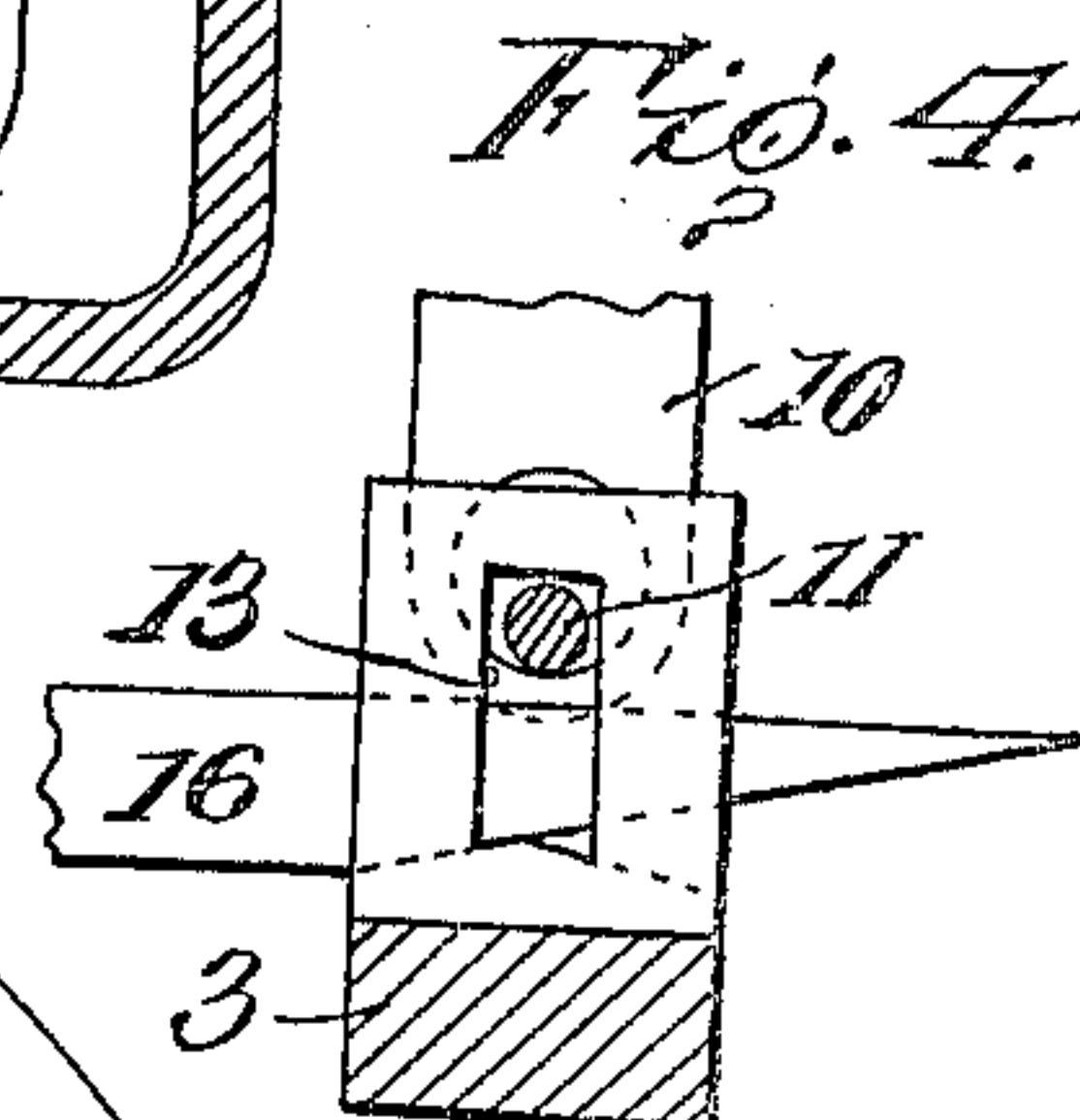
