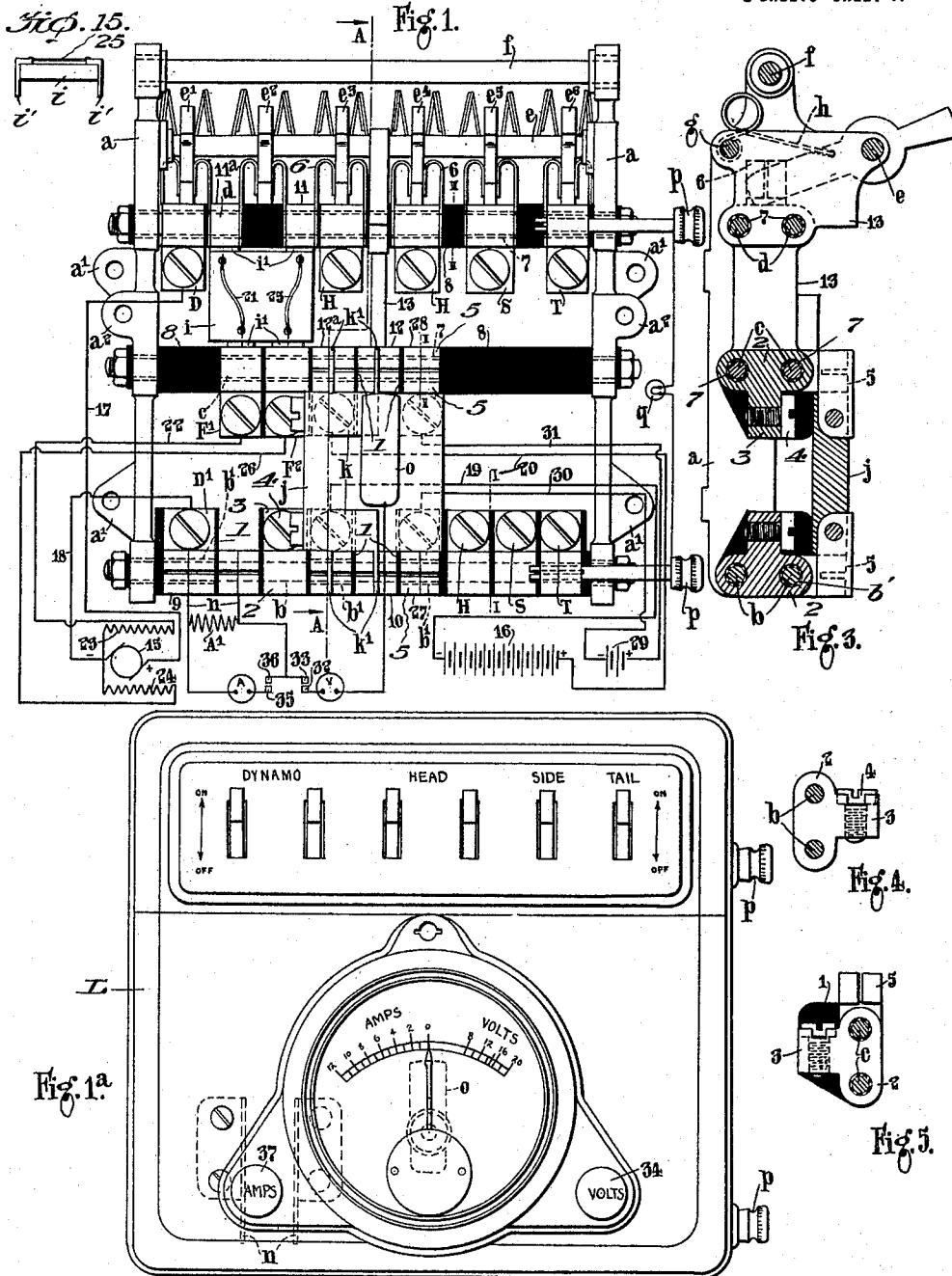


C. A. VANDERVELL & A. H. MIDGLEY.
ELECTRIC SWITCHBOARD.
APPLICATION FILED JUNE 2, 1913.

1,226,031.

Patented May 15, 1917.
2 SHEETS—SHEET 1.



