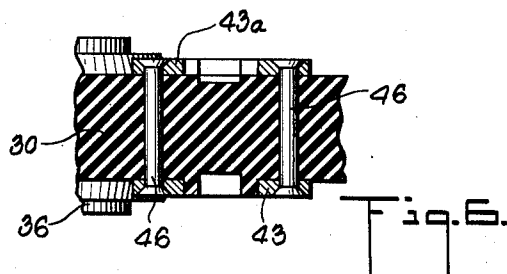
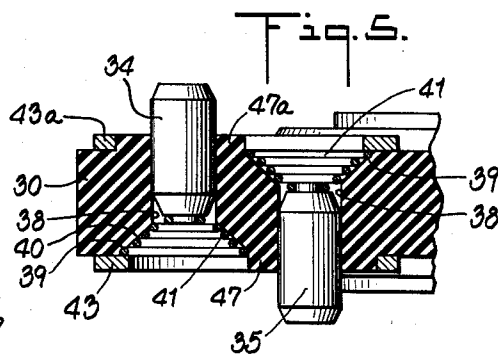
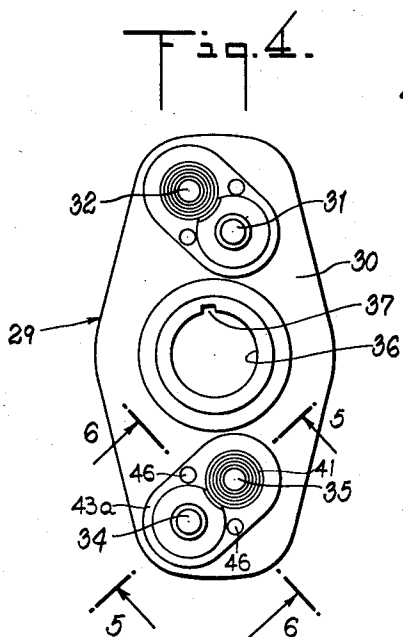
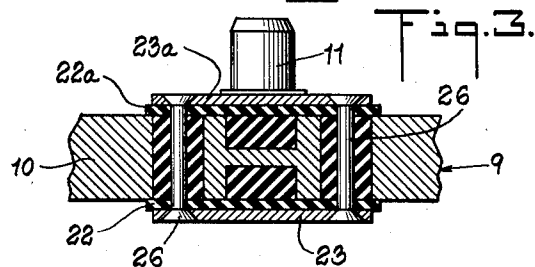
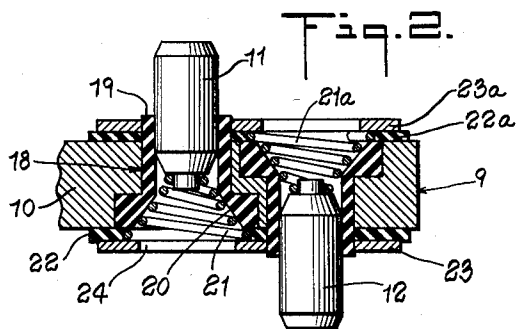
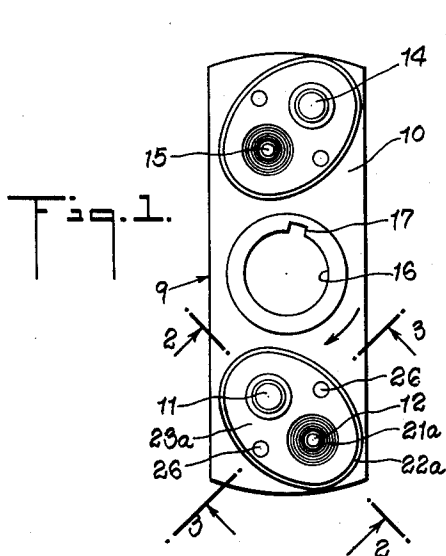


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ELECTRICAL APPARATUS
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ELECTRICAL APPARATUS

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This invention relates to electrical apparatus and more particularly to means in an ignition distributor for internal combustion engines for transmitting electrical current between stationary parts through rotating or movable parts for the purpose of effecting and controlling the distribution of electrical current impulses to a plurality of circuits in sequence.

