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RELEASING ARRANGEMENT FOR ELECTRIC SWITCHES

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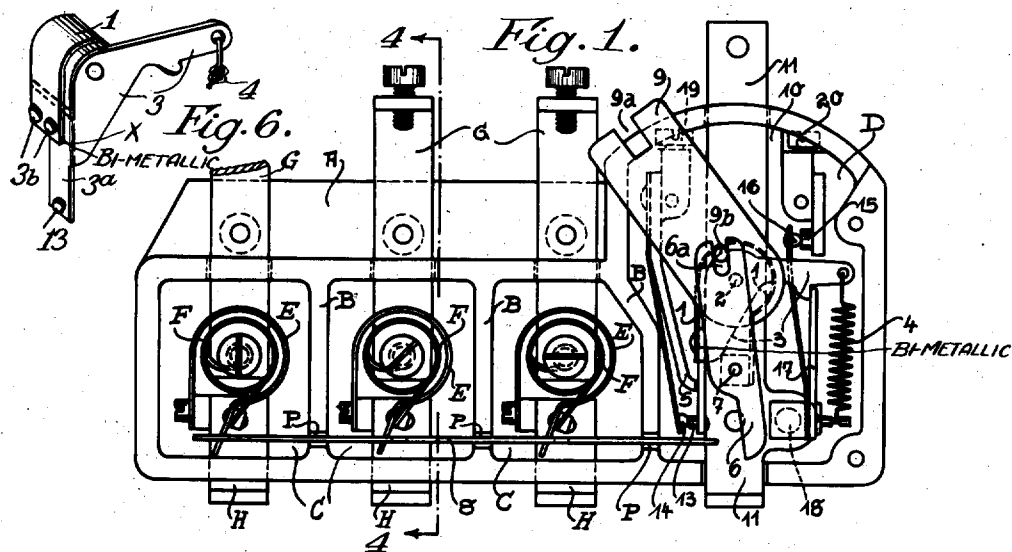
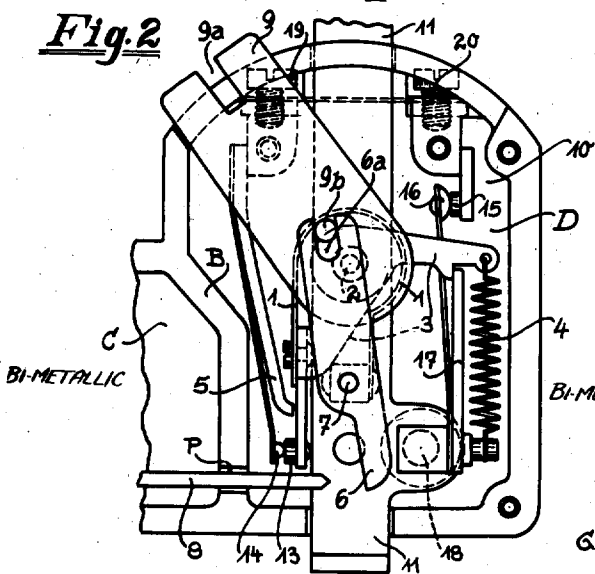
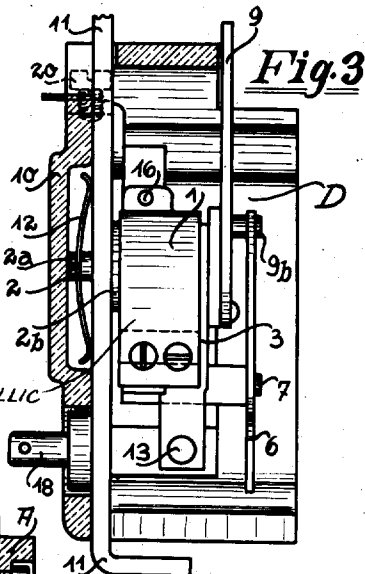
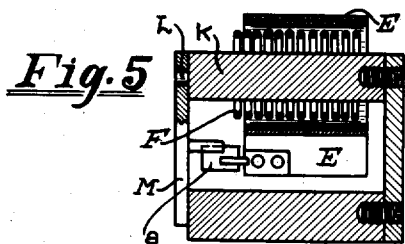
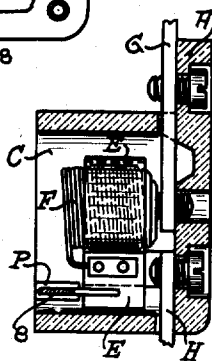


