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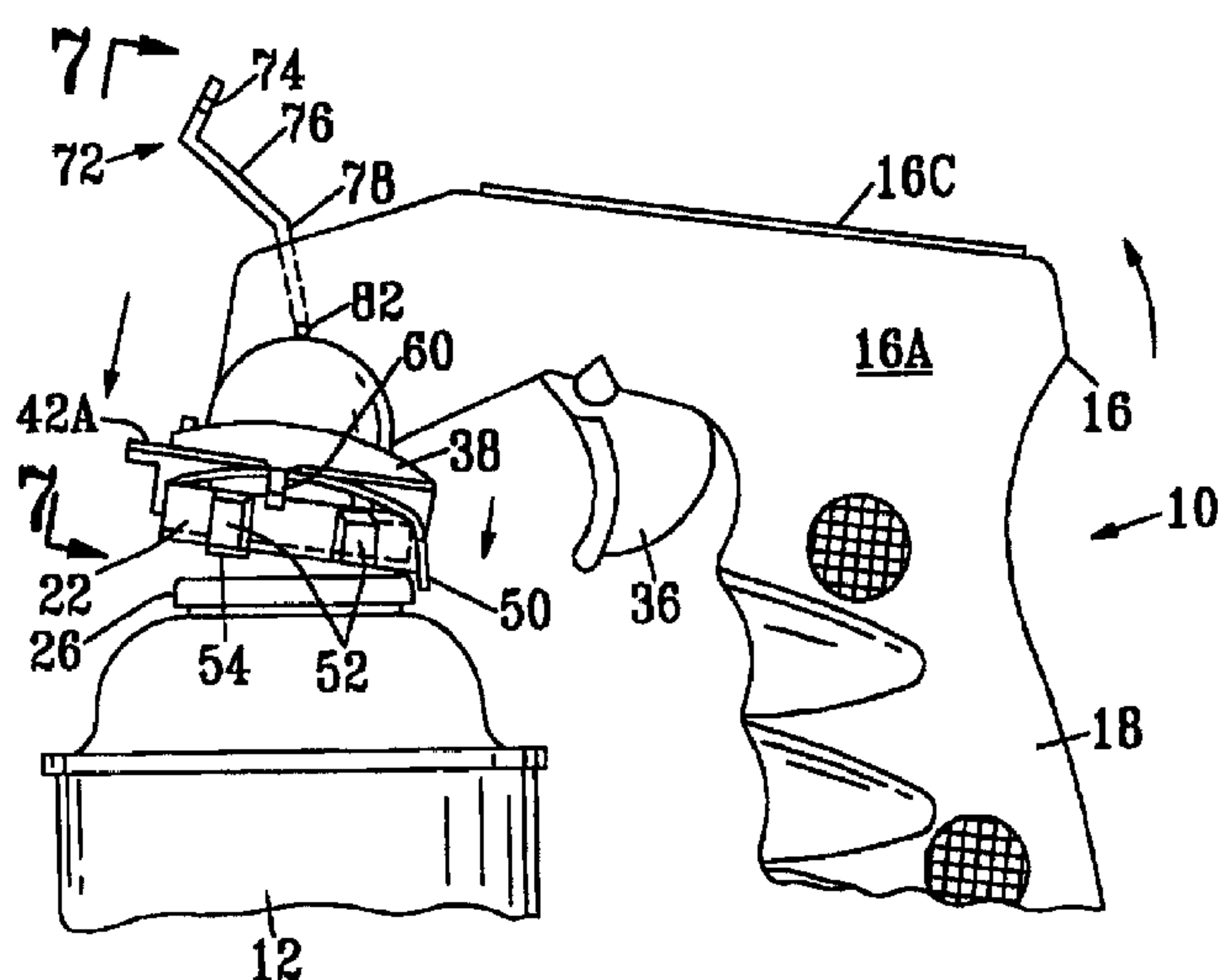
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(30) 1997/01/27 (08/786,726) US

(54) **DISPOSITIF D'ACTIONNEMENT POUR BOMBE DE
VAPORISATION AVEC MECANISME DE FIXATION
AMELIORE**

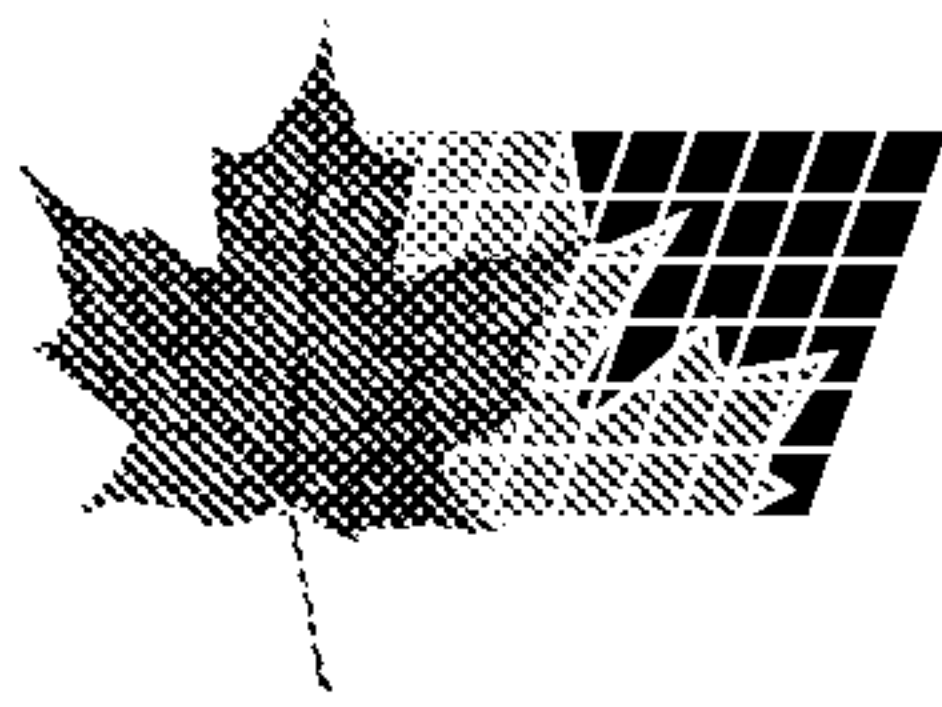
(54) **SPRAY CAN ACTUATOR WITH ENHANCED ATTACHMENT
MECHANISM**



(57) L'invention concerne un dispositif de maintien et d'actionnement d'une bombe de vaporisation comprenant un élément à adapter sur le bord et un mécanisme pour comprimer cet élément contre le bord entourant la soupape pour bouton-poussoir de la bombe, afin de fixer le dispositif sur le bord. Dans un mode de réalisation préféré, le mécanisme de compression comporte un élément de verrouillage pouvant être placé sélectivement dans une position de verrouillage dans laquelle il comprime l'élément à adapter sur le bord de façon à le verrouiller sur ce dernier. De façon plus spécifique, l'élément d'adaptation comprend une paire de segments opposés qui définissent ensemble une surface interne sensiblement annulaire correspondant de manière générale au tour extérieur du bord, et l'élément de verrouillage comprend un élément sensiblement annulaire pouvant être manoeuvré pour l'assembler de manière compressive avec la surface externe des segments d'adaptation, ou pour le libérer. Lorsque l'élément de blocage est manoeuvré de manière à réaliser un assemblage compressif avec les segments, il les

(57) A spray can holding an actuation device comprises a rim engagement element and a mechanism for compressing the rim engagement element against the rim surrounding the push-button valve on the can to attach the device to the rim. In a preferred embodiment, the compressing mechanism comprises a locking element that is selectively movable to a locking position in which it compresses the rim engagement element into a locking attachment to the rim. More specifically, the rim engagement element comprises a pair of opposed segments that together define a substantially annular interior surface that fits loosely around the exterior of the rim, and the locking element comprises a substantially annular member that is movable into and out of a compressing engagement with the exterior surface of the rim engagement element segments. As the locking element is moved into the compressing engagement with the segments, it presses them toward each other into a clamping engagement with the rim. When the locking element is moved out of the compressing engagement with the segments, the segments resiliently restore





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presse l'un contre l'autre de manière à les serrer sur le bord. Lorsque l'élément de verrouillage est manoeuvré pour le libérer de son assemblage avec les segments, les segments retournent à leur position initiale de manière résiliente, et l'élément d'adaptation peut être aisément séparé du bord. L'élément d'adaptation peut avantageusement comporter des surfaces d'appui sur sa face externe pour augmenter et faciliter l'effet de compression exercé par l'élément de verrouillage.

themselves to their original positions, whereby the rim engagement element can easily be separated from the rim. The rim engagement element may advantageously be provided with camming surfaces on its exterior surface to enhance and facilitate the pressing action provided by the locking element.



