No. 846,969. PATENTED MAR. 12, 1907.

M. J. WOHL.

SHUNT FOR ELECTRIC CIRCUITS.

APPLICATION FILED DEC. 13, 1906.

Fig. 1

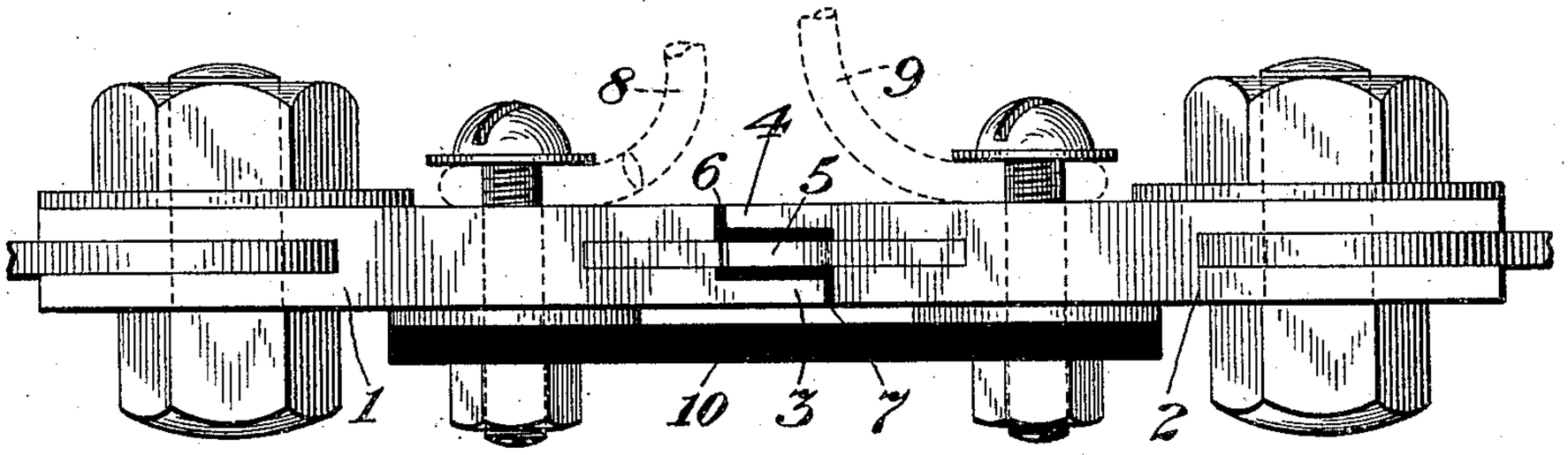


Fig. 2

