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Description

The invention relates to a polarized electromagnetic device comprising a core member surrounded by a coil, a pair of permanent magnets which are arranged outwardly of the respective end portions of said core member, and a first and a second armature plate member which are mutually confronting, spaced apart and mounted together at their opposite end portions through said pair of permanent magnets so as to provide a space for accommodating said core member between the armature plate members while leaving a gap between the armature plate members and the core member, said core member and armature plate members being supported for pivoting relative to each each other about a central traverse axis of the center portion of the core member.

A polarized electromagnetic device is well known which includes a pair of parallel elongated armature plates which carry a permanent magnet block therebetween and are pivotally supported with respect to their centroid axis extending perpendicularly to a centerline between the armature plates and a U-shaped core carrying a coil on its center portion and stationarily supported. The pole shoes of the core are respectively positioned between confronting free end portions of the armature plates outwardly extending beyond the sandwiched permanent magnet block so that they may swing the free end portions across the respective pole shoes of the core. Such a conventional electromagnetic device, however, has the disadvantage that it is bulky and cannot produce a strong magnetic force with a small amount of electric power supply to the coil, because the core wound with the coil is disposed outwardly of the pair of armature plates and has a relatively long coil—pole shoe distance. This disadvantage is particularly undesirable in a compact polarized electromagnetic relay small in volumetric dimensions which is desirable for a precise switching operation with a small electric power supply.

A polarized electromagnetic device of the type mentioned in the outset is known from GB—A—1 255 133. In this known device, the armature plate members form continuous outer walls of the device with the coil being accommodated inside these walls. This known device has the disadvantage that the thickness of the armature plate members necessarily adds to the overall thickness of the device.

A generally flat-shaped polarized electromagnetic device of different type having a H-core with a coil wound thereon and a frame-like armature pivoting around the axis of the center portion of the H-shaped core is disclosed in GB—A—2 013 035.

The invention seeks to provide an electromagnetic device of the type mentioned in the outset which while maintaining precise switching operations can be made particularly flat and is suitable for single-stable operation.

This is achieved by the features of the characterizing part of claim 1 as will be apparent from the following description of preferred embodiments in conjunction with the accompanying drawings in which

Fig. 1 is a perspective view of a polarized electromagnetic device of a latch type, and not falling within the terms of the present invention,

Fig. 2 is a disassembled view showing the device of Fig. 1,

Figs. 3A and 3B show schematic front views illustrating operations of the device of Fig. 1,

Fig. 4 is a disassembled view showing a polarized electromagnetic device of a single-stable type as a modification of the embodiment of Fig. 1,

Fig. 5 is a disassembled view showing a polarized electromagnetic device according to an embodiment of the invention,

Fig. 6 is a perspective disassembled view of a polarized electromagnetic device according to another embodiment of the invention,

Fig. 7 is a front assembled sectional view showing the device of Fig. 6,

Fig. 8 is a perspective view showing an insert-molded matrix carrying a lower armature plate which is employed in the device of Fig. 6 as viewed from the bottom side,

Fig. 9 is a partially cover removed side view showing a polarized electromagnetic device according to a modification of the embodiment of Fig. 6, and

Fig. 10 is a partially cover removed fragmentary front view showing the device of Fig. 9.

Referring, now, to Figs. 1 and 2 there is shown a polarized electromagnetic device of which the invention is a modification. The electromagnetic device includes a generally I-shaped or H-shaped core 1, a coil 2 wound on a center portion 13 of the core 1, a pair of permanent magnets 41 and 42 which are arranged in parallel with and outside of the respective end portions (pole shoes) 11 and 12 of the core 1, and first (upper) and second (lower) armature plate members 31 and 32 which are jointed together through the magnets 41 and 42 adapted to provide a chamber for accommodating the core 1 therebetween leaving a gap. The I-shaped core 1 is made from magnetic plate by stamping. The armatures 31 and 32 are made from magnetic plate by stamping as shown in Fig. 2, and have portions 31a, 31b, 32a and 32b all of which are substantially the same in size. Each of the armatures 31 and 32 is formed in the shape of a flat picture frame having a central opening (31c or 32c) for accommodating a projecting portion of the coil 2 from the center portion 13, whereby the entire thickness of the device of Fig. 1 may be decreased. Alternatively, the armatures 31 and 32 may be formed in the shape of solid flat plate having no opening if desired. The respective permanent magnets 41 and 42 are arranged in

a same direction. In this embodiment, the magnets 41 and 42 are arranged in such a manner that their respective top surfaces are N-magnetic pole. The core 1 with coil 2 is stationarily supported by a non-magnetic member (not shown in drawings). In Fig. 1, the armature plates 31 and 32 and the magnets 41 and 42 are carried by a non-magnetic member (not shown) in the drawings) and are supported to be swingable with respect to a transverse center line A—A perpendicular to a longitudinal axis of the center portion 13 as shown in arrow marks (B—C).

Operations of the device of Fig. 1 will now be described referring to Figs. 3A and 3B. Assume that the armatures 31 and 32 have been in the position as shown in Fig. 3A by a former energization of coil 2. Then, magnetic lines emitted from magnets 41 and 42 flow as shown in arrow marked flow lines, whereby the respective end portions 11 and 12 of core 1 are attracted by the respective attracting portions 32a and 31b. Upon energizing the coil 2 so as to polarize portion 11 to S-pole and portion 12 to N-pole, the portions 31b and 32a respectively repel the end portions 12 and 11, while portions 32b and 31a respectively attract the portions 12 and 11. Then, the armatures 31 and 32 swing in the direction shown in arrow marks C so as to take a position shown in Fig. 3B. Even if the coil 2 is disenergized after moving the armatures to the position of Fig. 3B, magnetic lines emitted from magnets 41 and 42 flow as shown in Fig. 3B and the armatures 41 and 42 keep the position.

