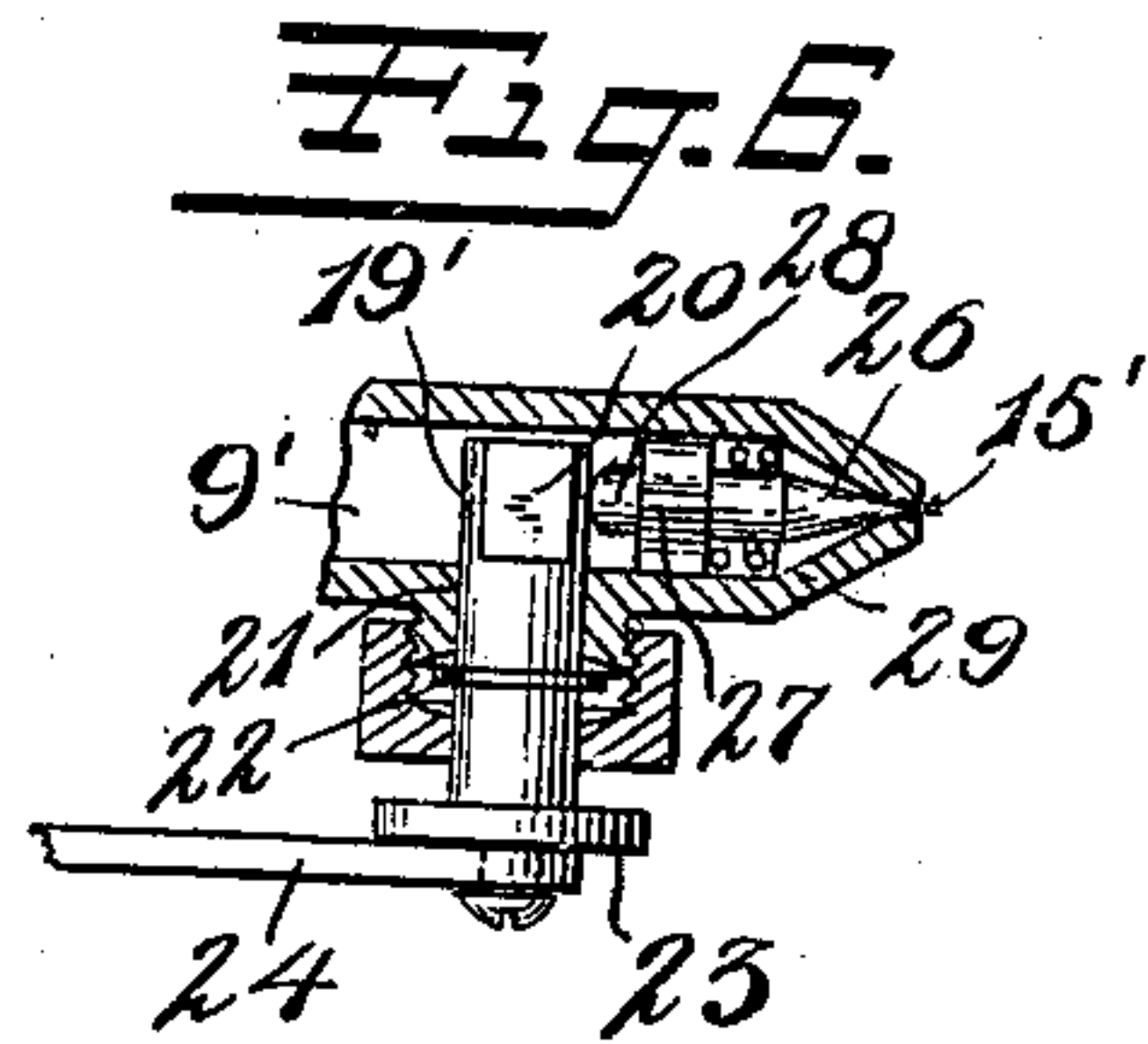
