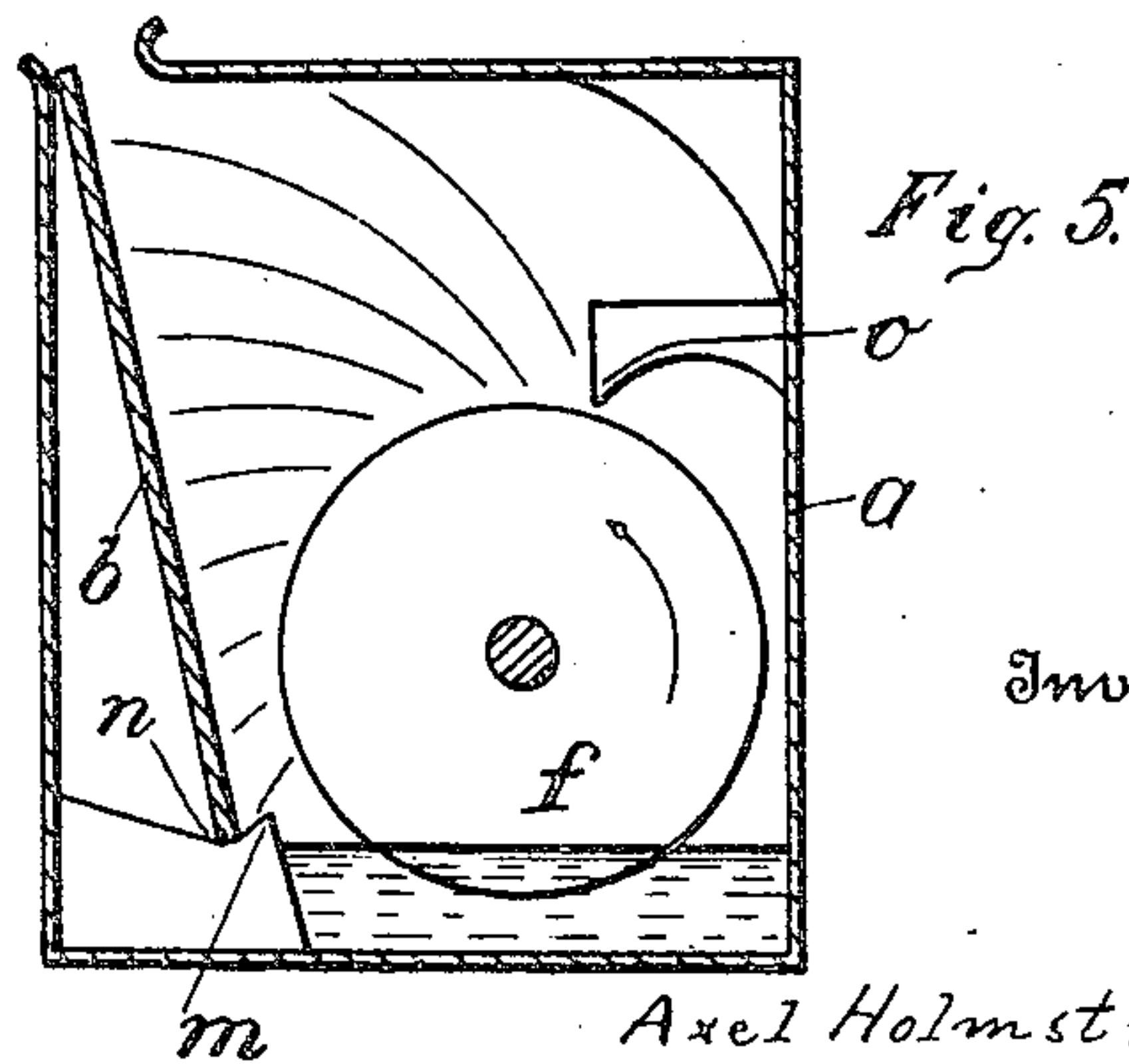
