

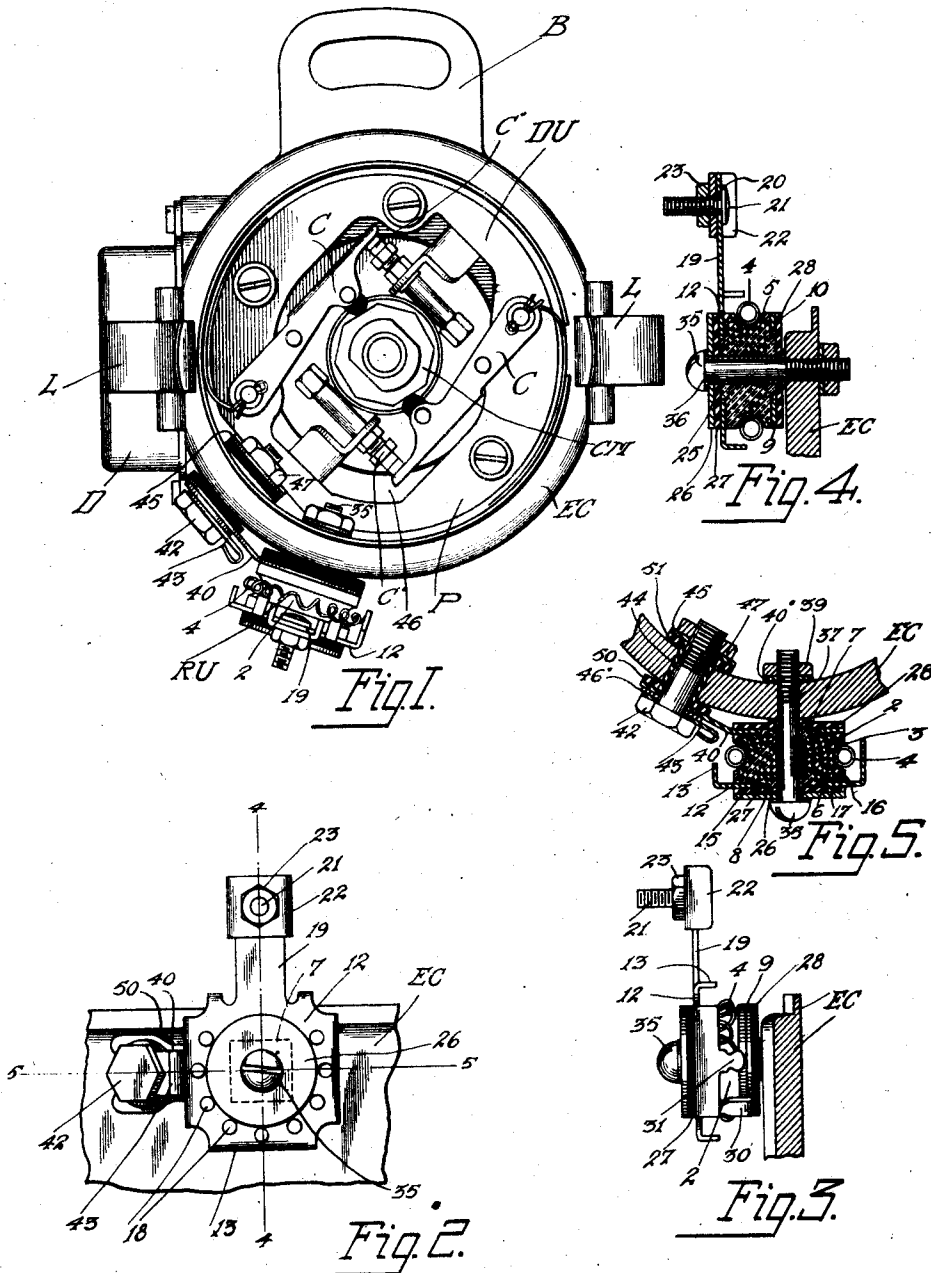
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L. B. SAUER ET AL

RESISTANCE UNIT

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UNITED STATES PATENT OFFICE.

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RESISTANCE UNIT.

