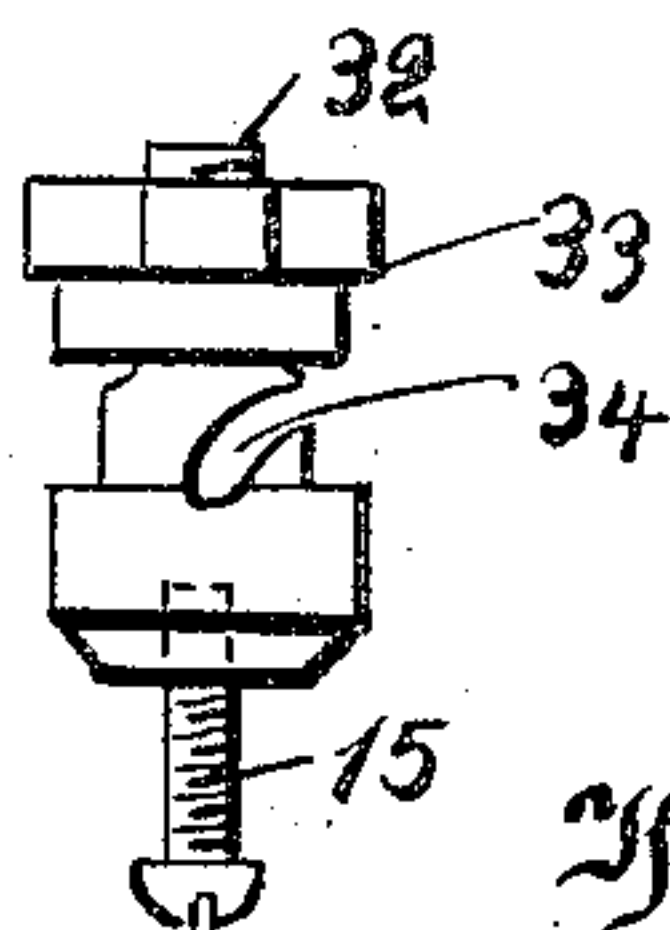