In Fig. 3B, if a reverse current is applied to the coil 2 in the direction illustrated by arrow marks to as to reversely polarize both end portions 11 and 12, the attracted portions 31a and 32b are set to be repelled, while the repelled portions 32a and 31b are set to be attracted. Then the armatures 31 and 32 swing clockwise as illustrated by arrow marks B, and return to the original position of Fig. 3A. By turning the direction of current flowing through the coil 2, the armatures 31 and 32 are set to the position of Fig. 3A or Fig. 3B. The armatures also keep their position without application of electricity until the coil 2 is supplied with a current having an opposite direction. Thus, the polarized electromagnetic device of this embodiment provides latching-operations. If desired, the electromagnetic device may be modified in such a manner that the coil 2 consists a pair of coils, which are oppositely wound on the center portion 13 of core 1, and the core 1 is reversely magnetized by selectively energizing one of the coils.

In Fig. 4, there is shown a polarized electromagnetic device of a single-stable type as a modification of the foregoing device. A pair of spacers 51 and 52 made of nonmagnetic material are respectively fixed to the portions 31b and 32a which are attracted by excited core 1. During disenergization of the coil 2, attracting forces produced from portions 31b and 32a are smaller than those from portions 32b and 31a with respect to end portions 12 and 11, respectively. Therefore, the end portions 11 and 12 are normally attracted by the portions 31a and 32b. When the coil 2 is energized so as to polarize the portions 11 and 12 to S and N poles, they attract the portions 31a and 32b. Alternatively, the spacers 51 and 52 may be fixed to the corresponding surfaces of end portions 11 and 12 in place of those of armatures 31 and 32, if desired.

In Fig. 5 there is shown a polarized electromagnetic device according to an embodiment of the invention. Portions 33a and 34b of a pair of coupled armatures 33 and 34 are respectively formed to be broader than their opposite portions 33b and 34a (L1 > L2), whereby end portions 11 and 12 are normally attracted by the respectively confronting portions 33a and 34b so as to contact therewith. When the coil 2 is energized so as to polarize the respective portions 11 and 12 to N and S poles, the end portions 11 and 12 respectively repel the portions 33a and 34b, and come into contact with the respectively opposed portions 34a and 33b. When the coil 2 is disenergized, the end portions 11 and 12 are again attracted by the respective portions 33a and 34b, and the armatures 33 and 34 return to their original position. Thus, a single-stable operations are performed without any spring.

Since the polarized electromagnetic devices according to the foregoing embodiments have such a construction that a pair of armatures in the shape of plate are jointed together through a pair of permanent magnets to accommodate a core wound with a coil in the direction across the pair of permanent magnets, the magnetic forces developed from both pole shoes (11 and 12) of the core effectively act with those from the permanent magnets for attracting or repelling operations and its electric power consumption is reduced. The permanent magnets are disposed outside of both end portions of the core at the edges of the armatures, whereby the volumetric size of the permanent magnets may be freely designed irrelevant to the shape and size of the core and the sensitivity of the device may be freely designed. The polarized electromagnetic device is of a stacked-up construction consisting of flat-shaped components, viz. core and armatures, so that it is small in size, especially in height.

Referring to Fig. 6, there is shown a latch type polarized electromagnetic device further including a contact switching mechanism, viz. relay, which is semi-assembled as another embodiment of the present invention. The electromagnetic device includes a box-shaped base member 110, a movable member 111 swingably mounted on the base member 110, an electromagnetic member 112 fixed to the base member 110, a lower cover 113 fitted onto a lower surface of the base member 110, and an

upper cover 114 which is adapted to contact a periphery of the base member 110. In Fig. 7, there is illustrated the electromagnetic device of Fig. 6 which is completely assembled.

The base member 110 is an insert-molded plastic including a frame portion 115, a bottom portion 117 having a center separating wall 116 extending downwardly therefrom, a peripheral wall 118 standing on the periphery of the bottom portion 117. The base member 110 further carries a plurality of external terminal pairs 119 and 120 which are arranged in parallel and spaced-apart side portions of the base member 110.

In the bottom portion 117 there are provided opening portions 121 and 122 on both sides of the separating wall 116. Movable contact blades 123 and 124 are at their base portions fixed to the wall 116, and disposed in the opening portions 121 and 122. On free ends of the blades 123 and 124 there are fixed movable contacts 129 and 130 which confront stationary contacts 127 and 128 of stationary contact blades 125 and 126, respectively. Thus, there is constructed a contact mechanism 100.

The elctromagnetic member 112 includes an I-shaped core 131, a spool 132 which is an insert-molded plastic carrying the core 131, and a pair of coils 133 and 134. The core 131 is made from a magnetic plate to be of an I-shape, and consists of a center portion 131a and end portions (pole shoes) 131b and 131c. The coils 133 and 134 are wound, in a mutually opposite relation on the center portion 131a of core 131 through spool 132. The spool 132 at its center forms a separating wall 135 for insulating the coils 133 and 134 from each other, and further forms a pair of stub shafts 136 extending outwardly in the direction perpendicular to a longitudinal axis of the core 131. The electromagnetic member 112 is adapted to be supported by the peripheral wall 118 in such a manner that shoulder portions 137a to 137d of the spool 132 are engaged with four cut-out portions 138a to 138d formed in the wall 118, respectively. A projection 139 extending downwardly from the separating wall 135 is inserted to a center opening 140 of the base member 110 so as to secure the electromagnet member 112 in position. There are inserted coil terminals 141 and 142 in flange portions of the spool 132 for connection with wires of coils 133 and 134.

Upper and lower armatures 145 and 146 are made from a magnetic plate by stamping and have similar shapes to those of armatures 33 and 34 of Fig. 5. In this embodiment, however, the armatures 145 and 146 are arranged in parallel and in the same direction to each other in order to perform latching operations. The respective broad and narrow portions 145a and 145b are arranged to oppose the respective broad and narrow portions 146a and 146b. The armatures 145 and 146 are adapted to be jointed together through a pair of permanent magnets 143 and 144 so as to sandwich the core 131 therebetween. An insert-molded plastic matrix 147 carries the lower armature 146, and forms a pair of compartments 148 and 149. The permanent magnets 143 and 144 are respectively inserted to the compartments 148 and 149 in such a manner that their upper portions are N-poles and they reside outsides of the end portions 131b and 131c of the core.

