

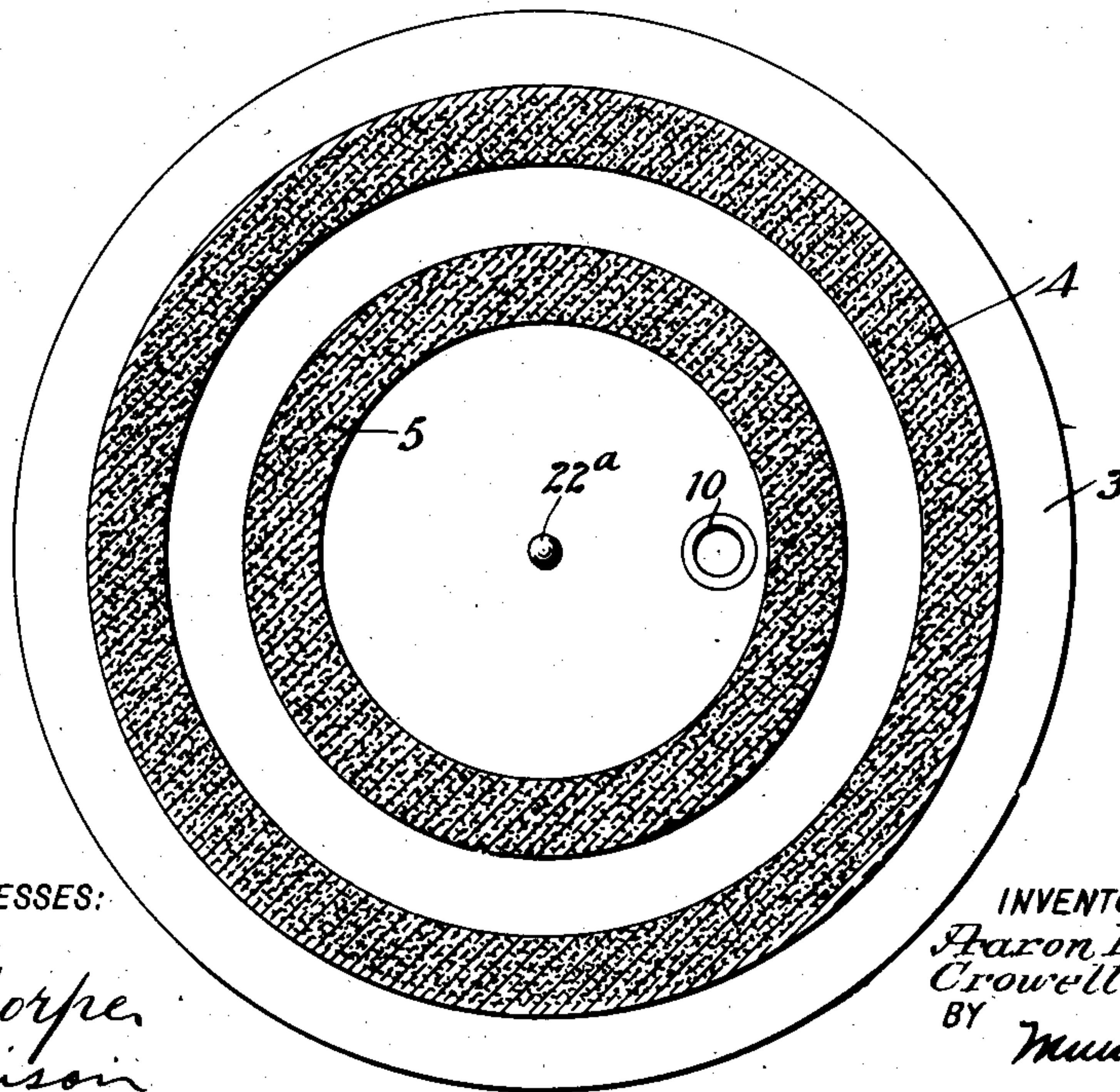
No. 834,054.

PATENTED OCT. 23, 1906.

A. E. HARRISON & C. M. HASLETT.  
SPARK GAP AND MUFFLER THEREFOR.

APPLICATION FILED SEPT. 26, 1905.

2 SHEETS—SHEET 1.





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Fig. 3.

