Dec. 22, 1942. H. W. BATCHELLER 2,306,152

REVERSING RHEOSTAT

Filed Dec. 30, 1940

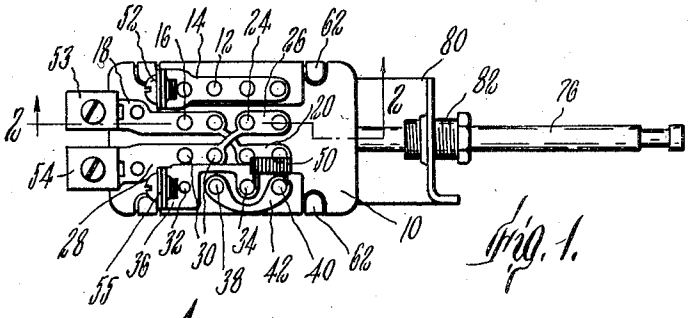

Fig. 1.

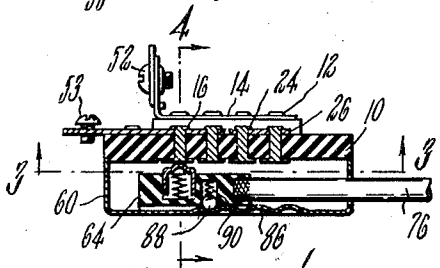

Fig. 2.

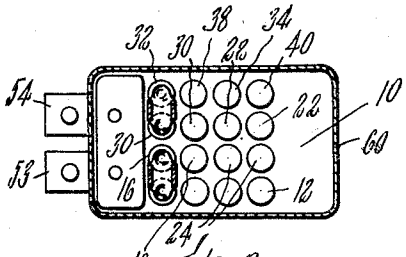

Fig. 3.

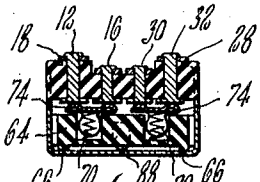

Fig. 4.

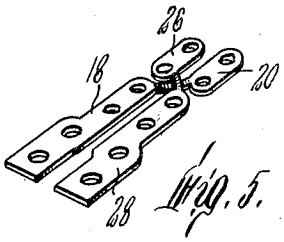

Fig. 5.

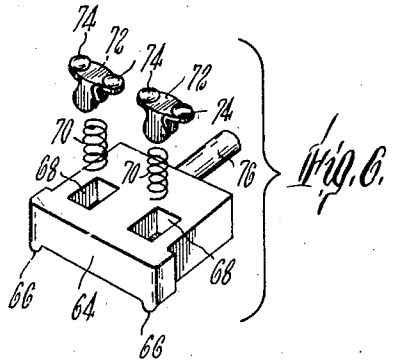

Fig. 6.

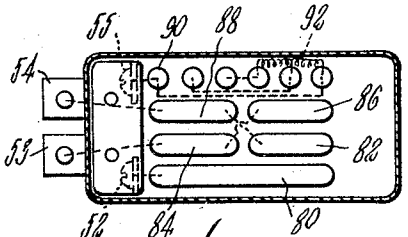

Fig. 7.

Inventor
Hugh W. Batcheller
by Wright, Brown, Quinby & May
Attys.

Patented Dec. 22, 1942

2,306,152

UNITED STATES PATENT OFFICE

2,306,152

REVERSING RHEOSTAT

Hugh W. Batcheller, Newton, Mass., assignor to Standard Mfg. Co., Worcester, Mass., a corporation of Massachusetts

Application December 30, 1940, Serial No. 372,325

2 Claims. (Cl. 201—62)

This invention relates to a reversing rheostat suitable for use on the dashboard of an automobile or elsewhere as desired.

It is an object of the invention to provide a rheostat which is compact and economical in structure, is reliable in operation, and is operated by a rod of the push-and-pull type.