**Fig. 4.**

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## UNITED STATES PATENT OFFICE

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## RELEASING ARRANGEMENT FOR ELECTRIC SWITCHES

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One of the most difficult problems in the construction of electric switches, for example in the construction of protective switches for motors, is the design of the thermal releasing arrangement. As a rule, each thermal releasing device forms a separate constructional unit which is fitted separately in the switch. This requires special technical knowledge which the person who undertakes the exchanging of releasing devices often does not possess. The fitting and exchanging of releasing devices is considerably simpler if all releasing devices of a switch are combined to form a constructional unit which is connected with the switch so as to be easily detachable, for example if they are mounted on a common plate or base. It has also already been proposed to enclose all thermal releasing devices separately from the remaining parts of the switch in a common housing, in order, while permitting of an easy mounting, to make them as far as possible inaccessible to inexpert persons, for example by sealing the housing of the releasing device. But all releasing arrangements wherein the releasing devices of all phases are combined to form a constructional unit separately from the remaining parts of the switch, e. g. the switch contacts, the actuating magnet, and so on, occupy a great amount of space.

The present invention solves the problem of providing a releasing arrangement of very small dimensions, wherein the thermal releasing devices are enclosed in a housing that can be connected with different switches so as to be easily detachable, and which covers, in spite of its smallness, a very great range of releasing current intensities, so that it is only necessary to construct a few types of releasing arrangements according to this invention in order to cover a required total range of releasing current intensities.

According to this invention, the housing of the releasing arrangement, consisting of insulating material, is sub-divided into a plurality of chambers whose number is greater by one than the number of releasing devices present each of which is accommodated in a chamber, while in the chamber not occupied by a releasing device an arrangement for the compensation of the influence of the room temperature on the releasing devices and for adjusting the releasing path of same is situated on which a releasing cross piece acts which passes through apertures in the partitions which thermally and electrically insulate the releasing devices with respect to one another

and with respect to the compensating and adjusting device.

Owing to the fact that in the case of the subject of the invention the individual thermal releasing devices are separated from one another and from the compensating and adjusting device by insulating partitions, great surface leakage paths and great flash-over distances are produced between the parts lying under various potentials, in spite of the fact that the releasing devices and the aforesaid compensating and adjusting device closely approach one another. By reason of the fact that the partitions thermally insulate the releasing devices with respect to one another it is brought about that one releasing device is not influenced by the adjacent releasing device. The consequence of all thermal releasing devices being thermally insulated with respect to the compensating and adjusting device is that the latter lies approximately at room temperature, that is, it is not subjected to any additional heating, whereby its correct functioning would be rendered impossible. The presence of the compensating and adjusting arrangement is intended to solve the problem of enabling the releasing arrangement to have a great releasing range or displacement range in spite of its smallness. A great releasing range of the thermal releasing devices corresponds to a great temperature range. If the uppermost value of the temperature range and consequently the entire range is selected high, this is equivalent to a small dimensioning of the releasing members or single releasing devices. If, for example, bimetal strips are used as releasing members or tripping means, they must have a very small cross-section. In the first place, this has the drawback that the danger arises of the releasing devices burning, because they must temporarily be able to endure a very high excess current. If it is a question, for example, of the protection of a motor having a short-circuited rotor or squirrel-cage rotor, the releasing devices must, during the starting of the motor, withstand 10 to 15 times the nominal current of the motor.