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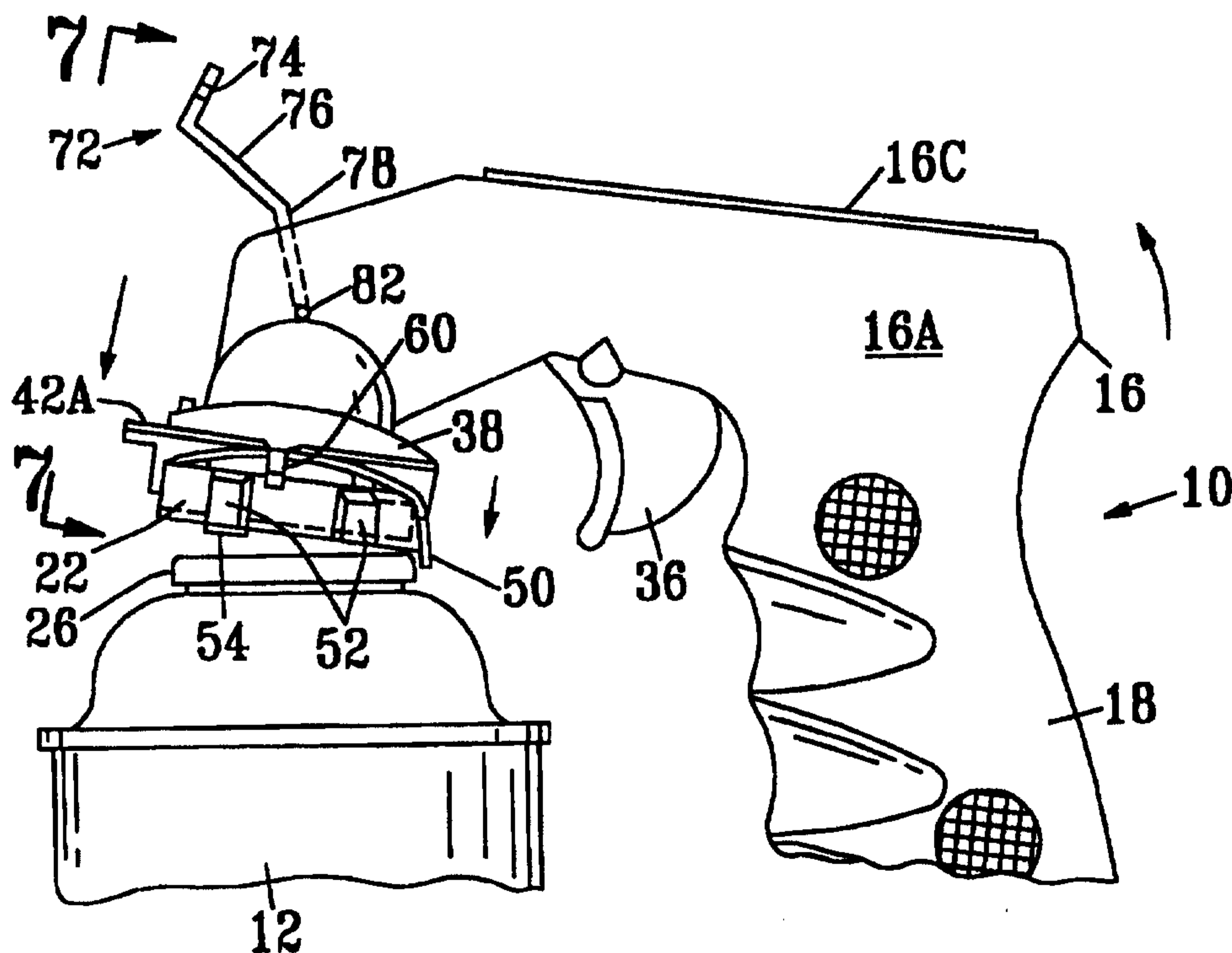
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(54) Title: SPRAY CAN ACTUATOR WITH ENHANCED ATTACHMENT MECHANISM

(57) Abstract

A spray can holding an actuation device comprises a rim engagement element and a mechanism for compressing the rim engagement element against the rim surrounding the push-button valve on the can to attach the device to the rim. In a preferred embodiment, the compressing mechanism comprises a locking element that is selectively movable to a locking position in which it compresses the rim engagement element into a locking attachment to the rim. More specifically, the rim engagement element comprises a pair of opposed segments that together define a substantially annular interior surface that fits loosely around the exterior of the rim, and the locking element comprises a substantially annular member that is movable into and out of a compressing engagement with the exterior surface of the rim engagement element segments. As the locking element is moved into the compressing engagement with the segments, it presses them toward each other into a clamping engagement with the rim. When the locking element is moved out of the compressing engagement with the segments, the segments resiliently restore themselves to their original positions, whereby the rim engagement element can easily be separated from the rim. The rim engagement element may advantageously be provided with camming surfaces on its exterior surface to enhance and facilitate the pressing action provided by the locking element.



1 **SPRAY CAN ACTUATOR WITH ENHANCED**
2 **ATTACHMENT MECHANISM**
3 **INCORPORATION BY REFERENCE OF**
4 **RELATED PATENT DISCLOSURE**

5 The subject matter of this application is related to that of
6 applicant's prior U.S. Patent No. 5,086,954, the disclosure of which is
7 incorporated herein by reference.

8 **BACKGROUND OF THE INVENTION**

9 The present invention relates to a device for both holding a
10 pressurized container, such as an aerosol spray can, and for
11 actuating the valve of the container to dispense its pressurized
12 contents. Specifically, the present invention relates to an
13 improvement in the mechanism by means of which these devices are
14 attachable to such containers.

15 Spray can holding and actuation devices are well known in the
16 art, as exemplified by the following U.S. patents: 2,877,934 -
17 Wallace; 3,172,582 - Belpedio; 3,189,232 - Joffe, and, 4,089,440 -
18 Lee. Further examples of such devices are disclosed in the following
19 United Kingdom patent specifications: 1,163,978; 1,343,881;
20 1,487,719; 2,001,706 (published application); and 2,038,952
21 (published application).

22 One of the most popular types of spray can actuation devices
23 has the general configuration of a pistol, as exemplified in the
24 following U.S. patents: 4,432,474 - Hutchinson et al.; 4,805,812 -
25 Brody; 5,086,954 - Brody; and 5,323,937 - Brody. These devices
26 typically include a body having a pistol grip handle, and means on
27 the front of the body for removable attachment to the top of a spray
28 can, the latter having a push-button spray valve. The body carries a
29 valve actuation member that is operatively connected to a trigger, the
30 latter being located with respect to the handle in a position
31 analogous to that of a pistol trigger. The linkage between the trigger

1 and the valve actuation member causes the actuation member to be
2 brought into operable engagement with the valve when the trigger is
3 squeezed, thereby actuating the valve to dispense the container's
4 contents.

5 The devices disclosed in the above-referenced patents to
6 Brody add to this structure a mechanism for disabling or locking the
7 valve actuation mechanism. Further improvements, disclosed and
8 claimed in U.S. Patents Nos. 5,086,954 - Brody and 5,323,937 -
9 Brody, relate to the structure of the device that provides for the
10 attachment of the device to a spray can by engagement with the
11 channel that typically surrounds the valve.

12 While many of the prior art devices, and particularly those
13 disclosed in the aforementioned patents to Brody, have achieved
14 commercial success, further improvements have been sought to
15 increase the utility and improve the performance of the available
16 spray can holding and actuation devices. Specifically, a stronger and
17 more secure can attachment structure than is currently available has
18 been sought to accommodate the use of these devices to larger,
19 heavier spray cans.

20 One approach to the problem of providing more secure can
21 attachment is shown in Figure 10 of the drawings accompanying the
22 instant specification. In this approach, a spray can holding and
23 actuation device 100, of the type generally described in the above-
24 mentioned patents to Brody, has a generally pistol-shaped body 102
25 with a downwardly and forwardly extending front portion 104 that is
26 adapted for attachment to a typical spray can 106 having a push-
27 button valve 108 surrounded by an annular rim 110. The front
28 portion 104 of the device 100 is provided with a can retention
29 member in the form of a split ring, comprising first and second ring
30 halves 112a, 112b attached at the rear by a hinge (not shown). The

1 free end of the first ring half 112a has a slot 116, and the free end of
2 the second ring half 112b is provided with a finger or protuberance
3 118 that is received in the slot 116 to secure the ring halves 112a,
4 112b together when they are placed around the rim 110. To provide
5 adequate stabilization of the can 106, the first ring half 112b is
6 provided with a slotted tab 120 approximately 90° from end slot 116,
7 and this slotted tab 120 receives a projection 122 that extends
8 laterally from the front portion 104 of the body 102.

9 While the above-described approach has provided satisfactory
10 results in many applications, it has proved somewhat complex and
11 expensive to manufacture, and there remain some problems with the
12 stability and security of the can attachment, especially with larger and
13 heavier cans.

14 Thus, there is a need for a more secure attachment mechanism
15 for use with larger, heavier cans, and for an attachment mechanism
16 that is simpler and more economical to manufacture than has
17 heretofore been available.

18 SUMMARY OF THE INVENTION

19 Broadly, the present invention is an improved aerosol spray
20 can holding and actuation device (of the type generally exemplified
21 by U.S. Patents Nos. 4,805,812 - Brody; 5,086,954 - Brody; and
22 5,323,937 - Brody), wherein the improvement comprises a rim
23 engagement element and a mechanism for compressing the rim
24 engagement element against the rim surrounding the push-button
25 valve on the can to effect a secure attachment between the rim
26 engagement element and the rim. In a preferred embodiment, the
27 compressing mechanism comprises a locking element that is
28 selectively movable to a locking position in which it compresses the
29 rim engagement element into a locking attachment to the rim.
30 More specifically, the rim engagement element of the present

1 invention comprises an opposed pair of ring engagement segments
2 that define a substantially annular interior surface dimensioned to fit
3 loosely around the exterior of the rim, and the locking element
4 comprises a substantially annular member that is movable into and
5 out of a compressing engagement with the exterior surface of the rim
6 engagement segments. As the locking element is moved into the
7 compressing engagement with the rim engagement segments, it
8 presses them toward each other into a clamping engagement with
9 the rim. When the locking element is moved out of the compressing
10 engagement with the rim engagement segments, they resiliently
11 restore themselves to their original positions, whereby the rim
12 engagement element can easily be separated from the rim. The rim
13 engagement element may advantageously be provided with camming
14 surfaces on its exterior surface to enhance and facilitate the clamping
15 action provided by the locking element.

16 As will be more fully appreciated from the detailed description
17 below, the present invention provides a secure attachment of the
18 spray can holding and actuation device to a spray can, even if the
19 can is quite heavy. Moreover, the present invention provides a
20 significant enhancement that can be readily achieved using
21 conventional injection molding techniques, and thus can easily be
22 incorporated into existing spray can holding and actuation devices.
23 Furthermore, the present invention can be included in such devices
24 with little additional cost.

