

No. 848,566.

PATENTED MAR. 26, 1907.

L. A. NILSSON.  
BORING CHUCK.

APPLICATION FILED NOV. 10, 1902.

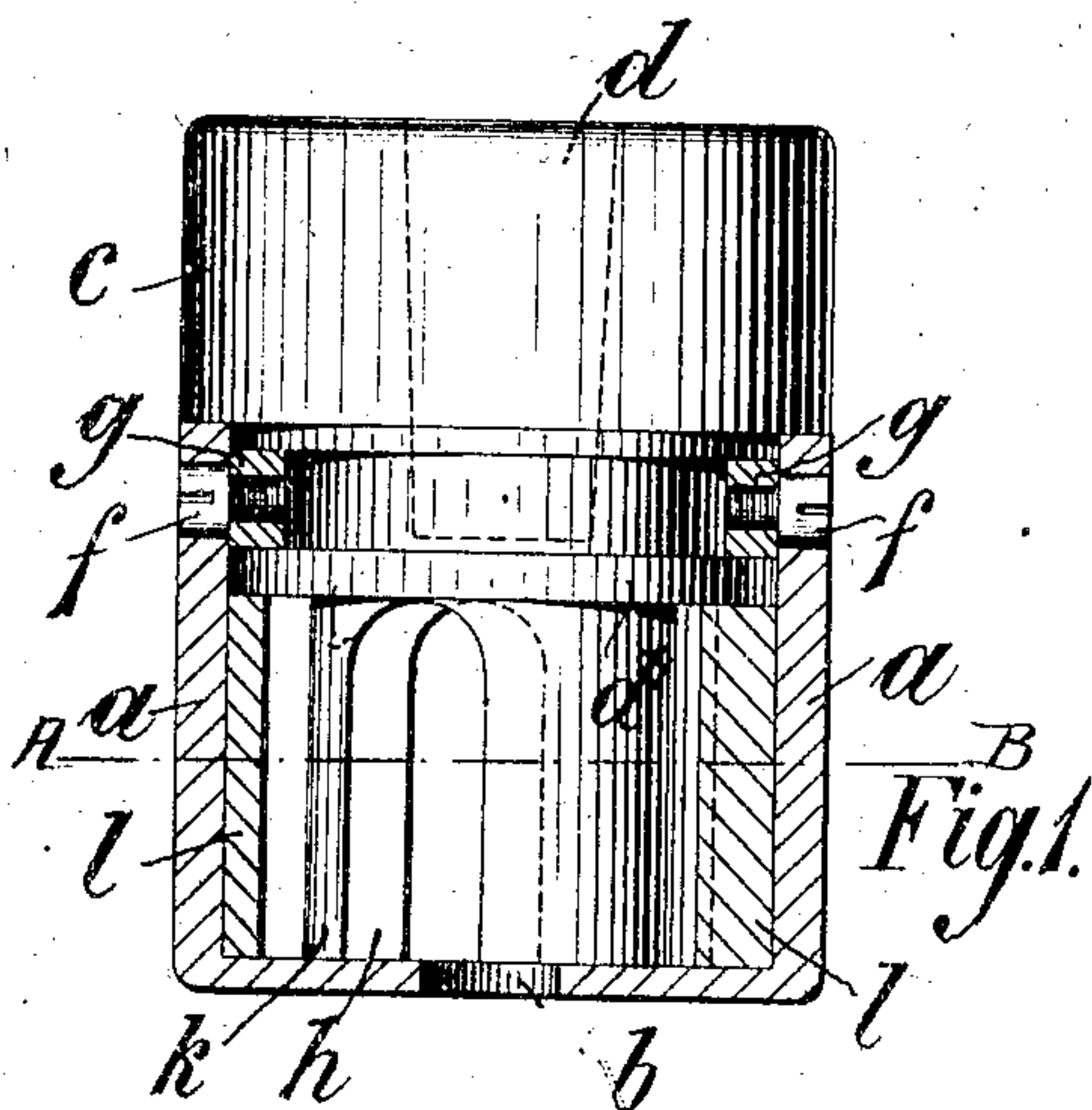


Fig. 1.

