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## (54) Hinge for lids of electric household appliances

(57) A right or left hinge for lids for electric household appliances, having a structure of the type that comprises a supporting head (10) provided with a partially threaded pivot (11) inserted in a helical spring (20) which acts by torsion and whose ends (21,22) are rigidly coupled respectively to the head (10) and to an adjustment nut (25) screwed onto the pivot thread (12), a lock nut (26), being further screwed onto the pivot thread (12), to lock the adjustment nut (25). The helical spring (20) is rigidly coupled, with its end (21) that lies opposite with respect to the adjustment nut (25), to a cam element (14) through which the pivot (11) passes, and a rod (16) cooperating with the cam element (14) is provided to convert rotary motion into axial translational motion, the rod (16) being perpendicular to the pivot axis and being pushed by a compression spring (27) arranged between the rod (16) and a portion of the head (10).

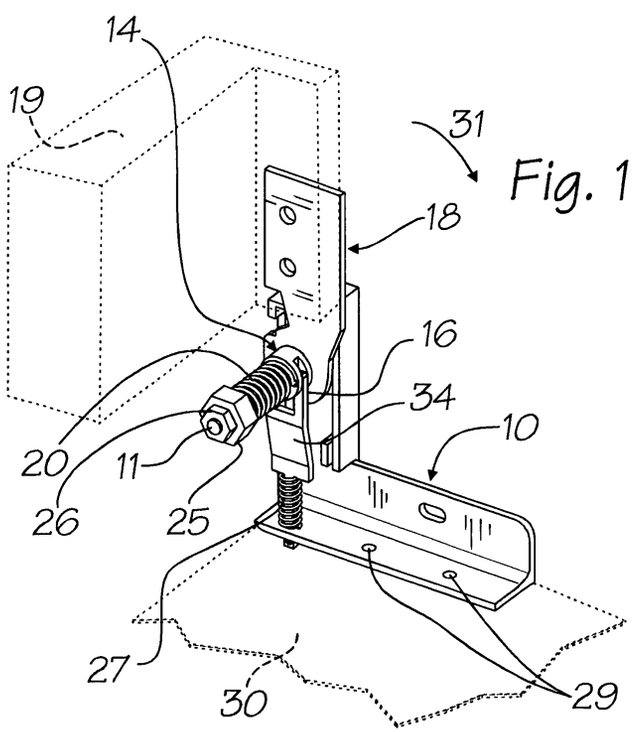


Fig. 1

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## Description

**[0001]** The present invention relates to a right or left hinge for use on lids of electric household appliances, such as combined electric and gas cookers, cooking ranges, et cetera.

**[0002]** The hinges can be mounted on the rear part of the electric household appliance so as to allow to close and open a lid made of glass, metal, or other material.

**[0003]** Hinges are already known which comprise a supporting head provided with a partially threaded pivot inserted in a helical spring, which acts by torsion and whose ends are rigidly coupled respectively to the head and to an adjustment nut screwed onto the thread.

**[0004]** A lock nut, also screwed onto the thread, is provided to lock the nut.

**[0005]** These known hinges have the disadvantage that they do not brake the movement of the lid if it is made to descend accidentally, therefore entailing the danger of breakage, for example in the case of glass lids, or in any case with operating safety problems for the user.

**[0006]** Furthermore, no device that closes the supply of the burners, if they are lit, in case of an accidental descent has been provided up to now.

**[0007]** The aim of the present invention is to provide a hinge that prevents the sudden descent of the lid during its closure by braking its motion.

**[0008]** Another object is to prevent accidental closure of the lid from the open position (90° with respect to the worktop).

**[0009]** Another object is to increase operating safety, making it impossible to close the lid while one or more burners of the appliance are lit.

**[0010]** Another object is to allow extraction and reposition of the lid from the hinges.

**[0011]** Another object is to provide a hinge that can be manufactured at low cost with conventional equipment and systems.

