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2 SHEETS—SHEET 1.

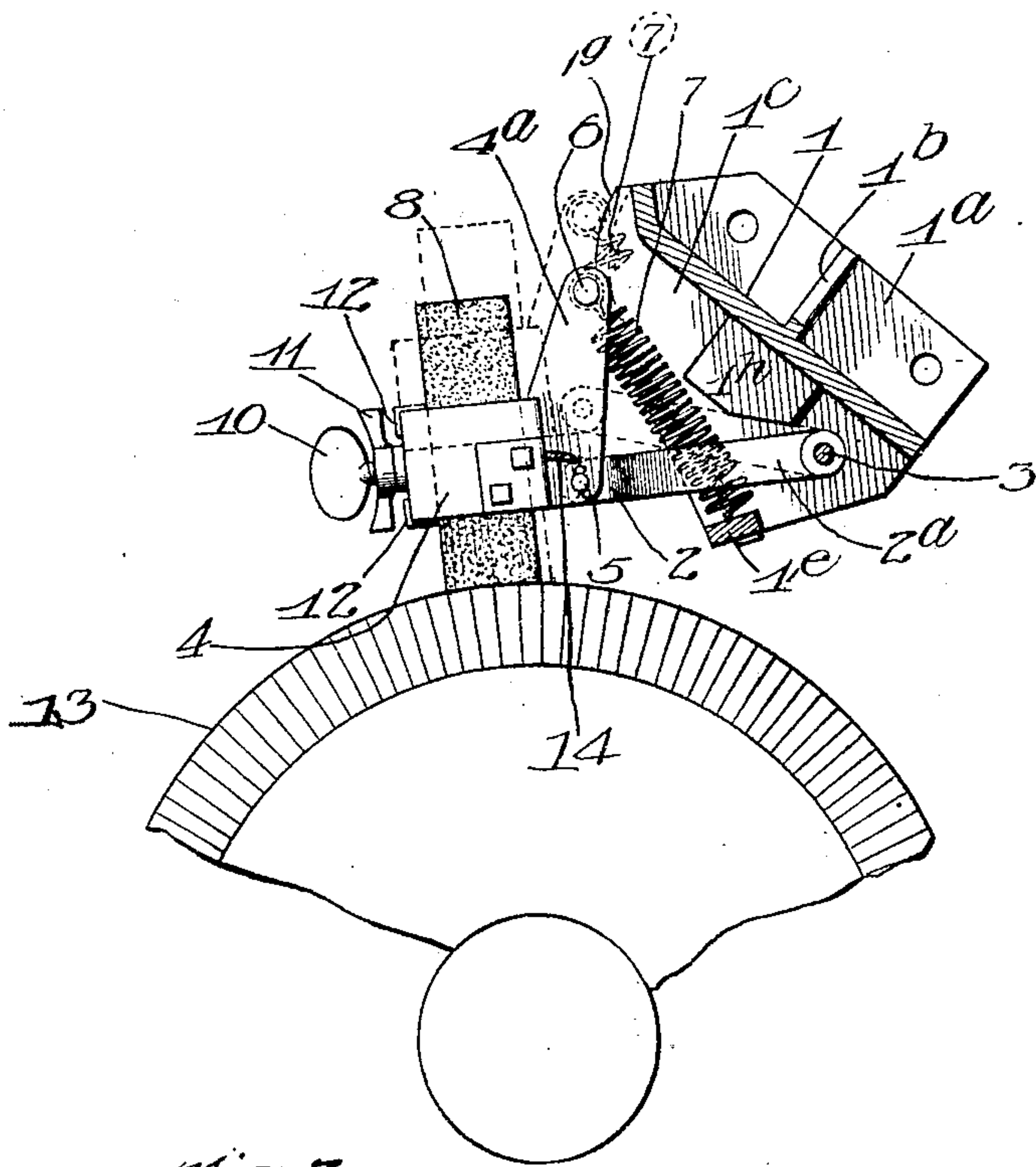
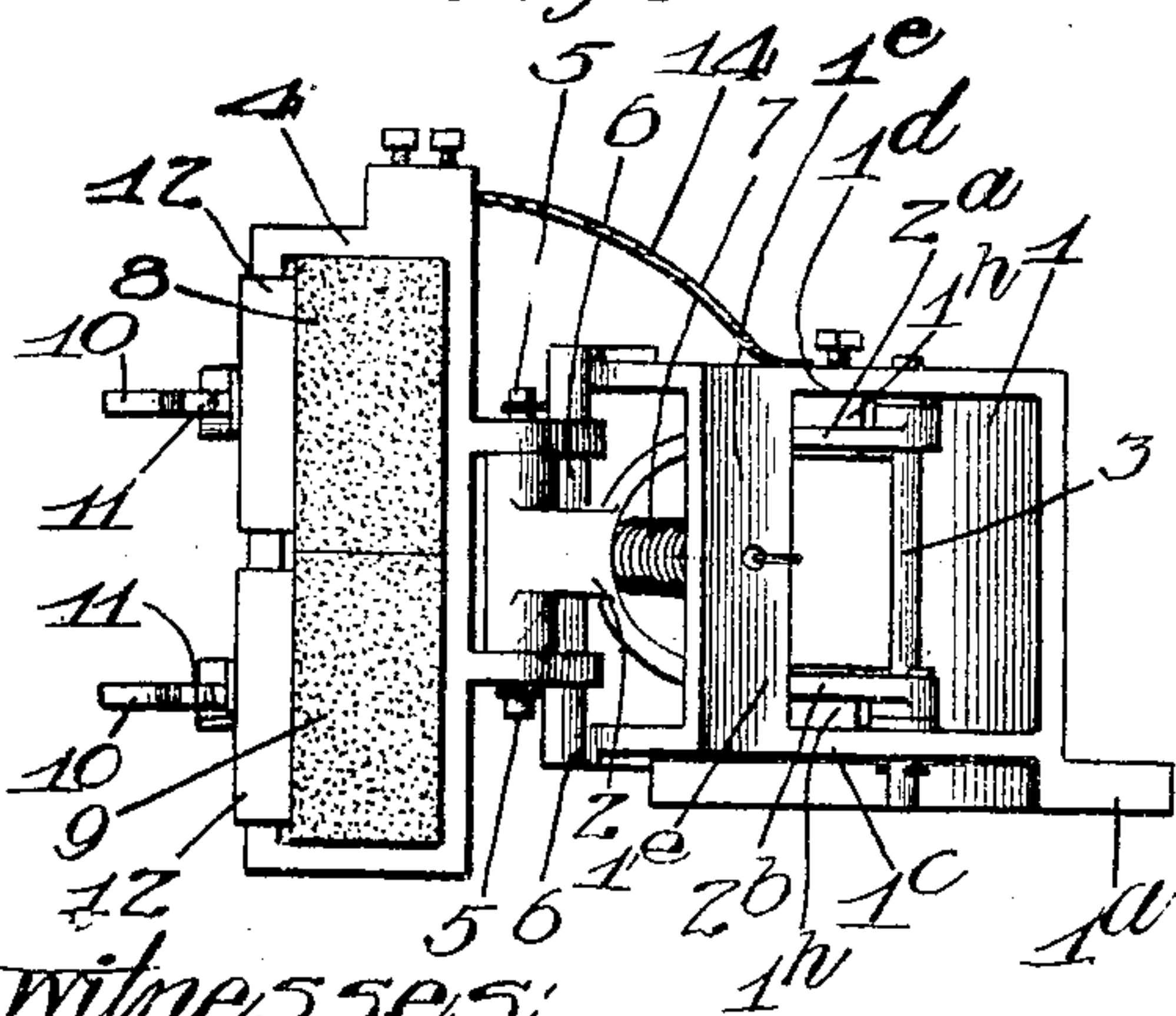


