

(No Model.)

S. H. JOHNSON.

FILTER PRESS.

No. 298,758.

Patented May 20, 1884.

Fig. 1.

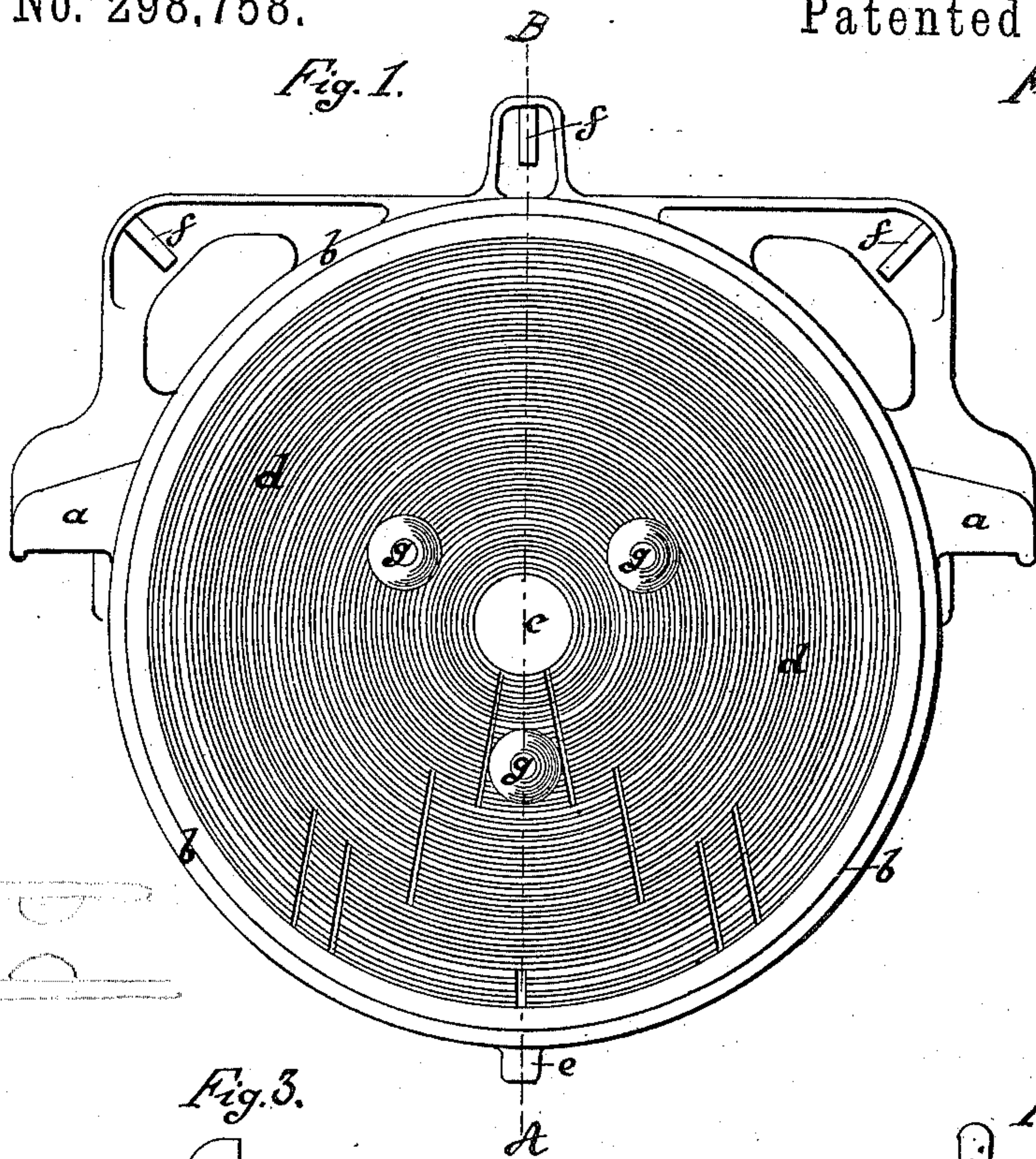


Fig. 2.