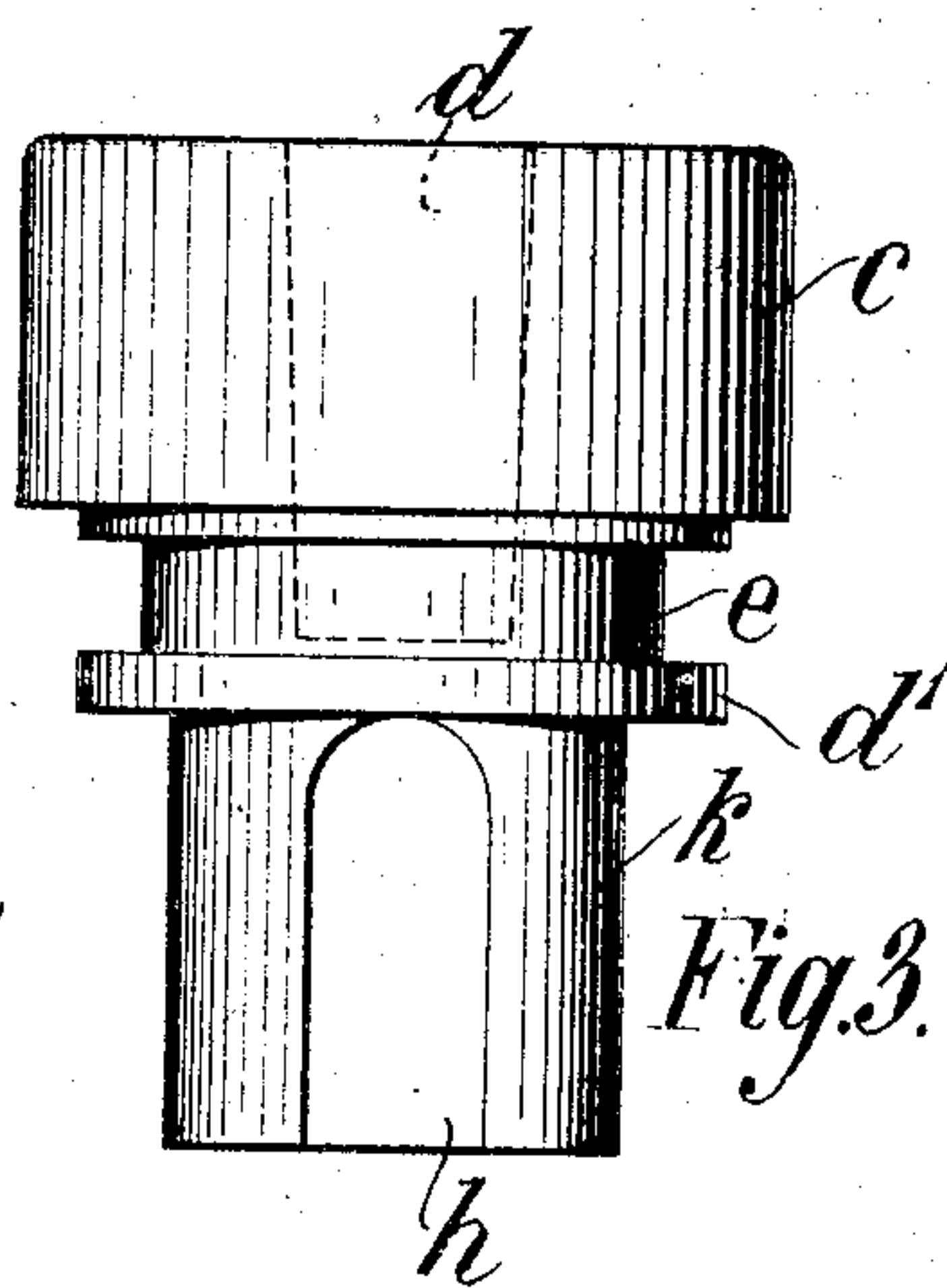


Fig. 2.

Fig. 3.

