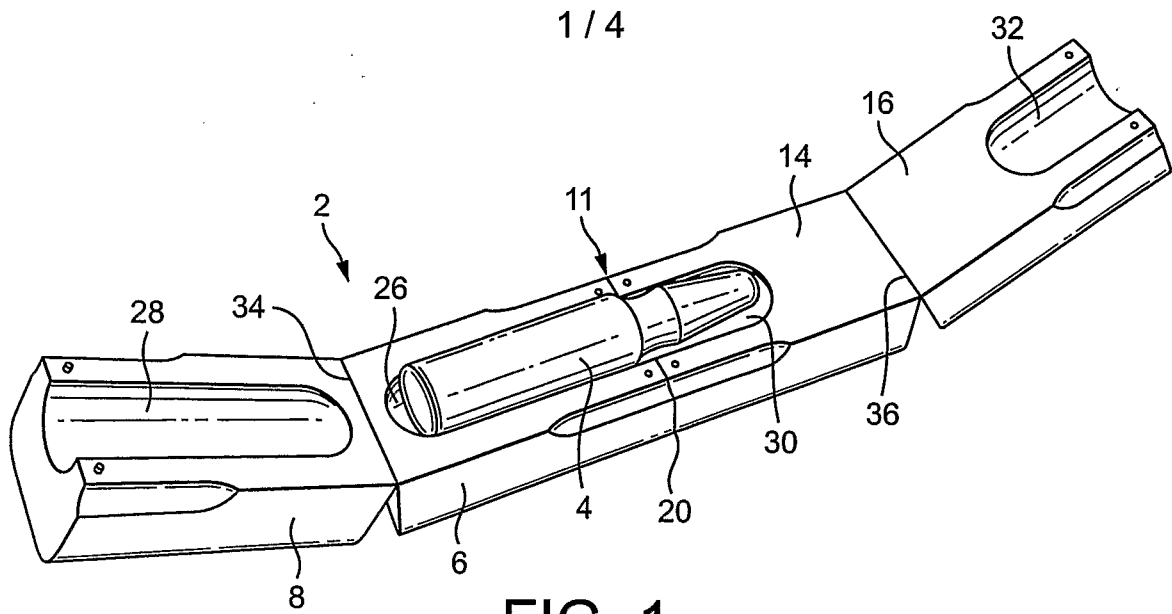
The device is conveniently formed of plastics material such as polypropylene.
15 There may be a void 82, 84 in each leaf of the second portion 66 including the part of the cavity for receiving the neck of the ampoule. This is in order to save material, the neck being generally shorter than the tube of the ampoule.

The devices may be supplied with a label extending along the side opposite the central hinge 20. The label may be perforated such that it breaks upon
20 opening of the device. This provides an indication of first use.

CLAIMS

1. A device for breaking an ampoule comprising first and second portions together defining a space for receiving the ampoule, the space being shaped so as to align a weakened area of an ampoule with an abutment region between the first and second portions, the portions being relatively movable between a closed abutting position and an open position, such that relative movement from the closed position to the open position causes an ampoule received therein to break open at the weakened area.
2. A device as claimed in claim 1, in which the first and second portions are pivotally movable.
3. A device as claimed in claim 2, in which the first and second portions are joined by a hinge.
4. A device as claimed in claim 1, 2 or 3, in which the space is an enclosed cavity in the closed position of the device.
5. A device as claimed in any one of the preceding claims, in which one or both of the first and second portions are arranged to retain the respective part of an ampoule therein in the open position of the device.
6. A device as claimed in any preceding claim, in which the space is narrower at or adjacent the abutment region.
7. A device as claimed in claim 7, in which the space comprises a blind cavity in each of the first and second portions which are sized to receive a tubular part of an ampoule and a neck part of an ampoule respectively.

