

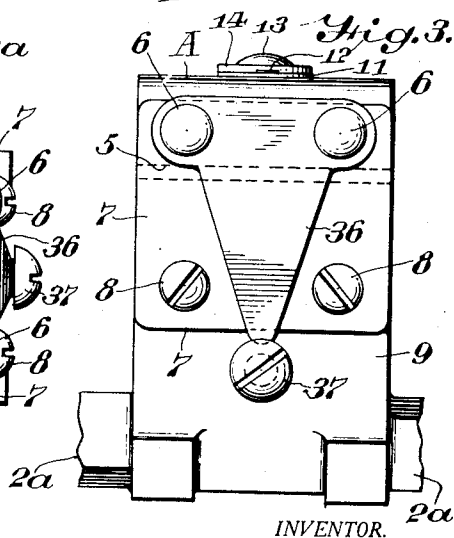
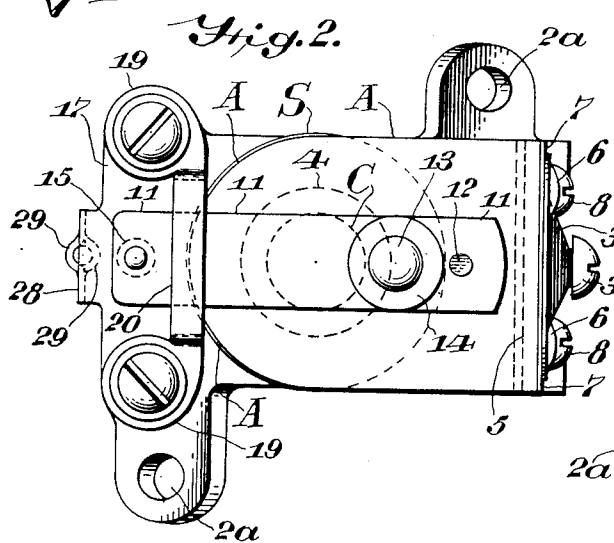
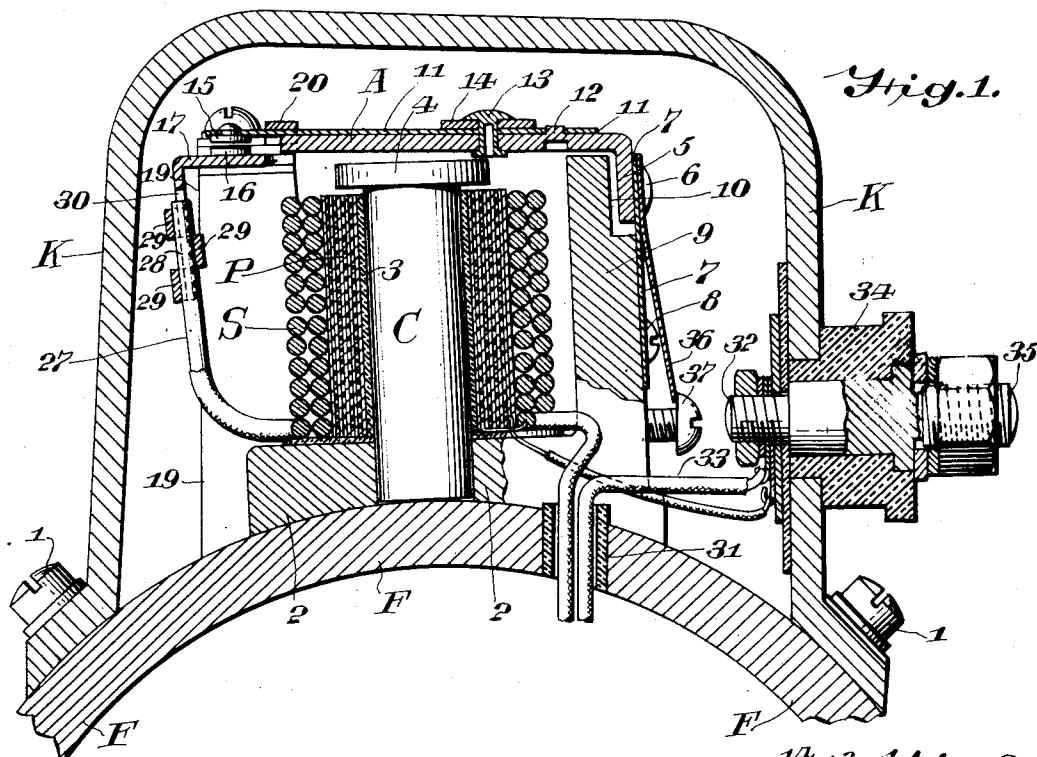
July 6, 1926.

