Dec. 5, 1939. G. SOULAT 2,182,038

MAKE AND BREAK DEVICE

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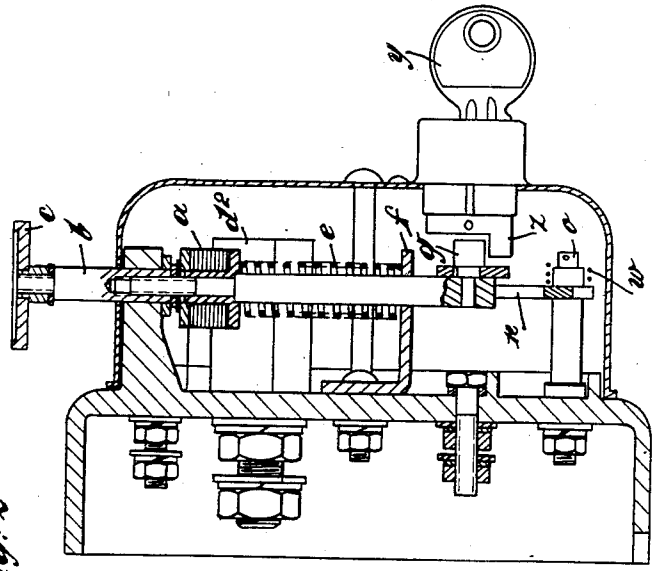


