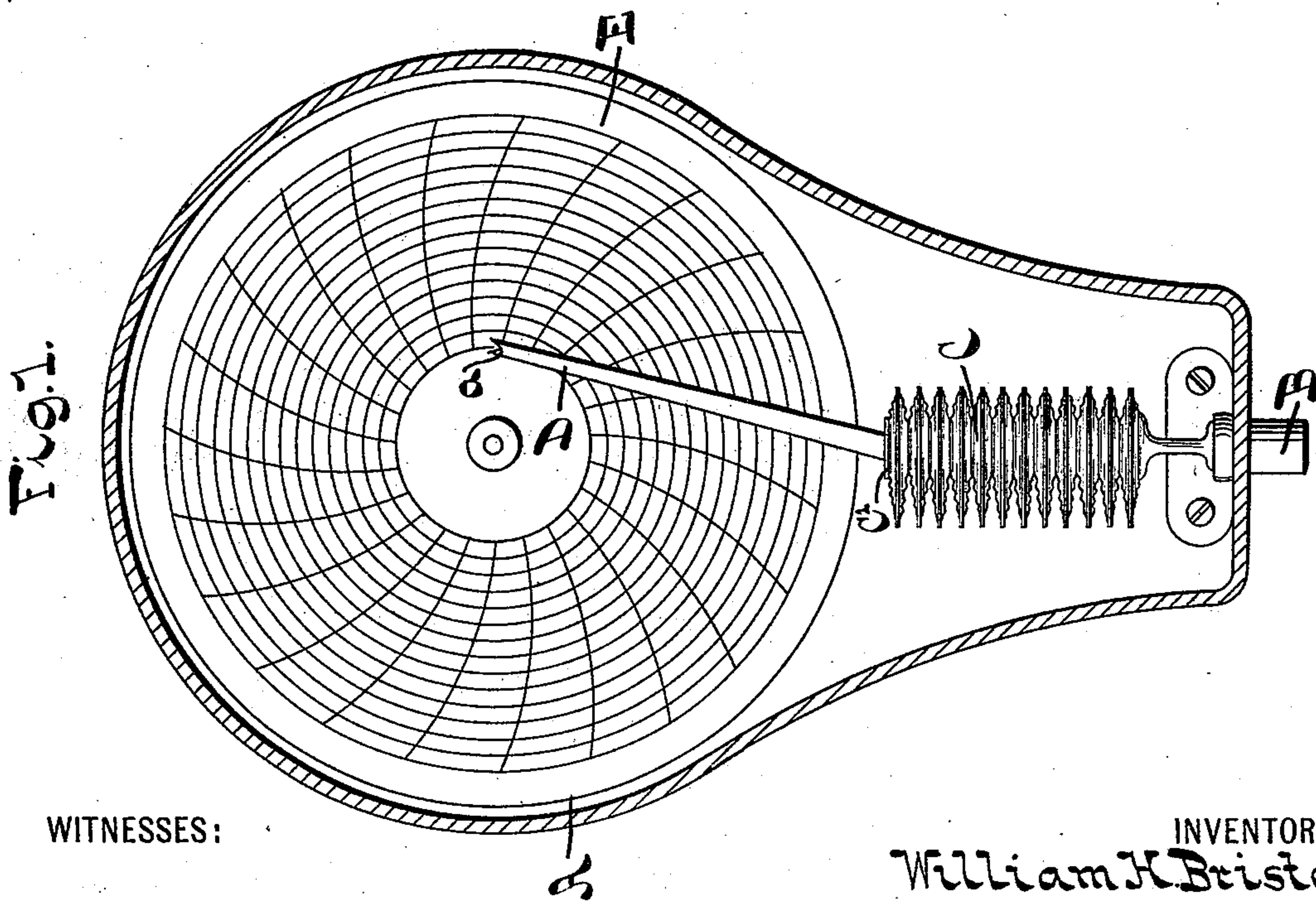
