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F. R. HOUSE

MAKE AND BREAK DEVICE

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Fig. 1.

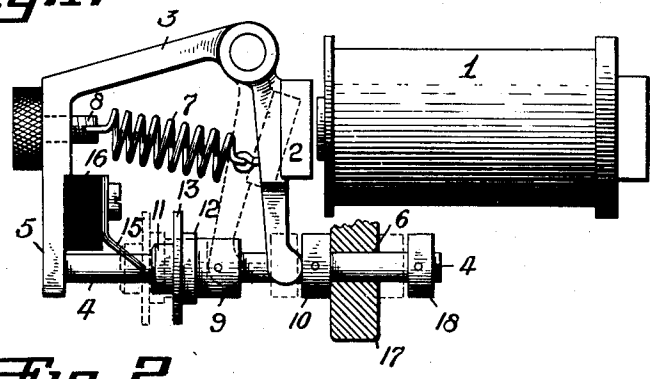


Fig. 2.

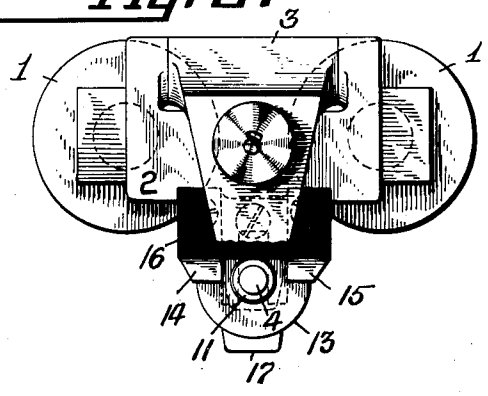
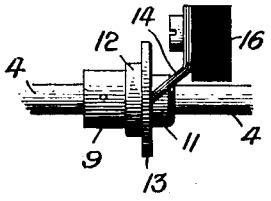


Fig. 3.



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UNITED STATES PATENT OFFICE.

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MAKE-AND-BREAK DEVICE.

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This invention relates to devices adapted to make and break an electric cricuit. As is well known, the separation of a pair of contacts to break a circuit often results in arcing between said contacts. Where the contacts are separated frequently such arcing results in pitting and deterioration of the contact surfaces with resulting poor contact when the contact members are in engagement.

The chief object of my invention is the provision of an improved make and break contact device wherein undue pitting and heating of the contact surfaces are prevented.

Another object is to provide a contact device whereby the contact surfaces are maintained continually in a clean and bright condition.

Further objects and advantages will become apparent as the description of the invention is hereinafter developed.

Referring to the drawings wherein I have shown what I now consider to be the preferred form of my invention:

Fig. 1 is a side elevation, partly in section, of one form which my improved contact device may assume.

Fig. 2 is a front elevation of the contact device of Fig. 1, part of a supporting bracket being broken away.

Fig. 3 is an elevation of a detail taken on the side opposite to Fig. 1.

In Figs. 1 and 2 I have shown a pair of electromagnets 1 adapted attract an armature 2. The latter is pivoted at its upper end to an arm of a bracket 3 and is forked at its lower end to straddle a shaft 4 which is mounted for longitudinal movement in suitable bearings 5 and 6. For retracting armature 2 when magnets 1 are deenergized I have shown a spring 7 attached at one end to said armature and at its other end to a screw or other tension adjusting device 8 mounted in bracket 3. Motion of armature 2 in either of opposite directions is communicated to shaft 4 to cause longitudinal movement thereof through suitable collars 9 and 10. Although said collars may be spaced on shaft 4 so that movement of armature 2 results immediately in longitudinal movement of said shaft, I have shown said collars spaced apart a sufficient distance to permit a certain amount of lost motion of armature 2 before any motion is transmitted to the shaft. While such lost motion is not necessary for many uses to which my make and break device may be put it will be found particularly desirable where said device is used in connection with arc light feeding mechanism. As shown, longitudinal movement of shaft 4 in one direction may be limited by engagement of collar 10 with the standard 17 which carries bearing 6, while longitudinal movement of said shaft in the other direction may be limited by engagement of a collar or abutment 18 with said standard.

Mounted between collars 11 and 12 on shaft 4 and free to rotate on said shaft is a contact disc 13 which is adapted to bridge a pair of spring contacts 14 and 15. The latter are mounted on an insulating block 16 supported by bracket 3. For a purpose which will presently appear said spring contacts are of different resiliencies. For example, one of said contacts may be made of two resilient strips and the other of three, so that one is stiffer than the others. It will be understood, of course, that when disc 13 bridges contacts 14 and 15 a circuit is closed through electromagnets 1, whereas when said disc is out of engagement with said contacts said magnets are deenergized.