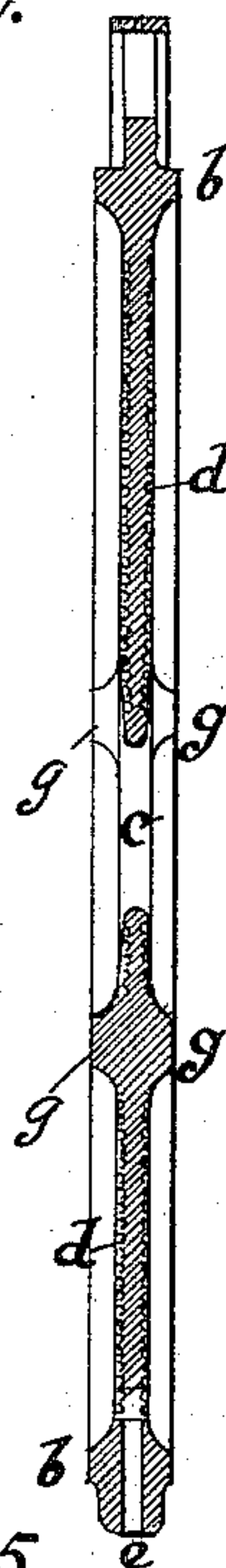


Fig. 3.

