W. R. YOUMANS.

RESISTANCE.

APPLICATION FILED OCT. 21, 1909.

1,065,015. Patented June 17, 1913.

Fig. 1

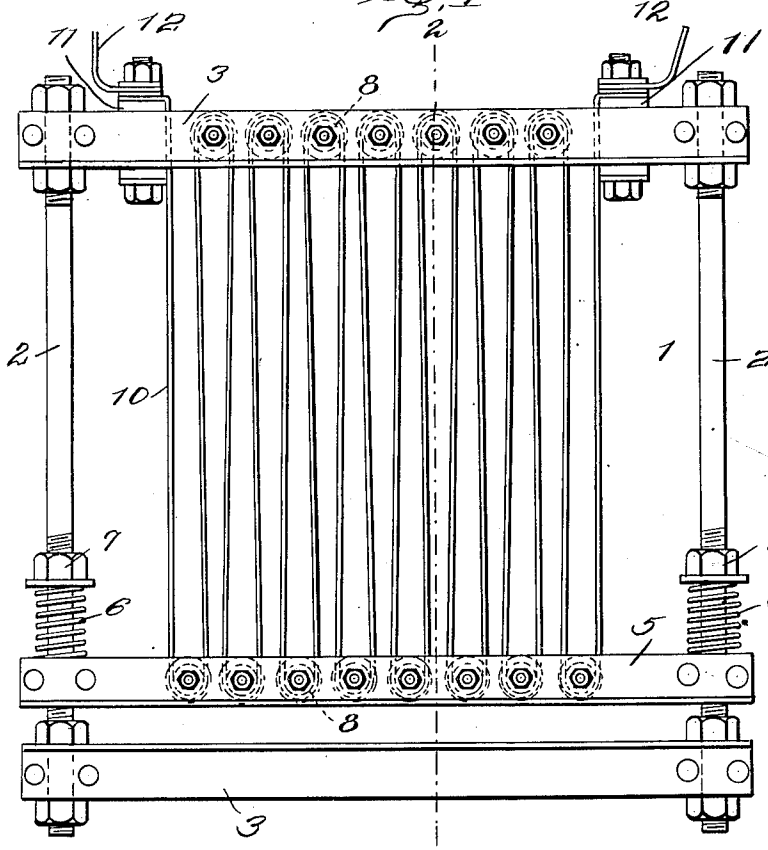
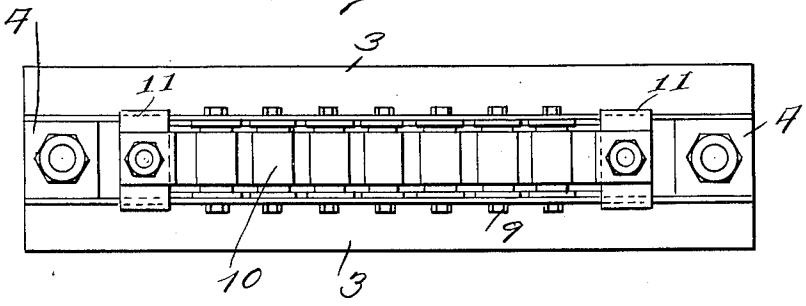


Fig. 2.

Fig. 3.



Witnesses

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UNITED STATES PATENT OFFICE.

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RESISTANCE.

1,065,015. Specification of Letters Patent. Patented June 17, 1913.

Application filed October 21, 1909. Serial No. 523,895.

To all whom it may concern:

Be it known that I, WILLIAM R. YOUMANS, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Resistances, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to improvements in resistances. One of its objects is to provide a light and compact construction which shall have a high resistance and large heat radiating capacity.

A further object is to provide improved means for tensioning the elements of the resistance.

In the accompanying drawings I have shown one embodiment of my invention, but it will be understood that various structural changes may be made within the scope of my invention.

In the drawings Figure 1 is a side elevation, Fig. 2 is a vertical cross section taken along the line 2—2 of Fig. 1, and Fig. 3 is a plan view.

