

(No Model.)

2 Sheets—Sheet 1.

E. B. BENJAMIN.

STATICAL ELECTRICAL APPARATUS.

No. 261,118.

Patented July 11, 1882.

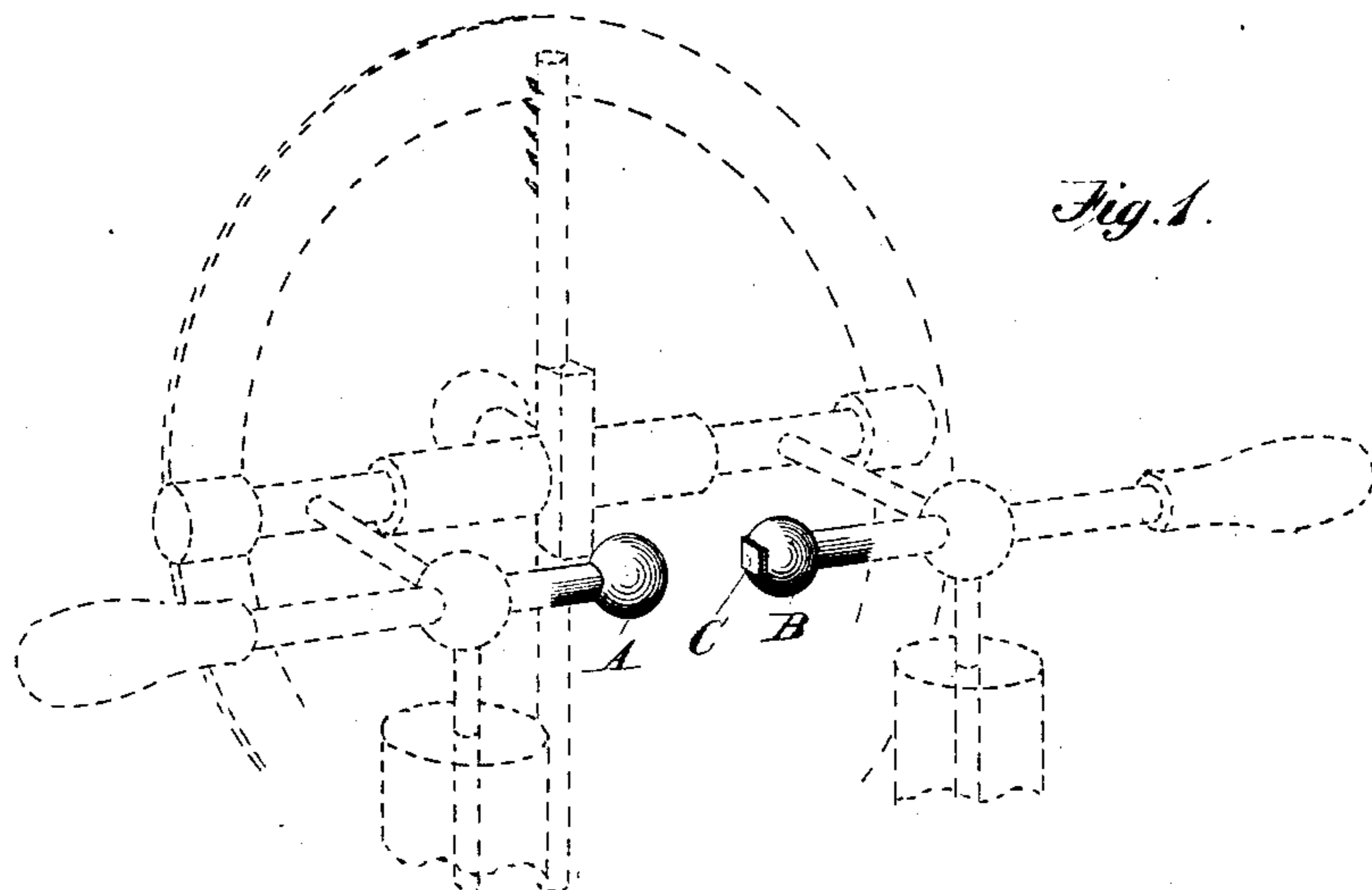


Fig. 1.

