

(No Model.)

E. WESTON.
RESISTANCE BOX.

No. 500,362.

Patented June 27, 1893.

Fig. 1.

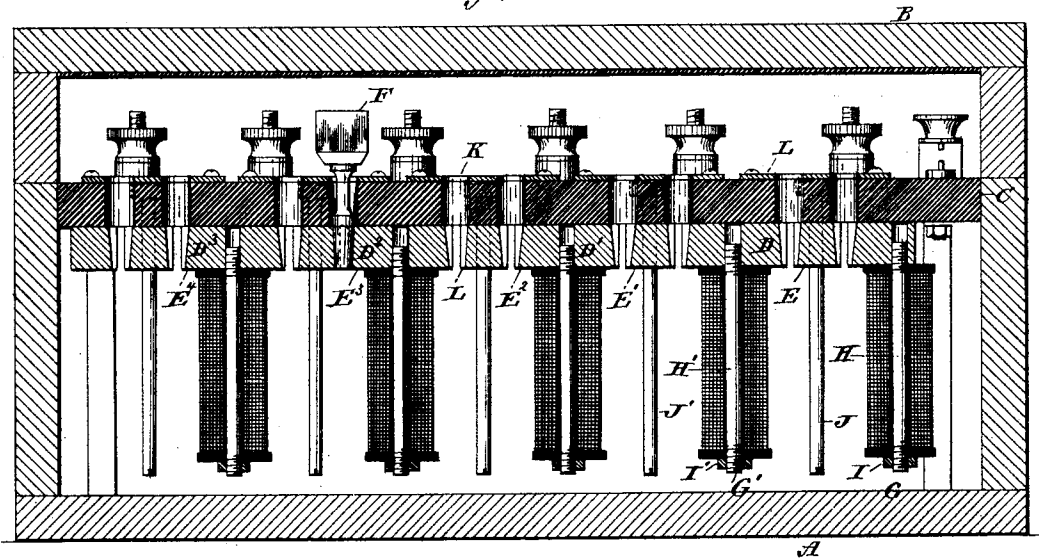
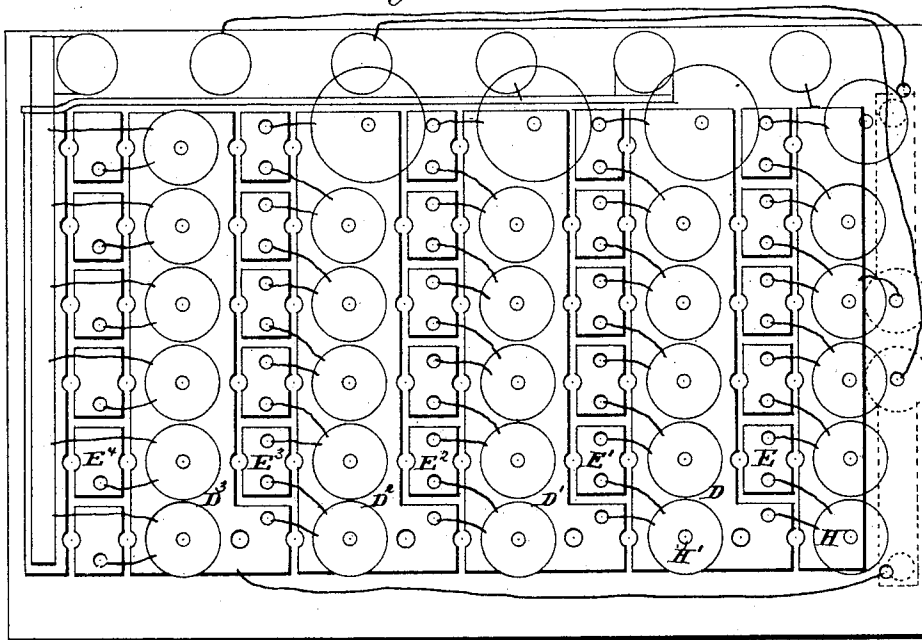


Fig. 2.



Witnesses
H. P. Mollen
M. Bosch.