Witness

[Signature]

C. A. Vandervell
A. H. Midgley

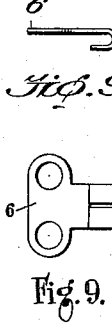
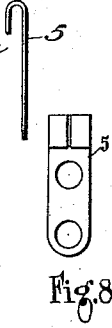
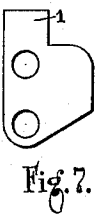
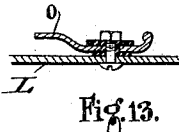
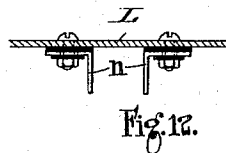
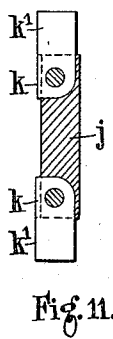
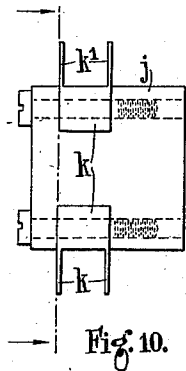
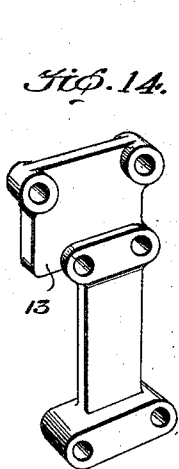
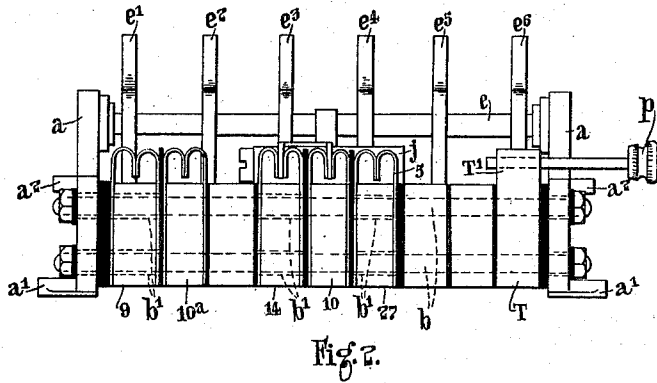
Inventors

by: *[Signature]*
Attorneys

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Witness:
[Signature]
Fig. 7^a

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UNITED STATES PATENT OFFICE.

CHARLES ANTHONY VANDERVELL AND ALBERT HENRY MIDGLEY, OF ACTON VALE,
LONDON, ENGLAND.

ELECTRIC SWITCHBOARD.

1,226,031.

Specification of Letters Patent.

Patented May 15, 1917.

Application filed June 2, 1913. Serial No. 771,257.

To all whom it may concern:

Be it known that we, CHARLES ANTHONY VANDERVELL and ALBERT HENRY MIDGLEY, subjects of the King of Great Britain and Ireland, and residing at Warple Way, Acton Vale, London, W., in the county of Middlesex, England, have invented certain new and useful Improvements in and Relating to Electric Switchboards, of which the following is a specification.

This invention relates to an improved switchboard and more particularly of the kind used in connection with lighting and like electric installations on motor cars and other vehicles.

Switchboards comprising a frame consisting of two end brackets connected together by fixed rods on which switch and terminal contacts are mounted, are broadly known. One feature of the present invention consists in that the switch and terminal contacts are secured on the said rods merely by their being provided with holes by which they are threaded, viz., strung together on the fixed rods connecting the end brackets and through the intermediary of insulating members which are threaded on the fixed rods between said switch and terminal contacts in the same manner as the latter.

Another feature of the invention consists in that the fixing screws of the terminal contacts secured in their position in the manner above referred to, are mounted with their heads accessible from the front side of the switchboard, so that by arranging the rods carrying the contacts sufficiently wide apart from one another, the connections between the wires terminating in the dashboard and the terminal contacts on the rods can easily be effected by passing the ends of the wires into the spaces left between the rods and attaching the same to the terminal contacts by means of the said fixing screws.

The invention also consists in the use of a bridge member, which when placed in one position, it establishes the necessary connection for lighting purposes and when placed in the same position after being inverted, it connects the dynamo to the ignition battery for the purpose of charging the latter.

A further feature of the invention consists in establishing some of the connections within the switchboard by contacts on the lid when the latter is placed in position.