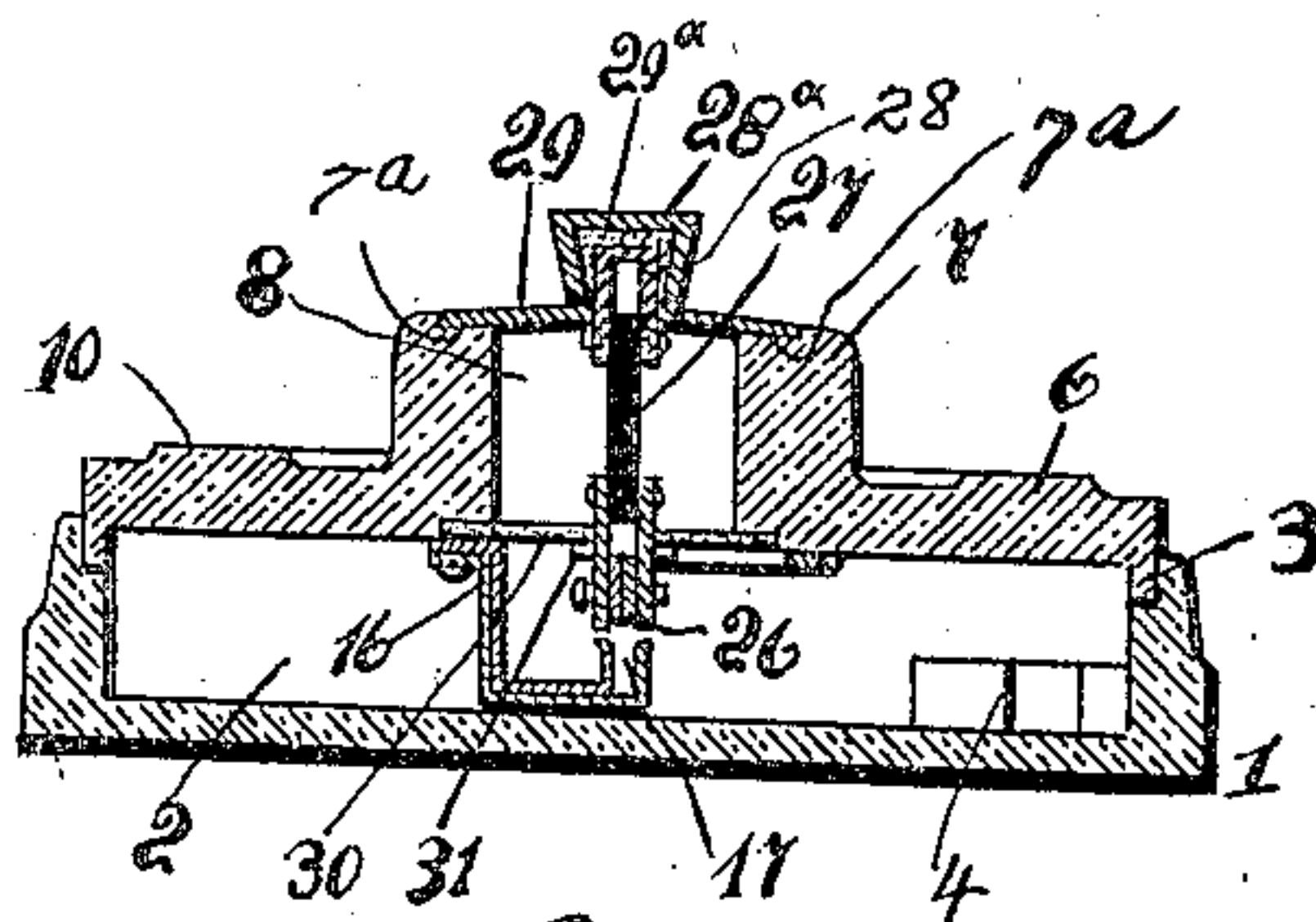
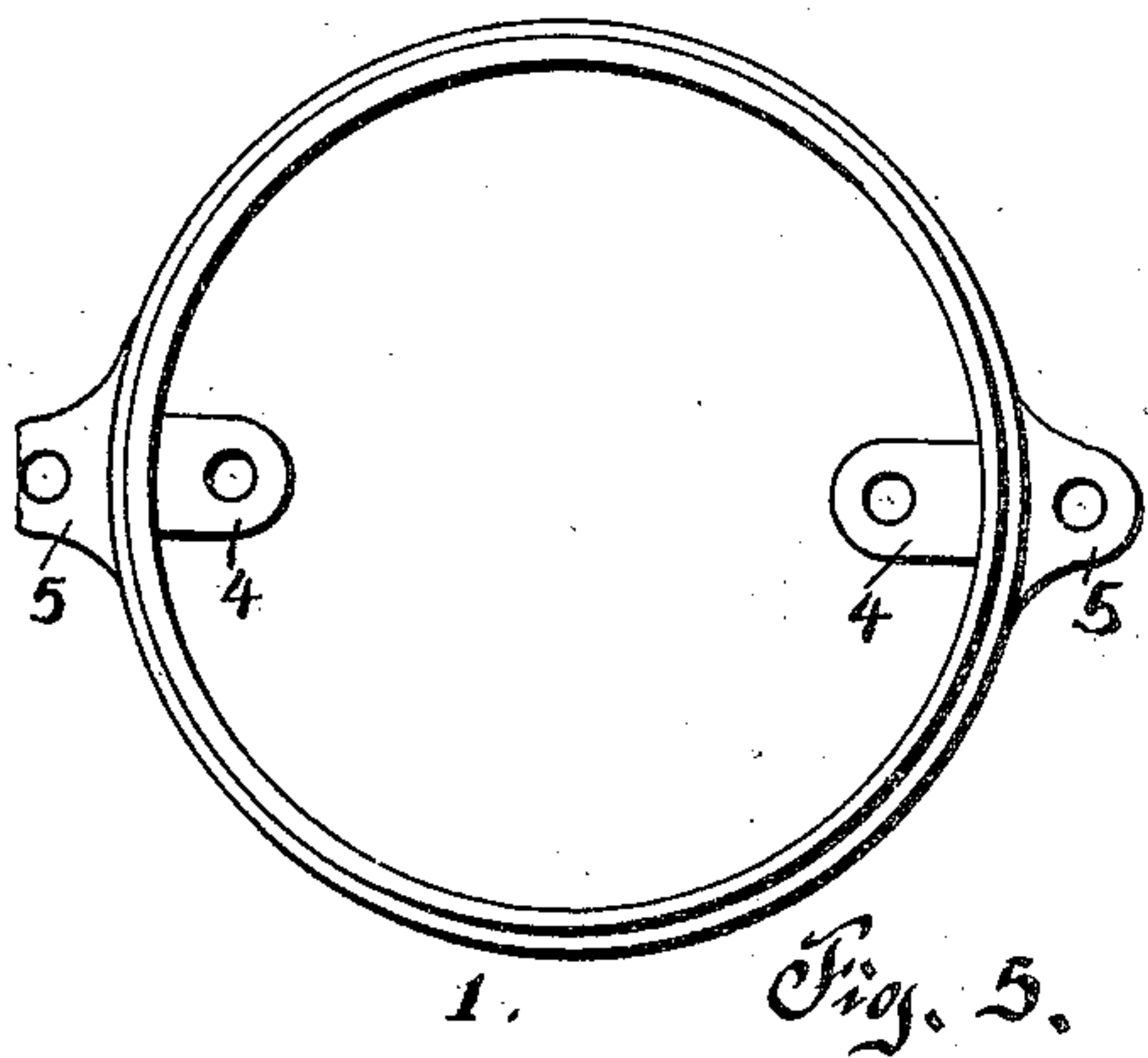