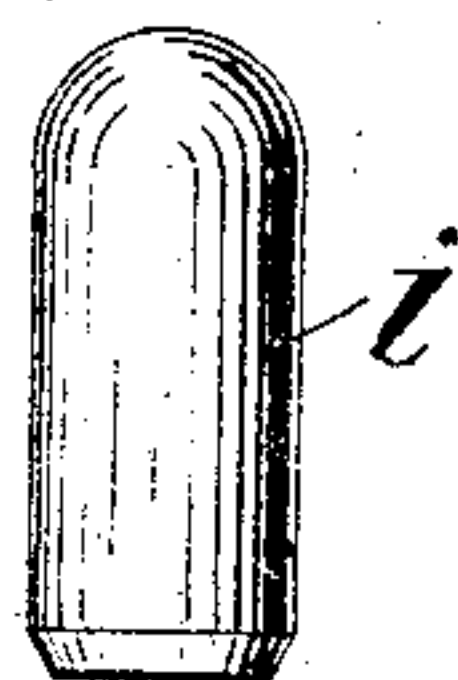


Fig. 4.

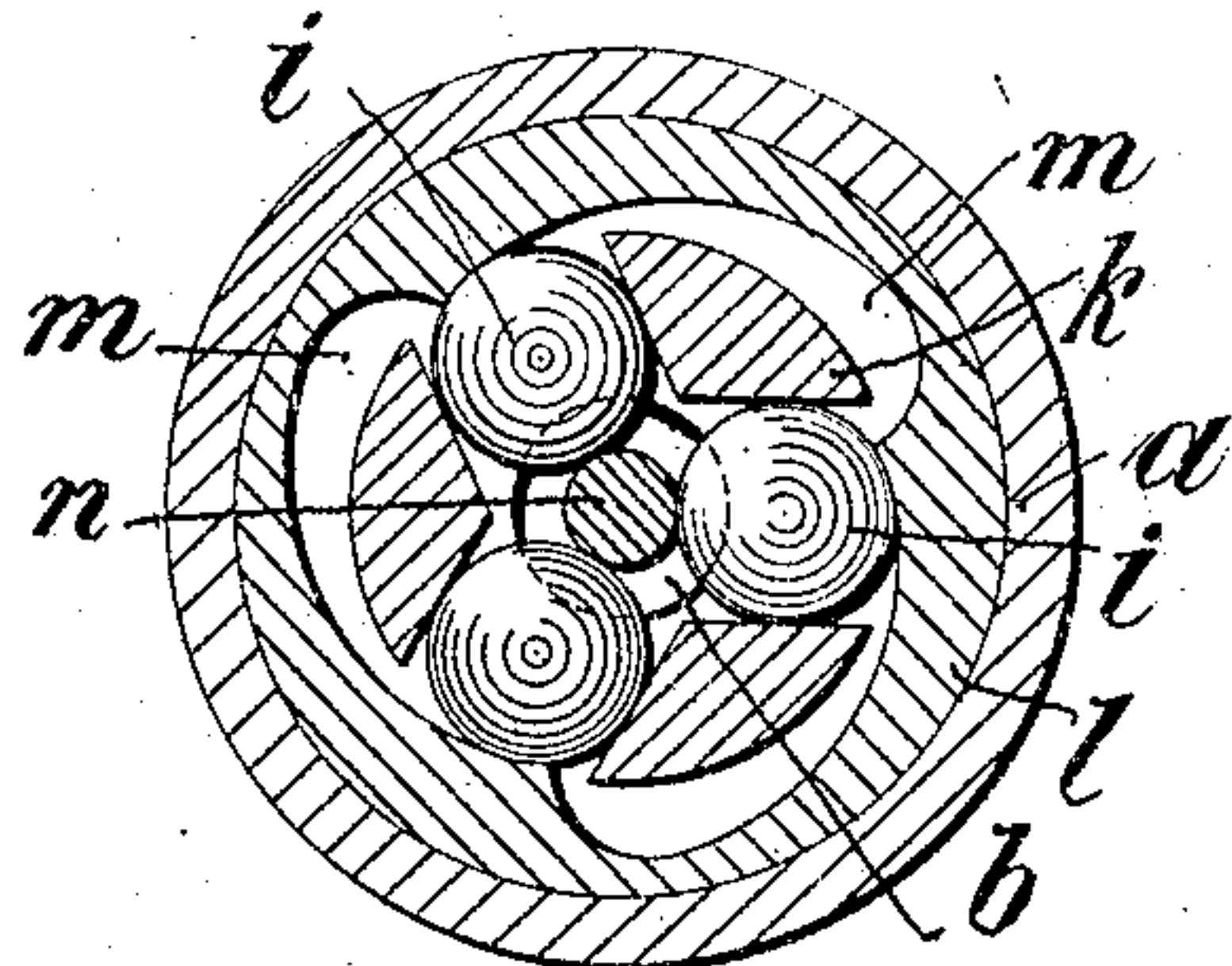


Fig. 6.

