

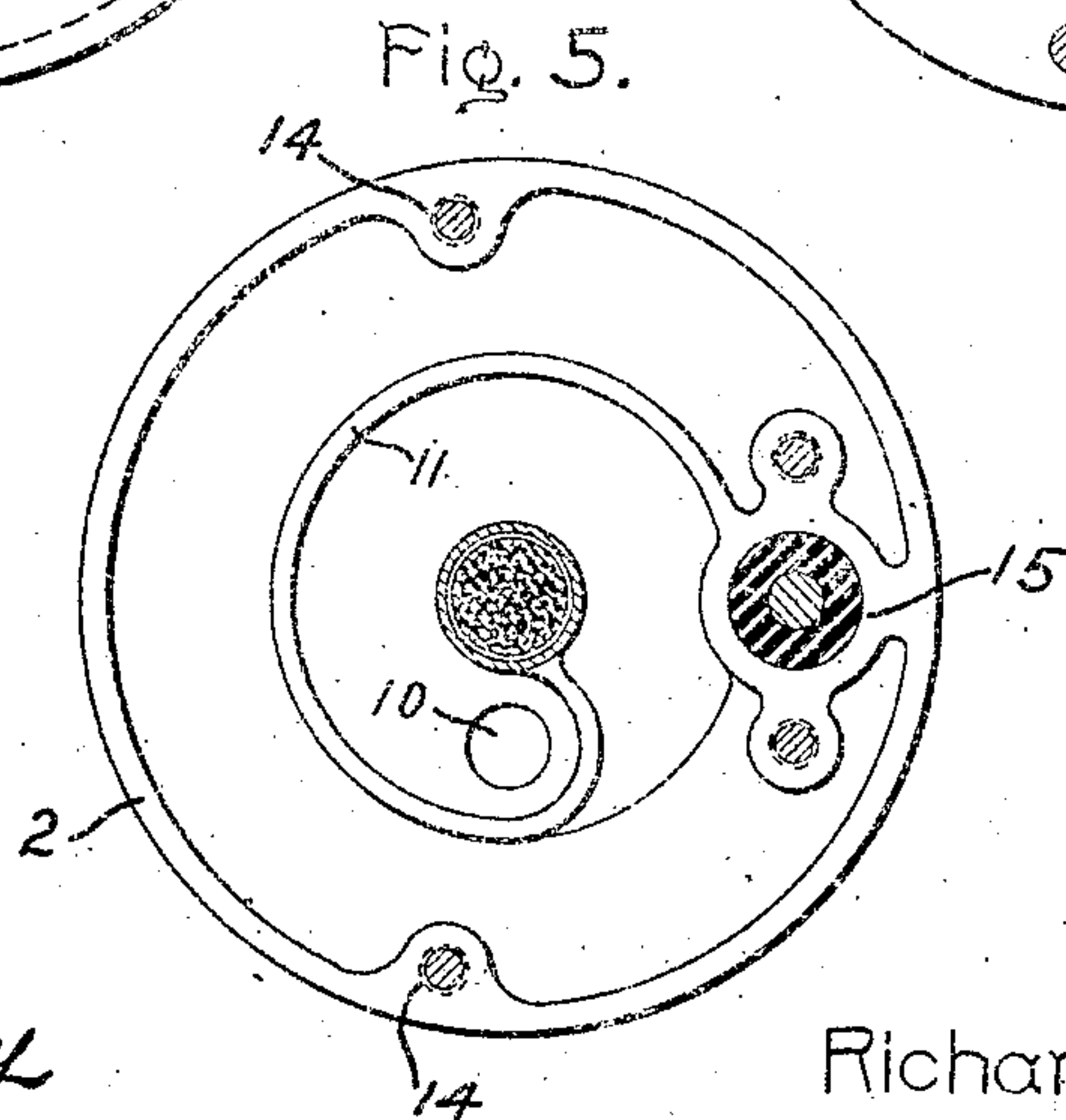