As hereinafter described in more detail, the invention may be embodied in a rheostat including a plate of insulating material on which are mounted four parallel rows of fixed contact elements, these elements being exposed on the front face of the plate. The elements of the several rows are suitably connected as by metal strips on the rear face of the plate, these metal strips having end portions which serve as terminals or binding posts for the attachment of circuit wires. A pair of movable switch members in the form of bridging conductors are arranged to move in parallel paths so as to connect corresponding pairs of contact elements in the first and second rows and in the third and fourth rows. These bridging conductors are mounted in a block of insulating material adapted to be reciprocated against the front face of the plate by means of a rod which projects from the block through an end wall of the housing member which covers the front face of the plate.

For a more complete understanding of the invention, reference may be had to the following description thereof, and to the drawing of which

Figure 1 is a rear elevation of a reversing rheostat embodying the invention.

Figure 2 is a section on the line 2—2 of Figure 1.

Figure 3 is a section on the line 3—3 of Figure 2.

Figure 4 is a section on the line 4—4 of Figure 2.

Figure 5 is a perspective view of a pair of crossed connecting strips adapted to be mounted on the rear face of the base of the rheostat.

Figure 6 is a perspective view of the sliding block or carrier for bridging conductors, showing the bridging conductors and springs therefor.

Figure 7 is a diagrammatic representation of a modified form of base for a reversing rheostat.

As indicated in Figure 2, the rheostat may comprise a base 10 consisting of a plate of insulating material which carries the fixed contact elements of the rheostat. These elements are preferably arranged in four parallel coextensive rows as shown in Figure 3, each element consisting of a rivet having a flat head exposed on the front face of the plate 10, the other end of the rivet being employed to secure against the rear face of the plate connecting strips as hereinafter described. The rows of elements are referred to as the first, second, third and fourth rows for convenience of description, it being understood that no particular order is essential. In the form of the invention shown in Figure 3 there are four contact elements or rivets in each of the four rows shown.

The elements 12 of the first row are all connected together by a metal strip 14 which is secured by these elements against the rear face of the plate 10.

In the second row of elements two of the elements 16 are connected by a metal strip 18 which they secure against the rear face of the plate 10. This strip 18 has a laterally offset portion 20 which is secured by a pair of elements 22 in the third row. The remaining two elements 24 in the second row are connected by a portion 26 of a metal strip 28 which is laterally offset, the strip being secured to the plate 10 by the remaining two elements 30 as in the third row. Thus the elements of each of the second and third rows are divided into two groups which are arranged side by side and are diagonally connected. As indicated in Figure 5, the strip 18, 20 and the strip 28, 26 are crossed in such a manner as not to be in contact.

In the fourth row of elements the first element 32 and the third element 34 are connected by a metal strip 36, the other two elements 38 and 40 in this row being connected by a metal strip 42. Between any two consecutive elements in the fourth row, as for example the elements 34 and 40, is connected a resistance coil 50 of suitable characteristics, this coil being preferably secured in place by the rivets 34 and 40. The strips 14, 18, 28 and 36 are preferably provided with suitable terminals or binding posts 52, 53, 54 and 55, respectively, to which circuit wires may be attached.

The front face of the plate 10 is covered by a suitable housing member 60 which is secured to the plate 10 by any suitable means such as a plurality of ears 62 bent over the margin of the rear face of the plate as shown in Figure 1. Within the housing 60 and guided thereby is a slidable block 64 of insulating material, this block preferably having a pair of longitudinal ribs 66 which bear against the inner face of the member 60. The rear face of the block 64 is provided with a pair of suitable recesses 68 adapted to receive a pair of springs 70 and a pair of bridging conduc-

tors 72. Each bridging conductor is constructed so as to present to the front face of the plate 10 a pair of contact elements 74, these contact elements being so spaced from each other as to move up and down the rows of fixed contact elements on the plate 10 as the block 64 is reciprocated in the housing. The springs 70 press the conductors 72 yieldingly against the front face of the plate 10 so that good electrical contacts are maintained between the movable contact elements 74 and the fixed contact elements in the respective rows on the plate 10. For operation of the rheostat a rod 76 is secured to the block 64 and projects from the end wall of the housing. A finger knob (not shown) of desired size and shape is mounted on the projecting end of the rod. To provide a suitable bearing for this rod and also means for mounting the rheostat in position, a bracket 80 may be secured to the housing member 60, this bracket 80 having a screw-threaded bearing member 82 carried thereby for the rod 76.

