

K. BROUCEK.
MINER'S SAFETY LAMP.

No. 557,548.

Patented Apr. 7, 1896.

Fig. 1.

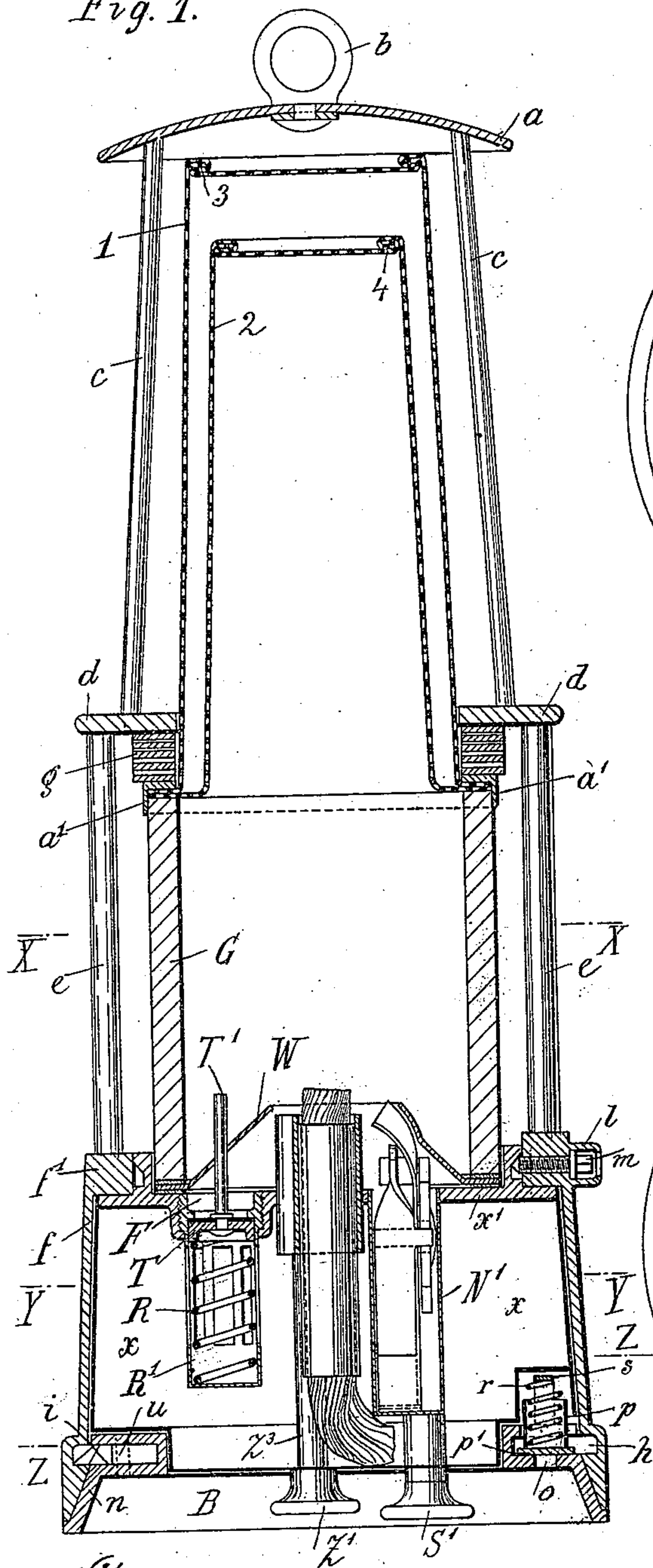


Fig. 2.