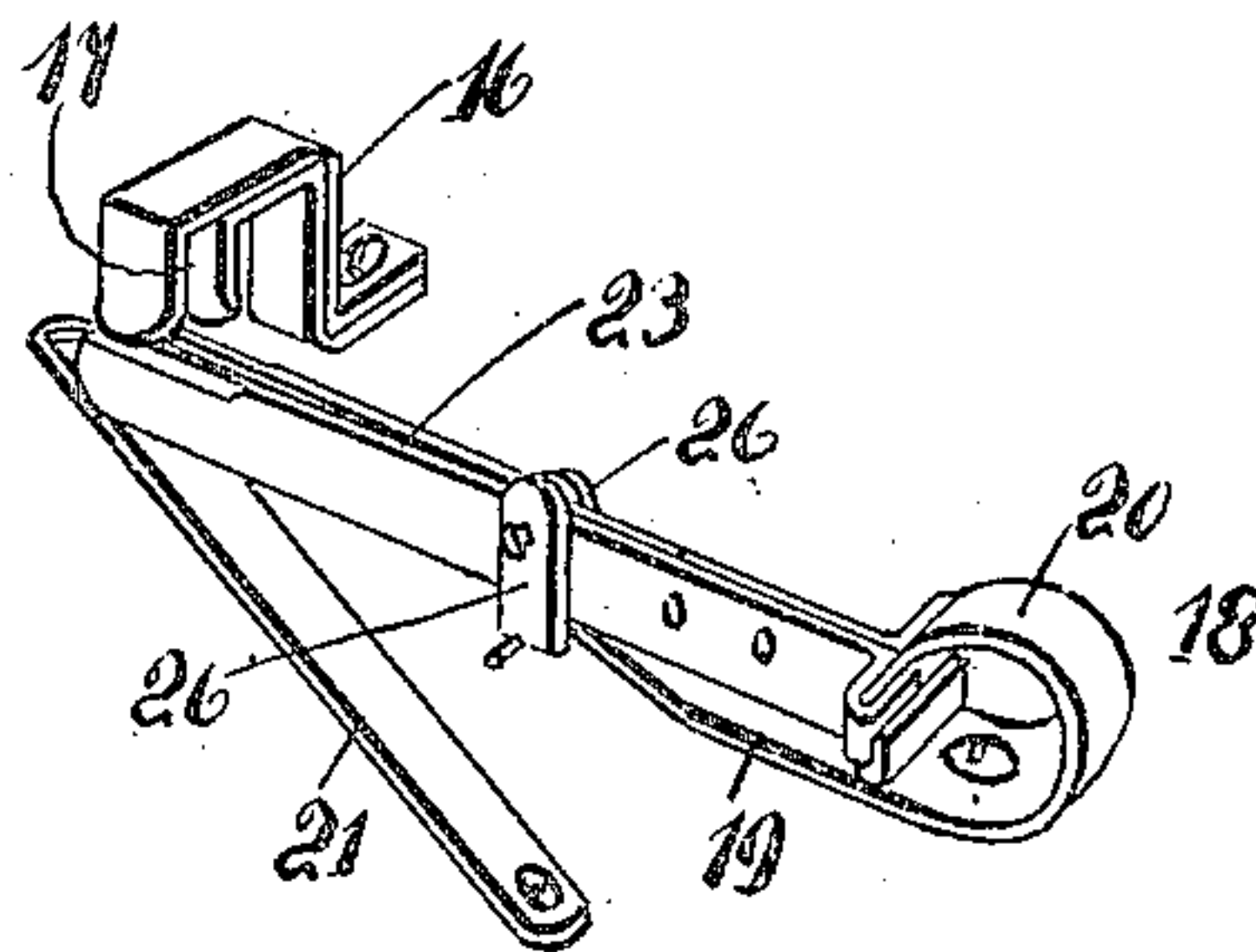