On the other hand, thermal releasing devices which, owing to the smallness of their dimensions and of their cross-section, work in a very high temperature range, have the drawback that they supply very small releasing forces. For these reasons, it is intended, in the case of the subject of the invention, to provide releasing thermal members or thermal tripping means of relatively great dimensions which work in a relatively low temperature range. Owing to the fact that the releasing members in the case of the subject of

the invention work in a low temperature range, their dependence on the room temperature is very great which necessitates the provision of the compensating arrangement. While, as a rule, the releasing temperatures are made very high in order that no compensating arrangement may be necessary, in the case of the subject of the invention only advantages are produced by working at low releasing temperatures. The necessity of providing a compensating arrangement does not mean any appreciable complication, on the one hand because, in the case of the present invention, a single compensating arrangement is used for the releasing members of all phases, and on the other hand because that chamber of the housing of the releasing arrangement which contains the compensating arrangement may be used to accommodate other parts which are advantageously arranged in immediate proximity to the releasing members and which, as well as themselves, are to be made inaccessible to incompetent persons. Finally, the extra expenditure necessitated by the provision of the compensating arrangement is of no importance considering the great adjustment range rendered possible by the subject of the invention.

A constructional example of the invention is illustrated on a greatly enlarged scale in the accompanying drawing, wherein

Figure 1 shows a longitudinal section, Figure 2 the constructional parts illustrated in the right-hand part of Figure 1, on a still larger scale,

Figure 3 a side view associated with Figure 2, wherein a number of constructional parts are shown in section,

Figure 4 a cross-section according to the line 4-4 of Figure 1,

Figure 5 a detail in somewhat modified form in section, and

Fig. 6 is a perspective of a detail.

The housing A of the releasing arrangement is subdivided by partitions B into the three chambers C and the fourth chamber D. The chambers C serve to accommodate three thermal releasing devices, each of which is intended to supervise one phase of a three-phase current supply. The chamber D contains a compensating and adjusting arrangement.

The releasing stroke of a bimetal releasing device increases with its length. In order to accommodate in the chambers C bimetal strips which are as long as possible, the bimetal strips are substantially bent in a circle. In the case of bimetal strips, both a direct current heating by means of an electric current flowing through the strips and an indirect heating by heating windings wound round the bimetal strip are known. The indirect heating is more advantageous per se, because by corresponding dimensioning of the heating winding that heating can be produced which is particularly desired, without depending on the resistance of the bimetal material. However, heating windings wound round the bimetal strip prevent the strip from bending out, wherein resides a considerable drawback of the indirect heating by such windings. This drawback is obviated in the case of the present invention by providing in the centre of the bimetal strip E a heating winding F concentric in relation thereto, this winding being, for example, helical. By the insertion of different heating windings, namely those having a different number of turns and consisting of different material, the bimetal strip E can be heated in the most manifold man-

ner. A further possibility afforded by the invention resides in connecting the windings F and the bimetal strips E in series. This would be objectionable per se, because it would be feared that the connection between the bimetal strips and the heating windings would interfere with the free movability of the former. According to the invention, the heating windings F are supported at one end by the housing A of the releasing arrangement and their free ends are current-conductively connected with the bimetal strips E which they surround. By this arrangement, it is brought about that the free ends of the heating windings and consequently their connection with the bimetal strips is easily movable. The ends of the heating windings F are connected to the current-connection bars G which, in their turn, are secured to the housing A. The circuit of the releasing devices runs from the bars G through the heating windings F and the bimetal strips E to the current-connection bars H which carry the bimetal strips. All bimetal strips E act on the common releasing cross-member 8 and displace it to the right with increasing heating. The cross-member 8 passes through apertures P in the partitions B separating the individual chambers C, D from one another.

