

2 Sheets—Sheet 1.

No. 467,613.

Patented Jan. 26, 1892.

FIG. 1.

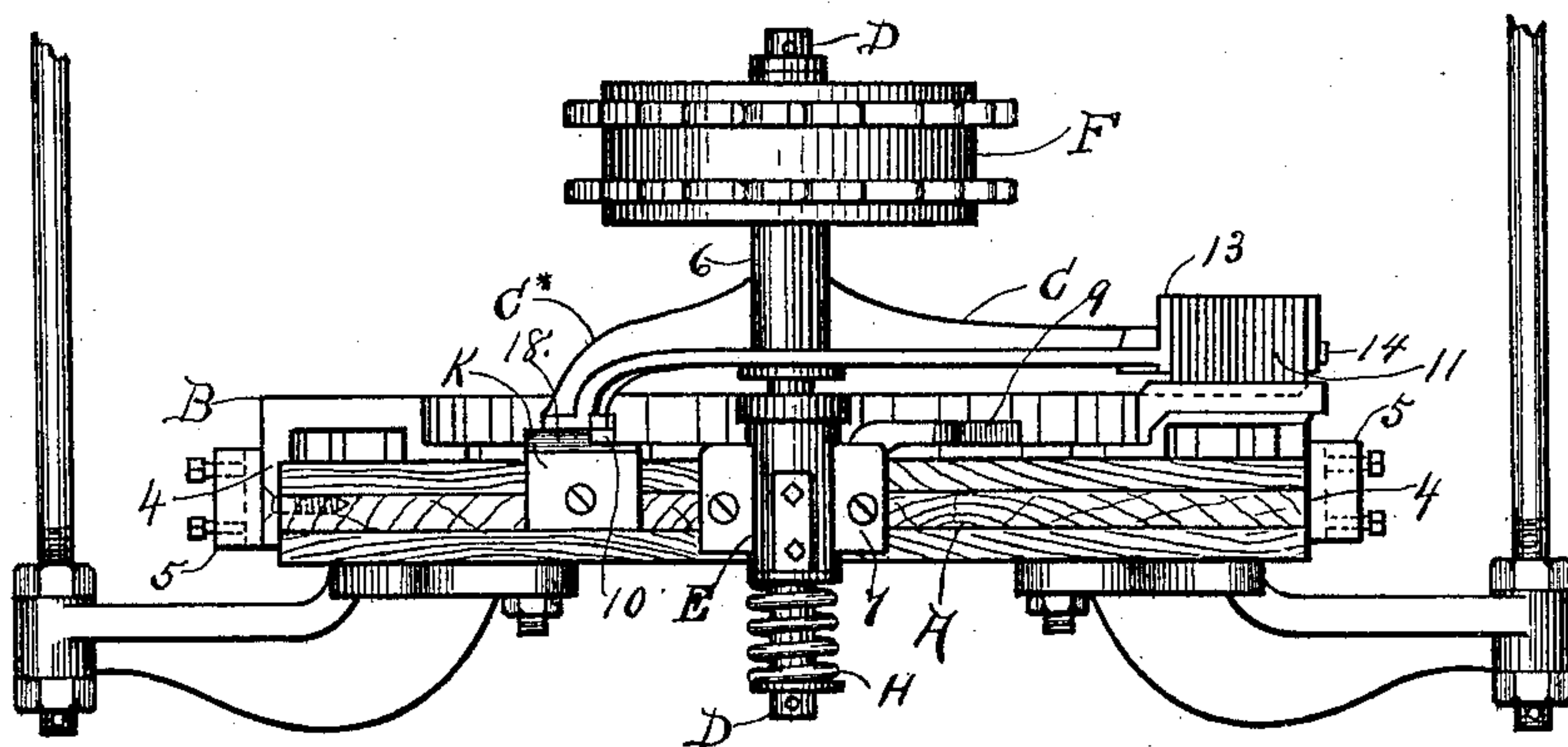


FIG. 11.

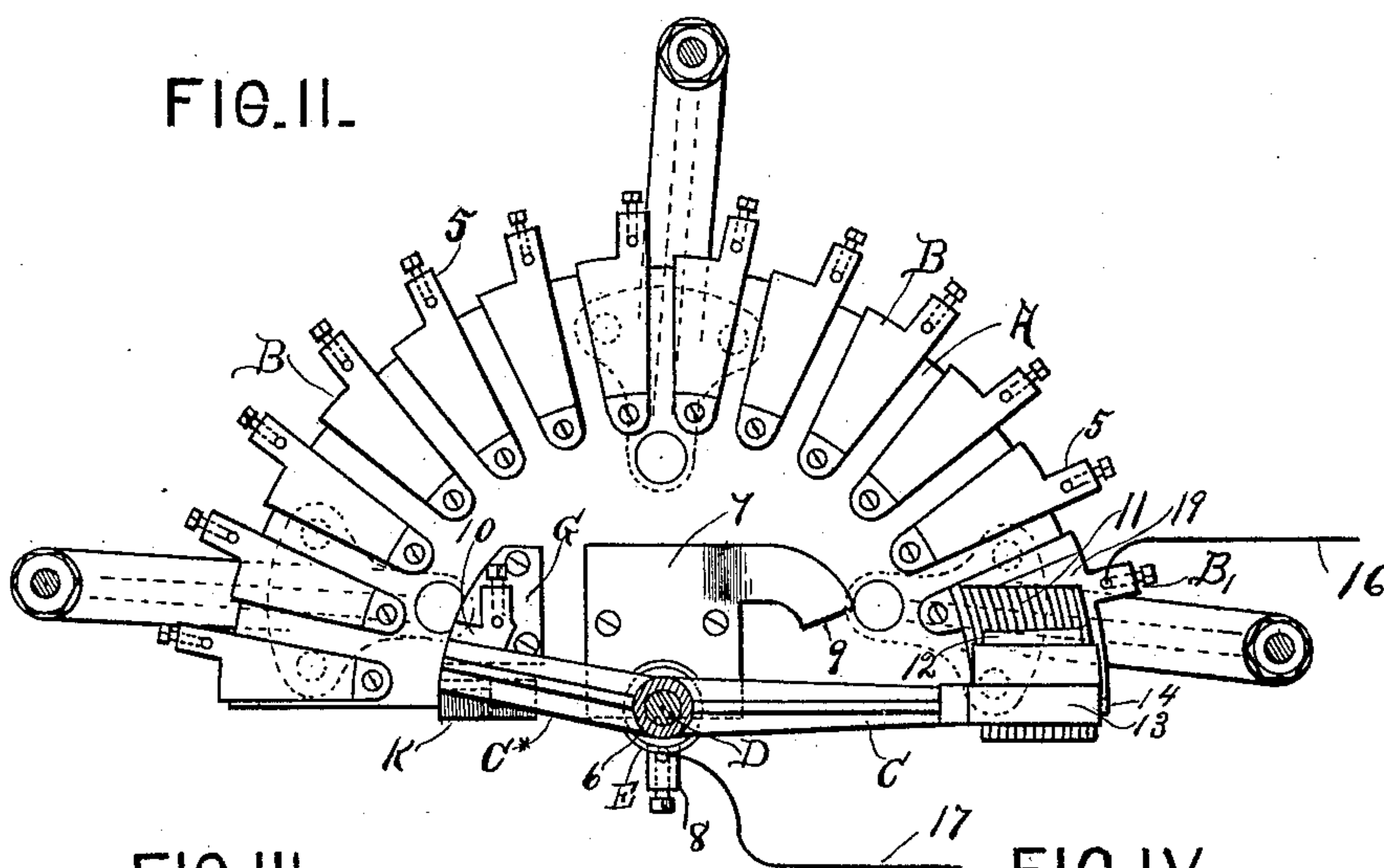


FIG. III.