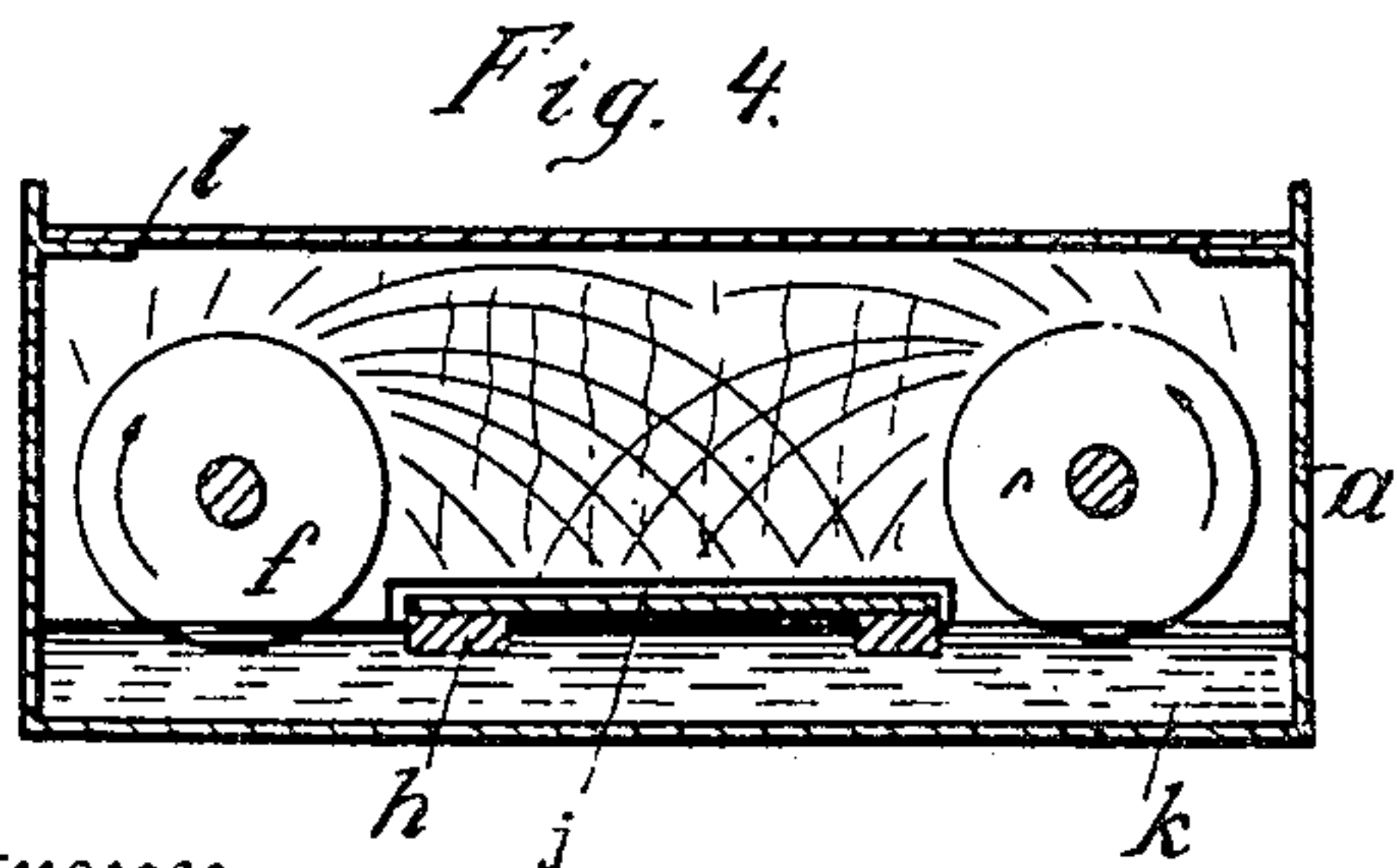
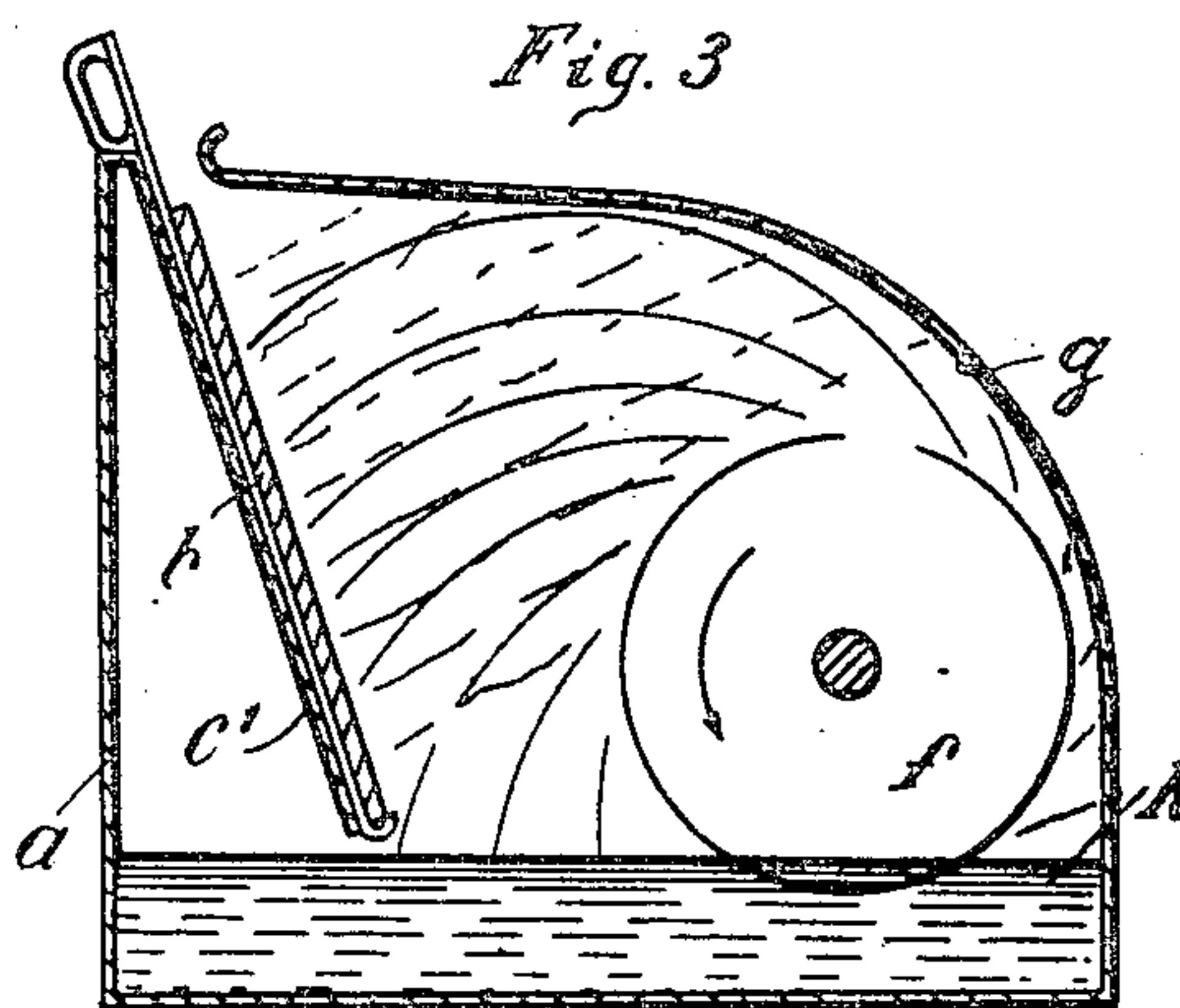
