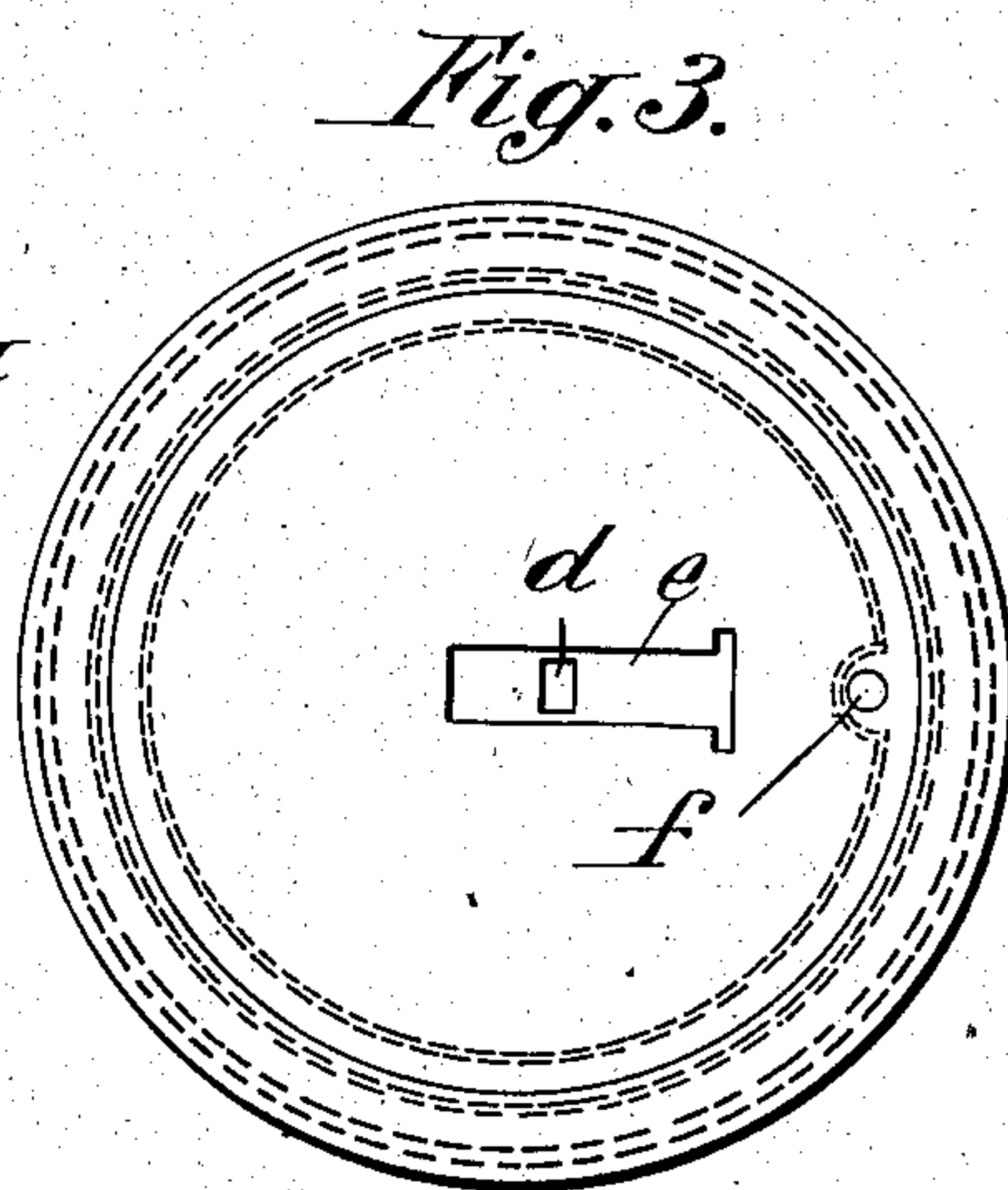