**[0012]** This aim and this and other objects that will become better apparent hereinafter are achieved by a right or left hinge for lids for electric household appliances, having a structure of the type that comprises a supporting head provided with a partially threaded pivot inserted in a helical spring which acts by torsion and whose ends are rigidly coupled respectively to said head and to an adjustment nut screwed onto said thread, a lock nut, which is also screwed onto said thread, being provided to lock said nut, the hinge being characterized in that said spring is rigidly coupled, with its end that lies opposite with respect to said adjustment nut, to a cam element through which said pivot passes, and a rod cooperating with said cam element being provided in order to convert the rotary motion into an axial translational motion, said rod being perpendicular to the pivot axis and being pushed by a compression spring arranged between said rod and a portion of said head.

**[0013]** Further characteristics and advantages of the present invention will become better apparent from the description of an embodiment thereof, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a partially sectional projection view of a hinge according to the invention, shown assembled and in use with the lid in the open position;
Figure 2 is an exploded projection view of the hinge of Figure 1;
Figures 3 and 4 are side and front views of the hinge in the position of Figure 1;
Figure 5 is a partially sectional projection view of a hinge according to the invention, shown assembled and in use with the lid in a partially closed position;
Figure 6 is a side view of the hinge in the position of Figure 5.

**[0014]** With reference to the figures, each hinge according to the invention, mounted in a right or left version, comprises a head 10, which is shaped like a right- or left-facing L, is preferably made of pressure die-cast aluminum alloy or other material having suitable mechanical characteristics, and has the end of a steel pivot 11 rigidly coupled thereto at right angles to the plane formed by said head.

**[0015]** In particular, the pivot 11 is embedded with its end 11a in the head 10 during die-casting and is partially provided with a right-handed thread in the case of a left hinge or with a left-handed thread in the case of a right hinge.

**[0016]** The thread is designated by the reference numeral 12 in the figures.

**[0017]** The shape of the embedded end is such that rotation of the pivot 11 is not allowed during closure or opening of the lid described hereinafter.

**[0018]** The pivot 11 is inserted in the through hole 13 of a tubular cam plug 14 made of treated steel, which is externally provided with a first slot 15, which constitutes the seat for a rod 16, and a second slot 17 (in two diametrically opposite planar portions), which defines a seat for the interlocking coupling of the end 18a, shaped like an inverted U, of a bracket 18, which is fixed at right angles to the edge of the lid 19.

**[0019]** A helical spring 20 (which acts by torsion) is arranged so as to surround the pivot 11 and has axially elongated ends 21 and 22 which are inserted respectively in an axial hole 23 of the plug 14 and in an axial hole 24 of an adjustment nut 25, which is screwed onto the thread 12 and lies opposite the plug 14.

**[0020]** A lock nut 26, also screwed onto the thread 12, is provided to lock the nut 25.

**[0021]** The rod 16 has a through hole 16a in which the end 21 of the spring 20 is inserted, coupling it in a hinge-like fashion to the movements of the plug 14.

**[0022]** The rod 16 lies at right angles to the pivot 11, initially with a wider portion 34 and then with a tab 32, which is inserted in a helical spring 27 (which acts by

compression), and with the end part 33 in a through hole 28 of the head 10.

**[0023]** The spring 27 is therefore compressed between the wider portion 34 and the head 10.

**[0024]** Finally, the head 10 is provided with holes 29 for fixing, for example by means of screws, to the worktop 30 (shown in dashed lines) of an electric household appliance.

**[0025]** As regards assembly, the plug 14 is fitted on the pivot 11, after fitting the spring 27, the rod 16 is locked on the plug 14 by means of the end 21 of the spring 20, which is fitted beforehand on the pivot 11.

**[0026]** The spring 20 is preset according to the requirements by tightening the adjustment nut 25 (with which the end 22 engages) with aid of a torque wrench, and the nut 25 is locked by means of a lock nut 26.

**[0027]** The right- or left-handed thread of the pivot 11 and of the nuts 25 and 26 do not allow said nuts to unscrew during the operations for closing and opening the lid 19.

**[0028]** In order to work, two hinges (a right one and a left one) must be matched and associated with a lid 19.

**[0029]** Once the hinges have been mounted and the lid 19 has been inserted by means of the brackets 18, operation from the open position to the closed position (arrow 31) is as follows: the bracket 18 turns the plug 14 and thus the spring 20 begins to be subjected to torsion.

