July 18, 1961 S. E. E. JOHANNESSON 2,993,151

ELECTROMAGNETIC RELAY

Filed Feb. 3, 1959

2 Sheets-Sheet 1

Fig. 1

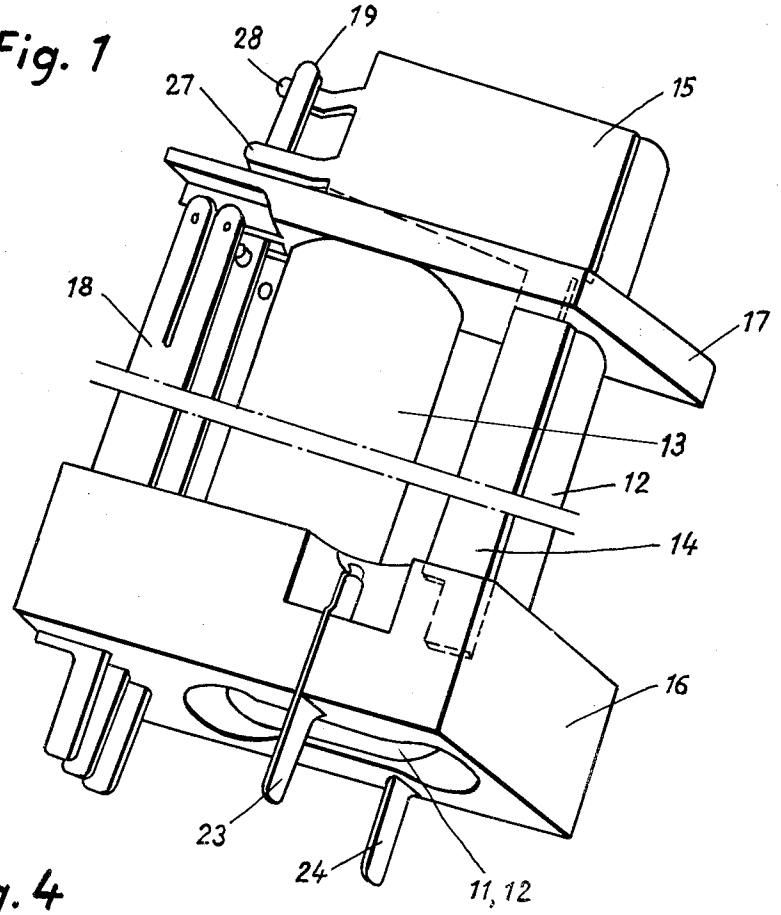

Fig. 4

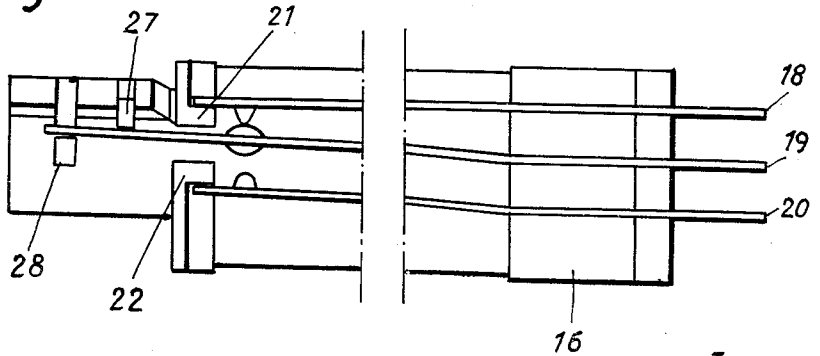

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Fig. 3

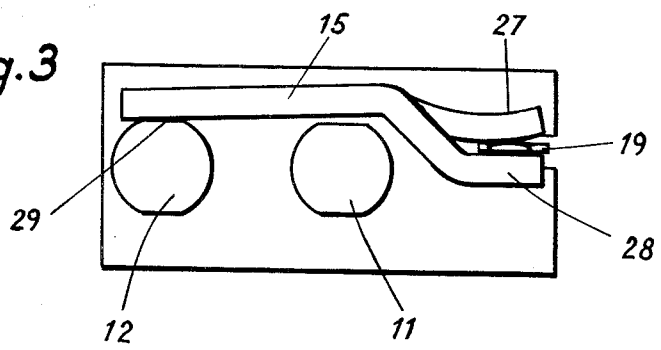
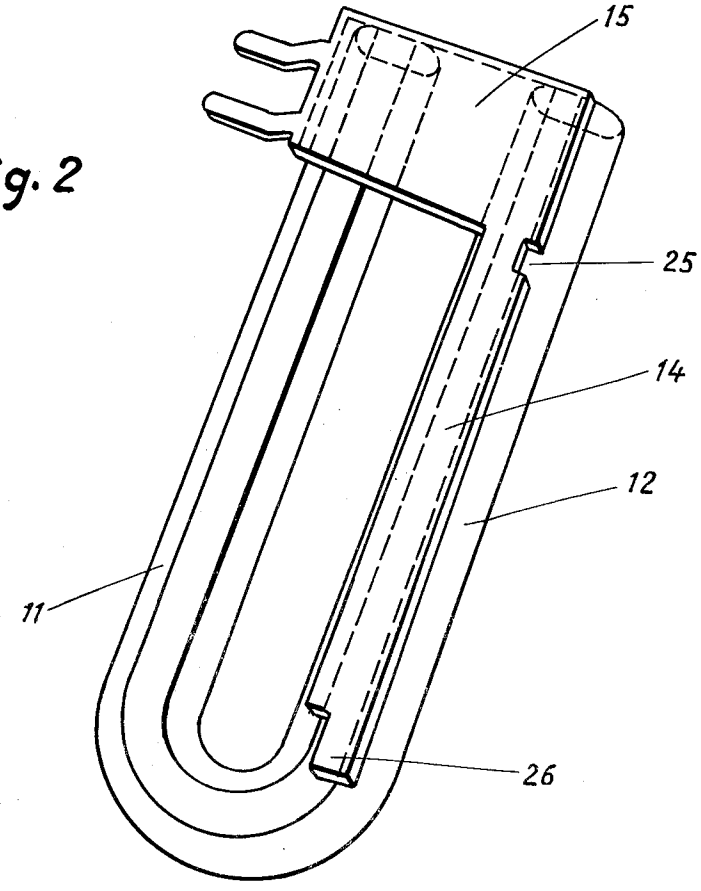


Fig. 2



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ELECTROMAGNETIC RELAY

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6 Claims. (Cl. 317—198)

The present invention refers to electromagnetic relays and especially to relays of this kind, which have a U-shaped magnetic circuit including one shank surrounded by the relay coil. The object of the invention is to provide a suitable device for supporting the armature. This is achieved according to the invention by the armature being provided with a supporting device, which extends along most of the second shank of the magnetic circuit.

The invention will be described more in detail in connection to the enclosed drawings. FIG. 1 is a perspective view of the relay. FIG. 2 shows a perspective view of the magnetic circuit and the armature. FIG. 3 is a terminal view of FIG. 1 and FIG. 4 a left hand side view of FIG. 1, which shows the contact springs.

In the relay shown on the drawing the magnetic circuit consists of a U-shaped iron core **11**, **12**, the one shank **11** of which is surrounded by a coil **13** and the other shank **12** of which is the supporting device of the armature **14**, **15**. The iron core and the armature are mounted in a frame of insulating material. This frame is produced in one piece, two flanges **16**, **17** being connected by a tubular part, on which the wire is wound. In one of these flanges **16** three contact springs **18**, **19**, **20** are fastened. The two outer ones of these springs **18**, **20** engage at their free ends supports **21**, **22** formed on the other flange **17**. At the flange **16** there are also terminals **23**, **24** for connecting the two ends of coil **13**.