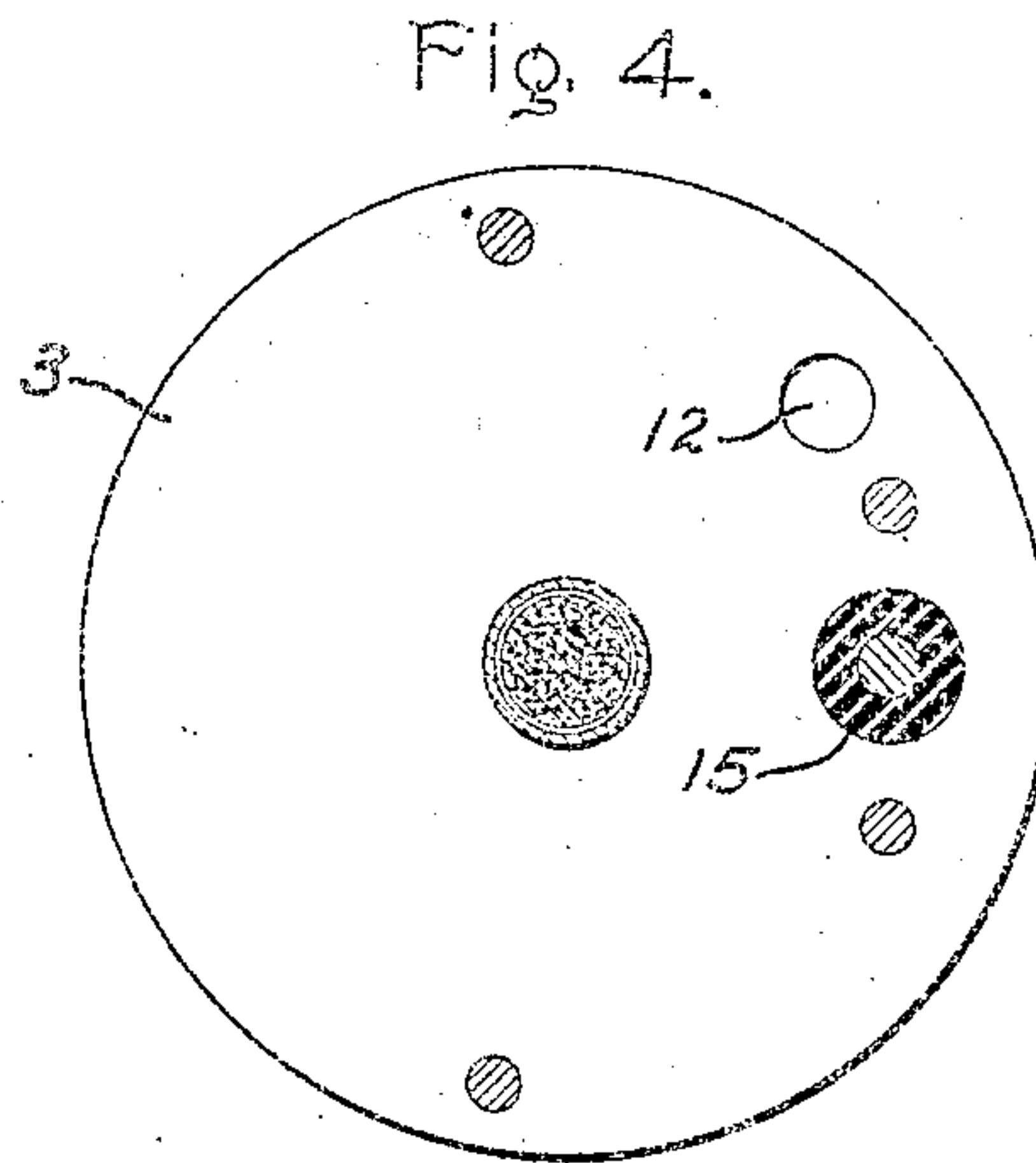
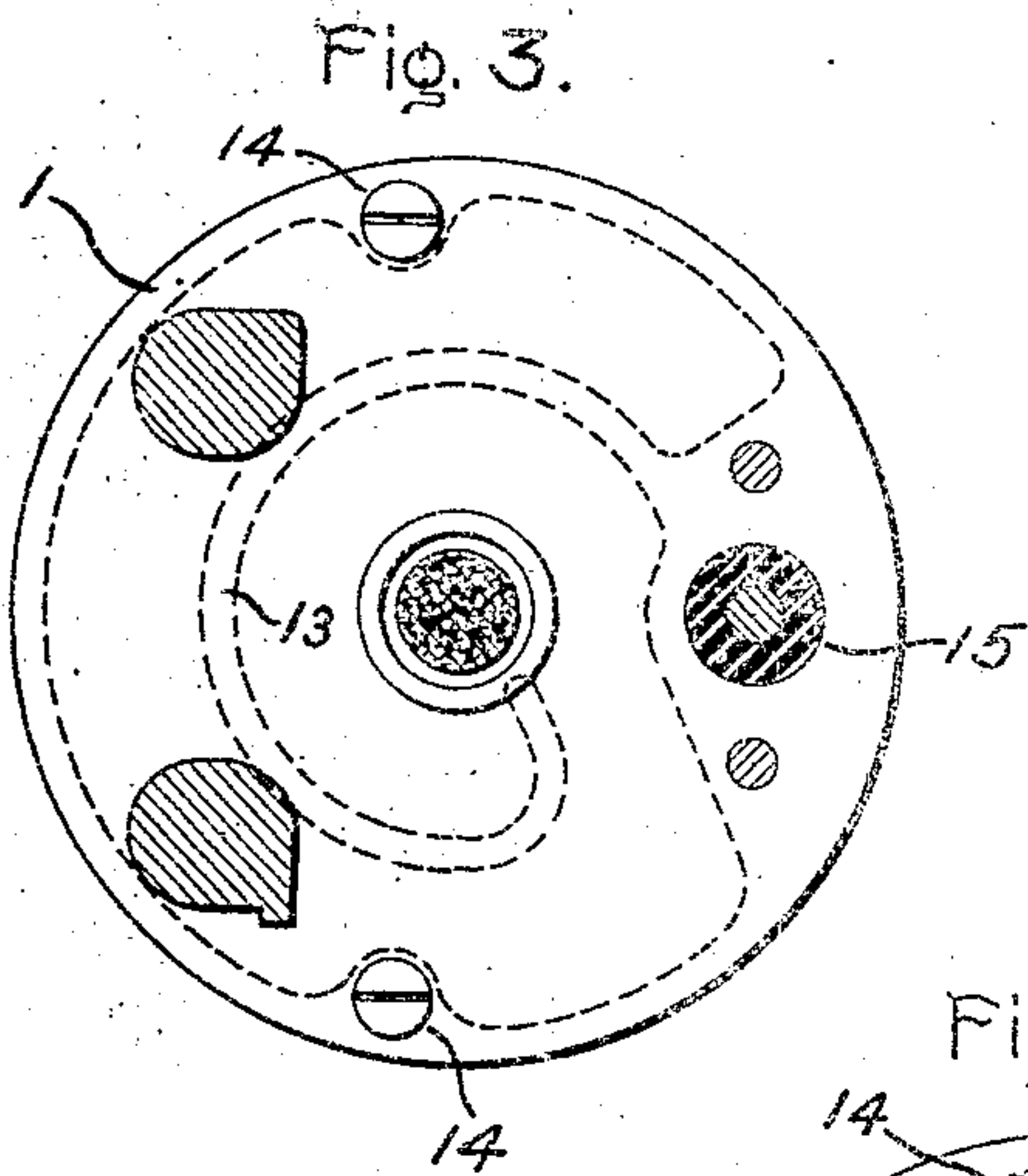
