

(No Model.)

E. W. RICE, Jr.

RHEOSTAT.

No. 383,913.

Patented June 5, 1888.

Fig. 1.

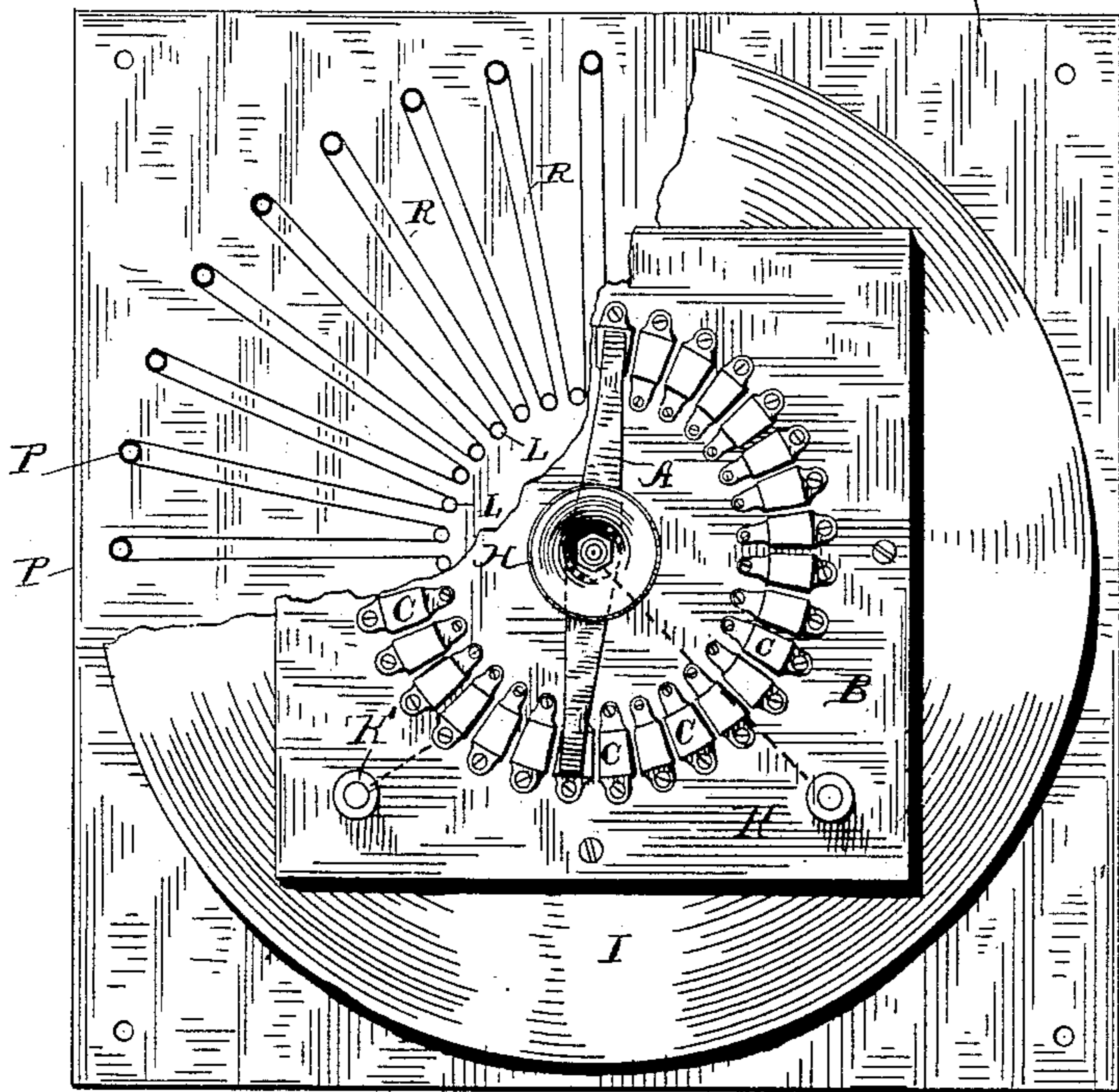


Fig. 2.