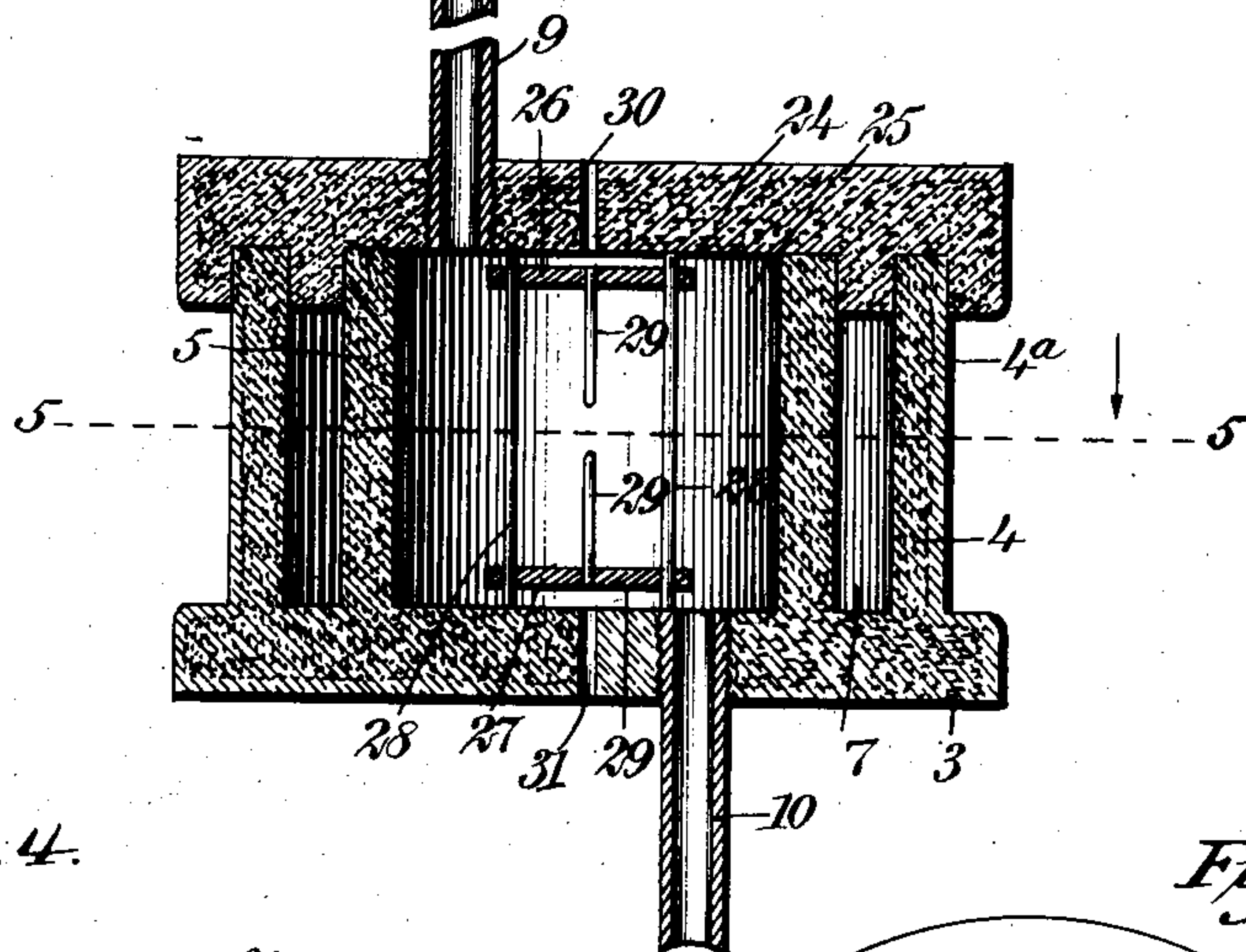