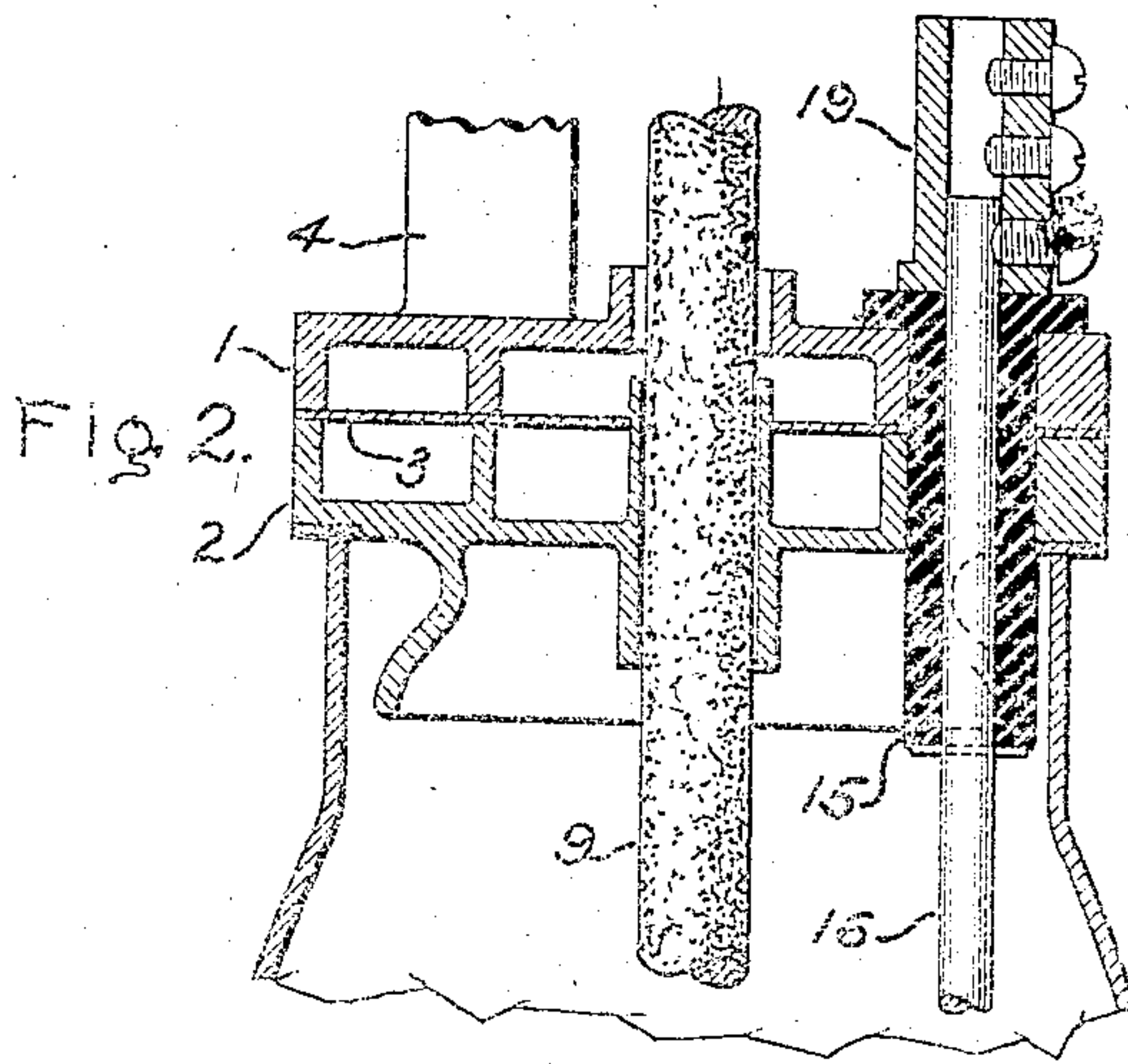