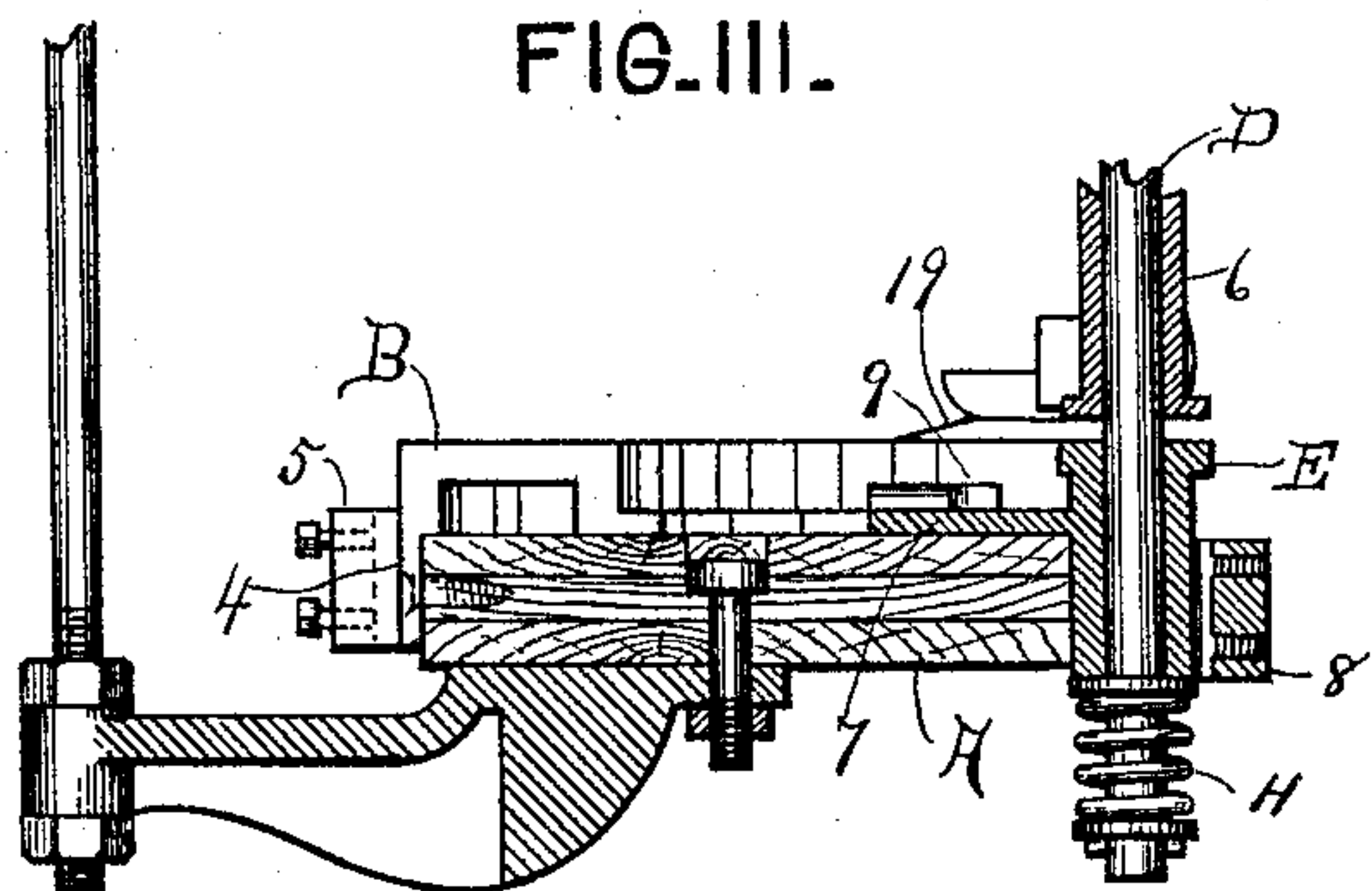
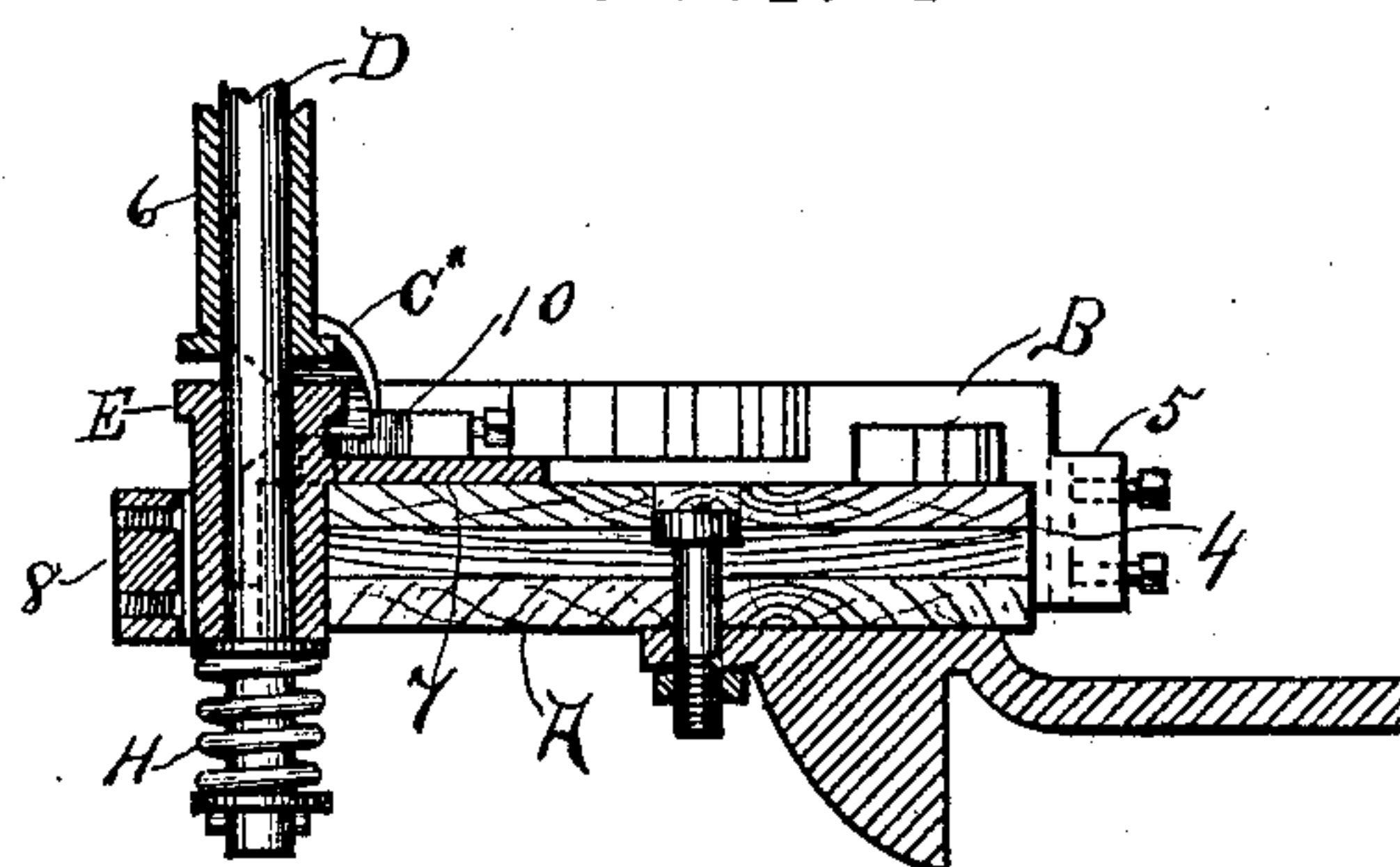