A. A. KENT
ELECTROMAGNETIC SWITCH

Filed July 13, 1921

2 Sheets-Sheet 1

1,591,133



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2 Sheets-Sheet 2

Fig. 4.

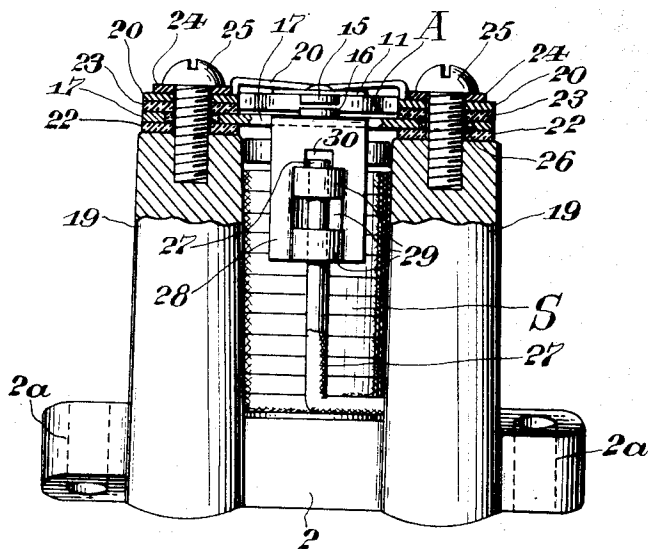


Fig. 5.

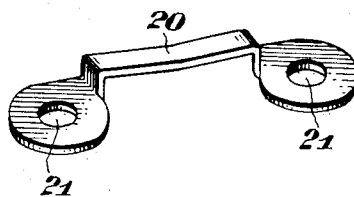


Fig. 6.

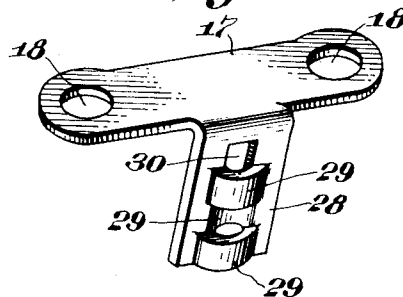
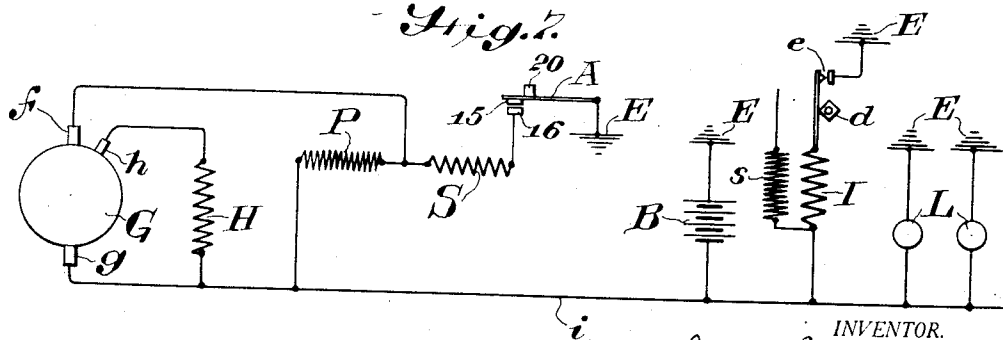


Fig. 7.



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UNITED STATES PATENT OFFICE.

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ELECTROMAGNETIC SWITCH.

Application filed July 13, 1921. Serial No. 484,319.

My invention relates to electro-magnetic switching means, as a cut-out, intervening between a generator and a storage battery, as employed, for example, upon automobiles or other motor vehicles.