The invention is illustrated by way of example in the accompanying drawings in which:—

Figure 1 is a plan view of a complete open frame of the switchboard showing at the same time the electrical connections with the dynamo and with the lighting and ignition batteries, and

Fig. 1^a is a plan view of the switchboard casing with the lid in its closing position;

Fig. 2 is a front view of the open frame;

Fig. 3 is a cross section along the line A—A of Fig. 1;

Figs. 4 to 6 show different transverse sections along the lines I—I, II—II, and III—III of Fig. 1 respectively;

Fig. 7 is an elevation of an insulating plate;

Fig. 7^a is an edge view of the insulating plate;

Fig. 8 is an elevation of one form of spring contact;

Fig. 8^a is an edge view thereof;

Fig. 9 is an elevation of another form of spring contact;

Fig. 9^a is an edge view thereof.

Figs. 10 and 11 are a plan view and a cross section of the bridge member, respectively;

Fig. 12 is a front view of a contact attached to the inner side of the lid, and

Fig. 13, a sectional view of another contact attached to the lid.

Fig. 14 is a perspective of the bar or frame member 13;

Fig. 15 is an end view of the fuse member *i*.

The frame of the switchboard comprises two metal end brackets *a a* provided with lugs *a*¹ by which the whole frame is secured to the dashboard and with lugs *a*² by which the same is mounted and secured to the switchboard casing said brackets *a a* being connected together by means of three pairs of metal rods *b, b, c, c,* and *d, d* arranged at suitable distances from one another and carrying the various contacts and insulating members hereinafter more particularly referred to, by a rod *e* carrying switch levers, *e*¹, *e*², *e*³, *e*⁴, *e*⁵, *e*⁶, by a rod *f* acting as an abutment for the switch levers when the latter are in their "off" positions and by a rod *g* arranged underneath the rod *e* and carry-

ing springs h controlling the switch levers, all the rods, $b c d e f g$ being insulated from the end brackets of the frame.

The following are the contacts and insulating members which are mounted on the pairs of rods $b b$, $c c$, and $d d$, all of which contacts and insulating members are provided with double holes for the purpose of being threaded on the various pairs of rods:—(1) rigid terminal contact members 2 provided with a lug 3 carrying the terminal screw 4 (see Fig. 4); (2) rigid contact members similar to 2 without the lugs 3 and terminal screws 4 (those arranged at 10, 10^a, 11, 11^a and 12 in Fig. 1); (3) spring contacts 5 of the shape shown in Figs. 2, 8, and 8^a, threaded on the rods $b b$ and $c c$ so as to abut with their sides against the sides of some of the rigid terminal contact members and rigid contact members and used in conjunction with contacts provided on the bridge member and on the lid of the switchboard as hereinafter referred to; (4) spring contacts 6 of the shape shown in Figs. 1, 3, 9 and 9^a, threaded on the rods $d d$ so as to abut with their sides against the sides of some of the rigid contacts and used in conjunction with the switch levers e^1 , e^2 , . . . e^6 ;—(5) insulating plates 1 of the shape shown in Figs. 1 and 7, and (6) insulating members 8 of smaller or greater lengths of the shape shown in Figs. 1, and 6, some of which, viz., those of greater length, are used at the same time as insulating distance pieces.

The various members threaded on the rods $c c$ and $d d$ are mounted thereon through the intermediary of insulating tubes 7, arranged to surround the said rods individually from one end bracket to the other end bracket a , while those threaded on the rods $b b$ are mounted directly thereon, so that the contacts are in metallic contact therewith with exception of the contacts 9, 14 and 27 which are insulated from said rods by short insulating tubes b^1 (Figs. 1, 2 and 3).

The rigid contact provided at 12 on the rods c is made integral with a bar 13 provided with holes by which it is threaded on the rods d , e and g being insulated from the rods b by the tubes 7 but being in metallic contact with the rods e and g (Fig. 3).

i is a detachable fuse carrying member (Figs. 1 and 15) adapted to be inserted in the spaces between the rods $c c$ and $d d$ where indicated, the fuse 21 electrically connecting the rigid contact 11^a with the rigid terminal contact F^1 and the fuse 25, the rigid contact 11 with the terminal contact F^2 through the intermediary of suitable spring contacts i^1 provided on the fuse member. The fuse carrier consists of a plate i of insulating material to which are

secured contact pieces i^1 , the ends of which are turned down and adapted to fit against the flat faces of the rigid contact members F^1 , F^2 11^a and 11. The fuse wires 21 and 25 are connected to the contact members i^1 in any suitable way.