FIG. IV.



Witnesses.

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(No Model.)

2 Sheets—Sheet 2.

S. H. SHORT.
CONTACT BOARD FOR RHEOSTATS.

No. 467,613.
FIG. XVII.

Patented Jan. 26, 1892.
FIG. V.

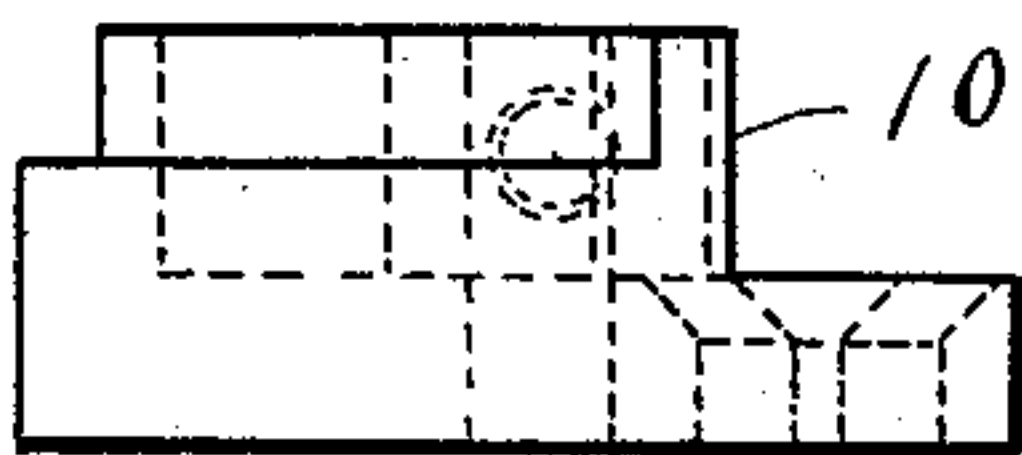


FIG. XVIII.

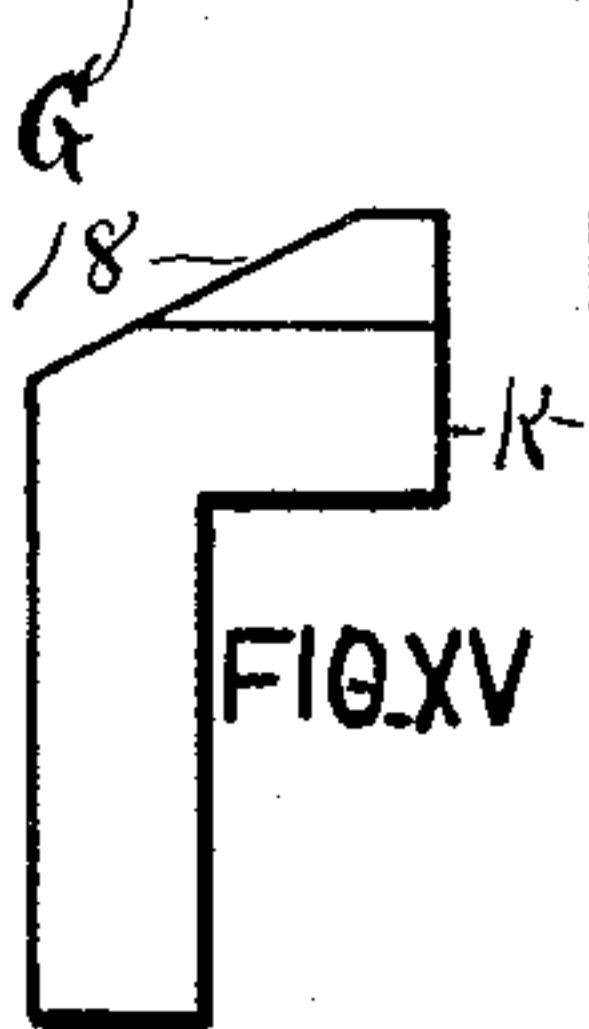
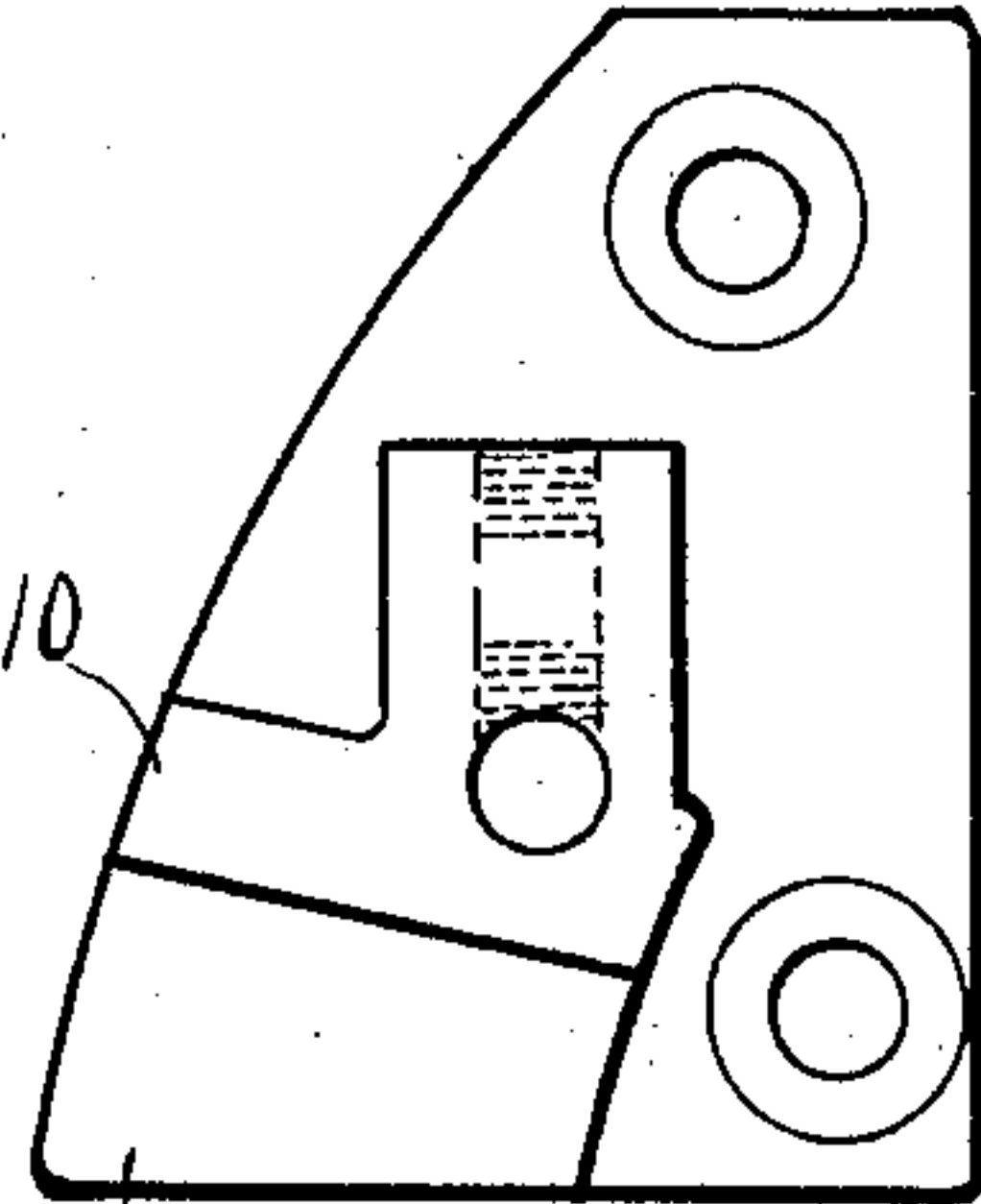