8. A device as claimed in claim 7, in which the or each cavity is arranged to be slightly longer than the respective ampoule parts, such that the broken parts of the ampoule will seat downwardly into the respective cavity after opening.
- 5 9. A device as claimed in any one of the preceding claims, in which at least one of the portions may be disassembled so as to expose the space to allow the ampoule to be inserted therein.
- 10 10. A device as claimed in claim 9, in which the or each portion comprises first and second leafs connected by a hinge.
11. A device as claimed in claim 10, in which the first and second leafs include cooperating locating means to retain the leafs together for use of the device.
- 15 12. A device as claimed in any preceding claim, in which, in the open position of the device, the device is arranged to stand with the abutment region uppermost to allow access to an open ampoule.
- 20 13. A device as claimed in claim 12, in which the first and second portions comprise means for securing the device in the open position.
14. A device substantially as described herein, with reference to Figure 1 to 6, or Figure 7 or Figures 8 and 9 of the accompanying drawings.



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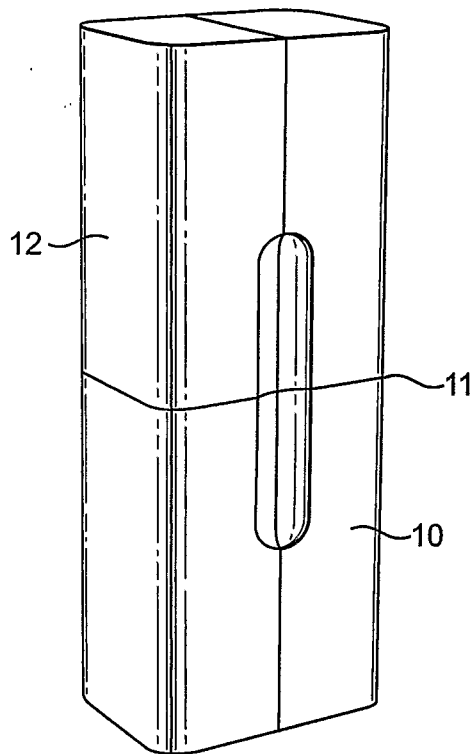