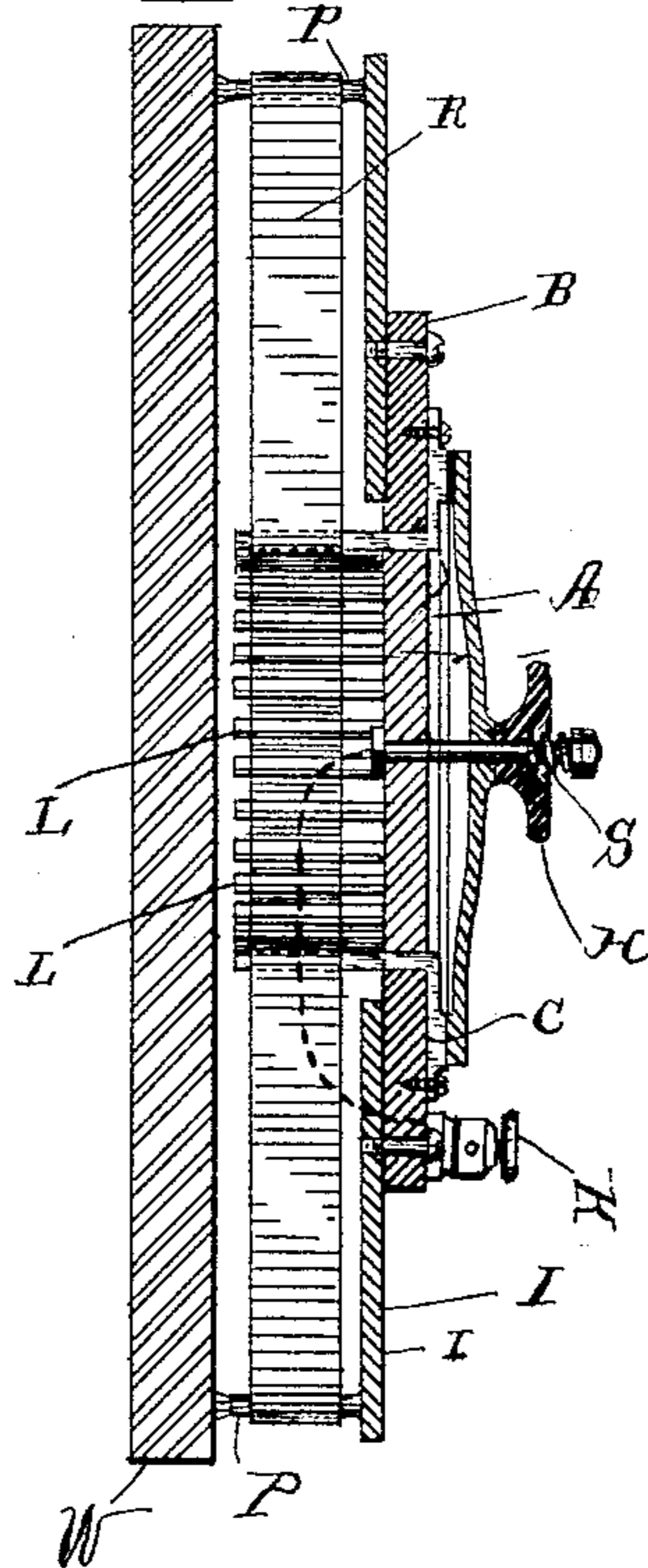


Fig. 3.