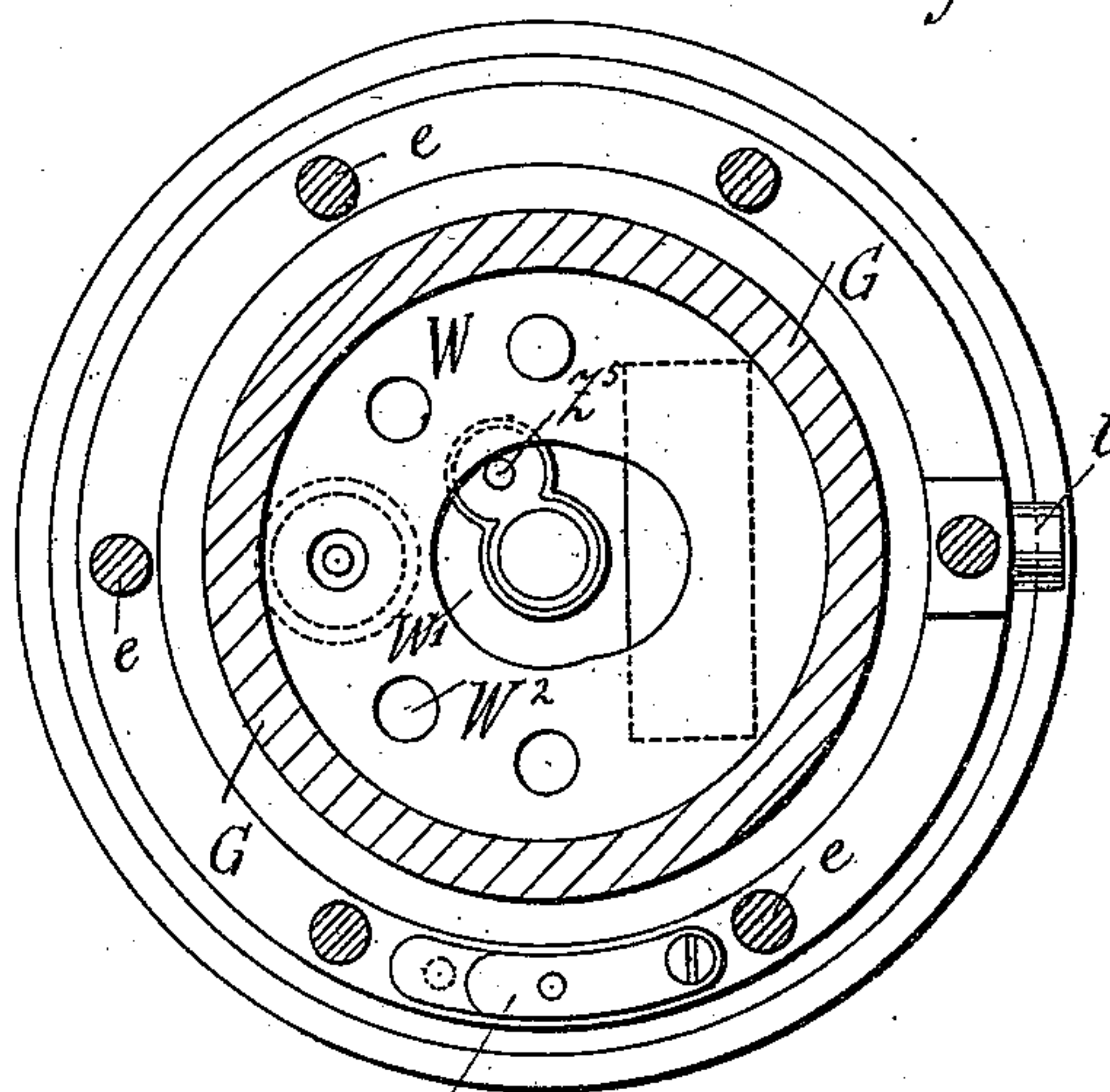


Fig. 2.^a

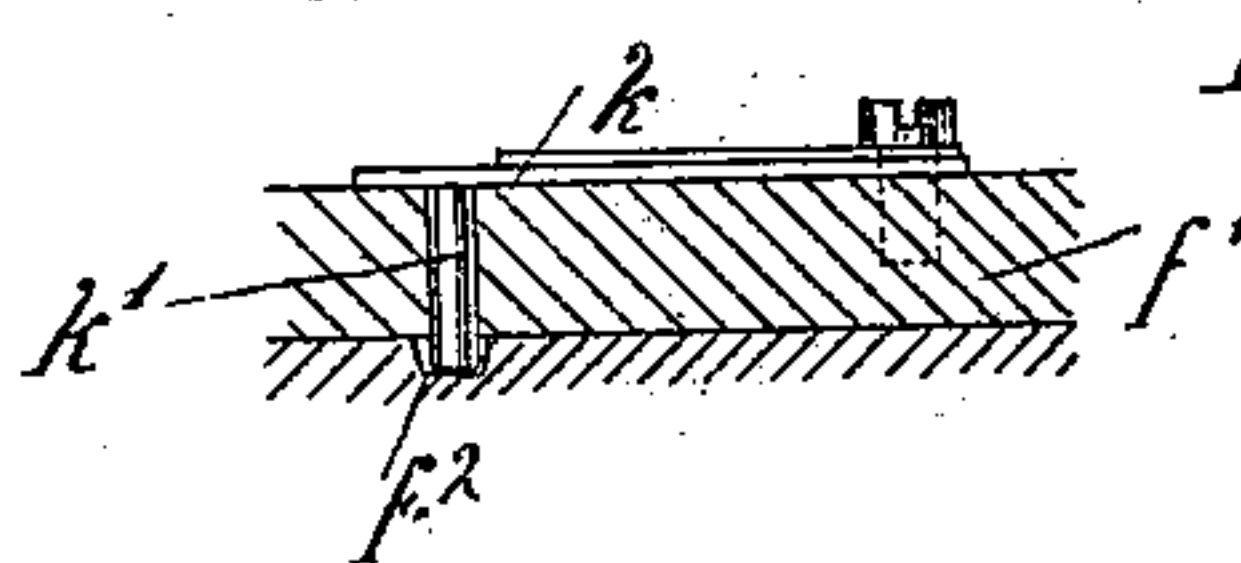
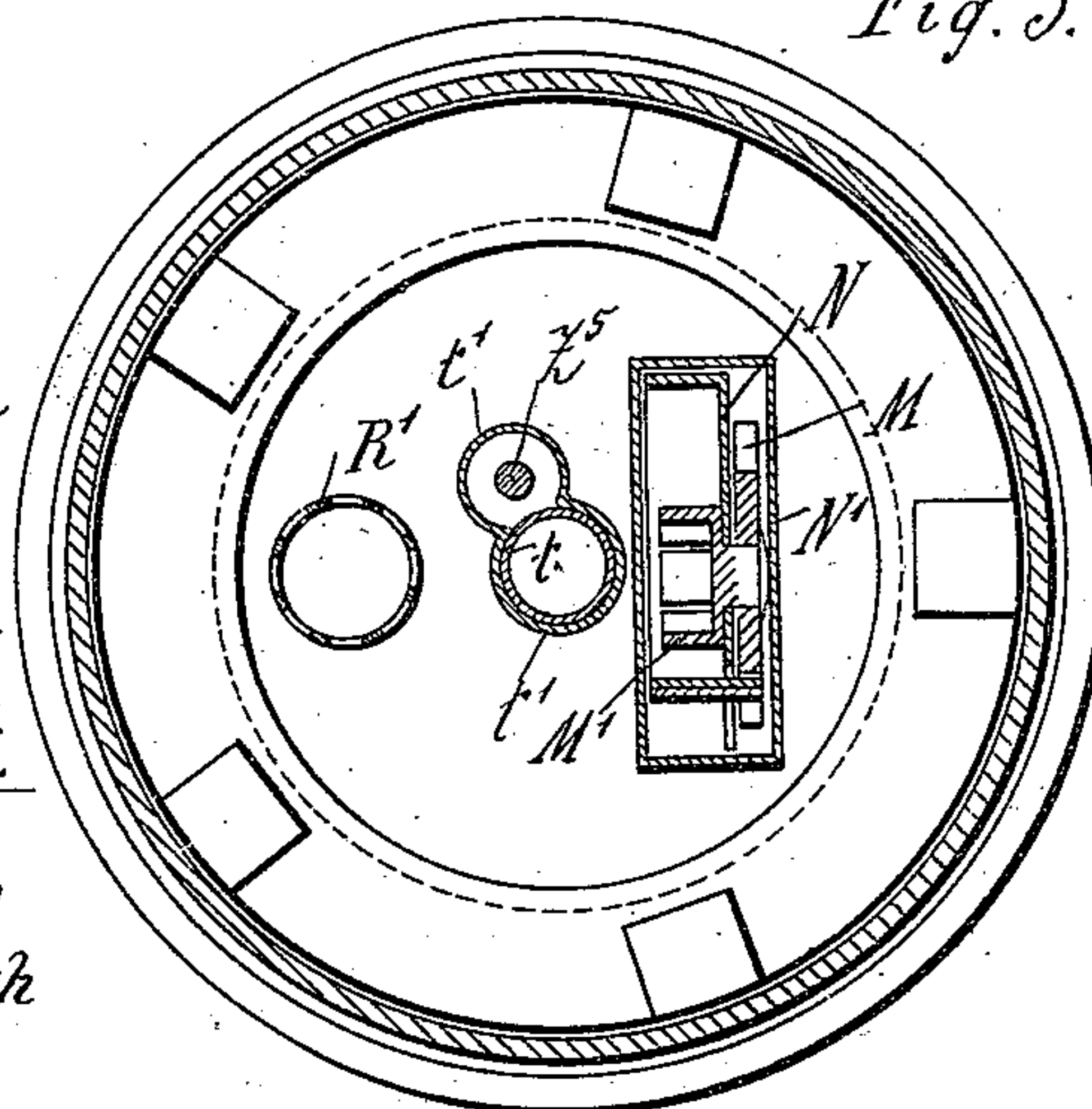


Fig. 3.



Witnesses:
Max Thörner
Juster Schwaner

Inventor:
Karel Broucek
by
Hans Herberich
Atty

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Fig. 5.