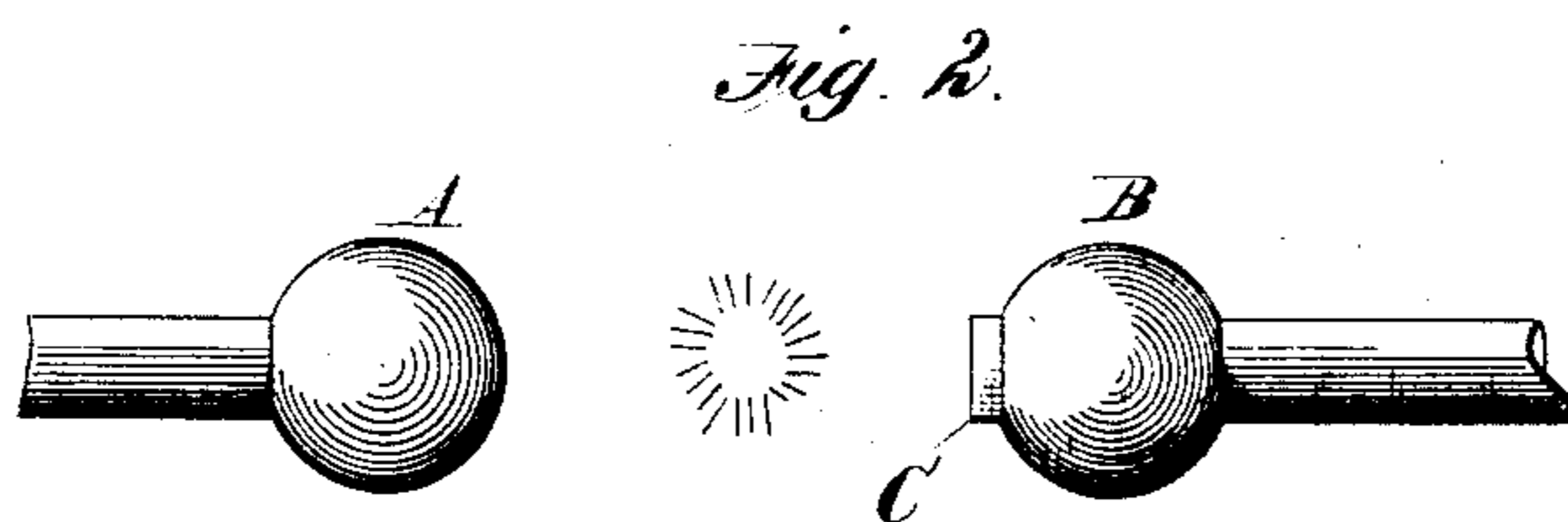


Fig. 2.

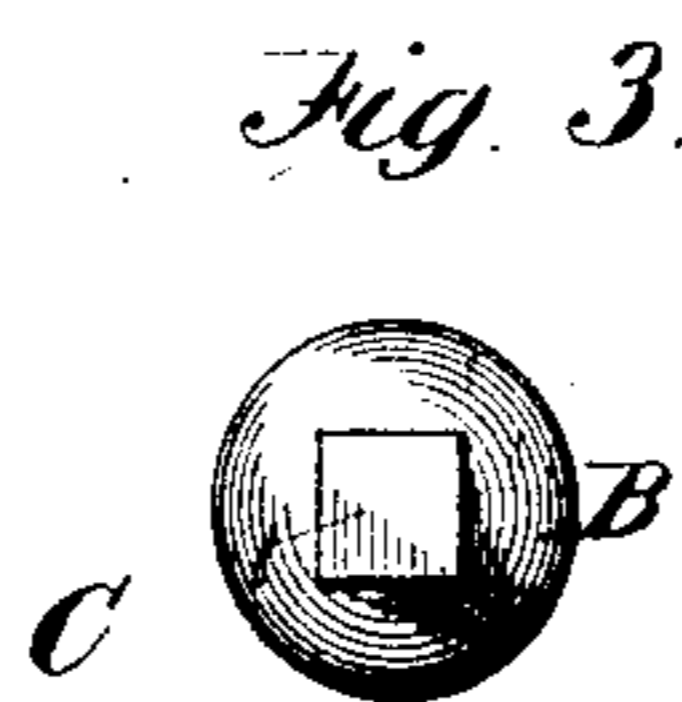


Fig. 3.