25 BRIEF DESCRIPTION OF THE DRAWINGS

26 Figure 1 is a perspective view of a spray can holding and
27 actuation device incorporating the improvements of the present
28 invention, showing the device attached to a typical spray can;

29 Figure 2 is a left side elevational view of the device, showing an
30 exploded view of the components of the improved attachment

1 mechanism of the present invention;

2 Figure 3 is a cross-sectional view taken along line 3 - 3 of
3 Figure 2;

4 Figure 4 is a cross-sectional view taken along line 4 - 4 of
5 Figure 2;

6 Figure 5 is a right side elevational view of the device, showing
7 an exploded view of the components of the improved attachment
8 mechanism of the present invention;

9 Figure 5A is a cross-sectional view taken along line 5A - 5A of
10 Figure 5;

11 Figure 6 is a left side elevational view of the device, showing
12 the device in the process of being attached to a spray can;

13 Figure 7 is a front elevational view, taken along line 7 - 7 of
14 Figure 6;

15 Figure 8 is left side elevational view, similar to that of Figure 6,
16 showing the device attached to a spray can;

17 Figure 9 is a cross-sectional view taken along line 9 - 9 of
18 Figure 8; and

19 Figure 10 is a perspective view of a spray can holding and
20 actuation device incorporating a prior art can attachment mechanism,
21 as described above, showing the device attached to a typical spray
22 can.

23 DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

24 Referring now to the drawings, Figure 1 shows an improved
25 actuation and holding device 10, in accordance with the preferred
26 embodiment of the present invention, attached to a pressurized
27 container or can 12, having a push-button spray valve 14. The
28 actuation and holding device 10 has a body 16 that would typically
29 be made of molded plastic by conventional techniques, well-known in
30 the art, such as the "butterfly" injection molding method. The body

1 16 includes a pistol grip handle 18 and a forward portion 20 that
2 extends in a generally downward direction, terminating in a generally
3 annular rim engagement element 22, interrupted in the front by a gap
4 24 (best shown in Figure 4). As best shown in Figures 6 and 9, the
5 rim engagement element 22 is internally dimensioned to fit around
6 the exterior of an annular rim 26 formed in the top of the pressurized
7 container 12, around the push-button valve 14.

8 The body 16 of the device 10 is formed by the butterfly
9 molding method. Thus, the body 16 is initially formed in two axial or
10 longitudinal halves 16a and 16b, joined along a longitudinal integral
11 hinge 16c, along which the body halves 16a, 16b are folded together.
12 The rim engagement element 22 is therefore also longitudinally
13 divided into two segments 22a, 22b that are respectively integral with
14 the body halves 16a, 16b. The rim engagement element segments
15 22a, 22b abut together at the rear, diametrically opposite the frontal
16 gap 24. The body halves 16a, 16b are attached to one another by
17 some conventional attachment mechanism, such as one or more pin
18 and socket arrangements (not shown), in the pistol grip handle 18.
19 There is, however, no such attachment between the body halves 16a,
20 16b in the front portion 20, for reasons that will be explained below.

21 A substantially rectangular opening 28 in the front of the body
22 16, above the rim engagement element 22, is defined on the sides
23 and top by the wall surfaces of the forward portion 20 of the body 16.
24 The contents of the container 12 are dispensed from the valve 14
25 through the opening 28.

26 The device 10 includes a valve actuation member comprising a
27 lever 30 disposed longitudinally within the body 16. The lever 30 has
28 a first or free end which extends through the forward portion 20 of
29 the body 16 and into the opening 28, thereby being disposed just
30 above the valve 14. The free end terminates in a laterally-extended

1 surface in the form of a flattened disk 32 that provides a flat,
2 substantially circular surface for effecting a positive engagement with
3 the valve 14, as described below. The other end of the lever 30
4 extends through an opening in the underside of the body 16 and is
5 configured in the shape of a trigger 36. The actuation lever 30 pivots
6 on a pin (not shown) when the trigger 36 is pressed toward the
7 handle 18, thereby causing the free end to pivot downwardly to bring
8 the disk 32 into operative engagement against valve 14. In this
9 manner, the valve 14 is depressed to dispense the contents of the
10 container 12. The actuation lever 30 may include a resilient,
11 rearwardly-extending extension (not shown) that engages an interior
12 surface of the body 16, and that acts as a spring to assist the return
13 of the lever 30 to its original position when the trigger 36 is released.
14 In this original position, the free end of the lever 30 is out of
15 engagement with the valve 14, as shown in Figure 1.

16 As shown in Figures 2 through 9, the attachment mechanism of
17 the present invention comprises the rim engagement element 22 and
18 a locking element or locking ring 38. The locking ring 38 is a
19 substantially annular element that fits concentrically around the
20 outside of the rim engagement element 22, and therefore has an
21 inside diameter that is slightly larger than the outside diameter of the
22 rim engagement element 22. As will be more fully described below,
23 the locking ring 38 is movable between a first, or released, position,
24 in which it is not in a compressing engagement with the rim
25 engagement element 22, and a second, or locking, position in which
26 it compressively engages the rim engagement element 22.

27 The rim engagement element 22 and the locking ring 38 are
28 best shown in Figures 2 through 6. Referring first to Figure 3, the
29 locking ring 38 has a substantially straight portion 40 that may be
30 called the "front" section, and that registers with the opening 28 in the

1 front portion 20 of the body 16 when the locking ring 38 is in its
2 locked position, as shown in Figure 1. The locking ring 38 includes
3 at least one, and preferably two, horizontal tabs 42a, 42b, extending
4 forwardly and rearwardly, respectively, that facilitate the movement of
5 the locking ring 38 between the aforementioned first and second
6 positions. Extending inwardly from the interior wall surface of the
7 locking ring 38, approximately 90° from the front section 40, is an
8 anti-rotation element, preferably in the form of a pair of flexible
9 prongs 44. The prongs 44 are dimensioned and located so as to be
10 received in a horizontal aperture or slot 46 in the peripheral wall of
11 the rim engagement element 22 (Figure 5). When the prongs 44 are
12 inserted into the aperture or slot 46, the locking ring 38 may not be
13 rotated relative to the rim engagement element 22. A locking plate
14 engagement finger 48 may advantageously be provided, extending
15 inwardly from the front section 40, the purpose of which will be
16 explained below. Displaced approximately 180° from the locking
17 plate engagement finger 48 is a downwardly-extending vertical
18 projection 50, which stabilizes the can 12 when the device 10 is
19 attached to it.

20 The rim engagement element 22 has an exterior peripheral
21 surface that advantageously includes one or more camming surfaces
22 52, at least one of which extends downwardly to a short, outwardly-
23 extending projection 54. The exterior peripheral surface forms a
24 substantially annular horizontal shoulder 56. Extending outwardly
25 from the shoulder 56, a short distance rearwardly from the slot 46, is
26 a short horizontal projection 58 that helps guide the locking ring 38
27 into its locking position from its released position. The shoulder 56
28 may also be provided with one or more vertically-extending, wedge-
29 shaped projections 60, a first one of which is located adjacent the
30 gap 24, on the opposite side of the gap 24 from the second

1 horizontal projection 58, and another of which may be located a short
2 distance circumferentially from the first one. The wedge-shaped
3 projections 60 also help guide the movement of the locking ring 38,
4 and, in addition, they tend to retain the locking ring 38 in its released
5 position until it is manually forced into its locking position.

6 As shown in Figure 5A, the segments 22a, 22b of the rim
7 engagement element 22 define an interior surface 62 that is
8 dimensioned to engage the exterior of the rim 26. The interior
9 surface 62 may advantageously have one or more inwardly-extending
10 projections 64 that abut against the top of the rim 26 to stabilize the
11 can 12 when the device 10 is attached to it. Further enhancing the
12 securing and stabilizing functions is an inwardly-extending peripheral
13 lip 66, around the bottom of the rim engagement element 22, which
14 is engageable with the underside of the rim 26 when the device 10 is
15 attached to the can 12.

16 In the preferred embodiment of the present invention, actuation
17 lever locking means are provided for selectively locking the valve
18 actuation lever 30 in a position disengaged from the valve 14. These
19 lever locking means include a locking plate 72 that comprises a
20 substantially horizontal base portion 74, an intermediate portion 76
21 joined to the base portion 74 at a slightly obtuse angle, and an upper
22 portion 78 joined to the intermediate portion 76 at an obtuse angle.
23 The upper portion 78 is bifurcated by a slot 80. The upper edge of
24 the upper portion 78 is provided with a pair of outwardly extending
25 pivot pins 82, advantageously of different diameters, that are
26 registrable and engageable with a pair of similarly-sized apertures in
27 the two opposed side walls of the forward portion 20 of the body 16,
28 on opposite sides of the opening 28. The asymmetrical sizes of the
29 pivot pins 82, and of their associated apertures, facilitate the proper
30 orientation of the plate 72 during assembly.

1 With the pivot pins 82 engaged in their associated apertures,
2 the plate 72 is mounted for pivotal movement in a substantially
3 vertical plane into and out of the opening 28. When the plate 72 is
4 pivoted upwardly out of the opening 28, it is in an unlocked position,
5 wherein the disk 32 on the free end of the actuation lever 30 is al-
6 lowed to come into operable engagement with the push-button valve
7 14 when the trigger 36 is pressed. When the plate 72 is pivoted
8 downwardly into the opening 28, it is in a locked position, in which
9 the free end of the actuation lever 30 is received in the notch 80 and
10 is thereby restrained from further movement. In this manner, the
11 actuation lever 30 is locked in a position with its free end disengaged
12 from the valve 14.

13 An advantageous feature of the above described actuation
14 lever locking mechanism is that when the plate 72 is moved
15 downwardly, it acts as a shield to block the spray from the valve 14,
16 should the free end of the actuation lever 30 somehow fail to be
17 received in the notch 80. Another advantage of the above-described
18 arrangement is that the locking plate 72 is pivoted upwardly a short
19 distance toward its unlocked position by the locking plate
20 engagement finger 48 on the locking ring 38 when the locking ring
21 38 is moved from its locking position to its released position, thereby
22 facilitating the removal of the actuation and holding device 10 from
23 the can 12.