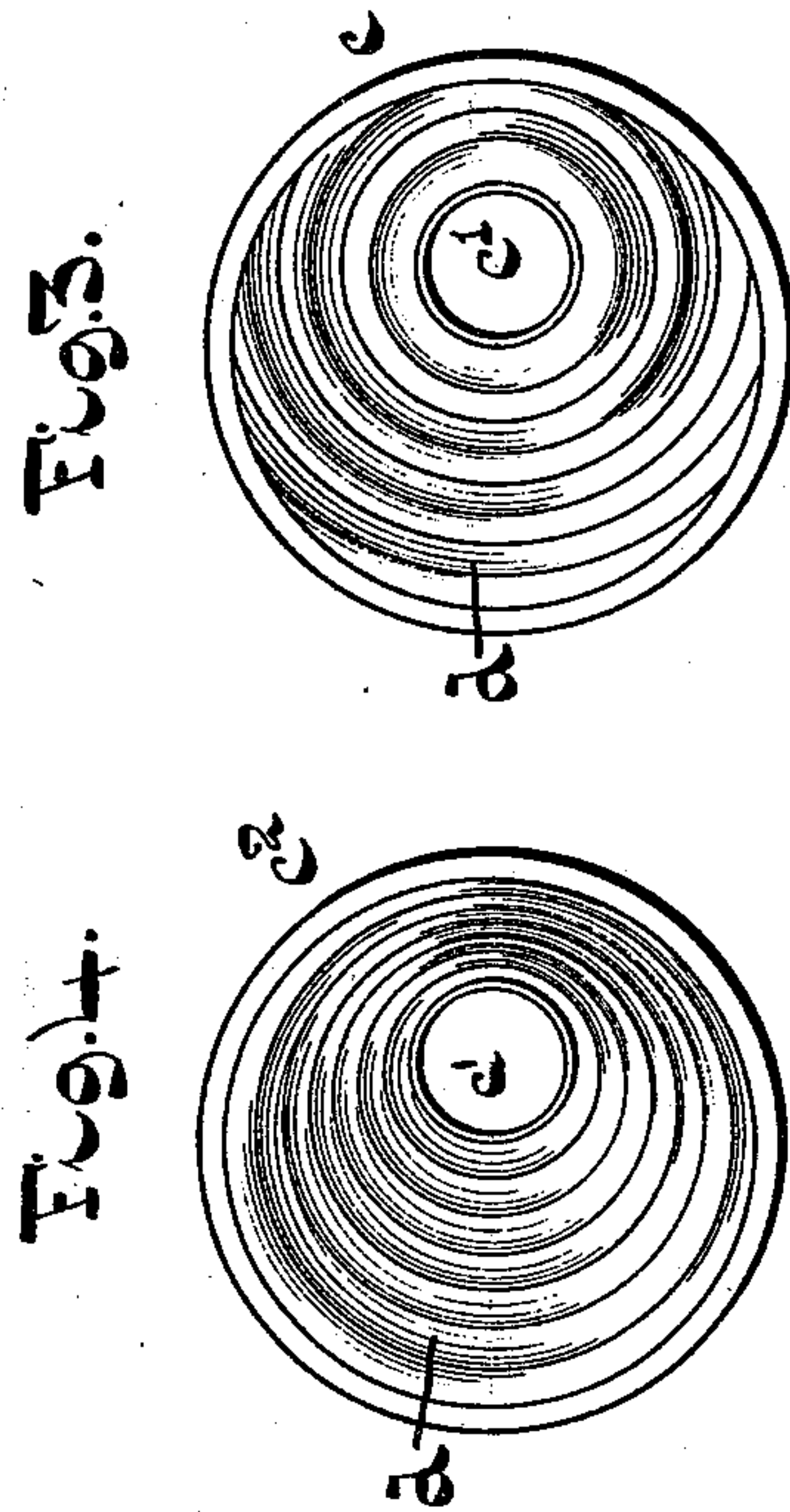