**[0030]** By way of the rotation, the cam plug 14 compresses the spring 27, because it acts as a cam that converts its rotary motion into the translational motion of the rod 16.

**[0031]** As the angle between the vertical position of the lid 19 (open = 90°) and the horizontal position (closed = 0°) increases, the compression of the spring 27 increases and so do the torsion of the spring 20 and, consequently, the force which, by contrasting the weight of the lid 19, slows down its descent.

**[0032]** In normal conditions and with conventional hinges, the lid, once moved beyond a minimum angle from the closed position (approximately 10°), would fall heavily onto the worktop.

**[0033]** By means of the lower end part 33 of the rod 16, it is possible to actuate:

a) a mechanical or pneumatic device (not shown in the figures) for interrupting the gas supply (shut-off) if the lid 19 is closed with one or more burners lit.

b) a switch (also not shown), which controls an electric valve applied to the supply line for supplying gas to the appliance and blocks the flow of gas therein if the lid is closed accidentally while the burners are lit.

**[0034]** It is thus possible to avoid severe damage to the lid 19 or to the appliance.

**[0035]** In practice it has been found that the present invention has achieved its intended aim and objects.

**[0036]** In particular, it should be noted that the hinge prevents the sudden descent of the lid during its closure by braking its motion.

**[0037]** It is also possible to increase operating safety by allowing actuation of devices that avoid closures of the lid when one or more burners of the appliance are lit.

**[0038]** Furthermore, the hinge allows easy extraction and repositioning of the lid.

**[0039]** The present invention is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

**[0040]** The technical details may be replaced with other technically equivalent elements.

**[0041]** The materials, so long as they are compatible with the contingent use, as well as the dimensions, may be any according to requirements.

**[0042]** The disclosures in Italian Patent Application No. PD2001A000043 from which this application claims priority are incorporated herein by reference.

**[0043]** Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

## Claims

1. A right or left hinge for lids for electric household appliances, having a structure of the type that comprises a supporting head (10), provided with a partially threaded pivot (11) inserted in a helical spring (20) which acts by torsion and whose ends (21,22) are rigidly coupled respectively to said head (10) and to an adjustment nut (25) screwed onto the pivot thread (12), a lock nut, which is also screwed onto said thread (12), being provided to lock said adjustment nut (25), the hinge being **characterized in that** said spring (20) is rigidly coupled, with its end (21) that lies opposite with respect to said adjustment nut (25), to a cam element (14) through which said pivot (11) passes, and **in that** a rod (16) cooperating with said cam element (14) is provided in order to convert the rotary motion into an axial translational motion, said rod (16) being perpendicular to the pivot axis and being pushed by a compression spring (27) arranged between said rod (16) and a portion of said head (10).

2. The hinge according to claim 1, **characterized in that** said head (10) is shaped like a right- or left-facing L, to which the end (11a) of said pivot (11) is rigidly coupled at right angles to the plane formed by said head (10), said head (10) being provided with holes (29) for fixing, for example by means of screws, to the worktop (30) of said electric house-

hold appliance.

3. The hinge according to one or more of the preceding claims, **characterized in that** said pivot (11) is embedded with its end (11a) in said head (10), the shape of the embedded end (11a) being such as to not allow the rotation of said pivot (11) during operations for closing or opening the lid (19).

4. The hinge according to one or more of the preceding claims, **characterized in that** said cam element (14) is constituted by a plug, in a through hole (13) of which said pivot (11) is inserted, said plug (14) being externally provided with a first slot (15), which constitutes the resting seat for said rod (16), which lies at right angles to said pivot axis, and is provided initially with a wider portion (34) and thereafter with a tab (32) inserted in said spring (27), which acts by compression, and with its end part (33) in a through hole (28) of said head (10), said spring (27) being compressed between said wider portion (34) and said head (10), said rod (16) being pivoted to said plug (14).