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Our invention relates to resistance units and is particularly adapted to be employed in ignition systems wherein the main circuit is intermittently interrupted such as are now employed in automobile ignition systems and the like.

An object of our invention is the provision of a simple, durable and cheaply constructed resistance unit whose parts are simple in structure and very easy to assemble into a single mountable unit.

Another feature of our invention is the manner and means employed for securing the different parts of our resistance unit together against displacement and movement relative to each other to form a single mountable operating unit.

A further feature of our invention is the simplified manner in which we secure our resistance unit to the device with which our invention may be used.

Still another feature of our invention is the provision of simplified means for conductively connecting the resistance unit of our invention in circuit with the operating circuit of the device, with which our resistance unit is utilized, independently of the means which we employ for securing our resistance unit to said device and which securing means also forms a feature of our invention.

The above features, as well as others, will be more specifically pointed out in the ensuing specification and for a more complete and clearer understanding of our invention reference may be had to the accompanying drawings, in which like reference characters in the several views denote like parts.

In the drawings:

Fig. 1 is a top plan view of the resistance unit of our invention, showing the same secured to the casing of a distributing unit, the top or cover of said distributing unit being removed to expose certain operating parts of the distributing unit. This figure also shows the means we employ for conductively connecting our resistance unit in circuit with the operating circuit of the distributing unit secured to the casing of said distributing unit;

Fig. 2 is a plan view in elevation of the resistance unit and circuit connecting means of our invention showing the same secured to the casing of the distributing unit;

Fig. 3 is a right side view of Fig. 2;

Fig. 4 is a sectional view of the resistance unit of our invention along the line 4—4 of Fig. 2; and

Fig. 5 is a sectional view of the resistance unit and means for connecting the same in circuit with the circuit control means of the distributor unit of our invention along the line 5—5 of Fig. 2.

Referring now particularly to the distributing unit DU with which we illustrate and describe our invention, we will first point out in general a few of the important parts or elements of said distributing unit.

EC is an enclosing casing for enclosing and supporting various parts of the distributing unit DU, which casing is provided with a pair of spring members or latches L for holding a suitable top or cover on said casing and is also provided with an integrally formed member or bracket B for adjustably mounting the unit DU in operative position by any suitable means. A pair of interrupter contacts C are provided which are pivotally supported on a removable conducting plate P secured in the casing EC and are spring pressed into contactual engagement with a pair of stationary contacts C' to close the ignition circuit, controlled by the distributing unit DU, through said stationary contacts. A cam member CM is provided which is secured to the rotatable shaft of the distributing unit and is adapted to rotate with the shaft to operate the pair of interrupter contacts C to interrupt the contactual engagement of said interrupter contacts C and a pair of stationary contacts C' for purposes well known to those skilled in the art. A condenser D is also provided which is suitably secured to a flat face portion of the casing EC and is adapted to be connected in the operating circuit for the well known purposes. For a clear understanding of our invention further description of the distributing unit DU is thought unnecessary and will, therefore, not be given.

Referring now in detail to the resistance unit RU of our invention, it comprises a resistance element carrying member 2, circular in shape and formed out of suitable insulation or non-conducting material which is also inignitable such as porcelain or the like. A circumferential groove or channel 3 is formed in the member 2 and is adapted to receive a helically shaped resistance element 4

of a pre-determined resistance. The flat faces of the member 2 have integrally formed therewith rectangularly shaped extending lugs 7 and 8 for purposes to be described presently. A disk member 9 of suitable conducting material is provided and has a rectangular centrally located opening 10 of a size to permit said member 9 to fit snugly around the rectangular lug 7 of the member 2 so that one face of the disk member 9 engages the flat circular face 5 of the member 2, while the end of the lug 7 is flush with the other face of the disk member 9. A protector 12 formed out of suitable conducting material having an interrupted flange 13 integrally formed therewith is provided. The protector 12 has a rectangularly shaped and centrally located opening 15 of a size to permit said protector to fit snugly around the integrally formed lug 8 of the insulation member 2 so that the face 16 of the protector 12 engages the circular face 6 of the member 2, the end of the lug 8 being flush with the other face 17 of the said protector 12. The flange 13 is cut away at certain places to avoid wrinkling of the said flange when the same is formed on the protector 12 and to also permit passage of air currents, as do also the orifices 18 provided in the protector 12 as will be pointed out more in detail in the ensuing specification. An ear 19 is integrally formed with the protector 12 and has an opening 20 provided in its free end through which a suitable screw 21 extends, said screw 21 extending through a U-shaped clamping member 22 and then has screw-threaded engagement with a suitable nut 23. The clamping member 22 and free end of the ear 19 are adapted to receive and have clamped there between an external conductor by means of the screw 21 and nut 23.