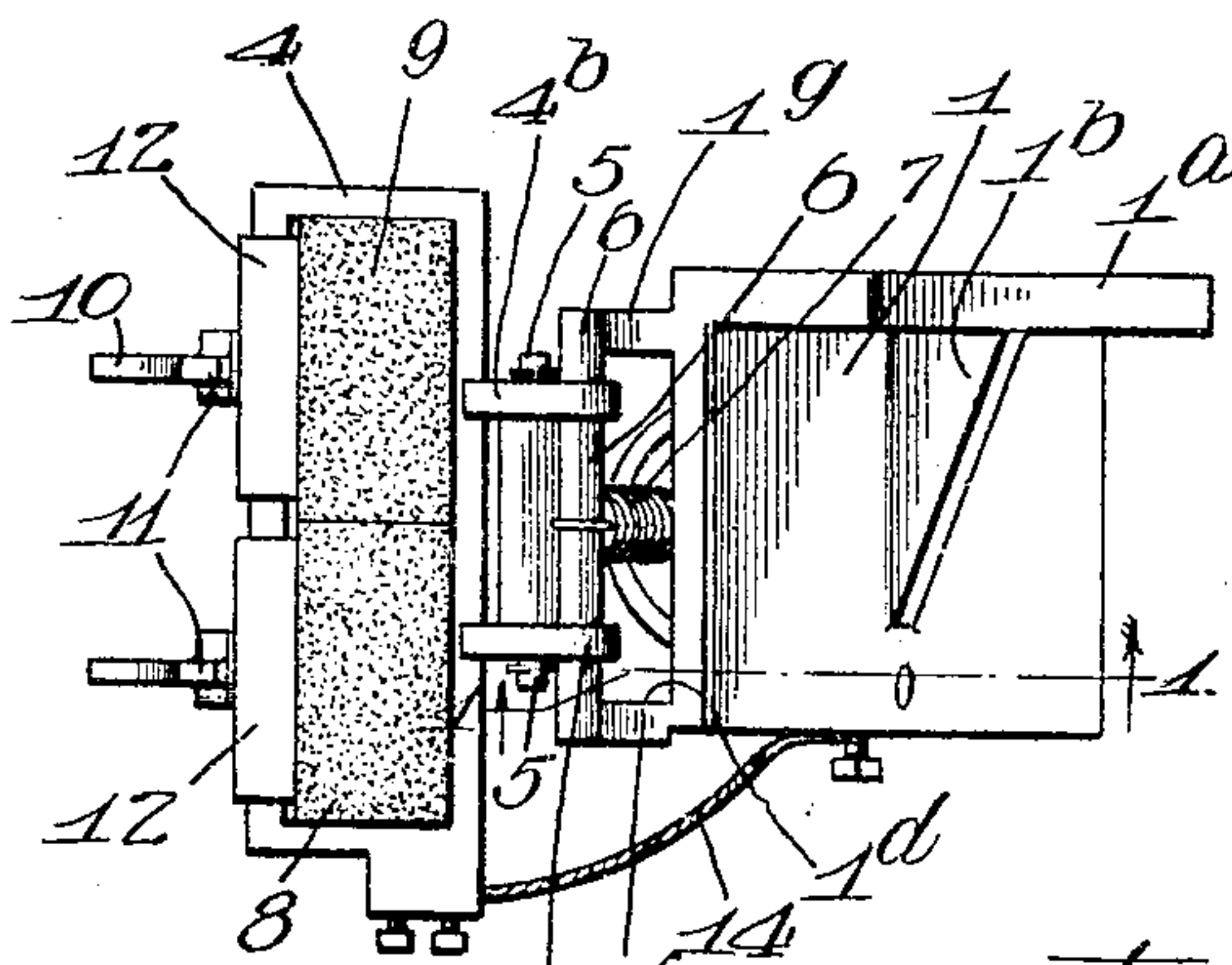
Fig. 3.



Witness, S. S. S.