WITNESSES

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fig. 6.

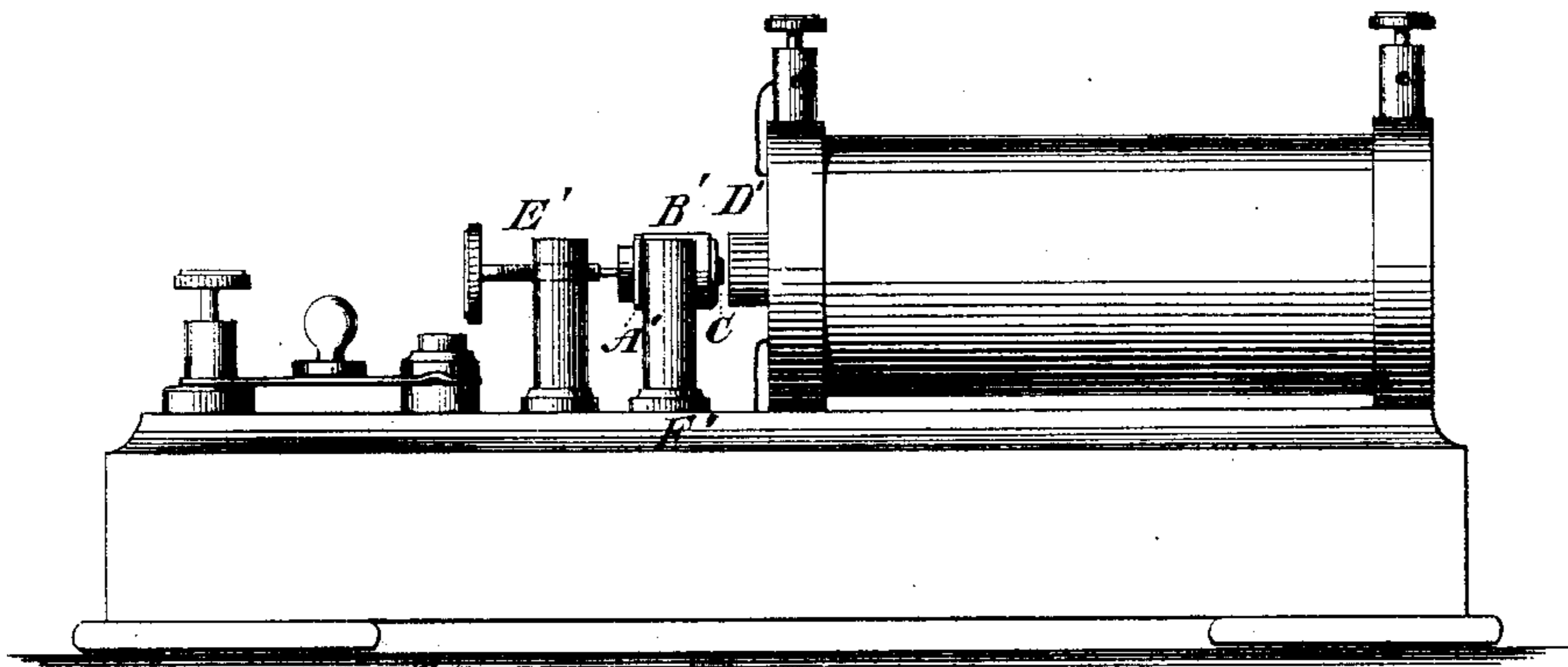


fig. 7.

