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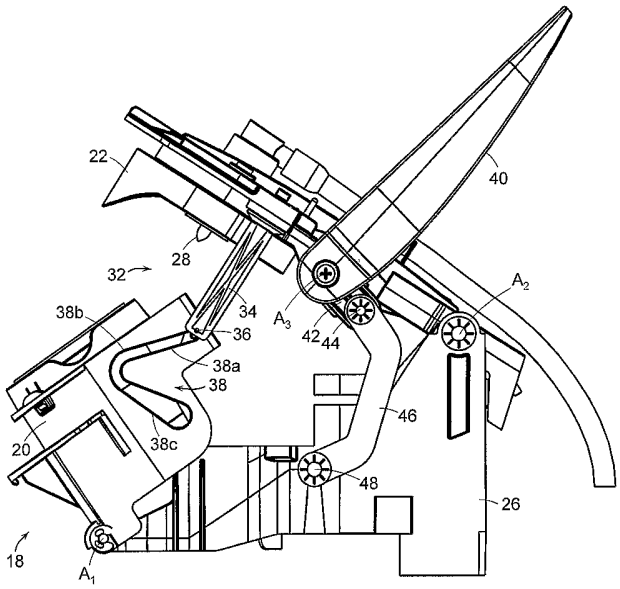
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[Continued on next page]

(54) Title: BREW CHAMBER FOR A SINGLE SERVE BEVERAGE BREWER



(57) Abstract: A brew chamber for a single serve filter package (24). The chamber includes a receptacle (20) having an open top, configured and dimensioned to receive the package (24). A frame (26) for supporting the receptacle for pivotal movement about a first axis (A1) between a vertical brew position and a forwardly inclined open position. A lid (22) is supported on the frame for pivotal movement about a second axis (A2) between a raised position allowing access to the open top when the receptacle is in the open position, and a lowered position closing the open top when the receptacle is in the brew position. The receptacle (20) is linked to the lid (22) such that the receptacle is pivoted between the brew and open positions in response to movement of the lid between the lowered and raised positions.

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BREW CHAMBER FOR A SINGLE SERVE BEVERAGE BREWER

PRIORITY INFORMATION

This application is a continuation-in-part of U.S. Serial No. 10/734,639 filed on December 12, 2003.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to single serve beverage brewers, and is concerned in particular with the provision of a novel and improved brew chamber for such brewers.

2. Description of the Prior Art

In known brew chambers for single serve beverage brewers, such as those disclosed for example in U.S. Patent Nos. 5,325,765; 6,079,315; 6,142,063; and 6,606,938, a disposable beverage filter cartridge is pierced by inlet and outlet probes to accommodate a through flow of metered hot water. The hot water infuses a dry beverage medium contained in the cartridge to thereby produce a single serving of the beverage.

The brew chambers are opened and closed by automatically operable mechanisms that have proven to be reliable, although relatively complex and expensive.

Other beverage brewers of the type disclosed for example in WO 02/43541 A1 have brew chambers that are opened and closed manually, but these also employ unduly complicated operating mechanisms.

Moreover, the prior art brew chambers, be they automatically or manually operated, suffer from an added disadvantage in that their cartridge or pod receptacles remain vertical and thus inconveniently oriented when the chambers are opened.

There exists a need, therefore, for an improved beverage chamber that has a relatively simple and inexpensive operating mechanism, with the capability, when opened, of presenting the cartridge receptacle in a forwardly inclined position, thus enhancing its accessibility during both insertion of fresh cartridges and retrieval of spent cartridges.

SUMMARY OF THE INVENTION

A brew chamber in accordance with the present invention has a receptacle with an open top configured and dimensioned to receive a beverage filter cartridge. A fixed frame supports the receptacle for pivotal movement about a first axis between a vertical brew position and a forwardly inclined open position. A lid is supported on the frame for pivotal movement about a second axis between a raised position allowing access to the forwardly inclined open receptacle, and a lowered position closing the receptacle in its vertical brew position. The first and second axes are parallel. A linkage connects the receptacle to the lid and serves to pivotally manipulate the receptacle between its open and brew positions in response to movement of the lid between its raised and lowered positions.

These and other features and advantages of the present invention will now be described in greater detail with reference to the accompanying drawings, wherein:

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a front perspective view of a single serve beverage brewer, with a brew chamber in accordance with the present invention shown in its closed condition;

Figure 2 is a side elevational view of the brewer as shown in Figure 1;

Figure 3 is a view similar to Figure 1 showing the brew chamber in its open condition;

Figure 4 is a side elevational view of the brewer as shown in Figure 3;

Figure 5 is a side view of the brew chamber and its operating mechanism removed from the brewer housing, the chamber being shown open;

Figure 6 is a view similar to Figure 5 with portions broken away;

Figures 7-9 are views similar to Figure 6 showing the brew chamber at successive stages during closure;

Figures 10a-10d are views showing the coaction between linkage arms and resilient elements of the frame during pivotal movement of the handle between its open and closed positions; and

Figure 11 is a top plan view of the closed brew chamber.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

With reference initially to Figures 1-4, a single serve beverage brewer is shown at 10 having a housing 12 with a forwardly protruding shelf 14 arranged to support a

cup 16 for the brewed beverage.

The housing 12 contains components conventionally included in brewers of this type, including, inter alia, a water tank, heater, pump, electronic controls, etc. These are well known to those skilled in the art, and thus have not been illustrated, nor will they be described further in this specification. Suffice it to say that these components coact in response to the user's command to deliver a metered amount of heated water to a brew chamber generally indicated at 18.

The brew chamber includes a cartridge receptacle 20 and a lid 22. The receptacle has an open top configured and dimensioned to receive a beverage filter cartridge 24 (see Figures 3 and 4). The cartridge 24 is preferably of the type disclosed, for example, in U.S. Patent No. 5,840,189, the description of which is herein incorporated by reference. Cartridge 24 includes an impermeable piercable outer container internally subdivided by a filter element into two compartments, one of which contains a dry beverage medium. Alternatively, the brew chamber could be employed to process beverage pods that typically are structured with soluble beverage materials confined between top and bottom filter media.

With reference additionally to Figures 5-9 and 11, the brew chamber 18 includes a frame structure 26 secured in any known manner within the brewer housing 12.

The receptacle 20 is supported by the frame structure for pivotal movement about a first axis A_1 between a vertical brew position, as shown in Figures 1, 2, 8 and 9, and a forwardly inclined open position, as shown in Figures 3, 4 and 5.