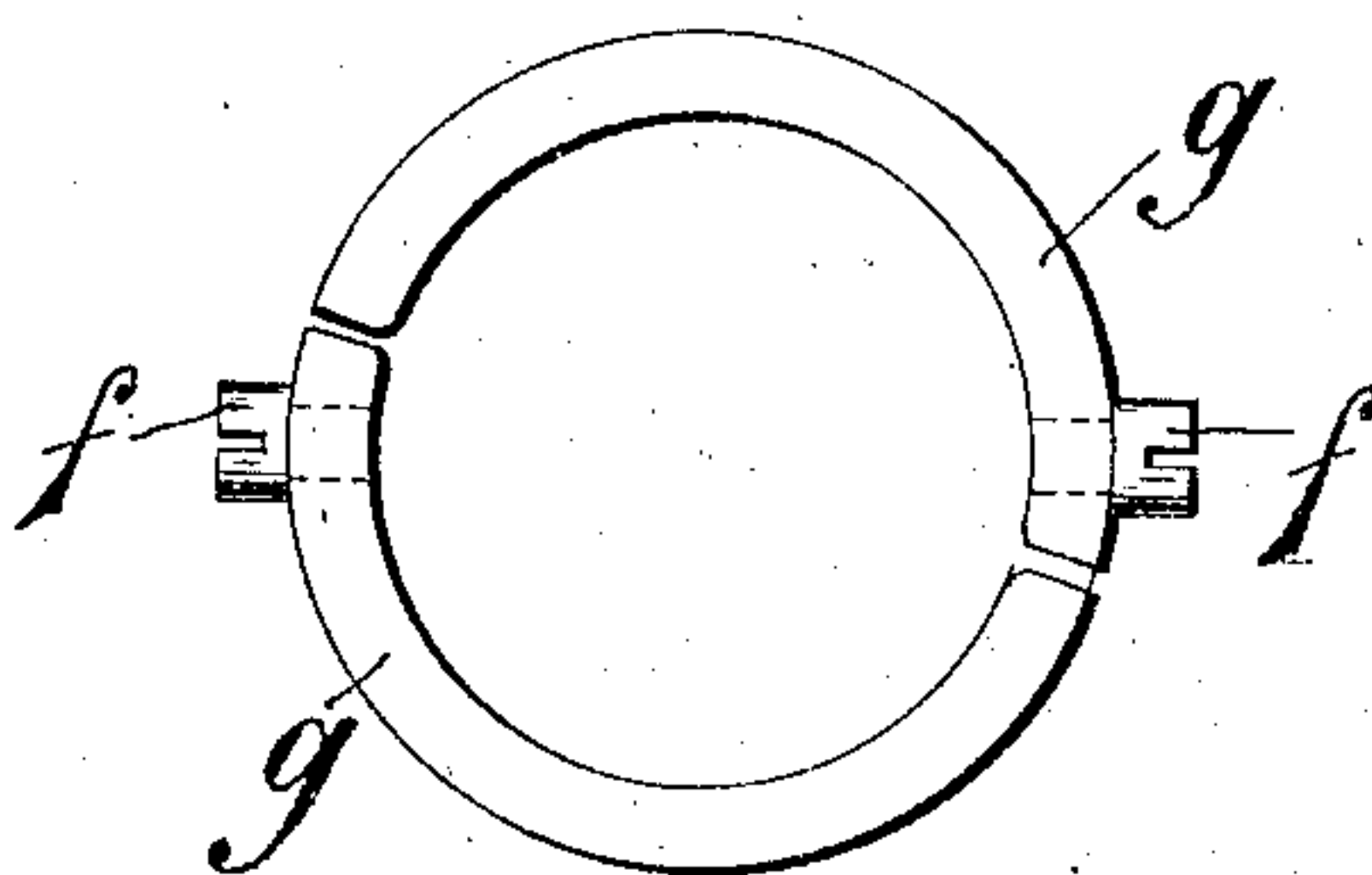
