

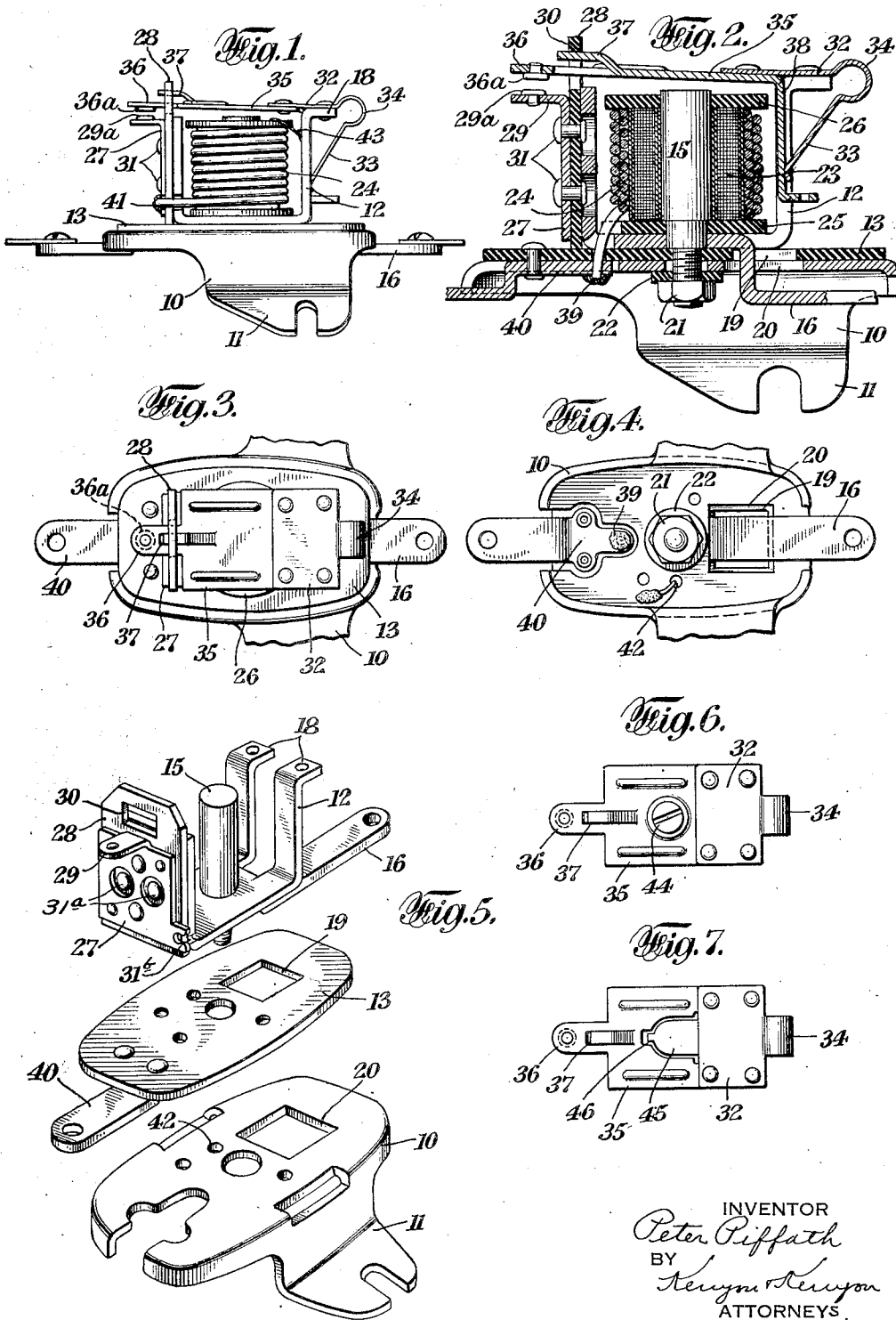
Nov. 24, 1936.

P. PIFFATH

2,061,920

CIRCUIT BREAKER

Filed March 20, 1935



INVENTOR
Peter Piffath
BY
Kearney & Kearney
ATTORNEYS.

UNITED STATES PATENT OFFICE

2,061,920

CIRCUIT BREAKER

Peter Piffath, Elmhurst, N. Y.

