

F. GRAUL.

LEVEL.

APPLICATION FILED AUG. 20, 1908.

988,637.

Patented Apr. 4, 1911.

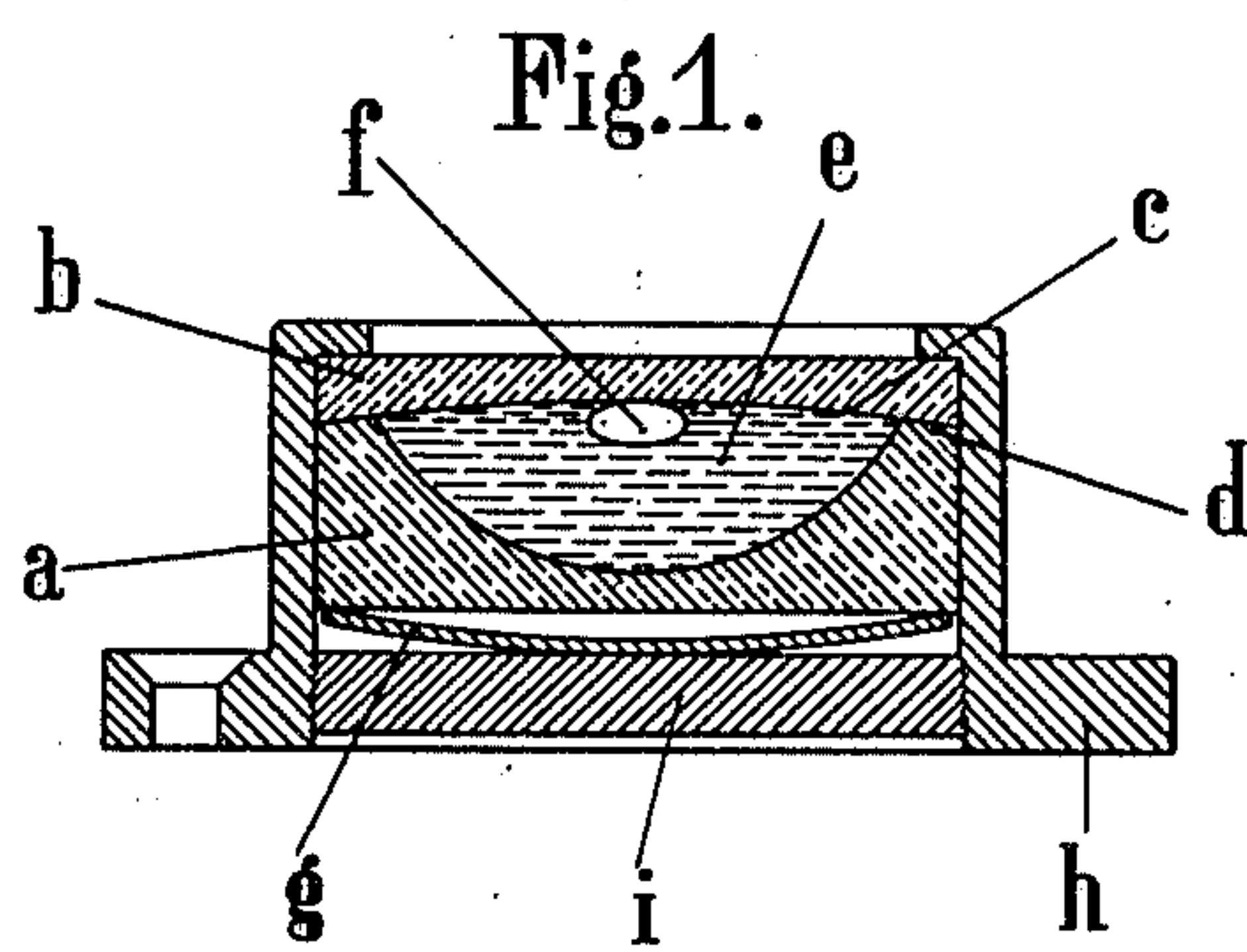
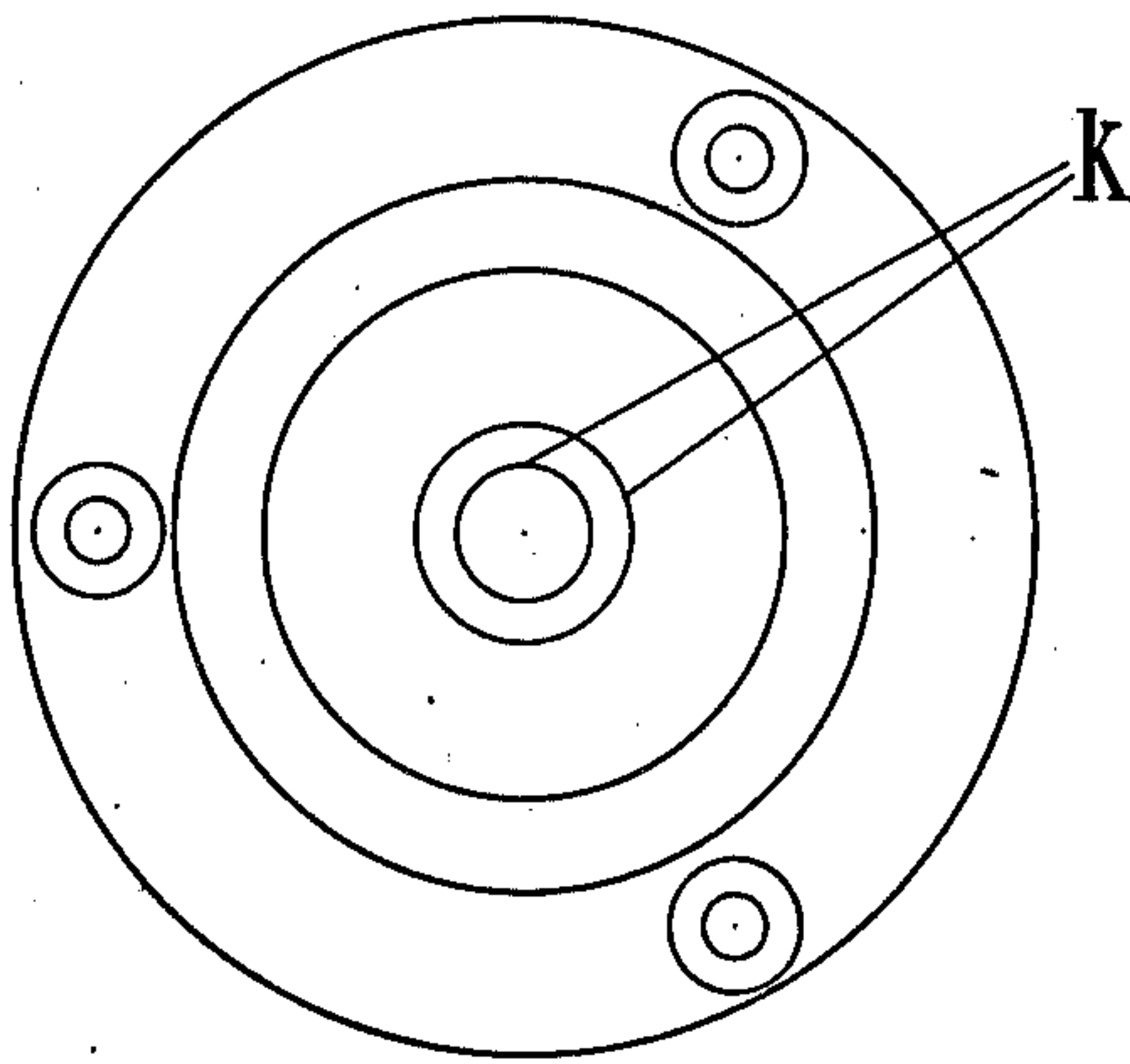


Fig. 2.