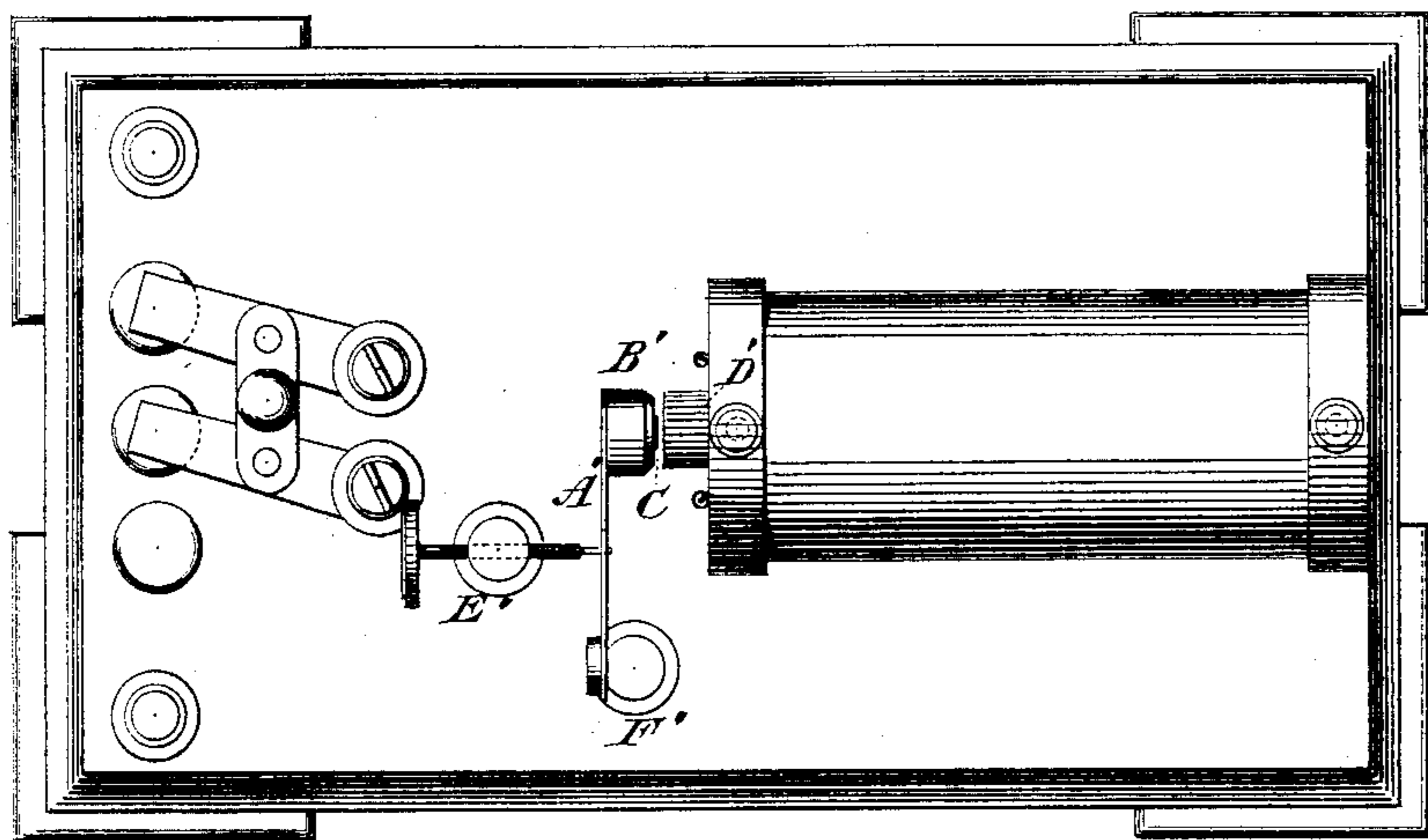


fig. 4.

