May 6, 1930. J. SACHS 1,757,744

ELECTRIC METER SERVICE APPLIANCE

Filed Jan. 11, 1928

Fig. 1

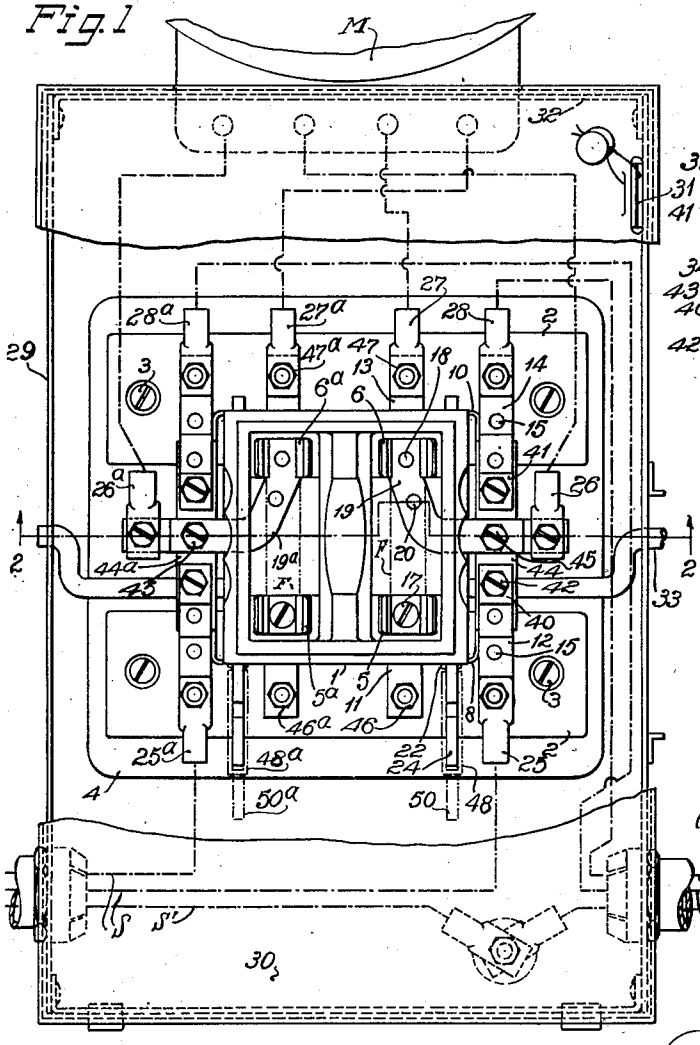


Fig. 3

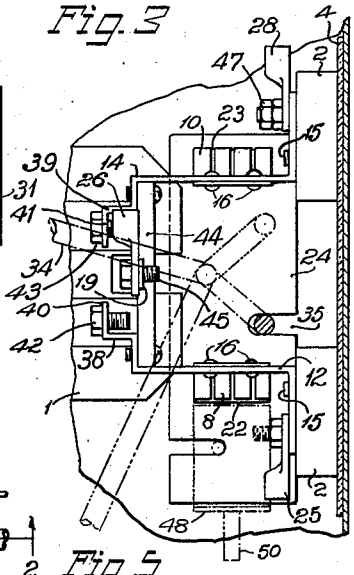


Fig. 5

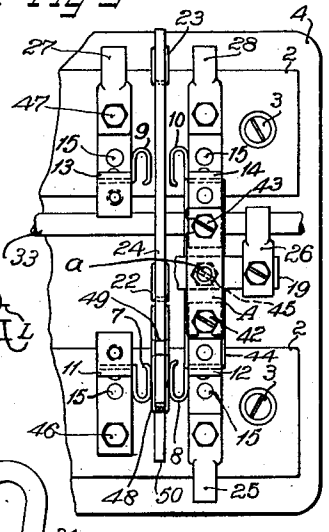


Fig. 2

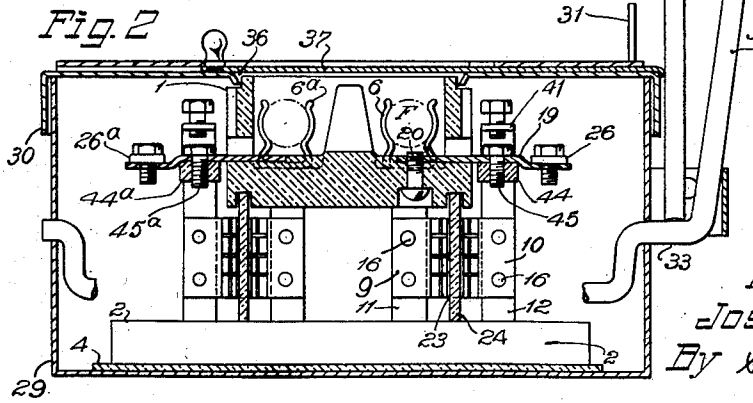
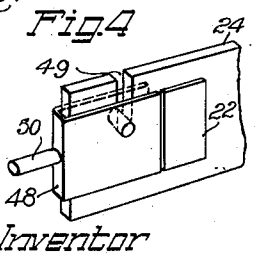


Fig. 4



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Patented May 6, 1930 1,757,744

UNITED STATES PATENT OFFICE

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ELECTRIC-METER SERVICE APPLIANCE

Application filed January 11, 1928. Serial No. 246,013.

The invention relates generally to electric switches or circuit controlling appliances. One of the objects of the invention is to provide an electric switch or circuit controlling appliance having a movable switching member cooperating with two stationary switch contacts and also having means associable with the switching member and adapted at the option of the user to either permit or prevent the breaking of the electrical connection between the stationary contacts when the switching member is moved to the position which is normally the "off" position.

The invention is applicable to a meter service fused switch appliance which is used not only for normal service purposes but also for facilitating the testing of the meter and which is constructed and connected to normally break the circuit ahead of the meter. While not necessarily so limited the invention is particularly applicable to an appliance which as concerns its electrical connections is similar to the construction disclosed in my copending application for electric meter service appliances, Serial No. 188,793 filed May 4, 1927 and which as concerns its mechanical features is similar to the constructions disclosed in my patents for electric circuit controlling appliances No. 1,754,443 and No. 1,754,445 both issued April 15, 1930, and in my copending application for electric circuit controlling appliances Serial No. 218,279 filed Sept. 8, 1927 and for electric meter service appliances Serial No. 220,807 filed Sept. 20, 1927. Such a meter service appliance is so constructed and connected that for normal switching purposes the circuit is broken not only before the meter but also after the meter. Thus the circuit is broken at at least two places and in addition the meter coil terminals are left electrically free so