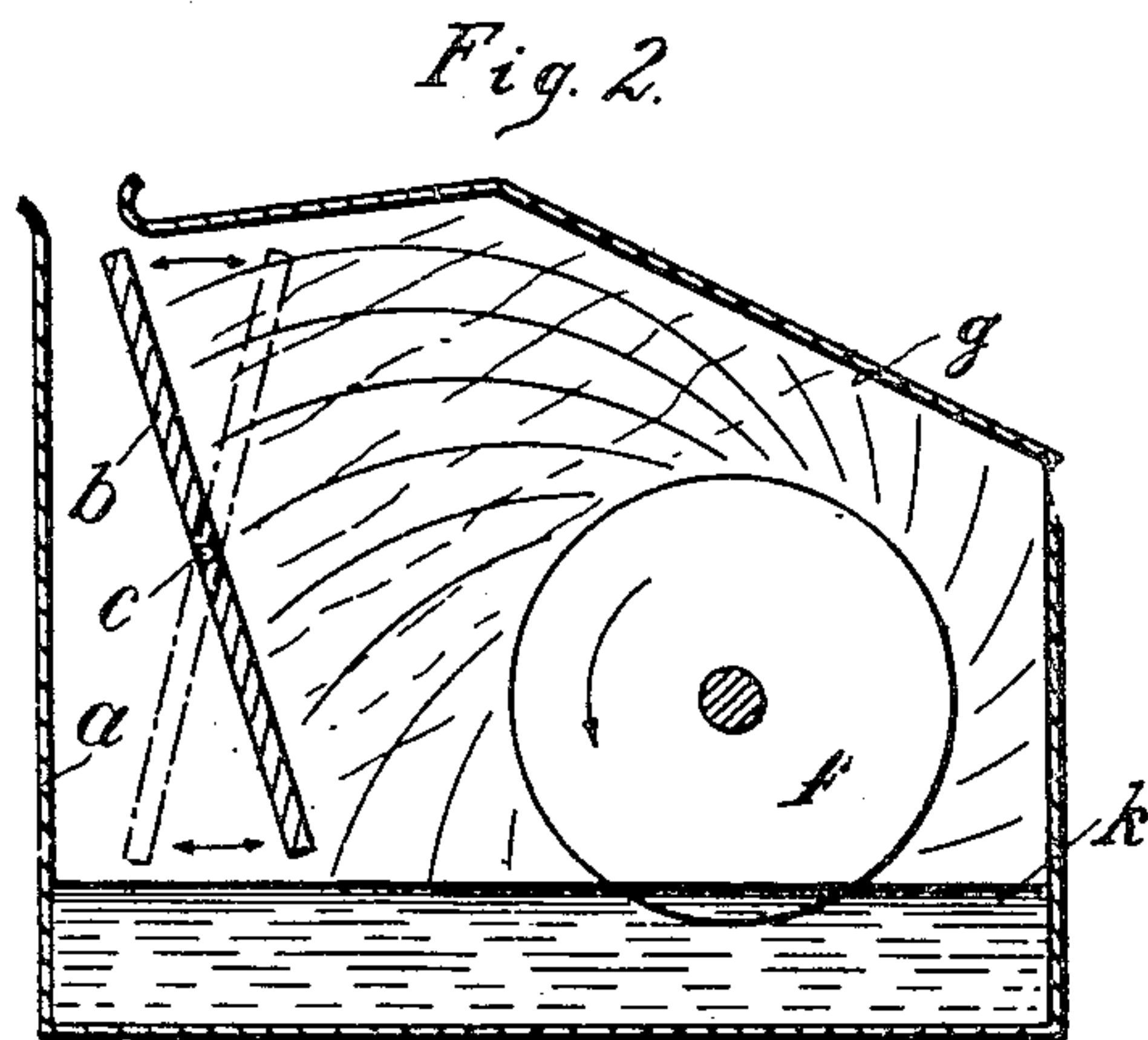
