(No Model.)

E. E. RIES.

REGULATING SOCKET FOR ELECTRICAL APPARATUS.

No. 515,969. Patented Mar. 6, 1894.

Fig. 1.

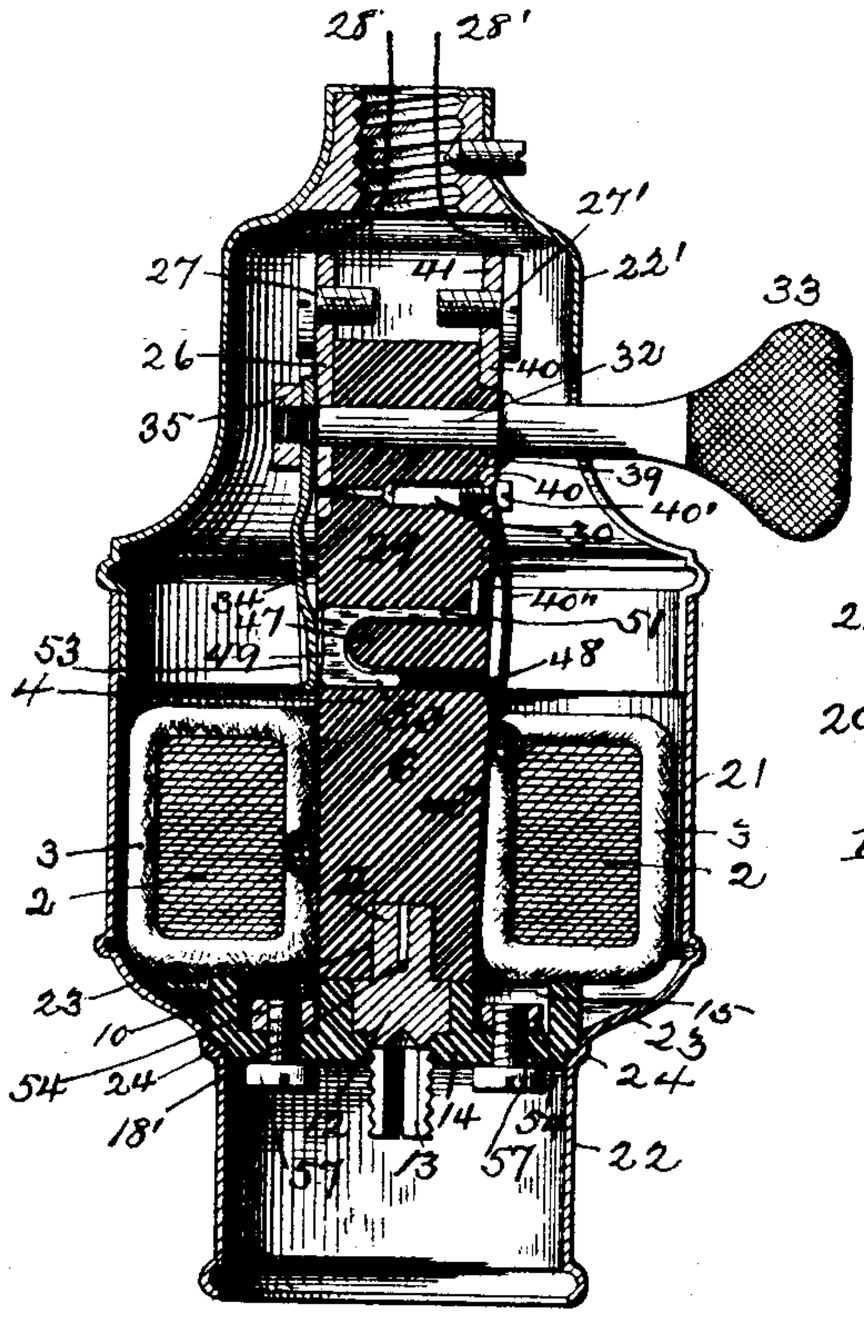


Fig. 2.