FIG. 3

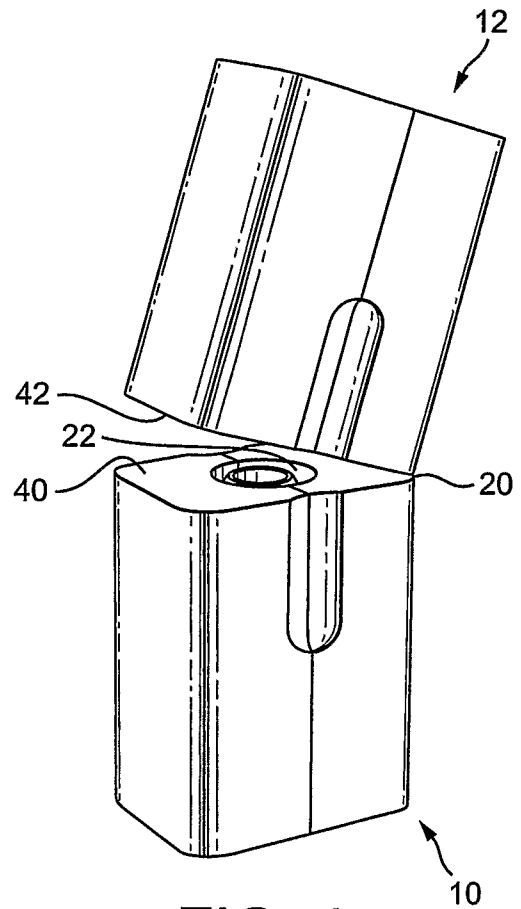


FIG. 4

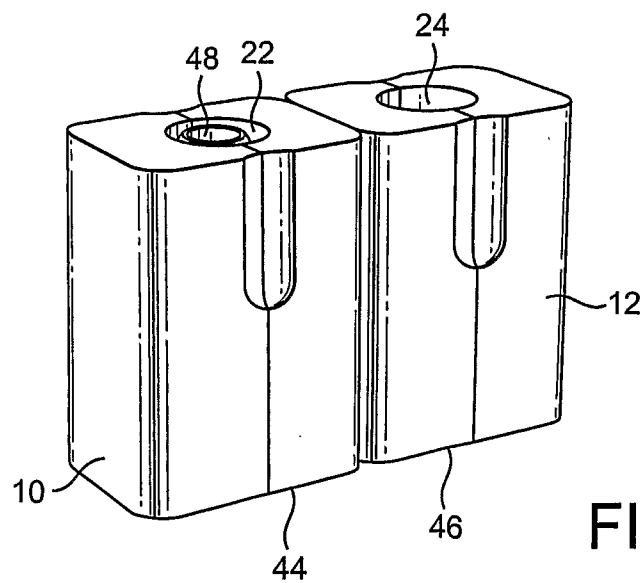


FIG. 5

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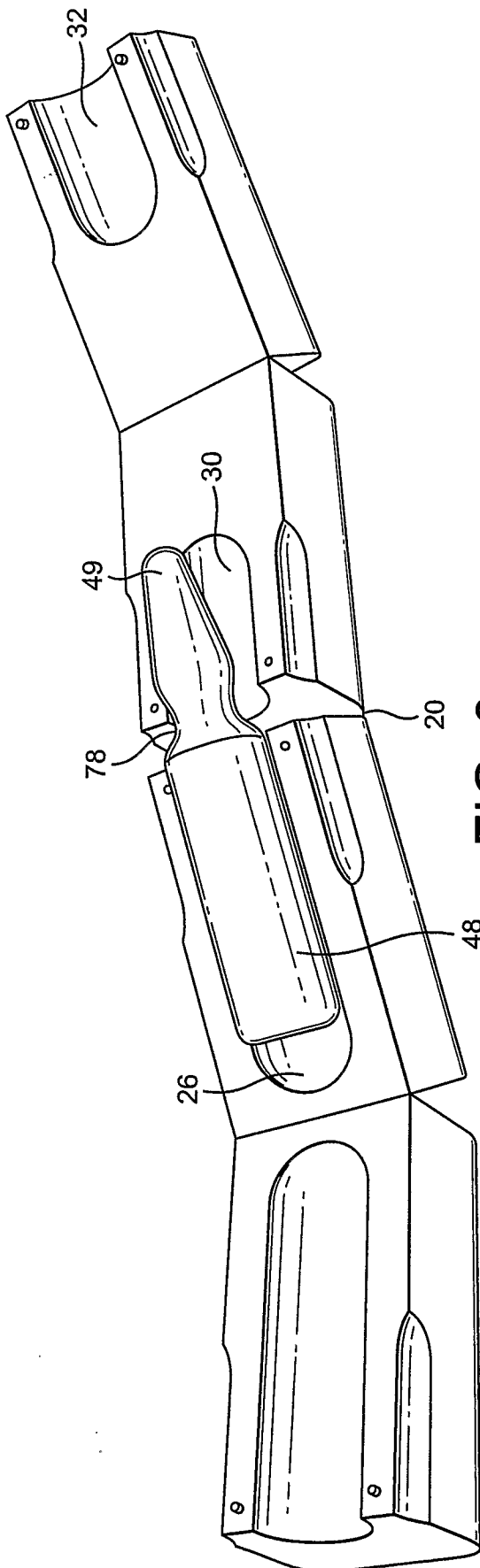