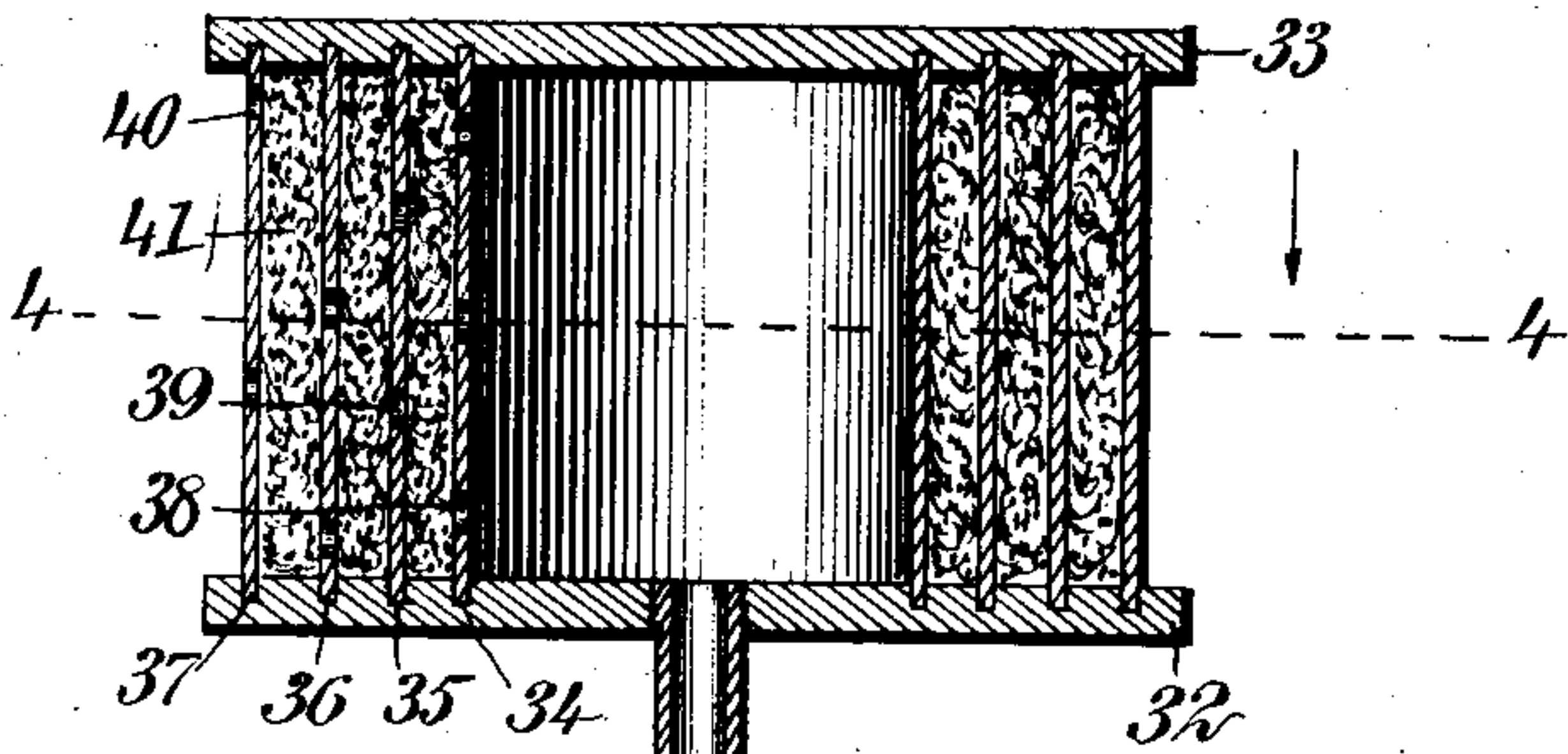