24 The device 10 may also advantageously be provided with a
25 pair of inwardly-extending projections or detents 84 (one of which is
26 shown in Figure 1), formed on the interior surfaces of the opposed
27 side walls of the forward portion 20 of the body 16, adjacent the pivot
28 pin apertures. These detents 84 are dimensioned so as to provide a
29 slight frictional engagement against the sides of the plate 72. This
30 frictional engagement requires the application of a slight pressure to

1 urge the locking plate 72 downward to its locked position, and
2 upward to its unlocked position, thereby providing a detent
3 mechanism that substantially reduces the likelihood that the locking
4 plate 72 will inadvertently move from its unlocked position to its
5 locked position or from its locked position to its unlocked position.

6 The operation of the actuation and holding device 10 is
7 illustrated in Figures 6 through 9. Referring first to Figures 6 and 7,
8 with the locking plate 72 flipped up to its unlocked position, the
9 locking ring 38 is shown in its released position, partially displaced
10 from the rim engagement element 22, and defining a plane that is
11 non-coplanar with the plane defined by the rim engagement element
12 22. With the locking ring 38 held in this released position by the
13 wedge-shaped projections 60, the device 10 is brought into
14 engagement with the rim 26 of the can 12. While the locking ring 38
15 partially engages at least one of the rim engagement element
16 segments 22a, 22b, this engagement does not result in any
17 significant compression of the rim engagement element 22.
18 Consequently, at this point in the attachment process, the body
19 halves 16a, 16b, being joined at the hinge 16c, are permitted to
20 spread apart slightly from each other at the front portion 20 to allow
21 the rim engagement segments 22a, 22b to fit loosely around the
22 outside of the rim 26.

23 As shown in Figures 8 and 9, the locking ring 38 is then moved
24 downwardly into its locking position, substantially coplanar with the
25 plane defined by the ring engagement element 22, and fully
26 encompassing the exterior peripheral surface of the rim engagement
27 segments 22a, 22b. This downward movement is facilitated, as
28 mentioned above, by the short horizontal projection 58 and the
29 wedge-shaped projections 60. As the locking ring 38 is thus moved
30 downwardly, it engages against the camming surfaces 52, and the

1 camming action that thereby results causes the rim engagement
2 segments 22a, 22b to be pressed toward each other, thereby
3 clamping against the rim 26 with sufficient force to effect a secure
4 attachment to it. The locking plate 72 may then be flipped down to
5 its locked position until the contents of the can 12 are ready to be
6 dispensed, at which point it is flipped back up to its unlocked
7 position.

8 The downward movement of the locking ring 38 is limited by
9 the outward projection 54 on the rim engagement element 22, which
10 (along with the engagement between the prongs 44 and the slot 46)
11 also prevents the locking ring 38 from slipping off of the device 10.

12 When it is desired to remove the device 10 from the can 12,
13 the locking ring 38 is moved to its released position. The rim
14 engagement segments 22a, 22b then resiliently spring back to their
15 original positions, in which they only loosely surround the rim 26, as
16 described above. The device 10 is then simply separated from the
17 can 12. As mentioned above, this separation is facilitated by the
18 locking plate engagement finger 48, which displaces the locking plate
19 a short distance upwardly to provide some clearance between it and
20 the rim engagement element 22.

21 The ability of the rim engagement segments 22a, 22b to be
22 selectively clamped against the rim 26 and released from it is largely
23 provided by the integral hinge 16c and the lack of any mechanical
24 connection between the body halves 16a, 16b at the front portion 20
25 of the body 16. These two features allow the rim engagement
26 segments 22a, 22b to separate sufficiently from each other to allow
27 them to be easily located around the rim 26 and to be easily
28 removed therefrom when the locking ring 38 is in its released
29 position, and to be pressed more closely together by the
30 compressive force applied by the locking ring 38 as it moves to its

1 locking position. This "clamshell" closing action thus gives the device
2 10 a very secure grip on the rim 26, while allowing a quick release
3 when the compressive force is removed by returning the locking ring
4 38 to its released position.

5 From the foregoing description, it can be seen that the present
6 invention offers a distinct advantage over the current state of the art,
7 in that an easier and yet more secure attachment of the actuation
8 and holding device 10 to the container or can 12 is achieved by the
9 unique and novel structure described above. The enhanced security
10 of attachment is achieved in a manner entirely consistent with
11 conventional injection molding techniques, without adding
12 significantly to the cost of manufacturing the current types of can
13 holding and actuation devices.

14 Although a preferred embodiment has been described herein,
15 variations and modifications of this embodiment will suggest
16 themselves to those skilled in the pertinent arts. Thus, the specific
17 configurations of the rim engagement element 22 and the locking
18 ring 38 disclosed herein are exemplary only. The central operational
19 principle of the invention is the "clamshell" closing action of the two
20 rim engagement segments 22a, 22b, provided by the integral hinge
21 16c and the lack of attachment between the body halves 16a, 16b at
22 the forward portion 20 of the body 16, as explained above. This
23 principle can be broadly realized by the use of a first element,
24 divided into opposed segments that together circumscribe a
25 substantial portion of the rim, and a second element that selectively
26 urges the segments of the first element resiliently into a secure
27 engagement with the rim. It will therefore be appreciated that the
28 same operational principle can be realized with a wide variety of
29 configurations for these components, other than those specifically
30 described herein. For example, means may be provided (such as

1 camming surfaces either on the rim engagement element or on the
2 locking ring) for allowing a rotational movement (rather than a vertical
3 movement) of the locking ring between its released and locking
4 positions. Alternatively, the selective compression and release of the
5 rim engagement segments may be effected by structures other than
6 the locking ring 38 described herein, such as a clasp mechanism, for
7 example. Such variations should be considered within the spirit and
8 scope of the present invention, as defined in the claims that follow.

1 WHAT IS CLAIMED IS:

2 1. An actuation device for holding a pressurized container and
3 actuating a push-button valve in the top of the container to dispense
4 the contents thereof, the container having an annular rim around the
5 valve, the device having a forward portion and an actuation member
6 in the forward portion that is engageable with the valve for the
7 actuation thereof, wherein the improvement comprises:

8 a resiliently flexible rim engagement element, fixed to the
9 forward portion, and having a relaxed state in which it is
10 dimensioned to fit loosely around a substantial portion of the
11 circumference of the rim; and

12 a locking element that is selectively movable between a
13 first position having a noncompressing relationship with the rim
14 engagement element and a second position in which it
15 resiliently compresses the rim engagement element against the
16 rim to effect an attachment therebetween.

17 2. The device of Claim 1, wherein the rim engagement element
18 comprises a substantially annular element having an interior surface
19 that is engageable against the rim, and an exterior surface against
20 which the locking element is selectively engageable.

21 3. The device of Claim 2, wherein the locking element includes
22 a substantially annular portion with an inside diameter that is slightly
23 larger than the outside diameter of the rim engagement element, and
24 wherein the exterior surface of the rim engagement element includes
25 a camming surface against which the locking element is engageable
26 when the locking element is moved to its second position, whereby
27 the engagement between the locking element and the camming
28 surface results in a camming action that resiliently presses the rim
29 engagement element into a clamping engagement with the rim.

30 4. The device of Claim 1, wherein the rim engagement element

1 and the locking element are interconnected so as to prohibit
2 significant rotation of the locking element relative to the rim
3 engagement element.

4 5. The device of Claim 4, wherein the rim engagement element
5 includes a peripheral wall with an aperture therein, and wherein the
6 locking element includes a substantially annular interior wall surface
7 with a prong extending radially inwardly therefrom and located so as
8 to be received in the aperture.

9 6. The device of Claim 1, further comprising means on the rim
10 engagement element for guiding the locking element in its movement
11 from the first position to the second position.

12 7. The device of Claim 6, wherein the rim engagement element
13 includes a substantially annular horizontal shoulder, and wherein the
14 means for guiding includes a projection extending from the shoulder.

15 8. The device of Claim 7, wherein the means for guiding
16 includes a horizontally-extending projection and a vertically-extending
17 projection.

18 9. The device of Claim 1, wherein the locking element, in its
19 first position, defines a plane that is non-coplanar with the plane
20 defined by the rim engagement element, and in its second position,
21 lies substantially coplanar with the plane defined by the rim
22 engagement element so as to surround the rim engagement element.

23 10. An actuation device for holding a pressurized container
24 and actuating a push-button valve in the top of the container to
25 dispense the contents thereof, the container having an annular rim
26 around the valve, the device having a forward portion and an
27 actuation member in the forward portion that is engageable with the
28 valve for the actuation thereof, wherein the improvement comprises:

29 a resiliently flexible rim engagement element, fixed to the
30 forward portion, and having a relaxed state in which it is

1 dimensioned to fit loosely around a substantial portion of the
2 circumference of the rim, the rim engagement element having
3 an exterior surface, and an interior surface that is engageable
4 against the rim;

5 a locking element that is selectively movable between a
6 first position in which it is non-coplanar with the plane defined
7 by the rim engagement element, and a second position in
8 which it substantially surrounds and is substantially coplanar
9 with the rim engagement element; and

10 a camming surface on the exterior surface of the rim
11 engagement element against which the locking element is
12 engageable when it is moved from its first position to its
13 second position, whereby the engagement between the locking
14 element and the camming surface results in a camming action
15 that resiliently presses the rim engagement element into a
16 clamping engagement with the rim.

17 11. The device of Claim 10, wherein the rim engagement
18 element is substantially annular, and wherein the locking element
19 includes a substantially annular portion with an inside diameter that is
20 slightly larger than the outside diameter of the rim engagement
21 element

22 12. The device of Claim 10, wherein the rim engagement
23 element and the locking element are interconnected so as to prohibit
24 significant rotation of the locking element relative to the rim
25 engagement element.