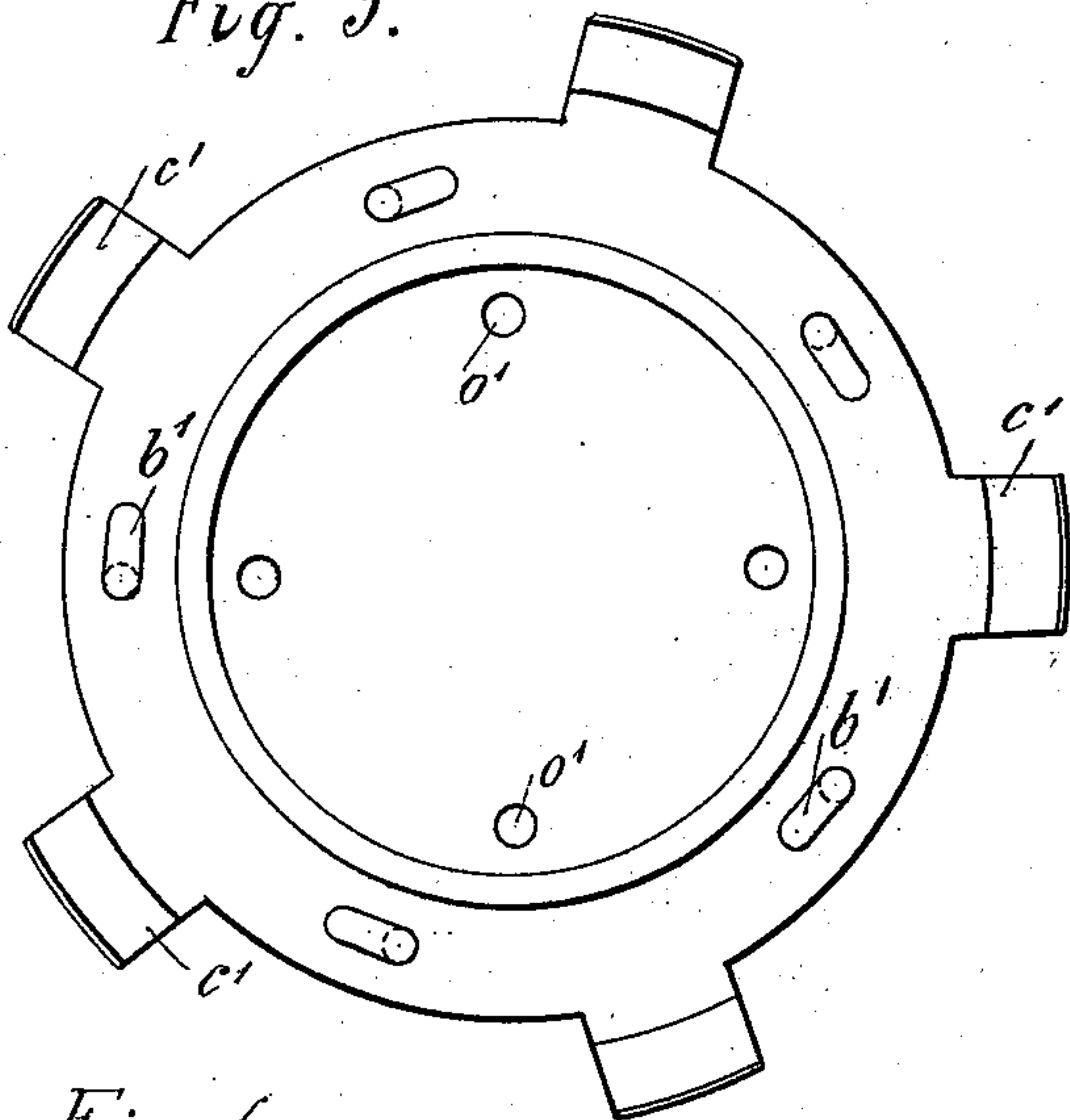


Fig. 6.