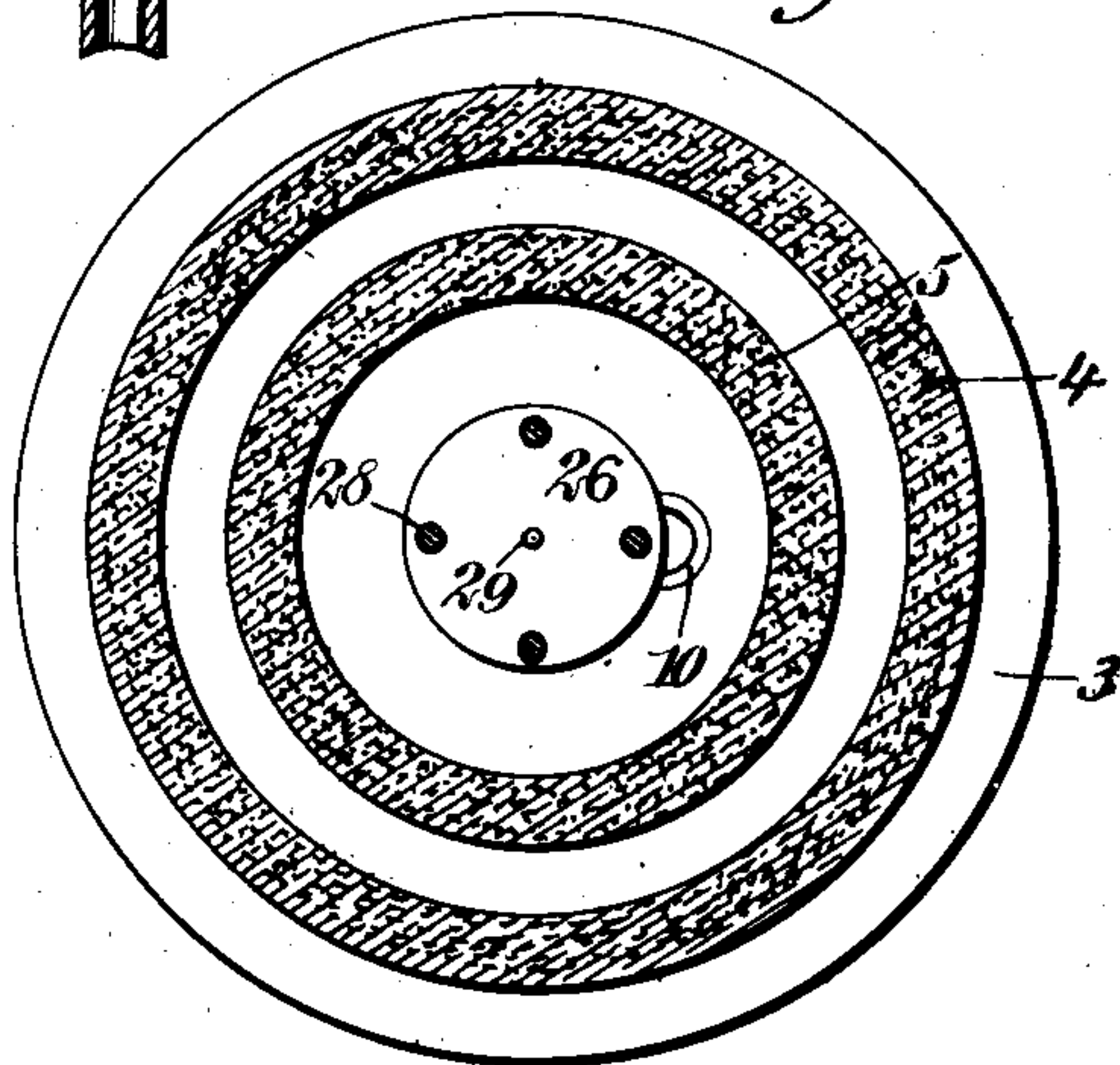