The assembly of the relay is made in such a way that the contact springs **18**, **19**, **20** are mounted and the armature **14**, **15** is placed on its place in the frame, and afterwards the iron core **11**, **12** is inserted. As is shown in FIG. 2, the armature is L-shaped and consists in the shown example of a long, narrow part **14** and a wide, short part **15**, extending at a right angle from the first mentioned part. At the place, where the extended armature-support begins, that is at the junction between the narrow part **14** and the wide part, the part **14** is provided with a notch **25**. At the other end of the armature-support there is a pin **26**. The notch and the pin fit in corresponding parts at the flanges **17**, **16**. Thus, as soon as the core has been placed, the armature will be held in position. It will be supported with its whole narrow, long part and with the one end of the wide part **15** on shank **12** of the core, practically along the length of its whole shank. The other free end of the wide armature part **15** is provided with two tabs **27**, **28** engaging both sides of the free end of the intermediate contact spring **19**. As a result the armature will be kept by the spring **19** in the position shown in FIG. 3 owing to bias tension in this spring in relation to the shank **11**. When the relay is magnetized by energizing coil **13**, the armature part **15** turns like a one-armed lever about its support along the shank **12**, until it presses against the shank **11**. Thereby the contact between the springs **18**, **19** is broken and a contact between the springs **19**, **20** is closed. When coil **13** is deenergized, the armature returns into the position shown in FIG. 3.

Due to the support of the armature along almost the whole part of the shank **12** the magnetic losses of the magnetic circuit are small. These losses are reduced further by the shank **12** being provided by such a flattening along its support, that the armature after closing will have a large contact surface against the core. For similar reasons the other shank is also bevelled along the part, which the armature will approach.

As a result of the shown construction a relay has been obtained, which is entirely without screws and screwed details. The armature is kept on its place of the relay core, and it can be locked for instance by making it somewhat thicker than the recess of flange **16**, so that this recess is subjected to a small plastic deformation, when the core is inserted. The relay construction suggested according to the invention is specially suited for small relays and especially for relays intended to be used in printed circuits. Therefore the terminals **23**, **24** and the back ends of the contact springs are specially shaped to fit in printed circuits and etched connections.

I claim:

1. An electromagnetic relay comprising a U-shaped core having two straight parallel shanks, an exciting coil surrounding one of said shanks, and an armature having an elongated portion lying lengthwise adjacent to said other shank parallel therewith and another portion extending toward said one shank, said armature being pivotal about a longitudinal axis of said elongated armature portion for attraction of the other armature portion toward said one shank in response to energization of the coil thereon.

2. An electromagnetic relay comprising a U-shaped core having two straight parallel shanks, an exciting coil surrounding one of said shanks, and an armature having an elongated narrow arm and a shorter wide arm laterally extending from said narrow arm, and mounting means supporting the narrow arm lengthwise adjacent to and parallel with the other shank and pivotal about a longitudinal axis, said wide arm extending toward said one shank for magnetic attraction thereby in response to an energization of said coil.

3. A relay according to claim 2 wherein said mounting means comprises a support frame of insulation material, one end of said narrow arm and said frame being formed with a pivot pin and a recess respectively engaging each other and an intermediate portion of said narrow arm and said frame being formed with a lug and a second recess engaging each other to retain the armature on said other core shank.

4. A relay according to claim 1 wherein said other core shank and said elongated armature portion have flattened surfaces positioned to face and engage each other in the attracted position of the armature to provide for a maximum magnetic flux path between the core and the armature.

5. An electromagnetic relay comprising a U-shaped core having two straight parallel shanks, an exciting coil surrounding one of said shanks, and a substantially L-shaped armature, the long L-arm of said armature being of a length substantially equal to that of the other shank, and mounting means supporting said long L-arm lengthwise adjacent to and parallel with said other shank and pivotal about a longitudinal axis, the short L-arm extending toward said one shank for magnetic attraction thereby in response to energization of said coil.

6. A relay according to claim 5 wherein the width of the long L-arm is narrower than that of the short L-arm.

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