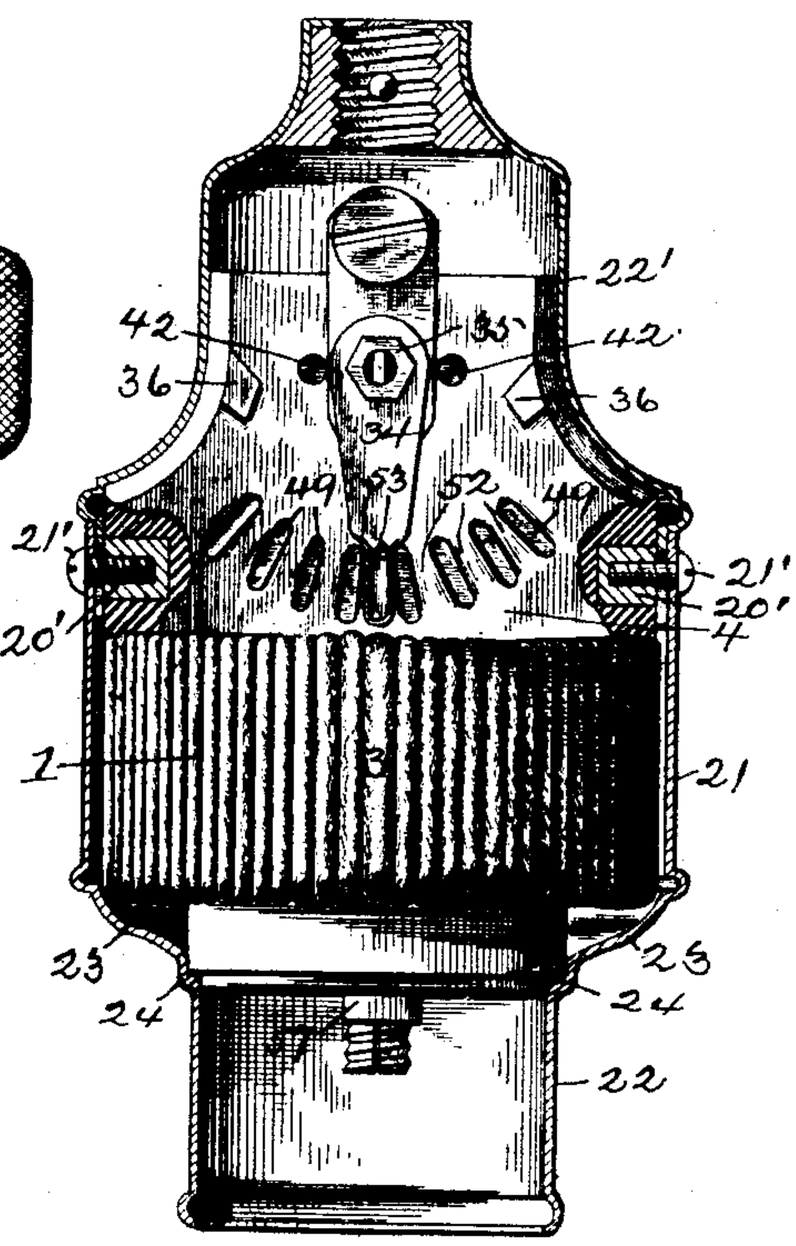


Fig. 3.