that, if desired, meter testing can be effected in any usual or desired way without any further manipulation of the switch. For some methods of testing, however, it is necessary to maintain a connection between the service wires and the meter and in my said application 220,807 I have shown for this purpose links manually connectible independently of the operation of the switch. One of the objects of the present invention is to provide improved means directly associated with the movable switching member for connecting or by-passing the switch contacts when said switching member is moved to the position which is normally the "off" position.

Further objects of the invention will be apparent from the following specification and claims.

In the accompanying drawings I have shown an embodiment of the invention which I now deem preferable but it will be understood that the drawings are intended for illustrative purposes only and are not to be construed as defining or limiting the scope of the invention, the claims forming a part of this specification being relied upon for that purpose.

Of the drawings:

Fig. 1 is a front view of an appliance embodying the invention, a portion of the front cover of the appliance being broken away to show interior parts.

Fig. 2 is a transverse sectional view taken along the line 2—2 of Fig. 1.

Fig. 3 is a fragmentary side view of some of the parts shown in Fig. 1.

Fig. 4 is a fragmentary perspective view showing a part of one switching member together with the auxiliary switch contact to which the invention particularly relates.

Fig. 5 is a fragmentary front view with the fuse base omitted and with the auxiliary contact in place, the switching member being in the "off" position.

While the invention is not necessarily so limited I have illustrated and will describe a meter service appliance of the type disclosed in the aforesaid copending applications. Such an appliance preferably includes a fused switch unit and a casing or cabinet for enclosing the said unit. I have shown a two pole fused switch unit but I do not necessarily so limit myself. It will be understood that the parts constituting the fuse and switch devices at the respective sides of the unit are or may be similar in construction except for reversal of positions. For the sake of brevity I will confine the description so far as possible to the parts at one side.