Witnesses:  
Frank E. Rappaman  
Paul H. Frank.

Inventor:  
Franz Graul,  
by  
Dickerson, Brown, Regener & Mitty.  
Attys.

# UNITED STATES PATENT OFFICE.

FRANZ GRÄUL, OF VIENNA, AUSTRIA-HUNGARY, ASSIGNOR TO THE FIRM OF OPTISCHE ANSTALT C. P. GOERZ AKTIENGESELLSCHAFT, OF FRIEDENAU, NEAR BERLIN, GERMANY.

## LEVEL.

988,637.

Specification of Letters Patent.

Patented Apr. 4, 1911.

Application filed August 20, 1908. Serial No. 449,530.

*To all whom it may concern:*

Be it known that I, FRANZ GRÄUL, engineer, a citizen of the German Empire, residing at 4 Goldeggasse, Vienna, Austria-Hungary, have invented certain new and useful Improvements in Levels, of which the following is a specification.

This invention relates to levels, and its object is to secure durability combined with simplicity of construction. For this purpose the liquid receptacle and glass cover, constructed as separate parts, are held together by pressure, without the aid of cement, and in order that a tight joint may be obtained in this manner the receptacle as well as the cover is made of glass. The contact surfaces are preferably polished, since, as is well known, polished glass surfaces are adapted to make very close contact. The marginal part of the cover, and the surface of the rim of the receptacle, on which the said marginal part rests, are preferably curved, to allow of more easily and accurately positioning the cover relatively to the receptacle. Permanent close contact between the liquid receptacle and glass cover may be secured by means of a spring so arranged in the mount or casing that it presses the two parts together. The index circles may be etched or engraved on the polished under surface of the glass cover.

A construction embodying the invention is shown in the annexed drawing, in which—

Figure 1 is a vertical axial section, and Fig. 2 a top plan view.

In the drawing the liquid receptacle is marked *a* and the glass cover *b*. The under surface *c* of the glass cover is curved and polished, the curvature being continued to the edge of the cover. The marginal part of this surface *c* rests upon the polished and correspondingly curved rim surface *d* of the receptacle *a*.

*e* represents the liquid in the receptacle, and *f* the bubble.

The receptacle rests upon a curved, elastic plate *g*. The glass cover, receptacle and elastic plate are inclosed in a metal casing *h*, in which they are retained by a bottom plate *i* screwed into the casing. The index circles on the polished under surface of the glass cover *b* are marked *k* in the drawing.

Having now particularly described and

ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

1. In a level a liquid receptacle and a cover for same, both consisting of glass and in direct contact with each other without interposition of cement or other joint tightening material, the under surface of the cover being homogeneously curved throughout the whole of its extension and the surface of the receptacle which forms the seat of said cover being identically curved, both said contacting surfaces being at the same time polished and means adapted to press said seat against said cover.

2. In a level a liquid receptacle and a cover for same, both consisting of glass and in direct contact with each other without interposition of cement or other joint tightening material, the contacting surfaces of said receptacle and said cover being polished, a casing for said receptacle and cover, a bottom plate for said casing and resilient means between said bottom plate and receptacle securing contact pressure between the contacting surfaces of said receptacle and said cover.

3. In a level a liquid receptacle and a cover for same, both consisting of glass and in direct contact with each other without interposition of cement or other joint tightening material, the contacting surfaces of said receptacle and said cover being polished, a casing for said receptacle and cover, a bottom plate for said casing and a curved spring plate between said bottom plate and receptacle.

4. In a level a glass receptacle the sides of which are spherically curved, and a glass cover for said receptacle, said glass cover having spherically curved edges the spherically curved edges of said cover being arranged to fit the spherically curved sides of said receptacle to produce a liquid tight joint by contacting the glass of the cover to the glass edges of the receptacle.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

FRANZ GRÄUL.

Witnesses:

ROBERT W. HEINGARTNER,  
AUGUST FUGGER.