The bimetal strip I of the compensating arrangement situated in the chamber D is substantially bent in a circle and mounted rotatably about the concentric axis 2. Owing to the substantially circular curve, the strip is caused to execute great deflections while occupying very little space. As all other parts of the arrangement are grouped about the bimetal strip having a substantially circular or U-shape, the space occupied by the entire arrangement is very small. The bimetal strip I is mounted through the medium of a supporting member 3 in the form of a bell-crank lever on the axis 2 with which the helical spring 4 engages. The bell-crank lever 3 is a metal stamping, having an arm 3b bent at right angles to the body portion thereof, along the line x. The arm 3b constitutes a support for one end of the bimetal strip I, the bimetal strips being held thereon by means of screws or rivets, as shown in Figs. 2, 3, and 6. A lower extension 3a of the arm 3b carries the contact member 13. The spring 4 presses one of the two ends of the bimetal strip against a stop 5. On the opposite end of the bimetal strip, which is freely movable by temperature warping, a releasing member 6 is rotatably mounted about the axis 7. The releasing or tripping devices arranged within the chambers C and whose dependence on the room temperature is to be compensated, act on the releasing member by means of the cross member 8. When the cross member 8 encounters the releasing member 6, it rotates the member 6 together with the bimetal strip I and the supporting member 3 in the anti-clockwise direction about the shaft 2, whereby the tension of the spring 4 is increased. The distance between the point of the strip or cross-member 8 and the releasing member 6, i. e. the releasing path, must not, upon fluctuation of the room temperature, be altered or only to a very small extent. Under conditions otherwise remaining constant, the releasing members press the strip or cross-bar 8 to the right with increasing room temperature, while with decreasing room temperature it is displaced to the left. The bimetal strip I also subjected to the influence of the room temperature displaces the releasing member to the right when the room

temperature rises and to the left when the room temperature drops. Consequently, the movement of the releasing members and the cross-bar respectively and that of the compensation strip 1 in the same direction which is necessary for the compensation of the influence of the room temperature, takes place. The movement, however, must not only be in the same direction, but must also be equal in magnitude. This requirement can suitably be fulfilled by selecting corresponding dimensions. Its fulfillment, however, is most conveniently effected if the compensation bimetal strip 1 is given the same shape as the releasing bimetal strips E.

With a view to arbitrarily adjusting the releasing path to correspond to the desired intensity of the releasing current, the adjusting member 9 is provided, by which the releasing member 6 can be rotated about its point 7, at which it is articulated to the bimetal strip 1, irrespective of the movement of the bimetal strip 1 by which it is carried. In the case of the embodiment illustrated in the drawing, the releasing member 6 is formed by a two-sided lever, on one side of which the releasing member or members whose dependence on the room temperature is to be compensated act through the medium of the strip or cross-member 8. The adjusting member 9 is mounted rotatably about the rotational axis 2 of the bimetal strip 1. Its upper end passes through a slot provided in the housing 10 of the arrangement. The upper side of the housing 10 is provided with a scale not shown in the drawing. In order to be able to fix the position of the adjusting member 9 with its aid, this adjusting member is provided with a slot 9a which acts in the manner of an indicator. The side of the releasing member 6 facing towards the adjusting member 9 is articulated to the adjusting member, whereby it is rendered possible to rotate the releasing member and the adjusting member together about their axes 7 and 2 respectively. This articulation is, for example, constituted by a guide slot in which is arranged a pin. According to Figures 1 and 2, the releasing member 6 is provided with a slot 6a in which is guided a pin 9b secured to the adjusting member 9. However, the adjusting member might be provided with a slot and the releasing member with a pin guided therein.