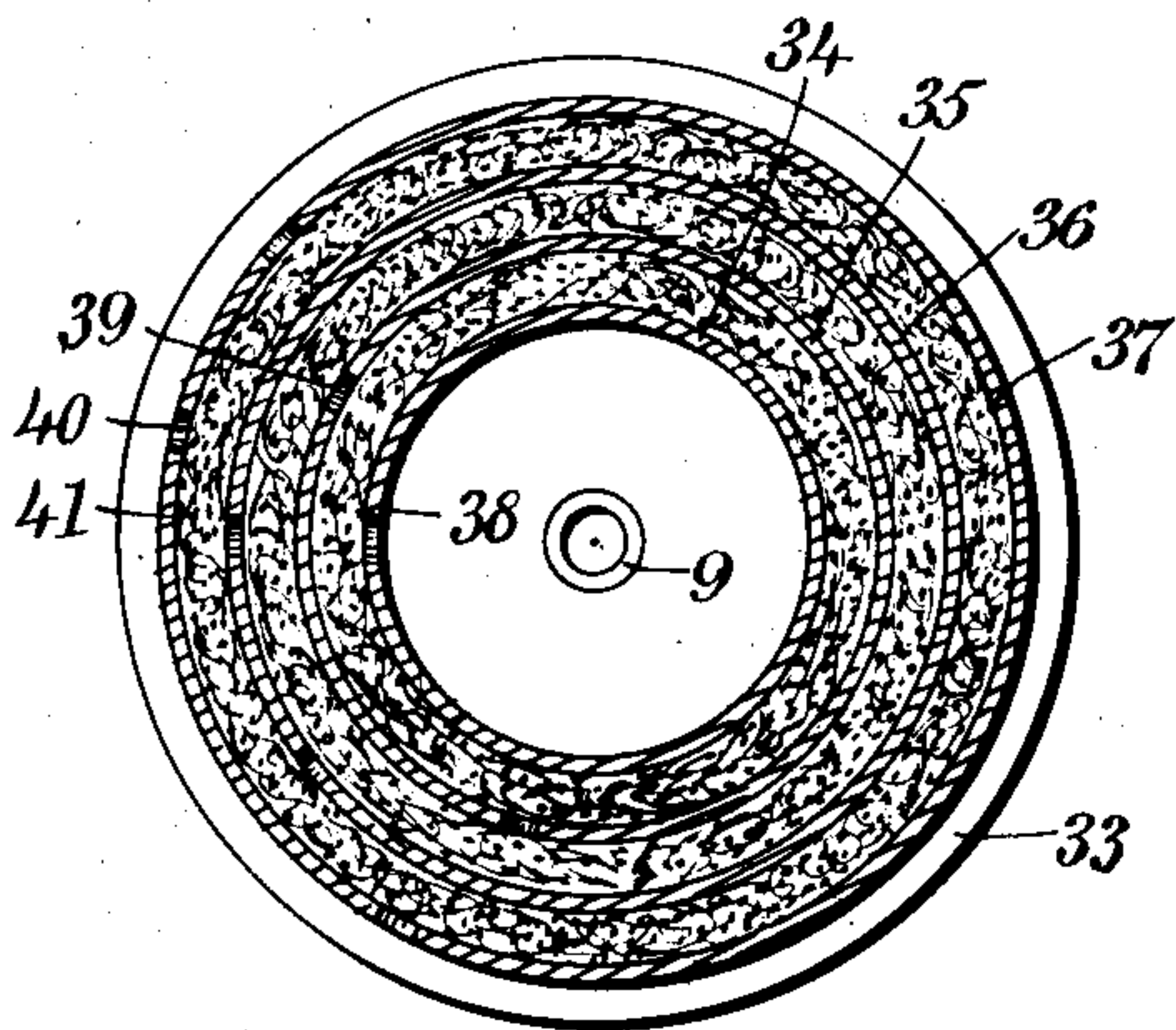