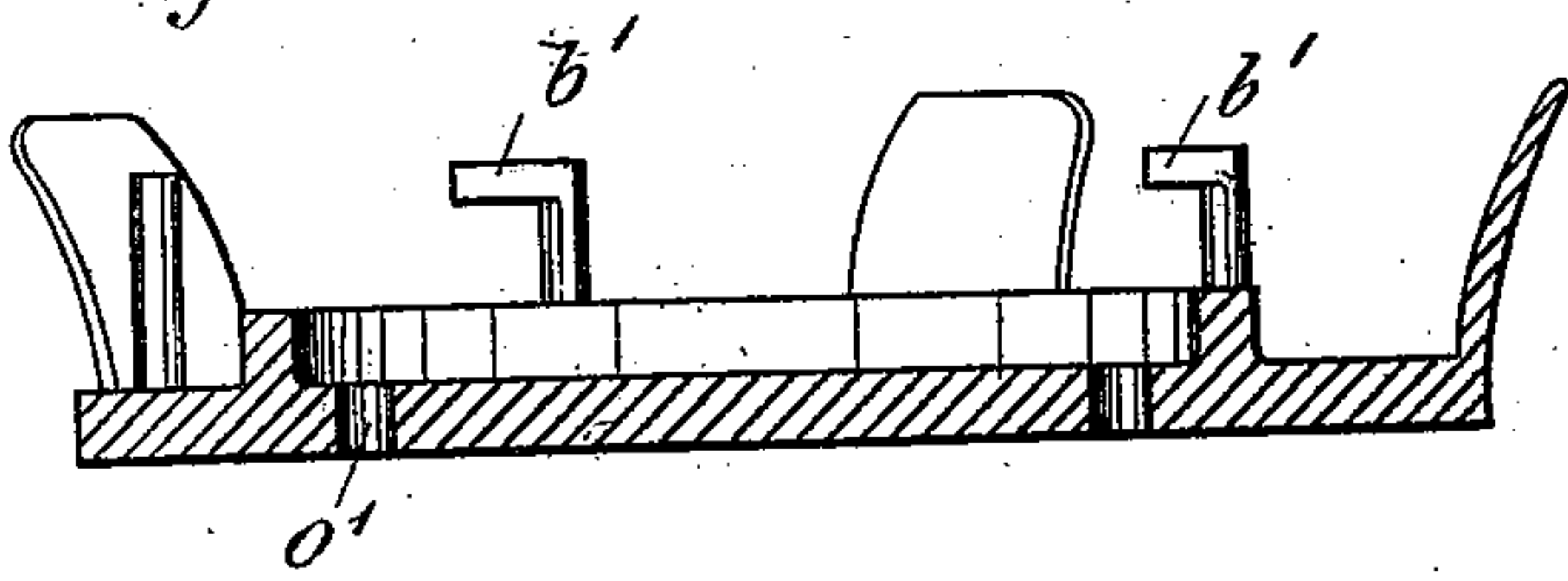
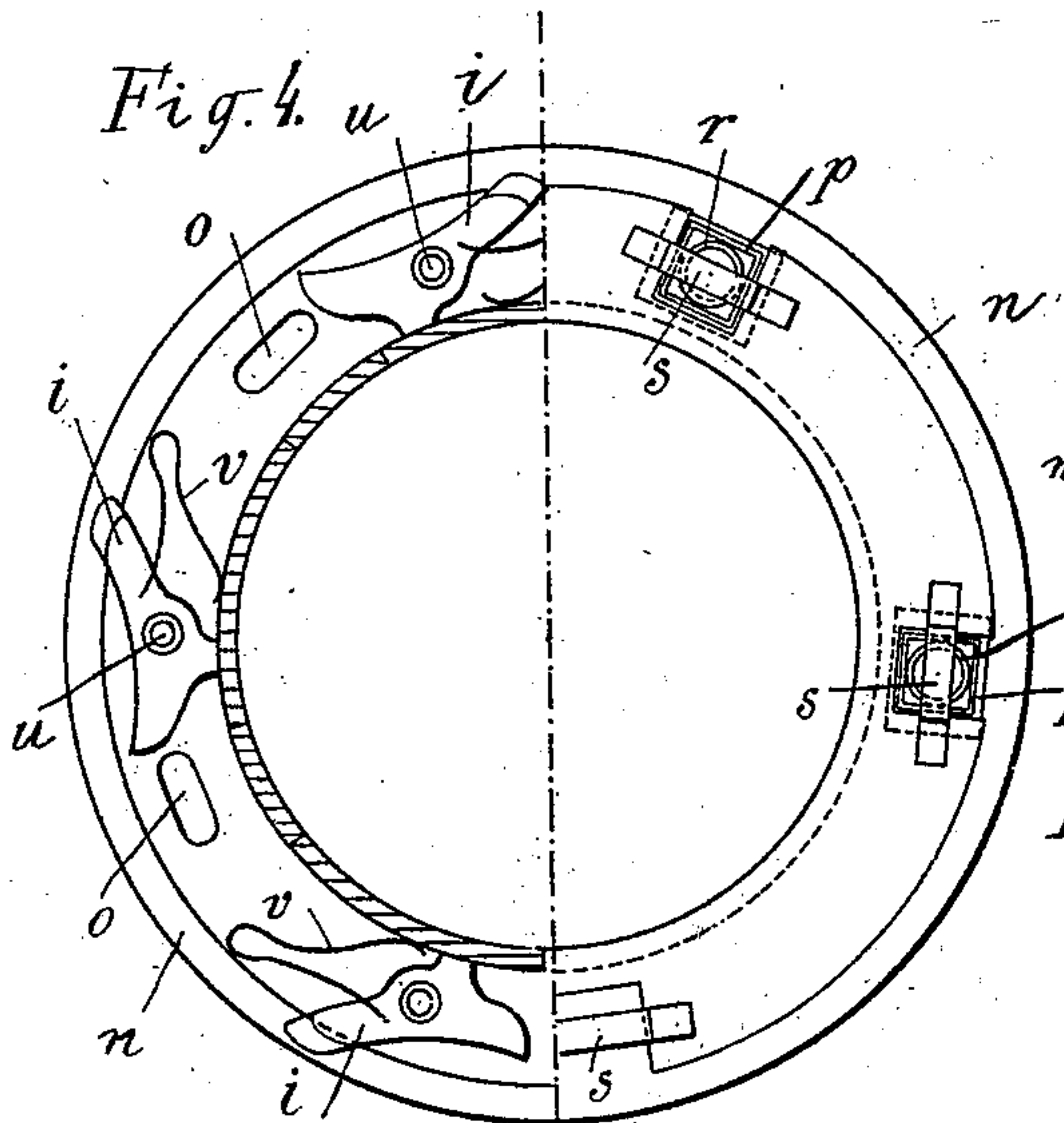
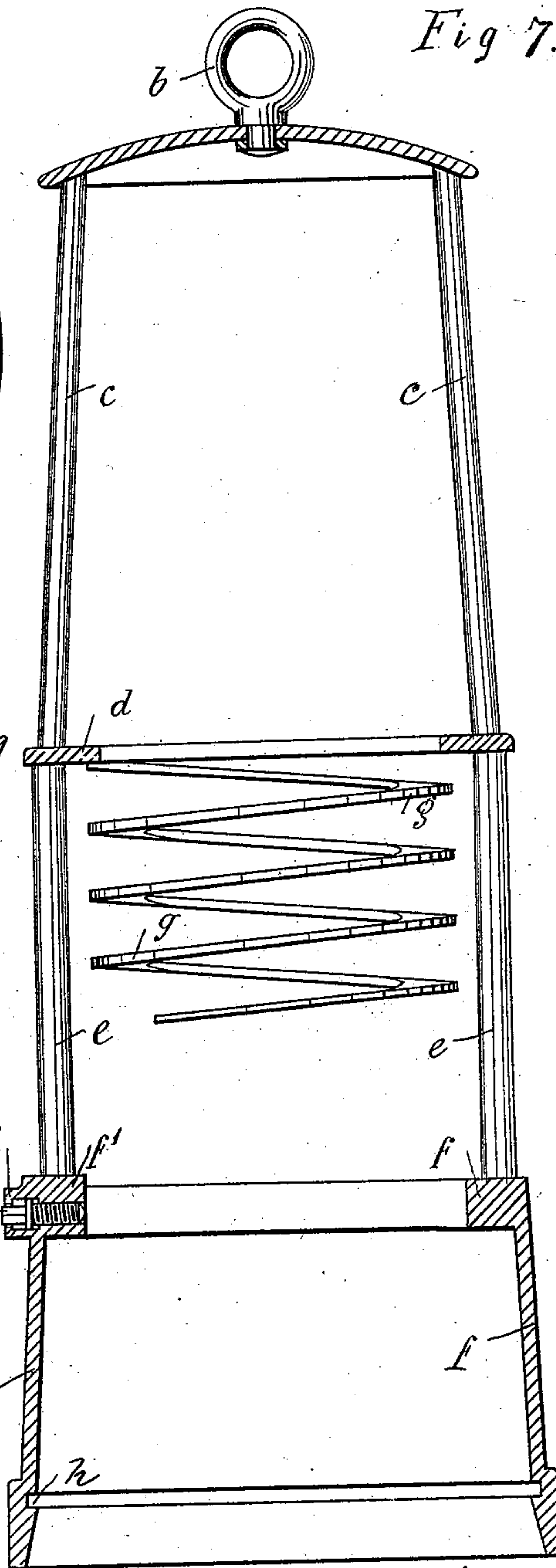


Fig. 4.



Witnesses:
Max Thörner
Johann Lehmann.

Fig. 7.



Inventor:
Karel Broucek
by
Max Wertheim
Atty

(No Model.)