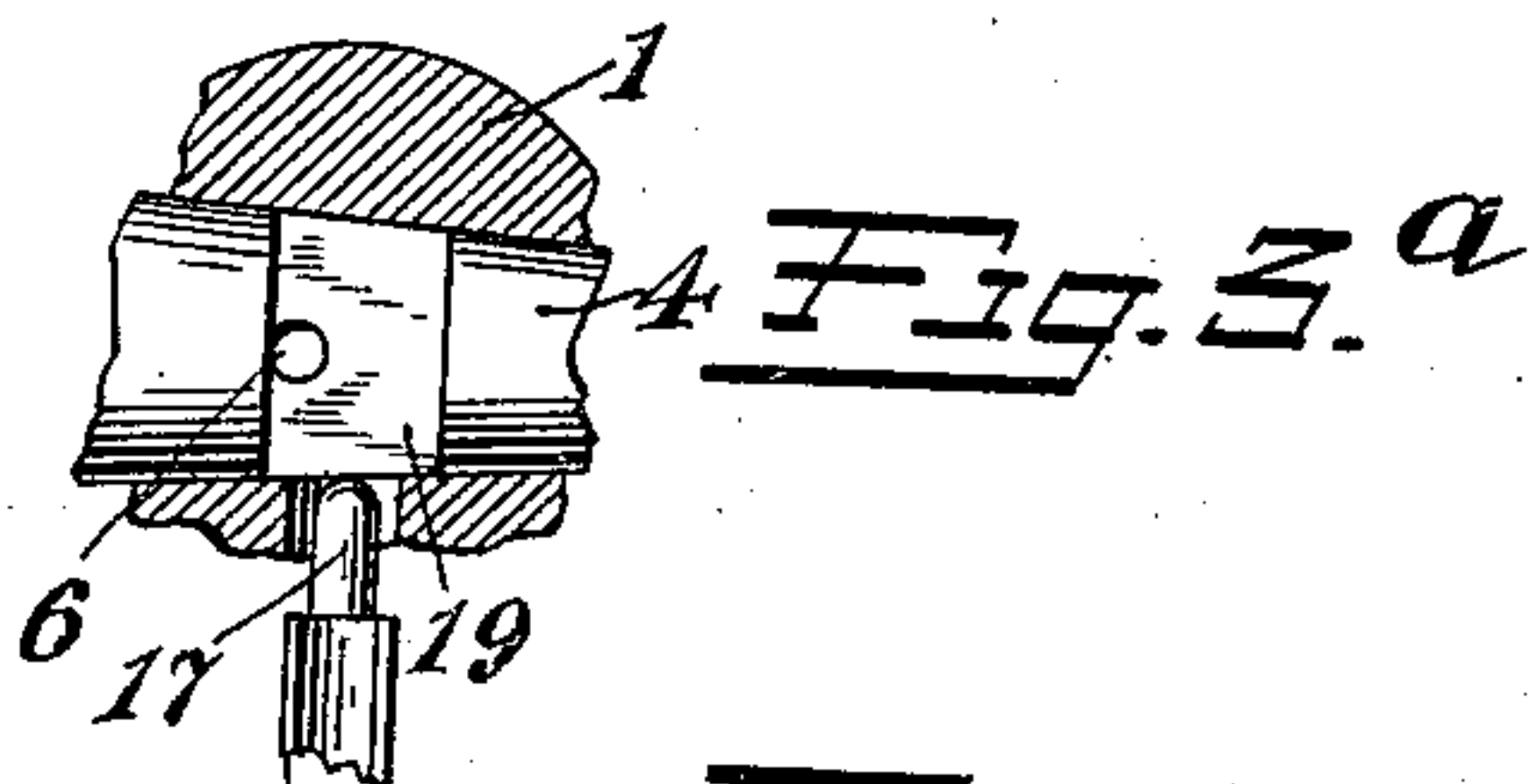