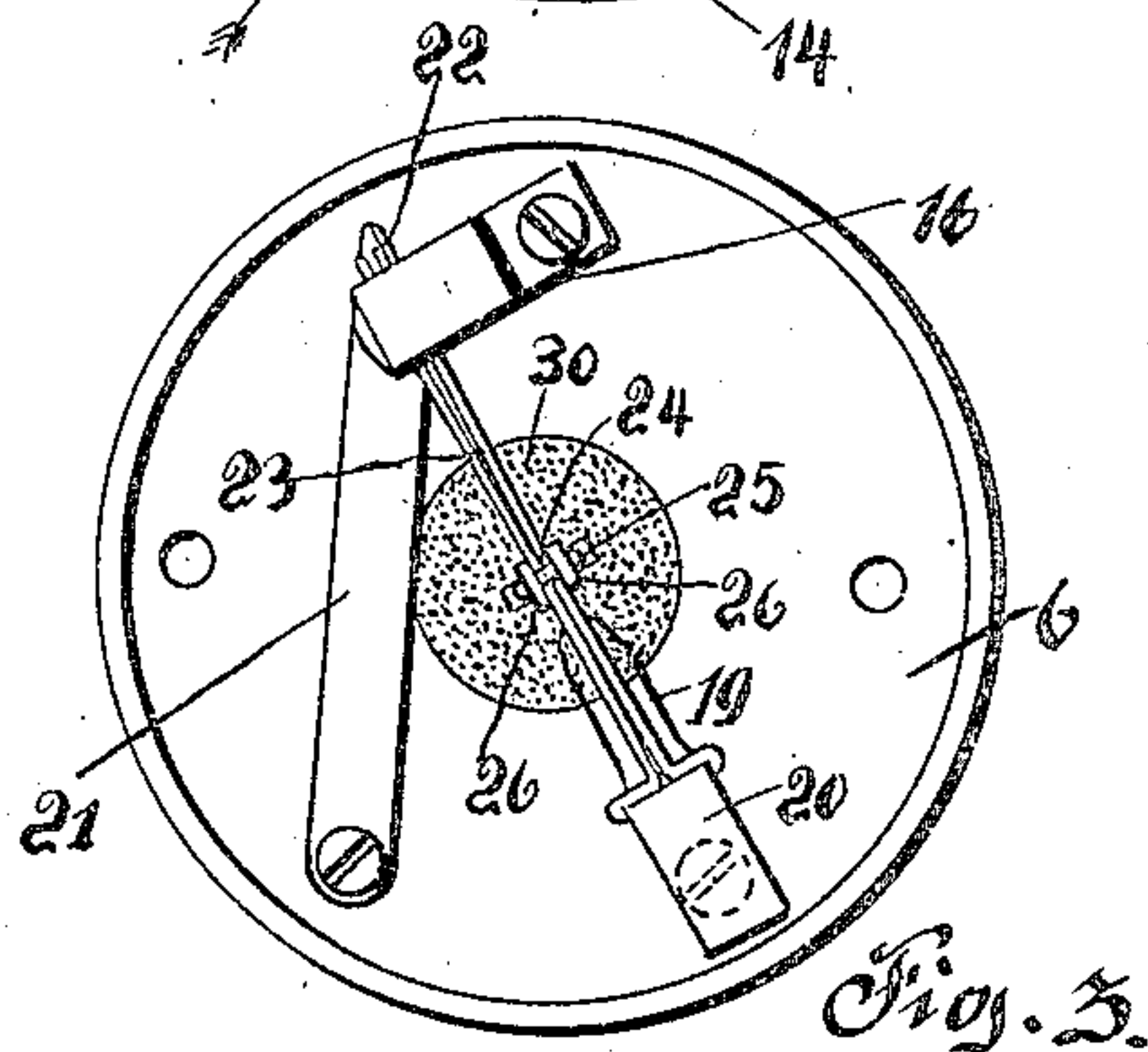
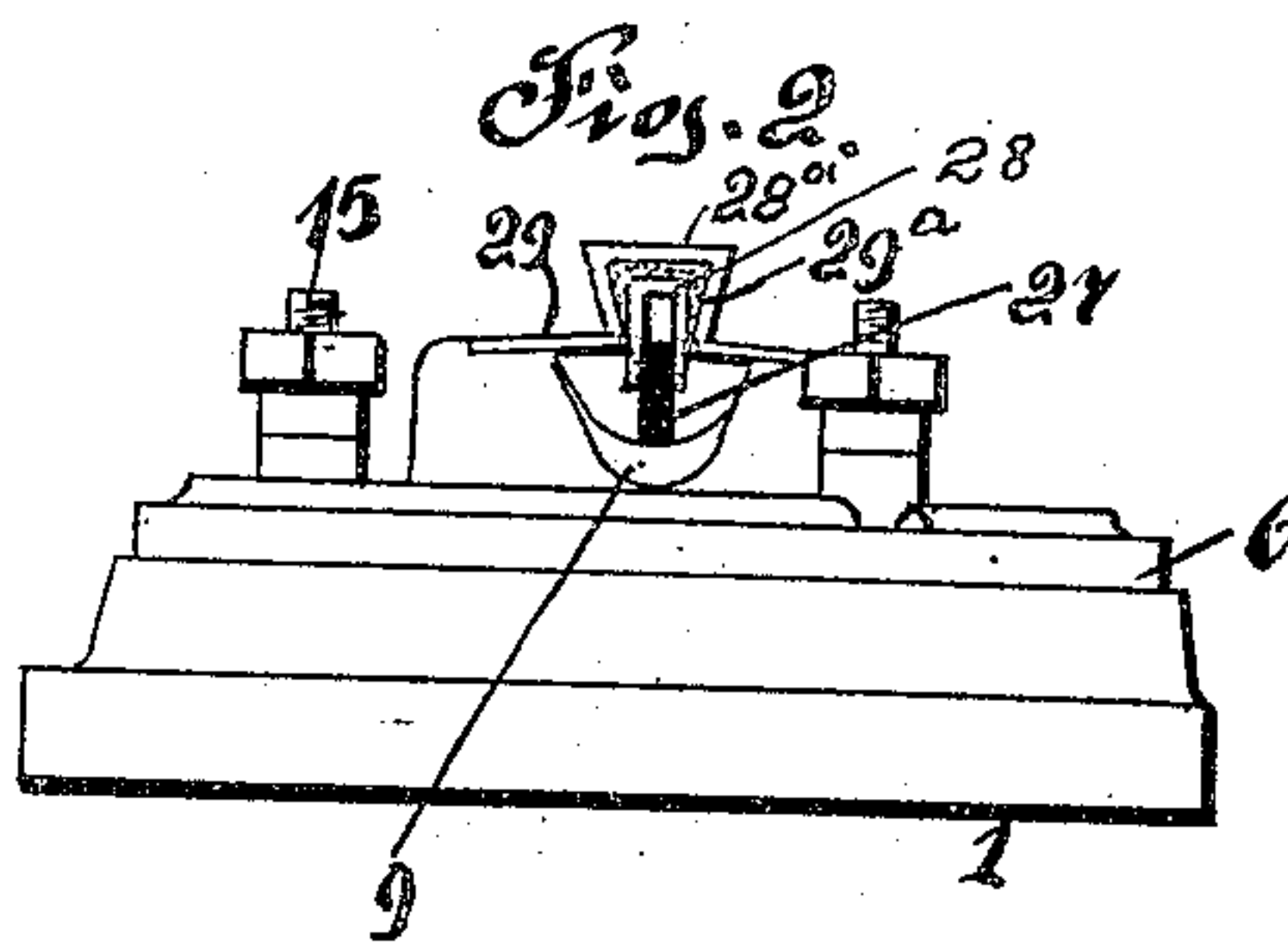