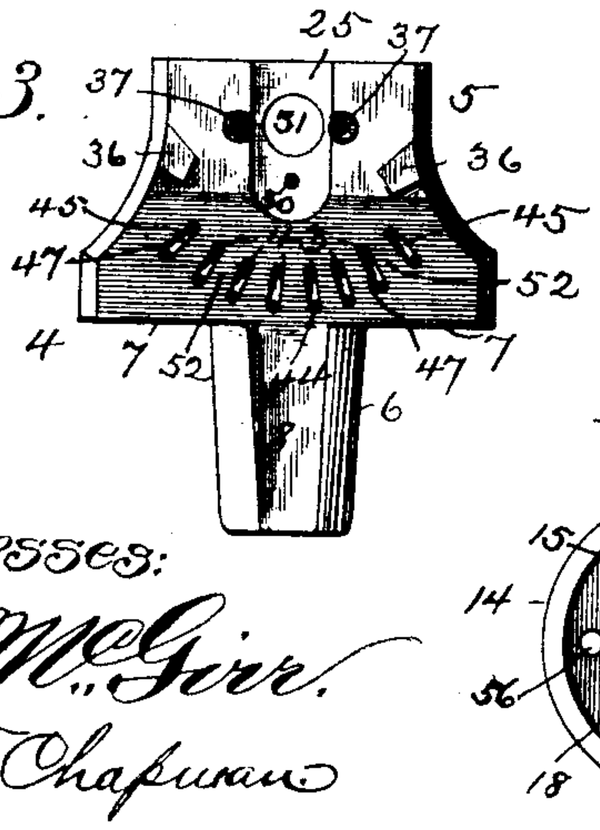


Fig. 4.

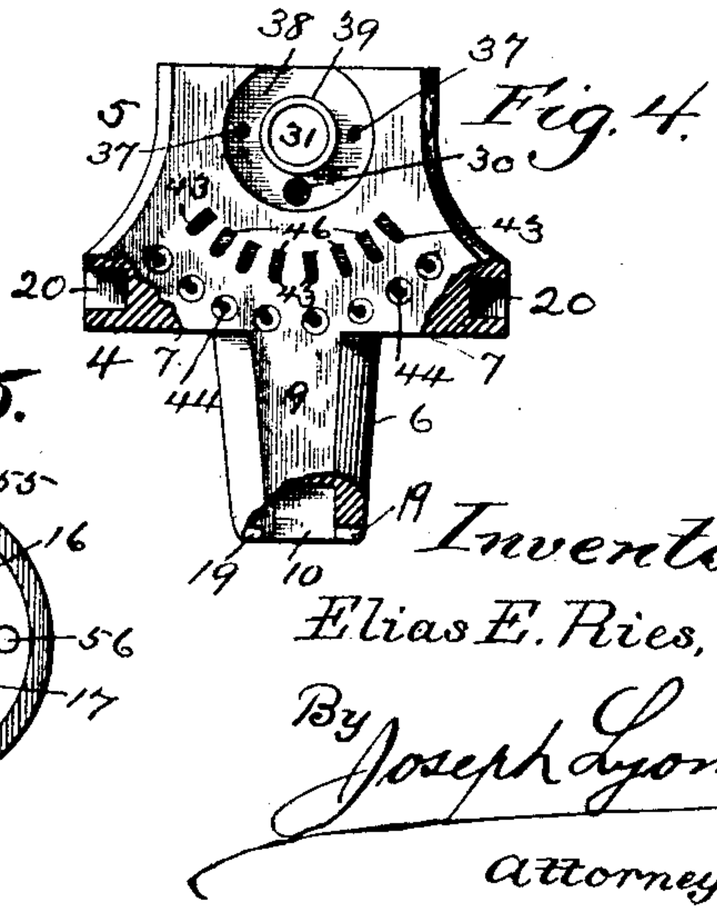
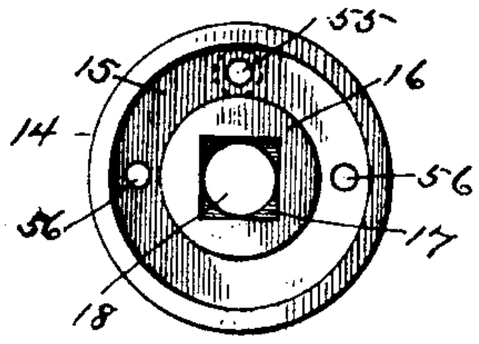


Fig. 5.