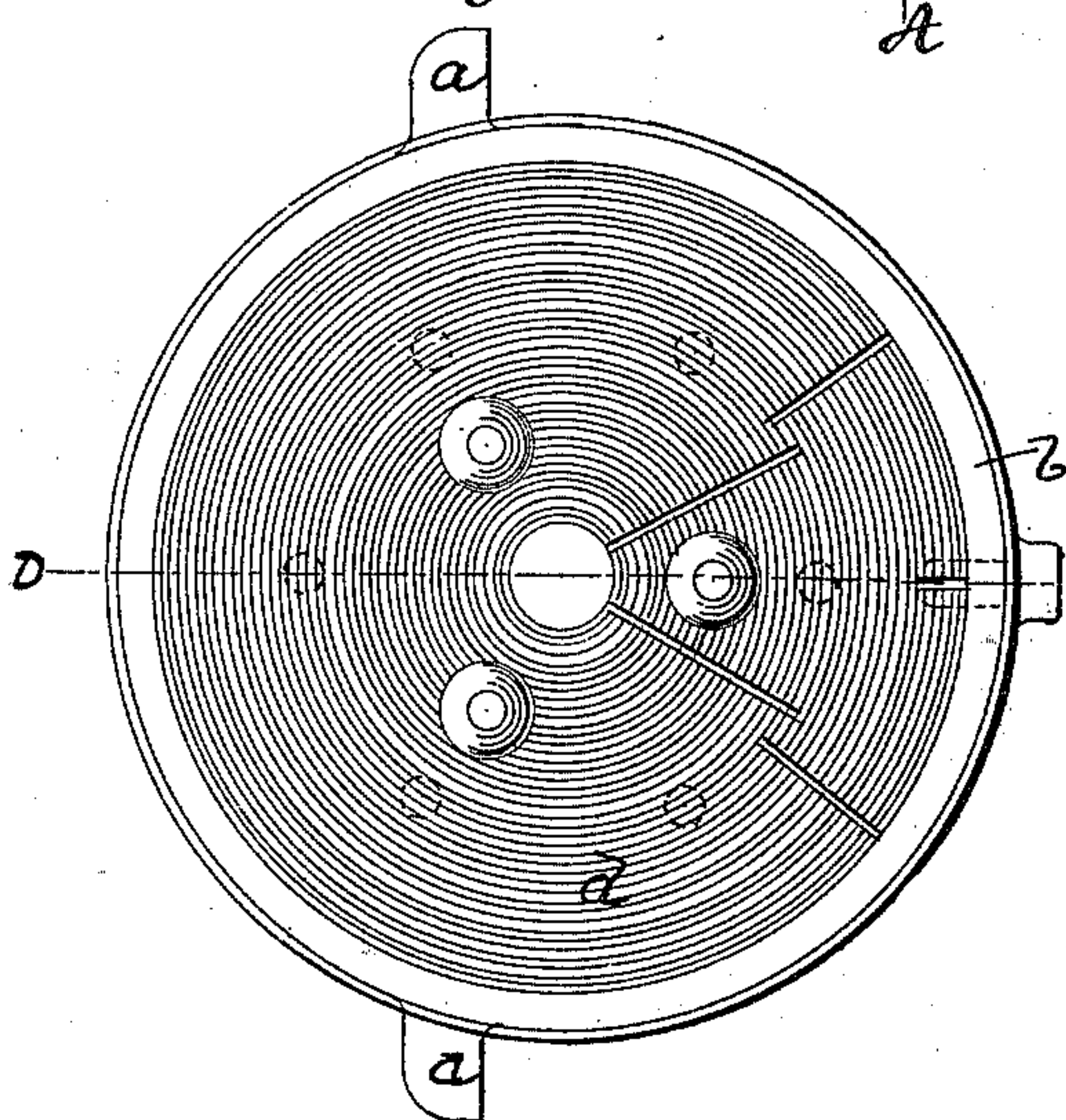


Fig. 5.