As illustrated the fused switch unit of the appliance includes an insulating base 1 mounted in fixed spaced relationship with a rear supporting wall which may be the rear wall of the enclosing cabinet. The fused switch unit also includes a second insulating supporting device secured directly to the said supporting wall. This supporting device may comprise two separate bars or members 2, 2 spaced apart and secured to the rear wall of the cabinet by screws 3, 3. A sheet 4 of insulating material may be interposed between the members 2, 2 and the supporting wall. The several conducting parts of the fused switch unit are connected with the said insulating members 1 and 2, 2.

The fuse contacts are represented at 5 and 6, these being carried directly by the base 1 ordinarily at the front thereof. I have shown contacts for receiving a fuse F of the cartridge enclosed type, but I do not necessarily so limit myself. Located at least in part in the space behind the plane of the rear face of the base 1 are two switching devices which may be variously constructed as concerns certain of the broader phases of the invention. Preferably, however, each of these switch devices comprises two opposed stationary switch contacts and a rectilinearly movable switching means which includes a contact adapted to engage or disengage both of the stationary contacts to make or break the electrical connections between them. The preferred construction as shown is similar to the constructions disclosed in my said patents.

The opposed stationary contacts for one switch device are represented at 7 and 8 and the stationary switch contacts for the other switch device are indicated at 9 and 10. The several stationary switch contacts are carried by supporting elements 11, 12, 13 and 14 which project forward from the supporting devices 2, 2, being secured thereto by screws 15, 15. Each of the switch contacts is preferably of a general U-shape and is provided with a laterally extending flange engaging the corresponding supporting element. Screws or rivets 16, 16 extend through the flanges and into the supporting elements to hold the contacting portions in place.

The supporting element 11 is extended upward to a position directly back of the fuse contact 5 and a screw 17 extends through the fuse contact and through the base 1 into the said supporting element 11. Thus the screw 17 serves to establish an electrical connection between the said fuse contact and the supporting element 11 which in turn is electrically connected with the switch contact 7 and at the same time the screw 17 serves to hold the fuse contact 5 in place. In addition the said screw and the supporting element 11 serve as one of the means for holding the base in normally fixed relationship with the supporting device 2, 2.

The remaining fuse contact 6 is held in place on the base 1 by a screw 18 which also retains a conducting member 19 engaging the said contact. The said member 19 extends from the fuse contact to a point adjacent or beyond one edge of the base. Preferably the said member 19 is in the form of a strap which extends downward and laterally from the fuse contact terminating near one side of the base. An additional screw 20 may be provided for more firmly holding the strap 19 in place.

For making and breaking electrical connection between the stationary switch contacts of the two pairs there are provided two rectilinearly movable switch contacts which are preferably carried by a single flat insulating element as described in detail in my aforesaid Patent No. 1,754,443. The two movable switch contacts are shown at 22 and 23 respectively and the flat insulating element is shown at 24, the said insulating element with the movable switch contacts thereon constituting a switching member. The switching member is guided at the front by the base 1 and at the rear by the supporting device 2, 2. It will be understood that when the switching member is moved the two contacts 22 and 23 are moved to simultaneously engage and disengage the respective pairs of switch contacts 7, 8 and 9, 10 and thus make and break the electrical connection through the switching devices. It will be further understood that to break the circuit each of the switching members is moved in the upward direction from the position shown in Figs. 1 to 3 to the position shown in Fig. 5.

Connected respectively with the supporting element 12, with the end of the strap 19 and with the supporting elements 13 and 14 are wire connecting terminals 25, 26, 27 and 28. It will be obvious that the said terminals 25, 26, 27 and 28 are electrically connected respectively with the switch contact 8, the fuse contact 6, the switch contact 9 and the switch contact 10.

The description thus far has been chiefly confined to the fuse and switch parts at the right hand side of the fused switch unit. The parts at the left hand side are ordinarily similar except for reversal of positions and repetition of the detailed description is unnecessary. The fuse contacts are designated by 5^a and 6^a, and the wire terminals corresponding to the terminals 25, 26, 27 and 28 are designated respectively by 25^a, 26^a, 27^a and 28^a. Other parts at the left are similarly marked.

For enclosing the fused switch device there is preferably provided a cabinet 29 provided with a pivoted front cover 30 which is hinged to one wall as for instance the bottom end wall. The cover may be locked in closed position by means of a latch 31 and if desired a seal may be inserted through the latch in the usual way.