FIG. 6

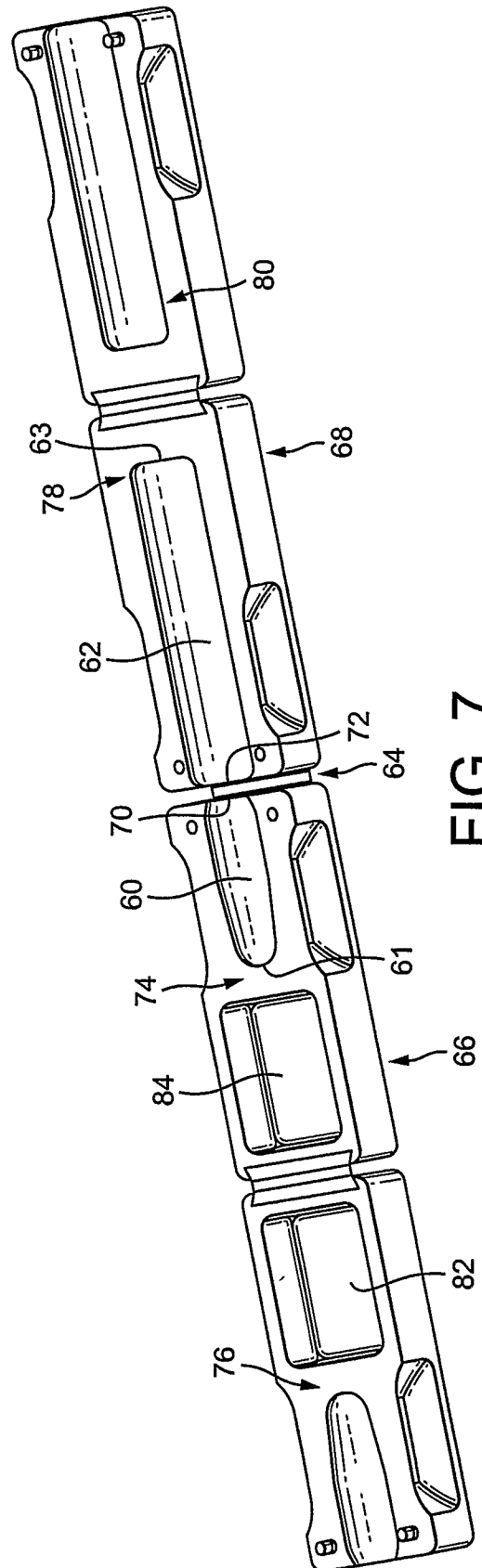


FIG. 7

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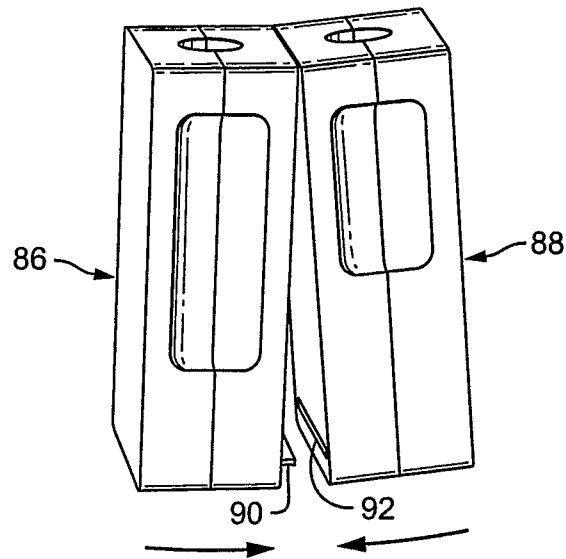


FIG. 8

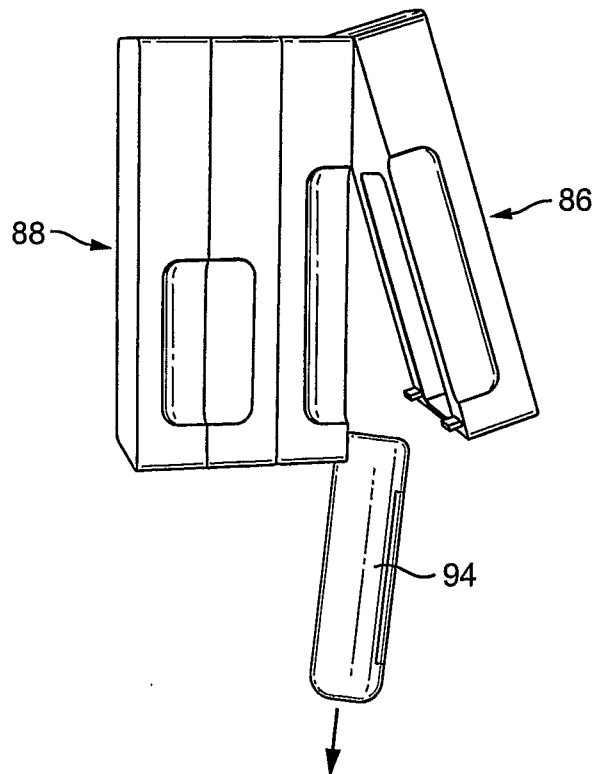


FIG. 9