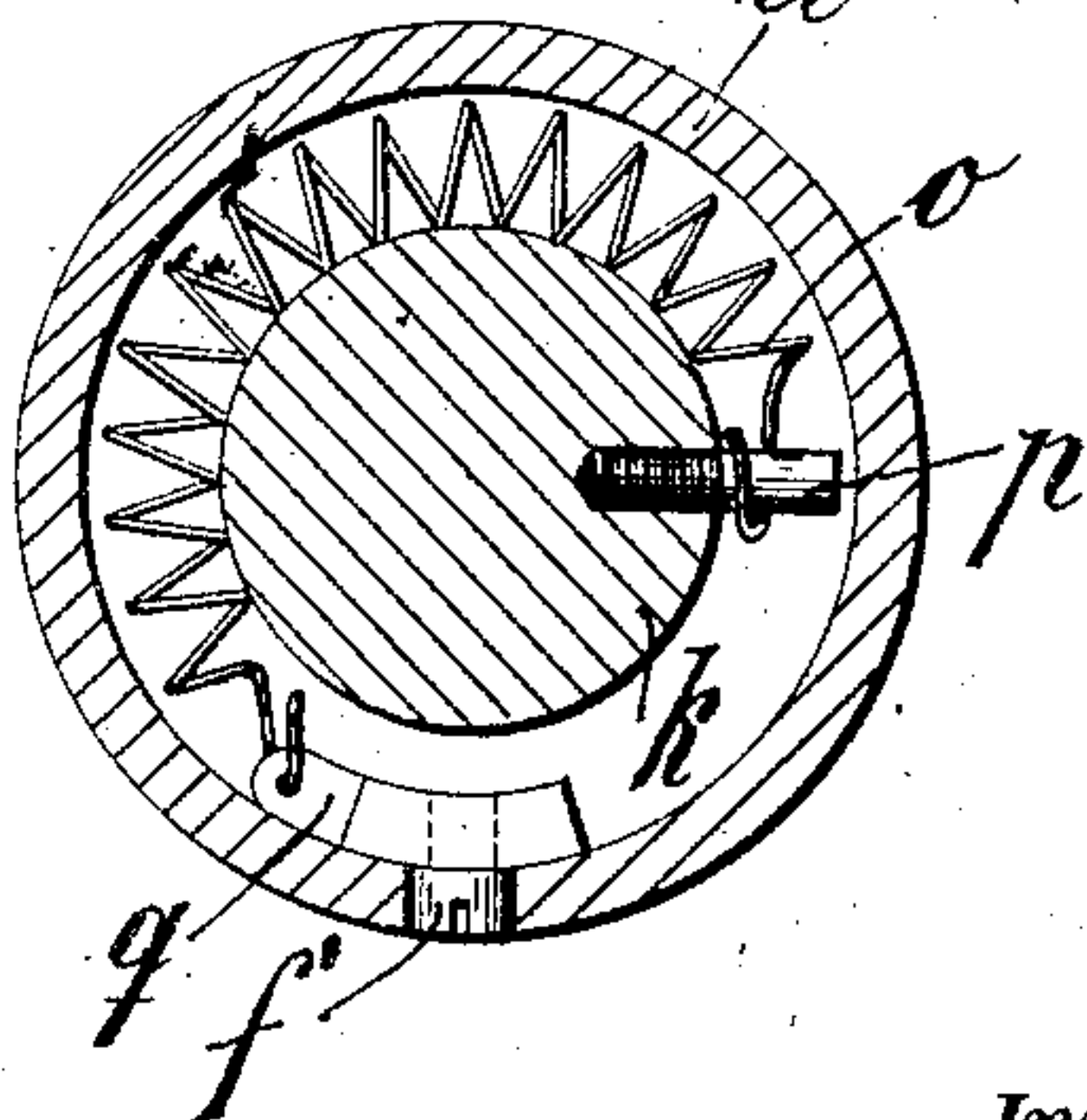
