L. W. CHUBB.

CONTACT DEVICE.

APPLICATION FILED DEC. 26, 1913.

1,162,571.

Patented Nov. 30, 1915.

Fig. 1.

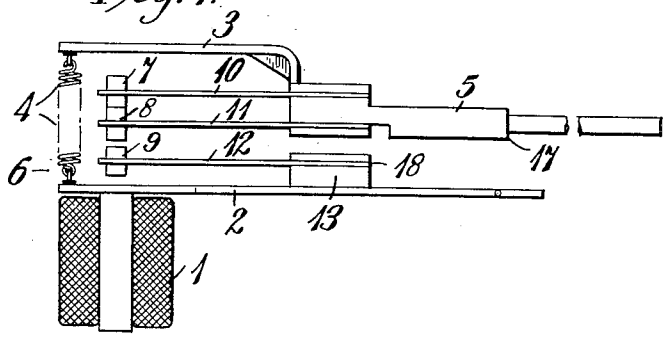


Fig. 2.

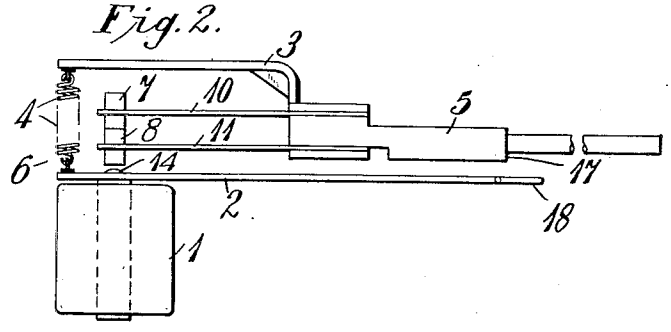
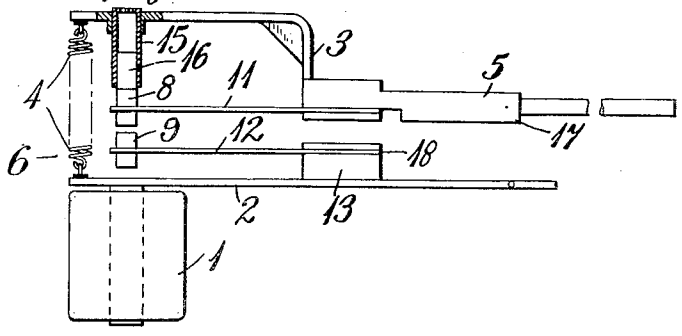


Fig. 3.



WITNESSES:

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LEWIS W. CHUBB, OF EDGEWOOD PARK, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

CONTACT DEVICE.

1,162,571. Specification of Letters Patent. Patented Nov. 30, 1915.

Application filed December 26, 1913. Serial No. 808,747.

To all whom it may concern:

Be it known that I, LEWIS W. CHUBB, a citizen of the United States, and a resident of Edgewood Park, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Contact Devices, of which the following is a specification.

My invention relates to contact-making and breaking devices, and it has particular reference to devices of the anti-vibrating type.

The object of my invention is to provide a contact-making and breaking device having contact members which will not rebound after engagement has been effected.

In various devices embodying separable contact members considerable difficulty has been experienced in obviating sparking but this difficulty has been partially overcome by connecting electrical condensers across the terminals of the devices. However, the use of an electrical condenser in this manner tends to cause the contact members to fuse together, if they rebound after the impact, by reason of the charging and discharging of the condenser. To overcome the difficulties attributed to the rebounding of contact members, I provide a contact device which prevents the separation of the contact members after engagement has been effected.

Figure 1 of the accompanying drawing is a diagrammatic view of a contact device embodying my invention and Figs. 2 and 3 are diagrammatic views of modified forms of contact devices embodying my invention.

Referring to the drawing, I provide an electromagnet 1 having a pivotally mounted armature 2 which is resiliently connected to a member 3 by a spring 4. The member 3 is supported by one terminal 5 of the contact device 6.

With reference now particularly to Fig. 1, the contact device 6 comprises three resiliently supported members 7, 8 and 9, the members 7 and 8 of which are supported from the terminal 5 by flat springs 10 and 11, respectively, and the member 9 is resiliently supported by a flat spring 12 from a member 13 that is mounted on the movable armature 2. The members 8 and 9 constitute the main contact members of the device. The spring 4 is insulated from the support 3 to prevent its acting as a conductor of electricity.