The insulating matrix 147 has a pair of U-shaped grooves 150 formed in side wall portions 151 which are adapted to be engaged with the pair of shafts 136, and a central opening 147a through which the projection 139 extends downwardly. As illustrated in Figs. 7 and 8, the matrix 147 on its bottom wall 157 has two pairs of projections 155 and 156 for actuating the movable blades 123 and 124. The bottom wall 157 serves as an insulator between the contact mechanism 100 and coils (133 and 134).

The upper armature 145 is mounted on the insulating matrix 147 that carries the magnets (143) and 144) and is engaged with the electromagnet member 112 through grooves 150 and shafts 136. Then, a biassing leaf spring 152 is engaged at its end portions 152a and 152b with a pair of projections 153 so as to secure the armature 145 to the matrix 147. The armature 145 on its bottom surface is pressed to top surfaces of a pair of trapezoid portions above shafts 136 so as to ensure such engagement between the matrix 147 and the member 112. The armature 145 further comes into contact with four islands 151a formed in the side wall portions 151.

Thus, the movable member 111 consisting of matrix 147, magnets 143 and 144, armature 145 and spring 152 is swingably supported by the shafts 136 of the electromagnet member 112 enclosed therein, and the member 112 is fixed to the base member 110. The coil terminals 141 and 142 are connected to terminals 162 and 163 through connection plates 158 and 159 in which a conductive pattern 161 is disposed on an insulating film 160.

The upper cover 114 is fitted onto the frame portion 115. The lower cover 113 is fitted onto the base member 110 by inserting a pair of upwardly extending projections 164 and 165 to a slit between portions 115 and 118.

Operations of the device in this embodiment are substantially the same as those of the device of Fig. 1. The core 131, magnets 143 and 144, and armatures 145 and 146 in Fig. 7 correspond to the core 1, magnets 41 and 42, and armatures 31 and 32. In Fig. 7, when the coil 133 is energized so as to polarize the core 131 to S-pole at portions 131b and N-pole at portion131c, the movable member 111 having the armatures 145 and 146 swings counterclockwise so as to open the contacts 127 and 129 and close the contacts 128 and 130, and keep its position even after disenergizing the coil 133. When the coil 134 is energized so as

to polarize the core 131 to a reverse direction, the movable member 111 swings clockwise so as to close the contacts 127 and 129 and open the contacts 128 and 130, and keep its position even after relieving such energization. Thus, latching operations are performed.

According to this embodiment, the movable member 112 is swingably supported by the pair of shafts 136, whereby, irrespectively of any errors in scale on molding the base member 110, the members 110 and 112 are brought into an accurate relationship in scale and the operational characteristics are stabilized. Since the shafts 136 a spool 132 are moulded as a single unit, the assembling work for this device is simplified. The device in this embodiment may have a good electrical insulation without any additional components because the bottom wall 157 of the matrix 147 completely insulates the electromagnet portion and the contact mechanism.

The polarized electromagnetic device in this embodiment may be modified in such a manner that a single coil is wound on the core 131 as illustrated in Fig. 2 or the movable member 111 has a single-stable construction as illustrated in Fig. 4 or 5. It should be understood that by simply mounting the upper armature 145 in a reverse direction, the construction is changed to a single stable type. In Fig. 6, adhesive materials may be applied to the respective top surfaces of the four island portions 151a so as to joint the upper armature 145 to the matrix 147, whereby the spring 152 may be omitted. Since the respective island portions 151a are surrounded with grooves, the adhesive materials forced out from the island portions 151a by contacting the armature 145 therewith fall into the grooves, whereby perfect movement of the movable member is retained.

In Figs. 9 and 10, there is shown a polarized electromagnetic device as another modification of the embodiment of Fig. 6. The base member 110 of Fig. 6 is modified to have a double-wall lateral structure which consists of an inner wall 181 (corresponding to peripheral wall 118) and an outer wall 182 (corresponding to frame portion 115) so as to form an elongated opening 180 extending vertically through the entire thickness of the base member. The inner wall 181 forms four window openings 380 (corresponding to the cut portions 138a to 138d of Fig. 6) which are inlaid by the shoulder portions 137a to 137d so as to fix the core 131 in position. The upper cover 114 of Fig. 6 is modified here to have at its lower end portion a recessed portion 141. The lower cover 113 of Fig. 6 is modified as illustrated in Figs. 9 and 10. The lower cover 213 is adapted to be fitted to the inner wall 181 and includes a center opening 213a under the projection 139. Thus, when the device is completely assembled as shown in Fig. 9, a sealant M is filled into the opening 180 and slit 141 to thereby seal and secure in position the connecting terminals (119, 120), lower cover 213, base member 110, shoulder portions (137a to 137d) and upper cover 114. The gases evolved from the sealant M within the device on curing are evacuated through the opening 213a. Then, the opening 213a is filled with a sealant M to complete sealing operation as illustrated in Fig. 10. In this embodiment a plurality of ribs (not shown in drawings) are interposed between inner and outer walls 181 and 182 so as to unite them.

Though in the foregoing embodiments the electromagnet (1) is stationarily supported and the armatures (31 and 32) are swingably supported, they may be reversely supported in such a manner that the electromagnet with its associated members is swingably supported and the armatures are stationarily supported.

It should be understood that the above description is merely illustrative of the present invention and that many changes and modifications may be made by those skilled in the art without departing from the scope of the appended claims.

Claims

1. A polarized electromagnetic device comprising a core member (1; 131) surrounded by a coil (2; 133, 134), a pair of permanent magnets (41, 42; 145, 146) which are arranged outwardly of the respective end portions (11, 12; 131b, 131c) of said core member (1; 131), and a first (33; 145) and a second armature plate member (34; 146) which are mutually confronting, spaced apart and mounted together at their opposite end portions (33a, 33b, 34a, 34b; 145a, 145b, 146a, 146b) through said pair of permanent magnets (41, 42; 143, 144) so as to provide a space for accommodating said core member (1; 131) between the armature plate members (33, 34; 145, 146) while leaving a gap between the armature plate members (33, 34; 145, 146) and the core member (1; 131), said core member (1; 131) and armature plate members (33, 34; 145, 146) being supported for pivoting relative to each other about a central transverse axis of the center portion (13; 131a) of the core member, characterized in that the magnetic core member (1; 131) is generally H-shaped with the end portions (11, 12; 131b, 131c) thereof extending parallel to the permanent magnets (41, 42; 143, 144) and the center portion (13; 131a) thereof carrying the coil (2; 133, 134), that each of said armature plate members (33, 34; 145, 146) is provided with an opening to accommodate said coil (2; 133, 134) and has a first end portion (33a, 34b; 145a, 146a) and a second end portion (33b, 34a; 145b, 146b) said first end portion being broader than said second end portion.

