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(54) **Tripping device with burning prevention switch.**

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Description

The present invention relates to a tripping device with burning prevention switch, and more particularly to miniaturize its size without deterioration of insulation characteristic.

A typical conventional tripping device with burning prevention switch used in a circuit breaker has a structure and operation as described with reference to Fig. 1, which is a sectional side view of the conventional tripping device with burning prevention switch. Such a tripping device is known from JP-A 55 138 748 (unexamined utility model publication). The tripping device has an electromagnet 1 and a burning prevention switch 2. The electromagnet 1 consists of a bobbin 1a, a coil 1b, a plunger 1c and a case 1d of conductivity material. The burning prevention switch 2 consists of a switch 2a and a switch lever 2b. The burning prevention switch 2 is fixed on an installation bracket 3 which is fixed to the electromagnet 1.

A tripping operation of this device is described below. An impression of a voltage to the coil 1b moves the plunger 1c, and the moving of the plunger 1c trips the trip-bar (not shown). When tripping, a cross-bar (or a movable contact) pushes the switch lever 2b as shown by an arrow 4. The moving of the switch lever 2b opens the switch 2a and cuts off a current to the coil 1b. Burning of the coil 1b is prevented, because the current of the coil 1b is cut off after the tripping.

In such a conventional tripping device, the device cannot be installed in small circuit breaker, because the device is large owing to the construction of using a bracket solely for mounting the burning prevention switch 2.

It is therefore the object of the present invention to provide a tripping device with burning prevention switch which is small-sized and has a superior insulating characteristic.

Solution of this object is achieved by what is stated in the main claim.

In detail, a tripping device according to the present invention comprises an electromagnet part which is contained in an insulating casing and has a plunger and an electromagnet for driving said plunger, a burning prevention switch part having a burning prevention switch for cutting off a current to the electromagnet after a tripping operation, and fastening means for fastening said electromagnet part and said burning prevention switch part and is characterized in that said electromagnet part comprises a bobbin which is provided with a hollow and a hole, and said burning prevention switch part comprises an insulating case, said case being fastened within said bobbin by means of projections being provided at said case for sliding engagement into said hollow and said hole at said bobbin.

The invention, both as to organization and content, will be better understood and appreciated, along with other objects and features thereof, from the following detailed taken in conjunction with the drawings, in which:

Fig. 1 is the cross-sectional side view of the con-

ventional tripping device with burning prevention switch;

Fig. 2 is a side view of a tripping device with burning prevention switch embodying the present invention;

Fig. 3 is a plane view of the tripping device with burning prevention switch embodying the present invention;

Fig. 4 is a cross-sectional side view of the tripping device with burning prevention switch embodying the present invention;

Fig. 5 is a decomposed view of the tripping device with burning prevention switch embodying the present invention;

Fig. 6 is an exploded perspective view of the tripping device with burning prevention switch embodying the present invention; and

Fig. 7 is a fragmentary cut-away side view of a circuit breaker in which the tripping device with burning prevention switch embodying the present invention is installed.

The structure of a preferred embodiment of a tripping device with burning prevention switch embodying the present invention is described in detail with reference to Figs. 2 to 7.

Fig. 7 shows a manner of installing the tripping device with burning prevention switch in a circuit breaker. As shown in Fig. 7, a case 5 made of an insulating material consists of a base part 5a and a cover 5b. A handle 6 is projected from the case 5. A movable contact 7, a cross-bar 8 for holding the movable contact 7, a trip bar 9 and the tripping device 30 with burning prevention switch are provided in the case 5. The tripping device 30 has an electromagnet 10 and a burning prevention switch 14.

The electromagnet 10 comprises a bobbin 10a of insulating material, a coil 10b, a plunger 10c and a casing 10d of insulating material, as shown in Fig. 4. A tripping lever 11 is moved by the plunger 10c. The bobbin 10a of insulating material has a first hollow 12 which is formed by a bent part of the bobbin 10a. Further, the bobbin 10a has a hole 13 as a second hollow which is formed on an end of the bobbin 10a.