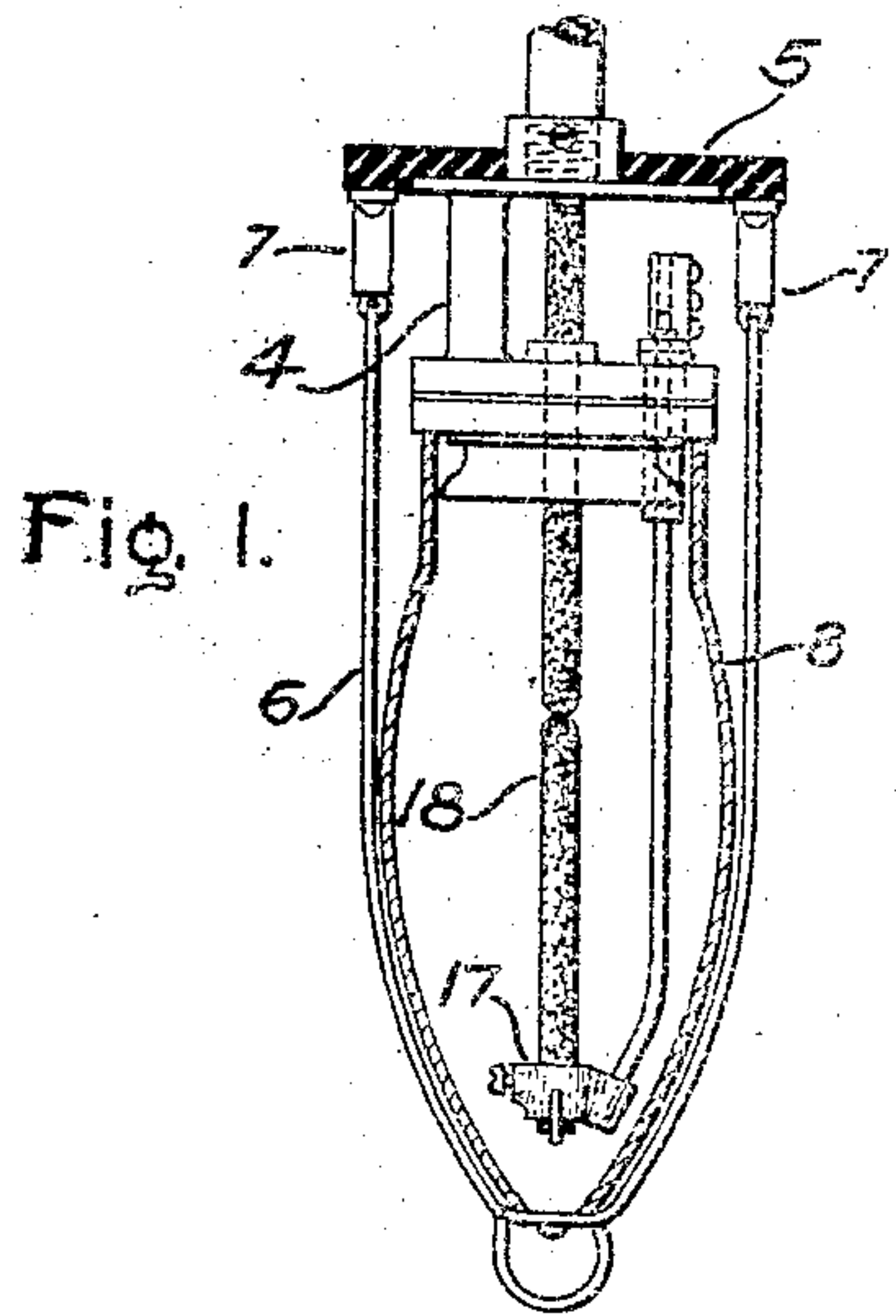
No. 876,956.