My invention resides in features of construction and combination, hereinafter described, yielding simplicity, cheapness, and satisfactory operation.

For an illustration of one of the various forms my invention may take, reference is to be had to the accompanying drawings, in which:—

Fig. 1 is a vertical sectional view, parts in elevation, of my cut-out and associated parts.

Fig. 2 is a top plan view of the cut-out.

Fig. 3 is an end elevational view of the cut-out.

Fig. 4 is an elevational view from the opposite end of the cut-out, on larger scale, and partly in section.

Figs. 5 and 6 are perspective views of elements of the cut-out.

Fig. 7 is a diagrammatic view indicating one of the modes of use of the cut-out.

Referring to the drawings, F is a portion of the cylindrical field yoke of a dynamo-electric generator upon which the cut-out is mounted within the cover or casing K conforming to the cylindrical surface of the yoke F and secured thereto, as by screws 1, 1.

The cut-out comprises the cast iron base 2, in a cylindrical hole in which is snugly fitted the core C of soft iron, or equivalent, as mild steel, etc. Surrounding the core C are the fine wire or shunt coil or winding P and the series or coarse wire winding S. The coil P may be first wound upon the insulating spool 3 and the series winding S wound upon the shunt winding P, the unit thus formed being then placed upon the core C, which latter is then inserted in the base 2.

The core C may be provided with a circular or other suitably shaped head 4 presented to the sheet iron or steel armature A having the heel or extension 5 projecting at right angles and secured by rivets 6 to the leaf spring 7 secured by screws or other suitable fastening means 8 to the cast iron yoke 9 integral with the base 2 and forming therewith and with the core C and armature A the magnetic circuit of the cut-out. The extension 5 is disposed in a notch 10 at the upper end of the yoke 9, the armature A being slightly spaced from the upper end

of the yoke 9 and the extension 5 slightly spaced from the side of the notch 10, whereby a short air gap of relatively great area, and therefore suitably small reluctance, is formed. Overlying the armature A is the contact spring 11 having a hole into which extends the projection 12 shown as of the metal of the armature A displaced laterally or extruded therefrom, and serving with the rivet 13 to prevent the spring 11 from moving laterally with respect to the armature A. The rivet 13 extends through the washer 14, the spring 11 and the armature A, and holds the spring 11 securely to the armature. The spring 11 projects to the left beyond the end of the armature A, Figs. 1 and 2, and carries adjacent its end the tungsten or other suitable contact 15 adapted, upon attraction of the armature A downwardly by the magnet, to engage and make electrical contact with the stationary contact 16, of tungsten or other suitable material, secured to and in electrical communication with the plate 17 extending transversely and having at its ends the holes 18, Fig. 6, registering with the upper ends of the columns 19, 19, upstanding from and integral with the base 2.

The back stop bridge or plate 20, Fig. 5, has at its ends the holes 21, 21, also registering with the upper ends of the columns 19, the plate 20 being disposed above the armature A and spring 11 to limit their upward movement upon deenergization of the magnet. The plate 17 is disposed upon the washers 22, 22, Fig. 4, of insulating material. And upon the upper surface of the plate 17 are disposed washers 23, 23, of insulating material, and upon these rest the ends of the back stop plate 20, upon which in turn are disposed the metal lock washers 24, 24. The holes 18, 21 and the holes in the washers 22, 23 and 24 are aligned, and through them pass the screws 25, 25 threaded into the columns 19, suitable bushings 26, 26 of insulating material being disposed in the holes 18 of the plate 17, whereby the plate 17 is completely insulated from the pillars 19, 19. The plate 17 is in addition insulated from the back stop 20, which latter may be bent downwardly at its center, as indicated in Figs. 4 and 5. One terminal, as 27, of the series coil S, is connected to the plate 17, and therefore the stationary contact 16. A suitable form of connection is provided by the downwardly projecting tongue 28 upon the plate 17, a passage for receiving the wire

27 being formed by expanding or forcing the metal of the tongue into arcuate portions 29. The wire 27 is entered into the passage so formed, which communicates with the opening 30 formed by punching a piece from the tongue 28. The wire 27 when so entered is preferably soldered in place.