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REGULATING-SOCKET FOR ELECTRICAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 515,969, dated March 6, 1894.

Application filed January 24, 1893. Serial No. 459,587. (No model.)

To all whom it may concern:

Be it known that I, ELIAS E. RIES, a citizen of the United States, and a resident of Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Regulating-Sockets for Electrical Apparatus, of which the following is a specification.

My invention has reference to improvements in the construction of regulating sockets for incandescent electric lamps or other translating devices, the same being an improvement upon the regulating socket for which Letters Patent of the United States were granted to William S. Horry and to myself, No. 470,402, dated March 8, 1892. The object of such socket or holder is to regulate the flow of current to the translating device by varying the degree of self induction of a conductor disposed within the socket and in the circuit of the translating device. For this purpose there are housed within the socket a reaction coil and a switch, whereby successive portions of the coil can be cut in and out of the circuit, as is clearly set forth in the said Letters Patent. For the support of the reaction coil, the switching mechanism and accessory devices, it is necessary to use structures made of insulating material, and I have heretofore used for this purpose vulcanized fiber or wood, by preference the former. In practice it is found that this material and the shaping of the same are expensive and that while regulating sockets thus constructed work sufficiently well when new and under normal conditions, the utility of the device is impaired by age and may be destroyed under abnormal conditions which cannot always be avoided. Thus for instance, vulcanized fiber and wood are hygroscopic bodies, liable to get damp, not only on the surface, but to a certain extent throughout the whole mass, whereby the insulating properties of these materials are practically made illusive, and short circuits within the socket occur. Sometimes an excessive flow of current through the socket occurs, owing to disorders on the line or at the generating station, and on such occasions the conductors within the socket become unduly heated, scorching the insulating supports if the same are made of such materials as wood, hard rubber or vulcanized fiber, and there is even a liability of burning the whole socket, and consequent danger to the building in which it is used. These difficulties are overcome by my present improvement in that I substitute for the wood, hard rubber or vulcanized fiber, a material which is a non-hygroscopic and highly refractory, and which at the same time is a better insulator than either wood or vulcanized fiber or hard rubber, or other like materials. Accordingly I make the insulating supports within the regulating socket, of vitreous or partly vitreous substance, such as malleable glass, porcelain, or highly burned partly vitrified and glazed earthenware. I have, however, found that porcelain is especially adapted for the purposes of my invention, although the use of other non-hygroscopic, refractory insulating materials come within the scope of my invention.

The use of porcelain for the supports of the reaction coil and switching devices requires special means for securing the parts together, since it is impracticable to tap screws into that material or to drive nails into the same. My improvement, therefore, also comprises special means for securing the porcelain supports together and to the metal structures comprising the socket and the switching mechanism. The same means which I employ for mounting the switching devices upon the porcelain support, are also useful in the construction of all kinds of switch boards, so that this part of my invention is not limited to its use in connection with regulating sockets, but is equally applicable to the construction of all kinds of switch boards. All this will more fully appear from the following detail description with reference to the accompanying drawings, in which I have illustrated a regulating socket for incandescent electric lamps as I now construct it, and embodying my invention.

Figure 1, represents a central vertical section of the complete socket. Fig. 2, is a similar view, the section being taken through the shell of the socket, at right angles to that represented in Fig. 1, and with the interior parts in elevation. Fig. 3, is an elevation of the

main portion of the porcelain support; Fig. 4, a like view of the opposite side of the same, partly in section, and Fig. 5, is a plan view of a porcelain disk, constituting an element of the support.

Like numerals of reference indicate like parts all throughout the drawings.