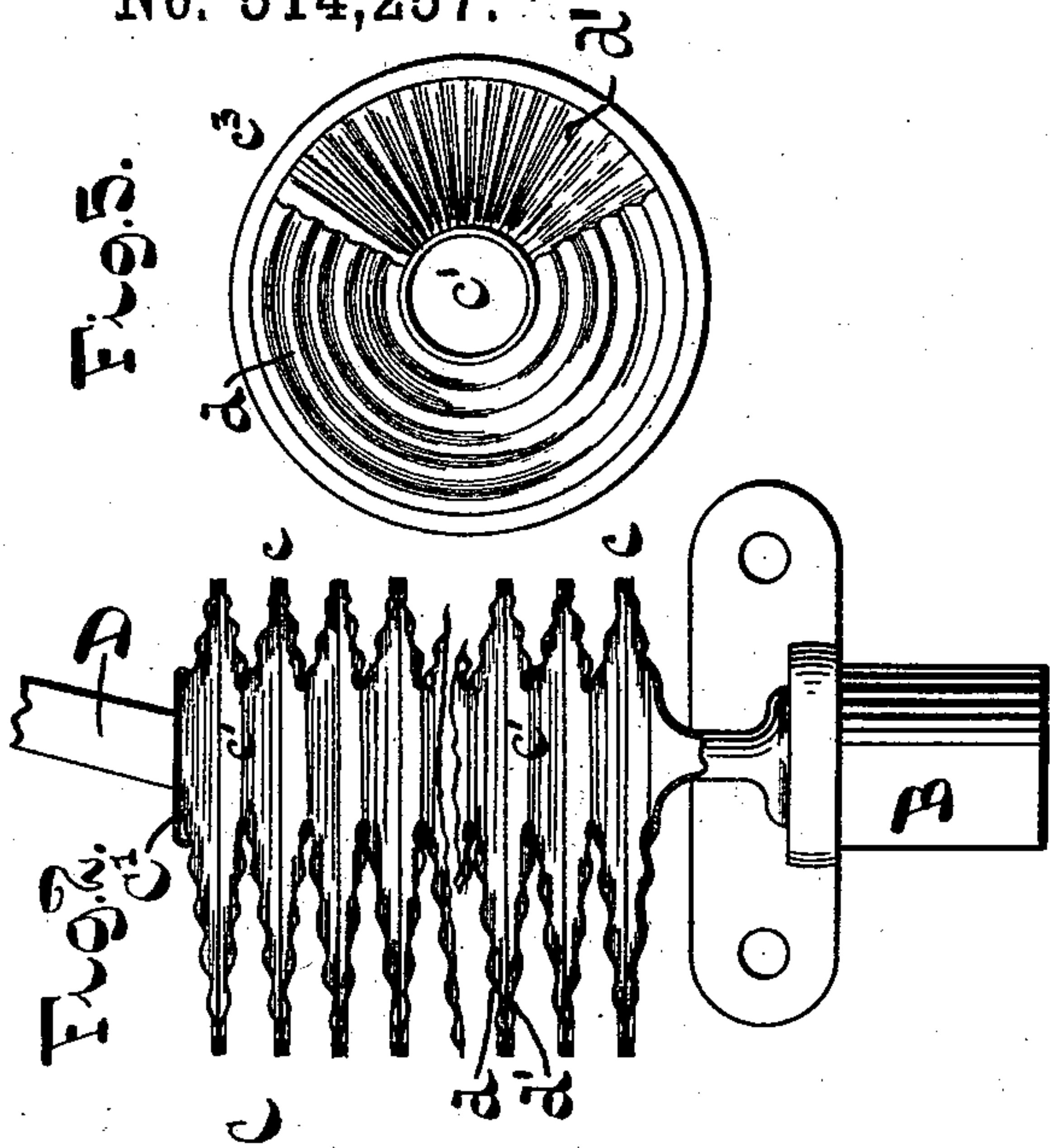