In operation, assuming that contacts 14, 15 are bridged by disc 13, as shown in dotted lines in Fig. 1, magnets 1 are energized and armature 2 is attracted. By engagement of said armature with collar 10 the shaft 4 is moved longitudinally and disc 13 is moved into the full line position shown in Fig. 1, wherein said disc is out of engagement with said contacts 14, 15. The circuit through magnets 1 being broken, spring 7 retracts armature 2 and shaft 4 is moved longitudinally in the opposite direction whereby disc 13 is brought into engagement with spring contacts 14 and 15. Now, since the stiffness of one of said contacts is greater than that of the other, it is evident that as disc 13 is moved longitudinally against the spring action of said contacts one side of said disc will meet with more resistance than the other, so that said disc will be rotated slightly. Armature 2 and disc 13 now occupy the dotted line position in Fig. 1. The circuit through magnets 1 being again established the above cycle will be repeated. It will be seen that due to the rotation of disc 13 each time that said disc engages springs 14 and 15 a new contact portion of said disc is presented to said springs by the time that said disc comes to rest. Consequently pitting of the disc by

continued arcing over a given portion of its surface when the circuit is broken is prevented. Undue heating of the contact portions of the disc is also prevented, since after a given portion has been in contact with one of springs 14, 15, some time elapses before the next contact of said portion and during that time said portion will have been cooled. Furthermore, it will be seen that by the rubbing of springs 14 and 15 over the rotating surface of said disc 13 the said surface is automatically kept clean and bright and good contact is insured.

It should be noted that it is not necessary that disc 13 be mounted rotatably with respect to shaft 4 since said shaft may be mounted rotatably as well as for longitudinal movement in bearings 5 and 6, in which case shaft 4 and disc 13 may be rotated together by contact springs 14 and 15. Of course, if desired, disc 13 may be mounted for rotation with respect to shaft 4 and at the same time shaft 4 be rotatably mounted in bearings 5 and 6, so that when disc 13 engages the contact springs both rotation of shaft 4 and of disc 13 with respect to said shaft may result.

In accordance with the provisions of the patent statutes, I have herein described the principle of operation of my invention, together with the apparatus, which I now consider to represent the best embodiment thereof, but I desire to have it understood that the apparatus shown is only illustrative and that the invention can be carried out by other means. Also, while it is designed to use the various features and elements in the combination and relations described, some of these may be altered and others omitted without interfering with the more general results outlined, and the invention extends to such use.

Having described my invention, what I claim and desire to secure by Letters Patent is:

1. An electrical make-and-break device comprising a freely rotatable contact and a non-rotatable contact, means for moving one of said contacts linearly and axially toward and away from the other contact, said contacts being so constructed that upon engagement between the same, rotation of said rotatable contact is caused by said stationary contact.

2. In an electrical make-and-break device, a contact comprising a plurality of contact members of different resiliency, a cooperating contact comprising a rotatable member adapted to bridge the first mentioned members, at least one of said contacts being rotatably mounted, and means for moving said contacts away from and toward one another for the purpose specified.

3. In a make and break device, a rotatable contact disc, means for moving said disc longitudinally, and a pair of resilient contact members adapted to engage different portions of one face of said disc, one of said members being more elastic than the other.

4. In a make and break device, a plurality of contact members of different resiliencies, a rotatable member adapted to bridge the first mentioned members, and means for moving said rotatable member away from or toward said first mentioned contact members.

5. In combination, an electromagnet, an armature movable thereby in one direction, means for moving said armature in the opposite direction, a rotatable and a fixed contact in circuit with said magnet, and means for moving the former contact axially and linearly with respect to the latter in response to movement of said armature, said fixed contact being so constructed that it imparts a rotary movement to the rotatable contact upon engagement therebetween.

6. An electro-magnetic switch comprising an electro-magnet, an armature movable thereby in one direction, means for moving the armature in the opposite direction when the electro-magnet is deenergized, means reciprocated by said armature, a rotatable contact carried by said latter means rotatable in a plane at an angle to the direction of reciprocation, and fixed contacts having means for imparting rotation to said rotatable contact upon their engagement.

7. A make and break device comprising in combination a rotatable contact, means for reciprocating said contact longitudinally on its axis, and a plurality of resilient contacts arranged to impart rotation to said first contact upon their engagement therewith.

8. An electro-magnetic switch comprising an electro-magnet having an armature movable thereby in one direction, means for moving the armature in the opposite direction when the magnet is deenergized, means reciprocated by said armature having a contact element rotatable in a plane different from the direction of reciprocation, and a pair of resilient contacts arranged to be bridged by said rotatable contact, said resilient contacts being arranged to impart rotation to the rotatable contact upon their engagement therewith.

In testimony whereof I have affixed my signature.

FRANK R. HOUSE.