Referring to Fig. 2, the member 13 and the resiliently supported contact member 9 are eliminated and a contact member 14 is mounted directly on the movable armature 2 of the electromagnet.

Referring now particularly to Fig. 3, the resiliently supported member 7 is eliminated, while a tube or cylinder 15, supported by the member 3, and a piston 16 are provided.

From the fundamental laws of impact in kinetics it is known that, if two elastic bodies of equal mass are in engagement and a third elastic body of the same mass strikes one of the two in a direct line, one of the stationary bodies will move away with a velocity equal to the velocity of the striking body and, since the momentum of the system remains constant, the striking body and the one struck will remain at rest and in effective contact.

It is upon the above fundamental law that my invention is based and its operation is as follows: Normally, the movable armature 2 is attracted by the electromagnet 1, the spring 4 is tensioned and the device assumes the position substantially shown in Fig. 1. When the electromagnet 1 is deenergized, the spring 4 draws the armature 2 upwardly to effect a percussive engagement of the contact member 9 with the contact member 8, which is mounted to move in substantially the same straight line with the member 9 for a relatively short distance. As explained hereinbefore, the velocity of impact of the contact member 9 is transferred to the member 7 through the contact member 8 and the member 7 moves upwardly leaving the members 8 and 9 in effective engagement. The upward movement of the member 7 is retarded by the spring 10 which stops the same and reverses the direction of its movement. By the time the member 7 is returned by the action of the spring 10 to strike the contact member 8, the core member 2 has moved farther upward and the springs 11 and 12 are sufficiently compressed to hold the contact members 8 and 9 together with such force as to prevent the impact between the member 7 and the member 8 from causing a disengagement of the contact members 8 and 9. Hence, there is no rebounding of the contact members and no wearing away of the surfaces by

reason of the arcing which would be a result of such rebounding. On energizing the electromagnet, the lower contact member is quickly drawn away from the member 8, which remains substantially stationary.

Referring particularly to Fig. 2, the armature 2 flies upwardly when the electromagnet 1 is deënergized to effect percussive engagement of the contact member 14 with the contact member 8 and cause the member 7 to be thrown out of engagement, substantially as hereinbefore explained.

In Fig. 3, the operation is similar to that hereinbefore described in that, when the electromagnet 1 is deënergized, the armature 2 moves into percussive engagement with the contact member 9 and causes it to engage the contact member 8 and the piston 16 to move upwardly in the tube or cylinder 15, which is so constructed that the height to which the piston 16 rises is limited. Before the piston 16 can fall, the end of the tube 15 is closed by a further upward movement of the contact member 8 and a dash pot action results which prevents sufficient impact between the piston 16 and the member 8 to cause the contact members 8 and 9 to become disengaged.

The conductors 17 and 18 in the several figures, are connected to the circuit which is completed when the contact device operates. The electromagnet 1 may be replaced by any form of operating device that is desirable.

While I have described my invention in connection with apparatus of definite forms of construction, I desire it to be understood that variations in size, form and construction and means of operating the same may of course be made within the scope of the appended claims.

I claim as my invention:

1. A contact-making and breaking device comprising two relatively movable members which are normally separated, a third relatively movable member normally in contact with one of said two members, means for insuring said normal separation, and means for effecting a percussive engagement between said normally separated members when the insuring means becomes inactive.

2. A contact making and breaking device comprising three similar movable alined members two of which are normally in engagement, and means for causing engagement and disengagement of the third member with one of the other two.

3. A contact making and breaking device comprising relatively movable contact members, means for causing said members to engage and disengage, and a movable body normally engaging one of the contact members upon the side opposite to that engaged by the other contact member, the said contact members and the said body being of substantially equal mass.

4. A contact making and breaking device comprising relatively movable contact members, means for causing said members to engage and disengage, and a non-resilient movable body in alinement with said members and normally engaging one of them, the said body being caused to disengage the one contact member when the latter is engaged by the other contact member.

5. A contact making and breaking device comprising relatively movable contact members, means for causing said members to engage and disengage, and a body normally engaging one of the contact members upon the side opposite to that engaged by the other contact member, and means for supporting the said body whereby it is permitted to move out of engagement with the one contact member when the said members are brought into engagement.

In testimony whereof, I have hereunto subscribed my name this 19th day of Dec., 1913.

LEWIS W. CHUBB.

Witnesses:
O. W. A. Oetting,
B. B. Hines.