Application March 20, 1935, Serial No. 11,907

13 Claims. (Cl. 175-336)

This invention relates to circuit breakers and more especially to generator cut-outs for automobile battery charging systems.

An object of this invention is a generator cut-out which is simple in construction and easy of assembly and has provision for facilitating the adjustment of the armature and tension applied thereto.

In one embodiment of the invention, an electro-magnet is arranged within a U-shaped metal frame, the core of the electro-magnet being fixed at one end to the bight of the frame. One of the legs of the frame is slotted and has its ends turned at right angles. The armature comprises a flat plate which is connected at one end to one end of a leaf spring, the other end of which rests on and is attached to the right angle leg ends previously referred to. The other end of the armature is provided with an adjustable member which engages a fixed stop. The leaf spring is provided with an extension which is bent back so that the free end thereof engages an arm extending from the armature normal thereto. Adjustment of this arm varies the tension applied to the armature and adjustment of the member previously referred to varies the air gap between the armature and core of the electro-magnet. A finer adjustment of the air gap between the armature and core may be obtained by providing the armature with an adjustable contact. The armature carries a contact which cooperates in the usual manner with a stationary contact to control current flow between the generator and battery.

Other objects, novel features and advantages of this invention will become apparent from the following specification and accompanying drawing, wherein:

Fig. 1 is a side elevation of a cut-out embodying the invention;

Fig. 2 is a vertical section thereof;

Fig. 3 is a top plan view;

Fig. 4 is a bottom plan view;

Fig. 5 is an exploded view with the coils and armature omitted, and

Figs. 6 and 7 are plan views of modified armatures.

A metal base 10 is provided with legs 11 which rest on the casing of a generator and are attached thereto by suitable means. A U-shaped metal frame 12 has its bottom portion or bight lying on an insulating plate 13, which in turn rests on the base 10. An electro-magnet is arranged within the frame 12 and has an iron core 15, one end of which projects through the bot-

tom of the frame 12 and has a force fit in the aperture through which it passes so that in effect, the core is integral with the frame. A portion of the right-hand leg of the frame 12 is struck out and bent down to form the connector 16, thus leaving a slot in the leg. The end of the slotted leg is bent normal to the leg at 18 for the purpose which will later be apparent. The connector 16 passes through registering apertures 19 and 20 in the insulator 13 and base 10 respectively and the frame, insulator and base are held in assembled relation by a nut 21 threaded on the end of the core 15 which projects through the insulator and base, the core fitting snugly in the aperture in the insulator 13, but being spaced from the inner periphery of the aperture in the base 10 for insulation purposes and an insulator 22 being interposed between the nut 21 and the base 10.

The windings for the electro-magnet consist of a coil 23 of fine insulated winding surrounding the core and a coil 24 of coarse insulated wire surrounding the coil 23. Insulating disks 25 and 26 are arranged on the core 15 at either end of the wire coils.

A metal plate 27 is attached to an insulating plate 28 which is in turn attached to the left-hand leg of the frame 12. The plate 27 terminates in an extension 29 at right angles thereto and at approximately the same level as the end of the leg. The insulator 28 projects beyond the ends of the plate 27 and frame leg and is provided with an aperture 30. The plate 27 is attached to the plate 28 by rivets 31, the right ends of which lie in apertures in the frame leg while the plate 28 is connected to the frame leg by rivets 31a, the left ends of which are arranged in apertures in the plate 27, thus insulating the plate 27 from the frame leg. The two plates 27 and 28 and the frame leg are correspondingly notched at 31b.

A leaf spring 32 rests upon and is connected to the right-angled portions 18 and is provided with an extension 33 bent to form a loop 34. A plate or armature 35 is connected at one end to the leaf spring 32 and extends across the end of the core 15 and terminates in an extension 36 which passes through the aperture 30 in the insulating plate 28. A tongue 37 is struck up from the plate 35 in position to engage the top of the aperture 30 and thus limit the gap between the end of the core 15 and the armature 35. The armature is provided with a right-angle extension 38 which lies in the slot in the right leg of the frame 12 and is engaged by the end of the spring extension 33. The tongue 37 may be adjusted to vary the spac-

ing of the armature and core and the armature extension 38 may be adjusted in or out to vary the tension applied thereto by the spring extension 33 and thus vary the pull required to actuate the armature. The extension 36 is provided with a contact point 36a which is adapted to engage the contact point 29a carried by the extension 29.