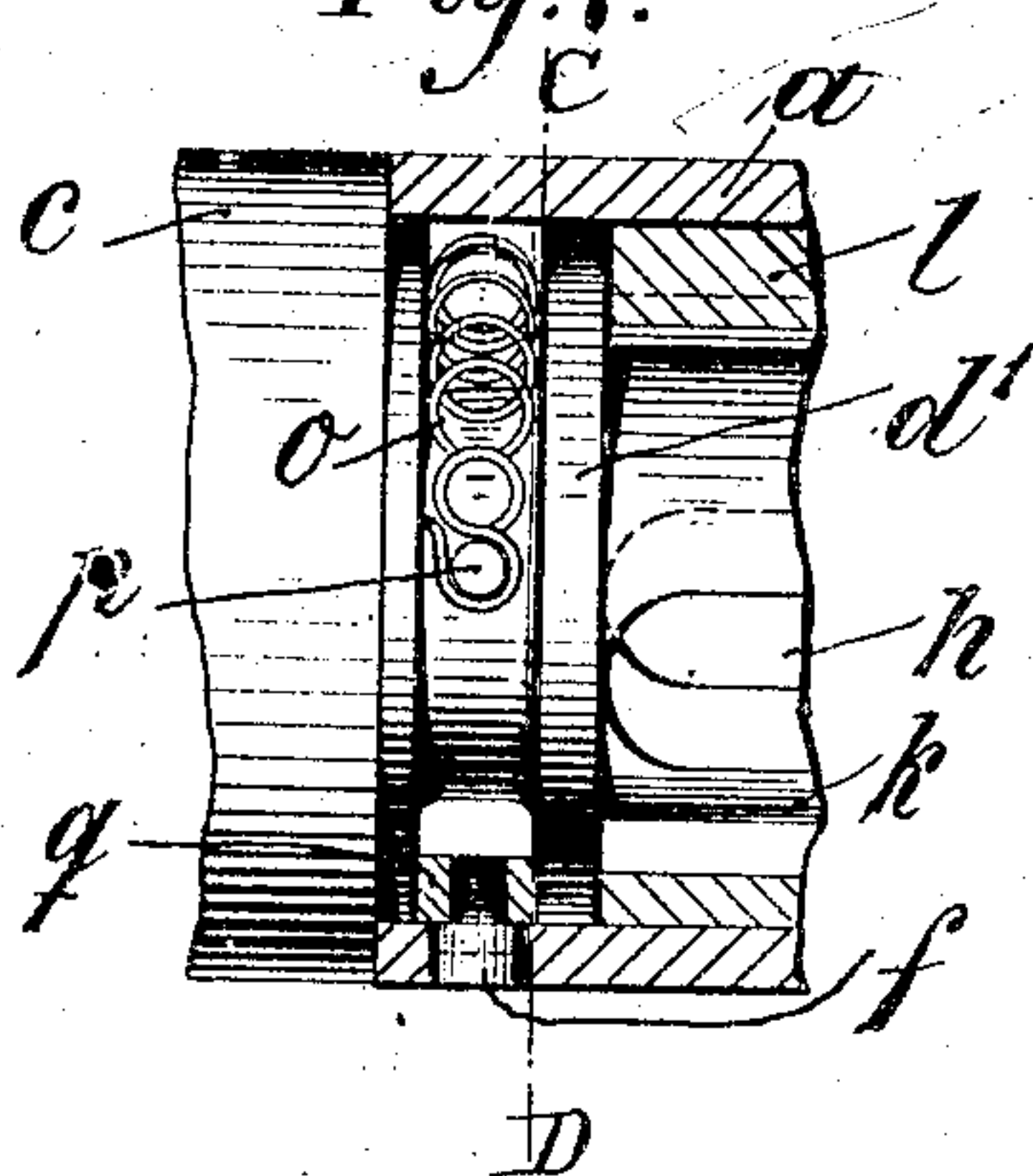