The other end of the series winding S has connected thereto one terminal of the shunt winding P, and extends through an insulating bushing 31 in the field yoke F to the interior thereof and connects with one terminal of the generator. The other terminal of the shunt winding P connects with the binding post or stud 32, with which connects also the other terminal of the generator by wire 33 extending through the bushing 31. The stud 32 is suitably insulated from the cover K, as by the member 34 of molded insulating material or the like, and terminates in the external binding post 35.

The contact 15 is grounded through the spring 11 and armature A to the yoke 9, which in turn is grounded upon the field yoke F of the generator, since the base 2 is secured to the yoke F by screws threaded into the yoke F and passing through the lugs 2^a upon the base 2. The yoke F is in electrical communication with the ground or return conductor of the generator-battery system, as is common upon automobiles.

Secured by the rivets 6 to the armature projection 5 is an additional spring 36, which stands off from the spring 7 and whose lower end engages beneath the head of the screw 37 threaded into the yoke 9 for giving to the spring 36 and the armature control as a whole a suitable adjustment and tension.

As illustrative of one of the modes of use of the cut-out structure described, reference may be had to Fig. 7, wherein the generator armature is indicated at G and the shunt field at H, the latter being excited from the third brush *h*, one of the main brushes of the generator, as *g*, connecting with the service lead *i*, while the other generator brush *f* connects to the common terminal of the cut-out windings P and S. The other terminal of the shunt winding P connects to the conductor *i*, while the other terminal of the series winding S connects to the contact 16 and to the ground or return conductor E when the cut-out magnet is energized and the armature A attracted by the core C. The storage battery B is connected between the conductor *i* and the ground or return conductor E, as are also the lamps L and the primary I of an ignition induction coil whose high tension secondary is *s*, the primary circuit being controlled by the interrupter contacts *e* controlled by the usual timer cam *d*.

As usual, when the generator G is started, the shunt winding P alone is excited, and when sufficiently excited, when the generator G develops sufficiently high potential, causes

attraction of the armature A, with resultant engagement of the contact 15 with contact 16, thereby closing the circuit of the generator G through the storage battery B, the series winding S thereafter assisting the shunt winding P in holding the armature A attracted, and the contacts 15 and 16 in engagement with each other, so long as current is flowing from the generator to the battery. If current should flow in opposite direction, as from battery B to the generator G through the series winding S, the latter will oppose the shunt winding P, and the attraction upon the armature A is so greatly diminished that it recedes from the core C, separating the contacts 15 and 16 and so cutting out the battery from communication with the generator G.

When the armature A is attracted, the contact 15 engages contact 16, and upon continued further attraction of the armature A the latter separates somewhat from the spring 11, which latter accordingly causes the contact 15 to slide upon the contact 16, as from right toward the left, Fig. 1, giving a wiping action which keeps the contacts clean.

What I claim is:—

1. In a cut-out, the combination with a core, of a yoke member disposed substantially parallel thereto, an armature extending transversely of the core and having a heel overlapping said yoke member but spaced therefrom, and means for normally yieldingly holding the armature in a predetermined position relatively to said core.

2. In a cut-out, the combination with a core, of a yoke member extending substantially parallel therewith, a sheet metal armature extending transversely of said core and having a transverse projection extending substantially parallel with said yoke member and spaced therefrom, a metal leaf secured flatwise to said projection and to said yoke member and extending across the space between them, and a leaf spring attached to said projection and extending along said yoke member and spaced therefrom, and adjusting means engaging the free end of said leaf spring.

3. In a cut-out, the combination with a core, of an armature co-acting therewith, a leaf spring overlying said armature, a contact carried by said leaf spring, a co-acting stationary contact, a single rivet attaching said leaf spring securely to said armature at a point remote from said first named contact, said leaf spring having an aperture, and means on said armature extending into said aperture for preventing movement of said leaf spring about said rivet.

4. In a cut-out, the combination with a core, of a sheet metal armature, a leaf spring overlying said armature, a contact carried by said leaf spring, a co-acting stationary

of a field frame of a dynamo-electric machine upon which said base member is secured, a core on said base member, a winding on said core, an armature carried by said base member and co-acting with said core, a stationary contact carried by said base member, a co-acting contact carried by said armature, a cup-shaped casing secured to said field frame and enclosing the cut-out structure, and terminal structure carried by said casing and included in the circuit of said winding. 10

In testimony whereof I have hereunto affixed my signature this 30th day of June, 1921.

