C. H. BEACH.

RHEOSTAT.

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1,201,921.

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Fig 1

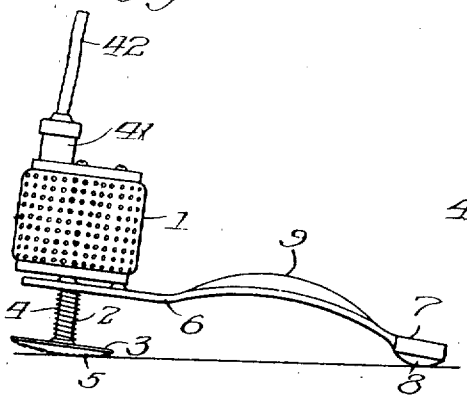


Fig 2

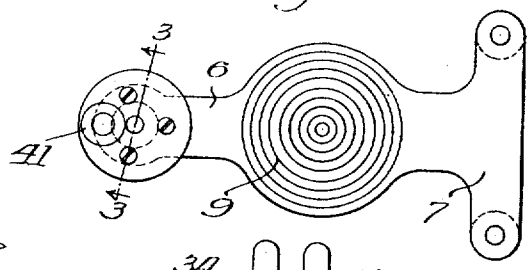


Fig 3

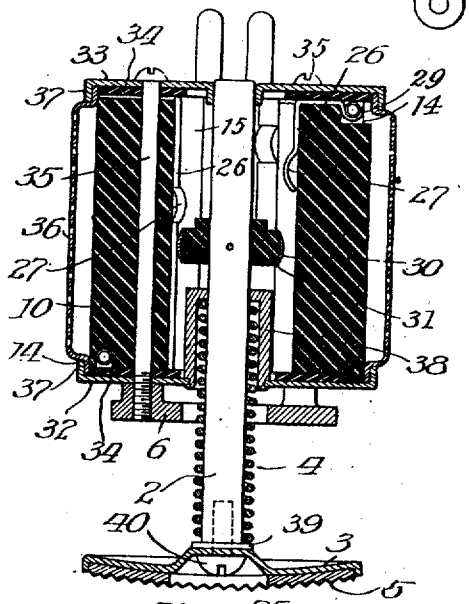


Fig 5

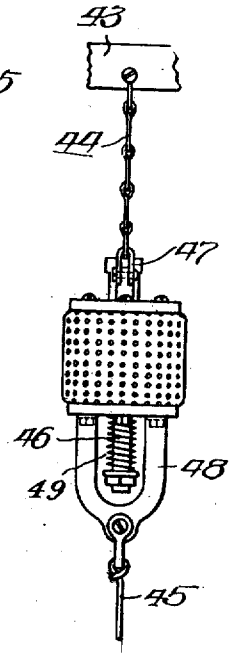
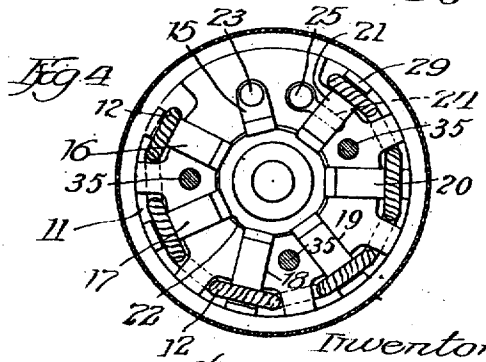


Fig 4



Witnesses:

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UNITED STATES PATENT OFFICE.

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RHEOSTAT.

1,201,921. Specification of Letters Patent. Patented Oct. 17, 1916.

Application filed October 25, 1915. Serial No. 57,875.

To all whom it may concern:

Be it known that I, CHESTER H. BEACH, a citizen of the United States, residing at Racine, in the county of Racine and State of Wisconsin, have invented a certain new and useful Improvement in Rheostats, of which the following is a full, clear, concise, and exact description.

My invention relates to improvements in rheostats.

The object of the invention is to provide a rheostat which may be conveniently operated to control a small motor such as a sewing machine motor.

In the accompanying drawings, I have illustrated two embodiments of the invention, in both of which the rheostat is operated by foot pressure. However, it may be operated in other ways.