26 13. The device of Claim 12, wherein the rim engagement
27 element includes a peripheral wall with an aperture therein, and
28 wherein the locking element includes a substantially annular interior
29 wall surface with a prong extending radially inwardly therefrom and
30 located so as to be received in the aperture.

1 14. The device of Claim 10, further comprising means on the
2 rim engagement element for guiding the locking element in its
3 movement from the first position to the second position.

4 15. The device of Claim 14, wherein the rim engagement
5 element includes a substantially annular horizontal shoulder, and
6 wherein the means for guiding includes a projection extending from
7 the shoulder.

8 16. The device of Claim 15, wherein the means for guiding
9 includes a horizontally-extending projection and a vertically-extending
10 projection.

11 17. An actuation device for holding a pressurized container
12 and actuating a push-button valve in the top of the container to
13 dispense the contents thereof, the container having an annular rim
14 around the valve, the device having a forward portion and an
15 actuation member in the forward portion that is engageable with the
16 valve for the actuation thereof, wherein the improvement comprises:

17 an opposed pair of resiliently flexible engagement
18 segments, fixed to the forward portion, and having a relaxed
19 state in which they fit loosely around the rim, the rim
20 engagement segments defining an exterior surface, and an
21 interior surface that is engageable against the rim; and

22 a locking element that is selectively movable between a
23 first position having a noncompressing relationship with the rim
24 engagement segments and a second position in which it
25 resiliently presses the rim engagement segments toward each
26 other and against the rim to effect an attachment between the
27 rim engagement segments and the rim.

28 18. The device of Claim 17, wherein the rim engagement
29 segments define a substantially annular element, and wherein the
30 locking element includes a substantially annular portion with an

1 inside diameter that is slightly larger than the outside diameter of the
2 substantially annular element.

3 19. The device of Claim 17, further comprising a camming
4 surface on the exterior surface of one of the rim engagement
5 segments, against which the locking element is engageable when the
6 locking element is in its second position, whereby the engagement
7 between the locking element and the camming surface results in a
8 camming action that resiliently presses the rim engagement
9 segments toward each other until the interior surface defined by the
10 rim engagement segments is attachably engaged with the rim.

11 20. The device of Claim 17, wherein one of the rim
12 engagement segments and the locking element are interconnected
13 so as to prohibit significant rotation of the locking element relative to
14 the rim engagement segments.

15 21. The device of Claim 20, wherein one of the rim
16 engagement segments includes a peripheral wall with an aperture
17 therein, and wherein the locking element includes a substantially
18 annular interior wall surface with a prong extending radially inwardly
19 therefrom and located so as to be received in the aperture.

20 22. The device of Claim 17, further comprising means one of
21 the rim engagement segments for guiding the locking element in its
22 movement from the first position to the second position.

23 23. The device of Claim 22, wherein the rim engagement
24 segments define a substantially annular horizontal shoulder, and
25 wherein the means for guiding includes a projection extending from
26 the shoulder.

27 24. The device of Claim 23, wherein the means for guiding
28 includes a horizontally-extending projection and a vertically-extending
29 projection.

30 25. The device of Claim 17, wherein the locking element, in its

1 first position, defines a plane that is non-coplanar with the plane
2 defined by the rim engagement segments, and in its second position,
3 lies substantially coplanar with the plane defined by the rim
4 engagement segments so as to surround the rim engagement
5 segments.

6 26. An actuation device for holding a pressurized container
7 and actuating a push-button valve in the top of the container to
8 dispense the contents thereof, the container having an annular rim
9 around the valve, the device comprising a body formed of two body
10 halves folded together along an integral hinge and defining a forward
11 portion, and an actuation member in the forward portion that is
12 engageable with the valve for the actuation thereof, wherein the
13 improvement comprises:

14 a rim engagement element fixed to the forward portion
15 and comprising a pair of opposed segments, each of which is
16 a part of one of the body halves, and having a relaxed state in
17 which they fit loosely around a substantial portion of the
18 circumference of the rim; and

19 a locking element that is selectively movable between a
20 first position having a noncompressing relationship with the rim
21 engagement element and a second position in which it
22 resiliently compresses the rim engagement element segments
23 toward each other and against the rim to effect an attachment
24 therebetween.

25 27. The device of Claim 26, wherein the rim engagement
26 element segments form a substantially annular element having a
27 circumferential gap, the annular element defining an interior surface
28 that is engageable against the rim and an exterior surface against
29 which the locking element is selectively engageable.

30 28. The device of Claim 27, wherein the locking element

1 includes a substantially annular portion with an inside diameter that is
2 slightly larger than the outside diameter of the annular element, and
3 wherein the exterior surface of the annular element includes a
4 camming surface against which the locking element is engageable
5 when the locking element is moved to its second position, whereby
6 the engagement between the locking element and the camming
7 surface results in a camming action that resiliently presses the rim
8 engagement element segments toward each other so as to be
9 attachably engaged against the rim.

10 29. The device of Claim 26, wherein the rim engagement
11 element and the locking element are interconnected so as to prohibit
12 significant rotation of the locking element relative to the rim
13 engagement element.

14 30. The device of Claim 29, wherein the rim engagement
15 element includes a peripheral wall with an aperture therein, and
16 wherein the locking element includes a substantially annular interior
17 wall surface with a prong extending radially inwardly therefrom and
18 located so as to be received in the aperture.

19 31. The device of Claim 26, further comprising means on the
20 rim engagement element for guiding the locking element in its
21 movement from the first position to the second position.

22 32. The device of Claim 31, wherein the rim engagement
23 element includes a substantially annular horizontal shoulder, and
24 wherein the means for guiding includes a projection extending from
25 the shoulder.

26 33. The device of Claim 32, wherein the means for guiding
27 includes a horizontally-extending projection and a vertically-extending
28 projection.

29 34. The device of Claim 26, wherein the locking element, in its
30 first position, defines a plane that is non-coplanar with the plane

- 1 defined by the rim engagement element, and in its second position,
- 2 lies substantially coplanar with the plane defined by the rim
- 3 engagement element so as to surround the rim engagement