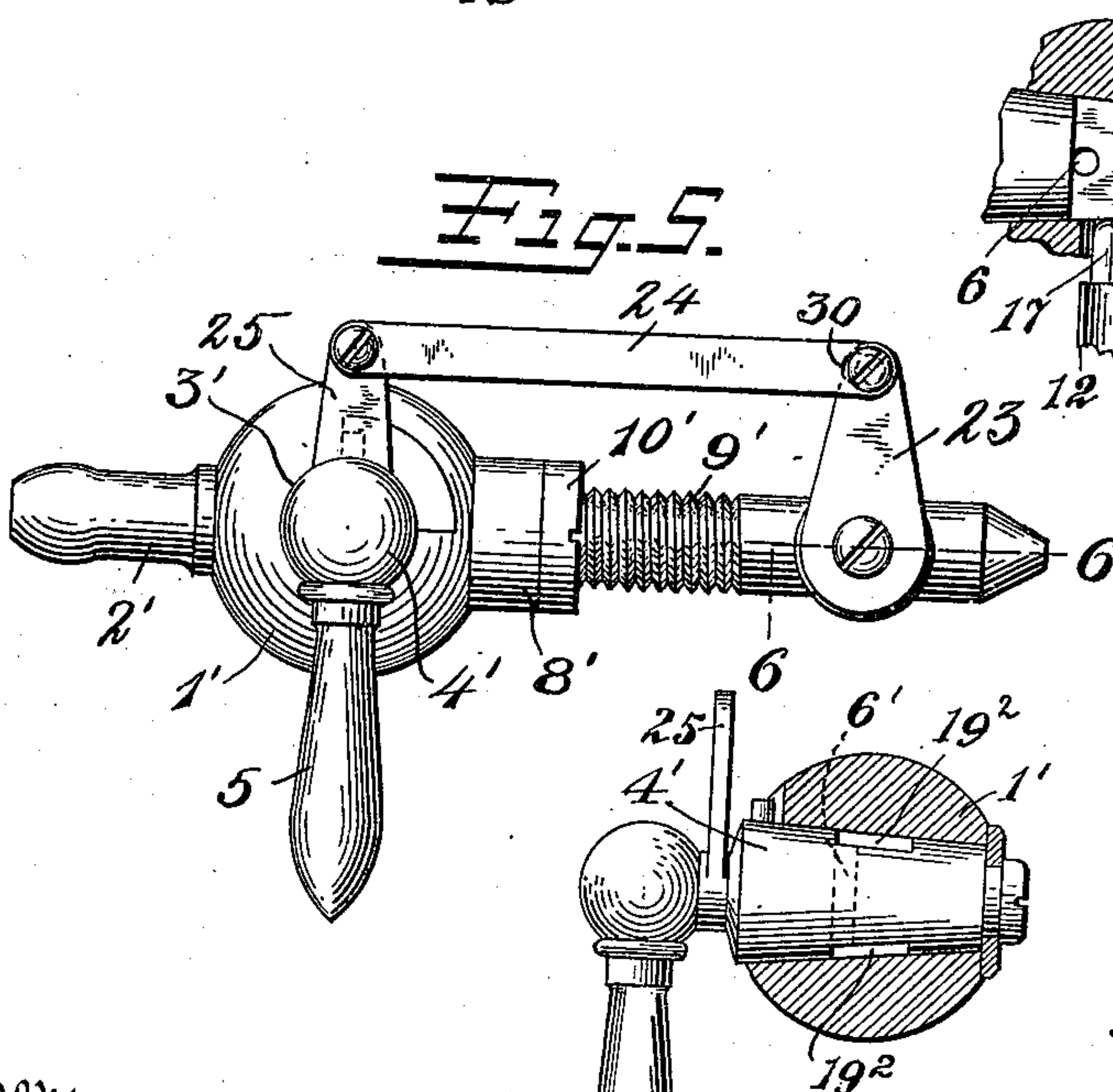
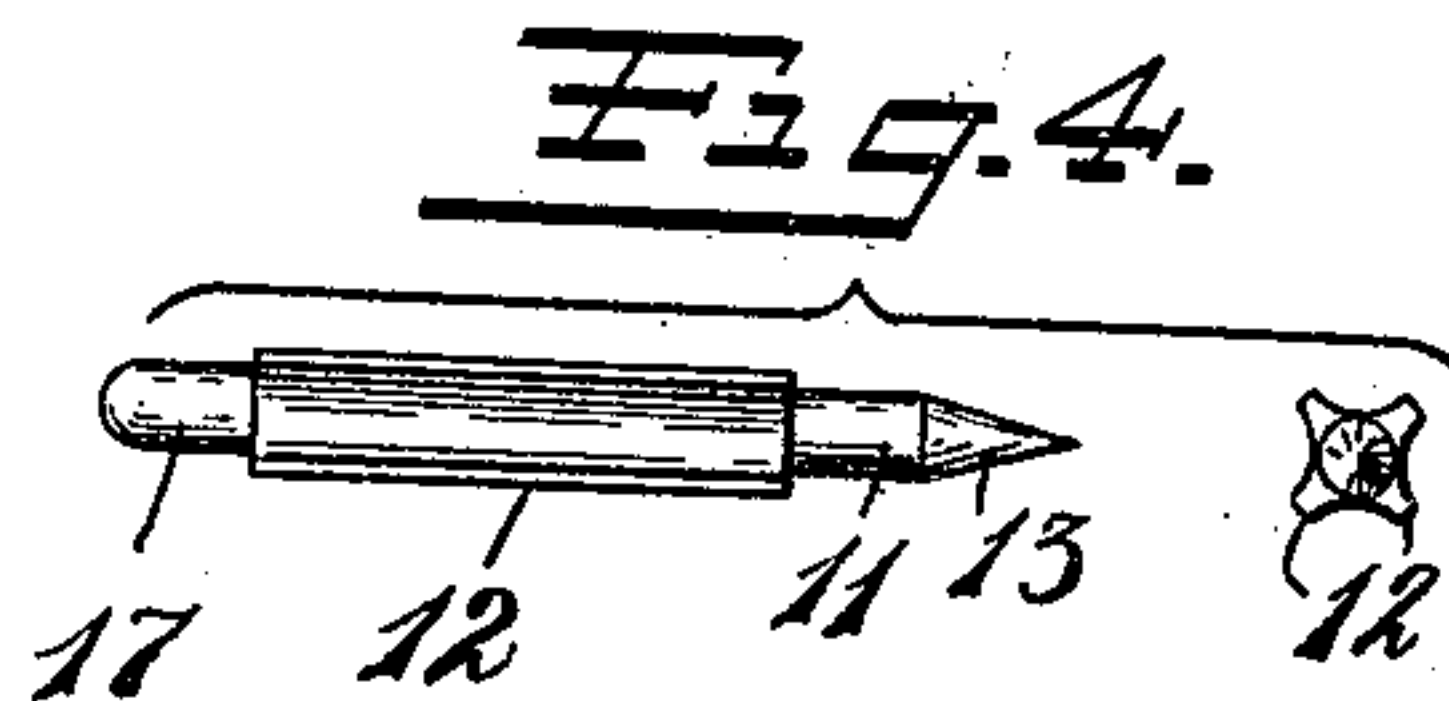