The lid 22 is supported by the frame structure 26 for pivotal movement about a second axis A_2 between a lowered closed position, again as shown in Figures 1, 2, 8 and 9, and a raised open position as shown in Figures 3, 4 and 5. The raised lid allows access to the forwardly inclined receptacle 20 for convenient insertion and removal of a beverage filter cartridge 24. The lowered lid closes and cooperates with the receptacle to enclose the filter cartridge during the brew cycle. As shown in Figures 5-7, the lid carries an inlet probe 28 and as shown in Figure 7, the base of the receptacle includes an outlet probe 30. The probes pierce the beverage filter cartridge as the lid is lowered to its closed position, thus accommodating a through flow of heated water into the cartridge via the inlet probe for infusion with the beverage medium contained in the cartridge, with the resulting brewed beverage exiting via the outlet probe for delivery to the underlying cup 16. As mentioned previously, a beverage pod could be employed

alternatively, with water flowing into the brew chamber via an inlet port or ports rather than an inlet probe, with the brewed beverage exiting the brew chamber via an outlet port or ports.

As can be seen in Figures 5-9 and 11, a linkage generally indicated at 32 connects the receptacle 20 to the lid 22 and serves to pivot the former about axis A between its vertical brew and forwardly inclined positions in response to movement of the latter between its lowered and raised positions. The linkage includes arms 34 fixed at their upper ends to the lid 22, and carrying pins 36 at their lower ends. The pins 36 are positioned to ride in contoured slots 38 in opposite sides of the receptacle 20. The slots 38 have upper substantially straight segments 38a communicating at bends 38b with rearwardly inclined and somewhat enlarge lower segments 38c.

A generally U-shaped operating handle 40 has its ends fixed to generally perpendicular crank arms 42 which in turn are connected to the lid 22 for pivotal movement about a third axis A_3 parallel to the first and second axes A_1, A_2. The crank arms 42 pivotally connected as at 44 to links 46 which in turn are pivotally connected as at 48 to the frame structure 26.

When the receptacle 20 is in its forwardly inclined open position as shown in Figure 5, the operating handle 40 is at an angle of approximately 90° with respect to the lid 22, and the pins 36 on arms 34 are at the rearmost ends of the straight slot segments 38a.

As the handle 40 is pivoted forwardly about axis A_3 (Figure 6), the pins 36 on arms 34 progress around the slot bends 38b, pivotally urging the receptacle about axis A_1 rearwardly from its forwardly inclined position. Simultaneously, the cooperative pivotal action of the crank arms 42 and links 46 causes the lid 22 to be pivotally lowered about axis A_2.

At the closed position shown in Figure 9, the pins 36 on arms 34 have reached the lower ends of the slots 38, and the operating handle 40 is substantially parallel to the fully lowered lid 22.

Frame 26 includes resilient elements 50 configured and arranged to coact with the crank arms 42 in providing an "over the center" yieldable tactile resistance to pivotal movement of the handle 40 between its open and closed positions. More particularly, and with reference to Figures 10a-10d, which coincide respectively with Figures 6-9, it will be seen that the crank arms 42 pivot together with handle 40 about axis A_3. At the

position shown in Figures 8 and 10c, corners 42a of the crank arms contact and downwardly deflect resilient elements 50 through an initial distance d_1, thus providing tactile resistance to continued handle movement. When the lid is finally closed, and as shown in Figure 10d, the flat bottoms 42b of the crank arms rest against the upper edges of the resilient elements, the latter having sprung back slightly but remaining downwardly deflected by a reduced distance d_2. The handle 40 is thus resiliently held downwardly in its closed position, thus providing a positive indication of chamber closure.

In light of the foregoing, it will now be understood that the mechanism of the present invention is relatively simple, involving as major components the receptacle 20, lid 22 and handle 40 respectively mounted for pivotal movement about parallel axes A_1, A_2 and A_3. The brew chamber 18 can accommodate various types of disposable filter packages, including the filter cartridge 24 shown in the drawings, as well as filter pods. When the brew chamber is opened, the receptacle is inclined forwardly to facilitate insertion of fresh filter packages and removal of spent filter packages.

We claim:

1. A brew chamber for a disposable single serve filter package, said chamber comprising:

a receptacle having an open top configured and dimensioned to received said package;

a frame for supporting said receptacle for pivotal movement about a first axis between a vertical brew position and a forwardly inclined open position;

a lid supported on said frame for pivotal movement about a second axis between a raised position allowing access to said open top when said receptacle is in said open position, and a lowered position closing said open top when said receptacle is in said brew position; and

connecting means for connecting said receptacle to said lid and for pivoting said receptacle between said brew and open positions in response to movement of said lid between said lowered and raised positions.

2. The brew chamber of claim 1 wherein said first and second axes are parallel.

3. The brew chamber of claim 1 wherein said connecting means comprises levers projecting from said lid, said levers being engaged in and movable along contoured slots in said receptacle.

4. The brew chamber of claim 1 further comprising a handle connected to said lid for pivotal movement between open and closed positions about a third axis parallel to said first and second axes, and linkage means for connecting said handle to said frame, said linkage means being configured and arranged to pivot said lid about said second axis between said raised and lowered positions in response to pivotal movement of said handle about said third axis between said open and closed positions.

5. The brew chamber of claim 4 further comprising resilient elements on said frame, said linkage means being engageable with said resilient elements to provide yieldable tactile resistance to pivotal movement of said handle between said open and closed positions.

6. The brew chamber of claim 5 wherein said resilient elements coact with said

linkage means to resiliently maintain said handle into said closed position.

7. A brew chamber for a disposable single serve filter package, said chamber comprising:

a receptacle having an open top configured and dimensioned to received said package;

a frame for supporting said receptacle for pivotal movement about a first axis between a vertical brew position and a forwardly inclined open position;

a lid supported on said frame for pivotal movement about a second axis parallel to said first axis between a raised position allowing access to said open top when said receptacle is in said open position, and a lowered position closing said open top when said receptacle is in said brew position;

connecting means for connecting said receptacle to said lid and for pivoting said receptacle between said brew and open positions in response to movement of said lid between said lowered and raised positions, said connecting means comprising levers projecting from said lid, said levers being engaged in and moveable along contoured slots in said receptacle;

a handle connected to said lid for pivotal movement between open and closed positions about a third axis parallel to said first and second axes; and

linkage means for connecting said handle to said frame, said linkage means being configured and arranged to pivot said lid about said second axis between said raised and lowered positions in response to pivotal movement of said handle about said third axis between said open and closed positions.