In the position assumed by the members 6 and 9 in Figures 1 and 2, the releasing path of the releasing members or of the strip or cross-member 8 has the greatest possible value. If the adjusting member 9 is turned about the axis 2 in the clockwise direction, the releasing path is reduced, because in this case the releasing member 6 is turned about the axis 7 in the clockwise direction. If the strip or cross-member 8 encounters the releasing member 6 the latter must carry out a movement suitable for initiating the releasing operation, but the position of the adjusting member 9 must not change while this is taking place. In order to prevent this, such frictional conditions must exist that the member 6 can only be driven by the member 9 but not, inversely, the member 9 by the member 6 when the strip or cross-member 8 encounters the latter. This condition may readily be complied with if the member 9 is so mounted that, owing to the presence of great frictional forces, it can only be turned about the axis 2 with difficulty, and if the bimetal strip be so arranged as to turn easily about the axis 2. Under this pre-supposition, when the strip or cross-member 8 encoun-

ters the member 6 the bimetal strip 1 will be turned about the axis 2 in the anti-clockwise direction, the tension of the spring 4 being increased, but the member 9 will remain at rest.

In order to create the necessary frictional conditions, the supporting member 3 is loosely mounted on the axis 2, so that it may be easily rotated about this axis together with the bimetal strip 1 and the releasing member 6. In this case, it is only necessary to overcome the force of the weak helical spring 4. The member 9 is so connected with the axis 2 that upon rotation of the member 9, the axis 2 turns with it. The shaft 2 is mounted at one end in the current-connection bar 11. The pin 2a passes transversely through the shaft 2. Between the pin 2a and the bar 11 is arranged a leaf spring 12 as may be seen from Figure 3. Owing to the fact that the leaf spring 12 presses on the pin 2a, the rotation of the shaft 2 and consequently that of the member 9 is subjected to a certain resistance, which prevents a shifting of the member 9 when the strip or cross-member 8 encounters the member 6. The shaft 2 rests with a collar 2b against the bar 11 (Figure 3).

When the bimetal strip 1 lies against the stop 5, a contact member 13 movable with the bimetal strip 1 touches a stationary contact member 14 co-operating with it. When the strip or cross-member 8 encounters the member 6 this latter is rotated in the anti-clockwise direction together with the bimetal strip 1 and the contact member 13, whereby the contact member 13 is raised from the contact member 14, and thus breaks the circuit which was previously closed by the contact members 13 and 14. The contact members 13 and 14 are suitable for controlling a circuit in which instantaneous breaking, i. e. breaking of short duration, is to take place. When the strip 8 is shifted again to the left after the circuit has been broken (Figures 1 and 2) the constructional parts 1, 3, 6, and 13 are turned under the influence of the spring 4 about the axis 2 in the clockwise direction, so that the contact members 13 and 14 can touch each other again.

In some cases there is not required a temporary interruption of short duration, but permanent interruption of the circuit should be effected, as by means of the co-operating contact members 15 and 16. The contact member 15 is stationary and the contact member 16 movable together with a locking member 17 which is latched with the supporting member 3 of the bimetal strip 1. The locking member 17 is adapted to turn about the axis 18 which passes out of the housing 10 at its rear side (Figure 3). The force of the spring 4 engages with the locking member 17 eccentrically in relation to its axis of rotation 18, this force pressing the bimetal strip 1 against its stop 5.

In the position of the parts shown in Figures 1 and 2, the contact members 15 and 16 touch each other. When the strip or cross-member 8 encounters the member 6, the bimetal strip 1 is turned together with the supporting member 3 about the axis 2 in the anti-clockwise direction. If the stroke of the strip or cross-member 8 is sufficient the latching between the parts 3 and 17 is released. After release of the latching the locking member 17 turns about the axis 18 under the influence of the force of the spring 4 in the anti-clockwise direction, whereby the contact member 16 is lifted from the contact member 15. The contact members 15 and 16 remain permanently separated from one another even when the strip or cross-member 8 is returned into its ini-

tial position owing to the cooling of the releasing devices by which it was moved. The contact members 15 and 16 are not brought into contact again until the latching between the constructional parts 3 and 17 is re-established by rotation of the axis 18 in the clockwise direction. This may take place through the provision of a special actuating member connected with the axis 18. On the other hand, the latching of the parts 3 and 17 can automatically be effected by the movement of a switch member adapted for this purpose.