j is a detachable bridge member of insulating material provided with two suitable contacts k (Figs. 1, 10 and 11) adapted to engage by means of lugs k^1 k^1 between certain of the spring contacts threaded on the rods $b b$ and $c c$ for the purpose of establishing the connection between the dynamo 15 and the lighting battery 16, or between the dynamo and the ignition battery 29, in order to charge the latter. When the bridge member j is in the position shown in Fig. 1, the lugs k^1 k^1 of the upper contact k engage with the spring contacts abutting against the rigid contacts placed at 12, 12^a respectively, and the lugs k^1 k^1 of the lower contact k with the spring contacts abutting against the rigid contacts placed at 10 and 14 respectively, a circuit being thereby established, by which the dynamo 15 is connected to the lighting battery. However, when the bridge member is inverted before being placed in the position shown in Fig. 1, the positions of the contacts k are also inverted and the contacts are at the same time caused to establish different connections from those established when the bridge member is not inverted. With the bridge member in its inverted position the lugs k^1 of one of the contacts k establish a connection between the spring contacts abutting against the rigid contacts placed at 12 and 28 and the lugs k^1 of the other contact k form a connection between the spring contacts abutting against the rigid contacts placed at 10 and 27, the circuit now established being such that the dynamo is connected to the ignition battery 29.

$n n$ are contacts secured in an insulated manner to the inner side of the lid and adapted to connect, through the intermediary of the ammeter shunt A^1 to the ends of which they are respectively connected, the two first left hand rigid contacts mounted on the rods $b b$ at 9 and 10^a by engaging, when the lid is in its closing position, with the pairs of spring contacts abutting against said two rigid contacts (Figs. 1, 1^a, and 12).

o is a spring contact secured in an insulated manner to the inner side of the lid (Figs. 1^a and 13) and adapted to make contact with the upper contact member k on the bridge member j . The contact o is connected to one end of the voltmeter (Fig. 1), the other end of the latter being connected to a contact 32 adapted to be brought into contact with a contact 33 by a push button 34 (Fig. 1^a) in order to insert the volt-

meter into the circuit. The ammeter is inserted into the circuit by means of a push button 37 (Fig. 1^a) which presses a contact 35 connected to one end of the ammeter into contact with a contact 36, the contacts 33 and 36 being permanently connected together and with one of the contacts n on the lid. Although the cover is omitted in Fig. 1, the contact o which is actually carried by the cover is shown in position so that the circuit connections which it effects can be easily understood.

Referring to Fig. 1 and assuming the two left hand rigid contacts 9 and 10^a on the rods b to be connected together by the contacts n on the lid of the switchboard as above referred to, it will be seen that when the bridge member j is placed in such a position as to connect the rigid contact 12 with the rigid terminal contact 12^a and the rigid contact 10 with the rigid terminal contact 14, and the first left hand switch lever e^1 is moved into its "on" position, the dynamo 15 is then connected to the lighting battery 16, the circuit being as follows:—contact terminal D, lead 17, dynamo 15, lead 18, contact terminal D¹, left hand contact n on the lid, ammeter shunt A¹, right hand contact n , rigid contact 10^a, rod b with which the rigid contact 10^a is in metallic contact, contact 10, with which the rod b is also in metallic contact, lower contact k on the bridge member j , contact 14, lead 19, lighting battery 16, lead 20, contact 12^a, upper contact k on the bridge member j , contact 12, bar 13, rod e , switch lever e^1 and contact terminal D. At the same time a circuit is closed through the contact member 11^a, fuse 21, contact member F¹, lead 22, field winding 23, dynamo 15, lead 17, contact D and switch lever e^1 . If in addition to the switch lever e^1 , the switch lever e^2 is placed in the "on" position, the second field winding 24 is then inserted into the circuit, the circuit of the second field winding being closed through the contact member 11, fuse 25, contact F² and lead 26. In order to connect the ignition battery 29 to the dynamo for charging purposes, the bridge member carrying the contact k is inverted, whereby the contact 10 is connected with the contact 27 and the contact 12 with the contact 28, the dynamo being thus connected to the ignition battery through the leads 30 and 31 as can easily be followed on the drawing. The head side and tail lamps are connected to the contact terminals marked H S and T respectively.