Geo. D. Perry
 Chas. H. Kern.

Fig. 2



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as Inventor:
C. E. K. Zachau
witnessed by Hoffmann
Attys

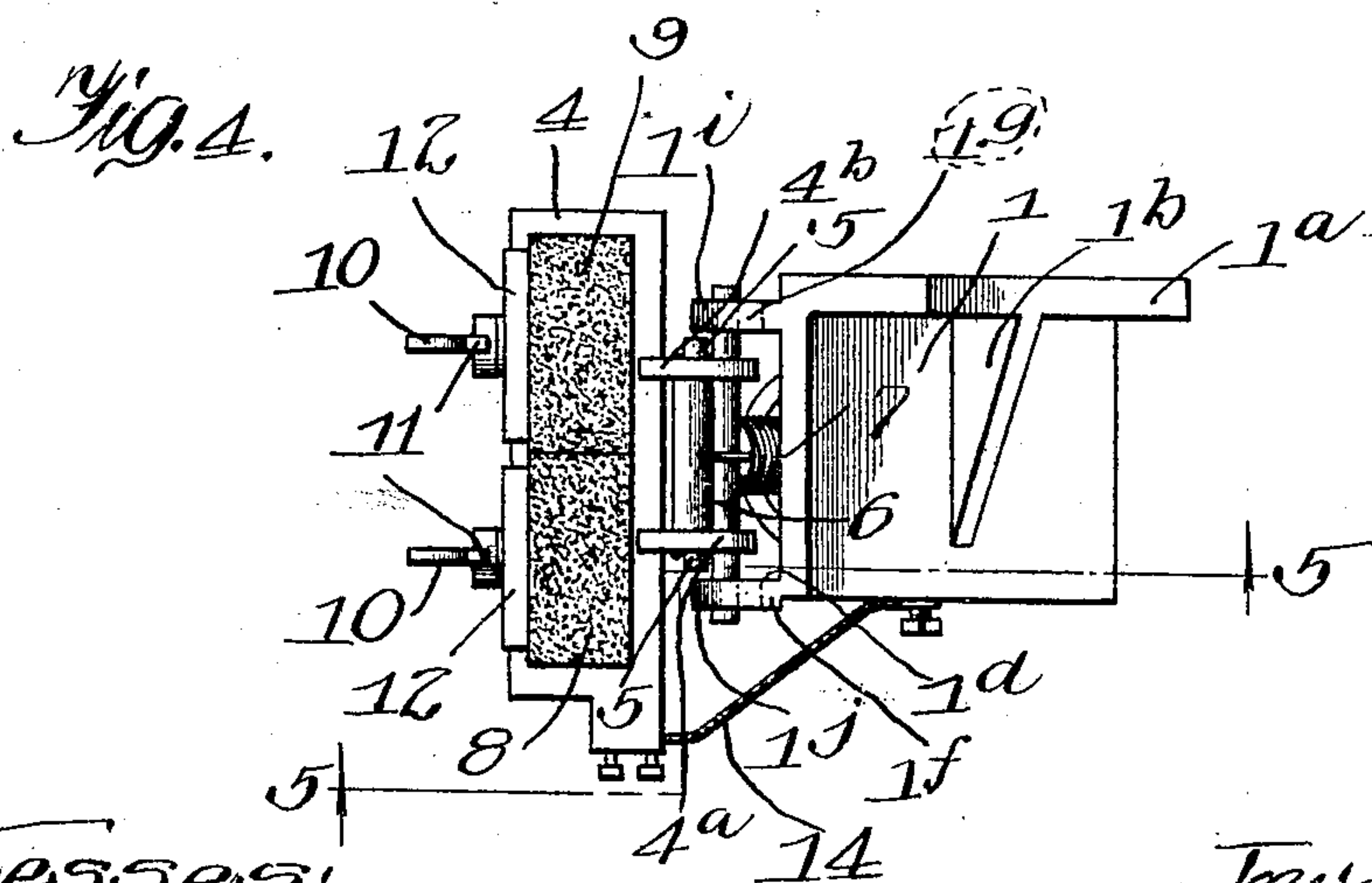
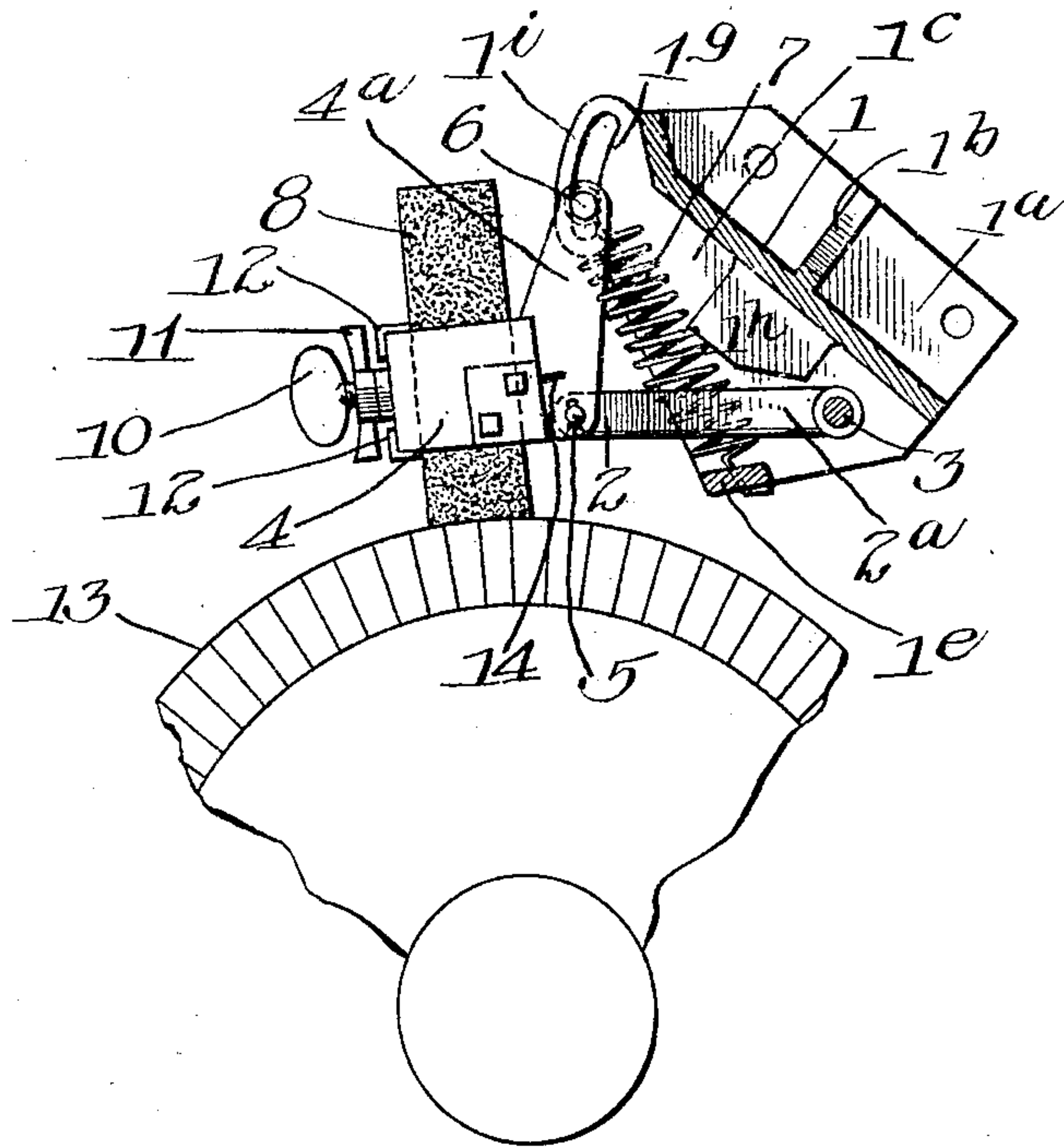
C. E. K. ZACHAU.
BRUSH HOLDER FOR DYNAMO ELECTRIC MACHINES OR MOTORS.
APPLICATION FILED JAN. 10, 1907.