PATENTED JAN. 21, 1908.

R. FLEMING.

GAS CAP.

APPLICATION FILED MAY 4, 1905.



Witnesses.  
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Inventor:  
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# UNITED STATES PATENT OFFICE.

RICHARD FLEMING, OF LYNN, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## GAS-CAP.

No. 876,956.

Specification of Letters Patent.

Patented Jan. 21, 1908.

Application filed May 4, 1905. Serial No. 258,796.

*To all whom it may concern:*

Be it known that I, RICHARD FLEMING, a citizen of the United States, residing at Lynn, county of Essex, and State of Massachusetts, have invented certain new and useful Improvements in Gas-Caps, of which the following is a specification.

This invention relates to gas caps for inclosed arc lamps and its object is to provide a cap so constructed as to give a long carbon life.

It has been found that in order to get a long carbon life in operating inclosed arc lamps, the arc inclosure should be provided with a long and unrestricted passage for the arc gases from the inclosure to the atmosphere so that as the carbon is moved up and down by the regulating mechanism its pumping action will transfer the inert carbon gases between the arc-inclosure and this passage and not draw oxygen freely into the arc-inclosure since oxygen hastens the consumption of the carbons. Some oxygen should be allowed to pass into the inclosure as restricting the supply too much results in a graphitization of the carbon tips diminishing the size of the arc and increasing its resistance, as under these conditions the carbon tips are less volatile. After considerable experimental work I have succeeded in producing a gas cap arranged to cover the open end of an arc-inclosing globe and having a passage therethrough forming a receptacle or reservoir for the arc gases of such size and length that just the proper amount of oxygen is supplied to the arc. This passage becomes filled with inert carbon oxids very shortly after the lamp is turned on and the pumping action of the carbon as it is moved up and down by the regulating mechanism and the varying heat of the arc draw the gas from the passage into the arc-inclosure or force it from the inclosure into the passage; at the same time the passage permits the entrance of a limited amount of oxygen just sufficient to insure the operation of the lamp under the best conditions. I make this passage through the gas cap in the form of a double spiral communicating with the arc-inclosure at one end and with the atmosphere at the other. Preferably the end of the passage communicating with the atmosphere is an opening surrounding the carbon so that the hot gases passing through this opening to the atmosphere will assist in

limiting the amount of oxygen admitted to the arc.

The novel features of my invention will be definitely indicated in the claims appended hereto.

The details of construction of my improved gas cap will be better understood by reference to the following description taken in connection with the accompanying drawings which show the preferred embodiment of my invention and in which

Figure 1 is a sectional elevation of the lower portion of an arc lamp with the outer globe removed; Fig. 2 is an enlarged section of the gas cap; Fig. 3 is a plan view of the upper plate of the cap; Fig. 4 a plan of the separating diaphragm; and Fig. 5 a plan of the lower plate.

