

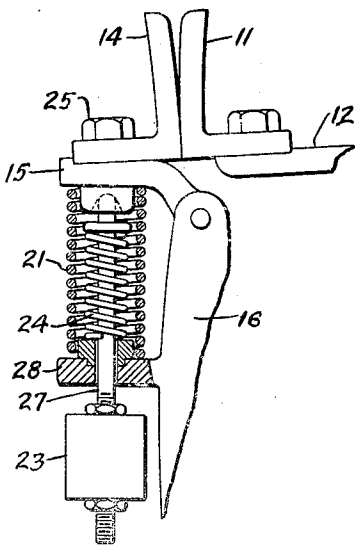
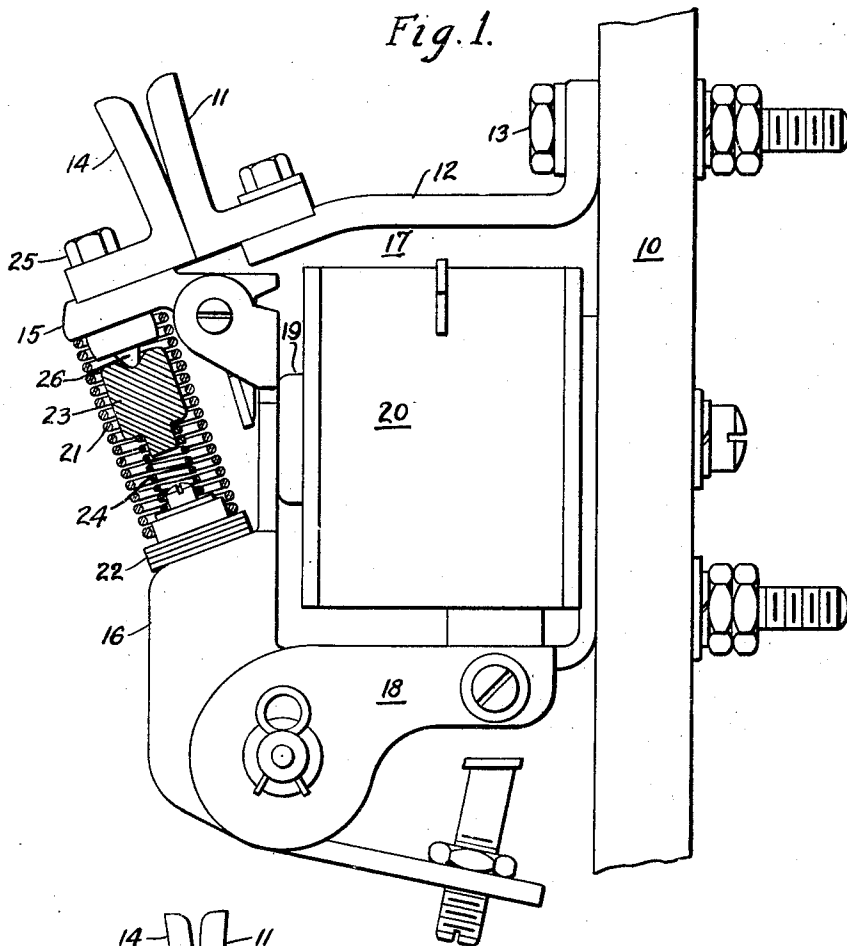
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G. C. ARMSTRONG

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CONTACTOR

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INVENTOR

George C. Armstrong.

BY
Wesley C. Carr
ATTORNEY

UNITED STATES PATENT OFFICE

GEORGE C. ARMSTRONG, OF FOREST HILLS, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA

CONTACTOR

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My invention relates, in general, to electric switches and, more particularly, to the contact members of electric switches or contactors.

One of the problems of electric-switch or contactor design is to prevent bouncing or rebounding of the contact members, which occurs during the interval of closing, as a result of the impact of the contact members. It is desirable to prevent this bouncing in order to minimize burning of the contact members and to decrease the danger of welding the contact members, which are the results of arcing after the contacts have touched.

An object of my invention, generally stated, is to provide a contactor which shall be simple and efficient in operation and which may be readily and economically manufactured.

A more specific object of my invention is to prevent bouncing or rebounding of a movable contact member when it is caused to impinge on a fixed contact member during operation.