2. Polarized electromagnetic device according to claim 1, wherein said core member (1; 131) is stationarily supported and said armature plate members (33, 34; 145, 146) are pivotally supported so as to allow the respec-

tive end portions (11, 12; 131b, 131c) of said core member (1; 131) to be alternately contacted by an inner wall surface of said armature plate members (33, 34; 145, 146).

3. Polarized electromagnetic device according to claim 1 or 2 which further comprises a contact carrying member including a base (110) made of electrically insulating material and a contact mechanism (100) and means for actuating said contact mechanism (100) in response to the pivoting movement of said core member or said armature plate members (145, 146).

4. Polarized electromagnetic device according to claim 3, wherein said core member (131) is stationarily supported by said base (110), and said actuating means is a pivotally supported matrix member (147) which carries said armature plate members (145, 146) and includes at least one projection (155, 156) for actuating said contact mechanism (100).

5. Polarized electromagnetic device according to claim 4, wherein said matrix member (147) includes an insulating wall for separating said contact mechanism (100) from said core member (131) wound with the coil (133, 134).

6. Polarized electromagnetic device according to claim 5, wherein said matrix member (147) is an insert-moulded plastic matrix carrying said second armature plate member (146) and at its periphery includes an island (151a) surrounded by a groove (150) so as to adhere said first armature plate member (145) to a top surface of said island with an adhesive material.

7. Polarized electromagnetic device according to claim 5, wherein said base (110) comprises inner and outer walls which therebetween form an opening extending vertically through the entire thickness of the base (110) so as to be filled with a sealant from a bottom side thereof to thereby seal and secure in position said base (110), said core member (131) engaged with the base (110) and a cover (114) fitted onto said base (110).

Revendications

1. Dispositif électromagnétique polarisé comprenant un noyau (1; 131) entouré par un enroulement (2; 133, 134), une paire d'aimants permanents (41, 42; 145, 146) qui sont placés à l'extérieur des parties extrêmes respectives (11, 12; 131b, 131c) dudit noyau (1; 131), et une première (33; 145) et une seconde plaque d'armature (34; 146) qui sont placées en regard et espacées l'une de l'autre et qui sont montées ensemble par leurs parties extrêmes opposées (33a, 33b, 34a, 34b; 145a, 145b, 146a, 146b) par l'intermédiaire de ladite paire d'aimants permanents (41, 42; 143, 144) de façon à ménager un espace de réception dudit noyau (1; 131) entre les plaques d'armature (33, 34; 145, 146) tout en laissant un intervalle entre les plaques d'armature (33, 34; 145, 146) et le noyau (1; 131), ledit noyau (1; 131) et lesdites plaques d'armature (33, 34; 145, 146) étant supportés de manière à pivoter relativement autour d'un axe transversal central de la partie centrale (13; 131a) du noyau, caractérisé en ce que le noyau magnétique (1; 131) est dans l'ensemble profilé en H, ses parties extrêmes (11, 12, 131b, 131c) s'étendant parallèlement aux aiments permanents (41, 42; 143, 144) et sa partie centrale (13; 131a) portant l'enroulement (2; 133, 134), en ce que chacune desdites plaques d'armature (33, 34, 145, 146) est pourvue d'une ouverture pour recevoir ledit enroulement (2; 133, 134), et comporte une première partie extrême (33a, 34b; 145a, 146a) et une seconde partie extrême (33b, 34a; 145b, 146b), ladite première partie extrême étant plus large que ladite seconde partie extrême.

2. Dispositif électromagnétique polarisé selon la revendication 1, dans lequel ledit noyau (1; 131) est supporté de façon stationnaire et lesdites plaques d'armature (33, 34; 145, 146) sont supportées de façon pivotante afin de permettre aux parties extrêmes respectives (11, 12; 131b, 131c) dudit noyau (1; 131) d'être alternativement touchées par une surface de paroi intérieure desdites plaques d'armature (33, 34; 145, 146).

3. Dispositif électromagnétique polarisé selon revendication 1 ou 2, qui comprend en outre un élément de support de contact comportant une base (110) formé d'une matériau électriquement isolant et un mécanisme de contact (100) et un moyen pour actionner ledit mécanisme de contact (100) en réponse au mouvement de pivotement dudit noyau ou desdites plaques d'armature (145, 146).

4. Dispositif électromagnétique polarisé selon revendication 3, dans lequel ledit noyau (131) est supporté de façon stationnaire par ladite base (110) et ledit moyen d'actionnement est un élément de matrice (147) supporté de façon pivotante, qui porte lesdites plaques d'armature (145, 146) et qui comprend au moins une saillie (155, 156) pour actionner ledit mécanisme de contact (100).

5. Dispositif électromagnétique polarisé selon la revendication 4, dans lequel ledit élément de matrice (147) comprend une paroi isolante pour séparer ledit mécanisme de contact (100) dudit noyau (131) entouré par l'enroulement (133, 134).

6. Dispositif électromagnétique polarisé selon la revendication 5, dans lequel ledit élément de matrice (147) est une matrice en matière plastique moulée avec insert et portant ladite seconde plaque d'armature (146), et comprend sur sa périphérie une protubérance (151a) entourée par une rainure (150) de façon à coller ladite première plaque d'armature (155) sur une surface supérieure de ladite protubérance avec une matière adhésive.

7. Dispositif électromagnétique polarisé selon la revendication 5, dans lequel ladite base (110) comprend des parois intérieure et ex-

térieure qui forment entre elles une ouverture s'étendant verticalement sur toute l'épaisseur de la base (110) de façon à être remplie d'une substance d'étanchéité à partir de son côté inférieur en vue de sceller et fixer ainsi en position ladite base (110), ledit noyau (131) assemblé avec la base (110) et un couvercle (114) monté sur ladite base (110).