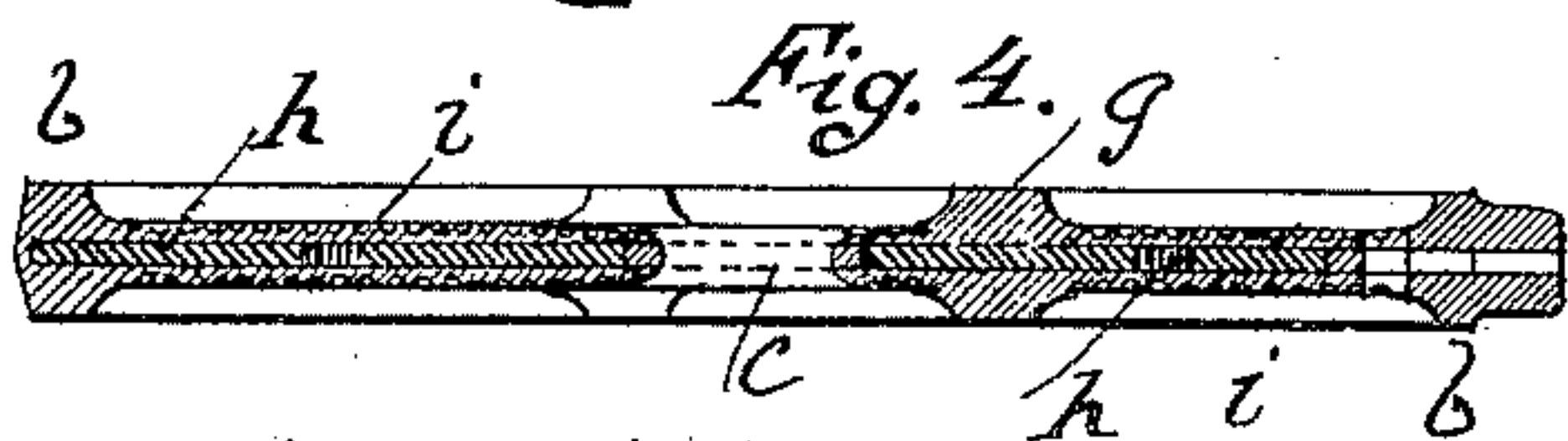
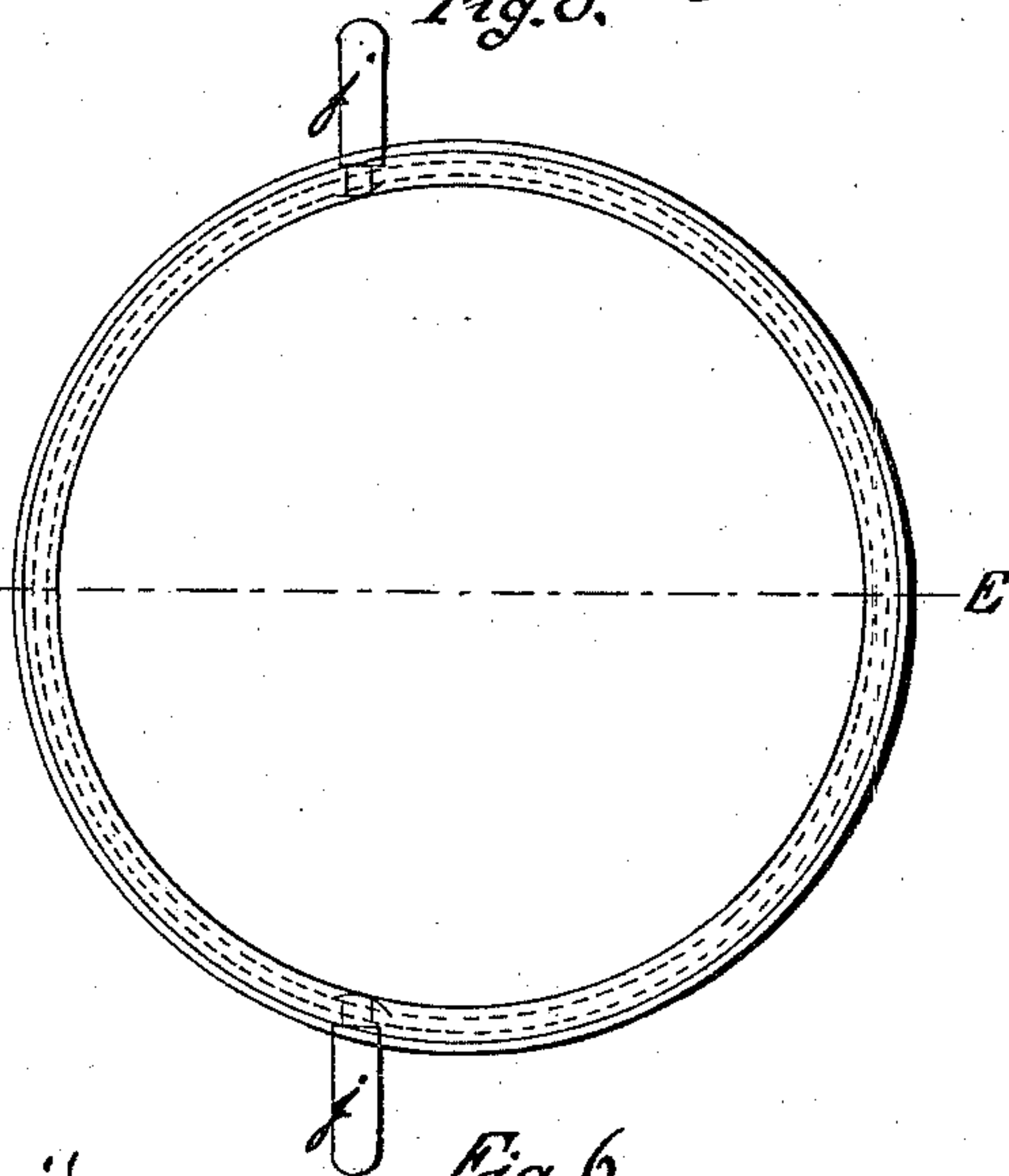
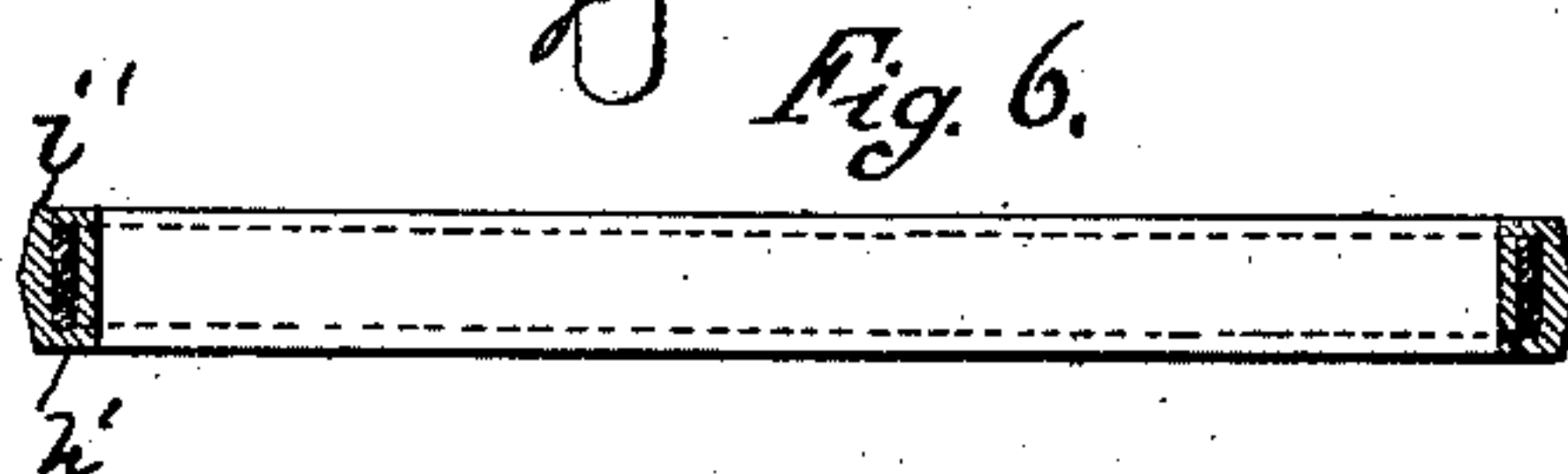