As indicated in Figure 2, means may be provided for yieldingly holding the block 64 in any one of its various operative positions. Such means may consist of a series of bosses 86 pressed in from the front face of the housing member 60 to be engaged by a spring-pressed ball 88 seated in a recess 90 in the front face of the block 64.

In operating the rheostat, the rod 76 is pushed or pulled to move the bridging conductors 72 into simultaneous engagement with successive pairs of contact elements in the four rows of elements, one of the conductors connecting the elements of the first and second rows, the other conductor connecting the elements of the third and fourth rows. When the rod 76 is pulled sufficiently to move the block into the first operating position as illustrated in Figure 2, the bridging conductors are in the position indicated in Figure 3. This results in a direct connection between the terminals 52 and 53 and between the terminals 54 and 55. When the conductors are moved to the next position of operation, it is evident from Figure 1 that the terminals 52 and 53 will be directly connected but the terminals 54 and 55 will be connected through the resistance unit 62. In the next position of operation the terminal 52 is connected with the terminal 54 and the terminal 53 is connected with the terminal 55, this resulting in the reversed operation of an electric motor which is properly connected to the terminals of the rheostat. In the fourth position of operation, the terminal 52 is directly connected to the terminal 54 and the terminal 53 is connected to the terminal 55 through the resistance unit 62. Thus two speeds in either direction are provided for.

Figure 7 illustrates a form of invention by which three speeds in either direction may be obtained. As therein shown the first row of contact elements on the front face of the insulating plate is represented by a strip 80 of copper. The second and third rows of contacts are represented by pairs of elements 82, 84 and 86, 88. The fourth row of contacts consists of six separate contact elements 90, these contact elements being connected together in pairs as indicated. Suitable resistance units 92 are connected between successive elements in either half of this row. The operation of this rheostat is similar to that hereinbefore described in connection with the rheostat shown in Figure 3.

It is evident that various modifications and changes may be made in the embodiment of the invention herein illustrated and described without departing from the spirit or scope thereof as defined in the following claims.

I claim:

1. A rheostat comprising a plate of insulating material, four coextensive parallel rows of the same even number of contact elements exposed on the inner face of said plate, means electrically connecting together all of the elements of the first row in a group, means electrically connecting the elements of each half of the second and third rows of groups, crossed connectors connecting each group in the second row with the diagonally opposite group in the third row, means electrically connecting each element of half of the fourth row with the corresponding element in the other half of said fourth row, a resistance unit connected between each pair of consecutive elements in one half of the fourth row, a set of four terminals connected respectively to elements of said rows, a carrier slidable in a direction parallel to said rows, a pair of separate alined bridging conductors carried by said carrier and arranged transversely with respect to said rows of elements, one of said conductors being adapted to connect any element of the first row with a corresponding element in the second row, the second bridging conductor being arranged to connect any element of the third row with a corresponding element of the fourth row, and means for guiding the movement of said carrier.

2. A reversing rheostat comprising a plate of insulating material, four coextensive parallel rows of rivets extending through said plate, said rivets having their heads exposed on the front face of the plate, a metal strip secured against the back of said plate by all of the rivets of the first row, a second metal strip having a portion secured to the back face of the plate by some of the rivets in the second row, said second strip having a laterally off-set portion secured by some rivets of the third row, a third metal strip having two portions relatively offset laterally to register with the remaining rivets of the second and third rows and secured to the plate by said remaining rivets, a fourth metal strip secured by a pair of rivets in the fourth row which are respectively opposite to the two portions of the second and third strips, a resistance unit mounted on the plate, means electrically connecting the remaining elements in the fourth row to each other and through said resistance unit to said fourth strip, a terminal on each said strip, a pair of insulated bridging conductors movable on the front face of the plate to connect corresponding rivet heads in the first and second rows and in the third and fourth rows, and means for moving said conductors up and down said rows.

HUGH W. BATCHELLER.