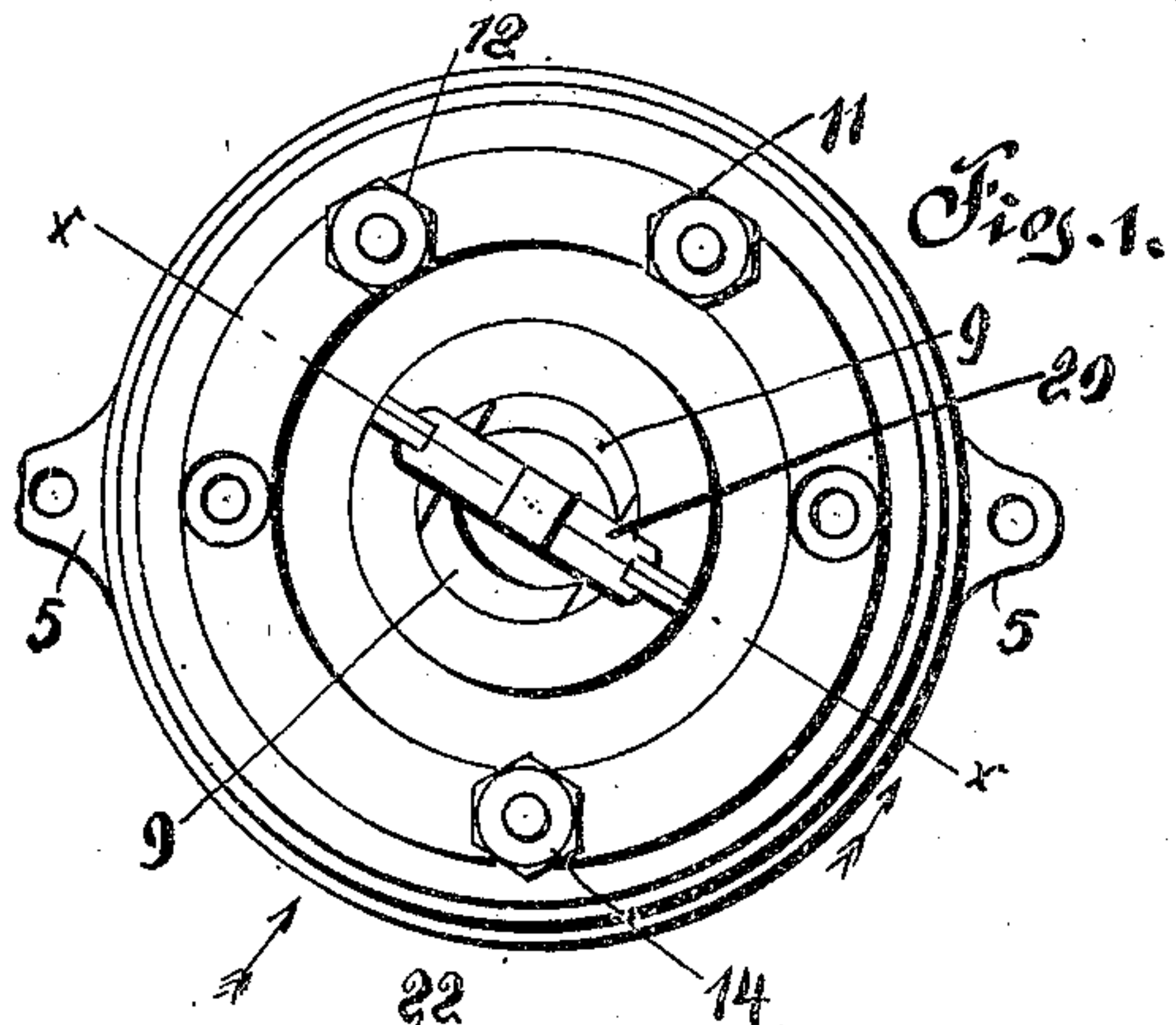