FIG. XV.

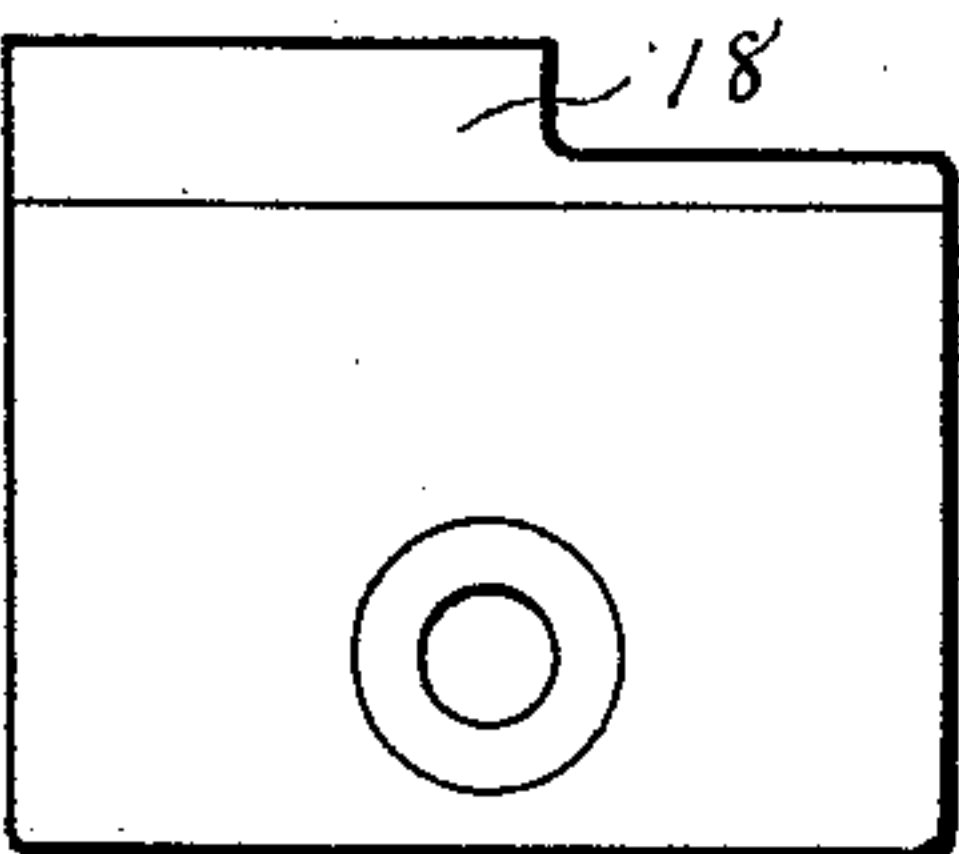


FIG. XIV.

FIG. XVI.

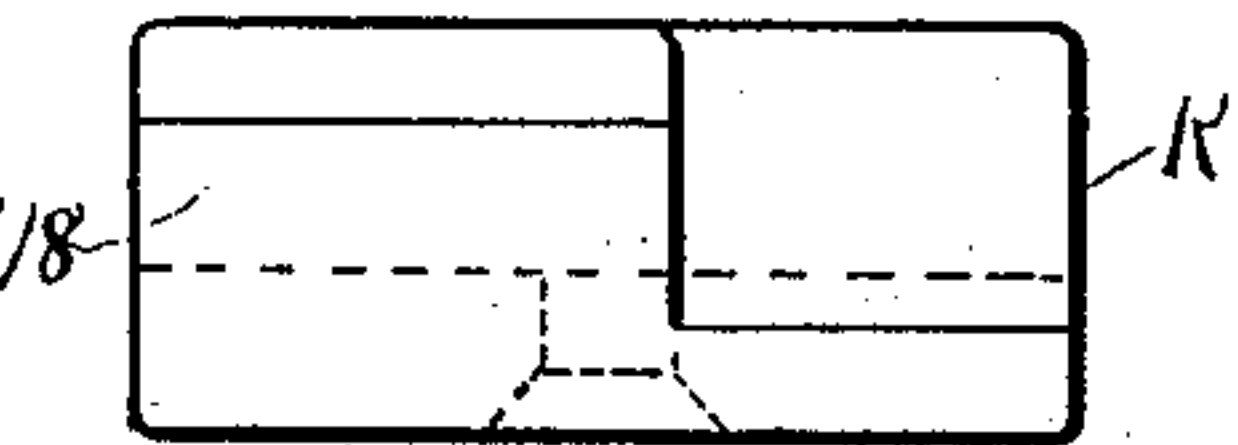


FIG. XII.