3 Sheets—Sheet 3.

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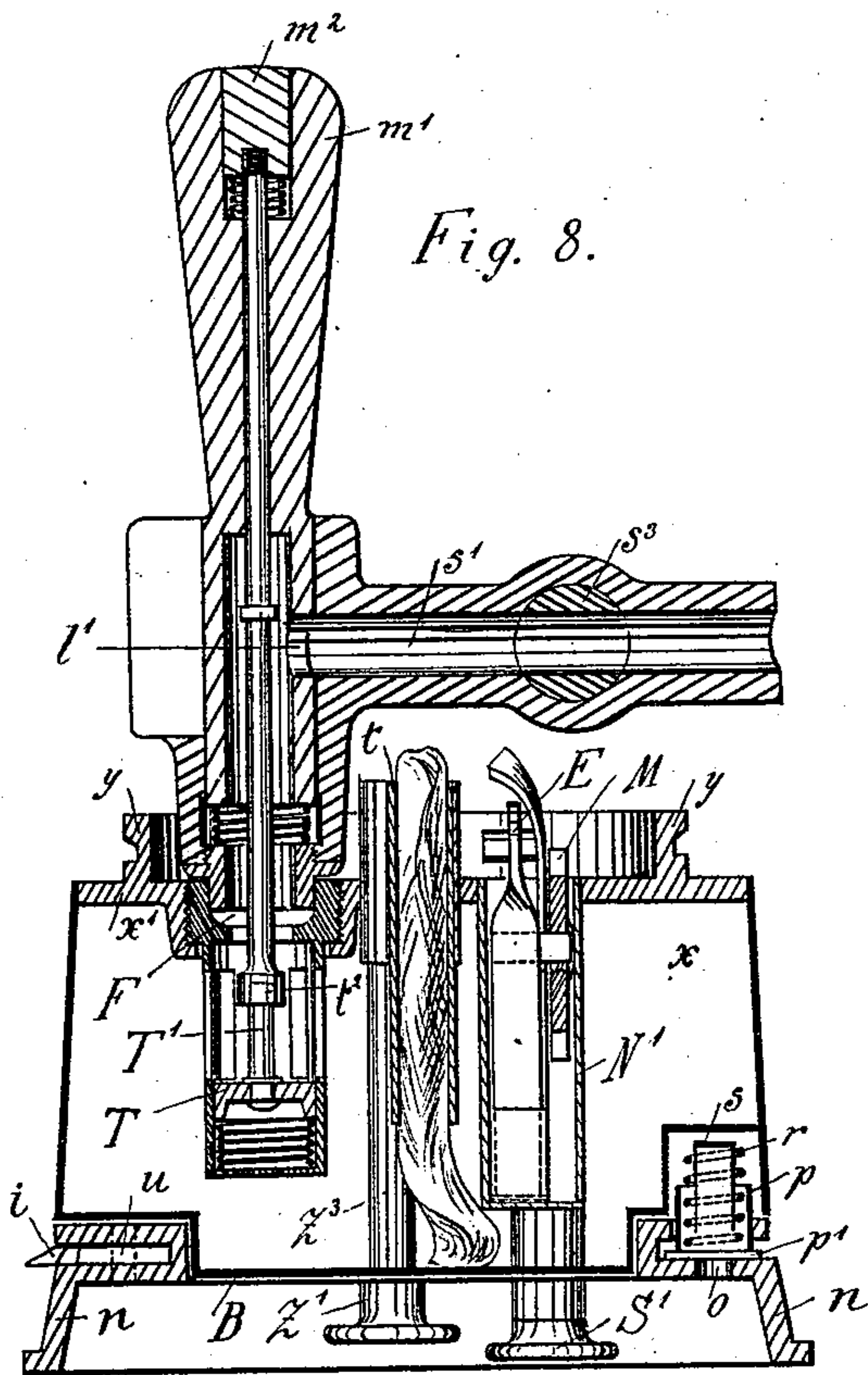


Fig. 8.

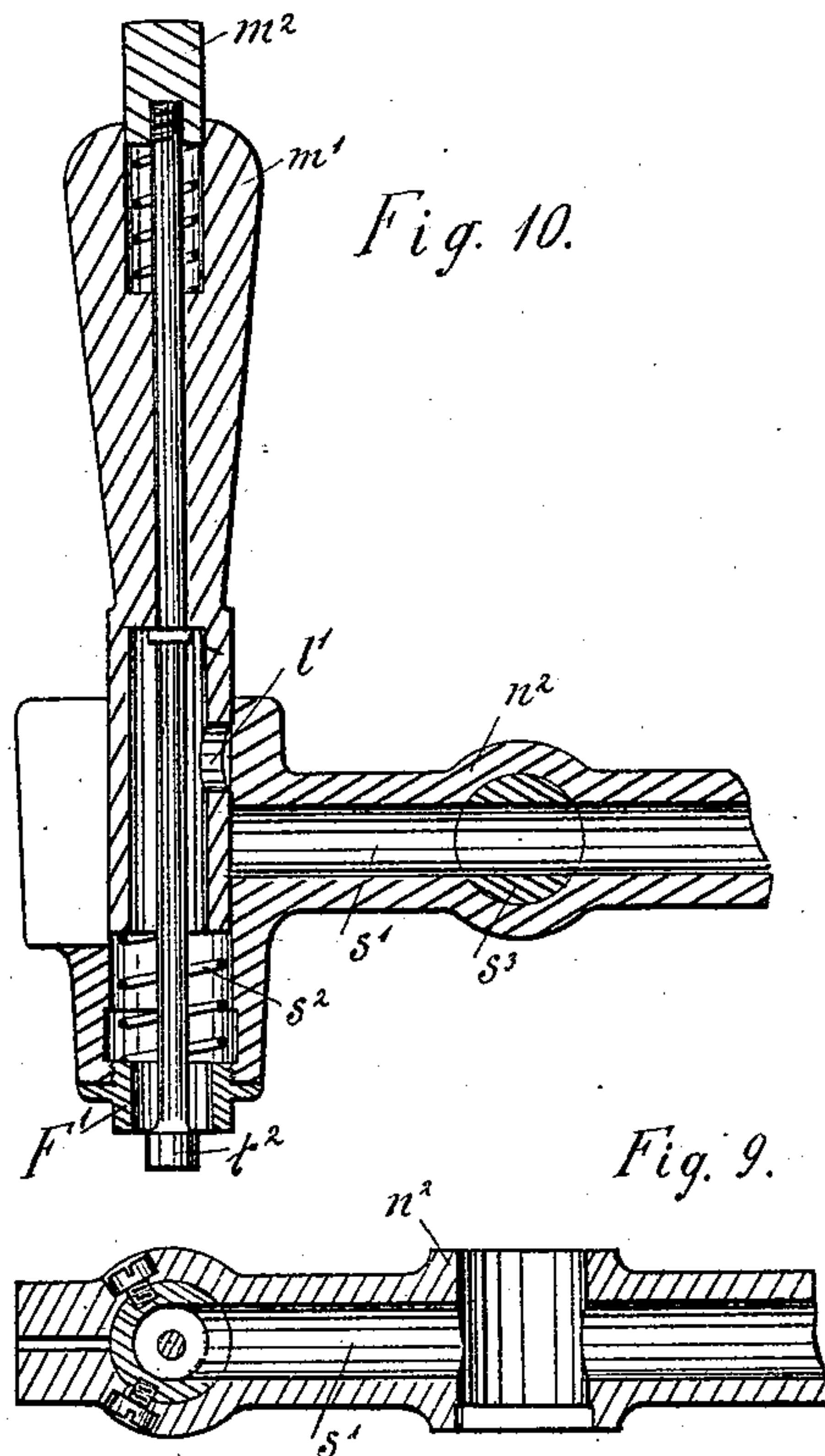


Fig. 10.

Fig. 9.

Fig. 13.