The burning prevention switch 14 comprises an insulating case 14a, a switch 14b and an insulating paper 20. The insulating case 14a has a first projection 15 to be engaged with the hollow 12 of the bobbin 10a and has a second projection 16 to be engaged with the hole 13 of the bobbin 10a. The second projection 16 has a beveled slope for easy insertion into the hole 13.

From a state where the electromagnet 10 is separated from the burning prevention switch 14 as shown in Fig. 5, the first projection 15 is inserted into the hollow 12. Next, the second projection 16 is slid and tailed into the hole 13 as shown in Fig. 4. Therefore, the device is easily assembled. Then, by inserting a shaft 14d for switch lever 14c through a hole 17a of an arm 17, a spring 40 and a hole 14e, as shown in Fig. 6, the electromagnet 10 and the burning prevention switch 14 are strongly fixed with each other.

When tripping is necessary, a voltage is impressed to the coil 10b of the electromagnet 10. The

impression of a voltage to the coil 10b moves the plunger 10c as shown by an arrow 21 in Fig. 7 and moving of the plunger 10c trips the trip-bar 9. When tripping, the cross-bar 8 pushes the switch lever 14c as shown by an arrow 22. The moving of the switch lever 14c opens the switch 14b and cuts off a current to the coil 10b. Therefore, burning of the coil 10b is prevented, because the current of the coil 10b is cut off after tripping.

As a modified embodiment, the projection may be provided on the electromagnet 10 and the hollow is provided on the burning prevention switch 14.

As has been described in detail, the tripping device with burning prevention switch in accordance with the present invention becomes small and has superior insulating characteristic, because the electromagnet 10 and the burning prevention switch 14 are provided within the insulating case 5 and are combined by simple engaging of the projection and the hollow.

Although the invention has been described in its preferred form with a certain degree of particularity, it is understood that the present disclosure of the preferred form can be changed in the details of construction and the combination and arrangement of parts may be resorted to without departing from the invention.

Claims

A tripping device (30) with a burning prevention switch (14), comprising:

an electromagnet part (10) which is contained in and insulating casing (10d) and having a plunger (10c) and an electromagnet (10) for driving said plunger (10c);

a burning prevention switch part (14) having a burning prevention switch (14b) for cutting off the current to the electromagnet (10) after a tripping operation; and fastening means for fastening said electromagnet part (10) to said burning prevention switch part (14), characterized in that said electromagnet part (10) comprises a bobbin (10a) which is provided with a hollow (12) and a hole (13); said burning prevention switch part (14) comprising an insulating case (14a), said case (14a) being fastened within said bobbin (10a) by means of projections (15, 16) being provided at said case (14a) for sliding engagement into said hollow (12) and said hole (13) at said bobbin (10a).

Patentansprüche

Eine Auslösevorrichtung (30) mit einem Schalter (14) zum Verhindern des Durchbrennens, mit:

einem elektromagnetischen Teil (10), der in einem isolierenden Gehäuse (10d) angeordnet ist und einen Tauchkolben (10c) und einen Elektromagneten (10) zum Antrieb des Tauchkolbens (10c) aufweist;

einem Schalterteil (14) zum Verhindern des Durchbrennens mit einem Schalter (14b) zum Verhindern des Durchbrennens zum Unterbrechen eines Stromes zu dem Elektromagneten (10) nach einem Auslösevorgang; und Befestigungsmitteln zum Befestigen des elektromagnetischen Teils (10) an

dem Schalterteil (14) zur Verhinderung des Durchbrennens, dadurch gekennzeichnet, daß der elektromagnetische Teil (10) einen Spulenkörper (10a) aufweist, der mit einer Ausnehmung (12) und einer Bohrung (13) versehen ist;

wobei der Schalterteil (14) zum Verhindern des Durchbrennens ein isolierendes Gehäuse (14a) aufweist, wobei das Gehäuse (14a) innerhalb des Spulenkörpers (10a) mittels Vorsprüngen (15, 16) befestigt ist, welche an dem Gehäuse (14a) ausgebildet sind für einen Gleiteingriff mit der Ausnehmung (12) und der Bohrung (13) an dem Spulenkörper (10a).