Fig. 2

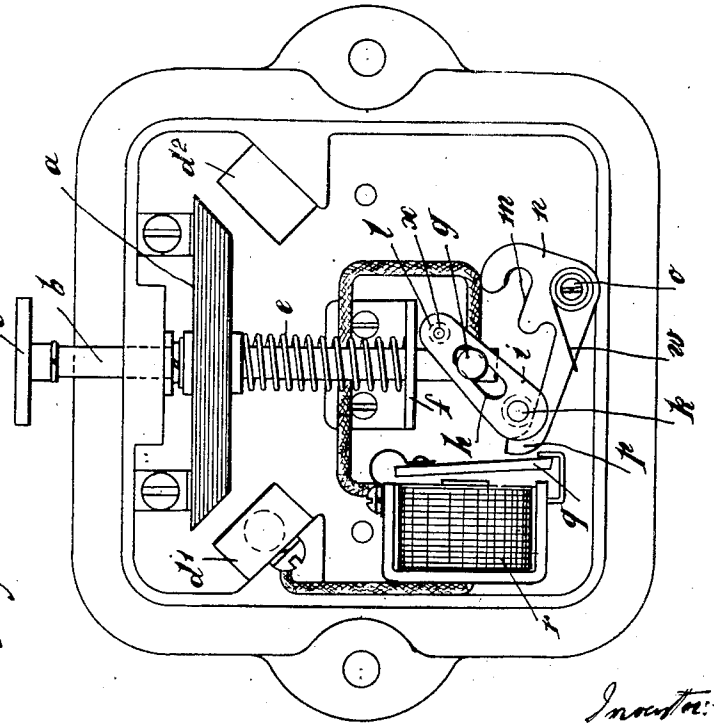


Fig. 1

Inventor:-
Georges Soulat
By Mauss & Lewis,
Attorneys

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Fig. 3

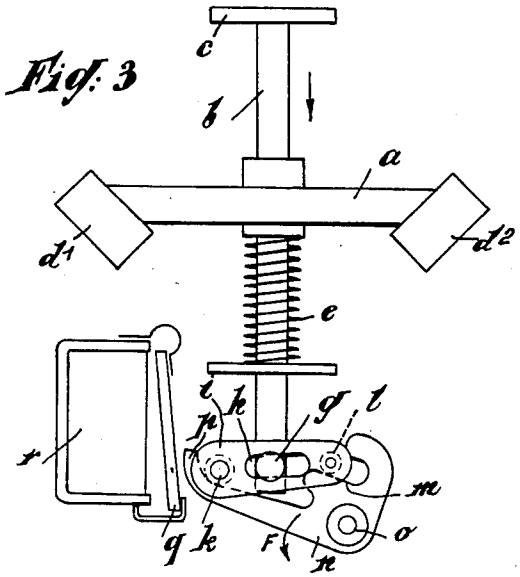
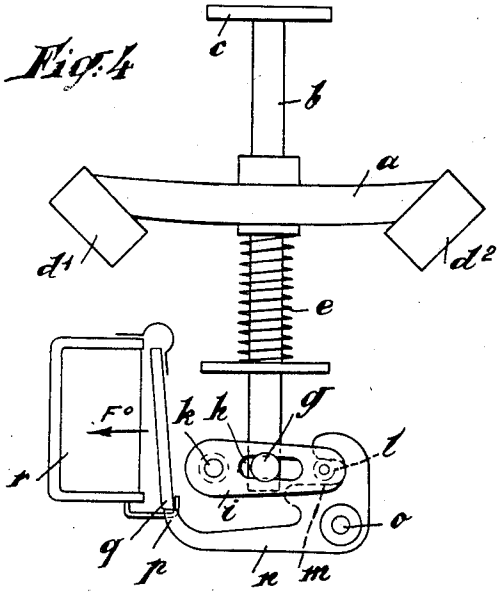


Fig. 4



Inventor:-
Georges Soulat
By Mauro & Lewis
Attorneys

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UNITED STATES PATENT OFFICE

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MAKE AND BREAK DEVICE

Georges Soulat, La Guerche sur l'Aubois, France

Application December 14, 1937, Serial No. 179,781
In France December 19, 1936

4 Claims. (Cl. 200—106)

The present invention relates to make and break devices of the kind adapted to be automatically operated by electromagnet means after which they must be manually brought back to their initial position.

The object of the present invention is to provide a make and break device of this kind which can easily be manually brought back into position, with a minimum effort, while ensuring a quick and satisfactory breaking of the contact when operated by the electromagnet.

According to the essential feature of the present invention, this make and break device is of the rectilinear motion type, the contact being ensured through a plurality of superposed blades, and the manually operated means for bringing back said make and break device to the circuit closing position after an automatic opening thereof include a pawl adapted to be temporarily held by said electromagnet and a lever operative by the manually operated sliding member and acting on said pawl through a roller.

According to another feature of the present invention, the breaking movement of the contact parts of the device is ensured by a strong spring, so as to ensure a quick and clear separation of the contacting parts, whereas the lever elements are calculated to ensure a proper leverage whereby the manually actuated return of the parts into contacting position can be effected smoothly and without exerting an exaggerate effort.

Other features of the present invention will result from the following detailed description of a specific embodiment thereof.

A preferred embodiment of the present invention will be hereinafter described with reference to the accompanying drawings, given merely by way of example, and in which:

Fig. 1 is a front view of the make and break device according to the present invention, with the front face of the casing removed;

Fig. 2 is a median vertical section of the device of Fig. 1;

Figs. 3 and 4 are diagrammatical views of the essential parts of the mechanism of Fig. 1, in different relative positions thereof.

As shown by the drawings, and especially Figs. 1 and 2, the make and break device according to the invention includes a block of small blades or leaves a carried by a sliding rod b provided with a push button c. This block of contact blades is adapted to bear through its ends against stationary contacts d^1 and d^2 when said button c is in the depressed position shown by Fig. 4, thus ensuring the closing of the circuit controlled by the make and break device. A spring e, bearing against a fixed plate f, tends to push the block of blades toward the outside, thus breaking the contact.

The lower end of sliding rod b carries a pin g engaged in a slot h of a lever i pivoted about a fixed point k. This lever carries, at its free end x, a roller l intended to come in contact with the plane face m of a pawl n pivotally mounted about a fixed point o. This pawl has its end p adapted to engage the lower edge of the armature q of the electromagnet r, said end p of the pawl being released as soon as the electromagnet is energized.