Fig. 6.



WITNESSES=

O. J. Morgan
C. H. Morgan

INVENTOR:

Sam^l Henry Johnson
By A. P. Thayer
att'y

UNITED STATES PATENT OFFICE.

SAMUEL HENRY JOHNSON, OF STRATFORD, COUNTY OF ESSEX, ENGLAND.

FILTER-PRESS.

SPECIFICATION forming part of Letters Patent No. 298,752, dated May 20, 1884.

Application filed January 15, 1884. (No model.) Patented in England March 4, 1882, No. 1,048.

To all whom it may concern:

Be it known that I, SAMUEL HENRY JOHNSON, a citizen of Great Britain, residing at Stratford, England, have invented new and useful Improvements in Filter-Presses, (for which I have received Letters Patent in England, No. 1,048, dated March 4, 1882,) of which the following is a specification.

This invention has for its object improvements in constructing filter-presses, with the view of making them more efficient and capable of standing higher pressures than with certain materials has been heretofore found practicable.

It has been found that when the material with which a filter-press is employed for the purpose of separating the solids from the liquid consists in part of fibrous or other matters which have a tendency to bind or collect as the process of filtration proceeds, so as to produce a resisting obstruction in the filtering-cells, then, by continuing the operation, the accumulation of such matter becomes so compact as to cut off the flow of liquid in some of the filtering-cells, thereby removing the normal pressure of working from such cell or cells for the time being. The consequence of this is that there no longer exists equal and opposite pressures on both sides of the filtering-diaphragms of such machines, and the equilibrium of pressure is destroyed, and unless the diaphragms are made exceedingly strong, fracture of the diaphragms of such obstructed chambers occurs. Where the surfaces of the diaphragms are large, or where the pressure employed is high, or where the material of which the filtering-diaphragms are made is soft, brittle, or otherwise incapable of resisting the strain, (lead, tin, or alloys of the same, for instance,) then the improvements hereinafter described become applicable.