Referring to the drawings, my improved gas cap consists of two plates 1 and 2 secured together but separated by a diaphragm 3. The upper plate 1 has two posts 4 formed integral therewith by which the gas cap is secured to the platform 5 which forms the bottom of the casing for the regulating mechanism of the lamp. A bail 6 suspended from the platform 5 by springs inclosed in casings 7 holds the arc-inclosing globe 8 in position with its open end pressed firmly against an accurately finished surface on the bottom of plate 2 so that air cannot enter between the globe and plate. The two plates 1 and 2 have openings therethrough for the upper movable electrode 9. The opening through the lower plate 2 is accurately finished, is only very slightly larger than the carbon 9 and is provided with upwardly and downwardly extending flanges forming a tube, so that the passage of air or gas through this opening around the carbon is prevented as much as possible. In the lower plate 2 is an opening 10 and a spirally-arranged wall 11 forms a spiral groove in the plate beginning close to the opening 10. The diaphragm 3 is secured on top of the plate 2 making the groove a spiral passageway and an opening 12 is provided through the diaphragm 3 in such a position that when the parts are assembled this opening is near the end of the spiral passageway. The upper plate 1 is provided with a spirally-arranged wall 13 forming a spiral groove and when placed down upon the diaphragm 3 the latter makes this groove also a spiral pas-



sageway. This passage begins at the opening 12 in the diaphragm 3 and ends at the center of the plate 1 where an opening is provided through the plate somewhat larger than the carbon 9 so as to permit the gases to flow out of the passage comparatively freely around the carbon 9.

The plates 1 and 2 and the diaphragm 3 are secured together by screws 14. An opening is provided through the plates 1 and 2 and the diaphragm 3, but not communicating with the gas passage, to receive an insulating bushing 15 through which a rod 16 extends. At its lower end this rod 16 carries the holder 17 for the lower carbon 18 and at its upper end is secured a binding post 19 for connecting the lead from the negative binding post of the lamp.

It will be seen that when the plates 1 and 2 and diaphragm 3 are assembled and held tightly together by the screws 14, a passage in the form of a double spiral is provided through the gas cap communicating with the globe 8 at one end and the atmosphere at the other. When the lamp is turned on the gas from the arc soon fills the globe 8 and the passage through the cap; then as the carbon 9 is moved up and down by the regulating mechanism its pumping action does not draw air into the arc-inclosure but merely draws inert carbon gas from the passage into the globe or forces gas from the globe into the passage. The hot gases issuing from the passage to the atmosphere rise around the carbon 9 and assist in preventing the entrance of air into the passage and directly into the arc-inclosure around the carbon. The length and capacity of the gas passage is such that some air does enter the arc-inclosure through the gas passage but this is only enough to insure proper working of the lamp. In former types of gas check for arc lamps the air entered through a tubular duct of uniform diameter and short as compared with that of my invention; in my design the length is doubled without

sacrificing any advantages of lamp construction and the size of the annular discharge opening is capable of the nicest determination to get maximum life without mushrooming of carbons. Besides this the line of direct leakage to the globe is intercepted by a dead gas chamber into which is being forced a laterally moving stream of hot gas which acts as a check against direct indraft on the familiar principle.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A gas cap for an inclosed arc lamp having a doubly spiral passage there- through for the arc gases communicating at one end with the arc-inclosure and at the other with the atmosphere.

2. A gas cap for an inclosed arc lamp comprising two plates each having a spiral groove therein, and a diaphragm having an opening therethrough separating the two plates, each of said plates having an opening therethrough from the spiral groove to the other side of the plate.

3. A gas cap for an inclosed arc lamp, comprising two plates, each having a spirally extending open channel formed in one of its faces, a diaphragm closing the two channels laterally and connecting them longitudinally so as to form a continuous gas passage, one of said channels having an opening to the atmosphere and the other an opening to the arc inclosure.

4. A gas cap for an inclosed arc lamp having a feed opening for the movable electrode of larger clearance at the top than bottom, and a long tubular duct between the openings communicating with the inner globe.

In witness whereof, I have hereunto set my hand this twenty-eighth day of April, 1905.

RICHARD FLEMING.

Witnesses:

JOHN A. McMANUS, Jr.,  
HENRY O. WESTENDARP.