Referring to the drawings, 1 represents the main frame. This comprises the two side rods 2, 2 and the end angle irons 3—3. 4 are spacer blocks through which the side rods 2, 2 pass and to which they are secured by means of the nuts. The angle irons are riveted to the spacer blocks 4, and in this way the spacer blocks unite the angle irons and the side rods into a rigid rectangular frame. 5, 5 are angle irons similar to 3—3. These are secured together and to the side rods 2, 2 by means of spacer blocks similar to the blocks 4, 4. The springs 6, 6 engage the angle irons 5, 5 and tend to force them outward. The pressure of the springs may be adjusted by turning the nuts 7, 7.

Between the upper pair of angle irons 3, 3, and between the angle irons 5, 5, I mount a series of rollers 8—8. These are supported by the bolts 9—9 which extend between the angle irons. The rollers 8—8 are constructed of wood or other suitable insulating material. Over these rollers is laced the ribbon 10 which extends alternately from a roller on one end to a roller on the other. The rollers 8 are provided with side flanges which prevent contact between the ribbon and the frame.

The ribbon 10 is composed of any suitable alloy which has a high specific resistance and is capable of withstanding a high temperature. The ends of the ribbon are secured to the terminal blocks 11 which are mounted between the angle irons 3, 3. To these terminal blocks are connected the lead wires 12, 12.

The elastic mounting of the frame section comprising the angle irons 5, 5, permits expansion and contraction of the ribbon 10, and at the same time maintains it in proper tension. With this construction it is impossible for two parts of the ribbon to expand and become short circuited by engaging one another. The use of the rollers distributes the tension uniformly throughout the various parts of the ribbon, and also gives a direct and positive connection between all parts, which would not be the case were the resistance to be composed of a number of separate strips connected together.

While I have described the resistance element 10 as a ribbon, I do not desire to limit myself to this exact construction. In some cases it may be preferable to use a circular wire, or even a number of parallel circular wires.

What I claim is:—

1. In a resistance device, the combination of two parallel frame parts, resilient means tending to hold the said parts in substantial parallelism and to force one of said parts away from the other, two parallel series of rotatable rollers, one on each of the said frame parts, the axis of each roller being perpendicular to the corresponding frame part and a continuous flexible resistance element extending over the said rollers and back and forth between the said two frame parts, substantially as set forth.

2. In a resistance device, the combination of two frame parts, each part consisting of two parallel connected bars, resilient means tending to force the two parts away from one another, a series of insulated flanged rollers rotatably mounted between the bars comprising one frame part, a second series of insulated flanged rollers rotatably mounted between the bars comprising the second frame part, and a continuous flexible resistance element extending over said rollers and in a zigzag manner between the two frame parts, substantially as set forth.

3. In a resistance device, the combination

of three parallel frame-parts lying in the same plane, rigid connecting members between the outer two of the said frame parts, the middle of the said frame parts being slidable on the connecting members, resistance elements between the middle frame part and one of the end frame parts, and means for moving the middle frame part to tension the resistance elements, substantially as set forth.

4. In a resistance device, the combination of three frame elements each comprising two parallel connected bars, connecting rods between the outer two of the said frame elements, the middle of the said elements being slidable on the bars, a series of insulated flanged rollers between the bars comprising one of the outer frame elements, a second series of insulated flanged rollers between the bars comprising the middle frame element, a continuous flexible resistance element extending over said rollers and back and forth between the two series, and resilient means for forcing the middle frame element in one direction to tension the resistance element, substantially as set forth.

5. The combination in a resistance device of two stationary frame parts, two tie-bolts rigidly connecting the said stationary frame parts, a movable frame part between the two stationary frame parts and slidably engaging the said tie-bolts, a series of insulating rollers rotatably mounted upon one of the stationary frame parts, a similar series of insulating rollers rotatably mounted upon the movable frame part, a continuous flexible resistance element extending over said rollers in a zigzag manner between the two frame parts, nuts in adjustable threaded engagement with the tie-bolts, and coil springs on the tie-bolts between the said nuts and the said movable frame parts, the said springs tending to move the movable frame part to tension the said resistance element, substantially as set forth.

In testimony whereof I affix my signature, in presence of two witnesses.

WM. R. YOUMANS.

Witnesses:
ARTHUR G. SKEELS,
R. R. DUNLOP.