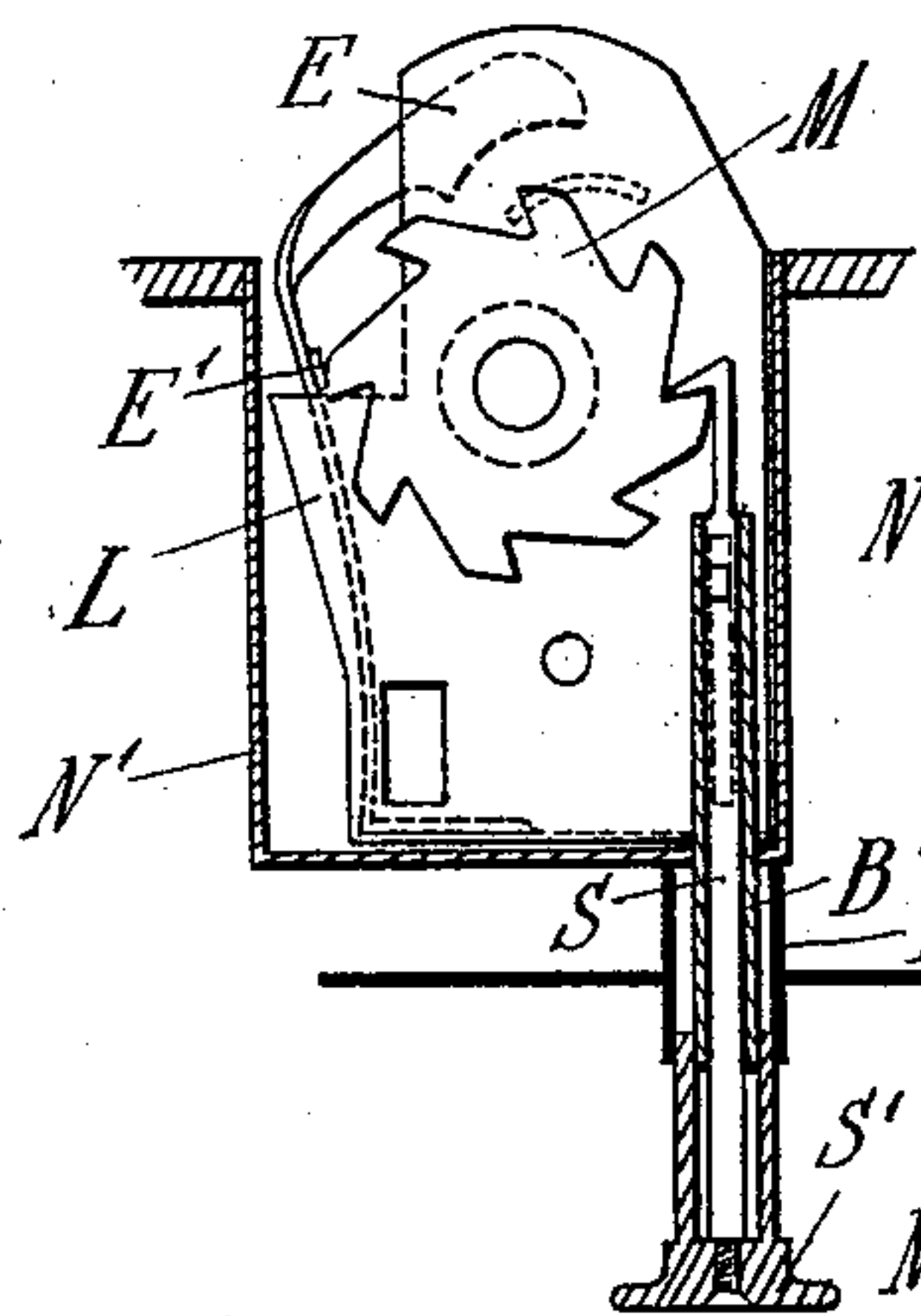


Fig. 11.

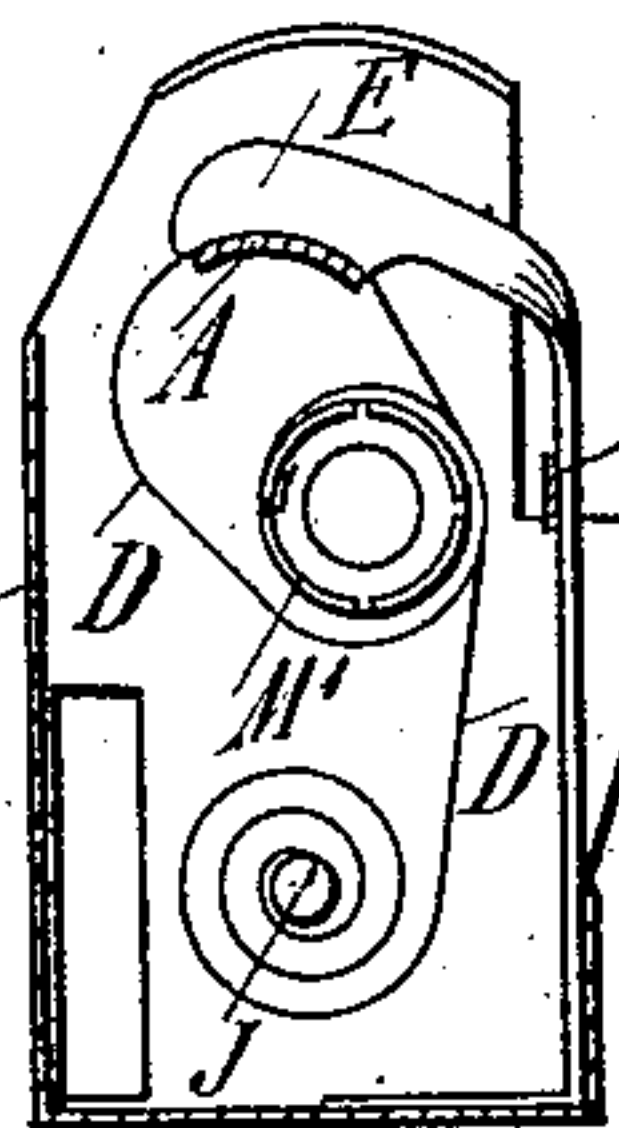


Fig. 12.



Fig. 14.