The contact members 13 and 16 are connected by means of the bar 11 with one pole of the circuit to be controlled. In the top of the housing 10, two terminals 19 and 20 are provided, the former being current-conductively connected with the contact member 14 and the latter with the contact member 15. The second pole of the circuit to be controlled is, according to choice, connected to the terminal 19 or to the terminal 20, this depending on whether breaking of short duration or permanent breaking of the circuit to be controlled is desired.

A third instance of releasing which comes into question in practice is the purely mechanical releasing, for example the mechanical opening of the locking mechanism of an automatic switch. The present invention is also suitable for this case, where, by means of the axis 18 of the member 17, the force of the spring 4 expanding upon the unlatching of the supporting member 3 and of the member 17 is transferred to the locking mechanism of the switch to be controlled. In this case, the spring 4 forms a power accumulator common to all releasing devices acting on the strip or cross-member 8.

According to the more schematical Figure 5, the heating winding F of the bimetal strip E at the same time forms the exciting winding of the magnet system K which serves for the electromagnetic release. The armature M rotatable about the axis L normally in relation to the paper plane acts, as well as the bimetal strip E, on the releasing strip or cross-member 8. In the case of thermal and electromagnetic release, releasing members of the type illustrated in Figure 5 are placed in all phases.

The transverse strip or cross-member 8 ought to be made of insulating material as well as the housing and the partitions subdividing the same.

I claim:—

1. In a releasing arrangement for electric switches the combination of a housing consisting of insulating material, thermally acting releasing members adapted to be heated by electric current, partitions which subdivide said housing into a plurality of chambers whose number is greater by at least one than the number of releasing members, each releasing member being accommodated in a separate chamber, means for the compensation of the influence of the room temperature on the releasing members and for the adjustment of their releasing path, said means being arranged in the additional chamber not occupied by a releasing member, a releasing cross-member being actuated by the releasing members, said cross-member passing through apertures in the partitions which subdivide the housing, said partitions being adapted to insulate thermally and electrically said releasing members from each other and from said compensating and adjusting means.

2. In a releasing arrangement for electric switches the combination of a housing consisting of insulating material, bimetal strips bent sub-

stantially in the shape of an arc, heating windings arranged substantially in the centre of said bimetal strips and being enveloped by same, partitions which subdivide said housing into a plurality of chambers whose number is greater by one than the number of said bimetal strips provided with a heating winding, each bimetal strip and its heating winding being accommodated in a separate chamber, means for the compensation of the influence of the room temperature on the bimetal strips and for the adjustment of their releasing path, said means being arranged in the additional chamber not occupied by a bimetal strip and a heating winding, a releasing cross-member actuated by said bimetal strips, said cross-member passing through apertures in the partitions which subdivide the housing, said partitions being adapted to insulate thermally and electrically the elements being arranged in different chambers.

3. In a releasing arrangement for electric switches the combination of a housing, bimetal strips bent substantially in the shape of an arc, heating windings arranged substantially in the centre of said bimetal strips and being enveloped by same, partitions which subdivide said housing into a plurality of chambers whose number is greater by one than the number of bimetal strips provided with a heating winding, each bimetal strip and its heating winding being accommodated in a separate chamber, means for the compensation of the influence of the room temperature on the bimetal strips and for the adjustment of their releasing path, said means being arranged in the additional chamber not occupied by a bimetal strip being provided with a heating winding, said means including a bimetal strip bent substantially in the shape of an arc, a releasing cross-member being actuated by the bimetal strips provided with a heating coil, said cross-member passing through apertures in the partitions which subdivide the housing, said partitions being adapted to insulate thermally and electrically the elements being arranged in different chambers.