Revendications

Dispositif de déclenchement (30) comportant un commutateur ignifuge (14), comprenant:

un élément électromagnétique (10) qui est logé dans un boîtier isolant (10d) et comportant un plongeur (10c) et un électroaimant (10) pour entraîner le plongeur (10c); un élément de commutation ignifuge (14) comportant un commutateur ignifuge (14b) destiné à couper le courant à destination de l'électroaimant (10) après une action de déclenchement; et des moyens de fixation servant à fixer l'électroaimant (10) sur la partie de commutation ignifuge (14), caractérisé en ce que l'électroaimant (10) comprend une bobine (10a) qui est munie d'un creux (12) et d'un trou (13);

l'élément de commutation ignifuge (14) comprenant un boîtier isolant (14a), fixé à l'intérieur de la bobine (10a) au moyen des saillies (15, 16) prévues sur lui pour l'engagement par coulissement dans le creux (12) et dans le trou (13) de la bobine (10a).

FIG.1 (Prior Art)

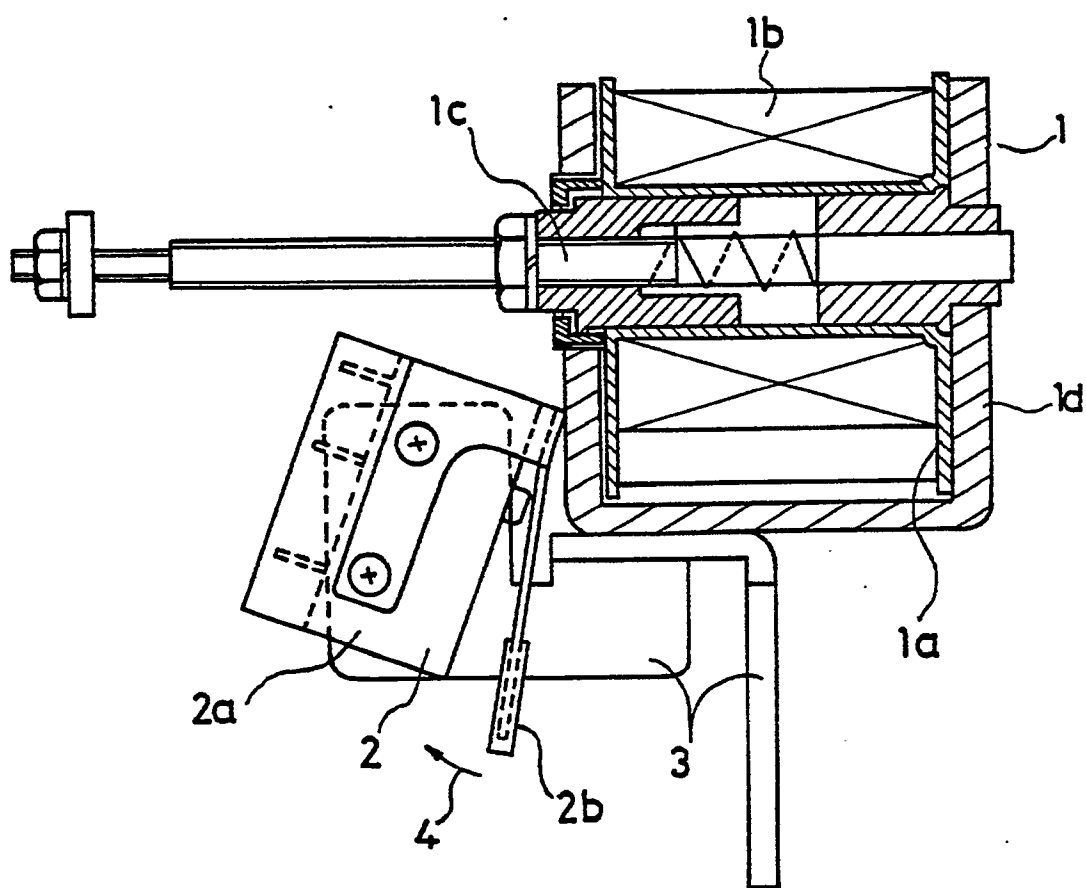


FIG. 2