Fig. 7.



Witnesses.

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# UNITED STATES PATENT OFFICE.

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## BORING-CHUCK.

No. 848,566.

Specification of Letters Patent.

Patented March 26, 1907.

Application filed November 10, 1902. Serial No. 130,735.

*To all whom it may concern:*

Be it known that I, LARS AXEL NILSSON, draftsman, a subject of the King of Sweden, and a resident of Katrineholm, Sweden, have invented new and useful Improvements in a Boring-Chuck; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in boring-chucks of the class in which gripping members movably arranged in the body portion of the chuck and adapted to hold the shank of the tool are brought into operative position by means of an angularly-displaceable sleeve carried by the said body portion and having eccentric surfaces on its inner side adapted to engage the tool-gripping members.

The object of the invention is to provide a chuck of this kind which will center and at the same time grip the tool with a force that increases in the same ratio or greater than the work or power transmitted through the chuck to the tool, thus permitting the transmission of any amount of power through the chuck to the tool without the employment of a positive lock between these parts.

According to my invention the tool-gripping members are of a rotary character and are so arranged relatively to the friction-surfaces of the sleeve that the frictional force existing between said surfaces and the tool-gripping members when power is being transmitted through the chuck to the tool tends to angularly displace the sleeve relatively to the chuck-body in a direction to cause the pressure between the tool-gripping members and the tool, as well as between the tool-gripping members and the friction-surfaces of the sleeve, to become increased, owing to the fact that the tangential component of the pressure at the points of contact between the tool-gripping members and the friction-surfaces never exceeds the tangential component of the frictional force at the same points of contact. These two tangential components are opposed to each other, and as the latter tends to angularly displace the sleeve, and with it the friction-surfaces, in a direction to increase the gripping force a positive

grip, as well as an exact alinement of the tool, is insured.

In the accompanying drawings I have illustrated a chuck embodying my invention.

Figure 1 is a sectional elevation of the chuck with the tool-gripping members removed. Fig. 2 is a horizontal section on the line A B of Fig. 1. Fig. 3 is a side elevation of the chuck-body shown separately. Fig. 4 is a plan of a divided ring for connecting the sleeve to the chuck-body, as hereinafter explained. Figs. 5 and 6 are an elevation and end view of a preferable form of one of the tool-gripping members detached. Fig. 7 is a fragmentary sectional elevation showing a modification. Fig. 8 is a cross-section on the line C D of Fig. 7.

The chuck consists of a central body portion *k*, the forward or inner part of which is hollow and formed with seats *h* for the gripping member *i*, which in the example illustrated comprise rollers or balls. In the former case the seats are formed by longitudinal slots or openings. In the latter case horizontal rows or openings could be made in place of the longitudinal slots. The slots extend from the exterior to the interior of the body portion, thus permitting the gripping members to project from the said slots internally as well as externally. The rear or outer part of the chuck-body is formed with a head *c*, which is provided with the ordinary opening *d* for the reception of the spindle of the boring-machine or other tool to which the chuck is to be applied.

*a* is the angularly-displaceable sleeve having the internal friction-surfaces *m*, with which the gripping members cooperate. As herein shown, the surfaces *m* are formed in a separate sleeve *l*, which may be sunk in or otherwise firmly anchored to the sleeve *a* in any desired manner. The said sleeve has its bearing on the head *c* of the chuck-body and is free to turn thereon, but is otherwise kept in position relatively to the chuck-body by means of a divided ring *g*, (composed of one or several parts,) contained in an annular channel *e*, formed between the head and a flange *d'* of the chuck-body and kept in place by screws *f*.

In order to fit a boring or similar tool in the chuck, the stem of said tool is inserted



into place through the opening *b*, provided in the sleeve *a*, the said sleeve having been first angularly displaced on the chuck-body by hand in opposition to either the friction of the ring *g* or the resistance of a spring *o*, which is anchored to a pin *p*, secured to part *k*. The gripping members *i* are thus enabled to move radially outward into the deeper portions or bases of the internal friction-surfaces *m* and to thereby separate in the act of introducing the stem of the boring-tool through the said opening *b*. The stem of the boring-tool having been thus inserted, the said sleeve *a* is turned back toward its original position either by hand or by the reaction of the spring *o*, whereby the gripping members will be pressed by the higher portions or crests of the friction-surfaces against the shank of the tool with a certain force which, if the spring *o* be used, will depend upon the strength of the latter.