8. A brew chamber for a disposable single serve filter package, said chamber comprising:

a receptacle having an open top configured and dimensioned to received said package;

a frame for supporting said receptacle for pivotal movement about a first axis between a vertical brew position and a forwardly inclined open position;

a lid supported on said frame for pivotal movement about a second axis parallel to said first axis between a raised position allowing access to said open top when said receptacle is in said open position, and a lowered position closing said open top when said receptacle is in said brew position;

connecting means for connecting said receptacle to said lid and for pivoting said receptacle between said brew and open positions in response to movement of said lid between said lowered and raised positions;

a handle connected to said lid for pivotal movement between open and closed positions about a third axis parallel to said first and second axes;

linkage means for connecting said handle to said frame, said linkage means being configured and arranged to pivot said lid about said second axis between said raised and lowered positions in response to pivotal movement of said handle about said third axis between said open and closed positions; and

resilient elements on said frame, said linkage means being engageable with said resilient elements to provide yieldable tactile resistance to pivotal movement of said handle between said open and closed positions.

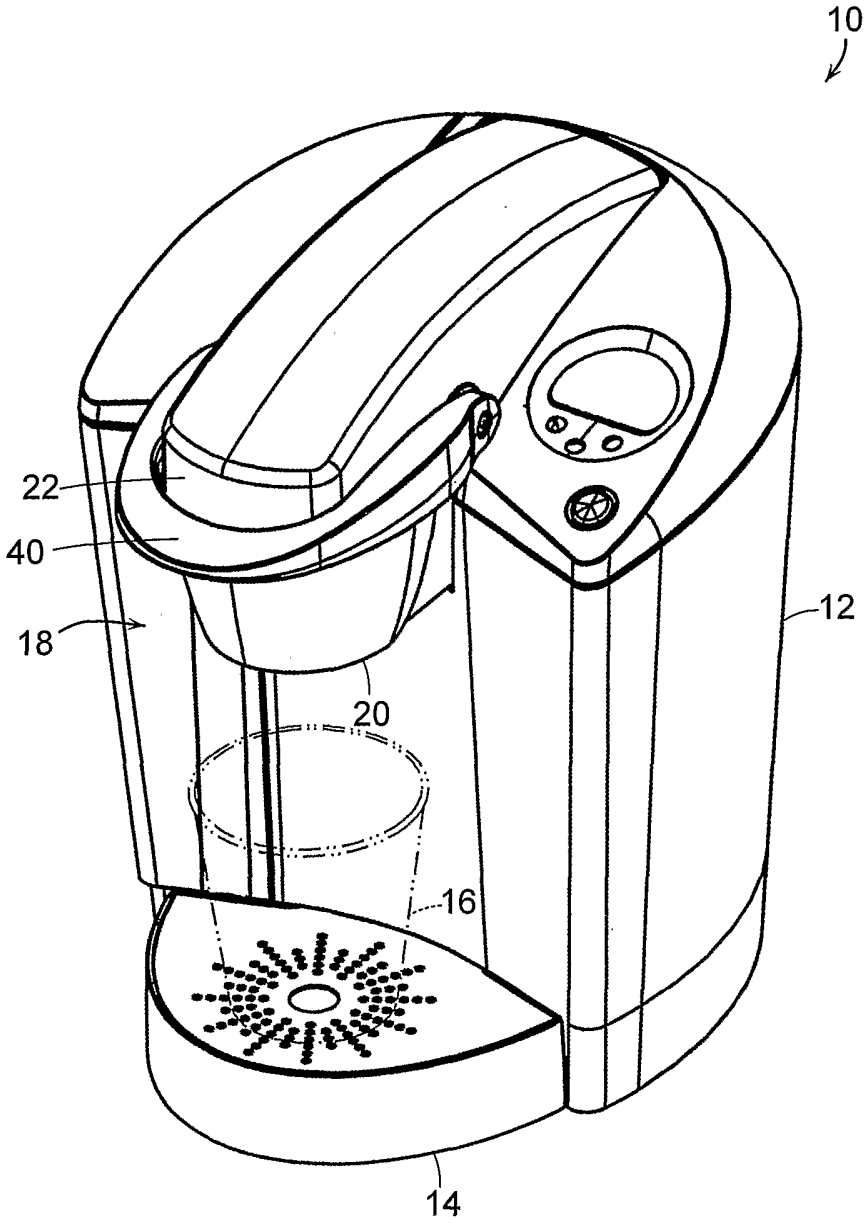


FIG. 1

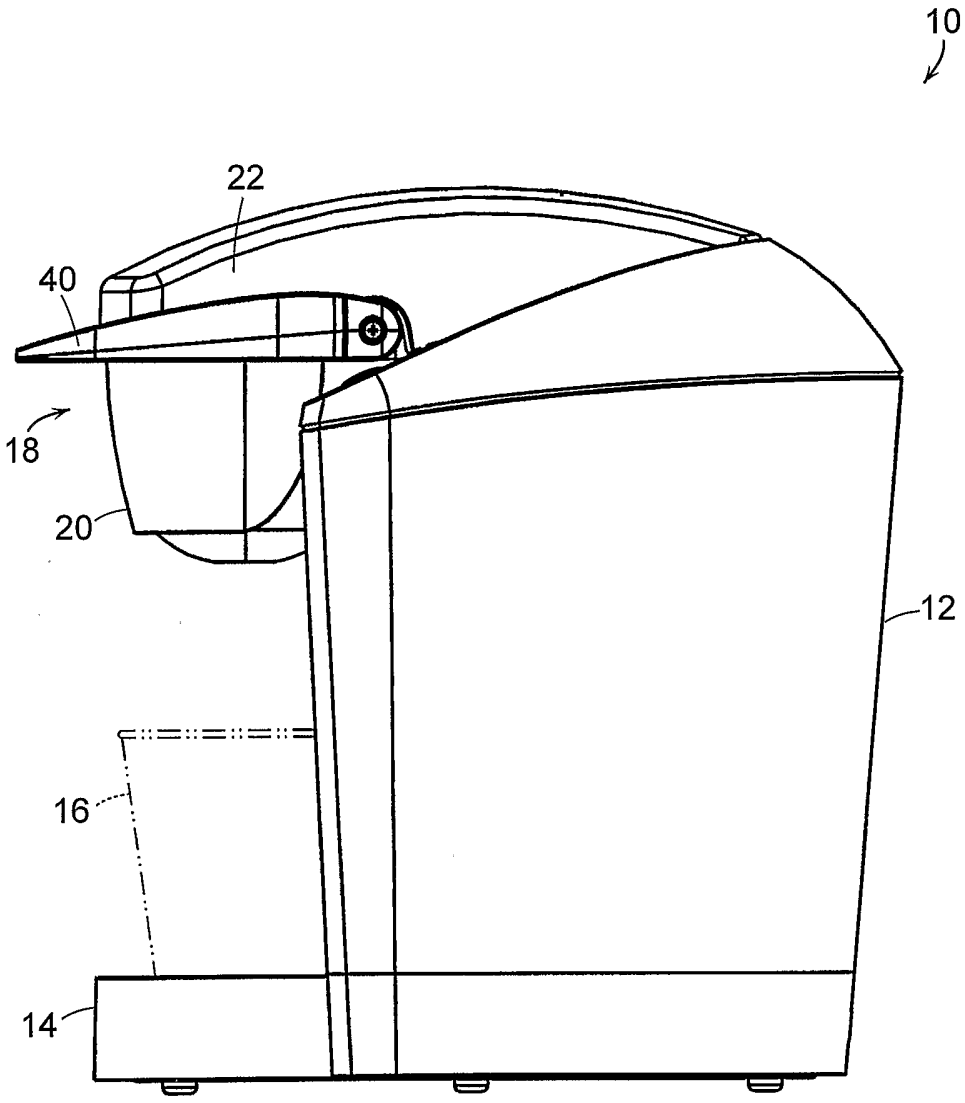


FIG. 2

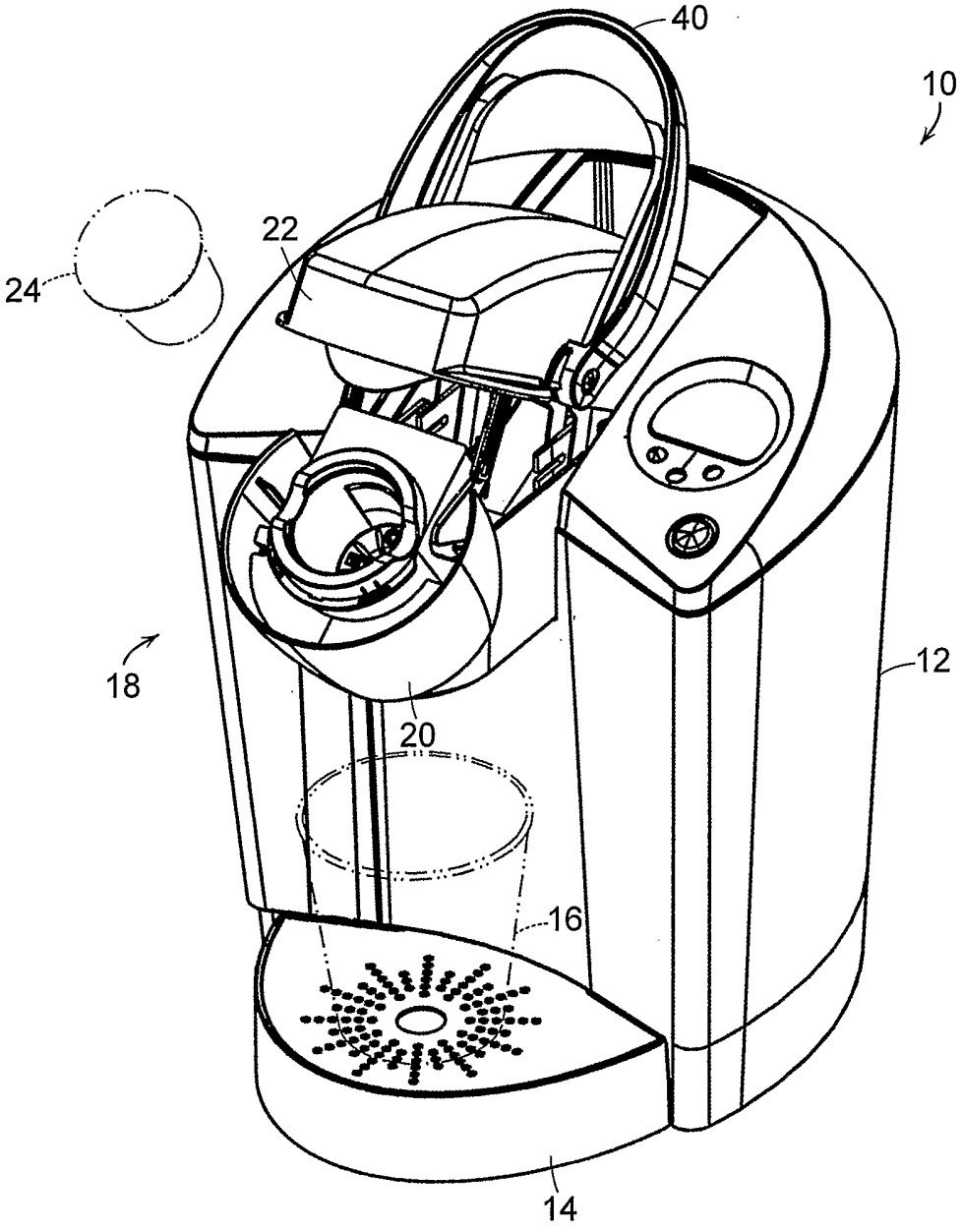


FIG. 3

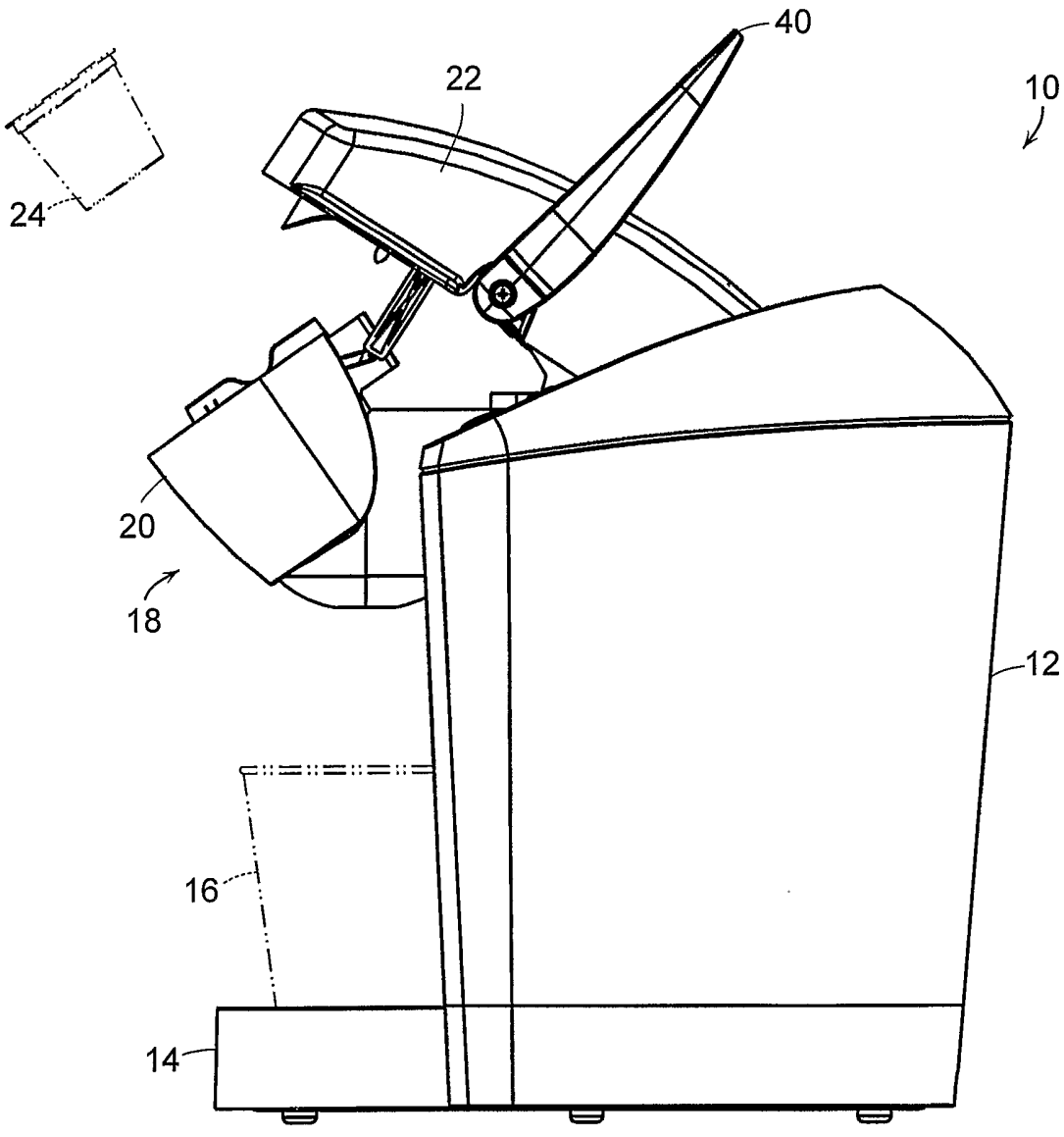


FIG. 4

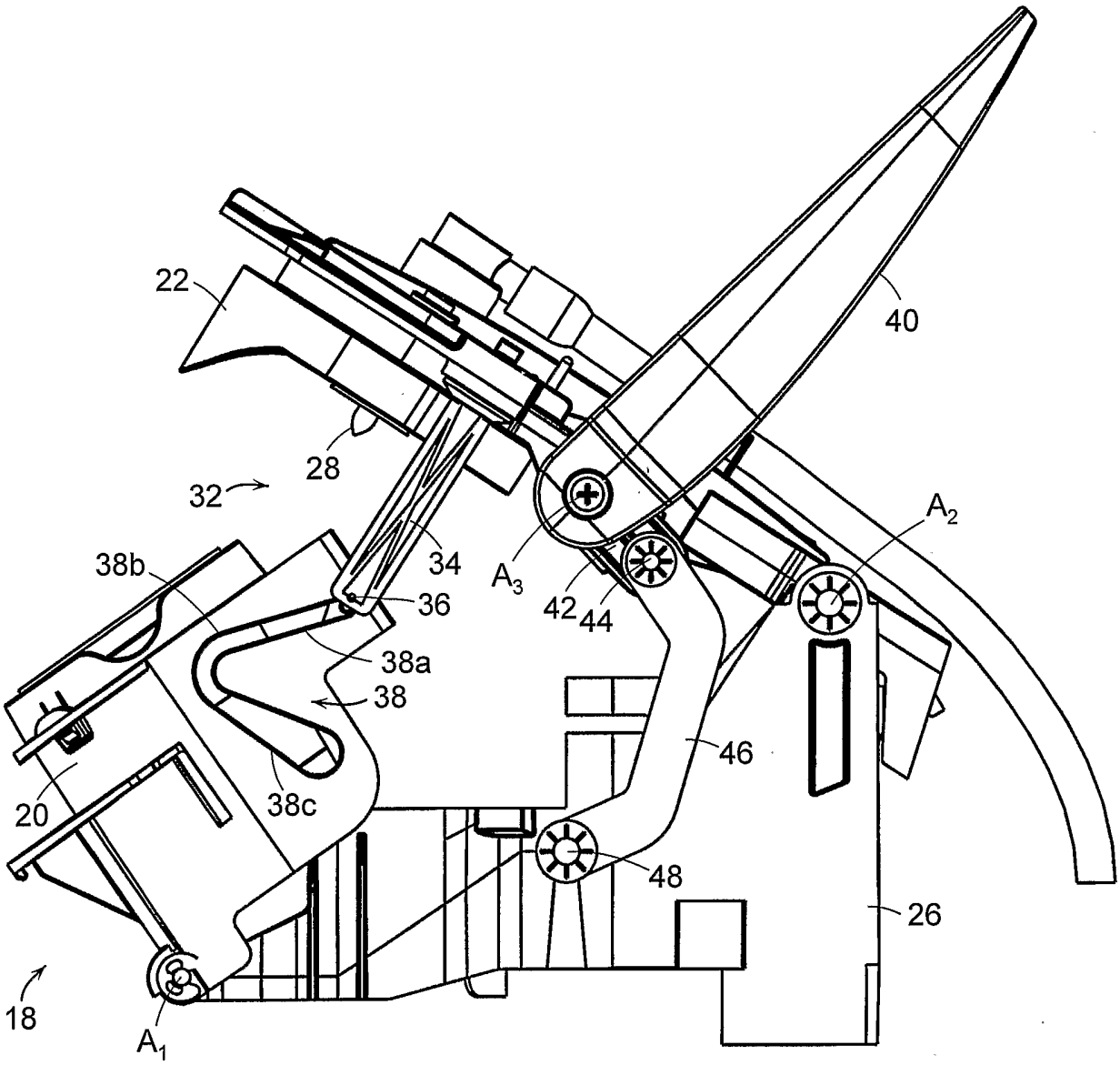


FIG. 5

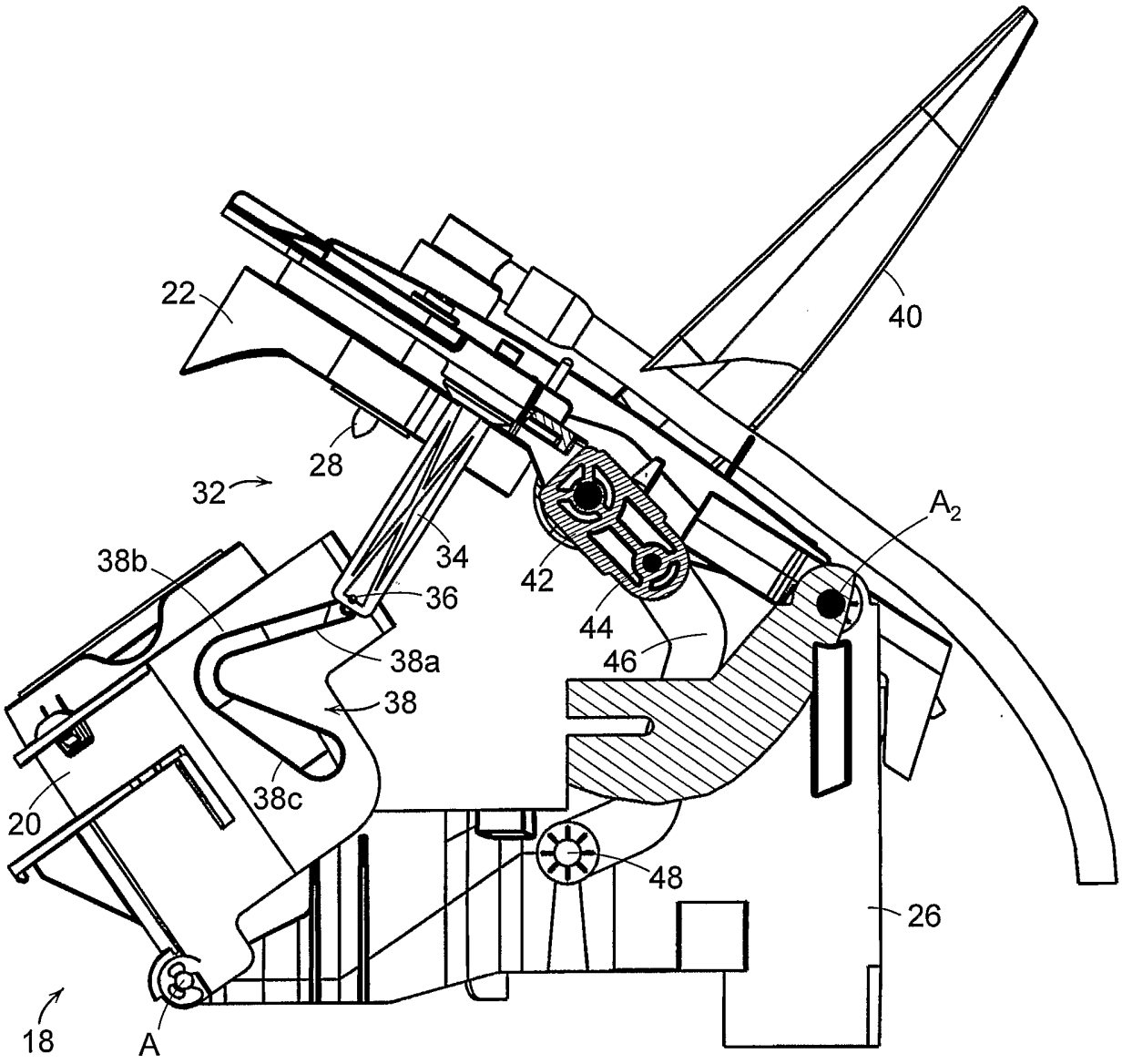


FIG. 6

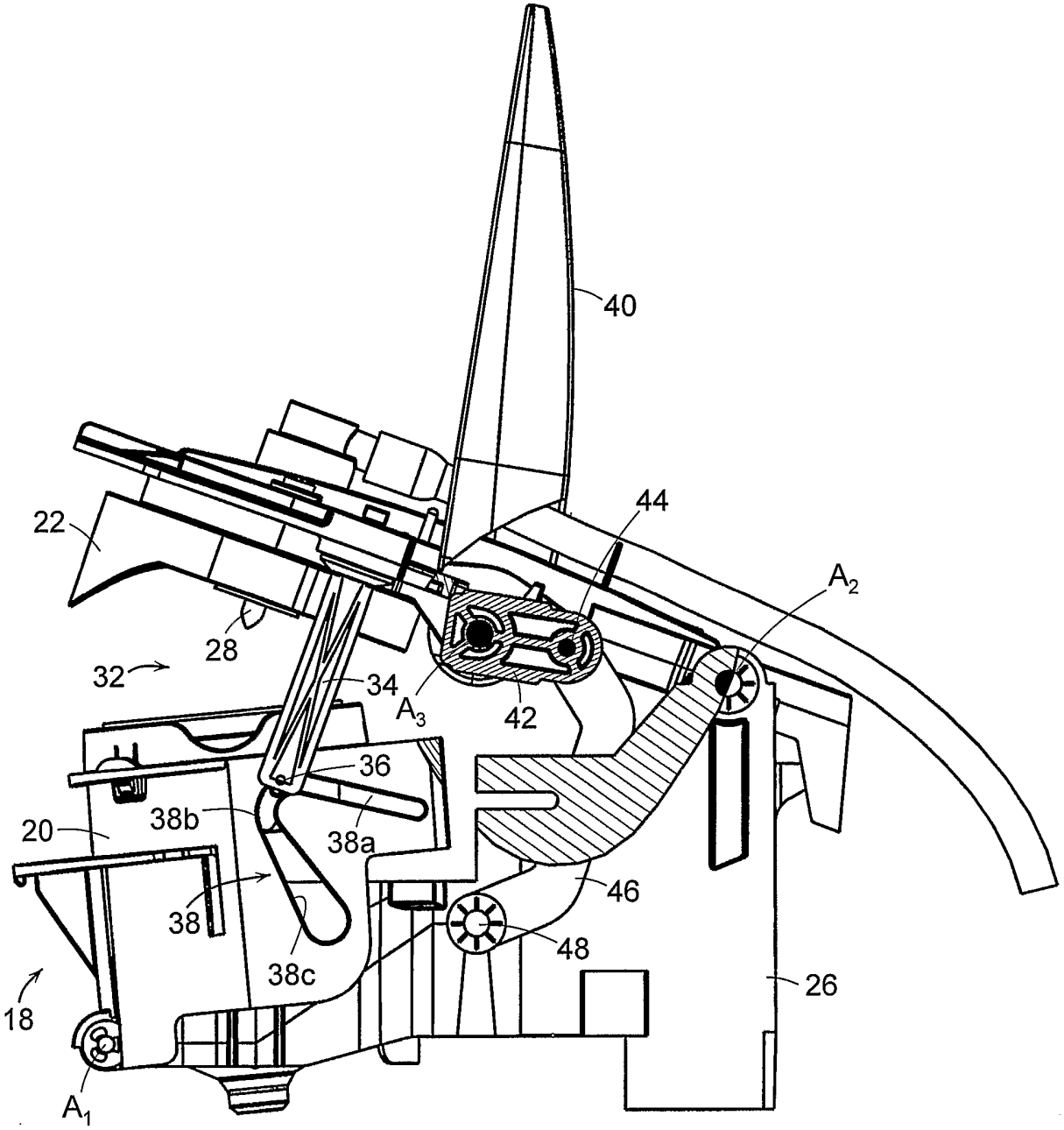


FIG. 7

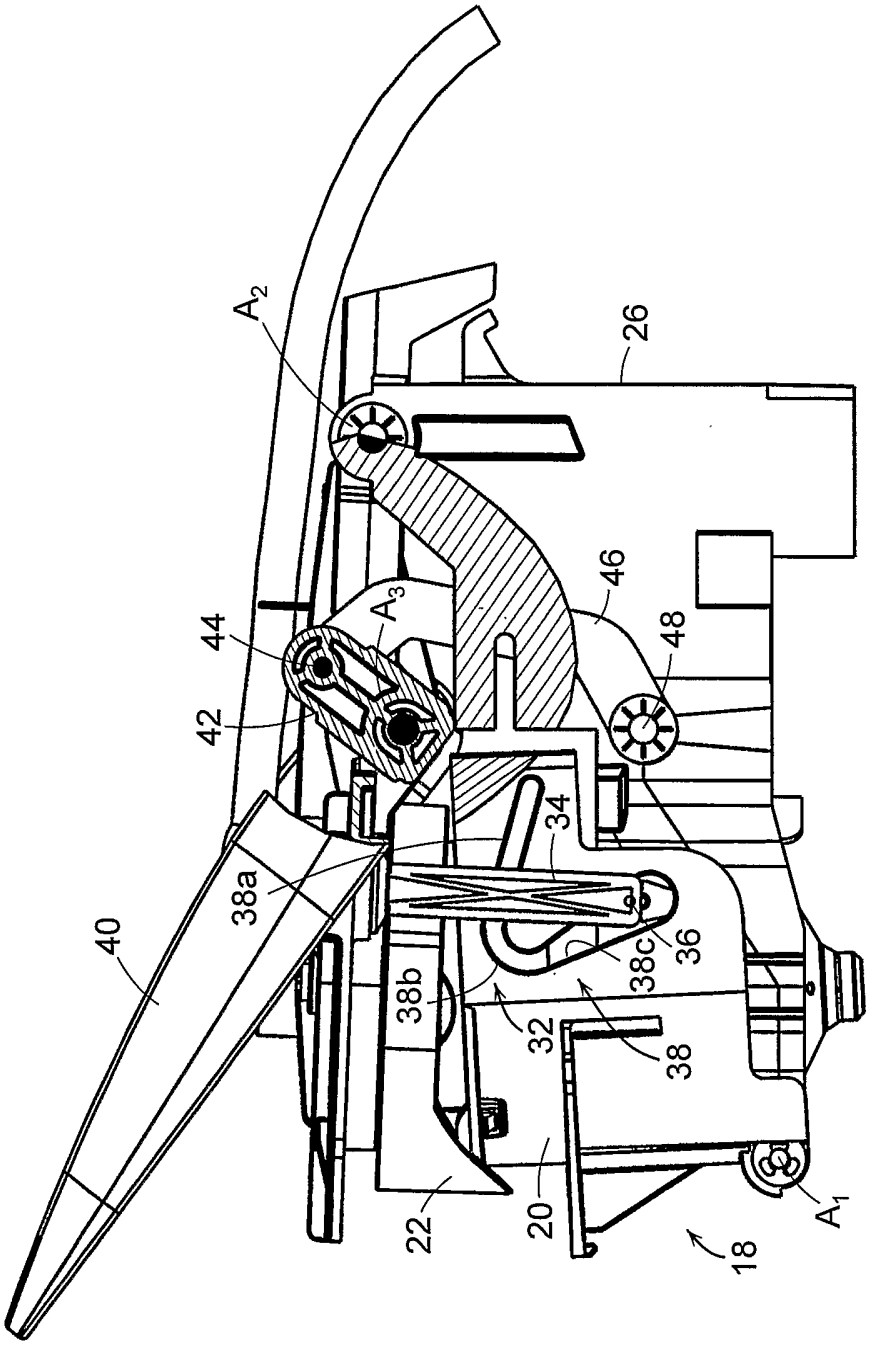


FIG. 8

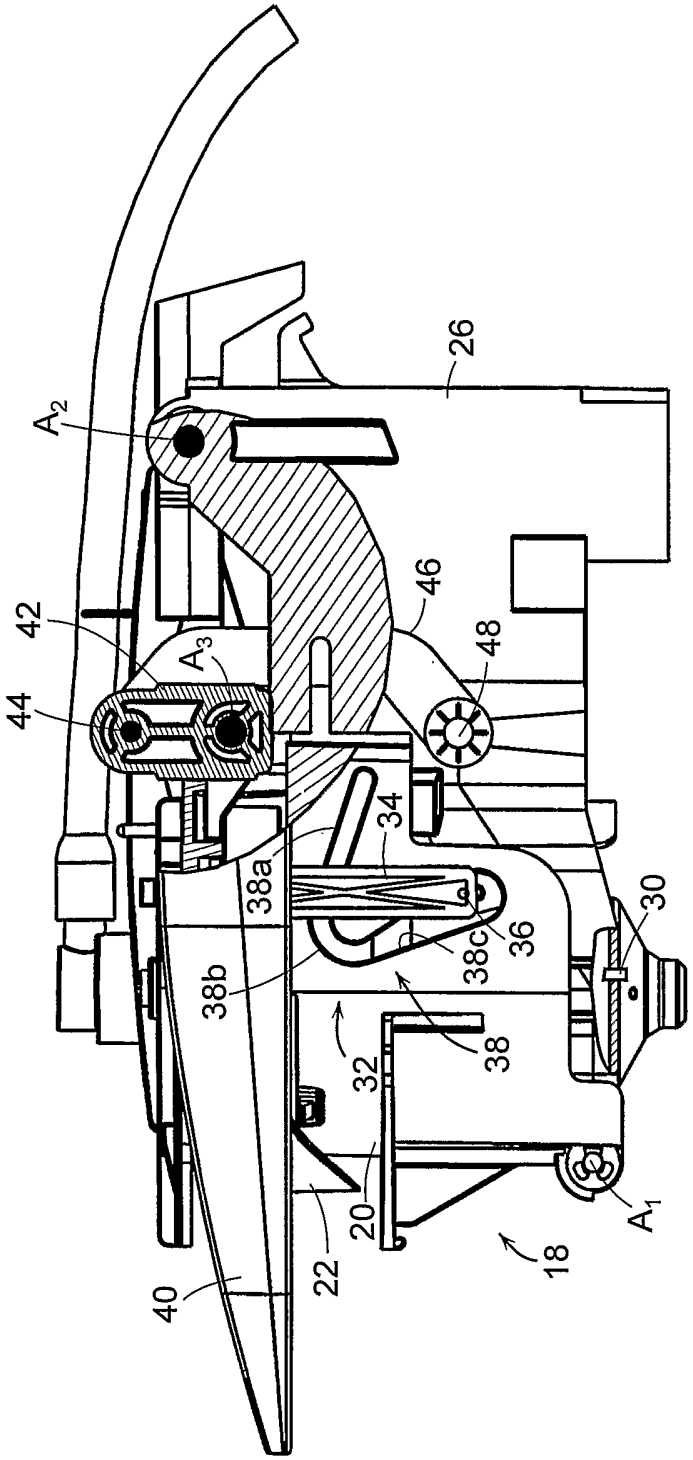