One of the objects of the present invention is to provide in an ignition distributor unit or the like novel means for mounting spring pressed current-carrying brushes of carbon or like material in a movable part, such as a rotor, whereby said brushes will not become disassociated from said part during assembly and disassembly of the unit.

Another object of the invention is to provide in an ignition distributor unit a novel rotor which is of simple construction, inexpensive to manufacture, composed of a relatively small number of parts, and reliable in operation.

Another object is to provide a novel constructed ignition distributor rotor which may be made for the most part of metal and wherein a pair of spring pressed brushes may be mounted for sliding movement and electrically connected together to transmit electrical energy from one stationary conductor to another.

A further object is to provide in an ignition distributor unit or the like for a multi-cylinder internal combustion engine novel means for mounting current-carrying brushes of carbon or like material in the rotor of said unit, said means including springs for applying yieldable pressure to said brushes and serving also as conductors to electrically connect said brushes, thereby simplifying the construction of the rotor and rendering the latter less expensive to manufacture.

A still further object is to provide apparatus of the above character embodying novel constructed and novelly functioning spring means for controlling the sliding action of a carbon brush or the like to insure against tilting of the brush and consequent binding thereof in its guide.

The above and further objects and novel features of the invention will more fully appear from the following detailed description when the same is read in connection with the accompanying drawings. It is to be expressly understood, however, that the drawings are for the purpose of illustration only and are not intended as a definition of the limits of the invention.

In the drawings, wherein like reference characters refer to like parts throughout the several views,

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Fig. 1 is a front elevation view of one form of distributor rotor constructed in accordance with the present invention;

Figs. 2 and 3 are detail sectional views of portions of the rotor of Fig. 1, the sections being taken substantially on lines 2—2 and 3—3, respectively, of Fig. 1;

Fig. 4 is a front elevation view of another form of distributor rotor constructed in accordance with the invention; and

Figs. 5 and 6 are detail sectional views of the embodiment of Fig. 4, the sections being taken substantially on lines 5—5 and 6—6, respectively, of Fig. 4.

The present invention is illustrated in the accompanying drawings, by way of example, in the form of a distributor rotor of the type employed in connection with an electrical current distributing unit which is adapted for use in the ignition system of a multi-cylinder internal combustion engine, and particularly the type wherein relatively low tension current is distributed from a common source to a plurality of spark plug circuits in sequence. In the form shown in Figs. 1 to 3, the novel distributor rotor indicated generally at 9 consists primarily of an elongated block 10 which may be of metal to provide strength accompanied by smallness to conserve space. Block 10 carries two identical pairs of carbon or like electrically conductive brushes 11, 12 and 14, 15 adjacent opposite ends thereof for picking up electrical current from a suitable source of electrical energy and conducting the same to the spark plugs in the engine cylinders in a manner well understood in the art. In the illustrated embodiment, brushes 11 and 14 may function as the input or pick-up brushes for receiving electrical energy from concentric conductive rings (not shown) connected to the same or different sources of electrical energy, and the brushes 12 and 15 may act as the output brushes which engage circumferentially spaced segments of the distributor for directing current to a plurality of spark plugs in sequence.