To secure the protector 12 and disk member 9 on the insulation member 2 against displacement a ferrule 25 is provided which extends through suitable aligned openings in a metal washer 26, and an insulation washer 27, then through a central opening in the insulation resistance element carrying member 2 and through a suitably aligned opening in an insulation washer 28, whereupon both protruding ends of the said ferrule 25 are spun over by a spinning operation whereby the insulation washer 27 engages the outer face of protector 12 and the end of the lug 8, and the insulation washer 28 engages the outer face of the member 9 and the end of the lug 7 of the insulation member 2. The protector 12 and the disk member 9 are now clamped and secured on the insulation member 2 against displacement by the washers 26, 27, 28 and the ferrule 25, and against rotation on said member 2 by the engagement of the rectangular lugs 7 and 8 which extend snugly through suitable rectangular openings in the protector 12 and member 9 as de-

scribed above. The insulation washer 27 insulates the protector 12 from the metal washer 26, while the said insulation washer 27 and the lug 8 insulate the said protector 12 from the ferrule 25, and the insulation washer 28 and 7 of the member 2 insulate the disk member 9 from the said ferrule 25.

When the parts of the resistance unit RU are assembled as described above the helical resistance element 4 has its one end tied or soldered to an ear 30 integrally formed with and at right angles to the member 9 and is then drawn taut around the insulation member 2 in the groove or channel 3 of said member 2 and has its other end tied or soldered to an ear 31 integrally formed with the flange 13 of the protector 12. The helical resistance element 4 will remain in the channel 3 of member 2 due to its spring effect and the protector 12 and member 9 serve as terminals for said resistance element 4. The flange 13 of the protector 12 serves to protect the resistance element 4, and the cut away portions of said flange 13 and the orifices 18 permit air currents to pass there-through to the resistance element 4 for cooling purposes.

Now in order to secure the resistance unit RU of our invention to the distributing unit DU as a single unit and in operative position relative thereto, we provide a suitable screw 35 which extends through the central opening 36 in the ferrule 25 and then through a suitable opening 37 in the enclosing casing EC of the distributing unit DU and has screw-threaded engagement with a suitably tapped nut 39, a suitable spring washer 40' being interposed between the nut 39 and the inner face of the casing EC to prevent the nut 39 from loosening and disengaging the screws 35 of its own accord or by the vibration of the distributing unit DU. The nut 39 is drawn in on the screw 35 whereby the resistance unit RU is secured in position on the casing EC. It will be noted, however, that the protector 12 and disk member 9 of the resistance unit RU are not in any way conductively connected to the casing EC of the distributing unit DU, consequently there will be no circuit closed through the protector 12, resistance element 4 and member 9 to the casing EC when an external conductor is clamped between the U-shaped member 22 and ear 19 of the protector 12 although the screw 39 has direct contactual engagement with the casing EC.

To connect the resistance unit RU in circuit with the ignition circuit controlled by the interrupter contacts C and stationary contacts C', we provide an arm 40 which is integrally formed with the disk member 9 and has its free end bifurcated. A screw 42 is provided which extends through a terminal member 43, bifurcated end of the arm 40, insulation bushing 44, through a con-

ducting member 45 integrally formed with the removable plate 46 of the distributing unit DU, said plate 46 being connected in circuit with the contacts C and C'. The terminal member 43 is provided for receiving a conductor extending from the condenser D and is connected with the arm 40 through the metal washer 46' and screw 42. The screw 42 has screw-threaded engagement with a suitably tapped nut 47 which is screwed down against the conducting member 45 to secure said screw 42 and parts engaging said screw in position. The screw 42 is insulated from the casing EC by the insulation bushing 44; the bushing 44 and insulation washer 50 insulating the arm 40 from the casing EC and the insulation bushing 44 and insulation washer 51 insulating the conducting member 45 of the removable plate 46 from the said casing EC. Thus it will be apparent that the resistance unit RU is in no way conductively connected to the enclosing casing EC of the distributing unit DU.