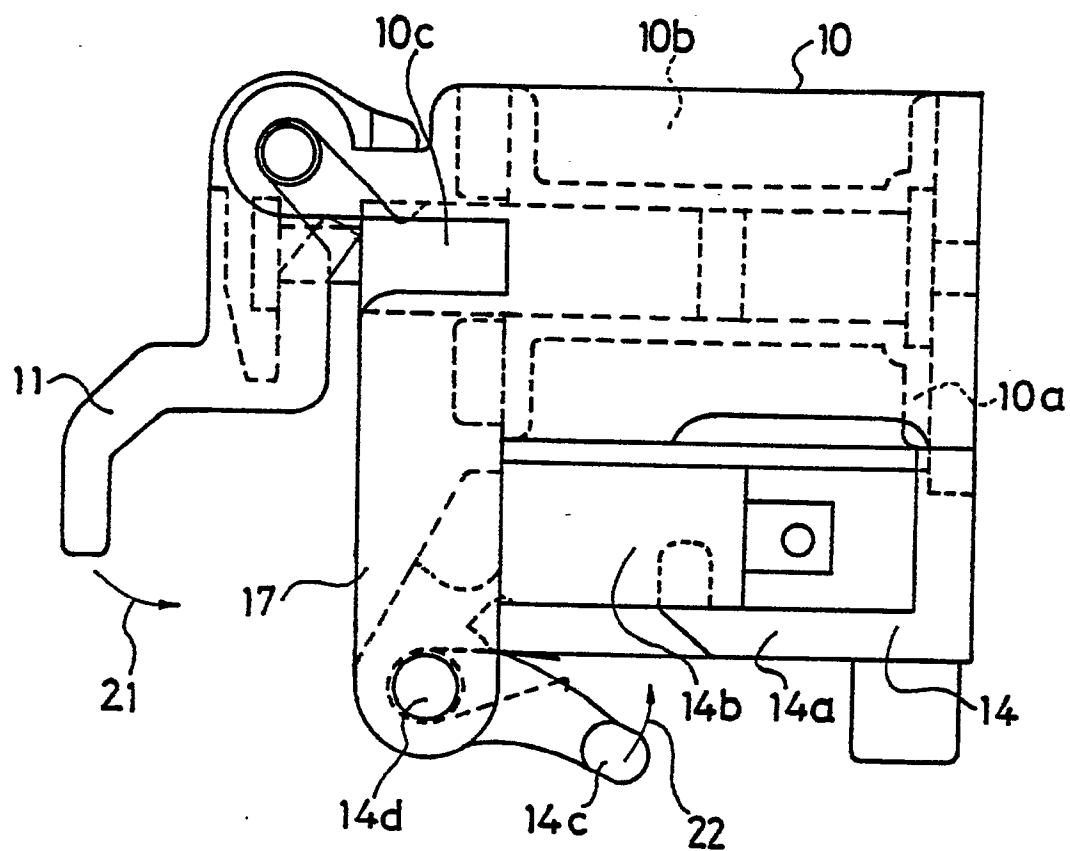


FIG. 3

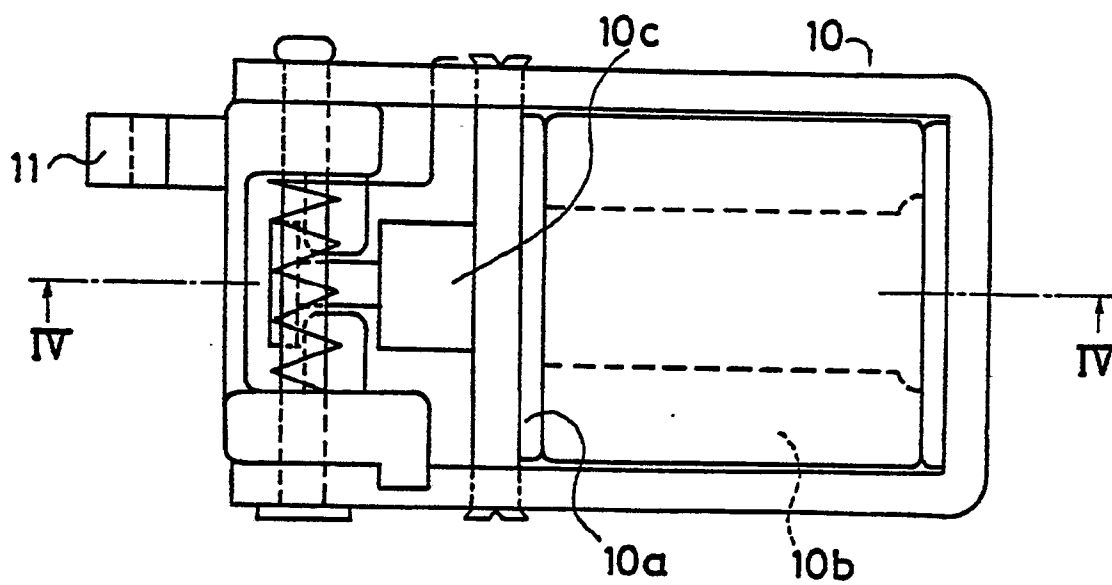


FIG. 4

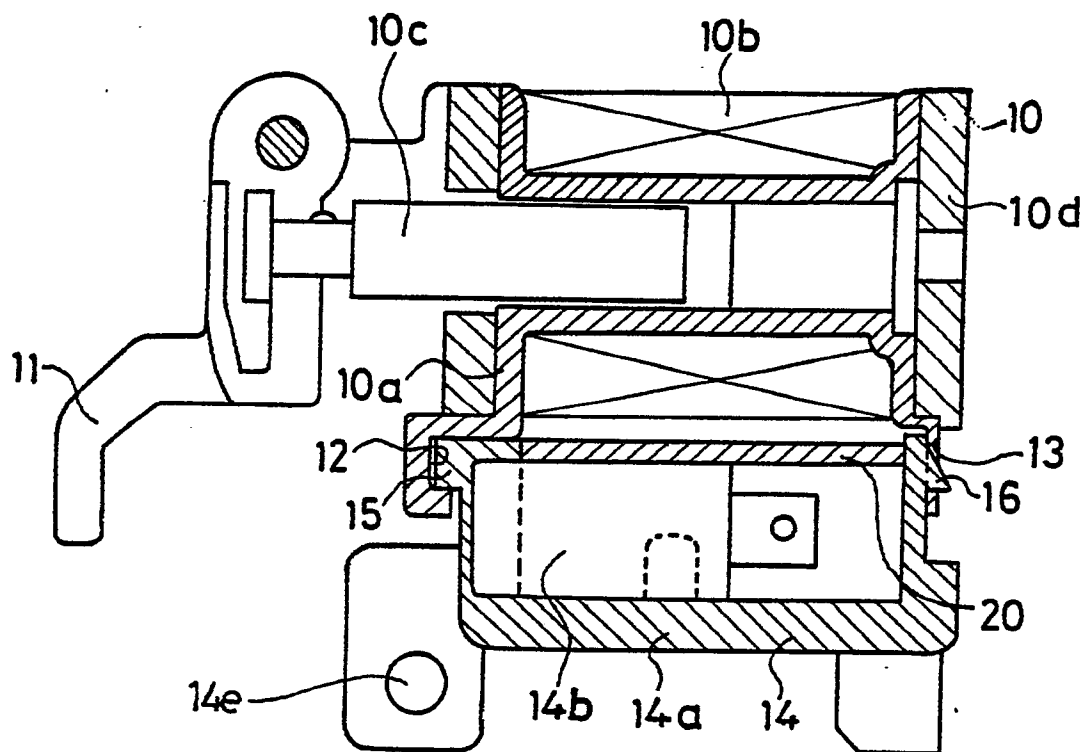


FIG. 5

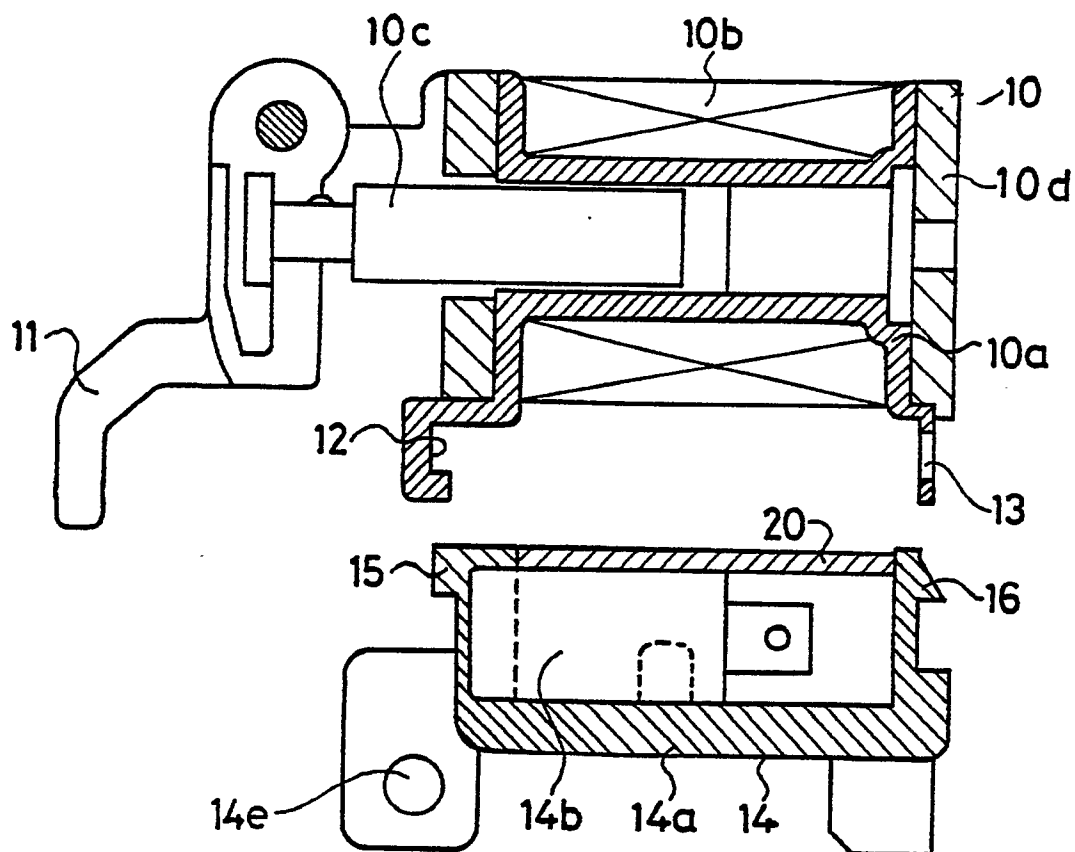


FIG. 6

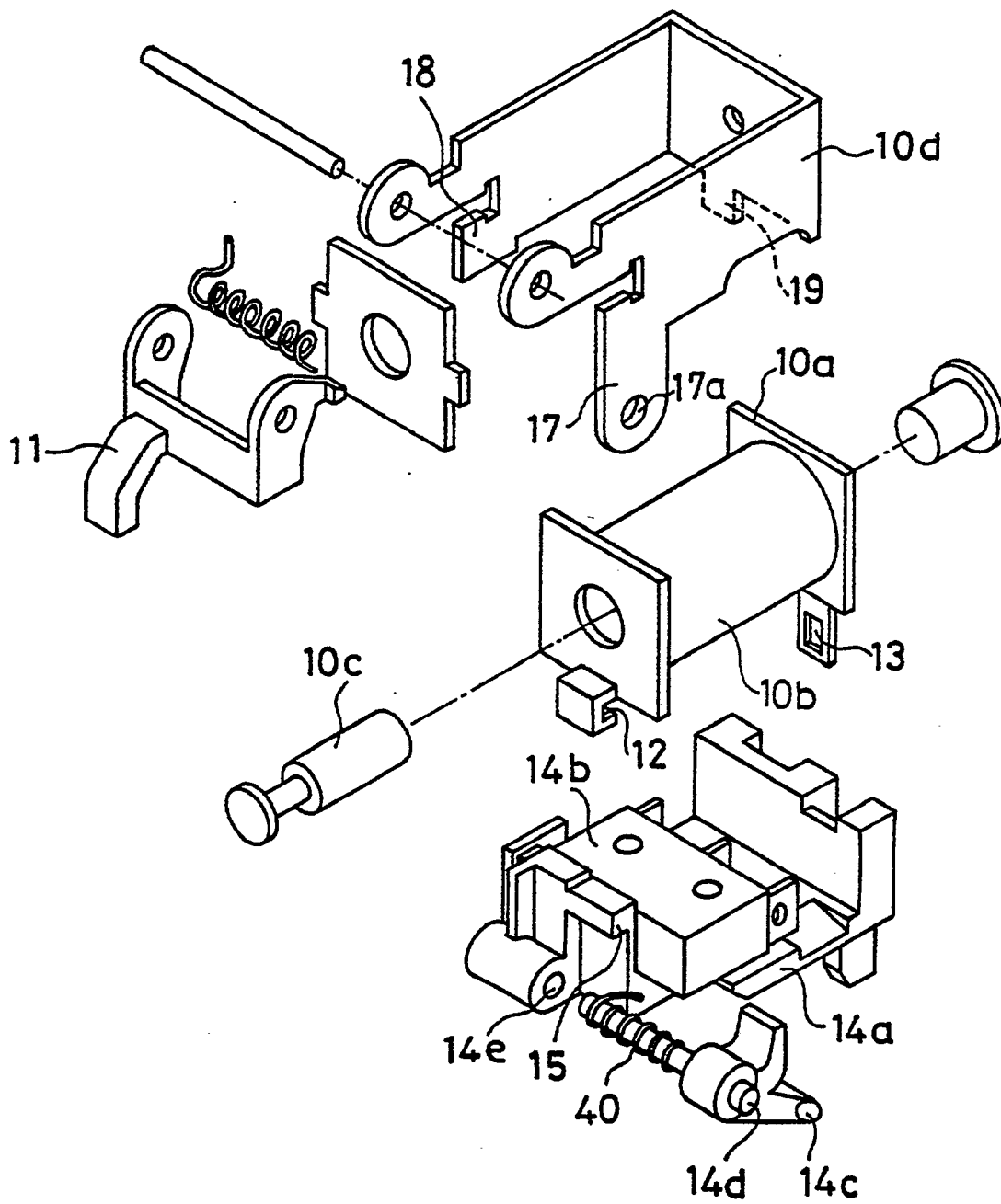


FIG. 7