Rotor block 10 is provided with a central opening 16 for receiving the driven rotor shaft of a distributor unit (not shown) and with a keyway 17 whereby the rotor 9 may be removably mounted on the shaft for rotation therewith. Each of the brushes 11, 12, 14 and 15 is mounted in rotor block 10 in like manner, and brush 11 will be taken as illustrative for detail description. The brush is preferably cylindrical and slidably projects into and from an insert 18 of insulating material. The reduced cylindrical end 19 of said insert has a cylindrical bore and projects be-

yond one face of block 10. The other and larger end of insert 18 is flush with the other face of block 10 and has tapered or cone-like bore 20. A cone-shaped coil spring 21 rests against the tapering walls of conical recess or bore 20 when the spring is extended and the small or innermost coil or turn thereof closely surrounds and is preferably soldered or otherwise suitably secured to the reduced inner end of brush 11, as best seen in Fig. 2. Spring 21 thus supports brush 11 and holds it against outward movement beyond the illustrated position while yieldably resisting the inward movement of the brush. The construction of the spring is preferably but not necessarily such that each coil or turn thereof will fit within the next larger turn or coil so that a comparatively flat and strong spring can be designed to occupy a relatively narrow space in the direction of the axis of rotation of the rotor while permitting ample axial movement of the brush.

At least a part of the outer and largest coil or turn of spring 21 may engage the end surface of insert 18 within an opening in an insulating plate 22, said opening being of slightly greater diameter than the outer end of bore or recess 20 and of lesser diameter than the outside diameter of the same end of insert 18. A metallic cover plate 23 engages the other surface of plate 22 and serves to hold spring 21 in place. Cover 23 may have an opening 24 therein, if desired. At the other face of the rotor an insulating plate 22a and a metallic cover or retaining plate 23a, identical with plates 22 and 23, respectively, but turned end for end relative thereto, have openings which receive the projecting end 19 of insert 18. The other end of plates 22a and 23a cooperate with the brush 12 and its spring 21a in the same manner that plates 22 and 23 cooperate with brush 11 and its spring 21.

The above described parts are secured together by a pair of rivets 26, 26 or other equivalent means. The shanks of the rivets between plates 22 and 22a are preferably surrounded by insulating bushings 27 to insulate the same from metallic rotor body 10. It will thus be seen that electrical current picked up by brush 11, for example, will be conducted through spring 21, cover plate 23, rivets 26, 26, cover plate 23a and spring 21a to brush 12. Hence, current may be conducted from a stationary ring engaged by brush 11 at one side of the rotor to circularly arranged arcuate segments engageable by brush 12 at the other side of the rotor.

In the embodiment of Figs. 4 to 6, the rotor 29 comprises a body 30 of insulating material, such as hard rubber, bakelite or the like. A bushing 36 having a keyway 37 is provided in rotor 29, 30 for drivably mounting the same on the distributor or other shaft. The current conducting brushes 31, 32, 34 and 35 which correspond with brushes 11, 12, 13 and 15 of Fig. 1 are mounted for sliding movement in cylindrical portions of openings 38, 38 in body 30. Opposite ends of passages 38 are cone-shaped, as at 40, and have internal shoulders 39 near the enlarged ends thereof. A conical coil spring 41 like spring 21 is seated in the cone-shaped portion of each bore 38 with the smallest or innermost coil thereof secured to the inner end of a brush, such as brush 34. The largest or outer coil of each spring 41 engages a shoulder 39 and is held in place by a metallic cover plate 43 or 43a, which plates are electrically connected and secured to opposite faces of body 30 by a pair of rivets 46, 46. If de-

sired bosses 47, 47a may be provided on body 30 to project into openings in cover or spring retaining plates 43, 43a, respectively.

It will thus be seen that electrical current supplied to brush 34, for example, at one side of rotor 29 will be conducted by spring 41, retaining plate 43, rivets 46, retainer plate 42a and a second spring 41 to brush 35 at the other side of the rotor. Thus, brushes 31 and 34 may pick up energy from concentric rings at one side of the rotor for conduction to concentric rings of spaced arcuate segments, for example, engaged by brushes 32 and 35 at the other side of the rotor during rotation of the latter.