One end of the coil 24 is attached at 39 to a conductor 40 which is carried by the insulator 13 and the other end is attached at 41 to the plate 27. One end of the coil 23 is attached to the base 10 at 42, while the other end is attached to the frame at 43. With the connector 16 connected to the generator and the connector 40 connected to the battery, the connections above described are such as to cause operation of the armature and control of current flow between the battery and generator in the well-known manner and therefore detailed description of the circuit is omitted.

In the modification shown in Fig. 6, the armature 35 is provided with a screw 44 in alignment with the core 15 by adjustment of which the air gap between the armature and core may be regulated. After the desired adjustment has been obtained, the screw 44 may be fixed in any desired position by nicking or the like.

In the modification shown in Fig. 7, the armature is provided with a struck-out ear 45 having a tip 46. The position of the ear 45 relative to the core 15 may be varied by bending the ear with any suitable tools, thus controlling the air gap between the core and armature.

The cut-out structure above described is composed of a relatively few number of parts which may be easily and quickly assembled, thus effecting a material saving not only in material cost, but in labor cost as well. The complete unit is of sturdy construction and capable of withstanding hard usage without impairment of its efficiency. Also, should the adjustment of the air gap or of the spring tension on the armature be not exactly right on the assembly of the cut-out, adjustment of the proper value may easily and quickly be made by manipulation of the tongue 37 or the projection 38. After assembly with the proper air gap spacing and proper armature spring tension, no further adjustment is required throughout the life of the cut-out.

I claim:

1. In a circuit breaker, a U-shaped metallic frame having a slot in one leg, an electro-magnet core fixed to the bight of said frame, an armature plate overlying the end of the core and having a projection lying in said leg slot, and a leaf spring having one end connected to the end of said slotted leg and the other end connected to said armature plate, said spring having an extension bowed to engage said armature projection.

2. In a circuit breaker, a U-shaped frame having a slot in one leg, an electro-magnet core fixed to the bight of said frame, an armature plate overlying the end of said core and having a projection lying in said leg slot, a leaf spring having one end connected to the end of said slotted leg and the other end connected to said armature, and an insulated stop carried by the other frame leg, said armature plate having a tongue struck out and engageable with said stop and said spring having an extension bowed to engage said armature projection.

3. In a circuit breaker, a U-shaped metallic frame having a slot in one leg, an electro-magnet core fixed to the bight of said frame, an armature plate overlying the end of the core and having a

projection lying in said leg slot, a leaf spring having one end connected to the end of said slotted leg and the other end connected to said armature plate, said spring having an extension bowed to engage said armature projection, a base, an insulating plate between said base and frame, said core having a projection extending through apertures in said base and plate, the projection being spaced from the edge of the base aperture, a nut threaded on said projection and an insulating washer interposed between said nut and base.

4. In a circuit breaker, a U-shaped metallic frame having a slot in one leg, an electro-magnet core fixed to the bight of said frame, an armature plate overlying the end of said core and having a projection lying in said leg slot, a leaf spring having one end connected to the end of said slotted leg and the other end connected to said armature plate, said spring having an extension bowed to engage said armature projection, a base, an insulating plate between said base and frame, said core having a projection extending through apertures in said base and plate, the projection being spaced from the edge of the base aperture, and insulated means for fastening together said core, frame and base.

5. In a circuit breaker, a U-shaped frame having a slot in one leg, an electro-magnet core fixed to the bight of said frame, an armature plate overlying the end of said core and having a projection lying in said leg slot, a leaf spring having one end connected to the end of said slotted leg and the other end connected to said armature, an insulated stop carried by the other frame leg, said armature plate having a tongue struck out and engageable with said stop and said spring having an extension bowed to engage said armature projection, a base, an insulating plate between said base and frame, said core having a projection extending through apertures in said base and plate, the projection being spaced from the edge of the base aperture, a nut threaded on said projection and an insulating washer interposed between said nut and base.

6. In a circuit breaker, a U-shaped frame, an electro-magnet core fixed to the bight of said frame, one frame leg having a struck-out portion extending downwardly and then outwardly from the bight of the frame, an insulating plate having an aperture through which said struck-out portion extends, a base, said core having a projection extending through apertures in said base and plate, the projection being spaced from the edge of the base aperture, a nut threaded on said projection, an insulating washer interposed between said nut and base, an armature plate overlying the end of said core and having a projection lying in the slot left by said struck-out portion, a leaf spring having one end connected to the end of the slotted leg and the other end connected to said armature, said spring having an extension bowed to engage said armature projection.