Edward Weston
Inventor

By his Attorney Rich Benjamin

UNITED STATES PATENT OFFICE.

EDWARD WESTON, OF NEWARK, NEW JERSEY.

RESISTANCE-BOX.

SPECIFICATION forming part of Letters Patent No. 500,362, dated June 27, 1893.

Application filed September 10, 1892. Serial No. 445,562. (No model.)

To all whom it may concern:

Be it known that I, EDWARD WESTON, of Newark, Essex county, New Jersey, have invented a new and useful Improvement in
5 Bridges or Resistance-Coils, of which the following is a specification.

In resistance coils or bridges as ordinarily constructed, there is present a plate or platform of ebonite or vulcanized rubber, upon
10 the upper side of which are arranged the contact plates of metal, and upon the lower side of which are disposed the various resistance coils. In order to make or break connection
15 between the coils, plugs or wedges are used which are inserted in openings between the plates. The plates are insulated one from another by being separated for a short distance. The platform of rubber carrying the
20 plates on one side and the coils on the other is then placed in a suitable box, so that the coils only are always inclosed; the contact plates and the upper side of the ebonite platform supporting them being often, when the instrument is in use, exposed to the atmosphere and
25 to light.

I have found that resistance coils constructed in this way are subject to serious error from leakage—due to two causes. First, the sulphur commonly used in rubber or ebonite
30 preparations combining with the oxygen of the air forms an acid film on the upper surface of the supporting platform which is conducting and which allows the leakage of a current from one contact plate to another
35 when the plugs are out. I have found that it is practically impossible to avoid this difficulty as long as the upper surface of the plate or platform is exposed to the air and light; and that to keep it within reasonable limits constant wiping or cleansing of the surface of
40 the platform, often with alkalies or alkali solutions, is requisite, especially when delicate or accurate measurements are being made. I have found that this is a prolific cause of
45 error in resistance boxes as commonly constructed, and that it is quite sufficient seriously to disturb the accuracy of measurements made by them unless great precautions

be taken to prevent it. It is hardly necessary to say that such precautions will rarely
50 be taken by persons using bridges for ordinary electrical work.

Another difficulty which I have encountered is that the constant abrasion of the plugs in their seats between the contact plates gradually wears off small particles of metal which
55 accumulate in the many angles and at the bottom of the many channels between the contact plates, and thus again form a means of causing leakage of the current. In order
60 to establish a given connection between the contact plates, it is usual to force the plug in with a turning motion, so as to secure better and tighter contact, and this very turning motion intensifies the grinding effect which
65 results in the deposition of fine particles in the places before mentioned.

My invention therefore consists first in means for preventing leakage by the formation of an acid in the manner above described,
70 and second, by the deposition of grindings or filings of metal in the interstices or channels of the contact plates, which means I have embodied in an operative resistance coil or bridge hereinafter described.

In the accompanying drawings, Figure 1 is a longitudinal section of my improved bridge,
75 and Fig. 2 is a plan view of the under side of the platform.

The general construction and arrangement
80 of the resistance coils in this bridge I do not claim, nor do I claim the arrangement of the coils in series with their connections so as to form a bridge. In these features the apparatus here presented is the invention of Mr.
85 Adalbert O. Benecke.

Referring now to the drawings, A represents the containing box or case and B the cover thereof.

C is a platform of vulcanized rubber or ebonite which is supported in the case A. On
90 the lower side of said platform are attached the large contact plates, as D, D', D², D³, and the small contact plates E, E', E², E³, E⁴. These contact plates are separated from one another
95 by an air space in the usual manner, and

they are provided with apertures or recesses in their edges to allow of the insertion of plugs, as F, Fig. 1, between them.

Extending downward from the large contact plates D, D', &c., are metal rods, G, G', &c., which, as shown, are tapped into said plates. These rods carry the resistance coils H, H', &c., which are made in the usual way and which are supported on said rods by nuts, I, I', &c., applied to the threaded extremities of said rods.