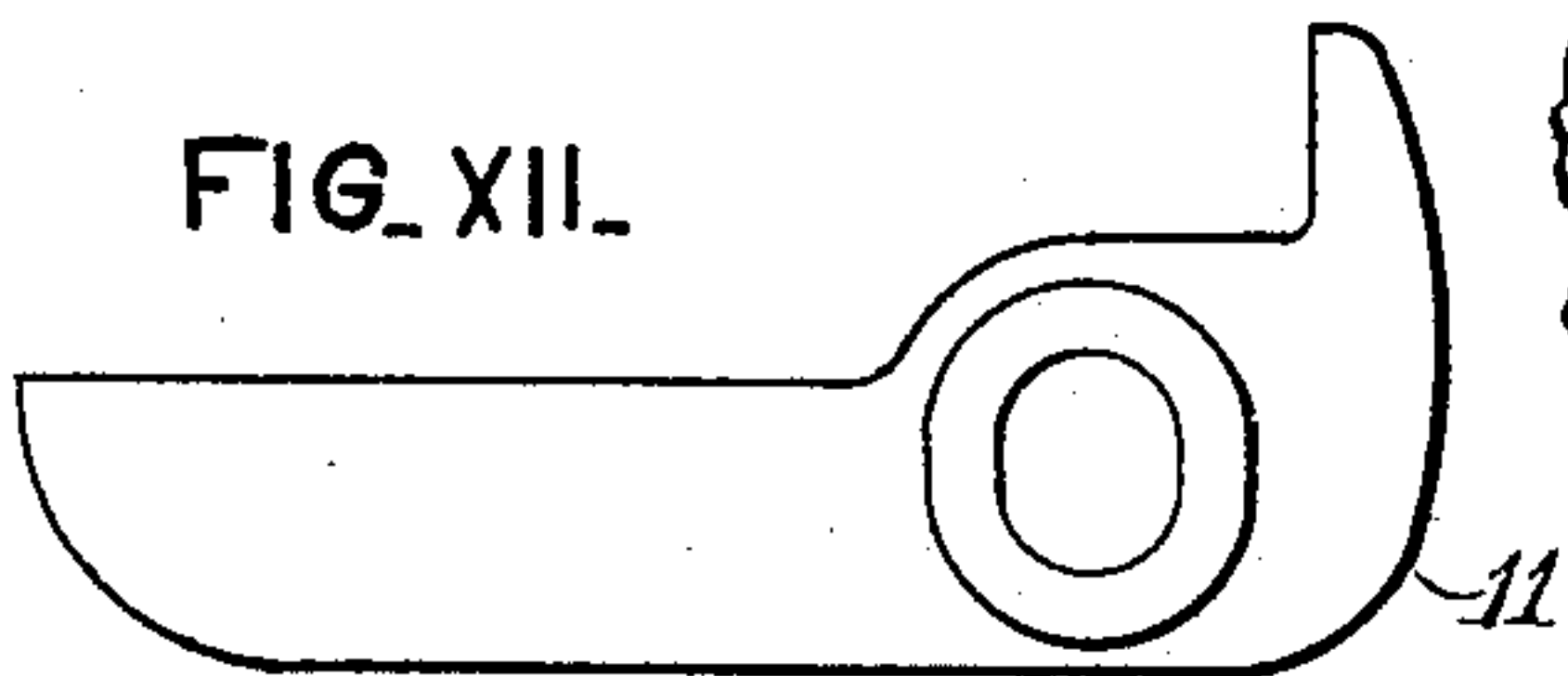


FIG. XIII.

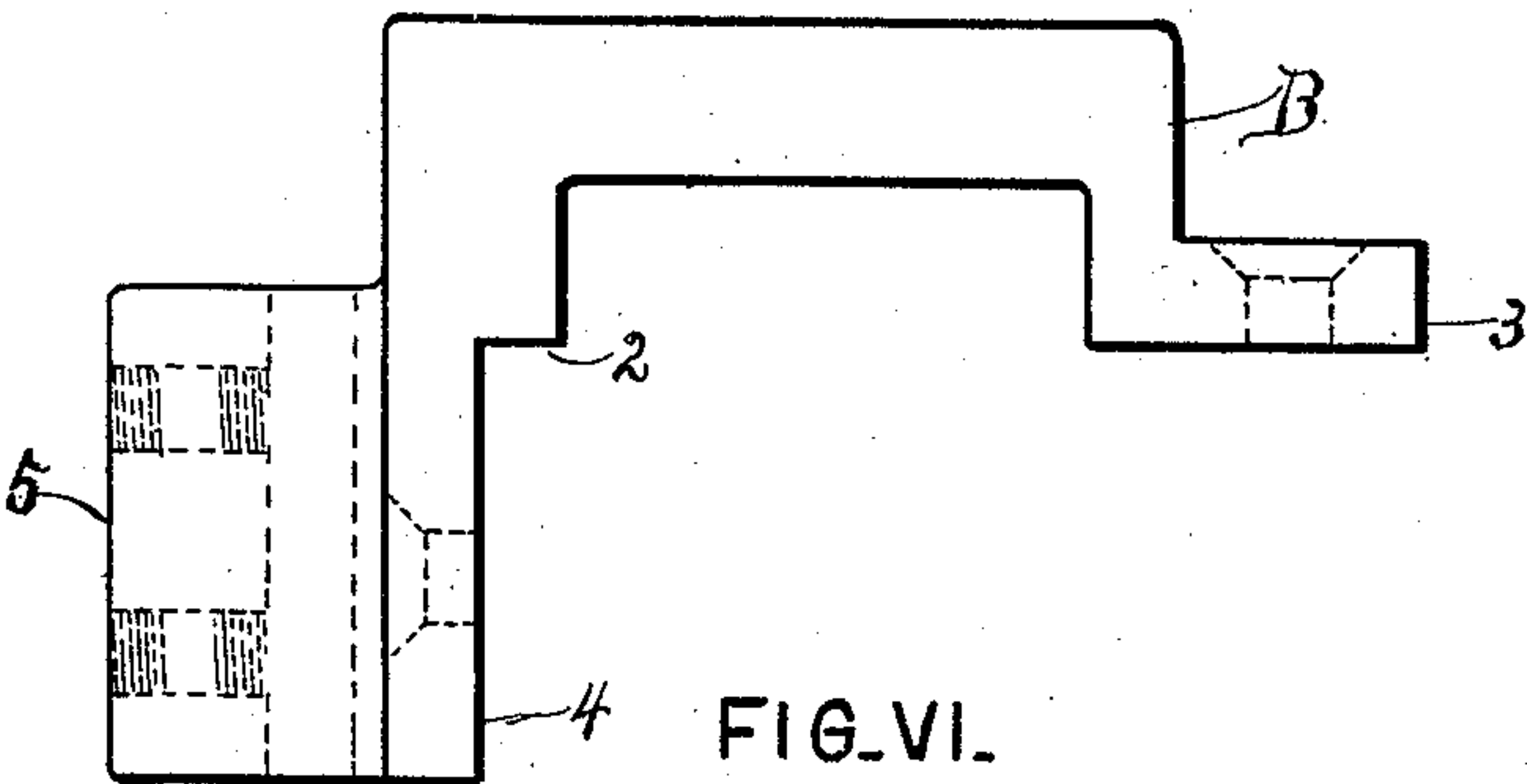
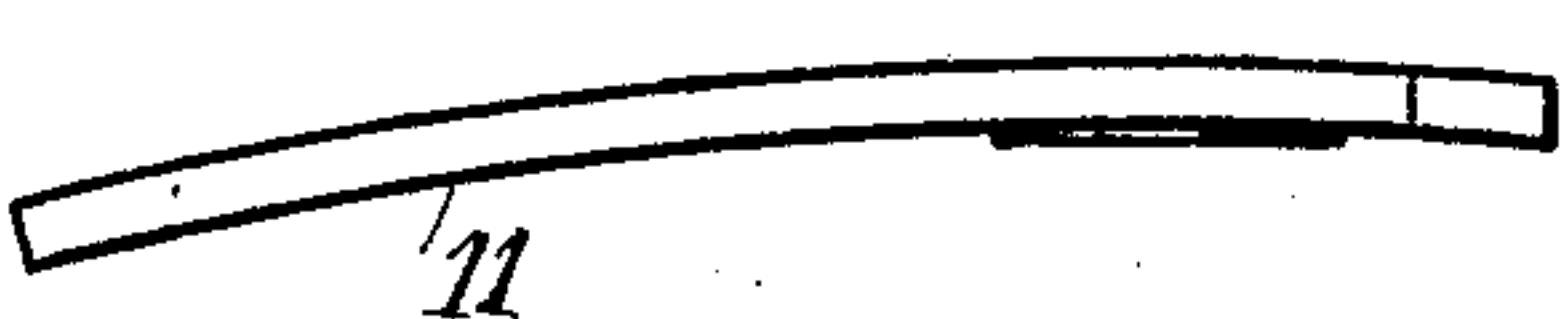


FIG. VI.