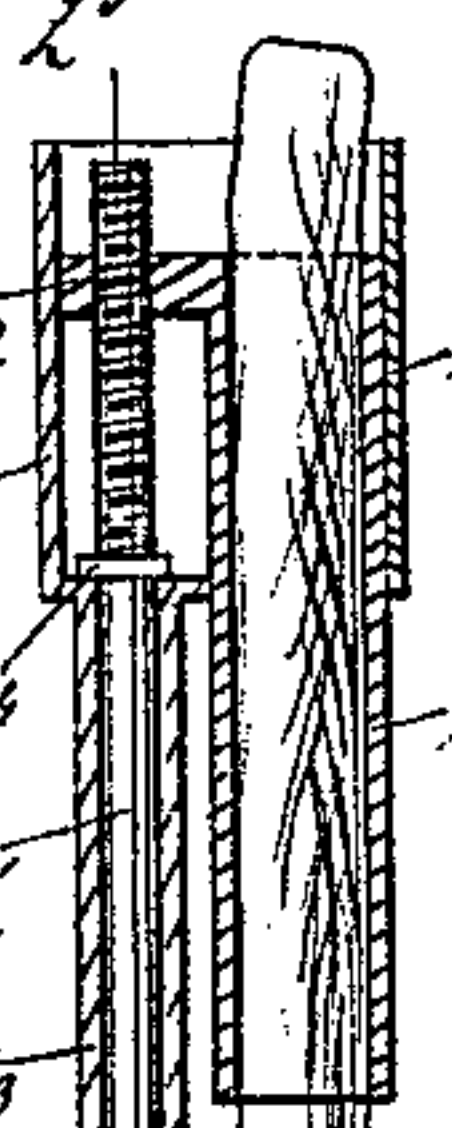


Fig. 14^a

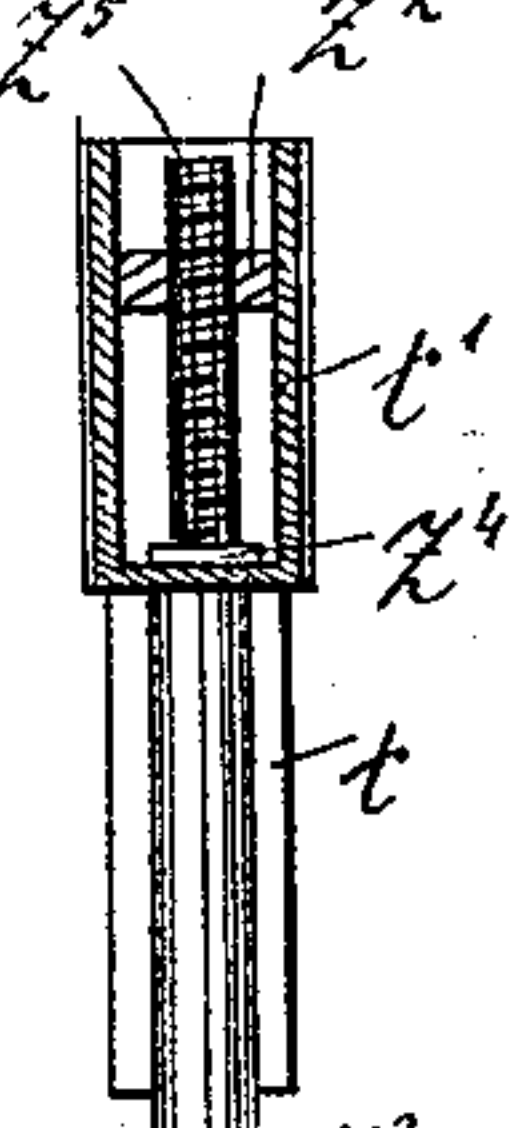
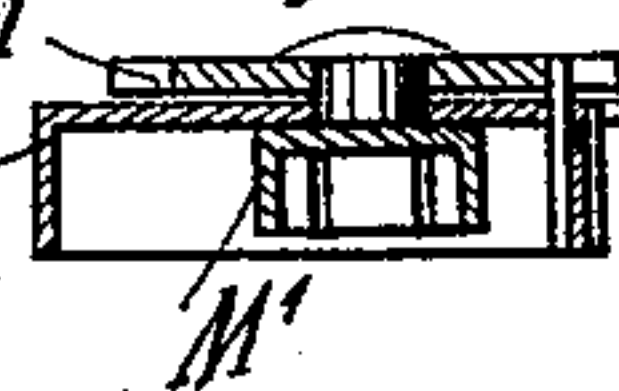


Fig. 12^a



Witnesses:
Max Thömer
Gustav Lehmann

Inventor:
Karel Broucek
by
H. W. Wetherill
Atty

UNITED STATES PATENT OFFICE.

KAREL BROUCEK, OF M. OSTRAVA, AUSTRIA-HUNGARY.

MINER'S SAFETY-LAMP.

SPECIFICATION forming part of Letters Patent No. 557,548, dated April 7, 1896.

Application filed December 7, 1893. Serial No. 493,061. (No model.)

To all whom it may concern:

Be it known that I, KAREL BROUCEK, a subject of the Emperor of Austria-Hungary, and a resident of M. Ostrava, Austria-Hungary, have invented new and useful Improvements in Miners' Safety-Lamps, of which the following is a specification.

The present invention relates to improvements in miners' safety-lamps, the object being to construct a lamp which shall suitably answer all requirements made of it.

The lamp is more especially constructed to burn benzene, being provided with an explosion-lighter; but it can also be constructed or reconstructed to burn petroleum.

In order to make the invention more fully intelligible, reference is to be had to the accompanying drawings, in which like letters and figures are used to denote like parts throughout the several views.

Figure 1 is a vertical section through the middle of the lamp. Fig. 2 is a cross-section on the line X X, Fig. 1. Fig. 2^a is a side view of a lid-catch, the support being shown in cross-section. Fig. 3 is a cross-section on the line Y Y, Fig. 1. Fig. 4 is a cross-section on the line Z Z, Fig. 1. Figs. 5 and 6 are views of the opening-plate in plan and section. Fig. 7 is the frame of the lamp in vertical section. Fig. 8 is a vertical section of the body of the lamp. Fig. 9 is a cross-section of the filling apparatus. Fig. 10 is a vertical section of the filling apparatus. Figs. 11 and 12 are front and side views of the lighting attachment. Fig. 12^a is a cross-section through the wheel-axle of the lighting attachment. Fig. 13 is a side view of the lighting attachment. Figs. 14 and 14^a show the wick-regulating arrangement.

The lamp consists of a frame with wire-mesh mantles 1 and 2, safety-spring *g*, and glass cylinder *G*, and of a reservoir composed of the fount *X* having the side *x*, the top *x'*, and the bottom *B*, the shell *f* containing the fount and the closing-ring *n*.

The lamp consists, further, of a filler, Figs. 8, 9, and 10, and of an opening-plate, Figs. 5 and 6. The frame consists of a lamp-lid *a* with ring *b*, a number of small columns or supports *c*, a middle ring *d*, and lower supports *e*, which are screwed to the cylindrical

lower part *f* of the frame, Fig. 1. The spiral spring *g* is fixed under the middle ring *d*. This spring is shown in an uncompressed condition in Fig. 7.

In the fitted lamp, Fig. 1, the spring is pressed between the middle ring *d* and the wire-mesh ring *a'*. The lower flanges of the wire-mesh mantles 1 and 2 lie between the ring *a'* and the glass cylinder *G*. This latter does not rest directly on the body of the lamp, but on the intermediate flanges of the perforated reflector *W*, Fig. 1, and it is packed at the top and below with caoutchouc rings. The cylindrical base of the frame is made preferably of soft metal, and it is strengthened at the foot and turned conically in its interior. Above this conical part a groove has been turned in the base at *h*, in which the closing-plate catches *i*, Figs. 4 and 8, described below, glide. The fount of the lamp, which contains the combustible material and the explosive lighter, forms a closed vessel, the side *x* of which can be easily pushed into the shell *f* from underneath. This side *x* is a sheet-metal vessel carried by a conical closing-ring *n* placed below it, this ring fitting into the cone of *f* and being made thick toward its top, where it receives a horizontal groove, which appears as a continuation of the groove *h*.