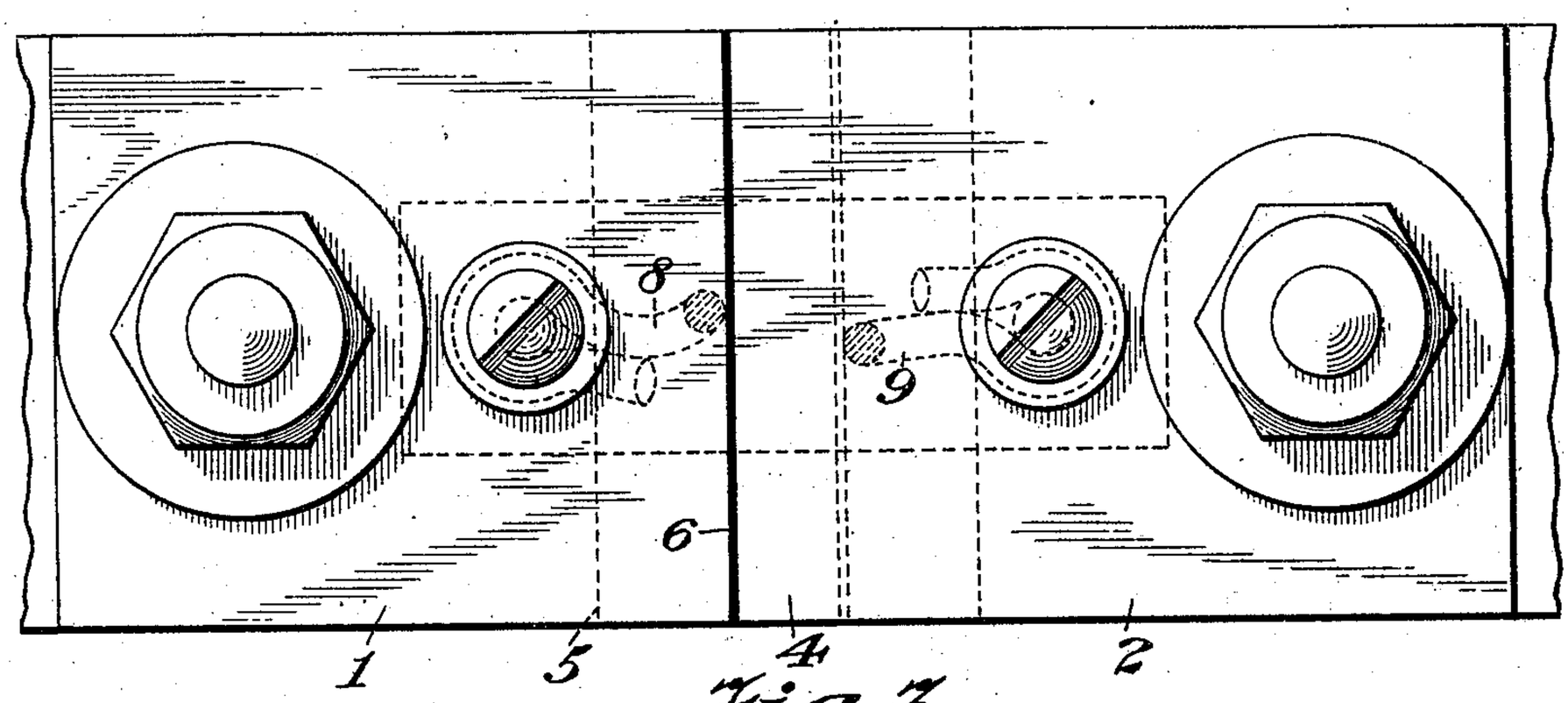
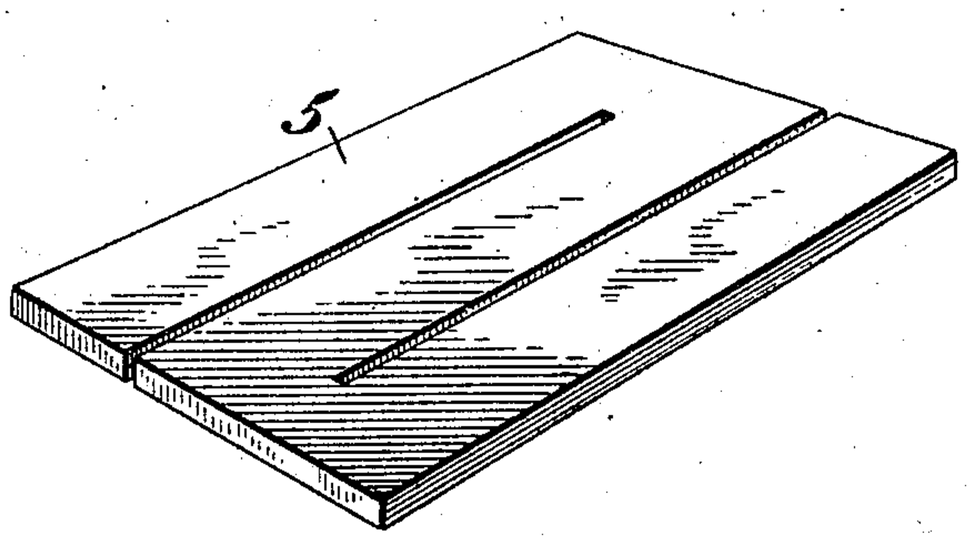


Fig. 3



WITNESSES

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SHUNT FOR ELECTRIC CIRCUITS.