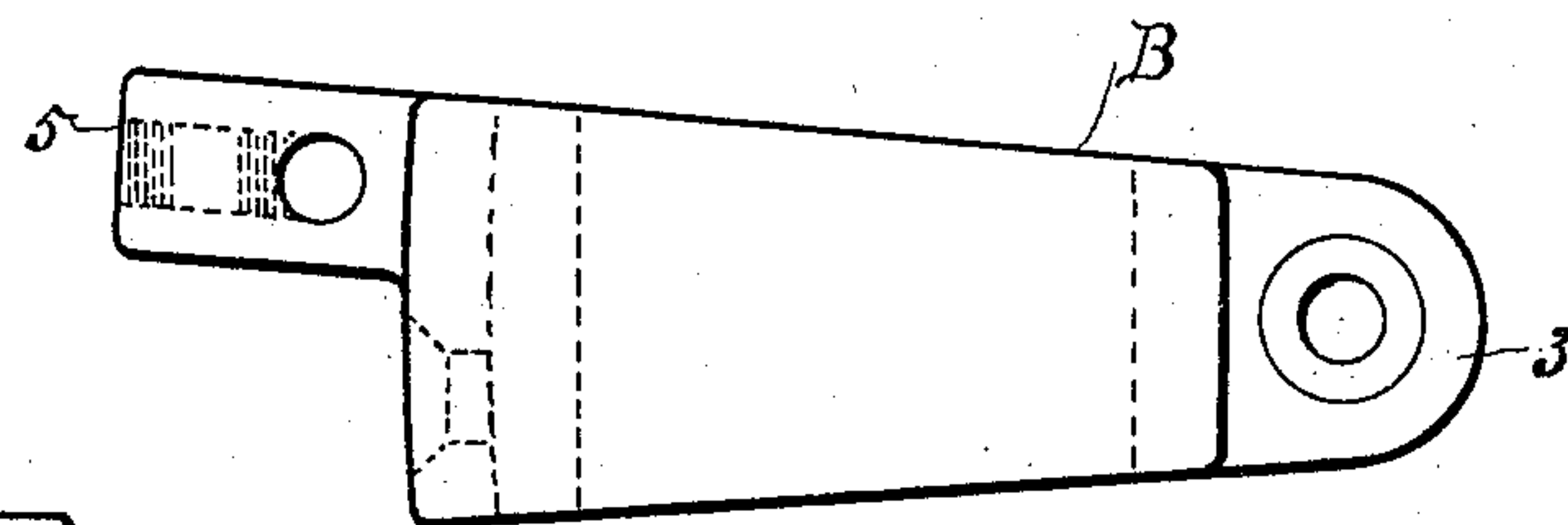


FIG. VII.

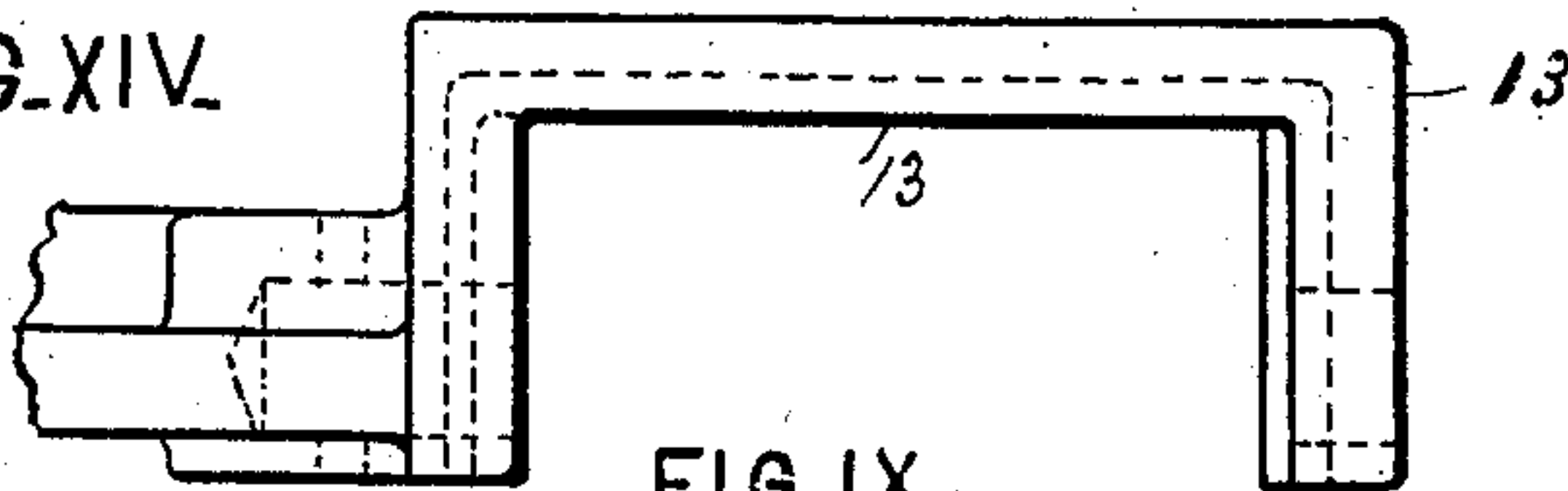


FIG. IX.

FIG. VIII.