Patentansprüche

1. Polarisierte elektromagnetische Vorrichtung mit einem von einer Wicklung (2; 133, 134) umgebenen Kernelement (1; 131), einem Paar von Permanentmagneten (41, 42; 145, 146), welche nach außen hin bezüglich der betreffenden Endabschnitte (11, 12; 131b, 131c) des Kernelements (1; 131) angeordnet sind, und einem ersten (33; 145) und einem zweiten Ankerplattenelement (34; 146), welche einander gegenüberstehen, im Abstand voneinander liegen und an ihren entgegengesetzten Endabschnitten (33a, 33b, 34a, 34b; 145a, 145b, 146a, 146b) über das Paar von Permanentmagneten (41, 42; 143, 144) aneinander angebracht sind, derart, daß ein Raum zur Aufnahme des Kernelements (1; 131) zwischen den Ankerplattenelementen (33, 34; 145, 146) unter Belassung eines Zwischenraums zwischen den Ankerplattenelementen (33, 34; 145, 146) und dem Kernelement (1; 131) geschaffen wird, wobei das Kernelement (1; 131) und die Ankerplattenelemente (33, 34; 145, 146) um eine zentrale Querachse des Mittelabschnitts (13; 131a) des Kernelements relativ zueinander schwenkbar gelagert sind, dadurch gekennzeichnet, daß das Magnetkernelement (1; 131) im wesentlichen H-förmig mit parallel zu den Permanentmagneten (41, 42; 143, 144) verlaufenden Endabschnitten (11, 12; 131b, 131c) ist, wobei der Mittelabschnitt (13; 131a) desselben die Wicklung (2; 133, 134) trägt, daß jedes der Ankerplattenelemente (33, 34; 145, 146) mit einer Öffnung zur Aufnahme der Spule (2; 133, 134) versehen ist und einen ersten Endabschnitt (33a, 34b; 145a, 146a) und einen zweiten Endabschnitt (33b, 34a; 145b, 146b) aufweist, wobei der erste Endabschnitt breiter als der zweite Endabschnitt ist.

2. Polarisierte elektromagnetische Vorrichtung nach Anspruch 1, bei welcher das Kernelement (1; 131) stationär gehalten ist und die Ankerplattenelemente (33, 34; 145, 146) schwenkbar gelagert sind derart, daß die betreffenden Endabschnitte (11, 12; 131b, 131c) des Kernelements (1; 131) abwechselnd von einer inneren Wandfläche der Ankerplattenelemente (33, 34; 145, 146) berührt werden können.

3. Polarisierte elektromagnetische Vorrichtung nach Anspruch 1 oder 2, welche ferner ein Kontaktträgerelement mit einer Basis (110) aus elektrisch isolierendem Werkstoff und einem Kontaktmechanismus (100) und Mittel zur Betätigung des Kontaktmechanismus (100) ansprechend auf die Schwenkbewegung des Kernelements oder der Ankerplattenelemente (145, 146) umfaßt.

4. Polarisierte elektromagnetische Vorrichtung nach Anspruch 3, bei welcher das Kernelements (131) stationär von der Basis (110) gehalten wird und die Betätigungsmittel ein schwenkbar gelagertes Matrixelement (147) sind, welches die Ankerplattenelemente (145, 146) trägt und wenigstens einen Vorsprung (155, 156) zur Betätigung des Kontaktmechanismus (100) enthält.

5. Polarisierte elektromagnetische Vorrichtung nach Anspruch 4, bei welcher das Matrixelement (147) eine isolierende Wand zur Trennung des Kontaktmechanismus (100) vom mit der Wicklung (133, 134) bewickelten Kernelement (131) enthält.

6. Polarisierte elektromagnetische Vorrichtung nach Anspruch 5, bei welcher das Matrixelement (147) ein einzugsgeformte Kunststoffmatrix ist, welche das zweite Ankerplattenelement (146) trägt und an ihren Rand eine von einer Nut (150) umgebene Insel (151a) für ein Kleben des ersten Ankerplattenelements (145) auf die Oberseite der Insel mittels eines Klebstoffes aufweist.

7. Polarisierte elektromatnetische Vorrichtung nach Anspruch 5, bei welcher die Basis (110) eine innere und eine äußrere Wand aufweist, welche zwischen sich eine sich vertikal über die gesamte Dicke der Basis (110) erstreckende Öffnung zur Füllung mit einem Abdichtmittel von der Unterseite derselben her ausbilden, um so die Basis (110), das an der Basis (110) angreifende Kernelement (131) und eine auf die Basis (110) gesetzte Abdeckung (114) zu verschließen und in Stellung zu halten.

FIG.1

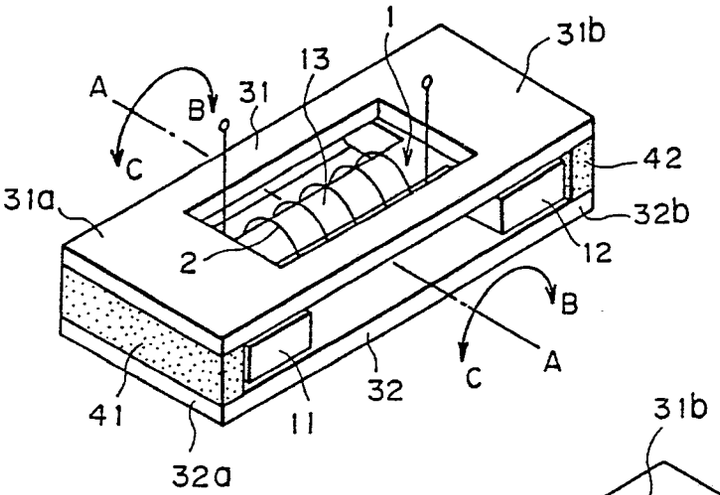
1
31b
13
A
B
31
C
42
31a
32b
2
12
B
C
A
41
11
32
32a