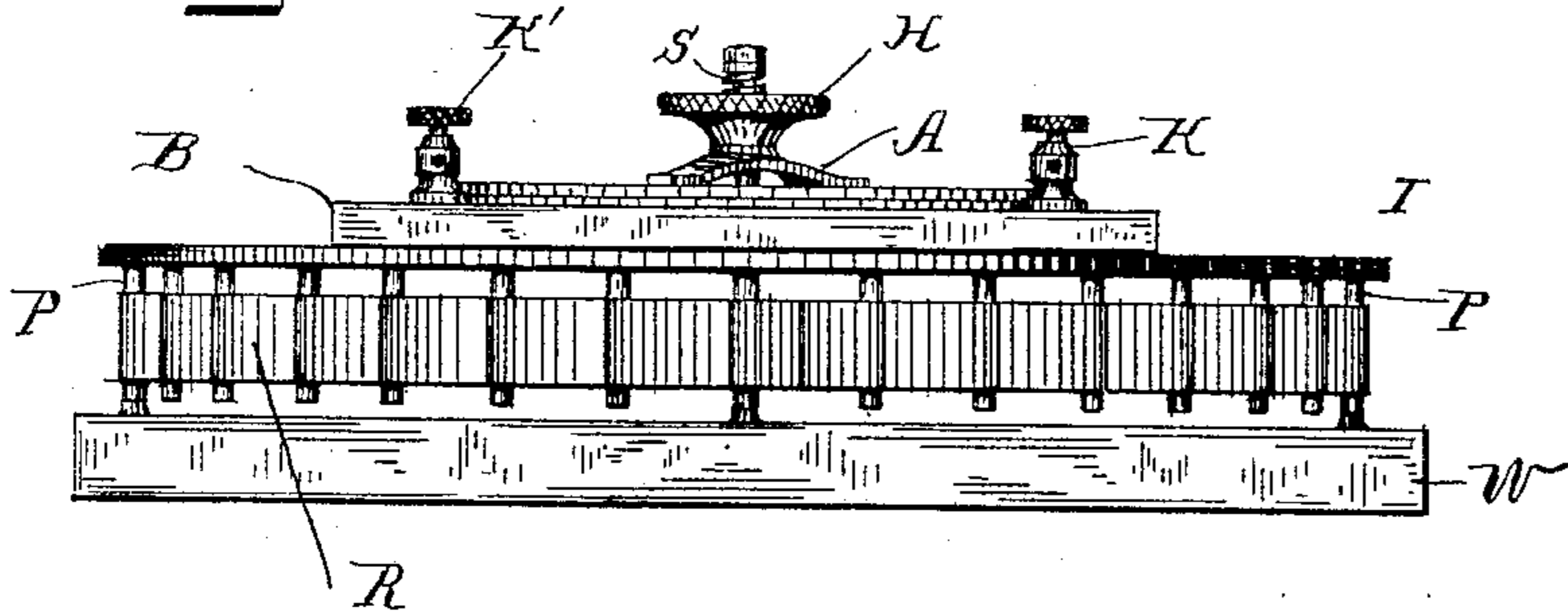


Fig. 4.

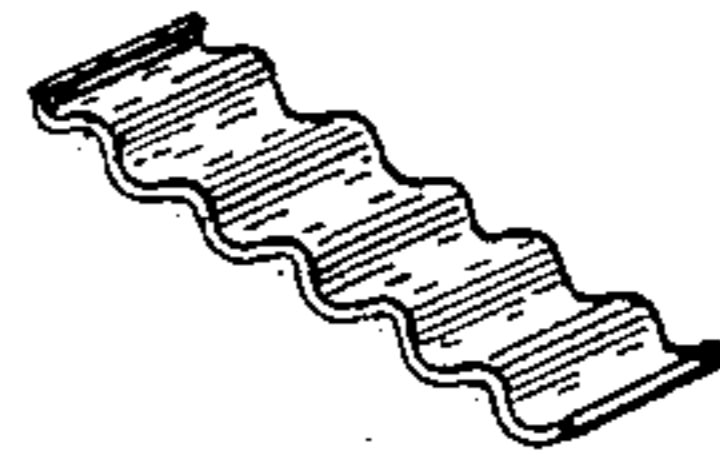
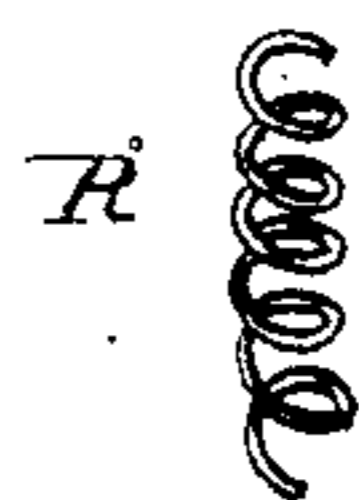


Fig. 5.



Witnesses:

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UNITED STATES PATENT OFFICE.

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RHEOSTAT.

SPECIFICATION forming part of Letters Patent No. 383,913, dated June 5, 1888.

Application filed February 4, 1888. Serial No. 262,983. (No model.)

To all whom it may concern:

Be it known that I, E. WILBUR RICE, JR., a citizen of the United States, and a resident of Lynn, in the county of Essex and State of Massachusetts, have invented a certain new and useful Rheostat or Resistance for Electric Circuits, of which the following is a specification.