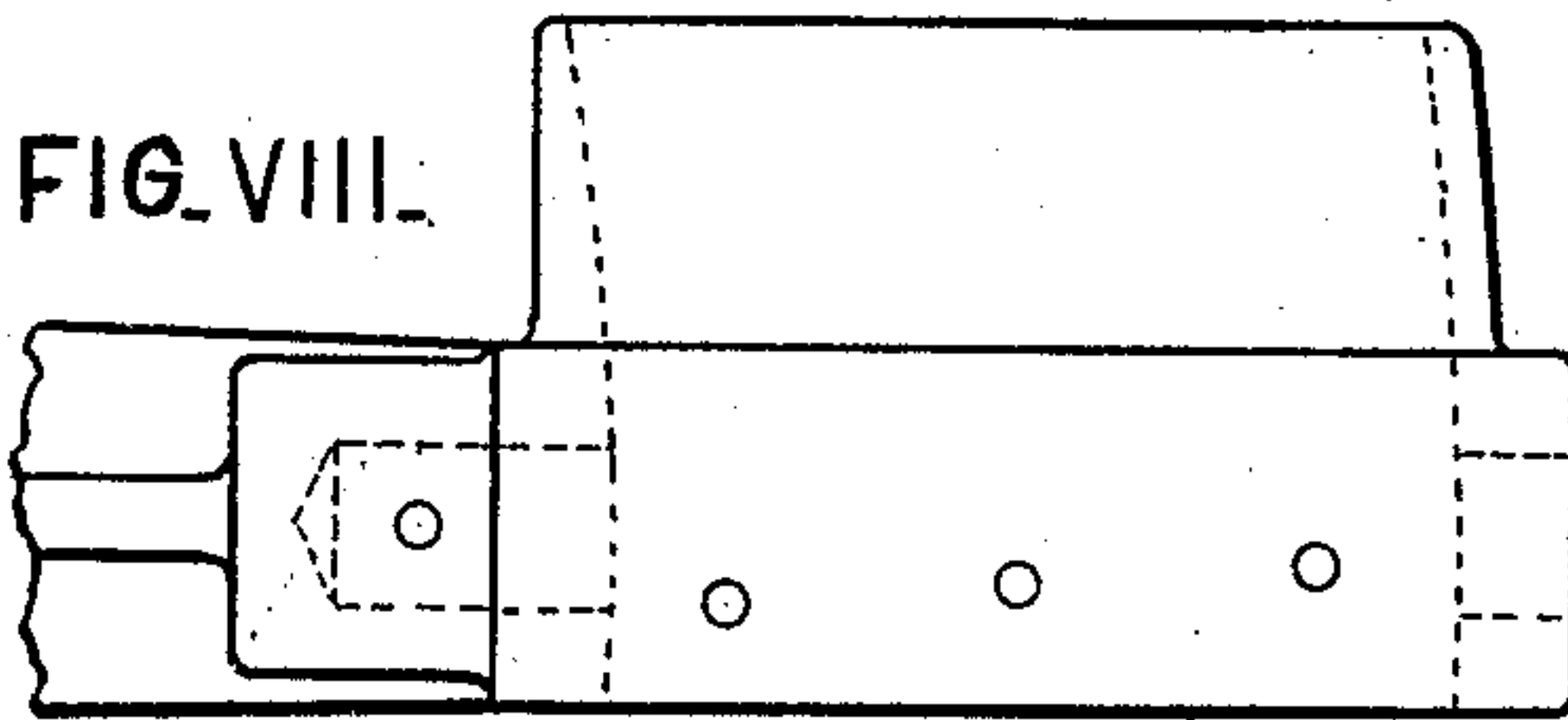


FIG. X.

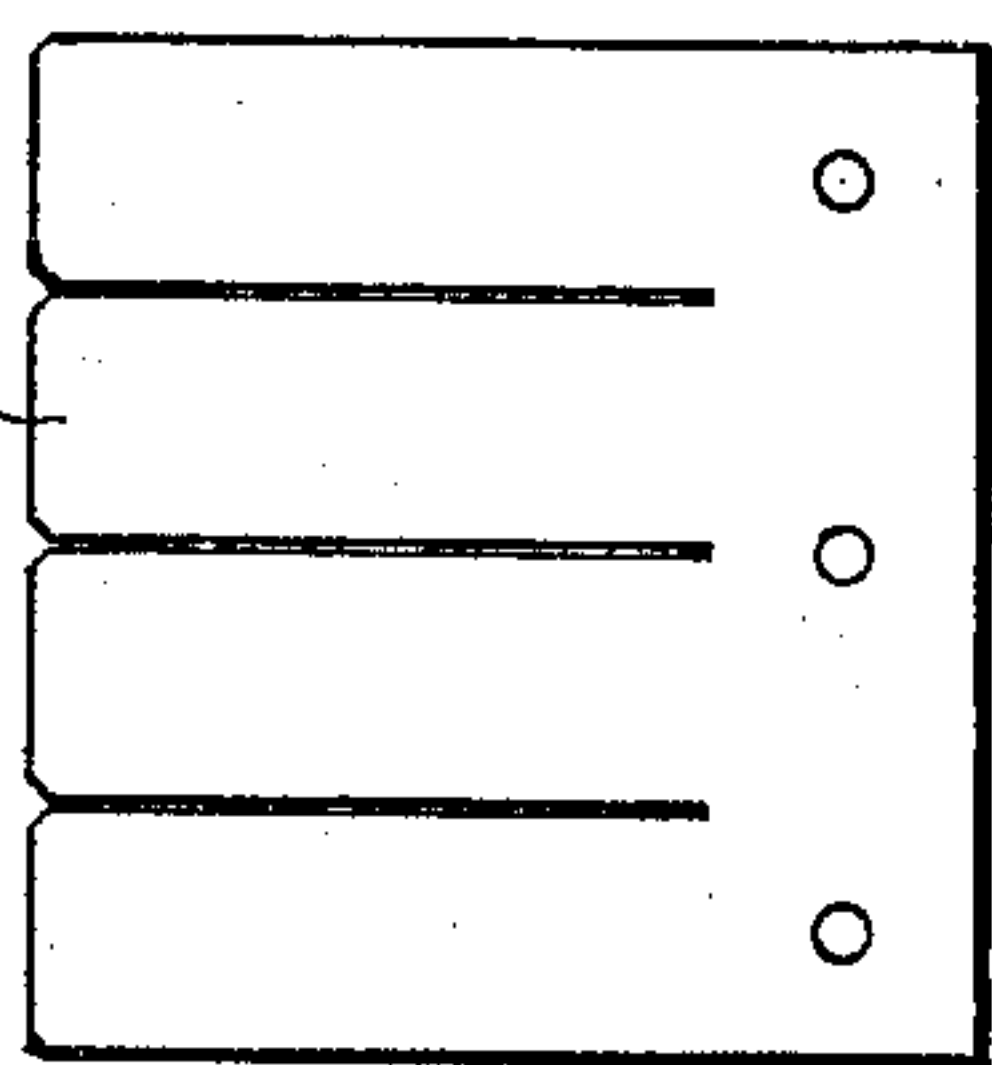
FIG. XI.



Witnesses

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UNITED STATES PATENT OFFICE.

SIDNEY H. SHORT, OF CLEVELAND, OHIO.

CONTACT-BOARD FOR RHEOSTATS.

SPECIFICATION forming part of Letters Patent No. 467,613, dated January 26, 1892.

Application filed March 18, 1891. Serial No. 385,549. (No model.)

To all whom it may concern:

Be it known that I, SIDNEY H. SHORT, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and
5 useful Improvements in Contact-Boards for Electric-Car Rheostats; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it ap-
10 pertains to make and use the same.

This invention relates more particularly to the contact board or switch for connecting in the resistances or the like on an electric-motor car; but each of the improvements con-
15 stituting said invention is included for all the uses to which it may be adapted.

The invention consists in certain particular constructions, combinations, and arrangements of parts, which can most conveniently
20 be explained with the aid of the accompanying drawings.

Figure I is an elevation of a contact-board constructed in accordance with the invention. Fig. II is a plan view of the same. Figs. III
25 and IV are central sections looking in opposite directions, and Figs. V to XVIII are detail views.