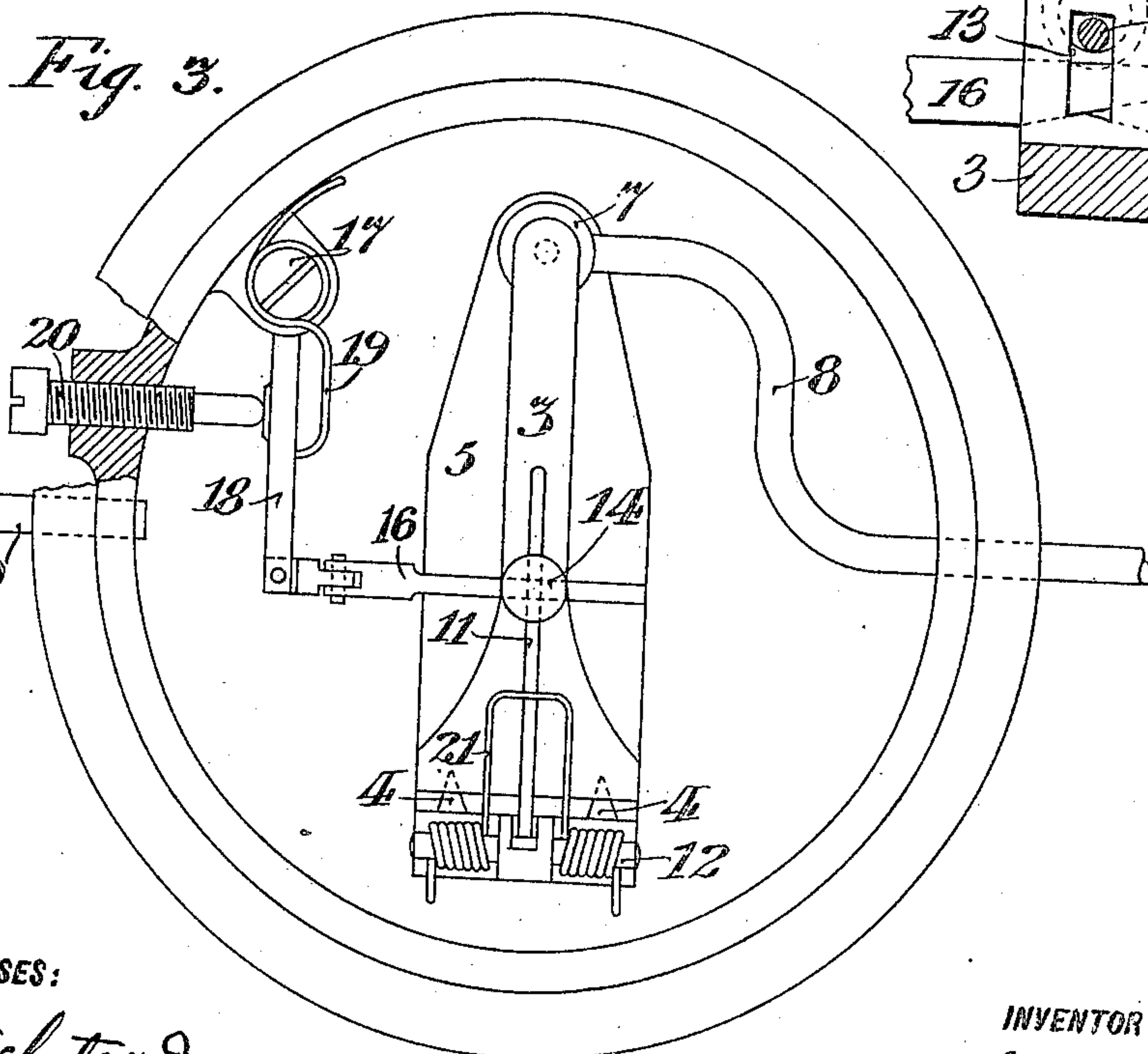
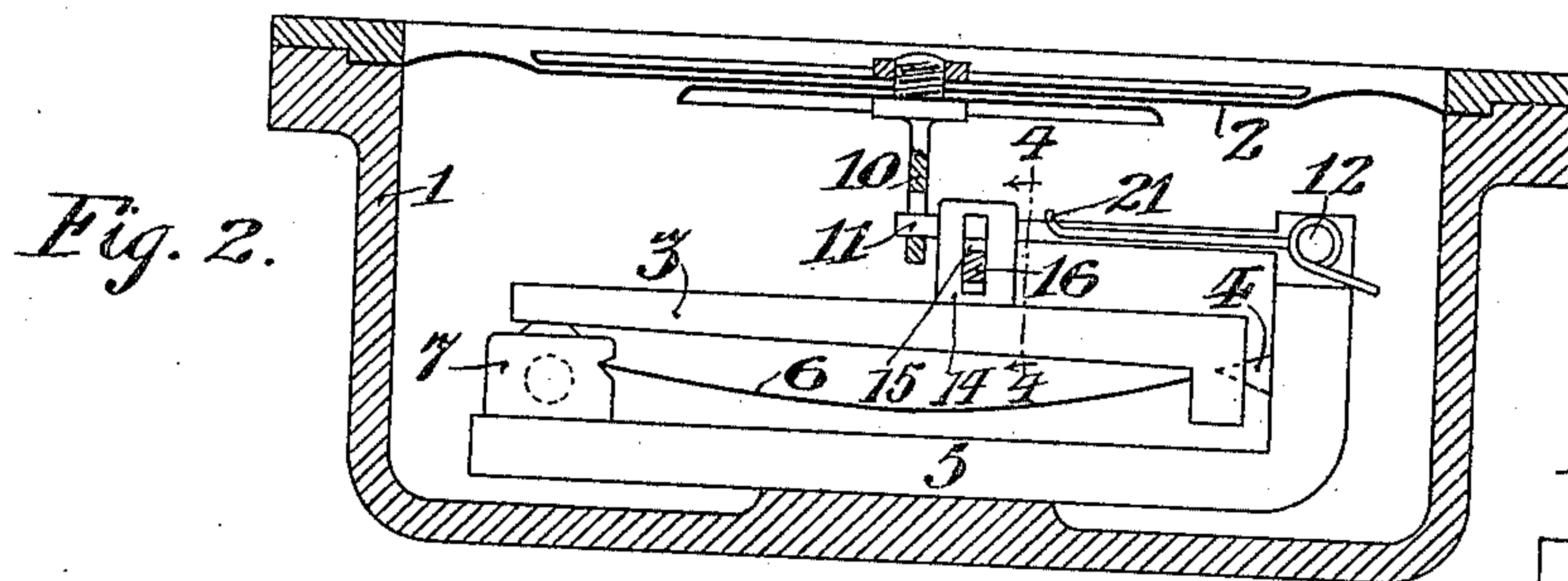