Figure 1 is a side elevation of one form of rheostat, which rests on the floor and is operated by foot pressure. Fig. 2 is a top plan view thereof. Fig. 3 is an enlarged sectional elevation on the line 3—3 of Fig. 2. Fig. 4 is a plan view on the same scale with the top removed. Fig. 5 is an elevation of a modified construction, in which the rheostat is suspended.

The first rheostat, which is indicated by reference character 1, is supported on a projecting spindle 2, provided with a base plate 3, the rheostat being yieldingly held above the base by a helical spring 4. The base plate is provided with a rubber pad 5 to prevent slipping. The rheostat as a whole, is forced downwardly against the action of a spring 4, by means of a suitable lever or foot pedal 6, secured to the rheostat at one end and constructed at the other end with an integral cross arm 7, provided with a pair of rubber pads 8, which rest directly on the floor. The middle part of the foot pedal is enlarged and provided with concentric ridges 9 to prevent slipping of the foot. In the normal position shown in Fig. 1, the circuit is open, as hereinafter explained and the sewing machine motor at rest. In order to start the machine the operator merely presses down with the foot, whereupon the motor starts and the speed thereof increases as the rheostat is pressed lower.

The main body of the rheostat consists of a cylindrical member 10 made of insulating material. It is provided with a plurality of grooves 11 around its periphery, said grooves being parallel to the main axis of the cylinder. The resistor 12 consists of a fine wire of high resistance, which is wound into helical form and then wound back and forth in the grooves as shown in Fig. 5. The grooves communicate with each other at the top and bottom by means of short connecting passages 13, 14. A plurality of resilient strips 15, 16, 17, 18, 19, 20, 21 are provided. These conductors are arranged radially on top of the insulating support, their inner ends being bent down and arranged parallel within the central opening of the cylinder, their parallel portions being received within suitable slots 22. The strip 15 has its lower part bent under, whereby the vertical length thereof is sprung away from the base of the channel within which it is received. The horizontal portion thereof has secured thereto a terminal pin 23. Contact strip 21 is arranged with its horizontal portion resting on a metal clip 24, which carries a second terminal pin 25. The conducting strips 16, 17, 18, 19, 20, 21 are generally similar, each having a vertical portion 26 extending downwardly as shown in Fig. 3, and provided with a curved projection 27 at the lower end thereof, which forms a yielding contact. The horizontal parts thereof are arranged radially, as stated, the outer end of each being formed into a hook 29, which rests in one of the passages 13, previously mentioned. The resistor is looped over the successive hooks and thereby maintains itself in electrical contact therewith.

The parallel downward extensions 26 successively shorten, beginning with contact 16 and extending around to contact 21. The projections 27 thereon are adapted to be engaged successively by a sliding contact 30, consisting of a ring of metal, spun down over an insulating button 31, carried by the spindle 2. The contact 30 is always in engagement with the vertical part of the conducting strip 15, whereby as the rheostat as a whole is moved downwardly by the operator's foot, as previously explained, the contact 30 engages successively the projecting lower ends of the various contacts 16, 17, 18, 19, 20, 21, in the order named. Engagement between the contact 30 and the lower end of the metal strip 16 results in closing the cir-

cuit through the entire length of resistance wire, thereby starting the motor slowly. When the contact 17 is engaged, the length of resistance wire in the circuit is reduced, thereby speeding up the motor and when contact is made with the last and shortest strip 21, all the resistance is out of circuit and the motor runs at full speed. The return circuit from the strip 21 is made through the metal clip 24 and contact pin 25 previously mentioned. Contact 30 in its upward movement is always in engagement with at least one of the yielding contacts 27, that is to say, before said contact leaves the inwardly arched lower end of one strip, it engages the arched end of the next strip, so that the circuit is never opened.