The reaction coil 1, of the regulating socket is made in the shape of a Gramme ring, wound upon a laminated core 2, in any desired manner; by preference the winding is formed of a thin cable 3, containing a number of insulated wires, properly joined, as described in the aforesaid Letters Patent, and this coil is mounted upon the porcelain support 4. This support consists of a block of porcelain, shaded, as shown in Figs. 3 and 4, with a flat head 5, and a slightly conical stem 6, the latter extending from the lower edge 7 of the head, and having a diameter somewhat greater than the thickness of the head. On diametrically opposite sides, portions of this stem are cut away, as shown at 8, 9, so that these sides become extensions of the planes of the two flat faces of the head. The reaction coil is slipped over the stem 6, so that with its upper edge it abuts against the lower edge of the head 5. In the lower end of the stem 6, is formed a rectangular cavity 10, into which loosely fits the rectangular stem 11, of a brass block 12; the central portion of this block is also rectangular and preferably quadrangular, and is considerably wider than the stem 11; from the lower face of this block a slotted screw-threaded tube 13, extends axially with the axis of the stem 11. The stem 11, is also slotted longitudinally as shown in Fig. 1, so that it may receive and hold one of the terminal wires of the reaction coil, as will appear farther on. The other portion of the reaction coil support is a disk 14, formed with an annular groove 15, on one side, so that in the center there remains a hub 16, the diameter of which is about equal to the diameter of the lower end of the stem 6. In this hub is formed a quadrangular recess 17, of a depth equal to the thickness of the central rectangular portion of the brass block 12, and of such size that the block will loosely fit into that recess. From the bottom of the said recess a circular hole 18, passes through the disk, and is of such size as to permit the tube 13 to pass through the same. The disk 14, serves as the lower support for the reaction coil and is loosely joined to the support 4, by means of the brass block 12, without, however, being thereby held to the same, this being effected by the shell of the socket, as will appear farther on. Before the stem 11, is inserted into the cavity 10, a wire, coming from one terminal 18′, of the reaction coil, is slipped into the slot formed in the stem, and this wire then passes from the stem between one of the sides of the same and one of the inner walls of the cavity 10 over the edge at the lower end of the stem 4, to the reaction coil; a shallow notch 19, formed in the lower edge of the stem 4, and which receives the wire 18′, will prevent the hub 16 of the disk 14, from rubbing against that wire.

The head of the block 4 has two flat faces, with certain holes, depressions, and projections formed thereon, which will presently be described in detail, and which serve for the mounting thereon of the switching mechanism. The upper and lower edges of the head are flat and parallel to each other, while the side edges are shaped and rounded off so as to conform to the shape of that portion of the shell of the socket which surrounds these edges as will presently appear. By thus shaping the head, the lower portion of it, to which the stem 6 is joined, is wider than the upper portion thereof, and in the edges of this wide portion of the head, are formed two quadrangular cavities 20, 20, which receive the small brass blocks 20′, which just fill the cavities, and are about flush with the edges.

The shell of the socket is formed as usual in two parts, the lower part having a cylindrical portion 21, which is of such size as to embrace the reaction coil and to fit closely over the edges of the widest portion of the block 4, and it is held to that block by screws 21′, passing through the shell and tapped into the brass blocks 20′. This wide cylindrical portion of the lower shell is joined to a smaller cylindrical portion or neck 22, by a conical molding 23, and where this molding merges into the neck 22, there is formed a bead 24, which is of such size that the lower edge of the porcelain disk 14 fits into the same. It will now be clear that when the shell 21 is passed over the reaction coil and over the sides of the widest portion of the head 5, and is pressed upwardly until the holes in the shell for the passage of the screws 21′, register with the nut holes in the blocks 20′, the porcelain disk 14 is tightly pressed with its hub against the lower end of the stem 6, and with its rim against the lower edge of the reaction coil; when now the screws 21′ are put in place, the porcelain supports are secured together and clamp between themselves the reaction coil. In the manipulation of this regulating socket for inspection and repair, there is a tendency to turn the block 4 about its axis, and if this block were permitted to thus turn without at the same time turning the porcelain disk 14, the wires which pass between the coil and either of these blocks might be twisted off. This is prevented by the brass block 12, which, as will now be understood, couples the block 4 with the disk 14 in such a manner that if one of them is turned the other will turn with it.