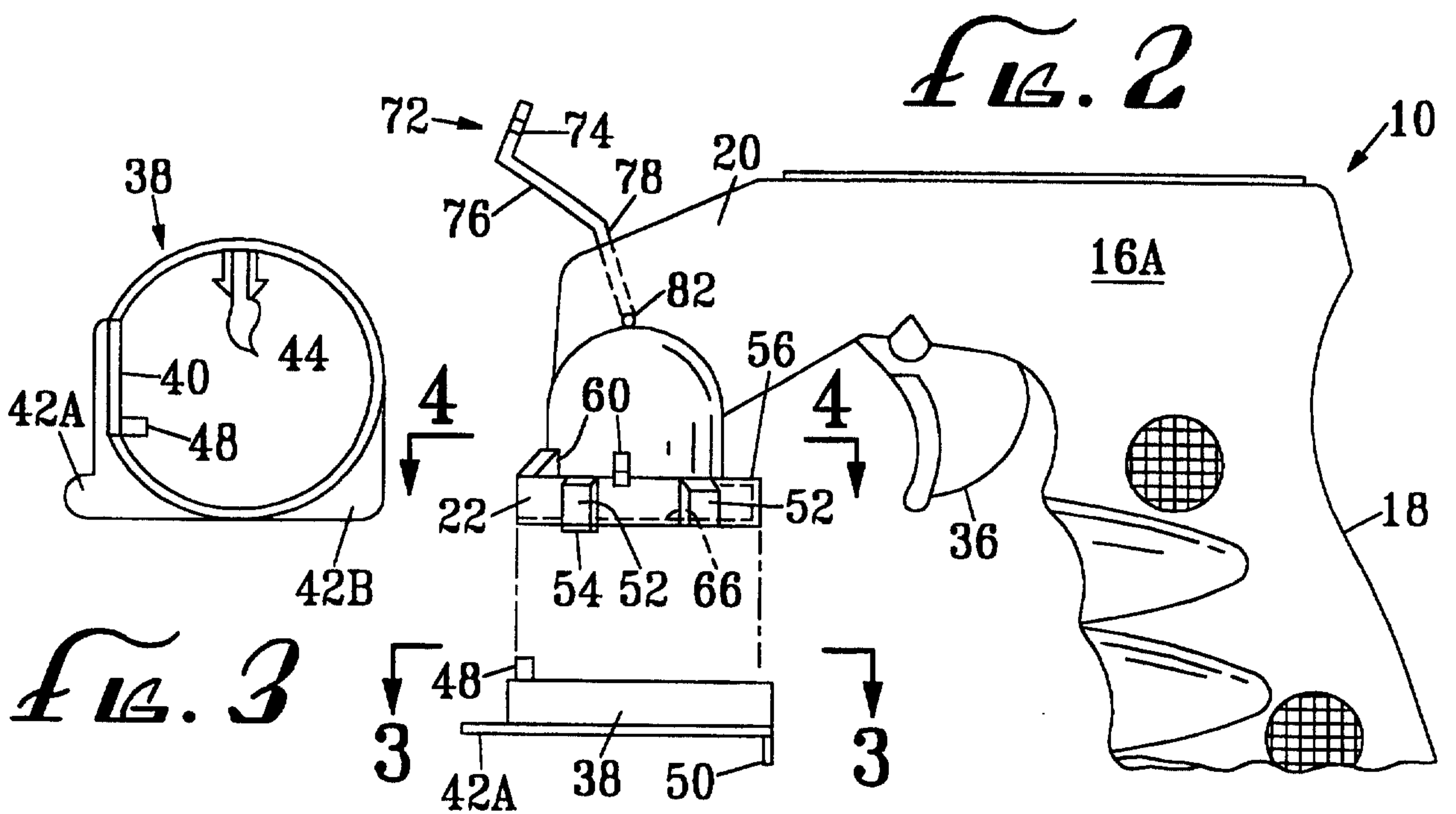
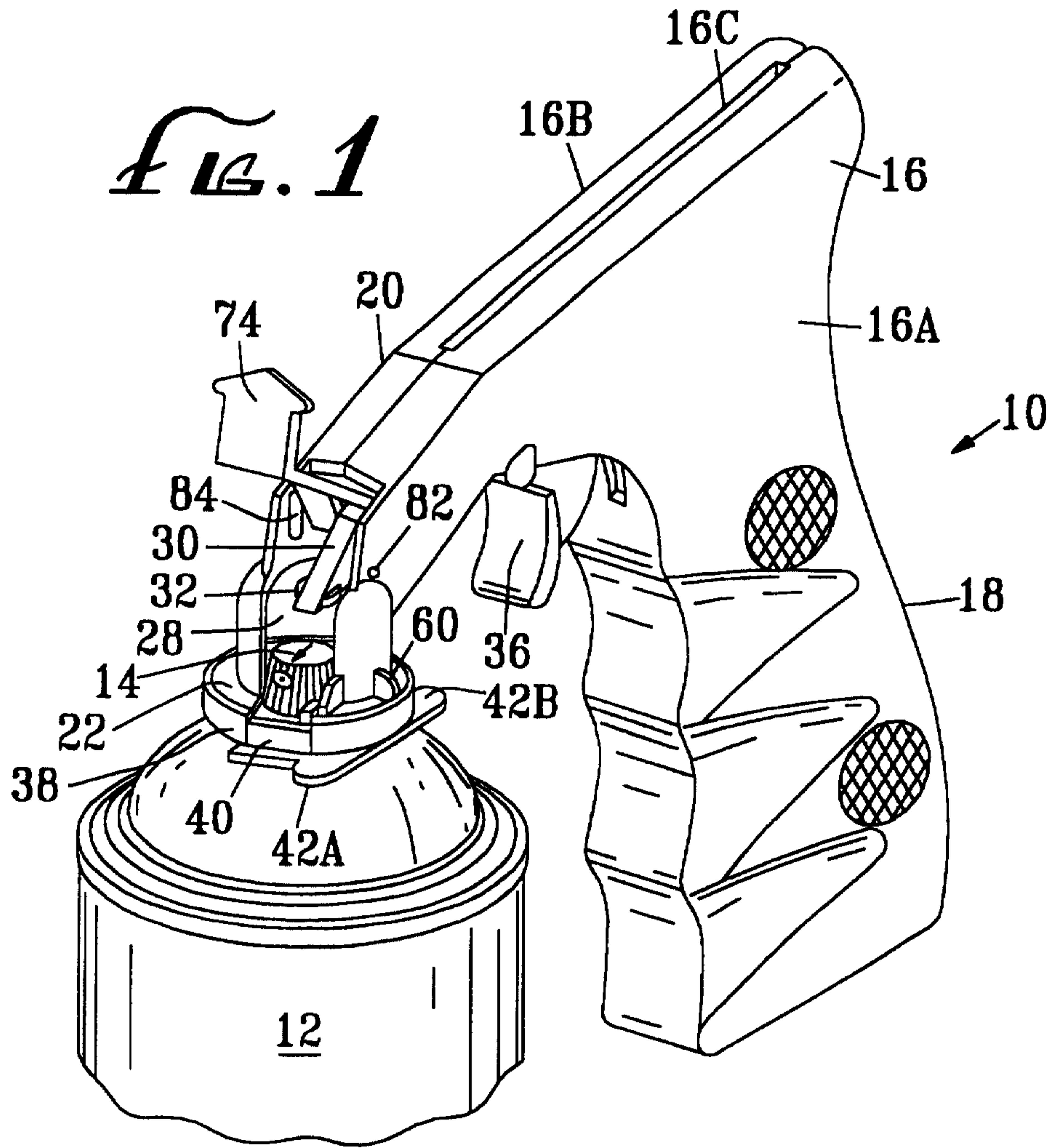
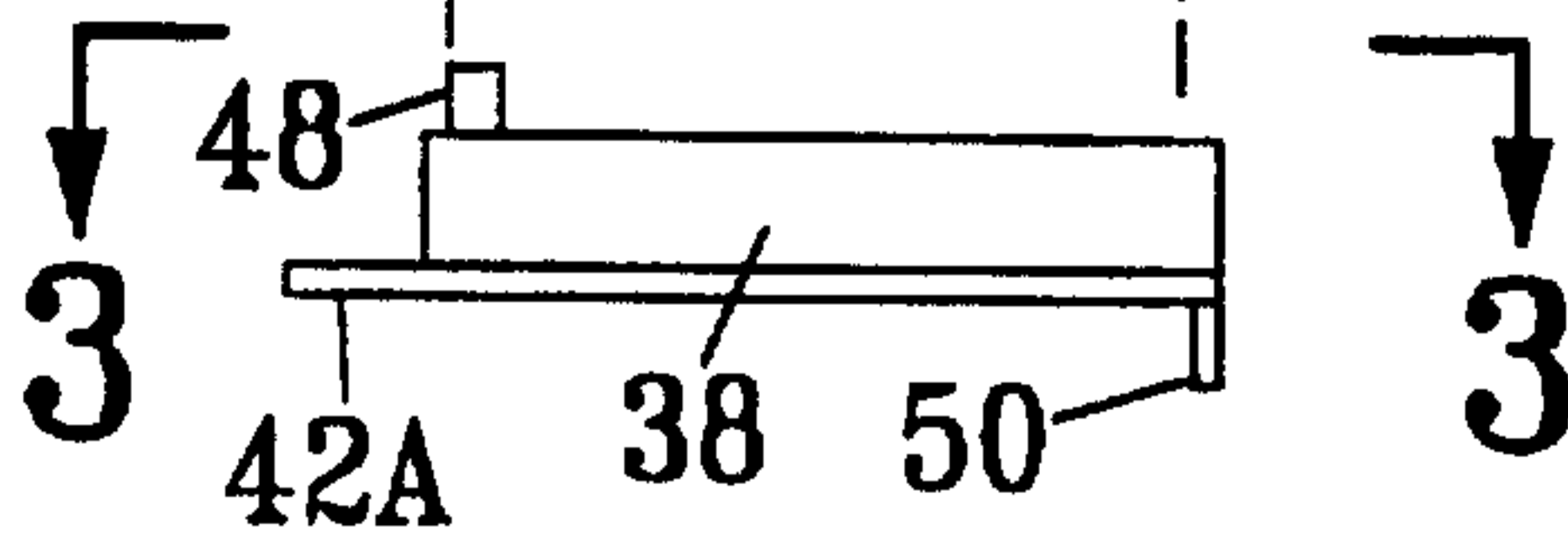