ARTHUR ATWATER KENT.

contact, a rivet securing said spring to said armature, said spring having an aperture, and an extruded portion of said armature extending into said aperture, said rivet being positioned nearer said contacts than said aperture.

5. In a cut-out, an iron base and an upstanding yoke member integral therewith, a core connected with said base and extending substantially parallel to said yoke member, an armature supported on said yoke member and extending across said core, relatively spaced columns on said base adjacent the free end of said armature, a plate secured to and bridging said columns and insulated therefrom, a stationary contact on said plate, and a co-acting movable contact carried by said armature.

6. In a cut-out, an iron base and an upstanding yoke member integral therewith, a core connected with said base and extending substantially parallel to said yoke member, an armature supported on said yoke member and extending across said core, relatively spaced columns on said base adjacent the free end of said armature, a plate secured to and bridging said columns and insulated therefrom, a stationary contact on said plate, a leaf spring overlying said armature and secured thereto, and a contact carried by said leaf spring and co-acting with said first named contact.

7. In a cut-out, an iron base and an upstanding yoke member integral therewith, a core connected with said base and extending substantially parallel to said yoke member, an armature supported on said yoke member and extending across said core, relatively spaced columns on said base adjacent the free end of said armature, a plate secured to and bridging said columns and insulated therefrom, a stationary contact on said plate, a co-acting contact carried by said armature, and a back stop plate above said first named plate and secured to said columns.

8. In a cut-out, an iron base and an upstanding yoke member integral therewith, a core connected with said base and extending substantially parallel to said yoke member, an armature supported on said yoke member and extending across said core columns on the base adjacent the free end of the armature, a contact plate carried by said columns, a back stop plate carried by said columns, and means common to said plates securing them to said columns.

9. In a cut-out, an iron base and an upstanding yoke member integral therewith, a core connected with said base and extending substantially parallel to said yoke member, an armature supported on said yoke member and extending across said core columns on the base adjacent the free end of the armature, a contact plate carried by said columns,

a back stop plate carried by said columns, means common to said plates securing them to said columns, and means insulating said plates from each other.

10. In a cut-out, a base, a core upstanding therefrom, a shunt winding surrounding said core, a series winding surrounding said shunt winding, an armature extending across said core, a contact carried by said armature, supporting means on said base extending parallel with said core and outside the effective magnetic circuit of the electromagnet, a plate secured on said supporting means, a co-acting contact carried on said supporting means, a downwardly extending tongue on said plate connected to one terminal of said series winding, and a back stop carried by said supporting means.

11. In a cut-out, a base, a core upstanding therefrom, an armature extending transversely of said core, a leaf spring overlying said armature and extending beyond the free end thereof, a contact carried by said spring, relatively spaced columns upstanding from said base, a plate secured to and bridging and insulated from said columns, a co-acting contact thereon, and a back stop plate extending above said spring and secured to said columns.

12. In a cut-out, a core, a yoke member disposed substantially parallel thereto, an armature extending across the ends of said core and yoke member and having a heel extending along said yoke member, and a flexible sheet metal member secured to said heel and yoke for yieldingly supporting said armature.

13. In a cut-out, a core, a yoke member disposed substantially parallel thereto, an armature extending across the ends of said core and yoke member and having a heel extending along said yoke member, said yoke member having a notch in which said heel is disposed, and a flexible sheet metal member secured flatwise to said heel and yoke member for yieldingly supporting said armature.

14. In a cut-out, the combination with a magnetizable base member, of a core thereon, a yoke member upstanding from and integral with said base member, an armature supported in magnetic relation with and upon said yoke member and coacting with said core at its end opposite said base member, a supporting member upstanding from and integral with said base member, said yoke and supporting member being disposed on opposite sides of said core, the free end of said armature being so spaced from said supporting member as to be substantially uninfluenced magnetically thereby, a contact carried by said supporting member, and a co-acting contact carried by said armature.

15. Cut-out structure comprising the combination with a magnetizable base member,