No. 837,898.

PATENTED DEC. 4, 1906.

H. CORTLAND & S. J. HEINRICH.  
THERMOSTAT.

APPLICATION FILED NOV. 21, 1905.



Witnesses.  
E. E. Potter

Wm. Butler

Fig. 7.

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Attorneys.



# UNITED STATES PATENT OFFICE.

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## THERMOSTAT.

No. 837,898.

Specification of Letters Patent.

Patented Dec. 4, 1906.

Application filed November 21, 1905. Serial No. 288,417.

*To all whom it may concern:*

Be it known that we, HARVEY CORTLAND, residing at Pittsburg, and STEPHEN J. HEINRICH, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, citizens of the United States of America, have invented certain new and useful Improvements in Thermostats, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in thermostats; and the invention has for its primary object to provide a thermostat having more sensitive qualities than thermostats heretofore used.

Our invention aims to provide positive and reliable means for effecting the breaking and making of electrical circuits when the temperature of a compartment or room has reached a predetermined number of degrees. In this connection we have devised a thermostat wherein a novel construction is employed which practically divides the thermostat into two parts, one part being adapted to contain a novel form of spring-actuated knife-switch, while the other part retains the sensitive elements adapted to be affected by heat to actuate the knife-switch.

In the construction of our improved thermostat we have devised effectual means for permitting the heat of a compartment to surround and affect the sensitive elements from all sides and have also employed a construction which entirely eliminates the heat from that part of the thermostat containing the spring-actuated knife-switch.

A further novel feature of our invention resides in the form of binding-post which we employ, the posts being so constructed as to firmly retain a wire in position without cracking or breaking the same, considerable trouble heretofore having been experienced in the lock-nuts of binding-posts cutting the wire and eventually causing the same to become detached therefrom. By our improved posts this is entirely eliminated, as the lock-nuts of said posts are constructed to engage the wire in such a manner as to firmly retain it in engagement therewith without injuring the same.