FIG.2

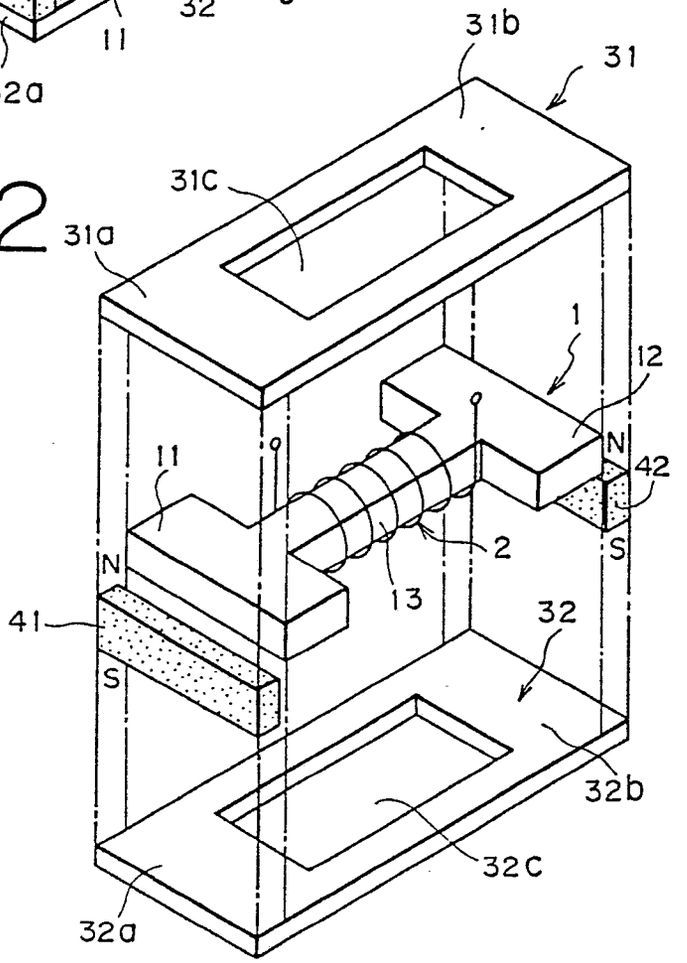
31b
31
31c
31a
1
12
N
11
42
2
S
N
13
41
32
S
32b
32c
32a