The base A of the contact-board is of laminated wood—that is to say, of different layers of wood, with the grain running in different directions; but a base otherwise constructed may be used with the other devices. The bodies of the contacts B are raised above the non-conducting base A and are separated
35 from each other by air-spaces, so that the body of the contact is surrounded by air, which acts as a cooling medium. Such raised contacts may of course be made in different ways. As shown, they each have feet 2 and
40 3 and a lug 4, by which they are held to the base A, and are provided, also, with a binding-post 5. By this construction the contacts are as rigid as if they were made of a solid block, being entirely inelastic by reason of
45 the bearing-feet 2 3, one at each end of the block, and at the same time the whole body of the contact proper is surrounded by air. In this respect my contact-blocks are different from contact-blocks made in the shape of

brackets secured at one end only, which, although surrounded by air, are liable to be bent and thus miss contact with the switch-arm.

The switching-arm C has a long hub 6, which turns loosely on a pin D, said pin being supported in a casting E, which has a plate 7 and a binding-post 8 and is fastened to the base A. There is also a stop 9 on the casting E. This stop 9 is a lateral extension from the plate 7, integral with the same, and is bent
55 upward into the path of one branch C^x of the switch-arm C. The branch C^x of the switch-arm is curved downwardly, so that its free end may strike against the stop, while the arm C is left straight, so as to clear that stop.
60 The arm C*, opposite the switching-arm C, strikes said stop when the switch-arm has been turned sufficiently in the direction opposite to the movement of the hands of a watch. As shown, the arm C* is against a stop 10,
70 which limits the movement of the switching-arm in the opposite direction. The switching-arm C is turned by a sprocket-wheel F, fast on the hub 6, or by other suitable means. A rubber of any suitable description might
75 be used to travel over the contacts B; but that shown is of improved form, and consists of a number of plates 11, turned edgewise and held down by the pressure of a spring or
80 springs 12. The end of the arm C is raised at 13 (see Figs. VII and VIII) to receive the plates, which are pivoted on the pin 14, the holes in said plates (see Fig. XII) being elongated widthwise of the plates 11, so that said
85 plates may move bodily in a direction transversely of said pin 14. The plates are adapted to catch against the raised part 13 when they are not held up by contacts B.

The resistances are connected electrically by suitable conductors with the contacts B,
90 and the ends 16 and 17 of the circuit which is to include them, are connected respectively, with the contact B' and the casting E. By turning the arm C, therefore, the rubber 11 makes contact with the contacts B in suc-
95 cession and connects in more of the resistances until it leaves the last contact, in doing which it breaks the circuit. After this has

occurred the arm C* strikes the stop 9 and arrests the movement. When the rubber 11 is free of the contacts B, the plates engage the part 13 and are prevented from turning so far but that they ride up onto the contact B when the arm C is turned back.

At G is a special contact which is to be connected with a shunt or branch whose introduction into the circuit will increase the speed of the motor above what can be attained simply by cutting out all the resistances. The arm C* is utilized to make connection with this contact G when the arm C is on the contact B', although it is not essential that the same arm should strike both the stops 9 and 10 and also make electrical connection with the contact G; nor is it essential that there should be two arms, one, as C*, to make contact with the contact G and the other to sweep over contacts B.

It is desirable that the motor-man should put forth a special effort in order to bring the arm C* onto the contact G. To effect this object the pin D is movable lengthwise in the casting E and is held down by means of a spring H, (shown as a spiral compression-spring,) and a cam K is provided in the path of the arm C*, so that when the latter strikes said cam it is obliged to slide up its inclined surface 18, (see Fig. XV,) lifting the arms C C* and pin D against the resistance of the spring H. After the arm C* has been lifted it passes onto the contact G. The contact B' is provided with an incline at 19 (see Figs. II and III) and with a surface raised above the rubbing-faces of the other contacts B. The rubber 11 makes contact with this face when the arm C* is on the contact G, which is the position shown in Figs. I to III. The contact B is elevated above the bearing-faces of the other contacts B, because at the time the rubbers 11 engage the contact B the arm C* also engages the elevated facial contact G, the spring H being compressed at this phase of operation to apprise the operator by the special effort required for this purpose that all resistance is being cut out and the special contact with the shunt or branch is being established. By reference to Figs. XII and XIII it will be seen that each lamina of the rubber 11 is formed on one side with a raised rim 11' around the elongated pivotal hole or slot by which the laminae are strung upon the pin 14. By this construction the laminae of the rubber are separated from each other by air-spaces, similar in this respect to the contacts B, and for the same purpose—viz., for cooling the body of the rubber. The laminae of the rubber are also curved laterally to correspond to the circle in which they travel, as shown in Fig. XIII, and by this construction I am enabled to utilize the whole edge 11² of each lamina as a bearing or rubbing surface, thus insuring great ease of movement, together with good contact and low resistance at the same time.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a contact-board for rheostats, the combination, with a board, of a series of contacts separated from each other by air-spaces, each contact being constructed with a downwardly-projecting foot at its opposite ends, whereby the body of the contact is elevated and separated from the board and an air-space is formed between them, substantially as set forth.

2. In a contact-board for rheostats, the combination, with a board, of a series of contacts separated from each other by air-spaces, each contact being provided at its inner end with a downwardly-projecting foot having a laterally-projecting flange by which it is secured to the upper surface of the contact-board, while the outer end of each contact is provided with a downwardly-projecting foot adapted to be secured to the outer edge of the contact-board, said contacts being arranged and secured in place to form an air-space between the board and the body of the contact, substantially as set forth.

3. A contact-board provided with a semi-circular series of contacts separated by air-spaces from each other and from the board, in combination with a rubber or brush composed of laminae curved in the circle of their travel and separated from each other by air-spaces, substantially as described.

4. A contact-board provided with a series of contacts separated by air-spaces from each other and from the board, in combination with a rubber or brush composed of laminae having holes elongated widthwise of the laminae, a common pivotal pin passing through the holes, and springs bearing upon the brush to force it against the contacts, substantially as described.

5. A contact-board provided with a series of rigid contacts, a pivoted switch-arm, a pivoted spring-actuated rubber or brush mounted in the switch-arm, a spring for forcing the rubber or brush against the contacts, and an inclined surface or cam for raising the arm against the opposing force of the spring, substantially as set forth.

6. A switching-arm having a raised part and provided with the plates mounted on edge and having therein holes elongated widthwise of said plates, the pivot-pin passing through said holes, and the springs, substantially as described.

7. The combination, with the switching-arm, the series of contacts, and the special contact, of the spring and the cam whereby the said arm is lifted against the force of said spring in establishing the electrical connection with said special contact, substantially as described.

8. A contact-board comprising a non-conducting base, a series of contacts, a special contact thereon, a casting on the base, a switch-

arm turning on a pin in said casting, a spring
on said pin, a cam for lifting the pin and
switch-arm against the action of the spring,
and stops for limiting the movement of the
5 switch-arm in either direction, substantially
as described.

In testimony whereof I have signed this

specification in the presence of two subscrib-
ing witnesses.

SIDNEY H. SHORT.

Witnesses:

E. H. MORRISON,
A. B. CALHOUN.