FIG. 3



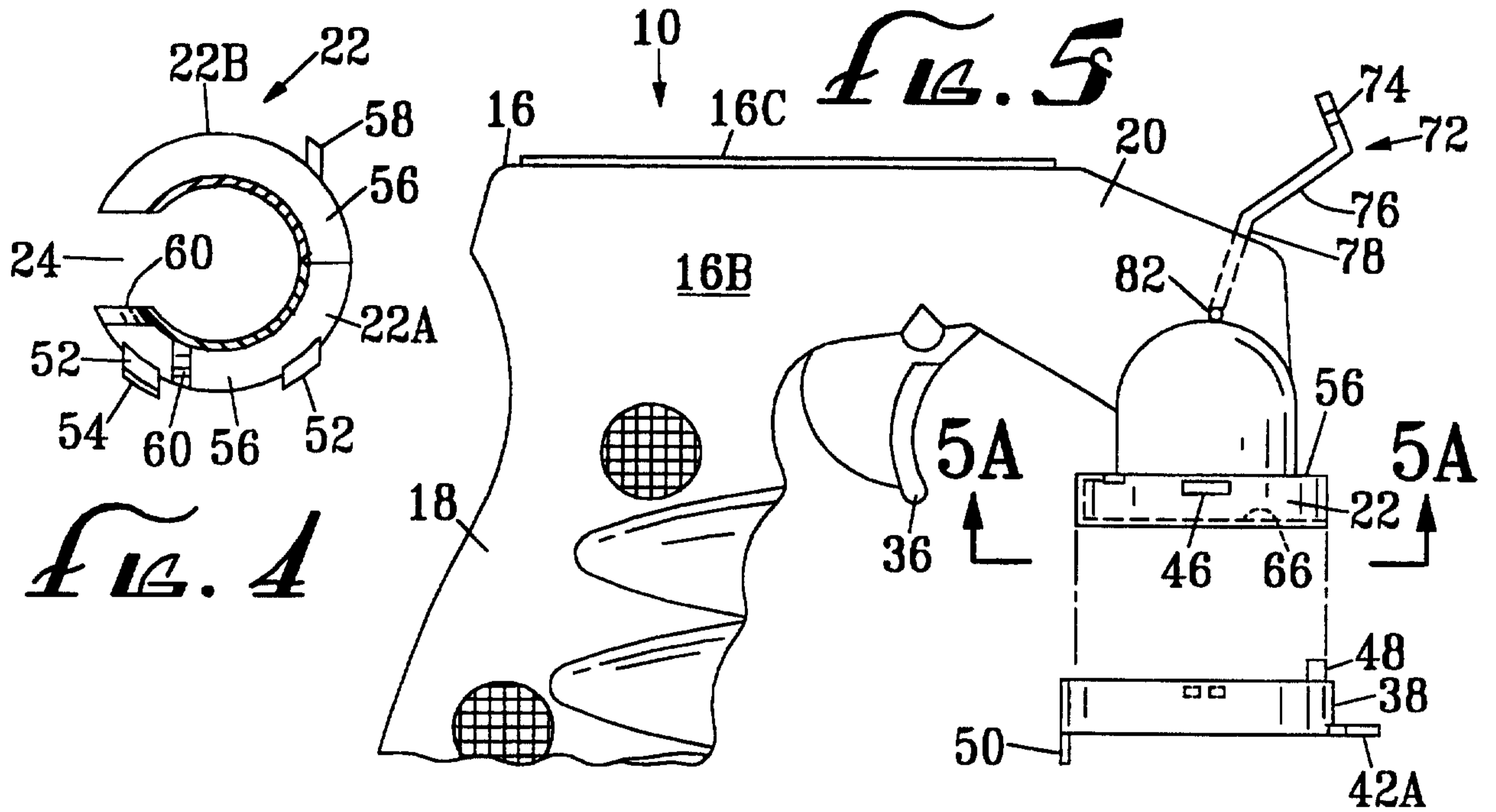


Fig. 4

Fig. 5

5A

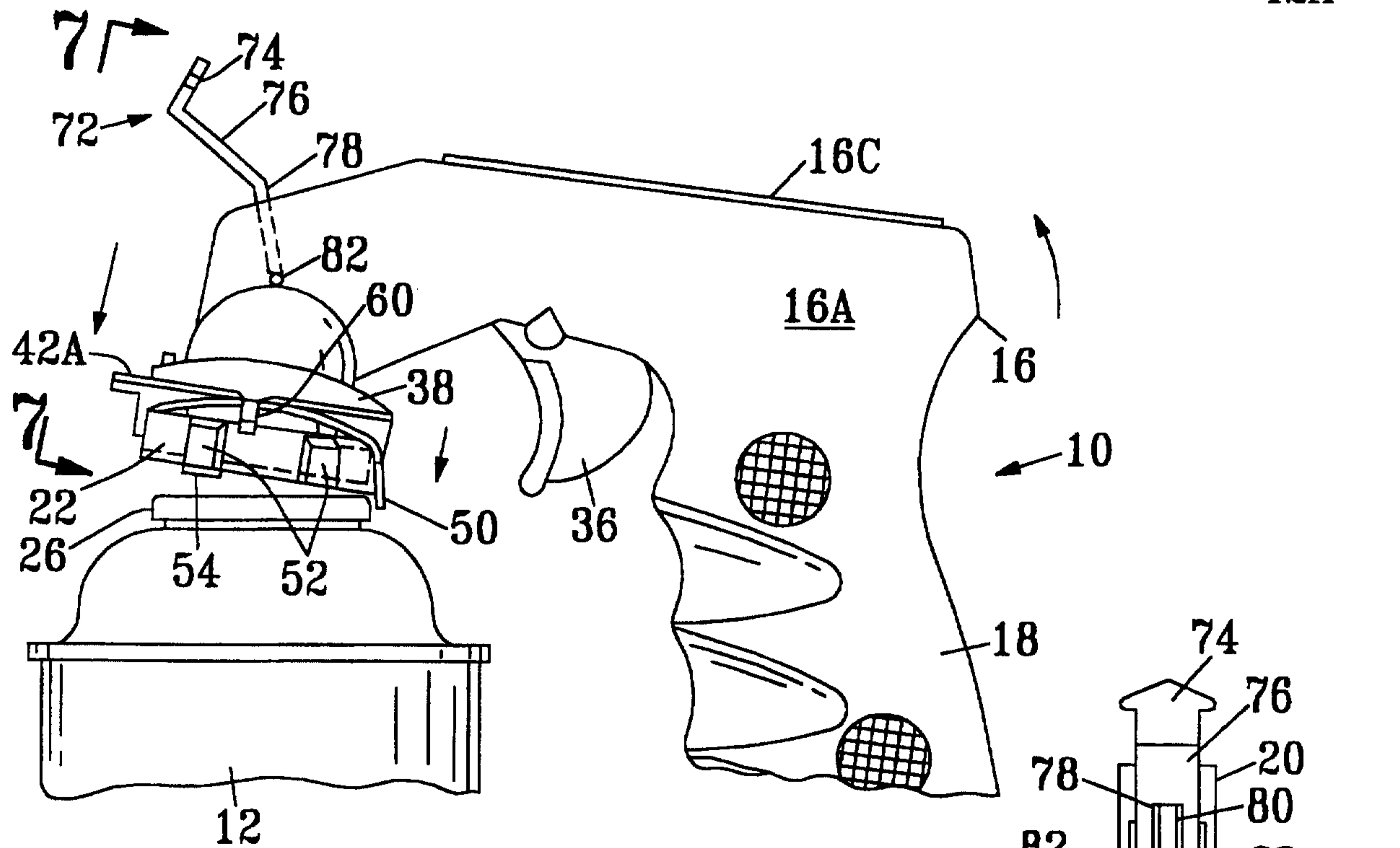
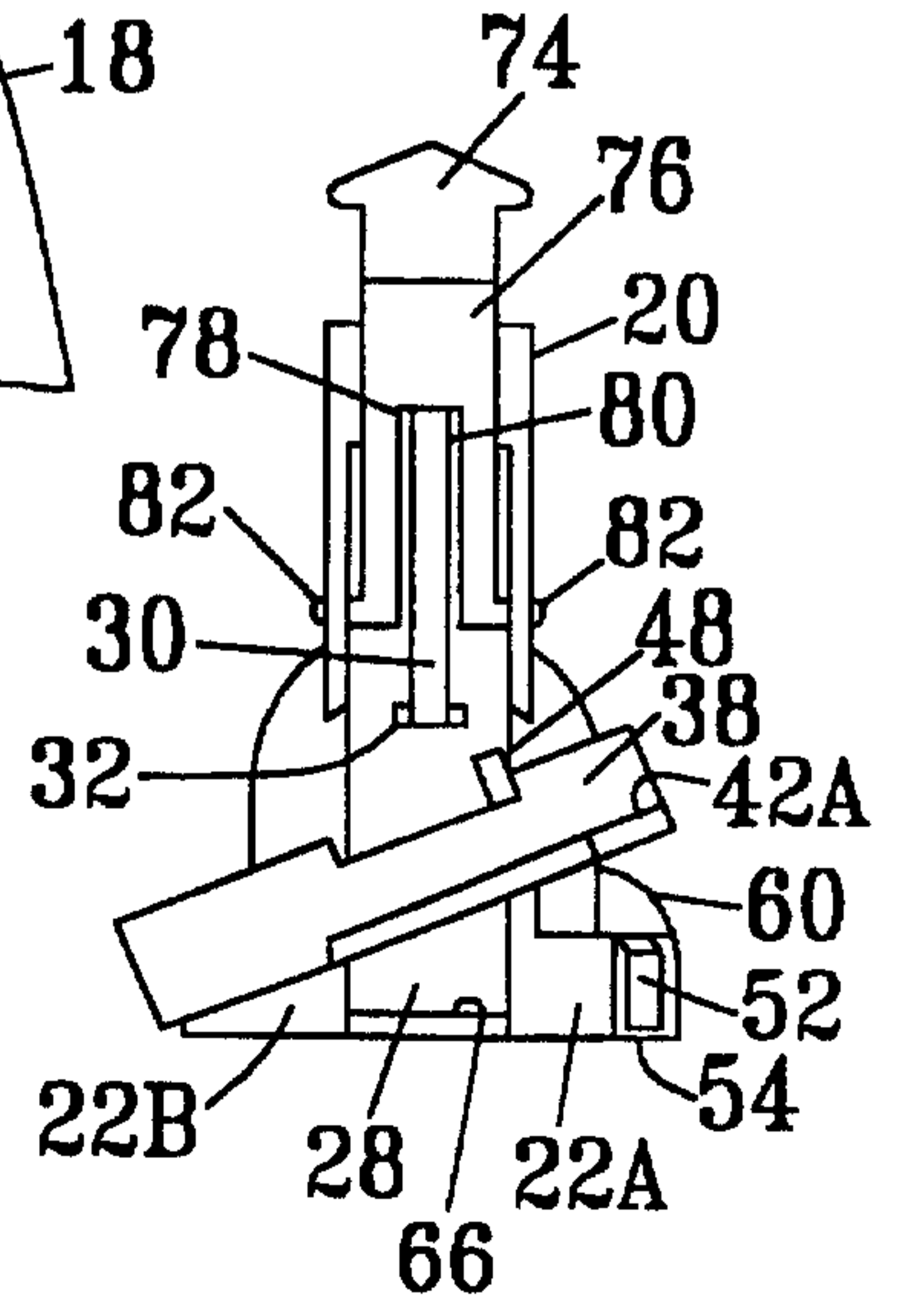