Fig. 4.

Fig. 5.



WITNESSES:

*W. Harrison*  
W. Harrison

INVENTORS

*Aaron E. Harrison*  
*Crowell M. Haslett*

BY

*Munn*

ATTORNEYS



# UNITED STATES PATENT OFFICE.

AARON E. HARRISON, OF NEW YORK, N. Y., AND CROWELL M. HASLETT,  
OF JERSEY CITY, NEW JERSEY.

## SPARK-GAP AND MUFFLER THEREFOR.

No. 834,054.

Specification of Letters Patent.

Patented Oct. 23, 1906.

Application filed September 26, 1905. Serial No. 280,130.

*To all whom it may concern:*

Be it known that we, AARON E. HARRISON, a resident of the city of New York, borough of Manhattan, in the county and State of New York, and CROWELL M. HASLETT, a resident of Jersey City, in the county of Hudson and State of New Jersey, citizens of the United States, have invented a new and Improved Spark-Gap and Muffler Therefor, of which the following is a full, clear, and exact description.

Our invention relates to spark-gaps of the kind used in wireless telegraphy and in relations analogous thereto, our more particular object being to provide an improved form of muffler for inclosing the spark-gap so as to reduce to a minimum the annoyance caused by sound proceeding therefrom.

It will be understood that in wireless telegraphy the spark-gap is very noisy, so much so that if the sounds are not properly muffled they become a considerable nuisance to people in the immediate vicinity. To telegraph operators and other employees the sounds in question are exceedingly undesirable, producing, as they do, painful sensations in the ears and even temporarily disqualifying the ears for efficient service in detecting delicate noise made in the receiving instrument—that is to say, a telegraph operator whose ears have been subjected to the influence of the loud sounds in question is unable to hear the delicate sounds of the telephone-receiver commonly used in wireless telegraphy. Often in ordinary work it is desirable for the operator to send a few words at a time and then listen to the sounds of his receiver. His ears are thus alternately subjected to such extremes of sound that their sensitiveness is not at its maximum when he is listening to the sounds of the receiver. Our purpose, therefore, is to so completely muffle the sounds from the spark-gap as to avoid the difficulties above mentioned.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a vertical central section showing a spark-gap and our improved muffler as applied thereto, and Fig. 2 is a horizontal section through the same upon the line 2 2 of

Fig. 1 looking in the direction of the arrow. Fig. 3 is a vertical section through a form of muffler used in connection with a removable spark-gap, this figure also showing the muffler-drum common to both types of muffler. Fig. 4 is a horizontal section upon the line 4 4 of Fig. 3 looking in the direction of the arrow and showing the perforated annular walls of the muffler-drum and the fireproof filling intermediate of these walls, and Fig. 5 is a section upon the line 5 5 of Fig. 3 looking in the direction of the arrow and showing the bottom part of the removable spark-gap.

Integral with the base 3 is an outer shell 4 and an inner shell 5. These shells are of annular form and concentric to each other. The inner shell 5 encircles a cylindrical chamber 6. Intermediate of the two shells in question is an annular channel 7, adapted to serve as a sound-proof chamber or to be filled with a substance such as mineral wool, sawdust, asbestos, or the like for the purpose of destroying sounds tending to pass through the chamber. The base 3 and the shells 4 and 5 are made, preferably, of earthenware, porcelain, fire-clay, or cement, the outer shell 4 and the exterior of the base 3 being glazed at 4<sup>a</sup> and preferably harder than the inner shell 5. A lid 8 is similarly glazed at 8<sup>a</sup> and is provided with annular ribs 8<sup>b</sup> 8<sup>c</sup>, projecting slightly downward and so disposed that the annular rib 8<sup>b</sup> neatly encircles the shell 4, while the annular rib 8<sup>c</sup> closely encircles the inner shell 5, thus effectively breaking joint as between the lid 8 and the shells 4 and 5. The muffler is connected with an air-outlet pipe 9 and an air-inlet pipe 10, disposed in threaded apertures 11 12. The purpose of these pipes is to allow a circulation of air through the muffler, thereby keeping the spark-gap as cool as practicable. The inlet-pipe 10 may be connected with a supply of air under pressure. As the air after exposure to the spark-gap becomes partially conducting it will be displaced by fresh air, and the ventilation afforded by the invention described promotes this purpose.

The lid 8 is provided with a central aperture 13, through which a bushing 14 projects a slight distance into the muffler. This bushing is provided with a shoulder 15, which engages the upper surface of the lid and serves as a limiting-stop for the bushing.



Mounted within the bushing 14, which is made of fireproof insulating material—preferably glazed porcelain—is a metallic tube 16. The upper end of this tube is threaded and is fitted with a larger tube 17, the lower end of the latter being threaded internally for the purpose. Encircled by the larger tube 17 is a quantity of mineral wool 18 or any desired fireproof material. A cap 19 is threaded internally and fitted upon the tube 17. The metallic electrode or stem 20 is threaded and passes through the mineral wool 18 into the tube 16. A nut 21 is screwed upon the lower end of the tube 16, and thus encircles the electrode 20. This electrode 20 terminates in a hemispherical end 22. Another hemispherical end 22<sup>a</sup> is turned on an electrode or stem 23, which may be molded rigidly into the bottom of the muffler, as shown. The purpose of the sleeve 16 is to afford a threaded passage for the electrode 20. The filling 18 prevents the escape of sound, while allowing the electrode to be adjusted. The electrode 20 is removed by unscrewing it from the threaded tube 16.