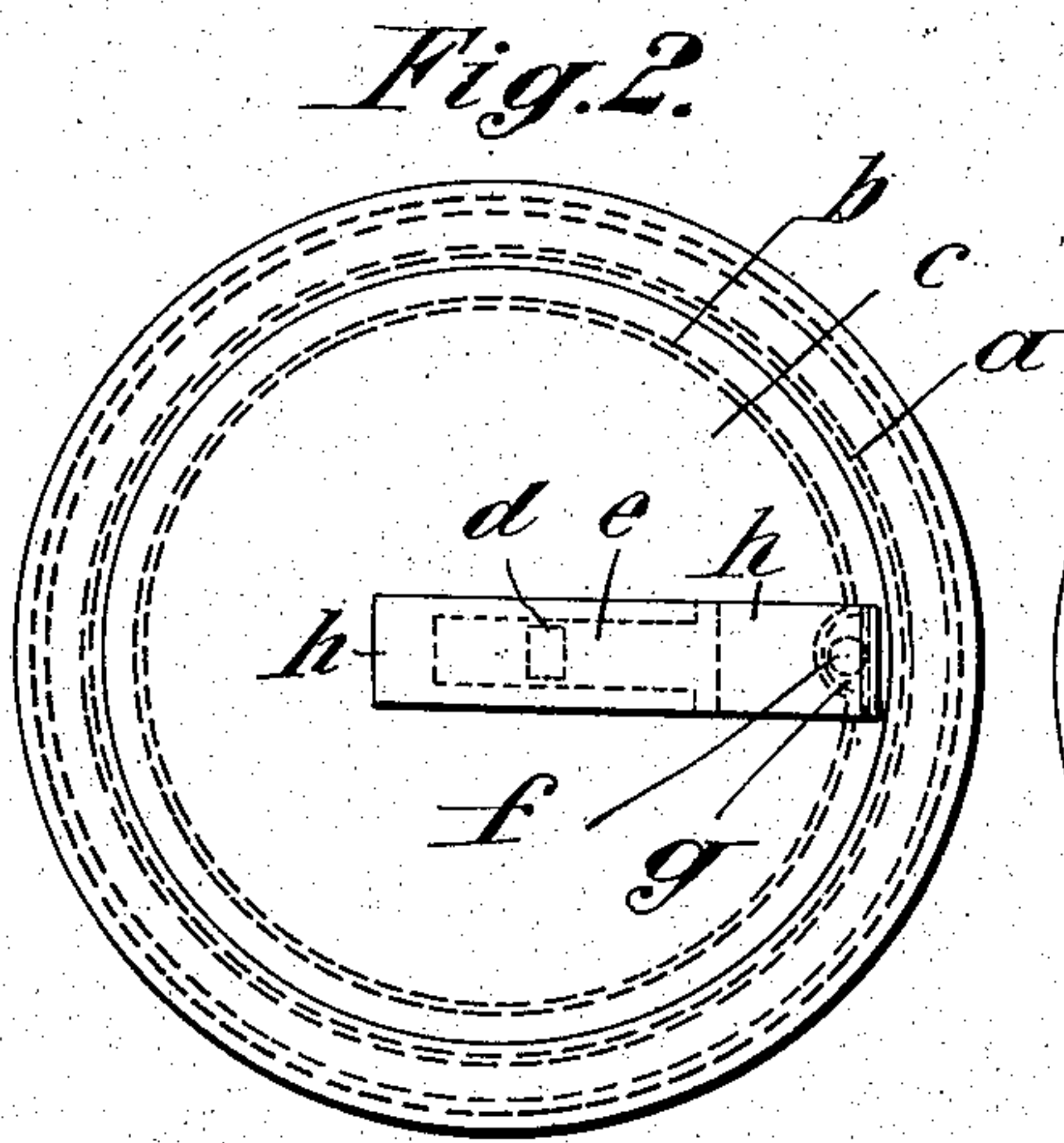