4. In a releasing arrangement for electric switches the combination of a housing, bimetal strips bent substantially in the shape of an arc, heating windings arranged substantially in the centre of said bimetal strips and being enveloped by same, each of said windings co-operating with a magnet core with an armature to magnetize the same, partitions which subdivide said housing into a plurality of chambers whose number is greater by one than the number of said bimetal strips provided with a heating winding, each bimetal strip and its winding being accommodated in a separate chamber, means for the compensation of the influence of the room temperature on the bimetal strips and for the adjustment of their releasing path, said means being arranged in the additional chamber not occupied by a bimetal strip and a heating winding, a releasing cross-member actuated by said bimetal strips and said armatures, said cross-member passing through apertures in the partitions which subdivide the housing, said partitions being adapted to insulate thermally and electrically the elements being arranged in different chambers.

5. In a releasing arrangement for electric switches the combination of a housing, bimetal strips bent substantially in the shape of an arc, heating windings arranged substantially in the centre of said bimetal strips and being enveloped by same, said windings being supported at one of their ends by said housing, their free op-

posite ends being current-conductively connected with the bimetal strips by which they are surrounded, partitions which subdivide said housing into a plurality of chambers whose number is greater by one than the number of said bimetal strips provided with a heating winding, each bimetal strip and its heating winding being accommodated in a separate chamber, means for the compensation of the influence of the room temperature on the bimetal strips and for the adjustment of their releasing path, said means being arranged in the additional chamber not occupied by a bimetal strip and a heating winding, a releasing cross-member actuated by said bimetal strips, said cross-member passing through apertures in the partitions which subdivide the housing, said partitions being adapted to insulate thermally and electrically the elements being arranged in different chambers.

6. In a releasing arrangement for electric switches the combination of a housing consisting of insulating material, thermally acting releasing elements adapted to be heated by electric current, partitions which subdivide said housing into a plurality of chambers whose number is greater by at least one than the number of releasing elements, each releasing element being accommodated in a separate chamber, a mechanism for the compensation of the influence of the room temperature on the releasing elements and for the adjustment of their releasing path, said mechanism being common to all said releasing elements and arranged in the additional chamber not occupied by a releasing element, contact members for opening and closing the circuit to be controlled by the releasing elements, said contact members being accommodated in the chamber of the compensation and adjusting mechanism, a releasing cross-member being actuated by the releasing elements, said cross-member passing through apertures in the partitions which subdivide the housing, said partitions being adapted to insulate thermally and electrically said releasing elements from each other and from said compensating and adjusting mechanism.

7. In a releasing arrangement for electric switches the combination of a plurality of thermally acting releasing elements, a cross-member being actuated by said elements, a substantially arc-shaped bimetal strip rotatably mounted on a substantially concentric axis, means to exert a force pressing one of the ends of the bimetal strip against a stop, a releasing member pivotally mounted on the opposite end of the bimetal strip freely movable by temperature warping, said cross-member being adapted to act upon said releasing member, and an adjusting member adapted to rotate the releasing member about its point of articulation to the bimetal strip irrespective of the temperature warping of said strip.

8. In a releasing arrangement for electric switches the combination of a plurality of thermally acting releasing elements mounted on a common support, walls between said elements adapted to insulate thermally and electrically said elements from each other, a cross-member being actuated by said elements, said cross-member passing through apertures in the walls between said elements, a substantially arc-shaped bimetal strip rotatably mounted on a substantially concentric axis, means to exert a force pressing one of the ends of the bimetal strip against a stop, a two-sided releasing lever pivotally mounted on the opposite end of the bimetal strip movable by temperature warping, said cross-member being

adapted to act upon one side of the releasing lever, an adjusting member rotatable about the axis of rotation of the bimetal strip, and a connection between the other side of the releasing lever and the adjusting member adapted to allow the common rotation of both said releasing lever and said adjusting member about their axes of rotation by actuating said adjusting member.