In the form shown in Figs. 3, 4, and 5 the lid 24 covers the central chamber 25 and the inner and outer concentric walls 4 and 5. Two disks 26 27 are connected together by tie-rods 28; and disposed centrally within these disks are spark-terminals 29. The electric conductors are led in through holes 30 and 31 and connect with these terminals, so as to energize the same, the method of connection being immaterial. Upon removing the lid 24 the disks 26 and 27, together with the tie-rods 28 and the conductors 29, are removable as a unit. This entire removable member we designate as a “removable spark-gap.” The action of the muffler shown in the lower part of Fig. 3 is substantially the same as that shown in Figs. 1 and 2. The upper end of the outlet-pipe 9 is threaded and fitted into a comparatively large disk 32, surmounted by another disk 33, the two disks being connected together by means of concentric cylinders 34, 35, 36, and 37, the latter being provided with holes 38, 39, and 40, staggered in relation to each other, as indicated in Figs. 3 and 4. Intermediate of the concentric cylinders 34, 35, 36, and 37 are annular portions 41 of mineral wool, asbestos, or other fireproof material. This substance is loosely disposed, so as to allow the heated air to pass outwardly from the inner cylinder 34, and yet, owing to the staggering of the holes and the deadening quality of the substances, little or no sound can make its escape. The cylinders 34, 35, 36, and 37 are let into the disks 32 and 33, together therewith constituting a member which we designate as the “muffler-drum.”

We find that by making the inner shell 5 comparatively porous it is rendered effective in deadening the sound-vibration. When a

spark-gap is placed within the muffler and is active, the sounds are scarcely audible, so effectively are they muffled.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. In a muffler, the combination of a member provided with inner and outer shells, and further provided with means whereby a spark-gap may be maintained within said inner shell, and a lid engaging said inner and outer shells and provided with portions for breaking joints between said lid and said inner and outer shells.

2. In a muffler, the combination of an inner shell of porous material, an outer shell encircling the same, and means for mounting spark-terminals within said inner shell.

3. In an apparatus of the character described, the combination of a base portion provided with inner and outer shells integral therewith and concentric to each other, a lid provided with annular members for fitting said inner and outer shells so as to break joints therebetween, and spark-terminals for maintaining a static discharge within said inner shell.

4. In an apparatus of the character described, the combination of a hollow member for containing a spark-gap, an outlet-pipe connected with said hollow member, a muffling-drum connected with said outlet-pipe, and means for supplying air into said hollow member.

5. In an apparatus of the character described, the combination of a hollow member for containing a spark-gap, means for admitting air thereinto, and a muffling-drum connected with said member and receiving therefrom the air heated by the spark-gap, said muffling-drum being provided with means for discharging said heated air while preventing the sounds from escaping.

6. In an apparatus of the character described, the combination of a hollow member, an outlet-pipe connected therewith, a disk mounted upon said outlet-pipe, a plurality of concentric cylinders connected with said disk and provided with holes staggered in relation to each other, another disk mounted upon said concentric cylinders, and means for admitting air to said hollow member.

7. In an apparatus of the character described, the combination of a receptacle provided with a spark-gap, and a muffler-drum separate from said receptacle and connected therewith.

8. In an apparatus of the character described, the combination of a hollow member, a spark-gap mounted therein, and a muffler-drum connected with said hollow member, said muffler-drum being provided with a plurality of outlets staggered relatively to each other.

9. In an apparatus of the character de-



scribed, the combination of a hollow member, a spark-gap mounted therein, a muffler-drum communicating with said hollow member, said muffler-drum having a plurality of walls provided with apertures, and fillings mounted intermediate of said walls for the purpose of suppressing sounds.

10. In a muffler for spark-gaps, the combination of a sound-proof receptacle for containing a spark-gap, a muffler-drum connected with said receptacle and provided with a plurality of outlets, and means for forcing a cooling medium through said receptacle and into said muffler-drum.

15 11. In an apparatus of the character described, the combination of a hollow mem-

ber, means for conducting an air-current therefrom, a spark-gap mounted within said hollow member, and a muffler-drum connected with said hollow member and provided with concentric walls, said walls having apertures staggered relatively to each other for the purpose of depressing sounds from said hollow member.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

AARON E. HARRISON.  
CROWELL M. HASLETT.

Witnesses:

WALTON HARRISON,  
EVERARD B. MARSHALL.