924,716.

Patented June 15, 1909.

2 SHEETS—SHEET 2.

Fig. 5.



Witnesses:
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by Brown & Sons
attys

UNITED STATES PATENT OFFICE.

CARL ERIC KRISTOFFER ZACHAU, OF MUSKEGON, MICHIGAN.

BRUSH-HOLDER FOR DYNAMO-ELECTRIC MACHINES OR MOTORS.

No. 924,716.

Specification of Letters Patent.

Patented June 15, 1909.

Application filed January 10, 1907. Serial No. 351,667.

To all whom it may concern:

Be it known that I, CARL ERIC KRISTOFFER ZACHAU, a subject of the King of Sweden, residing at Muskegon, in the county of Muskegon and State of Michigan, have invented certain new and useful Improvements in Brush-Holders for Dynamo-Electric Machines or Motors, of which the following is a clear and exact specification.

10 This invention relates to improvements in brush-holders for dynamo-electric machines or motors, and has for its primary object to provide an improved brush-holder for dynamo-electric machines or motors by which the brush is held in a manner to secure the most desirable results, the construction employed in the device making it extremely sensitive so that it is adapted to respond immediately to slight vibrations due to an uneven commutator surface or other causes.

A further object of the invention is to provide an improved brush-holder that is simple and economical in construction and employing as small a number as possible of operative parts and joints, thus decreasing the number of wearing parts and lengthening the life of the device.

30 To the attainment of these ends and the accomplishment of other new and useful objects, as will appear, the invention consists of the features of novelty in the construction, combination and arrangement of the several parts hereinafter more fully described and claimed and shown in the accompanying drawings, illustrating an exemplification of the invention and in which—

40 Figure 1 is a side elevation view of the device, showing the carbon brushes in contact with the surface of a commutator. The bracket or frame is shown in section in this view in order to disclose more fully to view the operative parts. The section of the frame is taken approximately on line 1—1, Fig. 2. Fig. 2 is a top plan view of the device. Fig. 3 is a plan view of the device from the under side or from the side opposite to that from which the view is taken in Fig. 2. Figs. 4 and 5 are views similar to Figs. 1 and 2, but show a modification of the invention by which the cam surfaces 1^f and 1^g form one side of slots. This construction, which is shown as a modification of the invention, is found advantageous under conditions as hereinafter described.

55 1 is the bracket or frame, which is an irregu-

lar member designed to furnish a convenient means of support for the operative parts of the device. The upwardly extending flange 1^a is designed to serve as a convenient means 60 for attaching the device to any suitable support on the machine. The transverse rib 1^b serves as a means of strengthening the casting, and the depending members 1^c and 1^d which are formed approximately at right 65 angles to the body member, serve as convenient means for attaching the brush holding frame and its connections. The transverse member 1^e extending between the members 1^c and 1^d serves to strengthen the 70 entire bracket or frame and also to furnish a convenient means for attaching a spring or other elastic means as hereinafter described.

2 is a link pivotally mounted in the depending members 1^c and 1^d. This link is 75 bifurcated, the branch 2^a extending to the depending member 1^d and the branch 2^b extending to the member 1^c. Both of these branches may be pivoted to the frame or bracket 1 by the common pin 3 or in any 80 other convenient manner.