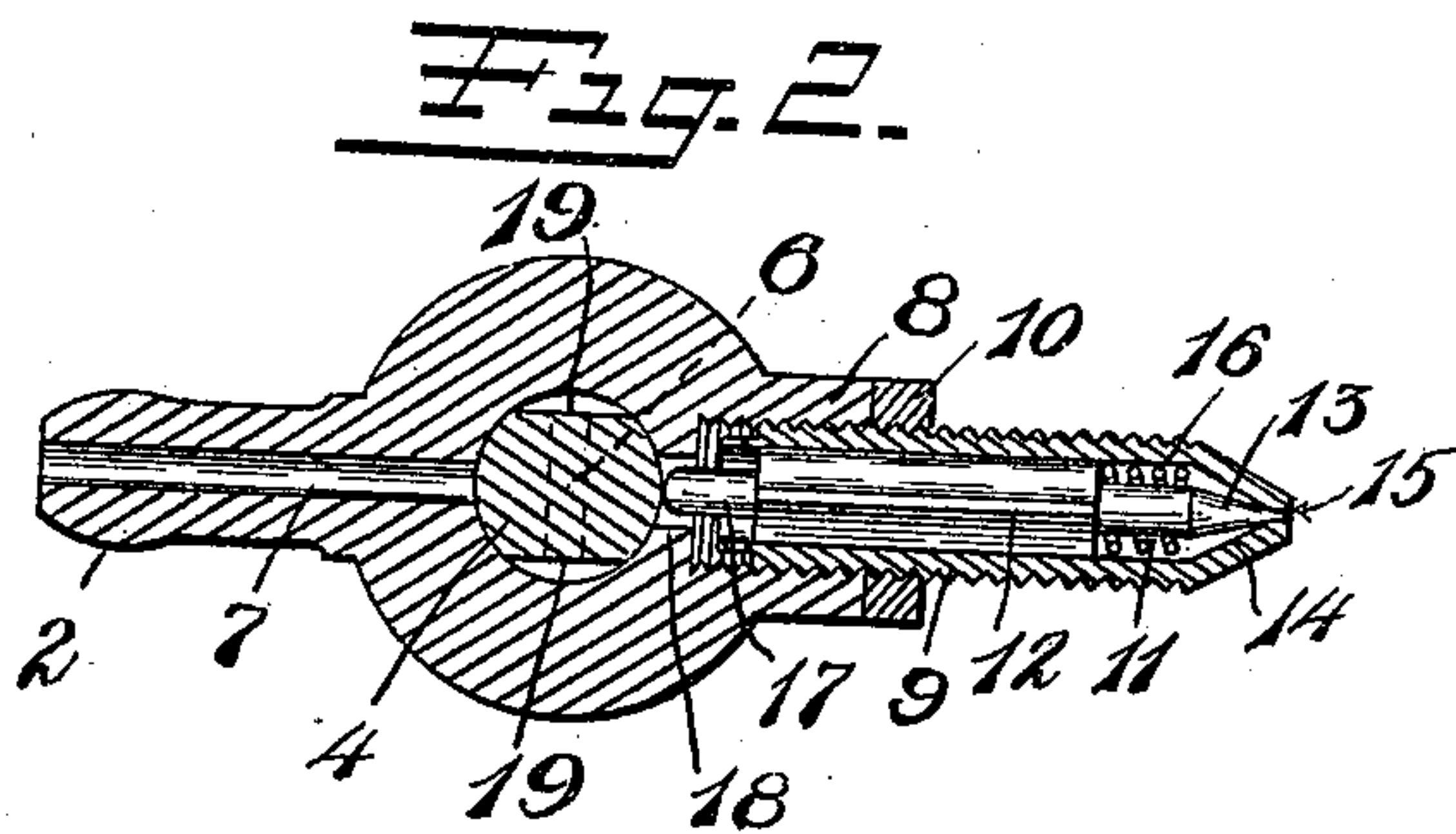