9. In a releasing arrangement for electric switches the combination of a plurality of bimetal strips bent substantially in the shape of an arc, means for heating said bimetal strips by electric current, a common support for said bimetal strips, walls between said strips adapted to insulate thermally and electrically said strips from each other, a cross-member being actuated by said strips, said cross-member passing through apertures in the walls between said strips, a substantially arc-shaped bimetal strip rotatably mounted on a substantially concentric axis, means to exert a force to rotate said last mentioned strip, a stop to limit the rotation of said last mentioned strip, a two-sided releasing lever pivotally mounted on one end of the last mentioned strip movable by temperature warping, said cross-member being adapted to act upon one side of said releasing lever, an adjusting member rotatable about the axis of rotation of said last mentioned strip, the other side of said releasing lever and said adjusting member being articulated together by a slot and a pin arranged therein, said slot being provided in the one and said pin in the other of both parts.

10. In a releasing arrangement for electric switches the combination of a plurality of bimetal strips, means for heating said strips by electric current, a cross-member being actuated by said strips, a bimetal strip of substantially the same shape as the before mentioned bimetal strips, said last mentioned strip being rotatably mounted on an axis through the medium of a supporting member, a rotatable locking member, a spring adapted to rotate said supporting member and said locking member, a stop to limit the rotation of said supporting member, means to latch said locking member through the medium of said supporting member, a movable contact member connected to said supporting member, a stationary contact member co-operating with said movable contact member, a second movable contact member connected to said locking member, a stationary contact member co-operating with said last mentioned contact member, a releasing lever pivotally mounted on one end of said last mentioned bimetal strip movable by temperature warping, said cross-member being adapted to act upon said releasing lever, an adjusting lever rotatable about the axis of rotation of said last mentioned bimetal strip, and a connection between said adjusting lever and said releasing lever adapted to allow to rotate said releasing lever about its point of articulation to the last mentioned bimetal strip by rotating said adjusting lever.

11. In a releasing arrangement for electric switches the combination of a plurality of bimetal strips, means for heating said strips by electric current, a cross-member being actuated by said strips, a bimetal strip of substantially the same shape as the before mentioned bimetal strips, said last mentioned strip being rotatably mounted on an axis through the medium of a supporting member, a rotatable locking member, a spring adapted to rotate said supporting member and said locking member, a stop to limit the rotation of said supporting member, means to latch said locking member through the medium

of said supporting member, a movable contact member connected to said supporting member, a stationary contact member co-operating with said movable contact member, a second movable contact member connected to said locking member, a stationary contact member co-operating with said last mentioned contact member, a releasing lever pivotally mounted on one end of said last mentioned bimetal strip, a connection between said adjusting lever and said releasing lever adapted to allow to rotate said releasing lever about its point of articulation to the last mentioned bimetal strip by rotating said adjusting lever, a housing, partitions which subdivide said housing into a plurality of chambers, each bimetal strip being accommodated in a separate chamber, said cross-bar passing through apertures in said partitions, said last mentioned bimetal strip, said supporting member, said spring, said locking member, said contact members, said releasing lever, and said adjusting lever being accommodated in a common chamber.

12. In a releasing arrangement for electric switches the combination of thermally acting releasing elements, a cross-member being actuated by said elements, means for the compensation of the influence of the room temperature on said releasing elements and for the adjustment of their releasing path, a pair of co-operating contact members, means for separating temporarily said contact members on the occurrence of a predetermined releasing movement of said cross-

member, a second pair of co-operating contact members and means for separating permanently said last mentioned contact members on the occurrence of a predetermined releasing movement of said cross-member.

13. In a releasing arrangement for electric switches, the combination of an insulating housing, thermally acting releasing members adapted to be heated by electric current, a winding for each releasing member and through which the heating electric current is adapted to flow, each of said windings co-operating with a magnet core with an armature to magnetize the same, partitions which subdivide said housing into a plurality of chambers whose number is greater by at least one than the number of releasing members, each releasing member and its winding being accommodated in a separate chamber, means for compensating for the influence of room temperature on the releasing members and for adjusting their releasing path, said means being arranged in the additional chamber not occupied by a releasing member and its winding, and a releasing cross-member adapted to be actuated by the releasing members and said armatures, said cross-member passing through apertures in the partitions, said partitions being adapted to insulate thermally and electrically said releasing members from each other and from said compensating-and-adjusting means.

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