FIG. 9

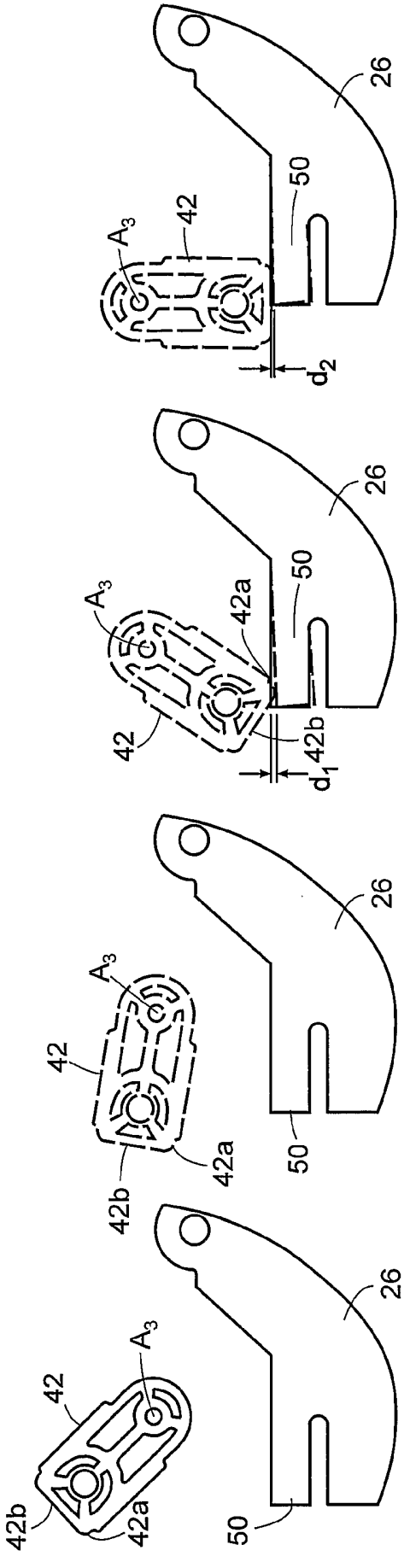


FIG. 10a FIG. 10b FIG. 10c FIG. 10d

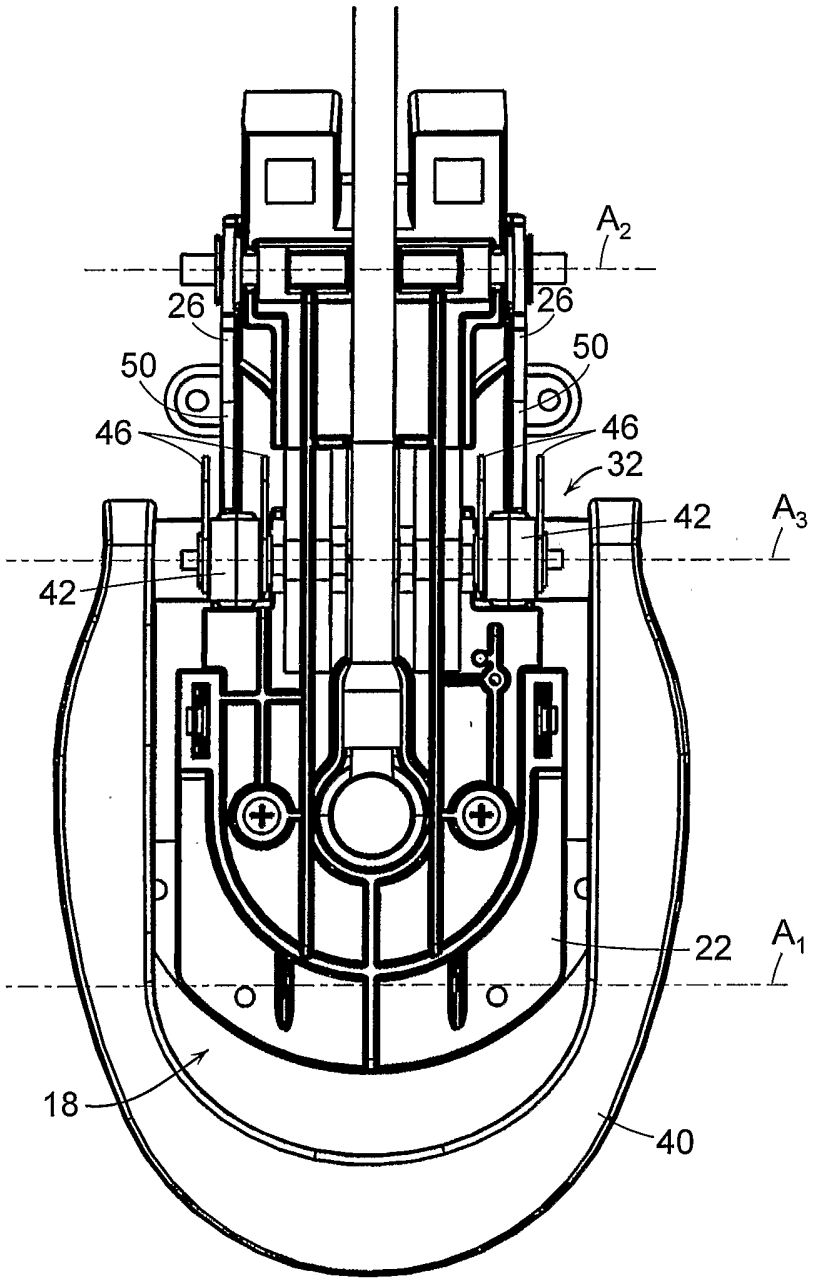


FIG. 11

INTERNATIONAL SEARCH REPORT

International Application No
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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A47J31/40

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A47J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2002/124736 A1 (KOLLEP ALEXANDRE ET AL) 12 September 2002 (2002-09-12) paragraph '0030! - paragraph '0032!; figures 1-8	1-4,7
A		5,6,8

X	US 2002/002913 A1 (MARILLER ALAIN ET AL) 10 January 2002 (2002-01-10) paragraph '0048! - paragraph '0068!; figures 1-9	1-4,7

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
6 April 2005	14/04/2005

Name and mailing address of the ISA	Authorized officer
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INTERNATIONAL SEARCH REPORT

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