It suffices to examine Figs. 3, 4 and 1 to understand the working of the device for restoring the parts into circuit closing position, after the contacts have been automatically cut off under the action of electro-magnet r. When push button c is depressed, the pin g provided at the lower end of the rod b which carries said button causes lever i to pivot downwardly. The roller l carried by said lever comes to bear upon the face m of pawl n (Fig. 3), thus producing the pivoting of said pawl in the direction of the arrow F of Fig. 3. The relative proportions of lever arms gk and lk are chosen in such manner as to permit of performing the operation under particularly favorable conditions. Furthermore, the presence of roller l reduces to a minimum the frictional resistance and also the wear and tear of the pieces.

At the end of this movement, the end p of pawl n slides along the lower end of the armature q of electro-magnet r and is caught under said end, which prevents said pawl from moving back upwardly (Fig. 4). Push button c can then be released. Although spring e tends to bring back the parts into the position of Fig. 1, which would break the contact which has been established between blades a and stationary elements d^1, d^2, the interlocking of pawl n and armature q maintains the part in the position of Fig. 4.

If, now current flows through the winding of electro-magnet r, armature q is attracted in the direction of arrow F^0, thus releasing pawl n and, under the action of spring e, the whole of the parts comes back into the position of Fig. 1. A small spring w urges the pawl toward the position thereof shown by Fig. 1.

The locking of the mechanism is ensured by means of key y acting upon a bent piece z in such manner that said piece can be brought either under or above pin g, thus preventing or permitting the downward movement of rod b, and consequently the engagement of the parts in the circuit closing position.

This device is especially advantageous for use

in connection with safety systems for the electric circuits of automobile vehicles as described in my prior application Ser. No. 114,822 filed December 8, 1936.

In a general manner, while I have, in the above description, disclosed what I deem to be a practical and efficient embodiment of the present invention, it should be well understood that I do not wish to be limited thereto as there might be changes made in the arrangement, disposition, and form of the parts without departing from the principle of the present invention as comprehended within the scope of the accompanying claims.

What I claim is:

1. A make and break device comprising at least one stationary contact, an elongated member, a contact carried by said member adapted to cooperate with each stationary contact, means for axially pushing the elongated member in the direction providing cooperation between said contacts, a spring urging the elongated member in the opposite direction, an electromagnet, an armature for said electromagnet, two stationary pivots, a pawl rotatably mounted on one of said pivots recessed at its shorter end and adapted to engage through the other the armature in its inoperative position and adapted to be disengaged when the electromagnet brings the armature in its operative position, a lever arm rotatably mounted on the second pivot, means for drivingly linking the elongated member with an intermediate point of the lever arm and means whereby the free end of the lever arm is adapted, when driven by the push exerted on the elongated member, to engage the recess in the pawl and force said pawl into engagement with the inoperative armature.

2. A make and break device comprising at least one stationary contact, an elongated member, a contact carried by said member adapted to cooperate with each stationary contact, means for axially pushing the elongated member in the direction providing cooperation between said contacts, a spring urging the elongated member in the opposite direction, an electromagnet, an armature for said electromagnet, two stationary pivots, a pawl rotatably mounted on one of said pivots recessed at its shorter end and engaging through the other the armature in its inoperative position and adapted to be disengaged when the electromagnet brings the armature in its operative position, a lever arm rotatably mounted on the second pivot and provided with a longitudinal slot, a stud on the elongated member engaging said slot, a roller on the free end of the lever arm adapted to drivingly move over the recess in the pawl, the push exerted on the elongated member being adapted to act through the lever and the roller on the pawl to force same into engagement with inoperative armature.

3. In a device as claimed in claim 2, a movable abutment and means for bringing same in the path of the stud on the elongated member to prevent manual operation of said member.

4. A make and break device comprising at least one stationary contact, an elongated control member, a contact carried by said member adapted to cooperate with each stationary contact, means for axially pushing the control member into an operative position providing cooperation between said contacts, a spring urging the elongated member in the opposite direction, an electromagnet, an armature for said electromagnet, a purely mechanical link system including a catch and lever means adapted, when in an operative position, to engage both said armature in its unattracted position on the one hand and said control member in its operative position on the other hand, whereby said control member is retained by said armature until same is attracted, and is thereupon released, and means for positively bringing said lever and catch means into their operative position by said control member's moving into its operative position.

GEORGES SOULAT.