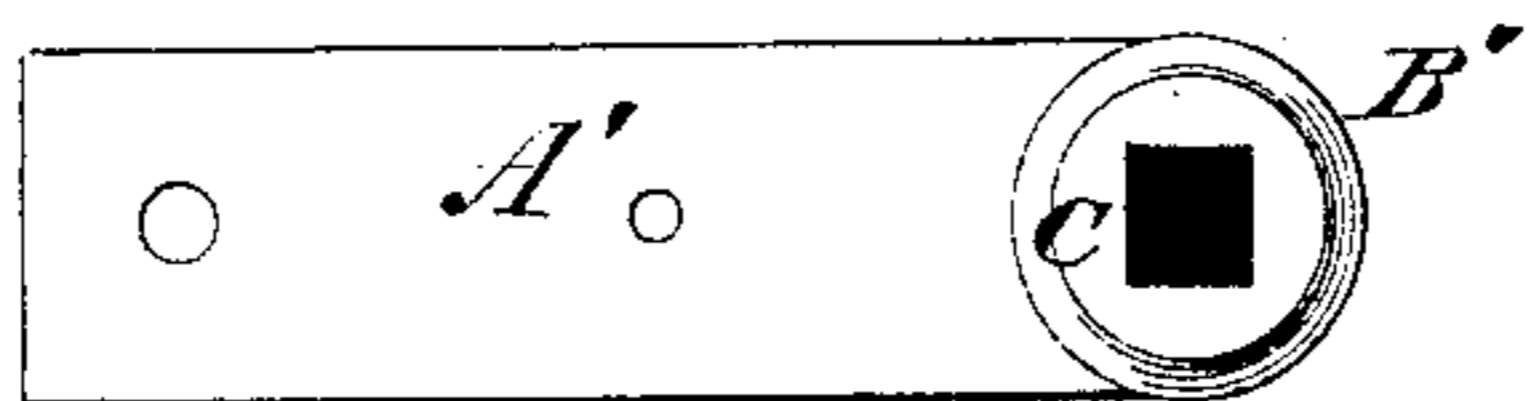
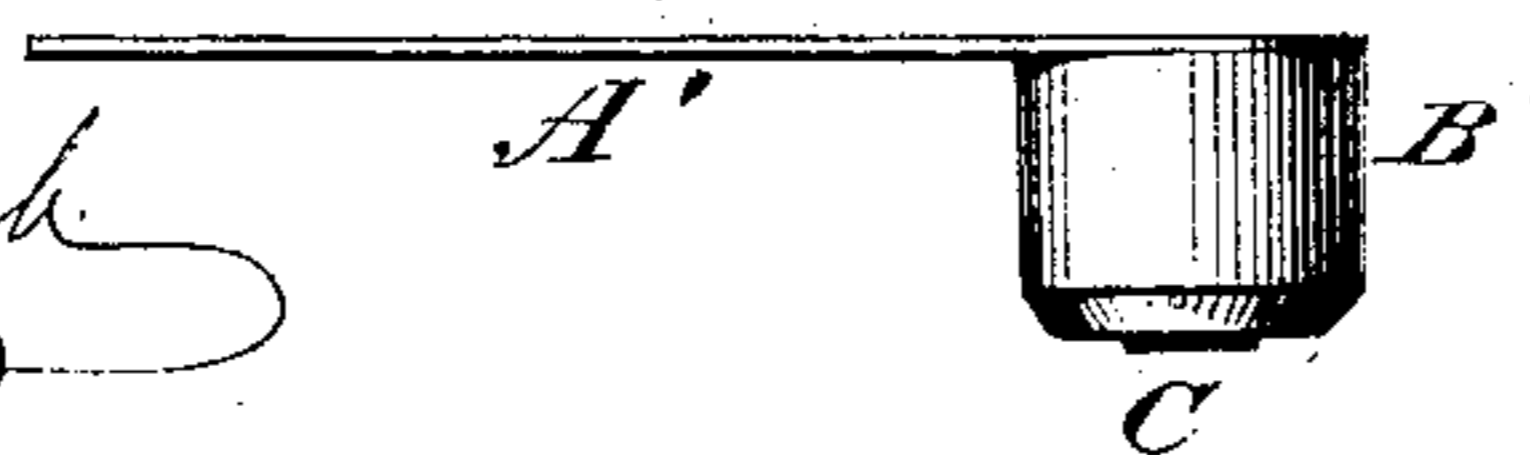


fig. 5.



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UNITED STATES PATENT OFFICE.

EDMUND B. BENJAMIN, OF NEW YORK, N. Y.

STATICAL ELECTRICAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 261,118, dated July 11, 1882.

Application filed March 24, 1882. (No model.)

To all whom it may concern:

Be it known that I, EDMUND B. BENJAMIN, of the city, county, and State of New York, have invented a new and useful Improvement in Statical Electric Apparatus, of which the following is a specification.

The object of my invention is to provide a means whereby the intensity and rapidity of the discharge of an electrical machine generating static electricity, or of an induction-coil which converts dynamic into static electricity, may be materially increased.