In the horizontal groove of the closing-ring *n* are placed a number—for instance, 5—of equidistant catches *i*, which turn on pivots *u*, the longer arms of which are made to slide into the groove *h*, Fig. 1, when the lamp is mounted, and are held in position by their springs *v*, Fig. 4. These springs are preferably adjusted with one end fastened to the catch. The shorter arm of each catch on the other side of the pivot *u* serves a different purpose and comes with the projection against the wall of ring *n*, Fig. 4. Between these catches *i* oblong holes *o*, also equidistant, are provided in the closing-ring *n*, Figs. 1 and 4. In the fitted lamp these holes are covered by small stoppers *p p'*, which are pressed into it from above by means of helical springs *r*. These helical springs *r* are contained in suitable cases provided with bottoms *p'* and are placed in niches formed by recesses in the fount *X* and closing-ring *n* under the side *x* of

the lamp between the closing-ring n and the fixed strip s . On opening the lamp by the projecting pieces b' , attached to the opening-plate, Figs. 5 and 6, and which pass into the openings o , the elastic casings p' are compressed in order that the catches i can be made to slide out of the groove h by means of the said projecting pieces b' , as will be later described.

As long as the lamp is in the mounted state, Fig. 1, the body cannot be removed from its framing and the lamp cannot be opened. To effect this, special arrangements are necessary, which are described below. In order, however, to still further prevent the possibility of opening, a screw m is fixed in the somewhat enlarged top of the framing at l , which screw fits into a horizontal groove provided in the suitably-extended top y of the top x' , as shown in Fig. 1. The rectangular head of this securing-screw m is in a small hollow and can only be got at by means of a special key, so that any one not in possession of the key cannot unfasten the screw and remove it from the frame. In order to prevent the lamp turning in its bearings in f on being opened, catches $K K'$ are affixed to the top plate f' of shell f , pins K' , under the influence of springs, catching in suitably-shaped holes in the top of the fount. In this top x' is provided a filling-opening F , the wick with its regulating apparatus, Figs. 14 and 14^a, and a rectangular hollow N' , into which the explosive lighter is introduced from above.

The wick can be regulated and lighted even when the lamp is closed by manipulating the two buttons Z' and S' beneath the bottom B , the button Z' being turned and the button S' being pulled to effect the different purposes. Over the top x is placed the sheet-metal cone and reflector W , Figs. 1 and 2, which has an opening W' in the middle sufficiently large for the flame, and is further provided with perforations W^2 round its sides for the admission of air. The opening-plate shown in Figs. 5 and 6 has the purpose of opening the lamp. This latter is placed on the closing-plate between the guides C' and turned somewhat until the feet b' pass into the oblong openings $o o$, Figs. 1 and 4, of the closing-ring n . If pressure is now applied to the lamp-top a , the small feet b move the casings $p p$ outwardly, whereupon by a movement of the lamp toward the left the points of these feet b move the shorter arms of the catches i also somewhat outwardly, in consequence of which the longer arms are pushed out of the groove h toward the interior and the body of the lamp is freed from its connection with the shell.

The lamp can be arranged to burn either benzene or oil with round burner, full burner, or flat burner. The burners differ from those usually employed in that between the wick-tube t and the regulating-tube t' (see Figs. 3, 14, and 14^a) a guide is attached, so as to insure reliable working of the regulator. The

spindle Z passes through a fixed tube Z^3 and is provided at the bottom with a turning-button Z' and above in the tube t with a circular enlargement Z^4 , and is further provided with a screw-thread Z^5 , passing through the nut Z^2 .

The nut Z^2 is guided in the tube t' and is fixed to the wick-tube t . If the button Z' is turned either to the right or the left, the wick-tube and wick move either up or down, so that the wick can be regulated from the exterior by turning the button Z' , Fig. 1.

For benzene-lamps the explosive-lighting apparatus shown in Figs. 11 to 13 is used. A rectangular hollow N' is provided for the same in the fount X , it being inserted into the hollow from above when the lamp is open, while when the lamp is closed it cannot be reached. The apparatus can only light the wick by pulling the button S' . For this purpose a hook is provided at the end of the rod S , passing through the little tube B' , this hook catching the cogged wheel M and which causes said wheel to move one tooth when the button S' is pulled. The length of pull is limited by a pin q , which is let into a slit in tube B' , at the same time preventing the hook from turning. This part of the lighting apparatus is rigidly fixed in the fount-body x , while the casing N , with its cogged wheel M , roller M' , and hammer E , is loose and set from above into the hollow N' , and can be removed when required. The roller and the cogged wheel are both rigidly fixed to one and the same spindle, the cogged wheel M being on the outside and the roller M' being on the inside. The hammer E is elastic, forming a striking-spring which is fixed at its lower end to the casing N , while its head lies with the whole of its striking-surface on a small saddle-shaped anvil A . This spring carries a fixed projection E' , which lies against the extended side of the cog-wheel M , while the remaining part of the hammer-spring does not come in contact with this cog-wheel.

By pulling at the button S' by each movement of a tooth the projection E' is raised and with it the hammer E from the anvil A , the spring striking back on the anvil when the tooth has reached its next position. Between anvil A and hammer E passes the explosive lighting-strip D , this strip being placed on a pin J in the form of a small roll and being led over the anvil A , from whence it winds itself onto the roller M' . This roller is grooved over its whole breadth parallel to the axle. In these grooves the strip to be wound adjusts itself in order to prevent the strip from refusing to act.

The benzene-lamp is preferably filled with a special filling apparatus. In the top X' of the body a plunger T is affixed, which closes the cylindrical opening F from below, while it is pressed against the lower edge of the filling-cylinder F by a helical spring R , which is placed in a slit cylinder R' . The closing plunger or valve T is guided in R' and carries

in the middle a spindle T' projecting upward, by means of which it is pressed down in order to open the filling-opening. As soon as this pressure ceases this opening closes automatically. The filling of the lamp is then effected by the apparatus shown in Figs. 8 and 10, preferably direct from a well-closed receptacle. For this purpose the lamp is placed directly under the filling apparatus in such a manner that the key t^2 fits over the rod or spindle T' . The pressure-handle m' is then taken between two fingers and with the thumb the button m^2 is pressed down. After the lamp has been brought with the opening F' against the projecting piece F' of the filling apparatus until the opening l' reaches the bore s' of Fig. 10, on the cock s^3 being turned the benzene flows into the body of the lamp without coming into contact with the atmosphere. When the lamp is full, the pressure on handle m' is somewhat relaxed, so that its spring s^2 lifts it. Button m^2 remains still under pressure in order that the fluid remaining in the filling apparatus may flow into the open lamp.

When the filling apparatus is not in use, it is for safety's sake closed by turning the plug s^3 .

Having now described my invention, what

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

1. In miners' safety-lamps, the combination of a fount X , of elastic stoppers p p' , located in niches formed by recesses in the fount X and closing-ring n , substantially as and for the purpose herein described with reference to the accompanying drawings.

2. In a miner's safety-lamp the combination with the fount X having a groove h , of an opening-plate provided with projecting feet O' , hooks b' , openings O' , and springs g , substantially as described.

3. In miners' safety-lamps, the combination with the lamp of a filling apparatus, consisting of plunger-valve T' cylinder R' , with helical spring R , of key t^2 fitting over T' , a pressure-handle m' pressure-button m^2 and filling-tube s' with opening l' and means for operating the same, substantially as and for the purpose herein described with reference to the accompanying drawings.

In witness whereof I have signed this specification in presence of two witnesses.

KAREL BROUCEK.

Witnesses:

ADOLPHE FISCHER,
L. VOJACEL.