7. In a circuit breaker, a U-shaped frame, an electro-magnet core fixed to the bight of said frame, one frame leg having a struck-out portion extending downwardly and then outwardly from the bight of the frame, an insulating plate having an aperture through which said struck-out portion extends, a base, said core having a projection extending through apertures in said base and plate, the projection being spaced from the edge of the base aperture, a nut threaded on said projection, an insulating washer interposed between said nut and base, an armature plate over-

lying the end of said core and having a projection lying in the slot left by said struck-out portion, a leaf spring having one end connected to one frame leg and the other end connected to said armature said spring having an extension bowed to engage said armature projection, an insulating plate attached to the other leg and having an aperture, said armature plate having a reduced portion extending through said aperture and a struck-out tongue engageable with the periphery of said aperture.

8. In a circuit breaker, a U-shaped frame having the end of one leg bent at right angles and said leg being slotted, an electro-magnet core fixed to the bight of said frame, an armature plate overlying the end of said core and having a projection lying in said leg slot, and a leaf spring having one end resting on and attached to the end of said slotted leg and having its other end connected to said armature, said spring having an extension bowed to engage said armature projection.

9. In a circuit breaker, a U-shaped frame having the end of one leg bent at right angles and said leg being slotted, an electro-magnet core fixed to the bight of said frame, an armature plate overlying the end of said core and having a projection lying in said leg slot, a leaf spring having one end resting on and attached to the end of said slotted leg and having its other end connected to said armature, said spring having an extension bowed to engage said armature projection, an insulating plate carried by said other leg and having an aperture, said armature plate having a reduced portion extending through said aperture, and a struck-out tongue engageable with the periphery of said aperture.

10. In a circuit breaker, a U-shaped frame, an electro-magnet core fixed to the bight of said frame, an armature plate overlying the end of said core, a leaf spring having one end connected to the end of one frame leg and the other end connected to said armature, an insulated plate carried by the other frame leg and having an aperture, said armature plate having a reduced portion extending through said aperture and a member adjustable with respect to said core.

11. In a circuit breaker, a U-shaped frame having a slot in one leg, an electro-magnet core fixed to the bight of said frame, an armature plate overlying the end of said core and having a projection lying in said leg slot, a leaf spring having one end connected to the end of said slot-

ted leg and the other end connected to said armature, an insulated stop carried by the other frame leg, said armature plate having a tongue struck out and engageable with said stop and said spring having an extension bowed to engage said armature projection, a base, an insulating plate between said base and frame, said core having a projection extending through apertures in said base and plate, the projection being spaced from the edge of the base aperture, and insulated means for fastening together said core, frame and base.

12. In a circuit breaker, a U-shaped frame, an electro-magnet core fixed to the bight of said frame, one frame leg having a struck-out portion extending downwardly and then outwardly from the bight of the frame, an insulating plate having an aperture through which said struck-out portion extends, a base, said core having a projection extending through apertures in said base and plate, the projection being spaced from the edge of the base aperture, insulated means for fastening together said core, frame and base, an armature plate overlying the end of said core and having a projection lying in the slot left by said struck-out portion, a leaf spring having one end connected to the end of the slotted leg and the other end connected to said armature, said spring having an extension bowed to engage said armature projection.

13. In a circuit breaker, a U-shaped frame, an electro-magnet core fixed to the bight of said frame, one frame leg having a struck-out portion extending downwardly and then outwardly from the bight of the frame, an insulating plate having an aperture through which said struck-out portion extends, a base, said core having a projection extending through apertures in said base and plate, the projection being spaced from the edge of the base aperture, insulated means for fastening together said core, frame and base, an armature plate overlying the end of said core and having a projection lying in the slot left by said struck-out portion, a leaf spring having one end connected to the end of the slotted leg and the other end connected to said armature, said spring having an extension bowed to engage said armature projection, an insulating plate attached to the other leg and having an aperture, said armature plate having a reduced portion extending through said aperture and a struck-out tongue engageable with the periphery of the aperture.

PETER PIFFATH.