The invention consists in a plug, cap, shield, or cover of insulating material, which is combined with the conductor or part of the apparatus at which so-called "positive" electricity, or electricity of high potential, is supposed to accumulate, as hereinafter described.

In the accompanying drawings, Figure 1 is a perspective view, and Fig. 2 is a side view, of the conductors of a statical electric machine, between which the discharge takes place when the machine is operated. Fig. 3 is a face view of the conductor B in Fig. 1. Figs. 4 to 7 show my invention applied to an induction-coil. Fig. 4 is a face view, and Fig. 5 a side view, of the break to which the device is attached. Fig. 6 is a side elevation, and Fig. 7 is a plan, of the induction-coil and its support, with the break shown in Figs. 4 and 5 in place.

Similar letters of reference indicate like parts.

B is the conductor on which accumulates the so-called "positive" or high-potential electricity, and A is the conductor on which accumulates the so-called "negative" or low-potential electricity, generated in or by the machine. These conductors are of metal, and between them the discharge passes whenever the tendency of the electricity to pass from the high-potential to the low-potential conductor is sufficiently strong to overcome the resistance of the interval of air between said conductors.

The distance over which an electrical discharge or spark will pass in air between the conductors of an electrical machine is limited by the capacity of the apparatus to generate electricity, so that as between two similar machines the one which will project a spark over a greater interval of air between its conductors or discharging-points is relatively the more powerful of the two.

I have found by experiment that the length of spark in air and the intensity and rapidity of discharge of an electrical apparatus of the character before stated can be greatly increased by combining with the positive or high-potential conductor a cap, cover, shield, or plug of ebonite, rubber, glass, or other non-conducting or insulating material, so that said shield shall be in contact with but shall not wholly cover the face of the said conductor, and shall be placed thereon so as to be opposite the corresponding face of the low-potential conductor, and in the path normally taken by the discharge in passing through the air between said conductors. This shield is shown at C in the drawings, Figs. 1 and 2, as placed upon a conductor the end of which is of spherical form. The area of said shield should always be less than that of the face of the conductor to which it is applied, as is shown in the face view, Fig. 3. So long as this is observed I do not consider any particular relative proportion of area of shield to area of face of conductor as material.

It will be seen that the shield C serves the purpose of a stationary break or interrupter, and when it is made and combined with the high-potential conductors, as described, I find that it largely increases the capacity of the machine, enabling sparks of much greater length, and delivered more rapidly between the conductors, to be obtained. It also affords means of producing electrical effects in moist or warm climates with much greater facility than has hitherto been possible with the class of apparatus with which the device is combined. On small static electrical machines of the Holtz and other patterns I have found that it nearly doubles the length of spark otherwise obtainable.

The theory of the operation of my invention I believe to depend upon the fact that electricity accumulates on the surface of conductors until it reaches a state of tension sufficient to overcome the resistance of the non-conducting medium interposed between said conductor and another conductor adjacent thereto, when a disruptive discharge takes place between the two conductors. The cap of insulating material which I employ apparently prevents the overcoming of the resistance and the produc-

tion of the discharge until a higher degree of
tension is reached than could normally be at-
tained, the electricity being prevented from
accumulating at the portion of the conductors
5 where the cap is located and caused to do so
at or near the region surrounding said cap.

The application of my device to an induc-
tion-coil for converting dynamic into static
electricity is shown in Figs. 4 to 7. The cur-
10 rent passes by the post F' to the spring A' and
piece B', to the face of which last the cap C is
attached. D' is the induction-coil, and F' is
an adjusting-screw for the break-spring A'.
The discharge takes place between the piece
15 B' and the induction-coil D'.

What I claim as new, and desire to secure
by Letters Patent, is—

1. In a statical electric machine, or in an ap-
paratus for transforming dynamic into static
electricity, a shield, plug, or cap of insulating 20
material, in combination with the positive con-
ductor or discharging-point of high-potential
electricity, substantially as described.

2. In a statical electric machine, or in an ap-
paratus for transforming dynamic into static 25
electricity, the combination of the high-poten-
tial conductor, the low-potential conductor,
and the shield, plug, or cap of insulating ma-
terial, when said shield is arranged between
the conductors substantially as described.

EDMUND B. BENJAMIN.

Witnesses:

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G. H. DAVIDSON.