When a meter such as M is to be used the upper end wall 32 of the cabinet preferably has an opening therein of such size and shape as to substantially fit the terminal chamber portion of the meter, the said terminal chamber portion projecting for a short distance into the cabinet and substantially closing the said opening.

There is provided a switch operating spindle 33 which extends through bearing apertures in the side walls of the cabinet and which includes an operating handle 34 on the exterior of the cabinet. Within the cabinet the operating spindle 33 is provided with a cranked portion which extends through slots 35 formed in the respective insulating elements of the movable switching members. The one operating spindle 33 serves to operate both switching members to make and break the respective circuit connections substantially simultaneously.

The cover 30 of the cabinet has an opening 36 through which the fuse contacts and the fuses are accessible when the cover is closed, the cover nevertheless keeping the switching devices and other parts inaccessible. An auxiliary cover 37 is provided normally closing the opening 36 in the cover 30 and protecting the fuses. Provision is preferably made for interlocking the auxiliary cover 37 with the handle 34, but this feature need not be described in detail as it does not of itself constitute any part of the present invention, being set forth in my patents for enclosed fused switches, Nos. 1,721,493, 1,721,494 and 1,721,495 all issued July 16, 1929.

An appliance of the type illustrated is particularly adapted, when associated with a meter as shown, to provide an electrical sequence of service wire—switch—meter—fuse—switch—load wire or an electrical sequence of service wire—switch—fuse—meter—switch—load wire, all as fully described in my said copending application Serial No. 188,793. In Fig. 1 I have designated by dot-and-dash lines one arrangement of wiring connections which may be provided. The service wires designated S are connected respectively with the terminals 25 and 25^a, and the third wire S′ may extend across the cabinet without direct connection with the fused switch unit. One coil of the meter is connected between the terminals 26 and 27 and the other coil of the meter is connected between the terminals 26^a and 27^a. The load wires L are connected respectively with the terminals 28 and 28^a. It will be observed that with this construction I provide an electrical sequence of service wire—switch—fuse—meter—switch—load wire. By making other connections as set forth in the copending applications Serial Nos. 188,793, 218,279, and 220,807 I may provide an electrical sequence of service wire—switch—meter—fuse—switch—load wire. With the switching members in their "on" positions as shown in Figs. 1 to 3 the meter is connected in the circuit as above described. When the switching members are moved to their "off" positions as shown in Fig. 5 the circuit is broken at both sides of the meter which is thus disconnected from both service and load wires.

I preferably provide by-pass means for directly connecting the respective service wires with the corresponding load wires independently of the switch contacts and independently of the meter. To this end the respective service and load terminals at the two sides of the appliance are so arranged as to be substantially in vertical alignment with each other, that is, the terminal 25 is in alignment with the terminal 28 and the terminal 25^a is in alignment with the terminal 28^a. I further provide an association with the said service and load terminals devices or contacts adapted for the convenient attachment or holding of by-pass links.

Referring particularly to the construction at the right hand side it will be observed that the two supporting elements 12 and 14 are provided respectively with upward extensions 38 and 39. These extensions terminate in flanges 40 and 41 which extend respectively upward and downward toward each other and in alignment with each other. These flanges 40 and 41 are provided with means adapted for the clamping thereto of a conducting by-pass link and as shown these clamping means consist of cap screws 42 and 43 threaded into the respective flanges.

In Fig. 5 I have shown one of the switching members in its "off" position and at the corresponding side I have shown a link A secured to the clamping means or connecting elements at the side of the appliance. In this view the fuse base is omitted solely for the sake of clearness, but it will be understood that the said base is not to be removed when the by-pass links are in use. The link A is provided with two slots for receiving the corresponding screws 42 and 43, the screws being then turned to firmly clamp the link in place. The link preferably has a handle *a* of insulating material by means of which it may be conveniently put in place or removed. It will be understood that a similar link is provided at the other side and that with both in place the service terminals 25 and 25^a are directly connected respectively with the load terminals 28 and 28^a.

Preferably the two extensions 38 and 39 at each side are mechanically connected together by an insulating means such as a strut 44. The struts 44, 44^a serve to reinforce the extensions on the supporting elements and also serve to assist in supporting the base 1. For this purpose screws 45, 45^a are provided which extend through the straps 19, 19^a and enter threaded holes in the struts.