(No Model.)

W. H. BRISTOL.
RECORDING STEAM PRESSURE GAGE.

No. 514,257.

Patented Feb. 6, 1894.



WITNESSES:

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UNITED STATES PATENT OFFICE.

WILLIAM H. BRISTOL, OF HOBOKEN, NEW JERSEY.

RECORDING STEAM-PRESSURE GAGE.

SPECIFICATION forming part of Letters Patent No. 514,257, dated February 6, 1894.

Application filed June 24, 1893. Serial No. 478,771. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. BRISTOL, a citizen of the United States, and a resident of Hoboken, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Pressure-Gages, of which the following is a specification.

My invention has reference to improvements in springs for pressure indicating or recording devices of the character described in Letters Patent No. 420,570, granted to me February 4, 1890;—the nature of which springs is such that deflections due to variations in pressure are of such range or extent that the usual, or all devices for multiplying the movement can be dispensed with. In the said prior patent I describe a tube or spring made up of a series of expansible sections in which the tendency to elongate, as the result of internal pressure, is restrained on one side of the axial line by one or more flexible strips arranged and secured in a suitable manner either within or without said tube; whereby a resultant deflection or side movement of the tube is effected.

My present invention differs from the foregoing in that I build up the spring of sections composed of single or double expansion diaphragms of such nature that the tendency of the diaphragms to elongate under pressure is different on opposite sides of the axial line, thereby producing a resultant deflection depending on the differential action, without the aid of a deflecting strip.

The nature of my said invention will best be understood when described in connection with the accompanying drawings, in which—

Figure 1 represents a sectional elevation of a recording pressure gage embodying my invention. Fig. 2 is a sectional elevation on an enlarged scale of the spring detached, part being broken away. Fig. 3 is a plan view of one of the diaphragms. Figs. 4 and 5 are similar views of modified forms for the diaphragms. Similar letters of reference designate corresponding parts throughout the several views of the drawings.

Referring at present to Fig. 1 of the drawings, the letter A designates a suitable casing for containing the operative parts of a pressure gage, and B is the inlet nipple.

C is the spring, closed at its upper end by

a plate C' and secured at its lower end to the inlet nipple B. To the free end or terminal of the spring is directly attached by soldering or otherwise, a recording arm D, the upper end of which is provided with a suitable marking device, such as an ink style *a*, arranged to bear upon the rotating chart E.

The spring, as shown in Figs. 1 and 2, is built up of a series of expansible sections each constructed on the principle of a single or double expansion diaphragm opening eccentrically as at *c'*. In this example I have shown each of the sections composed of two corrugated disks *d d'* opening eccentrically. The corrugation may be concentric as shown in Fig. 3, or eccentric as in the section *c'* shown in Fig. 4, or if desired the disks may be made plain. The several disks are secured to one another by solder or otherwise, to form a series of expansible chambers or diaphragms, located eccentrically with the common passage formed by their eccentric openings *c'*. In a device of this kind, when an internal pressure is applied to the tube, it imparts to each of the sections a tendency to expand in the direction of the length of the spring, but in view of the eccentricity of their connections, the tendency to elongate is greater on one side of the axial line than on the other. When therefore internal pressure is applied the difference of elongation on opposite sides of the axial line results in deflection of the spring corresponding to the said difference of elongation. The degree of deflection in any one instrument will depend on the eccentricity and number of the sections. This deflection of the spring can be brought about by rendering the diaphragms more sensitive on one side of the axial line than on the other, for instance, the openings may be concentric and the character or form of the diaphragms made different on opposite sides of the axial line; or the same result may be accomplished by having the metal of different thickness on opposite sides of the axial line. To illustrate the former method I have shown in Fig. 5, a diaphragm C³ provided on one side with concentric corrugations *d* and on the opposite side with radial corrugations *d'*.

Of course it is to be understood that my invention may be equally well embodied in barometers, thermometers, or other analogous

instruments in which either the direct influence of a pressure, such as that of the atmosphere, or that of an expansible body when exposed to varying temperatures, is the course
5 of operation.

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

1. A spring for pressure gages consisting of a tube closed at one end and composed of a
10 series of connected expansible sections, each formed of two diaphragms placed opposite and having eccentric openings, substantially as described.

2. A spring for pressure gages, consisting of a tube closed at one end and composed of a
15 series of connected corrugated diaphragms, each rendered more sensitive on one side of the axial line than on the other, substantially as described.

Signed at New York, in the county of New
York and State of New York, this 15th day
of June, A. D. 1893.

WILLIAM H. BRISTOL.

Witnesses:

H. W. HELFER,
KLAS H. TERNSTEDT.