The diagram of connections also shows that if the switch lever e^3 is moved into its "on" position in order to insert one of the head lights in the circuit, the switch lever automatically closes the circuit of the second field winding 24 even when the switch lever e^2 is in its "off" position, the object of such an arrangement being to insure that the

dynamo shall give its full output when the head lights are on.

The tail lamps contact terminals T on the rods b and d are preferably provided with lugs T¹ (Fig. 2) adapted to receive, when the casing has been placed into its position, contact plugs p , connected together through a dash-lamp q (Fig. 1), which closes the circuit through the tail lamps, and thus indicates when the latter are "on" and when they are "off."

Having now described our invention, what we claim as new and desire to secure by Letters Patent is:—

1. An improved switchboard more particularly for use in connection with lighting and like electric installations on motor-cars and other vehicles, comprising in combination with two end brackets and a plurality of fixed rods arranged between said end brackets and secured thereto, a plurality of fixed contacts provided with holes by which they are strung together and supported on said fixed rods and a plurality of insulating members provided with holes by which they are strung together on the fixed rods between the fixed contacts, as set forth.

2. An improved switchboard more particularly for use in connection with lighting and like electric installations on motor-cars and other vehicles, comprising in combination with two end brackets and a plurality of fixed rods arranged between said end brackets and secured thereto, a plurality of fixed terminal contacts provided with holes by which they are strung together on said fixed rods and with fixing screws arranged with their heads toward the front of the switchboard, and a plurality of insulating members provided with holes by which they are strung together on the fixed rods between the fixed contacts, as and for the purpose set forth.

3. An improved switchboard more particularly for use in connection with lighting and like electric installations on motor-cars and other vehicles, comprising in combination with two end brackets and a plurality of fixed rods arranged between said end brackets and secured thereto, a plurality of fixed rigid terminal contacts and a plurality of fixed spring contacts, said fixed rigid terminal contacts and fixed spring contacts being provided with holes by which they are strung together on said fixed rods and the sides of the terminal contacts abutting against the sides of the spring contacts, and a plurality of insulating members provided with holes by which they are strung together on the fixed rods between the said rigid terminal contacts and spring contacts, as and for the purpose set forth.

4. An improved switchboard more particularly for use in connection with lighting

and like electric installations on motor-cars and other vehicles, comprising in combination with two end brackets and a plurality of fixed rods arranged between said end
 5 brackets and secured thereto, a plurality of fixed rigid terminal contacts and a plurality of fixed spring contacts, the fixed rigid terminal contacts and the fixed spring con-
 10 tacts being provided with holes by which they are strung together on said fixed rods, a plurality of insulating members provided with holes by which they are strung to-
 15 gether on the fixed rods between the said rigid terminal contacts and spring con- tacts and a removable bridge member ar-
 20 ranged between two of the rods and provided with contacts engaging with some of the spring contacts, as and for the purpose set forth.

5. An improved switchboard more particularly for use in connection with light-
 20 ing and like electric installations on motor-cars and other vehicles comprising in combination with two end brackets and a plu-
 25 rality of fixed rods arranged between said end brackets and secured thereto, a plurality of fixed rigid terminal contacts and a plurality of fixed spring contacts, said
 30 fixed rigid terminal contacts and fixed spring contacts being provided with holes by which they are strung together on the fixed rods, a removable bridge member ar-
 35 ranged between two of the rods and provided with contacts engaging with some of

the spring contacts, and a switchboard lid 35 provided with a suitable contact, whereby when the lid is placed in position, the contacts thereon close certain circuits by coming into contact with certain of the contacts
 40 carried by the rods and by the bridge member, as and for the purpose set forth.

6. An improved switchboard more particularly for use in connection with light-
 45 ing and like electric installations on motor-cars and other vehicles comprising in combination two end brackets, a plurality of rods arranged between and connected to
 50 said end brackets, rigid terminal contacts and spring contacts threaded on said rods, a bridge member arranged between two of the rods and provided with contacts engag-
 55 ing with some of the spring contacts and a switchboard lid provided with suitable contacts, whereby when the lid is placed in position the contacts thereon close certain cir-
 60 cuits by coming into contact with certain of the contacts carried by the rods and by the bridge members, as and for the purpose set forth.

In testimony whereof we have signed our 60 names to this specification in the presence of two subscribing witnesses.

CHARLES ANTHONY VANDERVELL.
 ALBERT HENRY MIDGLEY.

Witnesses:

BERTRAM H. MATTHEWS,
 JOHN HETTINGER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."