These improvements consist:

First. In forming the diaphragms with projections on the filtering or drainage faces corresponding with similar projections on the adjoining diaphragms throughout the series of cells, the last diaphragm at each end of the series being similarly supported on the head and follower of the filter-press when in operation. These projections are surfaced either by planing, turning, or other known means,

so that their surfaces shall lie in the same plane as the joint surfaces of the rims of the filtering-diaphragms, or so that when the series of cells is screwed together, with the cloths covering the surfaces of the diaphragms, these projections shall bear against each other with the cloth between them, so as to form a continuous resisting-stay, preventing the collapse of the plates.

Secondly. Where it is considered desirable to form the filtering-faces of the diaphragms in lead or tin or their alloys, (for example, for filtering acids,) then, either in conjunction with the aforementioned method of staying the diaphragms or alone, I form the diaphragms with solid more resisting cores of iron or steel, perforated or otherwise previously tinned, and cast the metal or alloy on such cores, which will thus be adherent thereto, and, if perforated, joined at the opposite sides of the diaphragm through the perforations in the iron or steel core, and by this means any necessary degree of rigidity may be imparted to the less resisting material.

In order that my said invention may be most fully understood and readily carried into effect, I will proceed to describe the drawings hereto annexed.

Figure 1 is a front elevation of a plate for a filter-press. Fig. 2 is a transverse section of the same. *a a* are the lugs by which the plate is supported upon the side bars of the press. *b b* are the turned surfaces to form joints. *c* is the central hole or passage through the plate by which one chamber of the press communicates with another. *d d* are the drainage-grooves leading down to the liquor-outlet *e*. The cloths used are double and have holes in the center. The two cloths forming a pair are sewed together around the central hole, one of the cloths of the pair is passed through the hole in the plate, and the cloths are then distended upon cloth-holders fixed upon the plate at *f f*. When the series of plates of which the press is composed are locked up together by the screw at the end of the press, the cloths become firmly nipped between the turned surfaces at *b b*. In respect to these arrangements no novelty is claimed, and the cloths, screw-head, follower, and supporting-frame are not shown; but the novel feature consists in the

provision upon the faces of the plate of isolated projections *g g*, between which also the cloths are nipped. Through these projections one plate supports another from end to end of the press. The tops of the projections *g g* should be in the same planes with the turned faces *b b*. The most suitable material for the plate is cast-iron, excepting in those cases where iron is liable to be acted upon by the matter to be treated.

Fig. 3 is a front elevation, and Fig. 4 is a transverse section, of a plate suitable for use when filtering acids. It has a wrought-iron interior, *h*, covered with soft metal, *i*, on which the acid has no injurious action—say with lead hardened by a small addition of antimony. I use iron molds in casting these plates, and heat the interior body, *h*, before introducing it into the mold. The soft metal is cast sufficiently thick to avoid difficulty in obtaining a sound casting, and it is then turned over the entire surface. To prevent the body-plate *h* floating in the mold, it is made with spurs projecting from it radially, and these are received into recesses in the mold. The spurs are afterward cut off and the soft metal covering is made good.

Fig. 5 is a front elevation, and Fig. 6 a transverse section, of a distance-ring which is some-

times interposed between plate and plate when thick press-cakes are required. There is an interior wrought-iron ring, *h'*, with supporting-lugs *j*, and soft metal, *i'*, is cast around it. The lugs *j* are to support the ring on the bars of the machine along with the plates supported by their lugs *a*.

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

1. The means by which press-plates are caused the one to support the other, consisting of suitable projections upon their drainage-faces, substantially as described.

2. The press-plate composed of an interior strong and rigid body of steel or iron, and a covering of metal or composition of metals having the quality of resisting acids—as lead hardened by a small quantity of antimony—substantially as described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

SAMUEL HENRY JOHNSON.

Witnesses:

J. WATT,

G. W. WESTLEY,

Both of 17 Gracechurch Street, London.