For the mounting thereon of the switch mechanism the head 5 is molded as follows. On the face of the head which is shown in Fig. 3, there is formed a shallow recess 25, intended to receive a brass strip 26, shown in Figs. 1 and 2, and which projects above the upper end of the head and has there a binding post 27, for the reception of one of the

leading-in wires 28. The brass strip or bracket 26 is secured in the recess 25 by a screw 29, which passes through a hole 30, formed in the head 5, and which is wider at one end than at the other, so that the screw is inserted through the wide end of the hole, which easily admits the head of the screw, as indicated in Fig. 1, (see also Fig. 4,) but which head cannot pass through the smaller part of the hole, so that when the screw is screwed into the brass strip 26, the latter is tightly drawn into the recess 25. Immediately above the hole 30 and still within the recess 25, there is a rather large hole 31, formed in the head for the passage therethrough of the spindle 32 of the key 33. A similar hole is formed in the brass strip 26 through which the spindle also passes and in which it turns as a bearing. The end of this spindle is flat screw-threaded as shown, and the switch arm 34 is there secured to it by means of a nut 35. On each side of the recess 25 (which corresponds to the central position of the switch-arm), there are formed on this face of the head small protuberances 36, which serve as stops for the extreme positions of the switch-arm. On each side of the recess 25, quite close to the same, so as to merge into it, is a hole 37, the two holes being on the line of a diameter of the hole 31, so that a line which connects the centers of the holes 37 passes through the center of the hole 31, and is parallel to the upper and lower edges of the head 5. These holes 37 are formed rather wide in the face of the block which is shown in Fig. 3, and are then reduced in size, so that these holes will appear rather small upon the face of the block which is shown in Fig. 4. Altogether these holes are formed just like the hole 30, except that the wider or countersunk portions are on the other side of the head 5; they also serve a similar purpose as the hole 30, as will presently appear.

On the face of the head which is shown in Fig. 4, and concentric with the hole 31, there is formed an annular recess 38, thus leaving in the center an annular ring 39, upon which the stem of the key bears. Into the recess 38 is fitted an annulus 40, of brass, which has an upwardly projecting lip 41, carrying a binding screw 27′, for the attachment thereto of the second leading in wire 28′. The annulus 40 is secured in the recess 38 by two screws 42, which are inserted through the wide ends of the holes 37 and are tapped into the annulus; the heads of these screws, bearing upon the bottoms of the wide portions of the holes 37, tightly draw the annulus into the recess. The annulus also carries a binding screw 40′, for the attachment thereto of a wire 40″, which connects with one of the lamp terminals, which will be described farther on.