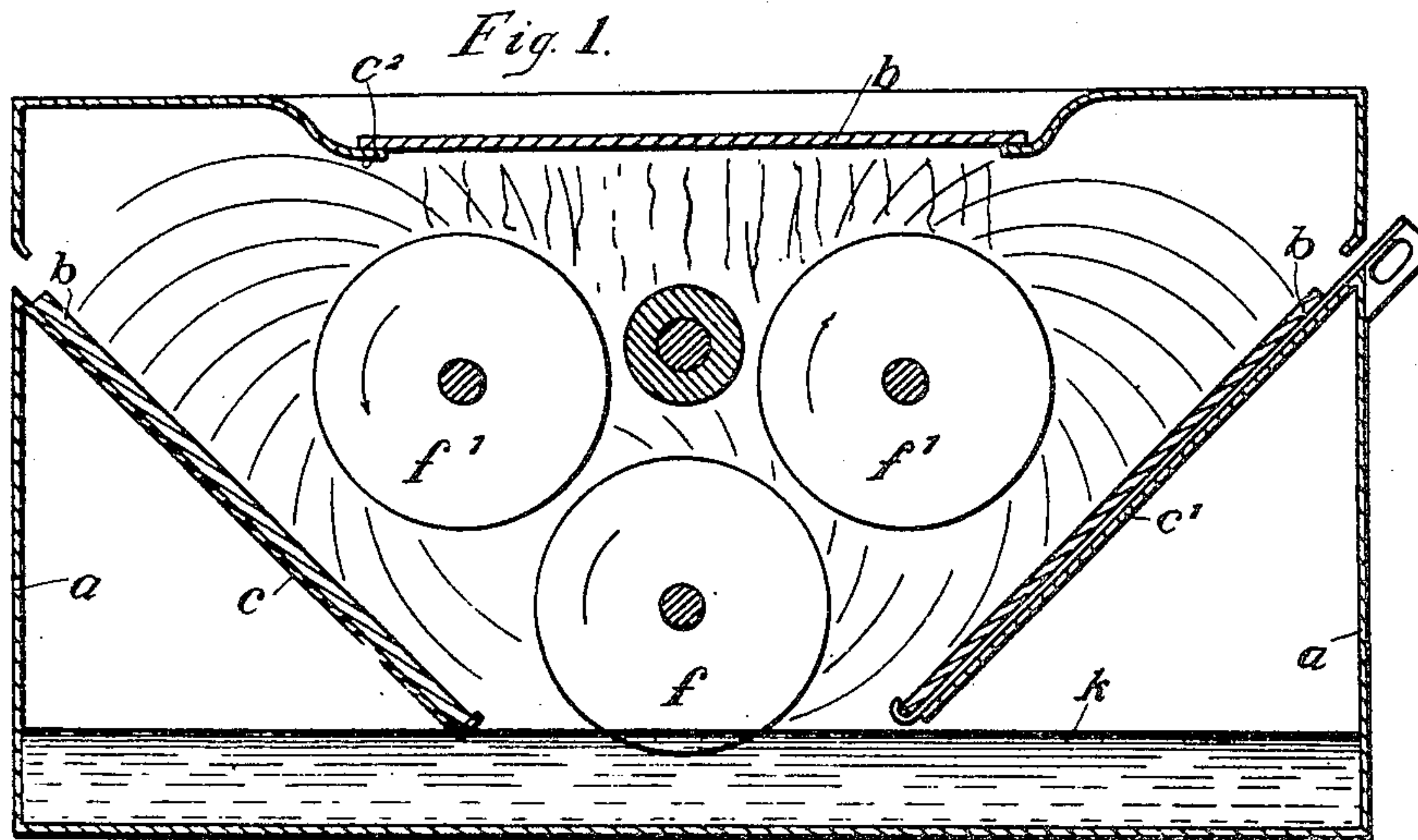