Another object of my invention is to reduce to a minimum the burning and welding of the contact members caused by arcing during operation.

My invention utilizes the well known principle of energy transfer through bodies in contact. An example, which will demonstrate this principle, may be found on a billiard table. Assuming that two billiard balls are standing in engagement and that one of the standing balls is struck by the cue ball so as to move the two in line, then the intermediate ball will remain substantially stationary and the energy of the moving ball will be transferred to the third ball.

In practicing my invention, a weight is normally held against the bottom of the movable contact member by a small spring. When the movable contact member impinges on the fixed contact member, the recoil energy of the movable contact member is transferred to the weight, which rebounds from the contact member, thereby preventing bouncing of the contact member.

In many applications both the weight and

the spring may be placed within the biasing spring which is provided to govern the pressure between the contact members when they are in the closed position. In other applications, it may be desirable to place the weight below the bracket which supports the contact spring, the weight being mounted upon a connecting rod, one end of which is held in contact with the movable contact member by a small spring.

For a fuller understanding of the nature and objects of my invention, reference may be had to the following detailed description, taken in conjunction with the accompanying drawing, in which:

Figure 1 is a view, partly in side elevation and partly in section, of a contactor constructed in accordance with my invention;

Fig. 2 is a view, partly in side elevation and partly in section, of a portion of a contactor showing a modification of my invention.

Referring to Fig. 1 of the drawing, the entire contactor mechanism is mounted upon an insulating panel 10. A fixed contact member 11 is carried by a bracket 12 which is mounted upon the panel 10 by a stud 13. A movable contact member 14 is carried by an arm 15, pivotally mounted on an armature 16 of an electromagnet 17 which is also mounted upon the panel 10.

In order that the contact member 14 may be actuated into contact with the contact member 11, the armature 16, which carries the contact member 14, is pivotally mounted on a bracket 18 and is disposed to be moved toward a core 19 when the coil 20 of the electromagnet 17 is energized.

In accordance with standard practice in constructing contactors of this type, a spring 21 is disposed between the contact-carrying arm 15 and the armature 16 to govern the pressure between the contact members 11 and 14. The compression of the spring 21 may be adjusted by varying the number of washers 22 that are provided between the base of the spring and the armature 16.

With a view to preventing the movable contact member 14 from bouncing or rebounding when it impinges on the fixed con-

tact member 11, I have provided a weight 23 for absorbing the recoil energy of the movable contact member. Referring to Fig. 1, it will be observed that the weight 23 is mounted within the contact spring 21 and is normally held in contact with the contact member 14 by a spring 24, also mounted inside of the spring 21. Direct contact between the weight 23 and the contact member 14 is established through a bolt 25 which retains the contact member 14 in position on the arm 15. An angular recess 26 is provided in the top of the weight 23 to receive the projecting end of the bolt 25 which prevents the weight from touching the spring 21. The angle of the recess 26 may be so designed that the momentum of the weight 23, produced by the rotative movement of the armature 16, will cause the weight to exert a vertical force against the contact member, when the armature strikes the core 19.

For best results, it is essential that the proportional weights of the moving parts of a contactor and the exact details of construction be designed for the particular application. The mass of the weight 23 may be so proportioned, with reference to that of the contact members, that the recoil energy of the contact members will be absorbed by the weight 23.

When the coil 20 of the electromagnet 17 is energized, the armature 16 is actuated toward the core 19, and the contact member 14 impinges on the contact member 11. In accordance with the well known principle of the transfer of energy between bodies in direct contact, the recoil energy of the contact member is transferred to the weight 23 which rebounds from the contact member, thereby permitting the contact between the contact members 11 and 14 to be maintained. When the armature 16 strikes the core 19, the horizontal momentum of the weight 23, acquired from the rotative movement of the armature, causes the weight to exert a substantially vertical force, through the bolts 25, against the contact member 14, as a result of the angle of the recess 26 at the top of the weight.

It will be understood that, by preventing bouncing of the contact members, I have reduced burning and welding of the contact members, which is caused by arcs being drawn between them when they are separated after an electrical circuit has once been established through them.

A modification of my invention is shown in Fig. 2, in which parts performing corresponding functions are designated by the same reference characters. In this instance, the weight 23 is mounted on one end of a connecting rod 27, the other end of which is normally held against the contact-carrying arm 15 by the spring 24, which is mounted within the contact spring 21. The connecting rod 27 extends through a projecting

shoulder 28, of the armature 16, which supports the contact spring 21 and also serves as a guide bearing for the rod 27, thereby preventing lateral displacement of the weight 23.