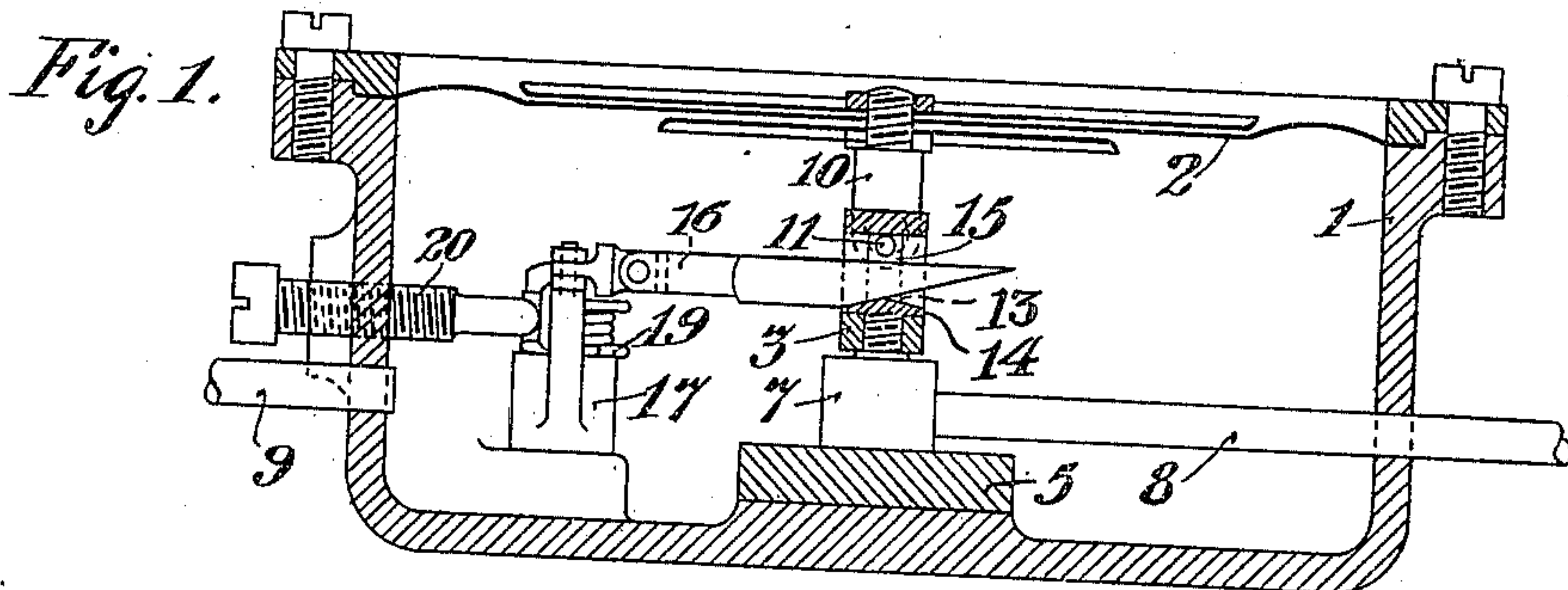