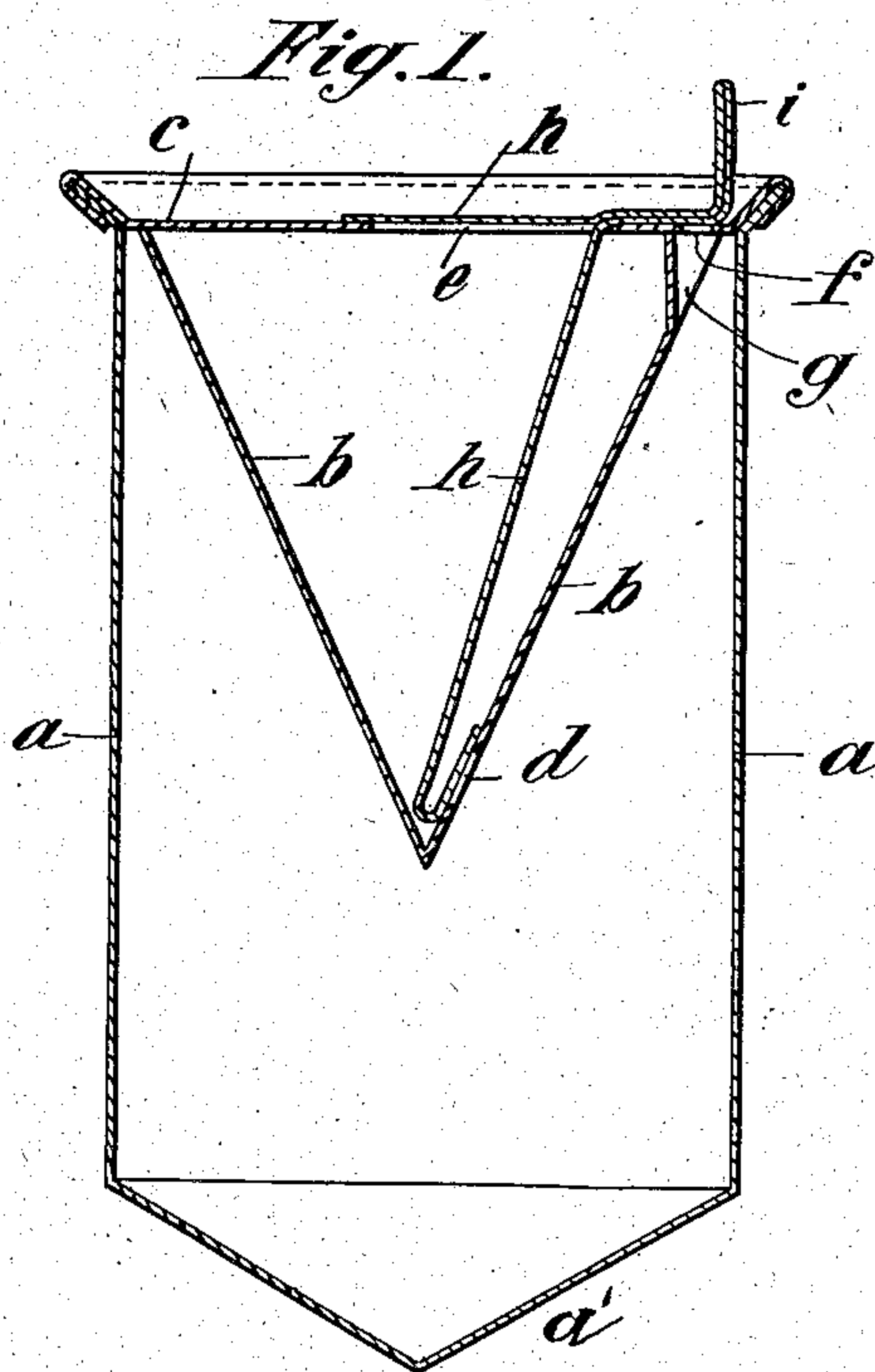