No. 846,969. Specification of Letters Patent. Patented March 12, 1907.

Application filed December 13, 1906. Serial No. 347,685.

To all whom it may concern:

Be it known that I, MAURICE J. WOHL, a citizen of the United States, and a resident of the city of New York, in the county of Kings and State of New York, have invented certain new and useful Improvements in Shunts for Electric Circuits, of which the following is a specification.

This invention relates to shunts adapted to be placed in an electric circuit and connected with a measuring instrument so that only a portion of the current passes through said instrument. The construction and use of a device of this nature is well understood, and consequently it is only necessary to set out herein the peculiar features of the shunt forming the subject-matter of this application.

It is common and well known in shunts to use a conductor of a relatively high resistance to connect a pair of terminal blocks, which allows a fixed amount of current of known potential to pass therethrough, a smaller amount of current being diverted through the measuring instrument. On account of the resistance of the conductor extending between the terminals it is necessary to provide for maintaining the same at as near a uniform temperature as possible in order to preserve a constant resistance of the same, and as the temperature of the air in different places where shunts are used varies greatly it has been found that the amount of variation in temperature of the conductor will be much less if the same is inclosed by material having a relatively large heat-conducting capacity. It is known that certain materials, such as copper, which form the best conductors for the electric current also have a large heat-conducting capacity.

In my invention as illustrated in the shunt shown and described herein I have provided a pair of terminal blocks of conducting material. The opposing faces of these terminal blocks are so formed that a conductor or shunt of relatively high resistance may be placed in position in this terminal block, and when so positioned will be inclosed in the same. Insulating material is provided to separate the opposing ends of the terminals, thus causing the current to pass through the conductor between the terminals. The heating caused by the current passing through this conductor will thus be carried away by the inclosing material of the terminals and will be radiated from the large surface thereof. The terminal blocks may be formed by shaping the ends of the bus-bars so as to receive the conductor instead of making the terminals in separate pieces, if desired.

In the drawings accompanying this specification same parts in the several views have been given similar reference-numbers.

Figure 1 is a side elevation of a shunt embodying my invention. Fig. 2 is a plan view of the same. Fig. 3 is a detailed perspective view of one form of conductor which may be used to connect the terminals.

A pair of terminal blocks are shown at 1 and 2, respectively, each of which is provided with suitable means for connecting the same to the bus-bars. These terminal blocks are provided with projecting portions 3 and 4, respectively, and also with slots in which the conductor 5 is placed. The conductor 5 is seated in these slots or otherwise suitably secured to each of the terminal blocks 1 and 2, so as to form an electrical connection between the same. Insulating portions 6 and 7 separate the projecting portions 3 and 4, respectively, from the conductor 5 and also from the opposing faces of the opposite terminals. This causes all of the current passing between the terminal blocks 1 and 2 to flow through the conductor 5, except a small portion which passes to the measuring instrument through the leads 8 and 9. It is thus seen that the conductor 5 is entirely inclosed by the terminals, and the heat therefrom will be rapidly conducted away by the terminal blocks, which are of relatively large mass and preferably constructed of copper, which has a large heat-conducting capacity.

The insulation at 6 and 7 shown has been exaggerated somewhat in the drawings and in actual practice would be relatively thin, as there is only a slight difference of potential between the adjacent parts separated thereby, and consequently this insulation does not interfere with the heat radiation from the conductor to the inclosing metal, as above described.

In order to provide a path for the current through the conductor of greater length than the distance between the terminal blocks, the same may be slotted or cut transversely from the opposite sides thereof, as shown in Fig. 3. This enables me to make a shunt of

the same dimensions for either a large or a small current or to replace a shunt of large capacity with one of a smaller capacity without changing the terminals.

On account of the peculiar features of construction of my shunt the usual terminal blocks may be done away with, if desired, and the ends of the bus-bars milled so as to receive the conductor or shunt metal as described, and the dimensions to which the bus-bars are to be milled may be the same for several different capacities of shunt metal on account of the variation in length of the path for the current and resistance of each piece of shunt metal itself which may be produced by slotting the same as described.