A. HOLMSTRÖM.
ETCHING APPARATUS.

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979,071.

Patented Dec. 20, 1910.



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ETCHING APPARATUS.

979,071.

Specification of Letters Patent.

Patented Dec. 20, 1910.

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To all whom it may concern:

Be it known that I, AXEL HOLMSTRÖM, painter, a subject of the Swedish King, residing at Brunnsgatan 78, Gefle, Sweden, have invented certain new and useful Improvements in Etching Apparatus, of which the following is a specification.

This invention pertains to improvements in etching apparatus, and the objects of the invention are to provide a device of this character in which under-etching will be guarded against and the etching operation carried out with great effectiveness and speed, and further to effect an intimate mixture of air and the etching liquid prior to the latter contacting with the object being etched.

In order that the stream of acid may be as finely divided as possible before coming on to the plate to be etched and be kept long enough in the air, it is not directly but indirectly brought into contact with the object to be etched by means of suitable secondary spraying devices. For this purpose, in addition to the usual primary spraying devices which dip into the etching fluid one or more secondary spraying devices are arranged, which are seated entirely outside the etching fluid and are fed by the primary spraying devices and in turn throw the etching fluid thus finely divided so received and mixed with air against the surfaces to be etched. In connection therewith the bodies to be etched are arranged in relation to the spraying devices so that on the one hand they are completely secured against any direct contact therewith and on the other hand assumes at the same time either automatically or in consequence of a certain position once given to them, such a position in relation to the acid sprayers that the surface to be etched is placed in the most favorable position for the etching operation. If necessary a reciprocating motion may be imparted in the known manner to the object to be etched.

Figure 1 is a vertical section of one form of the invention, Fig. 2 is a similar view of a modification, and Figs. 3, 4, and 5 are similar views of still further modified forms of the invention.