With the switch members in their "off" positions the circuit is broken at both sides of the meter and the terminals of the meter coils are entirely freed from both the service and the load wires. The meter is then ready for testing in any usual or preferred way.

In order to facilitate the connection of instrument leads for the testing of the meter I provide suitable test contacts. The test contacts may be variously constructed but as illustrated I use for this purpose certain of the aforesaid screws 15 which hold the switch contacts in place. Screws connected respectively with the contacts 7, 7ª and 9, 9ª are made longer than would otherwise be necessary and they are provided respectively with additional nuts 46, 46ª and 47, 47ª. These nuts serve for clamping the terminals of testing instrument leads which may thus be electrically connected with the respective meter terminals. It will be observed that the arrangement is such that the fuses are in the meter testing circuit.

In accordance with the invention I provide in association with at least one of the switching members and with one of the corresponding pairs of stationary switch contacts means adapted at the option of the user to either permit or prevent the breaking of the electrical connection between the said contacts upon movement of the switching member to the position which is normally the "off" position, and it will be understood that as concerns the broader aspects of the invention I do not limit myself to a switch of the type shown and described. The means above referred to may vary as to details but preferably it comprises an auxiliary contact relatively movably connectible with the switching member and ordinarily so connected as to be freely detachable. This auxiliary contact is so formed that upon being connected with the switching member it moves into engagement with or between the stationary contacts when the switching member is moved to disengage the normally operable contact from the said stationary contacts.

With a switch of the type shown and described I preferably provide an auxiliary contact 48 which is constructed to have a contact surface at both sides of the switching member. Preferably it comprises two connected plate sections. The insulating element 24 of the switching member is shown as being provided with a transverse slot 49 and the contact 48 includes suitable rivets or other connectors which are adapted to extend through the slot and thus connect the two plate sections and hold the contact in place. The contact may be provided with a handle 50 of insulating material which may be used to put it in place and remove it. An inspection of Fig. 5 shows that when the switching member is moved to disengage the movable contact 22 from the stationary contacts 7 and 8 the said auxiliary contact 48 is moved between the said stationary contacts so as to establish an electrical connection between them. Preferably and as shown, the auxiliary contact 48 is located immediately adjacent the main contact 22 so that there is no interruption of the circuit as the contact moves out of engagement and as the contact 48 moves into engagement. It will be obvious that without the auxiliary contact 48 the circuit between the stationary contacts 7 and 8 is broken by the upward movement of the switch member and it will also be obvious that with the auxiliary contact 48 in place the circuit between the said contacts 7 and 8 is not broken upon the upward movement of the switch member.

For some methods of meter testing it is necessary to have the meter coils in electrical connection with the service wires but out of electrical connection with the load wires. In accordance with the present invention I am able to conveniently provide for establishing electrical connections between the service wires and the meter notwithstanding the fact that the switching members are in their "off" positions to normally break the connections between the service wires and the meters. With the two auxiliary contacts 48 and 48ª in place on the switch member as shown by dot-and-dash lines in Figs. 1 and 3 and as shown by full lines in Figs. 4 and 5 the switch can be operated as described without breaking the circuit at the service side. The circuit is, however, broken at the load side so that the meter is disconnected from the load. It will be obvious that by means of the readily attachable and detachable auxiliary contacts the meter tester can provide as desired either for the breaking of the circuit at the service side of the meter or for the maintenance thereof upon the operation of the switch mechanism.

What I claim is :

1. In an electric switch, the combination of a pair of stationary switch contacts, a movable switching member including a contact adapted to engage or disengage the said stationary contacts to normally make or break electrical connection between them, and means associable with the movable switching member and adapted at the option of the user to either permit or prevent the breaking of the electrical connection between the said stationary contacts upon movement of the switching member to a position corresponding to a disengaged position of the first said movable contact.

2. In an electric switch, the combination of a pair of stationary switch contacts, a movable switching member including a contact adapted to engage or disengage the said stationary contacts to normally make or break

electrical connection between them, and an auxiliary contact relatively movably connectible with the switching member and when in one position thereon serving to make electrical connection between the stationary contacts when the switching member is moved to a position corresponding to a disengaged position of the first said movable contact.