Between the series of resistance coils H, H', &c., extend downward rods J, J', &c., which serve as fair leaders for the connections between the series of coils. The apertures, as K, which receive the plug, as F, extend down through the platform C and coincide with the recesses made in the sides of the contact plates, which recesses have tapering sides, as shown at L, Fig. 1. The plugs F are also made tapering or wedge-shaped to fit closely into said tapering recesses, and in this way to make a close and tight electrical connection between the two contact plates with which the plug is in contact.

On the upper side of the platform C are secured metal plates, as L, having openings which coincide with the openings in said platform. These metal plates serve to protect the edges of the apertures and also may have inscribed upon them any suitable marks indicating the resistances of the separate coils.

The particular arrangement of coils herein shown, nor the disposition of said coils and contact plates so as to form a bridge is not essential to, nor is my invention in any wise to be understood as limited thereby. The important advantage which I gain is effected first by the disposition of the contact plates on the under side of the platform C, and second by the inclosing of the plates so disposed within the closed box or case A. In this way I protect the plates and also the under side of the platform C from exposure to the outer atmosphere and light, and so prevents the formation of the acid conducting film on the surface of the platform. Second, by placing the plates on the under side of the platform, it will be plain that any filings, dust, or other foreign matter will tend to fall out of the channels or interstices in the body of the box, and therefore cannot remain or accumulate in said channels. I have found in actual practice that this construction materially improves the accuracy of the instrument and completely eliminates a serious disturbing cause affecting the delicacy of its measurements.

I claim—

1. The combination in an electrical instrument of two fixed terminals of an electric circuit, a box or case wholly inclosing the same, and a circuit closing device constructed to be inserted from without between said terminals through a suitable aperture in said case.

2. The combination in an electrical instrument of a plate of insulating material, two

fixed terminals of an electric circuit, a box or case inclosing said terminals, and a circuit closing device constructed to be inserted from without between said terminals through a suitable aperture in said plate of insulating material.

3. The combination in an electrical instrument of a box or case having one side of insulating material, two fixed terminals of an electric circuit supported on the inner face of said side, and a circuit closing device constructed to be inserted from without between said terminals through a suitable aperture in said side.

4. The combination in an electrical instrument of a normally horizontal support, two fixed terminals of an electric circuit on the under side thereof, and a circuit closing device constructed to be inserted vertically between said terminals and through a suitable aperture in said support.

5. The combination in an electrical instrument of an inclosing box or case, having its upper or horizontal side of ebonite or vulcanized rubber, two fixed terminals of an electric circuit secured to the under face of said side, and a circuit closing plug constructed to be inserted between said terminals and through a suitable aperture in said side.

6. The combination in a resistance coil or bridge of a plate or platform of insulating material, a resistance coil supported on one side of said platform, fixed terminals for said resistance coil supported on the same side of said platform, and a circuit closing device constructed to be inserted through said platform from the opposite side between said fixed terminals.

7. The combination in a resistance coil or bridge of a plate or platform of insulating material, a resistance coil supported on one side of said platform, a box or case inclosing said resistance coil, fixed terminals for said resistance coil supported on the same side of said platform, and a circuit closing device constructed to be inserted through said platform and between said fixed terminals.

8. The combination in a resistance coil or bridge of a plate or platform of insulating material, a series of resistance coils on one side thereof, a series of fixed metallic terminals for said coils and supporting the same, and circuit closing devices constructed to be inserted first through said platform and then between said terminals.

9. The combination in a resistance coil or bridge, of an inclosing case and a resistance coil within said case, and having its terminals therein inclosed, and a circuit closing device constructed to be inserted first, through a wall of said case and then between the terminals of said coil.

10. The combination in a resistance coil or bridge of an inclosing case a series of resistance coils within said case and having their terminals therein inclosed, and a circuit closing

ing device constructed to be inserted first, through a wall of said case and then between the terminals of said coils, whereby one or more of said coils may be short circuited or cut out of circuit.

ported on the under side of said platform, and a resistance coil, H, supported on said plate.

EDWARD WESTON.

Witnesses:

11. In a resistance coil or bridge, a plate or platform, C, of insulating material, an enclosing case A, a terminal plate, as D, sup-

JOHN C. YOUNG,
A. H. HOEFER.