5. The hinge according to one or more of the preceding claims, **characterized in that** said rod (16) has a through hole (16a) in which the corresponding end (21) of said torsion helical spring (20) is inserted.

6. The hinge according to one or more of the preceding claims, **characterized in that** said plug (14) has a second slot (17) in two mutually opposite planar portions which acts as an interlocking seat for an inverted U-shaped portion (18a) of a bracket (18) that is fixed at right angles to the edge of the lid (19).

7. The hinge according to one or more of the preceding claims, **characterized in that** said helical spring (20) that acts by torsion is arranged so as to surround said pivot (11) and has axially elongated ends (21,22) inserted respectively in an axial hole (13) of said plug (14) and in an axial hole (24) of said adjustment nut (25) screwed onto the thread (12) and located opposite with respect to said plug (14).

8. The hinge according to one or more of the preceding claims, **characterized in that** the lower end part (33) of said rod (16) actuates a mechanical or pneumatical shutt-off device for interrupting gas supplying if the lid is closed while one or more burners are lit.

9. The hinge according to one or more of claims 1 to 7, **characterized in that** the lower end part (33) of said rod (16) actuates a switch which controls an electric valve applied to a supplying line for supplying gas to the appliance and blocks the gas flow therein if the lid is closed accidentally while the burners are lit.