Upon an arc concentric with the center of the hole 31 there is formed in the head of the block a series of holes 43, and upon another arc of longer radius there is another series of holes 44, so that for each hole 43, there corresponds upon the same radius drawn from the center of the hole 31, a hole 44. Between each hole 43 and its corresponding hole 44, there is formed in the face of the head shown in Fig. 3, a radial recess 45, and upon the face of the head shown in Fig. 4, there extends from each hole 43 a short radial recess 46 toward the center of the hole 31; all these recesses merging into the holes between which they extend or from which they start. By preference, but not necessarily so, the holes 44 are countersunk upon the face of the head which is exhibited in Fig. 4. By this construction there are formed below the face of the head exhibited in Fig. 3, a number of short ledges 47, extending between each pair of holes, and these ledges are rounded off as is clearly shown in Fig. 1. The two segmental series of holes serve the purpose of connecting the different sections of the reaction coil with the contact blocks, over and in contact with which the switch-arm moves, and this is accomplished in the following manner: A branch wire 48, coming from the juncture of two adjacent sections of the reaction coil, has a portion of the insulation removed and is introduced into one of the holes 44 on the side of the block represented in Fig. 4, the countersink of that hole serving as a guide; the wire is passed through that hole until it projects on the face of the head represented in Fig. 3, and is then inserted into the corresponding hole 43; it is tightly drawn through that hole until the wire snugly fits over the rounded ledge 47, and the portion which then projects on the side of the block shown in Fig. 4, is cut off flush with the face of the block. The wire where it passes over the ledge 47, is still a considerable distance below the face of the block as will be clear by reference to Fig. 1. The contact blocks 49 for these wires 48, are shaped as shown in Figs. 1 and 2, that is to say, with a head which corresponds in size to the recess 45, and with two legs 50, 51. The leg 50 is rather short as shown, while the leg 51, is of such length that when the block is inserted as shown in Fig. 1, it will project through the hole 43 beyond the face of the block on the side represented in Fig. 4, so that it may be bent down or clinched over into the recess 46. On the inner side, where the two legs join the head, the contact block is formed concave so as to fit the surface of the wire 48 which has been passed over the rounded ledge 47. It will be seen that by this construction the contact blocks are connected with the branch wires from the different sections of the reaction coil, and are secured to the head of the porcelain block, without the use of screws, bolts, &c.

The size of the heads of the contact blocks is such that they snugly fit into the recesses 45, and the legs 50, 51 are of such size that they wedge with considerable force into the holes 43, 44, the openings of which are reduced by the presence therein of the wires 48, so that good contact is established between said block and the bared wires 48. The thick-

ness of each contact block is such that when driven home, its exposed surface will be slightly below the surface of the head 5. A particular advantage results from this construction, since the spaces 52 between the contact blocks which are slightly convex, thereby become, as it were, the teeth of a ratchet, over which the free end of the switch lever 34 rises, and then drops down by its elasticity into the comparative hollows or depressions represented by the surfaces of the contact blocks, making sure contact with these blocks, and at the same time apprising the user by a vibratory sensation transmitting through the key to the hand that contact is established. Accidental displacement of the switch lever is thereby not easily occasioned, since the switch arm operates as a kind of spring pawl.

The switch arm 34 is made from a piece of elastic sheet brass, or similar material, with the free end considerably reduced in width, and is struck up by a die so as to form a small cavity 53 on one side and a corresponding protuberance on the other side; and it is this protuberance which makes contact with the contact blocks, and being rounded, it easily rides over the contact spaces 52, and correctly falls in place upon the contact blocks.

As stated above the block 4 is preferably made of porcelain, and this material in its natural state has a considerable grit, so that as the free end of the switch arm passes from one contact block onto the other, it would be ground away and would deposit a thin layer of metal upon the spaces 52; this metal becoming, eventually, sufficiently heavy to bridge the contact blocks. This should be avoided, and for this purpose that portion of the face of the head 5 on which the contact blocks are disposed is glazed, as indicated in Fig. 3, by appropriate shading.

One of the lamp terminals is formed by the screw-threaded tube 13 which projects from the little brass block 12, and the other lamp terminal is formed by a brass ring 54, which loosely fits into the annular groove 15 formed in the porcelain disk 14. This ring 54 is secured in the groove 15 by a single screw passing up into the ring through a hole 55, formed in the disk, the hole being countersunk on the underside as indicated in dotted lines in Fig. 5, so that the screw head is flush with the lower face of the disk. In the drawings this screw is not visible. The wire 40″, coming from the binding screw 40′ is slipped under the ring 54 before it is screwed tight onto the disk 14. There are two other holes, 56, in the disk 14, on diametrically opposite sides, and through these two holes, two screws 57 are tapped into the ring 54, and the heads of these screws projecting below the lower face of the disk 14 constitute in reality the second terminal of the lamp; the lamp being so constructed that when slipped up into the neck 22 of the shell, it is screwed over the tube 13 and makes contact with the heads of the screws 57. This is a well known construction, and will be readily understood by those skilled in the art. The upper half 22′ of the shell of the socket is removable, and is so formed as to fit approximately to the outline of the side edges of the head 5 of the porcelain support, and is otherwise constructed in the usual manner and need not be further described.