Fig. 6

Fig. 7



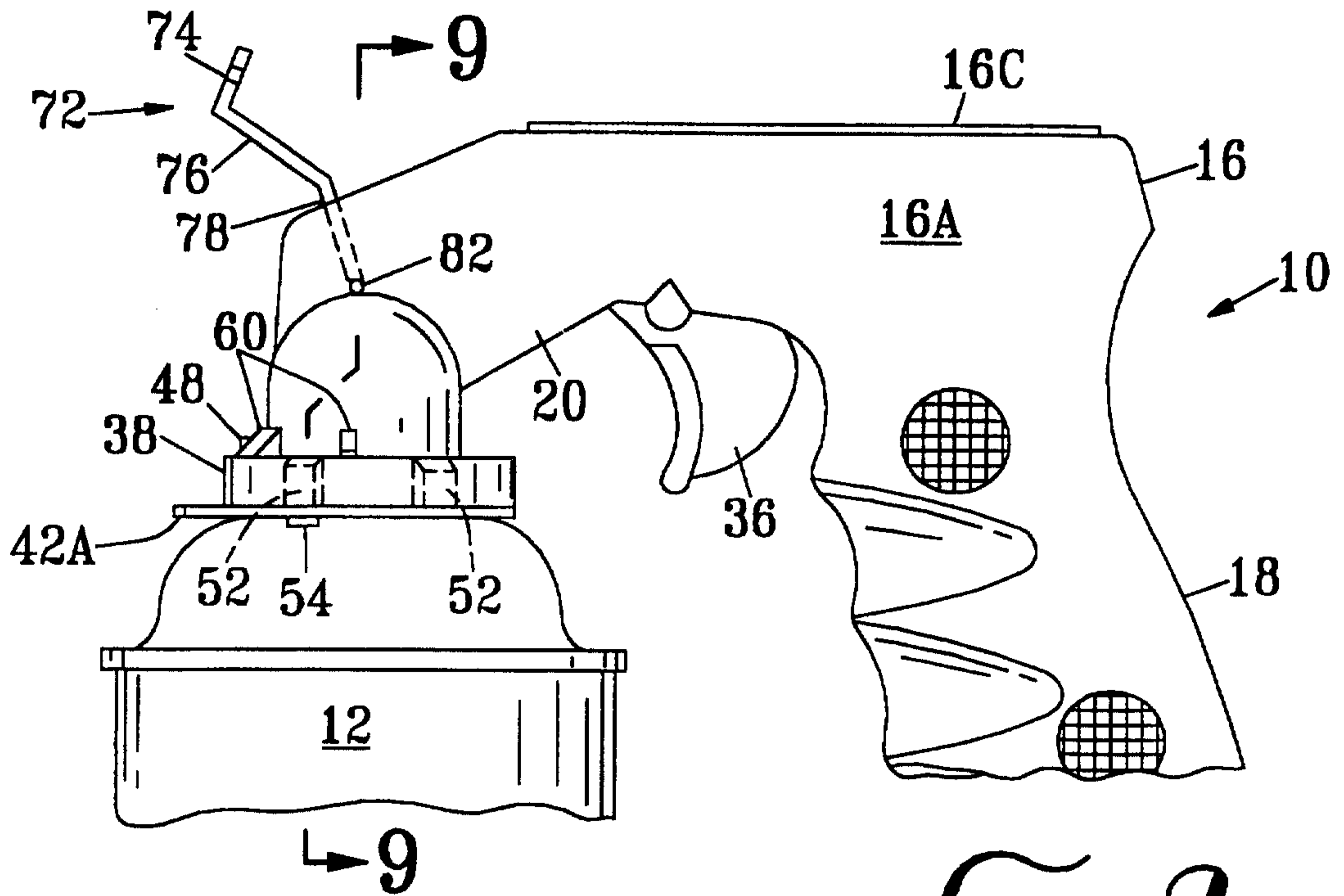


Fig. 8

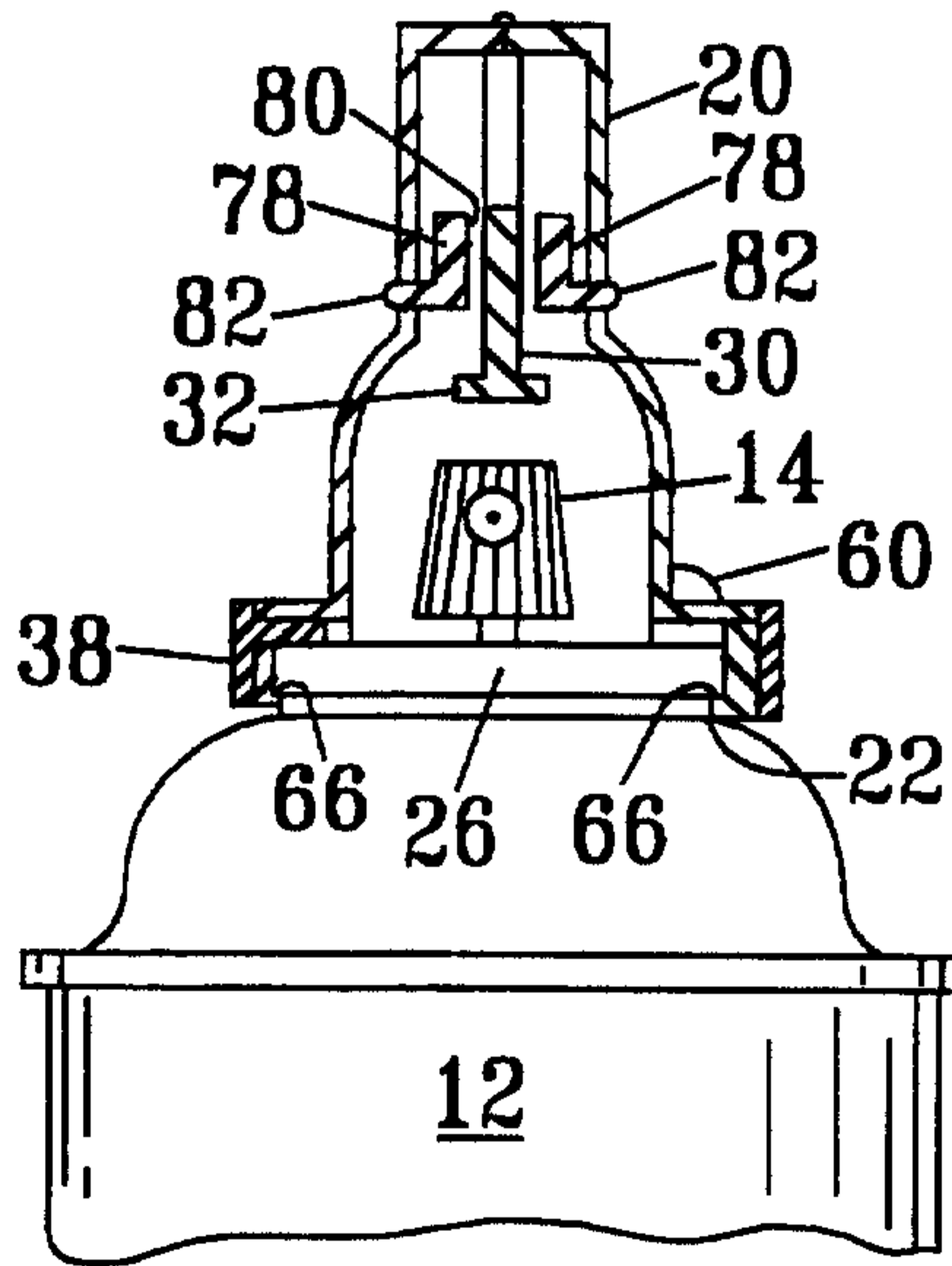


Fig. 9

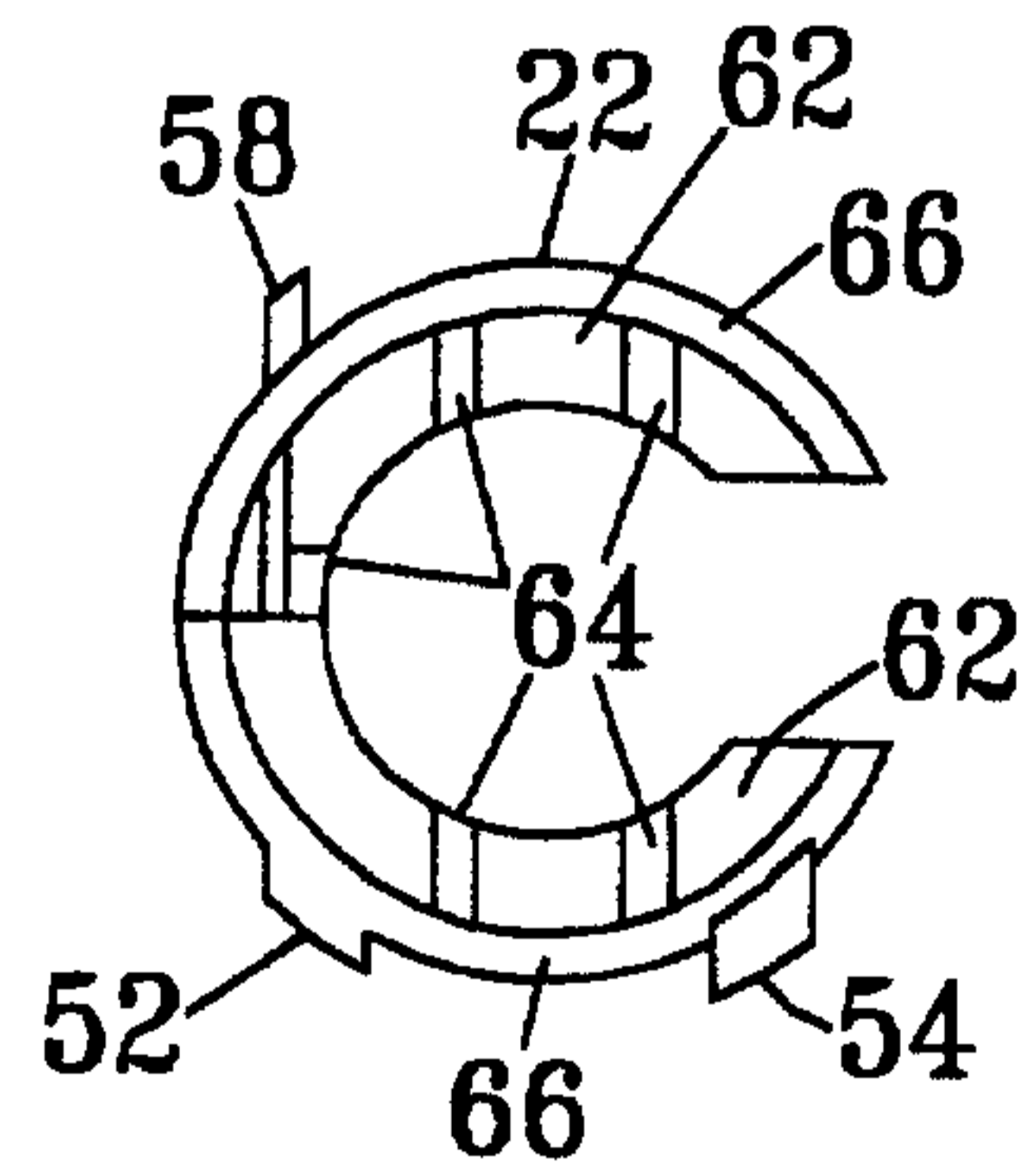


Fig. 5A

Fig. 10
PRIOR ART