No. 827,222.

PATENTED JULY 31, 1906.

W. ESPENHAYN & F. O. HUNGER.
CHEMICAL HEATING DEVICE.

APPLICATION FILED JAN. 13, 1905.



Witnesses:

W. K. Bonelli

[Signature]

Wilhelm Espenhayn

and Friedrich Oswald Hunger.

By *[Signature]*

Attorney.

UNITED STATES PATENT OFFICE.

WILHELM ESPENHAYN AND FRIEDRICH OSWALD HUNGER, OF CHEMNITZ,
GERMANY.

CHEMICAL HEATING DEVICE.

No. 827,222.

Specification of Letters Patent.

Patented July 31, 1906.

Application filed January 13, 1905. Serial No. 240,932.

To all whom it may concern:

Be it known that we, WILHELM ESPENHAYN and FRIEDRICH OSWALD HUNGER, subjects of the German Emperor, and residents of Chemnitz, Germany, have invented an Improved Chemical Heating Device, of which the following is a specification.

This invention has reference to an improved chemical heating device; and its object is to provide such a device which may be readily unsealed and is specially suitable for warming food, liquids, or other substances in a semiliquid state.

We have illustrated a simple form of our invention in the accompanying drawings, in which—

Figure 1 is a vertical section of the receptacles we employ for the chemicals and the fluid to be mixed therewith, showing our method of hermetically sealing same; and Figs. 2 and 3 are plan views of said receptacles, sealed and unsealed.

In carrying our invention into practice, we take a receptacle *a* of any suitable shape, preferably cylindrical and having a conical bottom *a'*, in which we place chemicals which in combining with a fluid generate heat. With caustic soda or lime as the chemical we employ water as the fluid. With some kinds of lime vinegar is preferable to water. These chemicals when brought into contact with the fluid generate an intense heat.

In the open end of the cylinder *a* we fix a funnel-shaped receptacle *b* to contain the water or the like. Said receptacle has a preferably dished cover *c* soldered to it, and the edge of said cover is bent over and soldered to the rim of the cylinder *a*, about as shown. Near the apex of the funnel *b* are one or more holes *d* for the admission of the water or other fluid into the cylinder *a* when the device is to be used, and the cover *c* has an opening *e* for filling the receptacle *b* and an air-hole *f* communicating with the cylinder *a*, the rim of the funnel at the point where this hole *f* is formed being bent inward, forming the recess *g*. Over these openings *d*, *e*, and *f* we secure with soft solder a strip of tin or the like *h*, so as to hermetically close the receptacles. We have shown the doubled part *i* of said strip projecting upward; but in practice it is bent around one of the usual tin-opener keys, such as used with sardine-boxes and the like.

Before the funnel-shaped receptacle *b* and cover *c* are placed in position on the cylinder *a* the latter is filled to about half its capacity with the lime or other chemical employed. Then, one end of the strip *h* having been soldered over the hole or holes *d* with its free end projecting through the opening *e* in the cover, the conical receptacle *b* is secured in position, as already described, and filled with the water or other fluid employed, whereupon the strip *h* is soldered down over the opening *e* and the air-hole *f*, thus hermetically sealing both receptacles.

To use our improved chemical heating device, the key referred to, which engages the strip *h* at *i*, is turned so as to wind said strip upon itself, whereby first the air-hole *f*, then the opening *e*, and finally the hole *d* are gradually unsealed. The water or other fluid in the receptacle *b* flows through said hole *d* into the cylinder *a*, and in a very short time considerable heat is generated by its combination with the chemicals contained therein, which heat may be communicated to the substance to be warmed by inserting the closed end of said cylinder into the vessel containing said substance. Neither the chemicals nor the fluid employed in our device can come into contact with the food or the like to be heated.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is—

1. In a device of the character described, the combination with two receptacles adapted to contain substances which when mixed together produce heat, one of said receptacles being carried by and forming a closure for the other receptacle, the first receptacle having a filling-opening and an opening to provide communication between the two receptacles and a band soldered to the receptacle having the openings and forming a tight closure for said openings and adapted to be operated from a point exteriorly of the receptacles to cause it to uncover the said openings for the purpose set forth.

2. In a device of the character described, the combination with two receptacles adapted to contain substances which when mixed together produce heat, one of said receptacles being carried by and forming a closure for the other receptacle, the first-named receptacle

having a vent-opening adapted to place the interior of the second receptacle in communication with the outer air, and said first receptacle also having a filling-opening and an opening adapted to place the interior of both receptacles in communication, and a single strip soldered to the receptacle having the three openings and forming a tight closure for all of said openings and adapted to be operated from a point exteriorly of said receptacles to uncover the openings for the purpose specified.

3. In a device of the character described, the combination with two receptacles *a b*, adapted to contain substances which when mixed together produce heat, the receptacle *b* being carried by and forming a closure for

the receptacle *a*, and having openings *d, e, f*, for the purpose set forth and having its cover secured to the upper edge of the receptacle *a*, and a strip soldered to the receptacle *b* and forming a tight closure for the said openings and having a portion thereof adapted to be engaged and operated from a point exteriorly of the receptacles to cause the strip to uncover the various openings.

In testimony whereof we have hereunto set our hands in presence of two witnesses.

WILHELM ESPENHAYN.

FRIEDRICH OSWALD HUNGER.

Witnesses:

J. F. MONAGHAN,

FREDERICK J. DIETZMAN.