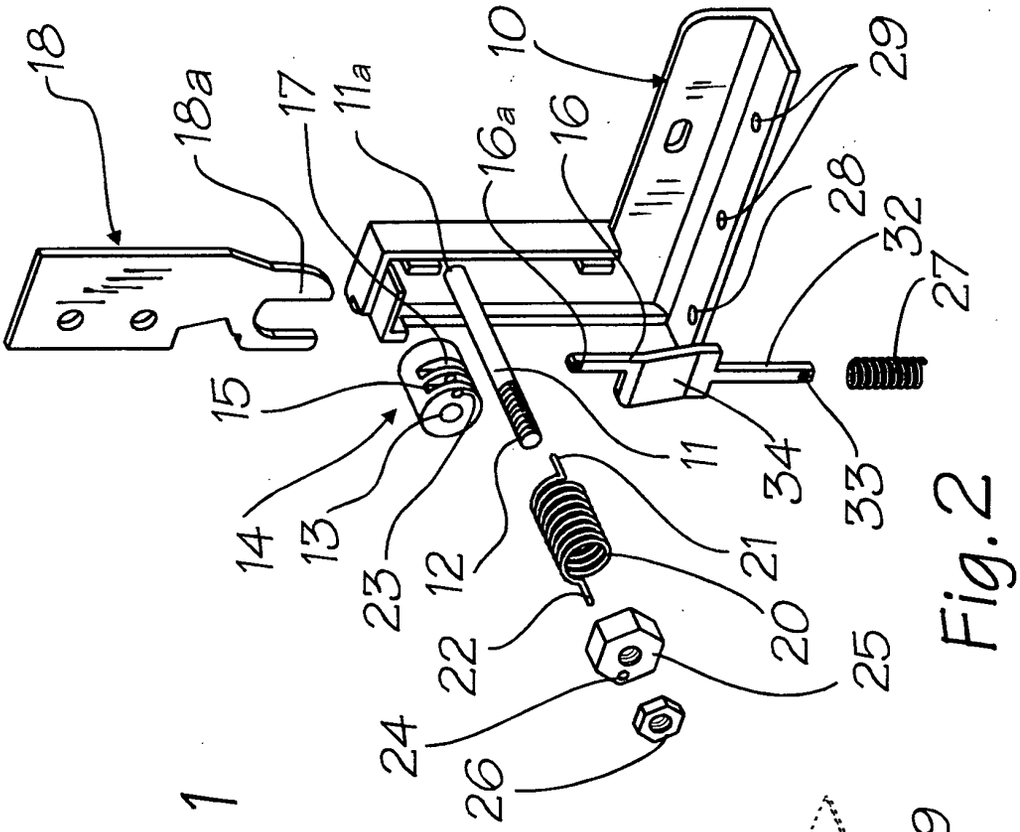
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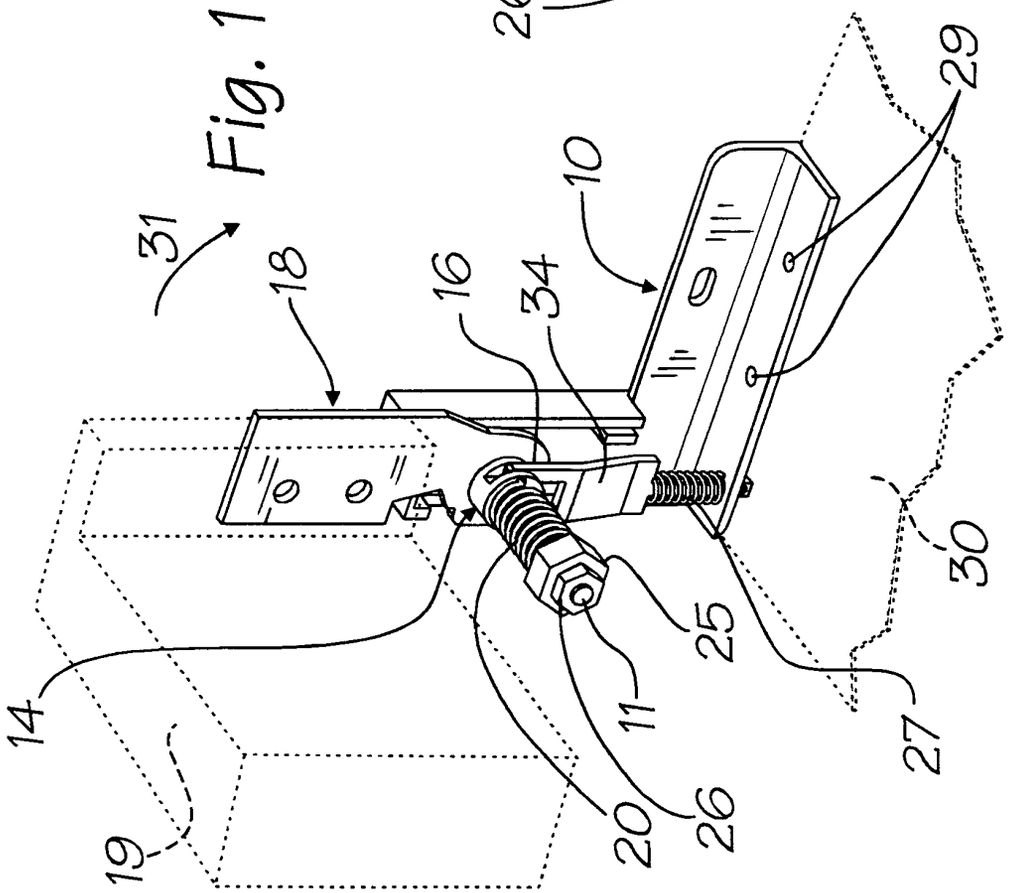
Fig. 2

Fig. 1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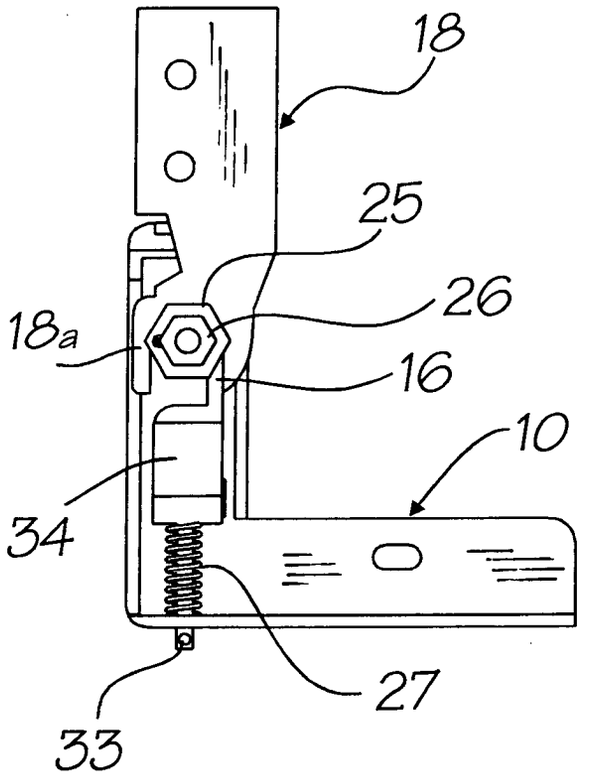


