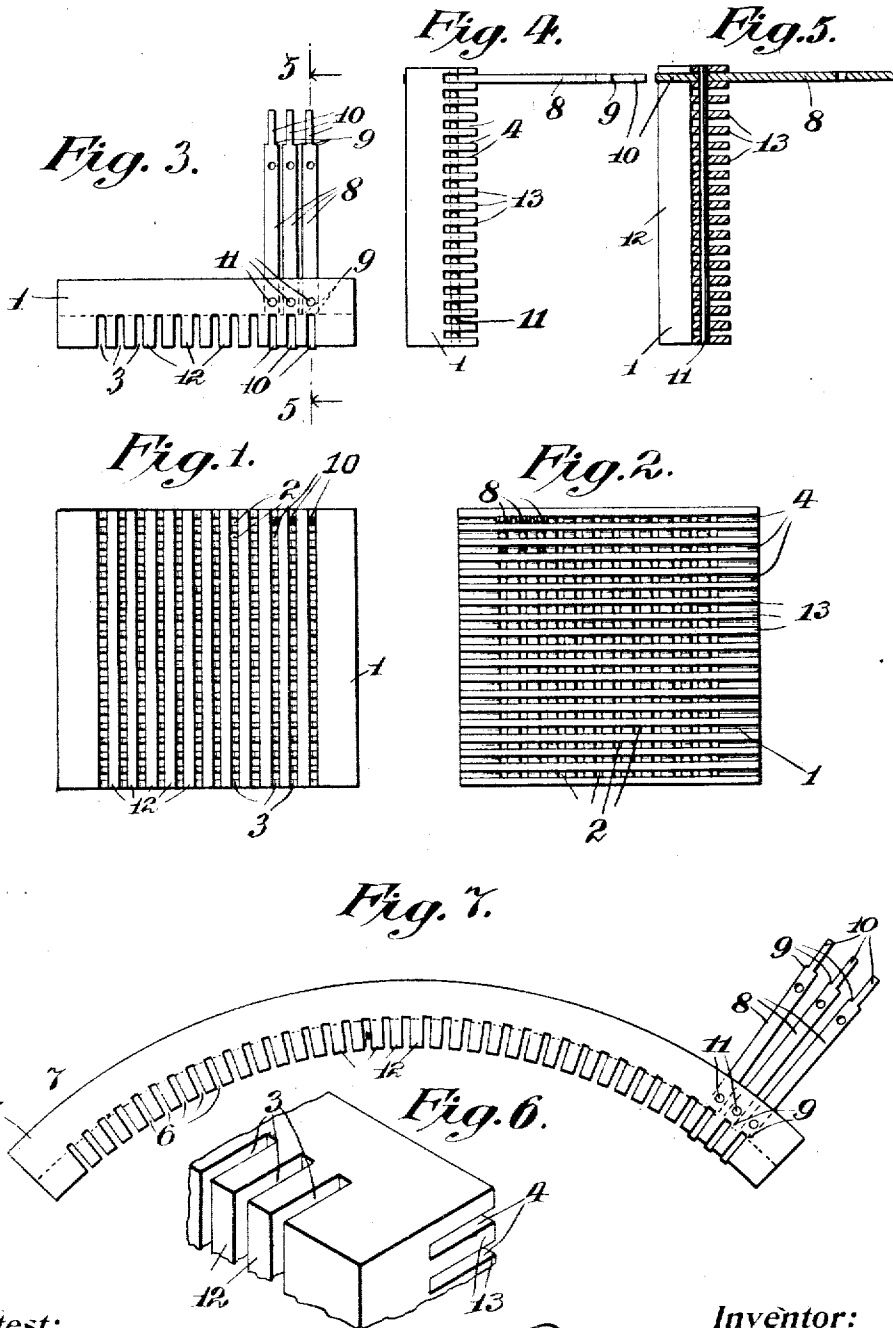


F. R. McBERTY.
 PERFORATED BLOCK FOR ELECTRIC CONDUCTORS.
 APPLICATION FILED FEB. 27, 1908.

920,614.

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PERFORATED BLOCK FOR ELECTRIC CONDUCTORS.

No. 920,614.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FRANK R. McBERTY, a citizen of the United States, residing at New Rochelle, in the county of Westchester and State of New York, have made certain new and useful Improvements in Perforated Blocks for Electric Conductors.