952,421.

G. DALÉN.  
LIGHT SIGNAL APPARATUS.  
APPLICATION FILED JAN. 4, 1910.

Patented Mar. 15, 1910.



WITNESSES:

Daniel Webster, Jr.  
Carrie E. Kleinfelder.

INVENTOR

Gustaf Dalén  
BY  
Cyrus N. Anderson  
ATTORNEY.



# UNITED STATES PATENT OFFICE.

GUSTAF DALÉN, OF STOCKHOLM, SWEDEN.

## LIGHT-SIGNAL APPARATUS.

952,421.

Specification of Letters Patent. Patented Mar. 15, 1910.

Application filed January 4, 1910. Serial No. 536,317.

*To all whom it may concern:*

Be it known that I, GUSTAF DALÉN, a subject of the King of Sweden, residing in Stockholm, Sweden, have invented certain new and useful Improvements in Light-Signal Apparatus, of which the following is a specification.

The present invention relates to light signal apparatus for light buoys and similar apparatus of the kind in which a valve controlling the gas supply to a burner, provided with a pilot flame, is opened and closed at certain intervals under the influence of the gas pressure in a casing or chamber closed by a diaphragm which diaphragm is connected with said valve.

The invention consists in means for providing an adjustable play or lost motion action in the lever connection between the diaphragm and the valve so that said diaphragm may be made to move a certain distance upward before causing the opening of the valve and may also be caused to move a certain distance in the opposite direction before closing the said valve. By adjusting the parts so as to vary the said play or lost motion movement, the light and dark periods of the flashes may be varied.

In order that the invention may be more readily and fully understood, reference may be had to the drawings in which:—

Figures 1 and 2 illustrate vertical sections of the light signal apparatus at right angles to each other; Fig. 3 is a plan view of the interior of said apparatus, a portion of the casing being in section; and Fig. 4 is a section on the line 4—4 of Fig. 2.

Referring to the drawings:—1 designates the casing closed by the diaphragm 2. A valve plate 3 is mounted to rock on edges or points 4 provided on a support 5. The said valve plate is pressed toward the said edges or points by a spring 6. The valve plate 3 is placed above a valve seat 7 in which opens a conduit 8 leading to a burner provided with a pilot flame (the said burner and pilot flame not being shown on the drawings). Gas is supplied to the casing through the conduit 9. The valve body or seat 7 is made of soft iron and constitutes one pole of a permanent magnet 5 to which it is fixed, whereby the said valve plate 3 may be quickly or suddenly opened and closed.

The diaphragm 2 is connected with the valve plate 3 by a lever connection consisting of an eye 10 fixed to the diaphragm

and receiving a bar 11 pivoted on the pivot rod 12 on the support 5 and actuated by the spring 21. The bar 11 passes through an opening 13 in the block 14 which is secured to the valve plate 3. Another opening 15 is arranged in the block 14 at right angles to the opening 13 and through the said opening 15 a wedge or take up block 16 passes, which wedge is jointed to an arm 18 which is pivoted on a stud 17 and is pressed toward a set screw 20 by a spring 19 which is twisted or coiled about the stud 17.

The operation of the apparatus is as follows:—When the valve 3 is closed the diaphragm 2 rises, owing to the augmented gas pressure in the casing 1, carrying with it the eye 10 and the bar 11 which is moved upward against the action of the spring 21. The wedge 16 is arranged so as to provide a space between its upper side or surface and the upper edge of the opening 15. When the valve plate 3 is first closed after having been opened for a period and the diaphragm 2 has moved to its lowermost position, the bar 11 under the influence of the spring 21 is carried into and held in contact with the upper edge of the wedge 16. It will be understood, therefore, that when the bar is raised by the action of the diaphragm it passes through a short distance before it strikes the upper edges of the openings 13 and 15.