In order to relieve the strain on the conductor or shunt metal, I have provided a stiffening member 10, extending from one to the other of the terminal blocks. This stiffening member may be formed of insulating material and secured to the terminal blocks by any suitable means, or instead of making this stiffening member of insulating material the same may be insulated from the terminal blocks at the point where it is fastened thereto, if desired.

It is thus seen that I have provided a shunt of very simple and substantial construction in which a constant resistance of the conductor or shunt metal is maintained on account of the means provided for conducting away the heat uniformly by the inclosing metal surrounding the conductor. Another advantage obtained by this construction is in the protecting of the conductor or shunt metal from injury on account of the same being inclosed as described.

As many changes could be made in the above construction and many apparently widely-different embodiments of my invention designed without departing from the scope thereof, I intend that all matter contained in the above construction or shown in the accompanying drawing shall be interpreted as illustrative merely of an operative embodiment of my invention and not in a limiting sense.

What I claim is—

1. In a shunt for electric circuits, a pair of terminal blocks of conducting material, and a conductor extending between and inclosed by said blocks.

2. In a shunt for electric circuits, a pair of terminal blocks of conducting material, and a conducting-plate extending between and inclosed by said blocks.

3. In a shunt for electric circuits, a pair of terminal blocks of conducting material, and a portion of metal forming a conductor extending between and inclosed by said blocks.

4. In a shunt for electric circuits, a pair of terminal blocks of conducting material, and a conductor extending between and inclosed by said blocks, the mass of said blocks being relatively large as compared with that of said conductor.

5. In a shunt of electric circuits, a pair of terminal blocks of conducting material, and a conductor extending between and inclosed by said blocks, the cross-sectional area of said blocks being relatively large as compared with that of said conductor.

6. In a shunt for electric circuits, a pair of terminal blocks of conducting material, and a conductor extending between and inclosed by said blocks, the said conductor being formed of a material of higher resistance than the resistance of said blocks.

7. In a shunt for electric circuits, a pair of terminal blocks of metal, and a conductor extending between and inclosed by said blocks.

8. In a shunt for electric circuits, a pair of terminal blocks of conducting material having opposing faces separated by insulating material, and a conductor extending between and inclosed by said blocks.

9. In a shunt for electric circuits, a pair of terminal blocks having relatively large heat-conducting capacity, and a conductor extending between and inclosed by said blocks.

10. In a shunt for electric circuits, a pair of terminals each having a projecting portion therefrom, and a conductor extending between said terminals and so positioned as to be inclosed thereby and by said projecting portions.

11. In a shunt for electric circuits, a pair of terminals having projecting portions from the opposing faces thereof, and a conductor extending between said terminals and so positioned as to be inclosed thereby and by said projecting portions.

12. In a shunt for electric circuits, a pair of terminals each having a projecting portion therefrom, a conductor extending between said terminals and so positioned as to be inclosed thereby and by said projecting portions, and insulating material separating said projecting portions from said conductor.

13. In a shunt for electric circuits, a pair of terminals having projecting portions from the opposing faces thereof, a conductor extending between said terminals and so positioned as to be inclosed thereby and by said projecting portions, and a portion of insulating material separating each of said projections from the opposing face of the opposite terminal.

14. In a shunt for electric circuits, a pair of terminals having projecting portions from the opposing faces thereof, a conductor extending between said terminals and so positioned as to be inclosed thereby and by said projecting portions, and a portion of insulating material separating each of said projections from said conductor.

15. In a shunt for electric circuits, a pair of terminals having projecting portions from

the opposing faces thereof, a conductor extending between said terminals and so positioned as to be inclosed thereby and by said projecting portions, and a portion of insulating material separating each of said projections from the opposing face of the opposite terminal and from said conductor.

Signed at New York city, in the county of New York and State of New York, this 11th day of December, A. D. 1906.

MAURICE J. WOHL.

Witnesses:

LEWIS J. DOOLITTLE,

H. W. FORSYTH.