My invention relates to a block having a plurality of perforations therein in which perforations electric conductors are adapted to pass through and be supported by or mounted upon the block; the invention being specially designed to effect the mounting of electric conductors in the form of pieces of metal intended to serve as terminals of an electrical switch, or other electrical device.

Heretofore in producing a plurality of holes in a block of insulating material for receiving electrical terminals it has been customary to drill the holes, either drilling each hole separately, or drilling a large number at the same time by means of a gang of drills. This method is, of course, only capable of producing round holes, and even where the holes are spaced sufficiently far apart to permit gangs of drills to be used, is slow and expensive. By means of my invention it becomes possible not only to produce perforations of a square or other non-circular form in a block of material, but it is possible to produce a very great number of such holes with the minimum amount of labor and at a minimum expense.

When a plurality of perforations is to be formed in a block of insulating or other material in accordance with my invention, the block is provided with a series of grooves in one of its faces, and with a series of grooves in its opposite face extending at an angle to the first mentioned series, and sufficiently deep to intersect the inner extremities of the series on the other face. In this way a hole having a shape determined by the angle of intersection of the grooves and by the contour of the walls of the grooves is formed at each point of intersection, and as many holes are formed as there are intersections. Thus by cutting, or otherwise forming, fifty grooves in one face of the block of material and thirty intersecting grooves on the opposite face, fifteen hundred holes will be produced. In this way the fifteen hundred holes are formed in a very small fraction of the time that would be required to produce them by drilling, even if a gang of drills were em-

ployed; and the holes may be of any form best adapted to fit the perforated block to the use to which it is to be put.

If the grooves are rectangular and extend at right angles to each other on the opposite face of the block the holes produced will be square holes. By varying the angle of intersection of the grooves and the contour of the groove walls, holes of any form desired may be produced at the points of intersection.

I will describe my invention more particularly by reference to the accompanying drawings in which—

Figure 1 is a view of one face of a block of material having a number of perforations formed in it in accordance with my invention, and provided with a few of the number of electrical terminals with which it is adapted to be equipped; Fig. 2 is a view of the other face of the block; Fig. 3 is a view of the upper end of the block illustrated in Fig. 1; Fig. 4 is a view of the right hand end of the block shown in Fig. 1; Fig. 5 is a sectional view of the block taken on line 5—5 of Fig. 3; Fig. 6 is a perspective view of one corner of the block; Fig. 7 is a view looking at the top of a curved block in which perforations are formed in accordance with my invention, for the accommodation of a large number of metal punchings forming the stationary terminals of an electrical switch.

The use or application of my invention which I have particularly illustrated in the accompanying drawing, and which I shall now describe, is that involved in the production of supporting or mounting blocks for electrical conductors, especially electrical terminals such as are employed in electrical switches, and in other electrical apparatus where it is desired to locate a large number of terminal pieces within a small space. The form of terminal block illustrated in Figs. 1 to 6, inclusive, of the drawing, consists of a block 1 of insulating material—such as hard rubber or insulating fiber—in which a large number of holes 2 is formed by providing the block with a series 3 of grooves or slots in one of its faces, and another series 4 of grooves or slots in its opposite face, the two series extending transversely with respect to each other and being made of a depth sufficient to cause their inner extremities to intersect each other. As shown, the grooves of each series lie parallel

to each other, and the two series of grooves on the opposite faces of the block are arranged at right angles to each other. With this relation between the grooves, the perforations that are formed at the points of intersection of the two series are square, and have a rectangular relation to each other. It is obvious that by forming the series of parallel grooves on one face of the block so that it intersects the series on the other face of the block obliquely, instead of at right angles, perforations can be formed of any shape and saving any straight line relation to each other desired. The arrangement and shape of the holes can also be further modified, if desired, by altering the contour of the walls of the grooves, and by employing other than the parallel relation illustrated between the grooves of the same series. As shown in the drawings, each groove is so formed as to cause its inner walls to lie parallel to each other, and this is the relation which I prefer to employ. In the particular terminal block illustrated in Figs. 1 to 6, inclusive, there are twelve grooves in one face of the block and eighteen intersecting grooves in the other face, a square hole being formed at each point of intersection of one of the grooves with another. The number of holes is, of course, equal to the product of the number of grooves on one side of the block into the number of grooves on the other side, so that in the particular block illustrated the total number of perforations is twelve times eighteen or two hundred and sixteen.