4 is the brush holding frame, in the present embodiment adapted to hold the common form of carbon brushes. This frame is pivoted at 5 to the free end of the link 2 and 85 is also provided with the upwardly extending members 4^a and 4^b. These members are provided near their upper extremities with the cross member 6, the extremities of which, it will be noted, extend beyond the 90 sides of 4^a and 4^b and form trunnions or lugs which contact with the cam surfaces 1^f and 1^g, which form a part of the depending members 1^c and 1^d of the bracket 1. It will be apparent that this construction affords 95 a convenient means for the attachment of the spring or other elastic means 7, the other end of which is attached to the member 1^e. Cross member 6 may be conveniently cast integral with the upwardly extending branches of the frame 4 or formed 100 individually and inserted, as shown in the present embodiment.

In Figs. 4 and 5 a modification of the member or bracket 1 is shown by which the cam 105 surfaces 1^f and 1^g are constructed as one side of curved slots, in which the ends of the cross member 6 are adapted to slide, the other sides of the slots being formed by the extensions 1ⁱ and 1^j of the main frame. This 110 construction, it will be apparent, secures the ends of pin 6 within the slots, and will pre-

vent the frame from being tilted out of position, if any extreme irregularity on the surface of the commutator should strike the side or end of the carbon brushes 8 and 9.

5 Heretofore it has been common to mount brush carrying frames on parallel links in order that the brush, as it moves in relation to the surface of the commutator, may move in planes constantly parallel with each other.
 10 It is one of the purposes of the present invention to secure this desirable result with the use of but a single link in order to reduce the amount of mechanism required and to this end the cam surfaces 1^f and 1^g describe
 15 arcs of circles whose radii are equal to the distance between the pivotal points at the extremities of the link 2 and whose centers are determined by the location of the fourth corner of the parallelogram, of which the
 20 three known corners are the pivotal members 3 and 5 and the transverse member 6 when the member 6 is held in its normal position against the cam surfaces 1^f and 1^g. It will
 25 be seen that the line of tension of the spring 7 is such that the pull on the transverse member 6 will constantly draw the upper end of the frame 4 toward the bracket and consequently keep the extensions or trunnions
 30 at the upper ends of 4^a and 4^b in constant engagement with the cam surfaces 1^f and 1^g. It will also be seen that the action of the spring 7 will be to draw the frame 4 downwardly until the link 2 will normally contact
 35 with the transverse member 1^e on the frame or bracket. From this construction it will be seen that the movements of the frame 4 are the same that would result from the use of the common form of parallel link construction and that in the present construction the
 40 upper link is omitted entirely, thus reducing the original cost and at the same time dispensing with two pivotal joints, which reduces to the minimum the liability of lost motion, thus making the present device ex-
 45 tremely sensitive, a result which is also facilitated by reason of the fact that the spring acts directly on the brush-holding frame 4.

The brush in the present embodiment is shown formed of the carbon strips 8 and 9 50 and are secured in the frame 4 by the set screws 10, which are held in position by the lock nuts 11. The lower ends of carbons 8 and 9 are adapted to contact with the commutator surface 13. The members 12 are 55 inserted between the contact points of set screws 10 and the surface of carbons 8 and 9 and may be formed of any convenient malleable or ductile material, as, for example, copper. It is also desirable to construct the 60 movable parts, consisting of the frame 4 and the link 2, of as light a material as possible consistent with the strength and wearing qualities required of the parts, in order that the inertia may be reduced as much as possible, a convenient material for this purpose 65 being aluminum.

The device may be provided with any suitable electrical connection, as for example, the bonds 14 connecting the frame or holder 70 4 with the bracket 1.

The downward swing of link 2 is limited by the transverse member 1^e and the upward swing may be limited by the use of lugs 1^h 75 cast on the bracket.

In order that the invention might be fully understood the details of an embodiment thereof have been thus specifically described, but

What I claim is:— 80

In a device of the character described, the combination of a bracket provided with a cam surface, a brush-holding frame, a link pivotally secured to said bracket and said frame, and elastic means adapted to hold 85 said frame normally in engagement with the cam surface on the bracket.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 7th day of 90 January A. D. 1907.

CARL ERIC KRISTOFFER ZACHAU.

Witnesses:

HARRY SAWYER,
C. A. MILLS.