The arm 40 of the member 9 need not be provided as any suitable flexible conductor may be employed and suitably connected to the screw 42 and soldered to the said member 9 and it is to be understood that we do not wish to be limited to the use of the rigid integrally formed arm 40 as shown and described.

To remove the resistance unit RU from the distributing unit DU all that is necessary is to remove the screw 35 and loosen the screw 42 which permits the removal of the arm 40 from the screw 42 through the bifurcated end of said arm 40 which engages said screw 42.

From the foregoing description it will be at once apparent that our resistance unit RU is secured to the casing EC of the distributing unit DU independently of the movable and stationary contacts C and C' and the other operating parts of the said distributing unit, and that the said resistance unit may be removed without interfering with said contacts and said operating parts.

While we have illustrated and described a preferred embodiment of our invention we do not wish to be limited to the exact structure as shown and described as changes and modifications will readily suggest themselves without departing from our invention and it is to be understood that we intend to cover and claim all that which may come within the spirit and scope of the appended claims.

What we claim as new and desire to secure by United States Letters Patent, is:

1. A device of the class described including a non-conducting supporting member having a central opening, conducting members supported by said supporting member, insulation washers engaging said conducting members, a cylindrical member of con-

ducting material extending through said central opening and said washers and having its ends distorted to secure said conducting members and washers on said supporting members against displacement to form a single mountable unit, protruding members integrally formed with said supporting members, adapted to engage said conducting members to prevent rotary movement of said conducting members relative to each other and to the supporting member, and also to insulate said conducting members from said cylindrical member, a resistance element supported on said supporting member and connected to said conducting members.

2. A device of the class described including an insulation member having a pair of rectangularly shaped lugs integrally formed therewith, a pair of conducting members having rectangular openings for receiving said lugs and adapted to engage said insulation member, a pair of insulation washers for engaging said conducting members and the free ends of said lugs, a central opening in said insulation member, a cylindrical member for engaging said washers and said opening in said insulation member and adapted to have its end spun over to prevent its removal and to clamp said conducting members between said insulation member and said insulation washers to form a single mountable unit, said lugs preventing rotary movement of said conducting members and also adapted to insulate said conducting members from said cylindrical member, and a resistance element supported on said insulation member having its ends secured to said conducting members.

3. A resistance unit comprising a pair of terminals, a supporting member of non-conducting material interposed between said terminals, insulation washers for engaging said terminals, a cylindrical member for extending through said washers and said supporting member and having its ends upset to secure said washers and terminals on said supporting member, a resistance element supported on said supporting member and connected in circuit with said terminals, and protruding members integrally formed with said supporting member for insulating said terminals from said cylindrical member and to prevent rotary movement of said terminals relative to each other and to said supporting member.

4. A device of the class described including a pair of conducting members having rectangular centrally located openings, a resistance element supporting member interposed between said conducting members and having integrally formed therewith rectangularly shaped lugs for engaging said openings in said conducting members, insulation washers for engaging said lugs and said con-

ducting members, an opening extending through said supporting member and said lugs, a cylindrical member for engaging said opening and adapted to have its ends distorted whereby said conducting members are clamped on said lugs between said supporting member and said washers to form a single operating unit, and a resistance element supported on said supporting member and having one of its ends secured to one of said conducting members and its other end secured to the other of said conducting members.

5. A device of the class described including a non-conducting supporting member, a pair of conducting members provided with centrally located openings, means including a cylindrical member for securing said conducting members on said supporting member, members integrally formed with said supporting member for engaging the openings in said conducting members to prevent rotation of said conducting members relative to each other and to said supporting member and also to insulate said conducting members from said cylindrical member, and a resistance element supported on said supporting member and having its ends secured to said conducting members.