3. In an electric switch, the combination of a pair of stationary switch contacts, a movable switching member including a contact adapted to engage or disengage the said stationary contacts to normally make or break electrical connection between them, and an auxiliary contact detachably connectible with the switching member and upon being so connected serving to make electrical connection between the stationary contacts when the switching member is moved to a position corresponding to a disengaged position of the first said movable contact.

4. In an electric switch, the combination of two opposed stationary switch contacts, a switching member movable between the said contacts and including a contact adapted to engage or disengage the said stationary contacts to normally make or break electrical connection between them, and an auxiliary contact relatively movably connectible with the switching member and when in one position thereon moving between the opposed stationary contacts to electrically connect them upon movement of the switching member to a position corresponding to a disengaged position of the first said movable contact.

5. In an electric switch, the combination of a pair of opposed stationary switch contacts, a switching member movable between the said contacts and including an insulating element and a contact, the said contact being adapted upon movement of the member to engage or disengage the said stationary contacts to normally make or break electrical connection between them, and an auxiliary contact detachably connectible with the insulating element of the switching member independently of the first said contact, the said auxiliary contact upon being so connected moving between the opposed stationary contacts to electrically connect them when the switching member is moved to a position corresponding to a disengaged position of the first said movable contact.

6. In an electric switch, the combination of a pair of opposed stationary switch contacts, a switching member movable between the said contacts and including a flat insulating element and a contact, the said insulating element having a transverse slot adjacent the contact and the said contact being adapted upon movement of the member to engage or disengage the said stationary contacts to normally make or break electrical connection between them, and an auxiliary contact having a portion adapted to enter the slot in the insulating element of the switching member to be thereby detachably connected with the said element, the said auxiliary contact upon being so connected moving between the opposed stationary contacts to electrically connect them when the switching member is moved to a position corresponding to a disengaged position of the first said movable contact.

7. In an electric meter service switch, the combination of two pairs of stationary switch contacts, terminals adapted for the connection of an electric meter in series with the said pairs of contacts and between them, a movable switching member including two spaced contacts adapted to substantially simultaneously engage or disengage the said stationary contacts of the respective pairs to make or break electrical connection at the service side and at the load side of the meter, and means associable with the movable switching member and adapted at the option of the user to either permit or prevent the breaking of the electrical connection between the stationary contacts at the service side of the meter upon movement of the switching member to a position corresponding to disengaged positions of the first said contacts.

8. In an electric meter service switch, the combination of two pairs of stationary switch contacts, terminals adapted for the connection of an electric meter in series with the said pairs of contacts and between them, a movable switching member including two spaced contacts adapted to engage or disengage the said stationary contacts of the respective pairs to substantially simultaneously make or break electrical connection at the service side and at the load side of the meter, and an auxiliary contact detachably connectible with the switching member and upon being so connected serving to make electrical connection between the stationary contacts at the service side of the meter when the switching member is moved to a position corresponding to disengaged positions of the first said contacts.

9. In an electric meter service switch, the combination of two pairs of opposed stationary switch contacts, terminals adapted for the connection of an electric meter in series with the said pairs of contacts and between them, a switching member movable between the said stationary contacts and including two spaced contacts adapted to substantially simultaneously engage or disengage the said stationary contacts of the respective pairs to make or break electrical connection at the service side and at the load side of the meter, and an auxiliary contact detachably connectible with the switching member and upon being so connected serving to make electrical connection between the stationary contacts at the service side of the meter when the switching member is moved to a position cor-

responding to disengaged positions of the first said contacts.

10. In an electric meter service switch, the combination of two pairs of opposed stationary switch contacts, terminals adapted for the connection of an electric meter in series with the said pairs of contacts and between them, a switching member movable between the said stationary contacts and including an insulating element and two spaced contacts carried by the insulating element and adapted to substantially simultaneously engage or disengage the said stationary contacts of the respective pairs to make or break electrical connection at the service side and at the load side of the meter, and an auxiliary contact detachably connectible with the insulating element of the switching member closely adjacent the service side contact thereof and upon being so connected serving to uninterruptedly maintain electrical connection between the stationary contacts at the service side of the meter when the switching member is moved to a position corresponding to disengaged positions of the first said contacts.

In testimony whereof I have hereunto set my hand this 31st day of December, 1927.

JOSEPH SACHS.