Fig. 3

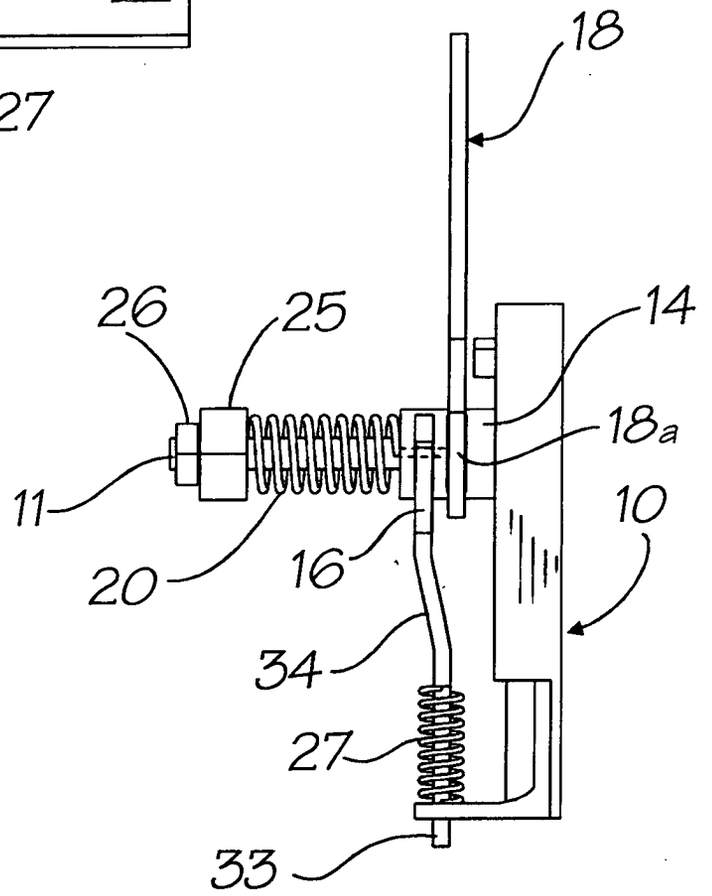


Fig. 4

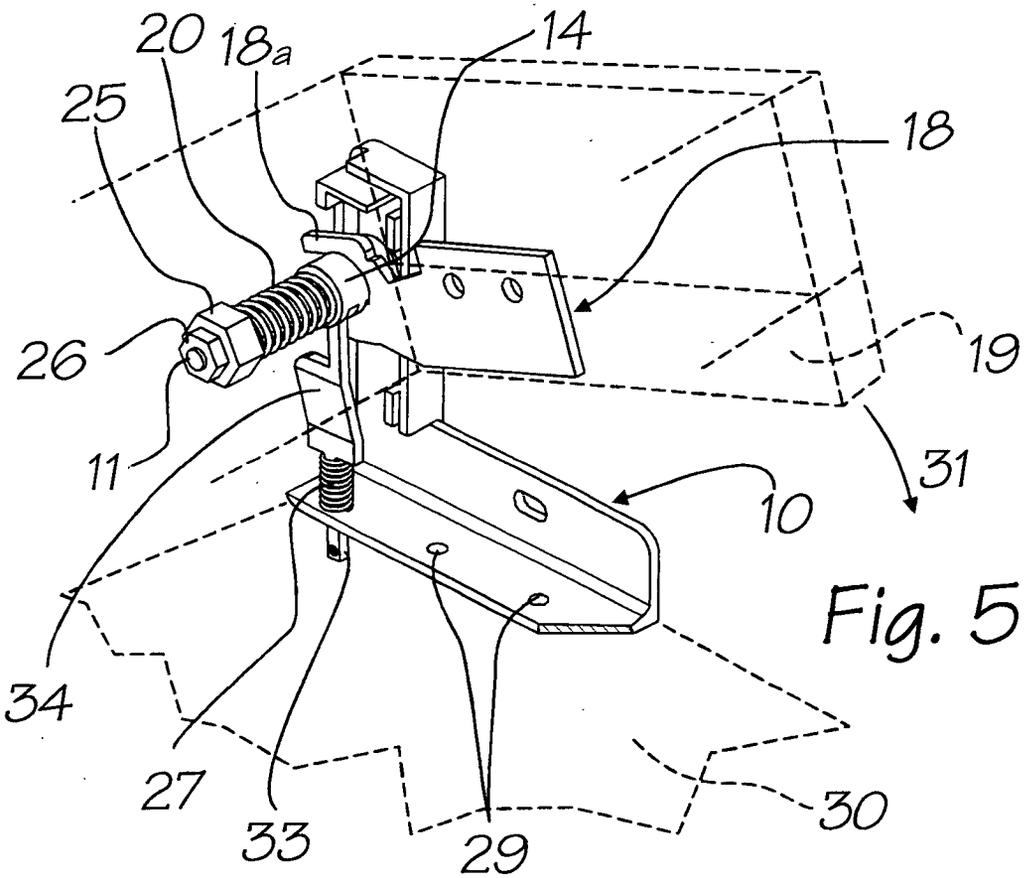
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