In Fig. 7 I have illustrated another form of terminal block provided with perforations, in accordance with my invention, for the accommodation of the terminal pieces to be mounted in it. The terminal block illustrated in Fig. 7 is of the same character as that illustrated in Figs. 1 to 6, inclusive, excepting that its surfaces are curved to lie in concentric arcs of a circle, in order to bring the inner ends of the terminal pieces that it supports into position to be traversed by a movable terminal carried upon an arm pivoted at the center of the arc in which the inner surface of the block lies. The terminal block of Fig. 7 consists of a block 5 of insulating material—such as hard rubber or the like—having its surface curved into the form of a segment of a cylinder, and provided with a series 6 of grooves in the inner or concave surface of the block, extending parallel to the longitudinal axis of the cylinder, and a series 7 of parallel grooves on the opposite or convex surface of the block extending at right angles to the series of grooves in the inner or concave surface of the block. As illustrated in the drawing, the inner extremities of the grooves in the outer or convex surface of the terminal block 5 (represented by the dotted line concentric

with the curved surfaces of the block) intersect the inner extremities of the series of grooves formed in the concave surface of the block, and at each point of intersection a square perforation of the terminal block is formed. The other dimension of the terminal block illustrated in Fig. 7 is not shown, but it will be understood that the block may be made of any convenient width, and may be provided with any desired number of grooves in its outer or convex surface. As illustrated, there are thirty-seven parallel grooves in the inner surface of the block, and if it be assumed that the outer surface is provided with, say, thirty grooves, the total number of perforations formed will be eleven hundred and ten.

Perforated blocks of the character described are intended and adapted to support electrical conductors, or electrical conducting elements passed through perforations in the blocks. The particular forms of terminal block illustrated in the drawings are to be provided with a full equipment of conductors or conducting elements in the form of terminal pieces; but for the sake of simplicity in illustration only a few terminals are shown mounted in each block. One form of terminal piece which I have found it convenient to employ is that illustrated in the drawing, consisting of a flat metal punching 8 provided with shoulders 9 and a narrow portion or tongue 10 at each end. One of these terminal pieces is placed with its tongue 10 projecting through the terminal block at each of the perforations 2, the end of the tongue protruding slightly beyond the front surface of the terminal block, in order that it may be engaged by the movable terminal of a switch, or may be connected with in any other manner desired. The shoulders 9 in the forward end of each terminal piece 8 rest against the bottom of the groove in which the terminal is mounted, and thus serve to limit the extent to which the forward end can be caused to protrude beyond the face of the terminal block. The terminals may be held in place in the terminal block by means of insulating rods 11, which are thrust through transverse series of holes in the webs into which the rear surface of the terminal block is divided by the parallel grooves, and through registering perforations in the forward ends of the terminal pieces. On account of the transverse relation of the grooves on one surface of the terminal block to the grooves on the other surface, and the correspondingly transverse relation to each other of the series of webs 12 and 13 on the opposite surface of the block, the terminal pieces 8 are supported against lateral displacement, the webs on each surface of the block supporting the terminal pieces against lateral displacement in the direction of the grooves on the other sur-

face of the block. The terminal pieces are thus held securely in position, being supported against lateral displacement by the transversely extending webs or walls of the grooves, and being prevented from lengthwise displacement by the shoulders 9 and the rods or pins 11. It will, of course, be understood that the terminals mounted in the terminal blocks may be of any form desired, and may be held in place in any convenient manner.