My present invention relates to improvements in the construction of rheostats or resistances for electric circuits, whereby I obtain cheapness of construction, neatness in design, ease and certainty of operation, and extreme simplicity.

My invention consists in a novel construction and arrangement of the parts of the apparatus, which will be hereinafter fully described, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view partly of the internal structure of my invention and partly of the external structure. Fig. 2 is a cross-section, certain parts being shown in side view. Fig. 3 is an end view of the apparatus. Figs. 4 and 5 illustrate forms of conductor that may be used in the apparatus.

In the construction of rheostats or resistances for electric currents of considerable volume it is very desirable that the parts be so arranged as to afford rapid and constant radiation of the heat produced by the currents to the outer air; that these parts be easy of access, so as to avoid difficulty in the event of accident to the apparatus, and that the liability of the rheostat to "short circuits" be reduced to a minimum.

The object of my invention is to secure these features of construction, together with cheapness and simplicity in the arrangement of the parts.

In Fig. 1, W indicates a base plate or board, which may be of wood or any other desired material, preferably an insulating material. Supported above this plate in any desired way is a second plate or table, formed, preferably, in two parts, I B, as will be presently described, from which plate or table project inwardly, or at right angles therefrom, and into the free air-space between the base and table, two sets of pins or studs, P L, arranged, preferably, in circular or curved lines, in order to secure compactness.

The pins or studs P may be of any desired material, but in the present case are supposed to be of iron and project from the plate or portion of plate I, to which they are secured or attached by casting in one piece or by other means.

The plate I and its studs or pins might be of insulating material; but for the sake of simplicity and cheapness I prefer to make them of iron. The plate I is in the form of an annulus or disk open at its center to form a space through which the pins L may project. The latter pins are of conducting material, and are attached to or project from a series of contact-blocks, C, which are arranged in a circle upon a plate or board, B, that is preferably made of insulating material, and is suitably secured to the part I.

The blocks C are attached to the board or plate B in any desired way, and the pins L may be cast in one piece with said blocks. The pins pass through perforations in the block or plate B.

Upon the plate B is mounted a pin or stud upon which the contact-arm or switch A swings by means of a thumb-piece or handle, H. The arm or switch A is held in firm contact with the switch-blocks by means of a spring, S, and electrical connection with the switch-arm is made through the pin or stud upon which it is mounted, said pin or stud being properly connected in any ordinary way with one of the binding-posts K of the apparatus. One end of the switch-arm A is provided with an insulating-face, or is made of insulating material, as indicated in Fig. 2, so that it shall not make electrical connection with the contact-blocks C.

The various pins P L extend to within a short distance of the base-board W, but do not touch the same.

The opening at the center of the disk or annulus I should be sufficiently large to leave a considerable space between its edges and the pins L and the disk I, when the latter is made of conducting material. The pins are arranged, preferably, at uniform distances apart, and when the resistance consists of a continuous circuit, the length of which is varied in order to vary the effective resistance, it is desirable that the inner set of pins, L, should be

placed on radial lines passing between the outer set of pins, P.

That contact-block C, which is connected with the pin L from which the electric-resistance conductor starts, is electrically connected with the binding-post K' in obvious manner. The strips or pieces of conductor which form the sections of the variable resistance are indicated at R. In the present instance, where-
in I have illustrated the application to the frame of a sectional resistance whose length is varied, each section of said resistance is represented by lines which, starting from one of the pins L, pass to one of the outer pins, P, and thence back to the next pin L of the inner set. The sections of resistance, supported, as indicated, between the pins of the two sets and bridging the space between such sets, may be secured on the pins in any desired manner.

A preferable manner of supporting and arranging the resistance, when the same is to consist of a conductor of variable length, is as follows: A wire strip or other continuous form of German silver or other suitable material is fastened at one of its ends so as to be electrically connected with that pin L of the series of conducting pins which is connected to or projects from any initial contact-plate C that is electrically connected with the binding-post K'. The wire strip or other form is then passed around the nearest pin P, Fig. 1, of the outer set, and if said pin P is of conducting material it is carefully insulated therefrom by insulation indicated by the heavy circular black line. The conductor or wire is then carried to the next pin L of the inner set and electrically connected with it by simply allowing it to rest in free connection with the same, and the process is repeated in the manner indicated to any desired extent. The winding is continued backward and forward from the pins L to the pins P, a good electric connection being made with the pins L, and a thorough avoidance of contact at the pins P being observed until the circle or the portion of the circle which it is desired to use is completed. When the apparatus is thus arranged, it will be obvious that by moving the arm A to any plate C, any desired resistance can be thrown into circuit, as the circuit will then be complete from the binding-post K, through whatever resistance may have been thrown into circuit between that contact C and the terminal contact C, connected with the binding-post K'.