6. A device of the class described including a non-conducting supporting member, a conducting member having an integrally formed flange and a rectangular central opening, a rectangular member integrally formed with said supporting member and adapted to engage said central opening in said conducting member so that the flange of said conducting material extends over the periphery of said supporting member, another conducting member having a rectangular central opening, another rectangular member integrally formed with said supporting member opposite to said first rectangular member for engaging the opening in said second conducting member, means including a cylindrical conducting member for securing said conducting members on said supporting member against displacement, said rectangular members adapted to insulate said conducting members from said cylindrical conducting member, and a resistance element supported on said supporting member and having its ends secured to said conducting members, the flange of said first conducting member adapted to protect said resistance element against injury.

7. A device of the class described including a flat circular supporting member of non-conducting material and having integrally formed therewith a rectangular member on each side of said supporting member, a pair of conducting members each having a rectangular opening, one of said conducting members adapted to fit over one of said rectangular members and engage one

side of the supporting member while the other of said conducting members fits over the other rectangular member of said supporting member, insulation washers for engaging said conducting members, and means including a conducting cylindrical member for clamping said conducting members on said supporting member against displacement to form a single mountable unit, and a helical resistance element drawn taut around said supporting member and having one of its ends secured to one of said conducting members and its other end secured to said other conducting member whereby a circuit is closed through said conducting members via said resistance element.

8. A device of the class described including a non-conducting supporting member having a circumferential groove formed therein, a pair of non-circular members integrally formed with said supporting member, said supporting member provided with a central opening extending through said non-circular members, a pair of conducting members for fitting over said non-circular members and adapted to engage said supporting member, insulation washers for engaging said conducting members, a cylindrical member for extending through said central opening and said washers and having its free ends distorted whereby said conducting members are clamped on said supporting member between said distorted ends to prevent their displacement, said non-circular members adapted to prevent rotary movement of said conducting members relative to each other and to said supporting member, and a resistance element resting in said circumferential groove and having its ends connected to said conducting members to connect said conducting members in circuit.

9. A device of the class described including an insulation member, a pair of rectangular lugs formed integrally with said member, a pair of conducting members provided with rectangular openings adapted to receive said pair of lugs, insulation washers for engaging said pair of conducting members and said pair of lugs, a ferrule for engaging said insulation member and insulation washers having its ends spun over to secure said pair of conducting members and washers on said insulation member to form a single mountable unit, and a metal washer interposed between one of said washers and one of the spun over ends of said ferrule.

10. A device of the class described including an insulation member having a central opening and a circumferential groove, a pair of rectangular lugs formed integrally with said member and through which said opening extends, a pair of terminals having rectangular openings and adapted to fit over said lugs and engage said insulation mem-

- ber, a cylindrical member extending through said central opening and having its ends turned over to prevent its removal, insulation washers interposed between said turned over ends and the ends of said pair of lugs, said cylindrical member adapted to clamp said washers and terminals on said insulation member against displacement and said lugs adapted to prevent rotary movement of said terminals, and to also separate said cylindrical member from said lugs, a resistance element secured to said terminals and adapted to engage said circumferential groove, and a flange integrally formed with one of said terminals for protecting said resistance element against injury, said one terminal having openings for permitting air currents to pass therethrough to said resistance element.
11. A device of the class described including a pair of terminals having rectangular openings, an insulation member having rectangular lugs integrally formed therewith interposed between said pair of terminals, said lugs adapted to extend through the openings in said terminals, an opening for said insulation member extending through said pair of lugs, a ferrule engaging said opening for clamping said terminals on said insulation member against displacement, insulation washers and a metal washer for engaging said ferrule, said ferrule having its ends spun over to clamp said terminals between said insulation member and said washers to form a single mountable unit, said lugs engaging said rectangular openings to prevent rotary movement of said pair of terminals on said insulation member, and a resistance element supported on said insulation member and having its ends secured to said pair of terminals whereby said terminals are included in circuit with each other via said resistance element.
- Signed by us at Chicago, in the county of Cook and State of Illinois, this 15th day of April, 1924.
- LOUIS B. SAUER.
GEORGE A. YANOCHOWSKI.