Since numerous changes may be made in the above-described construction, and different embodiments of the invention may be made without departing from the spirit and scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

I claim as my invention:

1. In a contactor, in combination, a fixed contact member, a movable contact member disposed to impinge on the fixed contact member, a non-elastic weight disposed to absorb the recoil energy of the movable contact member to prevent it from rebounding when it impinges on the fixed contact member, said weight being disposed to rebound from the contact member.

2. In a contactor, in combination, a fixed contact member, a movable contact member disposed to impinge on the fixed contact member, a non-elastic weight disposed to absorb the recoil energy of the movable contact member to prevent it from rebounding when it impinges on the fixed contact member, said weight being disposed to rebound from the contact member, and resilient means for normally holding the weight in contact with the movable contact member.

3. In a contactor, in combination, a fixed contact member, a movable contact member disposed to impinge on the fixed contact member, a non-elastic weight disposed to absorb the recoil energy of the movable contact member to prevent it from rebounding when it impinges on the fixed contact member, said weight being disposed to rebound from the contact member, a spring for normally holding the weight in contact with the movable contact member, and means for supporting said spring.

4. In a contactor, in combination, a fixed contact member, a movable contact member disposed to impinge on the fixed contact member, a non-elastic weight disposed to absorb the recoil energy of the movable contact member to prevent it from rebounding when it impinges on the fixed contact member, said weight being disposed to rebound from the contact member, a spring for normally holding the weight in contact with the movable contact member, means for supporting the spring, and means for preventing lateral displacement of the weight.

5. In a contactor, in combination, a fixed contact member, a movable contact member disposed to impinge on the fixed contact member, a spring disposed to govern the pressure of the movable contact member

against the fixed contact member, a weight disposed to absorb the recoil energy of the movable contact member to prevent it from rebounding when it impinges on the fixed contact member, a spring for normally holding the weight in contact with the movable contact member, said spring being mounted within the spring disposed to govern the pressure of the movable contact member, means for supporting the spring, and means for preventing lateral displacement of the weight.

6. In a contactor, in combination, a fixed contact member, a movable contact member disposed to impinge on the fixed contact member, an arm for supporting the movable contact member, a conical projection on the surface of the arm opposite the movable contact member, and a weight disposed to absorb the recoil energy of the movable contact member to prevent it from rebounding when it impinges on the fixed contact member, said weight having an angular recess which co-operates with the conical projection on the contact-carrying arm to cause the momentum of the weight to exert a substantially vertical force against the movable contact member.

7. In a contactor, in combination, a fixed contact member, a movable contact disposed to impinge on the fixed contact member, an arm for carrying the movable contact member, a bolt for retaining the movable contact member on said arm, the end of said bolt being disposed to project from the bottom surface of said arm, a weight disposed to absorb the recoil energy of the movable contact member to prevent it from rebounding when it impinges on the fixed contact member, said weight having an angular recess which co-operates with the projecting end of said bolt to cause the momentum of the weight to exert a substantially vertical force against the movable contact member, and resilient means for normally holding said weight in contact with the end of said bolt.

8. In a contactor, in combination, a fixed contact member, a movable contact member disposed to impinge on the fixed contact member, an arm for supporting the movable contact member, said arm having an angular recess on its surface opposite the movable contact member, and a weight disposed to absorb the recoil energy of the movable contact member to prevent it from rebounding when it impinges on the fixed contact member, said weight having a conical projection which cooperates with the angular recess on the contact carrying arm to cause the momentum of the weight to exert a substantially vertical force against the movable contact member.

9. In a contactor, in combination, a fixed contact member, a movable contact member disposed to impinge on the fixed contact member, a spring disposed to govern the pressure of the movable contact member against the

fixed contact member, a weight disposed to absorb the recoil energy of the movable contact member to prevent it from rebounding when it impinges on the fixed contact member, a second spring disposed to normally hold the weight in contact with the movable contact member, and means for retaining the springs in the operative position.

In testimony whereof, I have hereunto subscribed my name this 15th day of May 1930.
GEORGE C. ARMSTRONG.

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