The other novel features of our invention, together with a detail description of the con-

struction, will be presently described in detail, and reference will now be had to the drawings accompanying this application, wherein like numerals of reference designate corresponding parts throughout the several views, in which—

Figure 1 is a top plan view of our improved thermostat. Fig. 2 is a side elevation of the same. Fig. 3 is a bottom plan view of the cap of the thermostat. Fig. 4 is a detail perspective view of the spring-actuated knife-switch and its contact-points. Fig. 5 is a plan of the body portion of the thermostat. Fig. 6 is a cross-sectional view of the thermostat, and Fig. 7 is an enlarged detail side elevation of one of the binding-posts of our improved thermostat.

To put our invention into practice, we construct our improved thermostat of a body portion 1, which is preferably circular in form and provides an annular compartment 2. This body portion is constructed of porcelain or the like material having non-conductive properties. The side walls of the compartment 2 are provided with an annular shoulder 3, also with inwardly-extending pierced lugs 4 4 and outwardly-extending lugs 5 5, the last-named lugs being employed to secure the thermostat to a suitable support, while the lugs 4 4 are employed for locking the cap 6 upon the body portion 1.

Our invention resides particularly in the cap 6 and its appurtenant parts. This cap is also made of porcelain and is annular in form to fit upon the body portion and rest upon the shoulders 3 3. The cap is provided upon its top face with a central enlargement 7, having a vertically-disposed opening 8 formed therein, establishing communication between the receptacle 2 of the body portion 1 and the exterior of the thermostat. The central enlargement 7 is provided with two diametrically-opposed cut-away portions 9 9, these cut-away portions serving for ventilating purposes to admit of air freely circulating within the enlargement 7, the object of which will be presently described.

The top surface of the cap is provided with an annular raised portion 10, and mounted upon this raised portion are binding-posts 11 12 14. The screw-threaded stem 15 of each binding-post extends through the cap, and



the stem of the binding-post 14 upon the bottom face of the cap is provided with two angular metallic contact-arms 16, the loose ends of these arms being slightly separated and flared outwardly, as at 17. The screw-threaded stem 15 of the binding-post 11 supports a compensating spring 18 upon the under face of the cap, this spring being provided with a straight portion 19 and a circular portion 20. The screw-threaded stem 15 of the binding-post 12 is provided with a metallic contact-arm 21 upon the under side of the cap, and this arm extends diagonally across the underneath face of the cap and is bent upwardly, as at 22, to normally engage a two-bladed knife-switch 23, thereby establishing a connection between the binding-posts 11 and 12.

The two-bladed knife-switch is carried by the end of the circular portion 20 of the spring 18, this being clearly shown in Fig. 4 of the drawings. The flat portion 19 of the spring is adapted to bear upwardly against the two-bladed knife-switch, and in this manner a novel and effective form of actuating-spring has been devised for use in connection with thermostats. The lower edges of the blades of the switch are notched, as at 24, and engaging in these notches is a pin 25, carried by two links 26 26. These links extend upwardly into the vertically-disposed opening 8 of the cap and are connected to a piece of mica or the like insulation 27. The mica is in turn connected to a stirrup 28, that is carried by a bridge 29, mounted upon the top of the enlargement 7. Between the stirrup 28 and the bridge 29 is a sensitive fusible material 29<sup>a</sup>, such as soft solder, and this fusible material is adapted to melt or fuse at approximately a temperature of 160°.

In order to prevent the atmosphere surrounding the exterior of the thermostat from affecting the mechanism contained within the compartment 2, we employ a partition 30, which is also made of mica, and the links 26 26 are adapted to extend upwardly through a central opening formed in this partition. To limit the upward movement of the links 26 26, we provide the same with a transversely-disposed pin 31, which normally bears against the under surface of the mica partition 30.

In Fig. 7 of the drawings we have illustrated one of our improved binding-posts, and it will be observed that the outer screw-threaded portion 32 of the post which carries the lock-nut 33 is provided with an angular-disposed transversely-arranged groove 34, and in this groove is adapted to seat a wire which is to be connected to the binding-post. When the lock-nut 33 is forced into engagement with the wire, a double lock is formed which prevents the wire from moving otherwise than longitudinally, and pressure will be brought to bear upon the wire at such

points as to prevent it from cracking or breaking, and it is by the combination of these small features of our improved thermostat that we secure a positive coöperation of each part which will insure a perfect operation of the thermostat at the proper time.