FIG. 3A

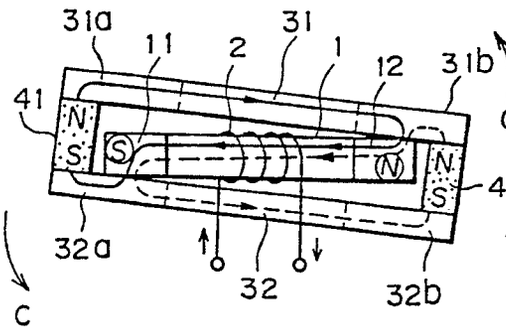

FIG. 3B

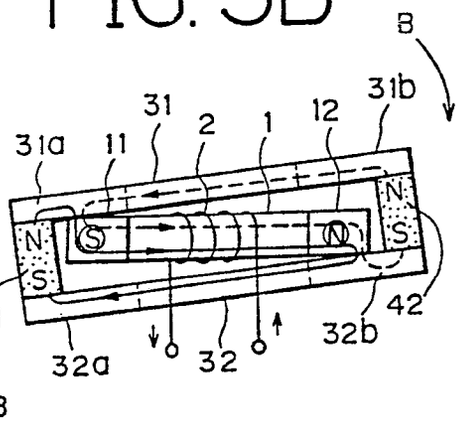

FIG. 4

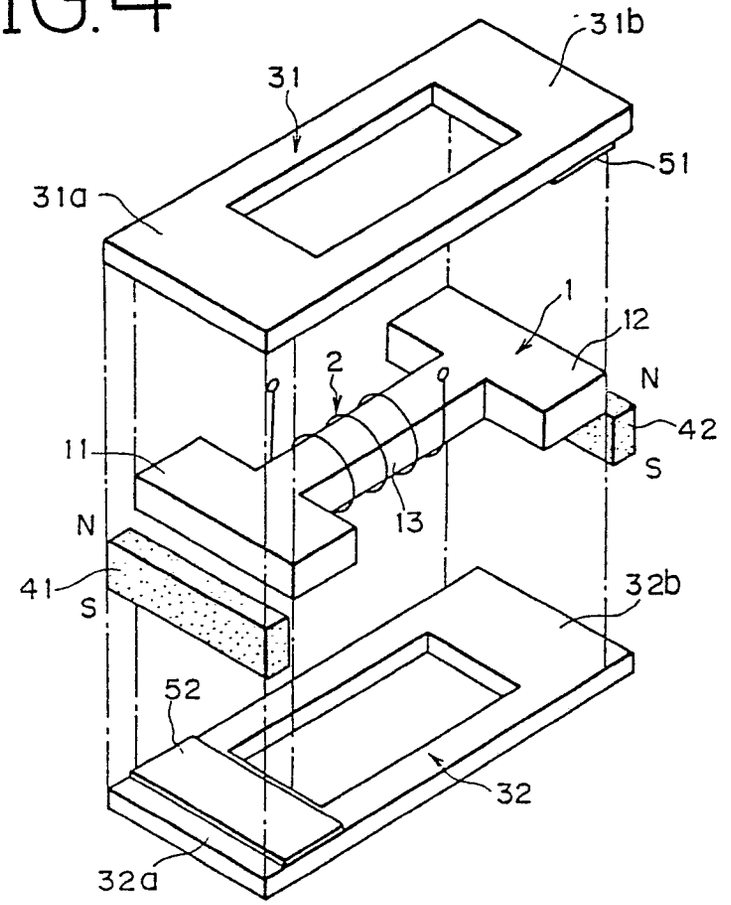

FIG.5

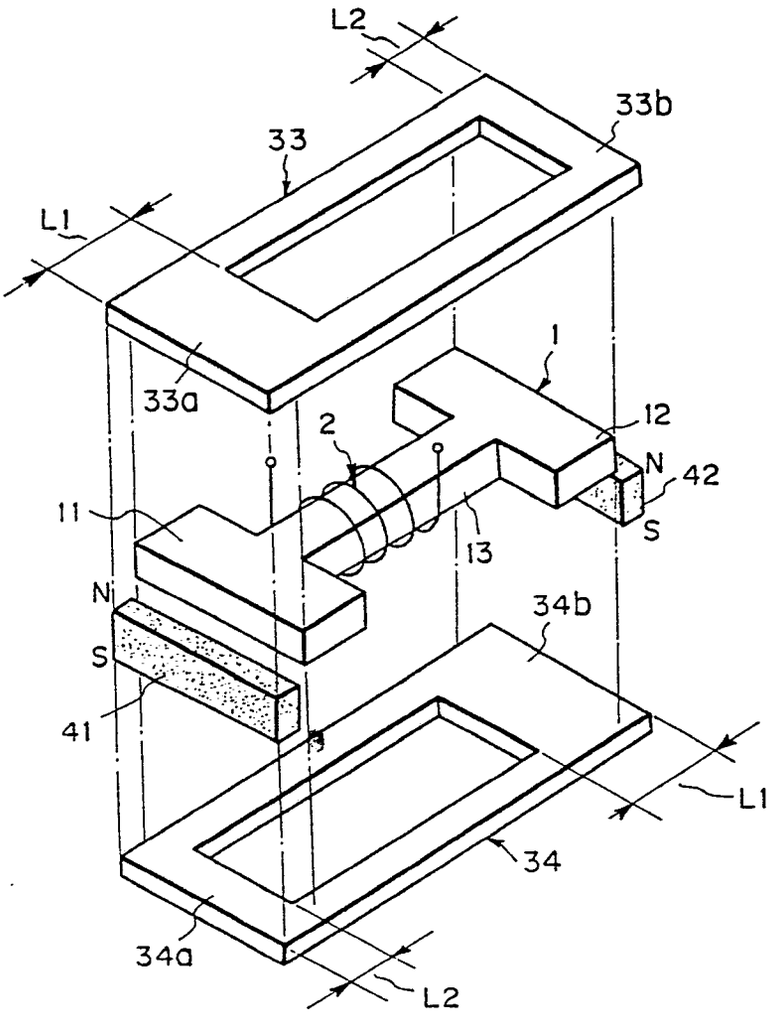

FIG. 6

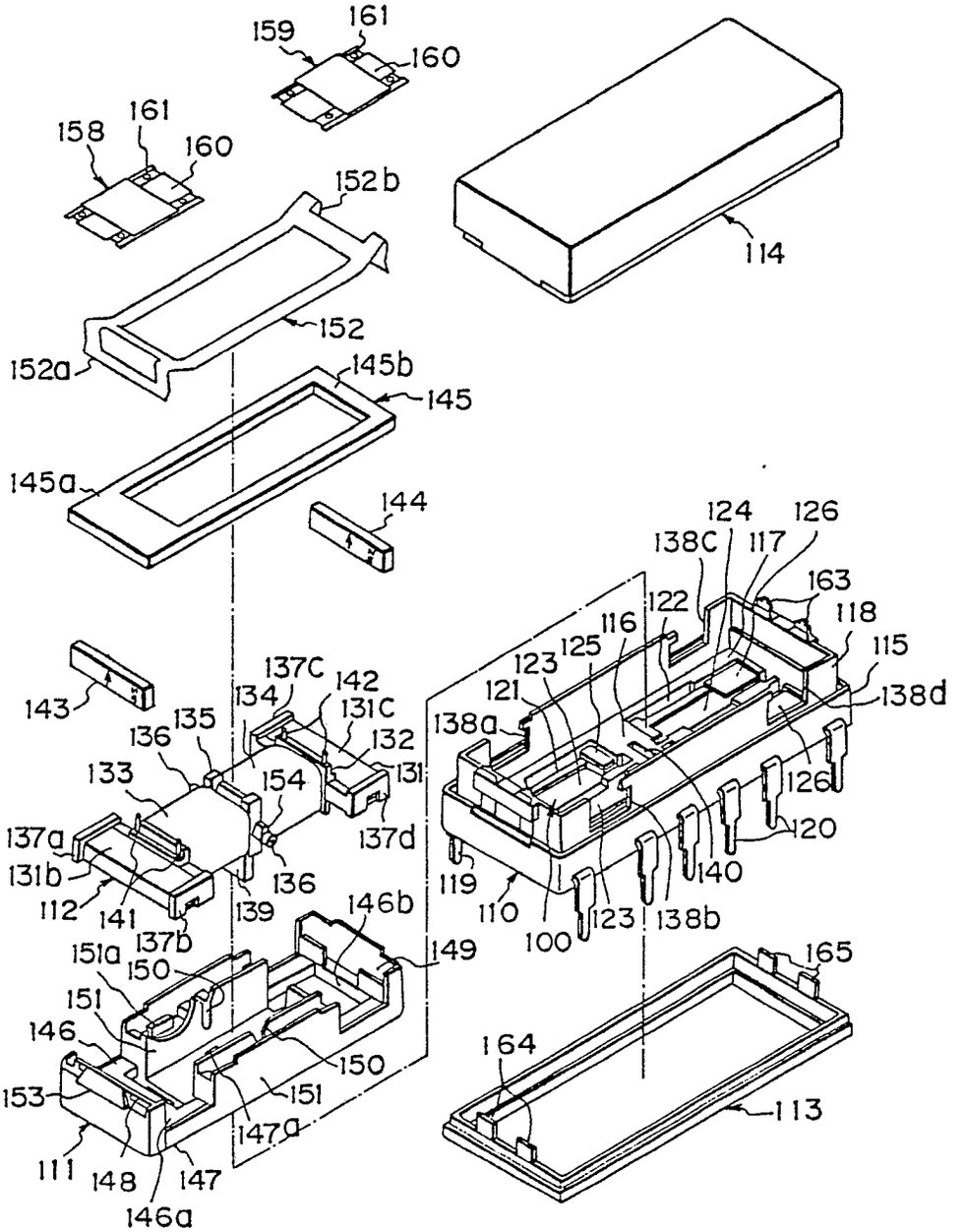
159
161
160
158
161
160
152b
114
152
152a
145b
145
145a
144
124
126
138C
117
163
122
118
116
115
123
125
121
138d
138a
143
137C
142
134
131C
135
136
132
133
154
131
126
137a
137d
120
131b
136
119
140
112
141
139
110
123
138b
137b
146b
100
151a
149
165
150
151
146
164
150
153
151
147a
113
111
148
147
146a