The relation between the insulating cylinder 1 and the spindle 2, over which it slides, is maintained by a pair of metal plates 32, 33, which fit over the ends thereof, but are insulated therefrom by disks of insulating material 34. The parts are held together by a plurality of screws 35, which pass downwardly, as shown in in Fig. 3 and screw into the foot pedal 6. An ornamental outer casing 36 is provided which is made preferably of perforated metal to permit ventilation of the rheostat. Said casing is retained within the flanged over ends 37, 37 of the upper and lower metal plates 32, 33. The spindle 2 is guided through a central opening in said upper plate and through a metal thimble 38, secured to the lower plate and having a central opening, as shown. The spring 4 is received within said thimble and bears against the upper wall thereof and against a washer 39 surrounding the lower end of the spindle 2. Said spindle is secured to the base 3 by means of a screw 40 received within a recess in the under part of the base. Connections from the rheostat to the motor are made through any suitable attachment plug 41 and flexible leads 42.

In Fig. 5 I have illustrated a somewhat modified construction, the main body of the rheostat being substantially the same as that previously described, but means being provided whereby it may be suspended from the frame of the sewing machine 43, or other suitable support, by means of a chain 44 or a cord, and operated by means of a further chain or cord 45, attached to the usual treadle of the machine, which is not otherwise used, where an electric motor is employed. The chain 44 is secured to the top of the main central spindle 46 of the rheostat by means of a bail 47. The downward pull is communicated to the frame of the rheostat through a bracket 48, which is secured in place by the same screws which in the preceding form were used to secure the rheostat to the foot treadle. The downward pressure of the operator's foot pulls downward the entire body of the rheostat against the action of the spring 49, the central spindle being supported by the chain 44. The motor is therefore controlled by the same relative movement of the parts.

The rheostat is small, light and easily actuated. It need not necessarily be operated by foot power as it may be operated equally well by hand power, where the operator has a hand available. It is not confined to use with a sewing machine motor, but may be used in various other relations. I do not desire therefore, to limit myself to the structural details described herein, except where limitations are imposed in the appended claims.

What I claim as new and desire to obtain by Letters Patent of the United States is:

1. A rheostat comprising a body of insulating material, having a central opening and having a plurality of contacts arranged in said opening at successively increasing distances from the one end thereof, a resistor associated with said contacts, and a spindle slidably mounted in said opening, said spindle carrying a contact arranged to engage said first mentioned contacts in succession.

2. A rheostat comprising an insulating body, a resistor thereon, contacts for varying the effective length of said resistance, a spindle projecting into said insulating body and carrying a contact coöperating with said first contacts, means for supporting said spindle and a spring for supporting said rheostat on said spindle to vary the resistance.

3. A rheostat comprising a cylindrical insulating base, having parallel slots around the circumference, a continuous helical resistor wound back and forth through said slots, a terminal conductor connected to one end of said resistor and a plurality of contacts of varying length secured to intermediate portions of said resistor and to the other end thereof, an additional contact connected to a second terminal conductor, and a sliding contact always in engagement with said additional contact and arranged to engage the remaining contacts in succession.

4. A rheostat consisting of a cylindrical block having outer longitudinal parallel grooves, a plurality of contacts at one end of said block, each having a projecting end constituting a hook arranged between the ends of adjacent grooves, and a helical resistor wound back and forth in said grooves and engaging said hooks, said helix being under tension, whereby it makes the necessary electrical contact with said hooks without auxiliary clamping means and tends to hold said contacts in place.

5. A rheostat consisting of a cylindrical block having outer longitudinal parallel grooves, a plurality of contacts each having

one end projecting into a central opening in said block and having the outer end provided with a hook, a resistor wound back and forth in said grooves and engaging said hooks to make electrical contact therewith and hold said contacts against the end of said block, and an outer casing for positively locking said contacts against misplacement and for incasing said resistor.

6. In a device of the class described, a central spindle having a contact ring thereon, an insulating block surrounding said ring, contacts arranged on said block to be engaged successively by said ring, a spring surrounding said spindle, and means for guiding said spindle at both ends of said block, whereby relative sliding movement of said block and said spindle is effective to close the successive contacts.

7. In a device of the class described, a base of insulating material having a central opening, a plurality of conducting strips arranged radially with their inner ends received within said opening, a resistor engaging the outer ends thereof, an insulating washer at each end of said base, a perforated casing surrounding said resistor, end caps at each end of said base and screws passing through said end caps and said base to secure the parts in place.

In witness whereof, I hereunto subscribe my name this 12th day of October A. D., 1915.

CHESTER H. BEACH.