In operation should the temperature of a compartment or room in which the thermostat is mounted reach 160°, or that number of degrees adapted to affect the fusible material used in connection with thermostats, the material will melt and release the piece of mica 27. The actuating-spring 18 will immediately withdraw the two-bladed knife-switch 23 from engagement with the contact-arm 21 and will establish a connection between the contact-arm 16 and the blades of the knife. By employing the double contact-arm 16 and the double blades of the knife-switch we are assured of a positive contact being formed between these two elements, thereby establishing an electrical circuit when the thermostat is employed in connection with a suitable source of electrical energy. The practical usefulness of our improved thermostat is greatly increased by making the compartment in which the switch is mounted substantially air-tight and by insuring a perfect circulation of air around the sensitive or fusible material. In a great many thermostats the fusible material is shielded in such a manner that the temperature of a compartment can rise to quite a number of degrees above the melting-point of the fusible material without affecting the same, owing to the fact that the atmosphere cannot properly act upon the fusible material. In our improved construction perfect ventilation of the fusible material is established and a positive operation of the thermostat insured.

We desire to call particular attention to the construction of the bridge 29. By referring to Figs. 2 and 6 of the drawings it will be observed that the bridge is formed with a raised rectangular portion 28<sup>a</sup> and that the top edges of the enlargement 7 are provided with two diametrically-opposed recesses 7<sup>a</sup> 7<sup>a</sup>, these recesses being adapted to receive the ends of the bridge. The bridge is constructed whereby when it is placed in position the central portion of the bridge will be elevated above the ends of the bridge, and when in such a position the rectangular portion 28<sup>a</sup> of the bridge conforms substantially to a wedge-shaped slot, and it is in this slot that the stirrup is secured by solder 29<sup>a</sup>. The stirrups which have heretofore been used in connection with thermostats are generally constructed of bronze containing bismuth, and considerable trouble has been experienced by the stirrups crystallizing and eventually releasing the thermostat, which causes a false alarm. In our device the stirrup is held within the portion 28<sup>a</sup> of the body



29 until the solder or fusible material is melted, and we have found in actual practice that this manner of holding the stirrup until the fusible material has melted has effectually obviated the many false alarms heretofore caused by insecure holding of the stirrup.

It is thought from the foregoing that the construction, operation, and advantages of the herein-described thermostat will be apparent without further description, and various changes in the form, proportion, and minor details of construction may be resorted to without departing from the spirit of the invention or sacrificing any of the advantages thereof.

What we claim, and desire to secure by Letters Patent, is—

1. In a thermostat, the combination with a body portion having an annular compartment formed therein, of a cap adapted to fit upon said body portion, said cap having a vertically-disposed opening formed therein, a partition mounted in said opening, a bridge mounted across said opening, an actuating-spring mounted upon the bottom of said cap, and carrying a bladed switch, a stirrup detachably held in said bridge and connected with said switch, binding-posts carried by said cap, an angular contact-arm carried by one of said posts, a contact-arm carried by the other of said posts, and engaging said switch, means to temporarily hold said stirrups in engagement with said bridge, and means to secure said cap to said body portion, substantially as described.

2. In a thermostat, the combination with a body portion having a compartment formed therein, of a cap carried by said body portion, an enlargement carried by the top of said cap, said enlargement having an opening formed therein, a bridge mounted over

said opening, a spring-actuated bladed switch carried by said cap, a stirrup engaging said bridge, and connected with said switch, binding-posts carried by said cap, an angular contact-arm carried by one of said posts, and engaging said switch, a contact-arm on the other of said posts, and means to temporarily hold said stirrup in engagement with said bridge, substantially as described.

3. In a thermostat, the combination with a body portion having a compartment formed therein, of a cap mounted upon said body portion, said cap having an opening formed therein, a bridge mounted over said opening, a two-bladed switch mounted upon said cap and detachably held by said bridge, contact-arms carried by said cap, one of said arms engaging said switch, means to move said switch in engagement with the other of said arms when released by said bridge, and means to detachably hold said switch in engagement with said bridge, substantially as described.

4. In a thermostat, the combination with a body portion having a compartment formed therein, a cap carried by said body portion, contact-arms carried by said cap, a switch carried by said cap, and engaging one of said contact-arms, means mounted upon the outer side of said cap to temporarily hold said switch in engagement with said arm, and means to move said switch in engagement with the other of said arms, when released, substantially as described.

In testimony whereof we affix our signatures in the presence of two witnesses.

HARVEY CORTLAND.  
STEPHEN J. HEINRICH.

Witnesses:

C. KLOSTERMANN,  
E. E. POTTER.