The porcelain supports, hereinbefore described, can be and are molded with the various holes, recesses and projections, by means of specially constructed molds, with great accuracy, so that no additional fitting or rectifying is required; these supports are therefore all alike and exchangeable; they are considerably cheaper than if made of wood, vulcanized fiber or hard rubber, and can be produced in great quantities in a very short time, and without the use of particularly skilled labor.

I do not herein claim the special construction of the central contact terminal for the lamp filament; consisting of a split tube, screw-threaded on the exterior but smooth on the inside, and which has special utility in so far as it is adapted to incandescent lamps of different types. This I propose to claim in a separate application which I am about to file.

Having now fully described my invention, I claim and desire to secure by Letters Patent—

1. In a regulating socket for incandescent electric lamps, a reaction coil and a holder or support for the same, composed of two blocks of refractory insulating material, clamped together and to the reaction coil by the shell of the socket, substantially as described.

2. In a regulating socket for incandescent electric lamps, a reaction coil and a holder or support for the same, composed of two blocks of refractory insulating material, axially joined by a loose coupling, and clamped together and to the reaction coil by the shell of the socket, substantially as described.

3. In a regulating socket for incandescent electric lamps, the combination of a reaction coil, switching mechanism, and a support for both, made of refractory insulating material; with metal blocks inserted into recesses in the sides of the support and screws tapped into the blocks and passing through the shell of the socket, substantially as described.

4. In a regulating apparatus for electrical translating devices, a switch board having a base of refractory insulating material formed with recesses for the reception of the contact blocks and a hole at each end of each recess for threading the conductor terminals for the blocks on to the base board, substantially as described.

5. A switch board for regulating or controlling electrical translating devices, comprising a base of refractory insulating material, formed with a series of recesses for the reception of the contact blocks, and a hole at

each end of each recess; conductor terminals threaded through said holes onto the base, contact blocks wedged into the holes and seated in the recesses, and a switch arm movable over the contact blocks, substantially as described.

6. In an electrical switch board, the combination of a molded base of porcelain or equivalent refractory insulating material, formed with a segmental series of radial recesses and a hole at each end of each recess; with conductor terminals threaded through said holes onto the base, contact blocks wedged into the holes and seated in the recesses, and a pivoted switch arm movable over the contact blocks, substantially as described.

7. In an electrical switch board, the combination of a molded base of porcelain or equivalent refractory insulating material, formed with a segmental series of radial recesses in one face of the block, for the reception of contact blocks, a hole at each end of each recess and a radial recess extending from each hole of one set on the second face of the block; in combination with conductor terminals threaded through the holes on to the block, and contact blocks having each a head and two legs, the latter wedged into the holes and one of them clinched over into the corresponding recess in the second face of the block, substantially as described.

8. In an electrical switch board, the combination of a base having a series of recesses separated by webs formed in one face; with contact blocks seated in the recesses below the face of the webs, and an elastic switch arm movable over and in contact with the blocks and webs, substantially as described.

9. In an electrical switch board, the combination of a base having a series of recesses with rounded separating webs formed on one face, with contact blocks seated in the recesses below the face of the base, and an elastic switch arm with a rounded struck up contact point, substantially as described.

10. In an electrical switch board, the combination of a base of porcelain having a series of recesses formed in one face, and a glazing over the webs which separate the recesses; with an elastic switch arm bearing upon the said webs and making contact with the blocks, substantially as described.

11. In an electrical switch board, a molded base of porcelain or equivalent material, formed with holes and recesses for the reception of terminal conductors, contact blocks, and for the mounting of a switch arm and key, and two raised portions serving as stops for the switch arm, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ELIAS E. RIES.

Witnesses:
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