There is thus provided an ignition distributor rotor or the like wherein current carrying brushes of carbon or other conductive material are novelly mounted for conducting electrical current between stationary elements at opposite sides of the rotor. Additionally, each brush is associated with spring means novelly mounted in the rotor and connected with the brush to insure proper operation of the latter during long periods of use. The novel mounting of the springs and brushes is such that sticking or binding of the brushes in their guides is substantially eliminated and such that the brushes are suitably maintained within the rotor when the latter is disassembled from the distributor or other unit. Other features are the light weight of the construction and the small space required therefor. The simplicity of the novel construction hereby provided facilitates and speeds up assembly of the rotor and reduces the cost over comparable prior devices for the same uses.

Although only a limited number of embodiments of the invention are illustrated in the accompanying drawings and described in the foregoing specification, it is to be expressly understood that the invention is not limited to these embodiments or to the specific use thereof in connection with an ignition distributor unit for internal combustion engines. For example, the reciprocable brushes may, if desired, have flats or other means on the sides thereof cooperating with similar flats or means on the inserts 18 or rotor body 30 for preventing any turning of the brushes about their own axes. Various other changes, particularly in the design and arrangement of the parts illustrated, may be made without departing from the spirit and scope of the invention as will now be apparent to those skilled in the art. For a definition of the limits of the invention, reference is had primarily to the appended claims.

What is claimed is:

1. In a device of the class described, an electrically conductive brush, an insulating block having an opening therethrough, an end portion of said opening being shaped to slidably receive an end portion of said brush, the other end portion of said opening being cone-like with the walls thereof diverging toward the face of the block, a cone-like coil spring in said cone-like portion of said opening and having turns thereof seated on the walls of said opening when the spring is extended, the smallest turn of said spring being secured to said brush, and means at the enlarged end of said opening for securing said spring in the opening.

2. In a device of the class described, a block comprising insulating material having a funnel-shaped opening therethrough, an electrically conductive brush slidably mounted in the reduced portion of said opening and projecting

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therefrom, a cone-like coil spring in the enlarged portion of said opening normally under compression and having turns thereof seated on the cone-like wall of said enlarged portion of the opening when the spring is extended, the smallest turn of said spring being secured to said brush, and means at the enlarged end of said opening for securing said spring in the opening.

3. In a device of the class described, an insulating block having an opening therethrough, said opening having an annular internal tapered shoulder, an electrically conductive brush slidably mounted in said opening and projecting from one end thereof, a cone-like coil spring with successive turns adapted to simultaneously engage said tapered shoulder when the spring is extended, the smallest turn of said spring being secured to the end of said brush in the opening, and means for anchoring the largest turn of said spring, whereby movement of said brush into said block is yieldably resisted by said spring and movement of the brush out of said block is limited by the engagement of the spring with said tapered shoulder.

4. A device as defined in claim 3 wherein each turn of said spring will fit within the next larger turn thereof when the spring is compressed upon movement of the brush into the block.

5. A device as defined in claim 3 wherein said anchoring means comprises a plate secured to the block, at least a portion of said largest turn of the spring being interposed between said block and plate.

6. In a device of the class described, a block comprising insulating material with spaced openings having parallel axes in said material, each

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of said openings having an annular internal tapered shoulder, said shoulders facing in opposite directions, an electrically conductive brush slidably extending into the reduced portion of each of said openings, one of said brushes projecting from said block in one direction and the other brush projecting therefrom in the other direction, a cone-like coil spring seated on each said shoulder and secured at its small end to one of said brushes, and means for anchoring the large ends of said springs in said openings, said anchoring means including an electrically conductive plate on each face of said block in electrical contact with a said spring and electrically conductive means connecting said plates and securing the same to said block, whereby said brushes are electrically connected through said springs.

7. A device as defined in claim 6 wherein said block comprises a metallic body and said insulating material is in the form of tubular inserts in said body.

8. A device as defined in claim 7 comprising means for insulating said plates and connecting means therefor from said metallic body.

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