In the receptacle *a* one or more primary spraying devices *f* of any suitable shape (cylinders, drums, scoops, etc.) are arranged which dip into the etching bath *h*. During their rotation these primary spraying de-

vices carry along a portion of the etching fluid and throw it against secondary spraying devices *f'* (Fig. 1) arranged entirely outside the etching bath which in turn receive etching fluid and throw it in a finely divided state and well mixed with air against the plates *b* to be etched. The secondary spraying devices may be fixed or movably arranged. In Fig. 1 they consist like the primary spraying devices which dip into the fluid, of rotary bodies.

The plates *b* to be etched may be arranged in any desired number in the receptacle *a* so that they can be sprinkled uniformly from all sides. They rest on supports *c* and *c'* which are arranged firmly or detachably in the receptacle *a* or may be pushed in from outside in the manner of a slide. For fixing the upper plate *b* guides *c²* are cut in the cover of the receptacle and bent downward and into these the plate is pushed for example from outside or they can be otherwise fixed.

According to the arrangement shown in Figs. 2 and 3 the cover *g* of the receptacle *a* may be arranged at a suitable angle, be bent or formed with facets and the object to be etched must then be so arranged within the receptacle as not to be exposed to the direct action of the primary spraying devices. The etching fluid in this form of the invention is first thrown at a great speed against the bent or faceted cover, and is sprayed therefrom in a finely divided state and well mixed with air back on to the plates to be etched, which if necessary may be arranged to swing, as shown in Fig. 2, so that thereby the plate can automatically adjust itself at all times suitably to the varying force with which the fluid is sprayed and in this way the etching action be regulated or made uniform.

In the form illustrated in Fig. 4, two rotary primary spraying devices *f* are arranged which in rotating throw the etching fluid against the cover *l* of the receptacle against which it is broken up, so that it comes in a finely divided state and in consequence of the long path covered well mixed with air on to the bodies *j* to be etched arranged firmly directly over the etching fluid in the known manner or movably in guides *h* with the picture-side upward.

If plastic bodies of cylindrical collar-like form are to be etched, they may, as shown

in Fig. 1, be inserted between the primary and secondary spraying devices and be rotatively seated either inside or outside the etching bath. In this case there is a decidedly powerful etching uniformly from all sides.

The special arrangement and construction of the devices for holding the objects to be etched can of course be as preferred and as suited to the particular case.

As will be seen from Fig. 5 a step *m* may be provided, on which the plates may be put. This step may be provided with a groove *n* in which the plates are placed by the edge. In addition to the spraying devices *f* further spraying devices *o* may be arranged.

When the spraying device *o* is used, the wheel *f*, rotating in the direction of the arrow (Fig. 5), throws a part of the liquid against the wall *a*, whence it is thrown against the spraying device *o*, which causes the liquid to again be thrown onto the wheel *f*, hitting with great force the liquid thrown by wheel *f* against plate *b*, so that an intimate mixing of the liquid and air takes place producing a uniform covering of the fluid on the plate.

What I claim is:

1. An apparatus for etching metal plates and the like, composed of a receptacle adapted to contain an etching bath, a primary spraying device arranged in the receptacle to dip into the etching bath, and means arranged in juxtaposition to the primary spraying device to intercept the etching fluid as it leaves the primary spraying device and

to cause the fluid to become finely divided and to direct same to contact with the plates.

2. An apparatus for etching metal and similar plates, composed of a receptacle for containing an etching bath, a primary spraying device to dip into the bath, means for supporting a plate in the receptacle, and means for intercepting the fluid as it leaves said primary spraying device to deflect same onto said plate.

3. An apparatus for etching metal and similar plates, composed of a receptacle for containing an etching bath, a primary spraying device to dip into the bath, a grooved element in the receptacle to receive and support one end of the plate, and a cover for the receptacle to intercept the fluid after it leaves said device and to direct said fluid onto the plate.

4. An apparatus for etching metal and similar plates, composed of a receptacle for containing an etching bath, a primary spraying device to dip into the bath, a step in the receptacle to receive and support one end of the plate, a cover for the receptacle to intercept the fluid after it leaves said device and to direct the fluid onto the plate, and a further spraying device in the receptacle disposed between the primary spraying device and the cover.

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

AXEL HOLMSTRÖM.

Witnesses:

ANNA SÖDERSTRÖM,
BENGT SISPENPANE.