Fig. 5

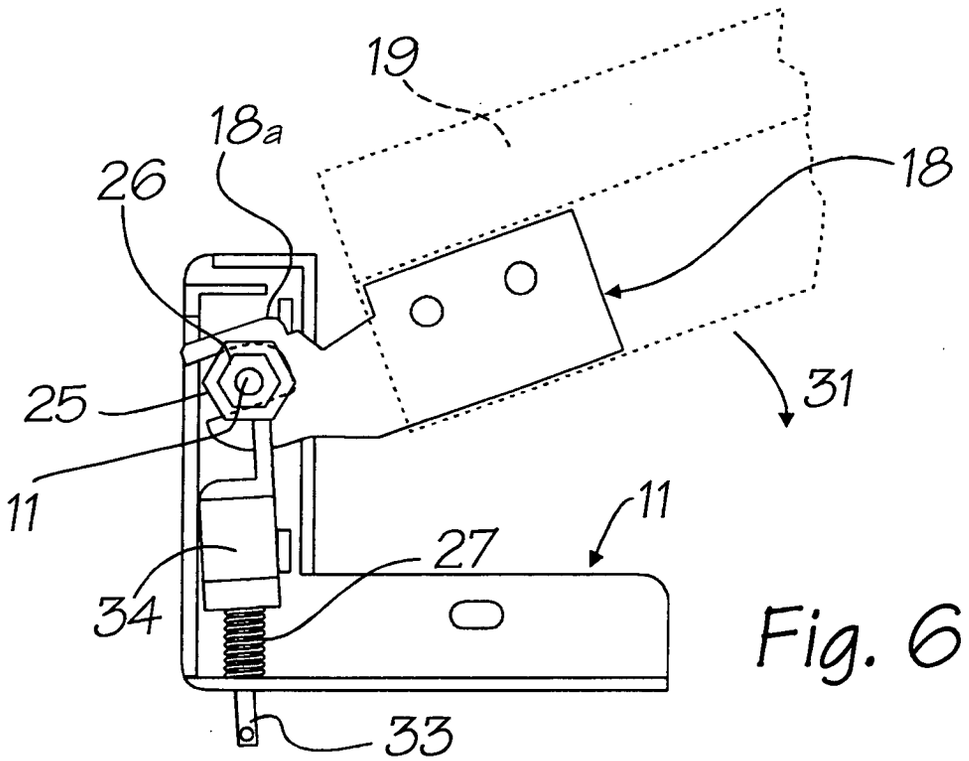
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Fig. 6