It will be observed that by this construction almost the entire space between the base W and the top plate or support is left exposed, so that air may freely circulate around the resistance, thereby largely preventing the bad effects which might arise from the accumulation of heat.

It will be seen, also, that from the convenient size and small depth of the apparatus it may very readily be placed upon a wall as a cut-out box is placed, so that the switch-arm

for cutting in and out resistance may be easily reached by the hand.

In the construction of rheostats for currents of moderate strength and of comparatively high potential the resistance-windings may be corrugated between the supporting lugs or pins L L and P P, or they may be of spiral wire instead of straight, so that a greater length of conductor or resistance in the path of current may be obtained between any two of the contact-plates C C. These modifications are indicated in Figs. 4 and 5.

The mechanical construction of my resistance-frame is such that, as will be obvious, it may be readily employed for other arrangements of the conductor or conductors forming the electric resistance, as will be well understood by electricians.

What I claim as my invention is—

1. In an electric resistance-frame, the combination of a series of conducting pins or studs projecting inward from a suitable support and cast in one piece with contact-plates C, arranged upon the outer face of the support, a second set arranged parallel with the first, and electric-resistance strips or pieces supported by said studs and bridging the space between the sets.

2. In an electric resistance-frame, the combination of a series of conducting pins or studs projecting inwardly from a suitably-supported plate, a second set of pins arranged parallel with the first, but insulated therefrom, a continuous resistance strip or wire strung upon the two sets of studs and bridging the space between the two sets, and a series of switch-contacts cast in one piece with the conducting pins and arranged upon the outer face of the support, as and for the purpose described.

3. In a rheostat, the combination, with two sets of pins or studs arranged in circles one within the other, of a set of contacts connected with the pins of one set, a contact-arm or circuit-closer adapted to move over the same, and an electric resistance wound upon the two sets of pins and in electric connection with the pins connected with the contacts, as and for the purpose described.

4. In an electric resistance-frame, the combination of two sets of pins or studs projecting from the same side of a suitable support and arranged in circles, one set of pins being of conducting material and electrically disconnected from the other set excepting by the conductor forming the electric resistance, and a set of contacts connected with the conducting pins or studs.

5. The combination, with a base-plate, of a disk-plate or annulus supported thereon and having a series of pins or studs projecting from its under surface toward the base-plate, a second plate of insulating material carrying a series of conducting pins or studs, also projecting toward the base-plate, a series of contacts mounted on the insulating-plate and electrically connected with the conducting pins or studs, and an electric resistance supported be-

tween the pins of the two series, as and for the purpose described.

6. An electric resistance-frame consisting, essentially, of a base-plate, a superposed supporting table or plate separated from the first by a free air-space, two sets of pins projecting into said space at right angles to the base, one set being of conducting material, a series of contacts mounted on the face of the table or outer plate and severally connected with the pins of conducting material, and an electric resistance supported by the two sets of pins and bridging the space between the two sets.

7. In an electric resistance-frame, a series of contact-blocks, C, mounted on an insulating board or plate, B, and having pins or studs L formed integral with them and projecting through said board into the space between the latter and the base-plate, as and for the purpose described.

8. In an electric resistance-frame, the combination of a base-plate, a superposed disk or plate, I, having a series of pins projecting in-

ward from it and cast integral with it, a board or plate of insulating material, B, carrying contact blocks and studs L of conducting material projecting inward toward the base-board, and a continuous electric conductor wound to and fro upon the two sets of pins and across the space between the sets, as and for the purpose described.

9. The combination, with a suitable base-board, of a disk or annulus, I, of iron, having a series of pins, P, projecting downward from the same, a plate of insulating material supported over an opening in the center of the plate I and carrying a series of conducting pins or studs projecting inward from it and electrically connected with blocks or studs mounted on the base of the plate, and an electric conductor strung across the space between the two sets of pins, as and for the purpose described.

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Witnesses:

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