In the drawings the diaphragm 2 is illustrated as being in a partially raised position, having been moved upwardly a sufficient distance to carry the bar 11 into contact with the upper edges of the openings 13 and 15. The space between the lower edge of the said bar 11 and the upper edge of the wedge 16 indicates the amount of play or lost motion of the bar and consequently of the diaphragm 2. Further upward movement of the diaphragm 2 from the position shown in the drawings will cause the actuation of the valve plate 3. The valve plate 3 thus remains closed during the passage of the bar 11 through the said play as described. The parts being in the position shown particularly in Figs. 1 and 2 of the drawings, the valve plate 3 is actuated to open the valve opening in the valve body 7 as soon as the gas pressure on the diaphragm 2 overcomes the magnetic attraction between the said valve plate 3 and the valve seat or body 7 and gas escapes through the conduit 8 to the burner which is lighted by



the continually burning pilot or lighting flame.

When the valve 3 has been opened and the pressure in the casing 1 begins to sink owing to the escape of gas through the conduit 8, the diaphragm 2 descends under the influence of the spring 21. In its downward movement the bar 11 again passes through the space or play between the upper edges of the notches 13 and 15 and the upper edge or side of the wedge 16 before it comes into contact with the said wedge. When the magnetic attraction of the valve seat or body 7 on the valve plate 3 overcomes the gas pressure on the diaphragm 2, the valve plate 3 is closed and the burner flame is extinguished.

By moving the wedge 16 in and out in the opening 15 by means of the set screw 20 which is accessible from the outside of the casing of the apparatus, the said play or lost motion of the bar 11 in the opening 13 is decreased or increased and thereby the time during which the valve plate 3 is maintained opened and closed may be varied. The light and the dark periods of the flashes may thus be varied.

Having thus described my invention, what I claim is:—

1. In light signal apparatus, a casing having an expansible diaphragm, gas supply and delivery pipes, a valve inclosed in the casing and controlling the passage of the gas through the delivery pipe, a lever connection between the diaphragm and the valve, and means mounted on a stationary part of the casing, movable with the said connection and movable independently thereof for establishing a play or lost motion in said lever connection.

2. In light signal apparatus, a casing having an expansible diaphragm, gas supply and delivery pipes, a valve inclosed in the casing and controlling the passage of the gas through the delivery pipe, a lever connection between the diaphragm and the valve, and an adjustable take up block for establishing an adjustable play or lost motion in said lever connection.

3. In light signal apparatus, a casing having an expansible diaphragm, gas supply and delivery pipes, a valve inclosed in the casing and controlling the passage of the gas through the delivery pipe, a lever con-

nection between the diaphragm and the valve, and means operated from the outside of the casing, for establishing an adjustable play or lost motion in said lever connection.

4. In light signal apparatus, a casing having an expansible diaphragm, gas supply and delivery pipes, a valve inclosed in the casing and controlling the passage of the gas through the delivery pipe, a block on the valve, a wedge entering an opening in said block, and a spring actuated bar connected with the diaphragm, the said bar entering said opening and contacting with the wedge.

5. In light signal apparatus, a casing having an expansible diaphragm, gas supply and delivery pipes, a valve inclosed in the casing and controlling the passage of the gas through the delivery pipe, a block fixed to the valve, a wedge adjustable in a notch in said block from the outside of the casing, and a spring actuated bar connected with the diaphragm, the said bar entering said notch and contacting with the wedge.

6. In light signal apparatus, in combination, a casing having an expansible diaphragm, gas supply and delivery pipes, a valve inclosed in the casing controlling the passage of the gas through the delivery pipe, operable connections between the diaphragm and the valve, a take up block universally mounted in said casing and forming a part of said connections, and means for adjusting said block.

7. In light signal apparatus, in combination, a casing having an expansible diaphragm, gas supply and delivery pipes, a valve controlling the passage of the gas through the delivery pipe, operative connections between the diaphragm and valve, a take up block support vertically pivoted in said casing, a take up block horizontally pivoted to the said support to move vertically with the said connections, and means for adjusting the position of said support and block.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

GUSTAF DALÉN.

Witnesses:

WALDEMAR BOMAN,  
A. SÖDERSTRÖM.