FIG. 7

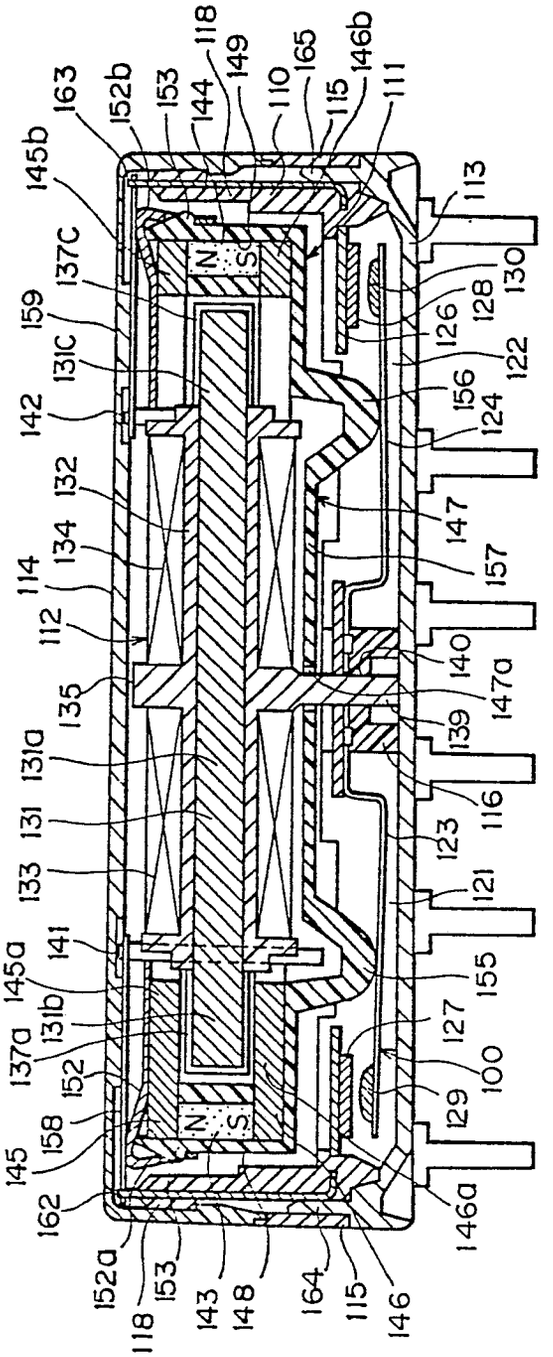
163
152b
153
144
118
149
110
165
115
146b
111
113
145b
137c
159
131c
142
132
134
114
112
135
131a
131
133
141
145a
131b
137a
152
158
145
162
152a
153
118
143
148
164
115
146
N
S
130
128
126
122
156
124
147
157
140
147a
139
116
123
121
155
127
100
129
146a

FIG. 8

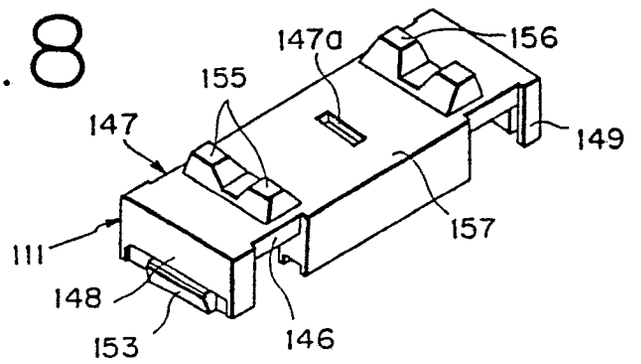

FIG. 9

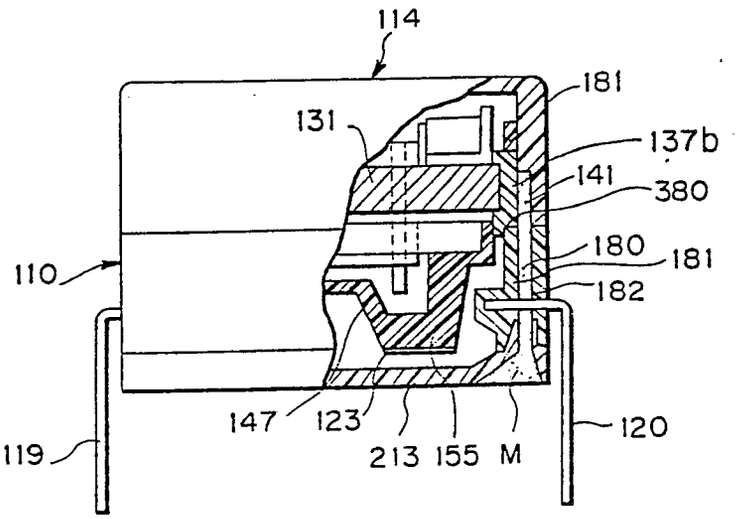
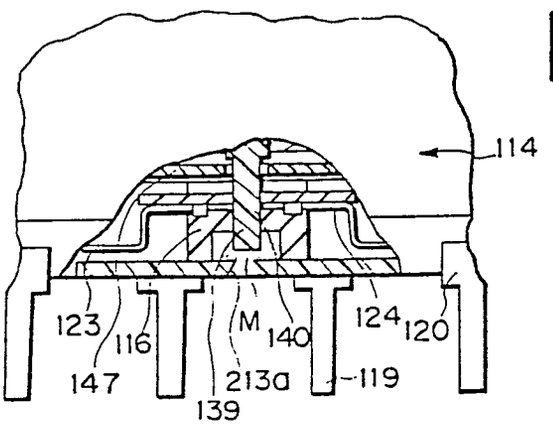
FIG. 10