The grooves, the intersections of which produce the perforations of the terminal block, may be formed in a number of ways. They may be formed, for instance, by molding them in the opposite surfaces of the block of insulating material when it is in a plastic condition. The method, however, which I prefer to employ is to cut the grooves in the flat surfaces of the terminal blocks by subjecting the blocks to the action of cutters in a milling machine. In producing the terminal block illustrated in Fig. 7—which is particularly adapted to accommodate the stationary terminals of the automatic switch—I have found it convenient to proceed as follows: A hard rubber tube having dimensions approximately corresponding to the dimensions of the cylinder of which the terminal block of Fig. 7 forms a segment is put on a lathe and bored out to the proper inside diameter. The outer surface of the tube is then turned off to the proper outside diameter, after which the tube is put on a milling machine and a series of circumferential slots cut on the outer surface to the proper depth by means of a gang of properly spaced cutters, as many slots being cut as there are circumferential rows of terminals to be accommodated. The inside axial slots are then cut, preferably one at a time, by means of an internal gear cutter, these slots being cut just deep enough to intersect the lower extremities of the transverse slots on the outside of the tube. The tube is then slit axially into segments of the form illustrated in Fig. 7. The terminal blocks shown in Figs. 1 to 6, inclusive, of the drawing are made, preferably, by passing a gang of properly spaced cutters first over one face of the block or plate of insulating material, and then over the opposite face of the block or plate in a transverse direction, the grooves being cut deep enough to intersect at their inner extremities. It is obvious that this method is applicable to the production of a plurality of perforations in a block or plate of metal, which may then be employed as a mounting block for electrical terminals by insulating the terminals from the block by means of interposed insulating material.

While my invention is capable of employment for a diversity of purposes, it is of particular utility in the production of mount-

ing blocks for the terminals of electrical switches, and I have illustrated such a terminal block in my application Serial No. 418,126 filed Feb. 27, 1908, and in this other application I have claimed the terminal block in combination with other elements of an automatic switch.

I claim:

1. The combination of a block having a series of grooves in one of its faces, and one or a series of intersecting grooves in an opposite face, the intersection of said grooves forming perforations through the block, and electric conductors mounted in said perforations.
2. The combination of a block of insulating material having a series of parallel grooves in one of its faces, and a series of parallel grooves in an opposite face, the intersection of said grooves forming perforations through the block, and electric conductors supported in and passing through said perforations.
3. A terminal block, consisting of a block of material having a series of grooves formed in one of its faces, and a series of intersecting grooves formed in its opposite face, and a plurality of electrical terminal pieces extending through the block at the perforations produced by the intersections of the two series of grooves.
4. A terminal block having a series of grooves in opposite faces, said opposite grooves intersecting to form openings, a plurality of terminal pieces situated in the openings, and means for determining the position of the terminals longitudinally of the openings.
5. A terminal block consisting of a body of insulating material having a series of parallel grooves in one of its faces and a second series of parallel grooves in its opposite face, said opposite grooves intersecting to form openings, and a plurality of terminal pieces situated in the openings and being provided with shoulders cooperating with the block.
6. A terminal block, consisting of a block of insulating material having a series of parallel grooves formed in one of its faces and a series of parallel grooves at right angles thereto in its opposite face, said two series of grooves intersecting to form a plurality of square holes, and a plurality of rectangular terminal pieces thrust through the square holes in said block, said terminal pieces being provided with shoulders to fix their position in the block with respect to movement in one direction.
7. A terminal block, consisting of a block of insulating material having a series of parallel grooves formed in one of its faces and a series of parallel grooves at right angles thereto in its opposite face, said two series of grooves intersecting to form a plu-

5 rality of square holes, and a plurality of rectangular terminal pieces thrust through the square holes in said block, said terminal pieces being provided with shoulders to fix their position in the block with respect to movement in one direction, and pins passing through the block and engaging said terminal pieces to fix the position of said terminal pieces in the block with respect to movement in the other direction.

10 8. A terminal block, consisting of a block of material having a series of grooves in one of its faces and a series of grooves at right angles thereto in its opposite face, said series of grooves on the opposite faces of the block intersecting at their inner extremities to form a plurality of perforations, and a plurality of terminal pieces extending through the block by the way of said perforations, the webs constituting the walls of the grooves on one side serving to hold said

terminals against movement in one plane, and the webs constituting the walls of grooves on the other side of the block serving to hold the terminals against movement in the other plane. 25

9. A terminal block, consisting of a block of insulating material having a series of parallel grooves formed in one of its faces and a transverse series of parallel grooves formed in its opposite face, said two series of grooves intersecting to form a plurality of perforations, a plurality of terminal pieces extending through the perforations in said block, and means for fixing said terminal pieces in position with respect to lengthwise movement thereof. 30 35

FRANK R. McBERTY.

Witnesses:

NICHOLAS E. KERNAN,
WILLIAM G. McKNIGHT.