In transmitting the driving power through the chuck to the boring-tool the chuck-body and the gripping members seated in the same are (at the moment of applying the power) first caused to turn relatively to the shank of the boring-tool. Then the friction between the shank of the boring-tool and the gripping members tends to rotate the latter in an opposite direction to that in which the boring-tool turns. This tendency of said gripping members to rotate in contact with the friction-surfaces *m* imparts to the sleeve *a* a tendency to turn relatively to the chuck-body in a direction to cause the friction-surfaces to become firmly wedged against the gripping members. The pressure between the gripping members and the shank of the boring-tool is thus increased until the friction corresponds to the transmitted power. The boring-tool is thus held firmly in place, but in such a manner that it can be very readily disengaged from the chuck when necessary by merely angularly displacing the sleeve *a* in the opposite direction by hand.

The chief advantages derived from my improved chuck are that the tool can be quickly changed without the use of any special key or wrench and even without stopping the machine, that no special means or care is necessary to get the tool in exact alinement, that the shank of the tool does not need to be provided with grooves, tapers, or projections, and that a number of different sizes of tools can be used with one and the same chuck.

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

1. In a chuck, the combination of a body having an axial bore for the reception of a tool-shank or the like, and provided with a radial opening, a radially-movable tool-gripping roller seated in said opening, a sleeve embracing said body and rotatable thereon

and provided with an internal cam constructed and arranged to bear against said tool-gripping roller and force it inward when rotated.

2. In a chuck, the combination of a body and a surrounding sleeve, said body and sleeve being relatively rotatable, said body having an axial tool-opening and a radial opening, a rolling gripping device radially movable in the radial opening of said body, said surrounding sleeve provided with a cam-surface constructed and arranged to bear upon said gripping device and force it inward when said sleeve and body are rotated relatively.

3. In a chuck, the combination with a hollow body portion having longitudinal slots therein, a sleeve angularly displaceable thereon, a series of radially-displaceable tool-gripping rollers situated in said slots of the body portion and adapted to bear internally against the tool and externally against the sleeve, and angularly-disposed cam-surfaces on said sleeve for the rollers to bear against, the movement of the rollers about their axes when power is transmitted through the chuck to the tool displacing the sleeve in a direction to cause the cam-surfaces to automatically exert on the rollers and the tool an inward pressure which increases with the power.

4. In a chuck, the combination with a hollow body portion having longitudinal slots therein, a sleeve angularly displaceable thereon, a series of radially-displaceable tool-gripping rollers situated in said slots of the body portion and adapted to bear internally against the tool and externally against the sleeve, eccentric friction-surfaces on said sleeve for the rollers to bear against, and means for normally keeping the sleeve in a position in which the crests of the eccentric friction-surfaces bear against the rollers and enable the latter, in tending to roll about their axes when power is transmitted through the chuck to the tool, to angularly displace the sleeve in a direction to cause the eccentric friction-surfaces to automatically exert on the rollers and the tool an inward pressure which increases with the power.

5. In a chuck, the combination with a hollow body portion having longitudinal slots at its inner end, a sleeve detachably connected with said portion and angularly displaceable thereon, a series of radially-displaceable tool-gripping rollers situated in said slots of the body portion and adapted to bear internally against the tool and externally against the sleeve, eccentric friction-surfaces on said sleeve for the rollers to bear against, and a spring for normally keeping the sleeve in a position in which the crests of the eccentric friction-surfaces bear against the rollers and



enable the latter, in tending to roll about  
their axes when power is transmitted through  
the chuck to the tool, to angularly displace  
the sleeve in a direction to cause the eccen-  
5 tric friction-surfaces to automatically exert  
on the rollers and the tool an inward pressure  
which increases with the power.

In testimony whereof I affix my signature  
in presence of two witnesses.

LARS AXEL NILSSON.

Witnesses:

CHAS. FREDBORG,  
ERNST NAIDSMITH.