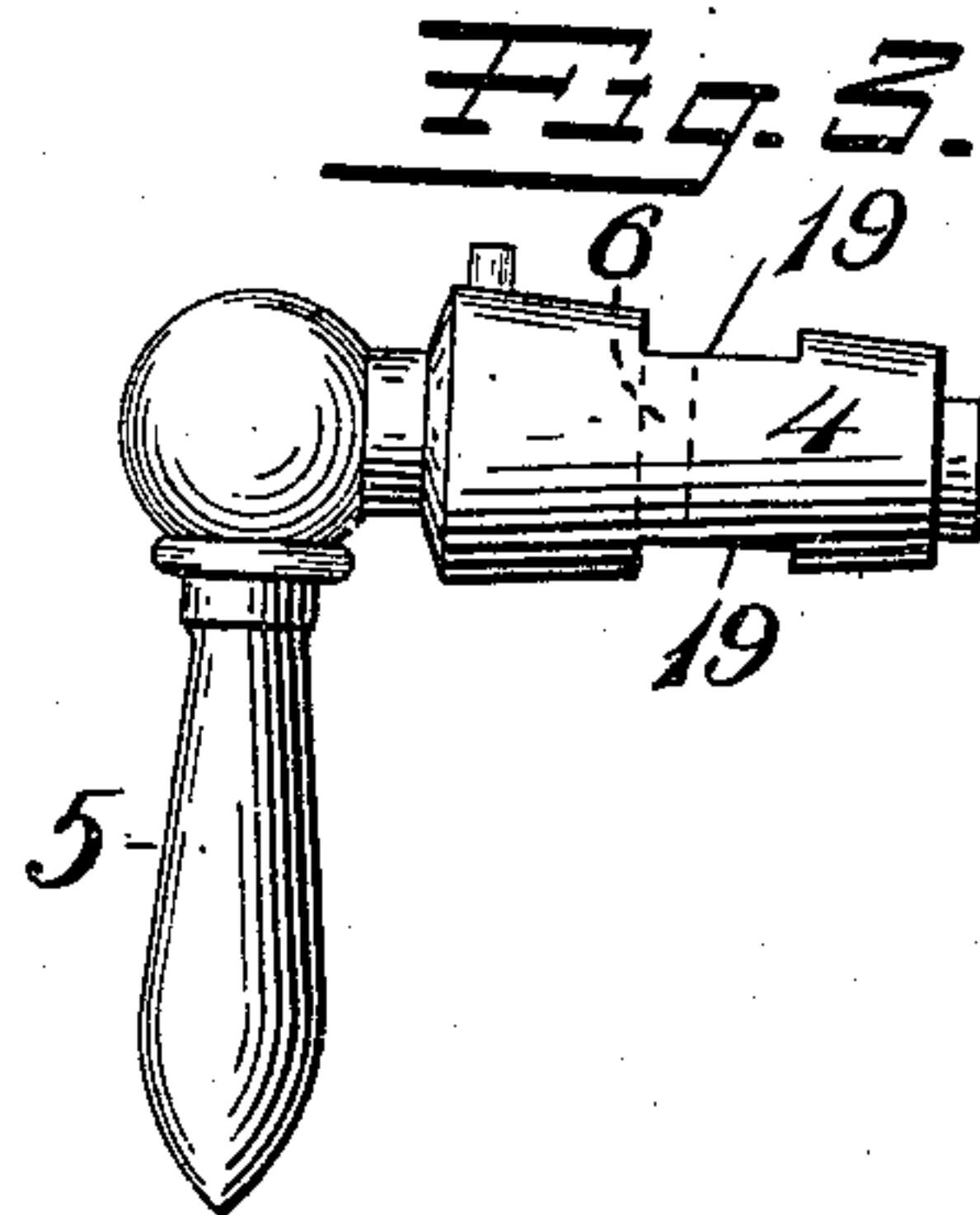
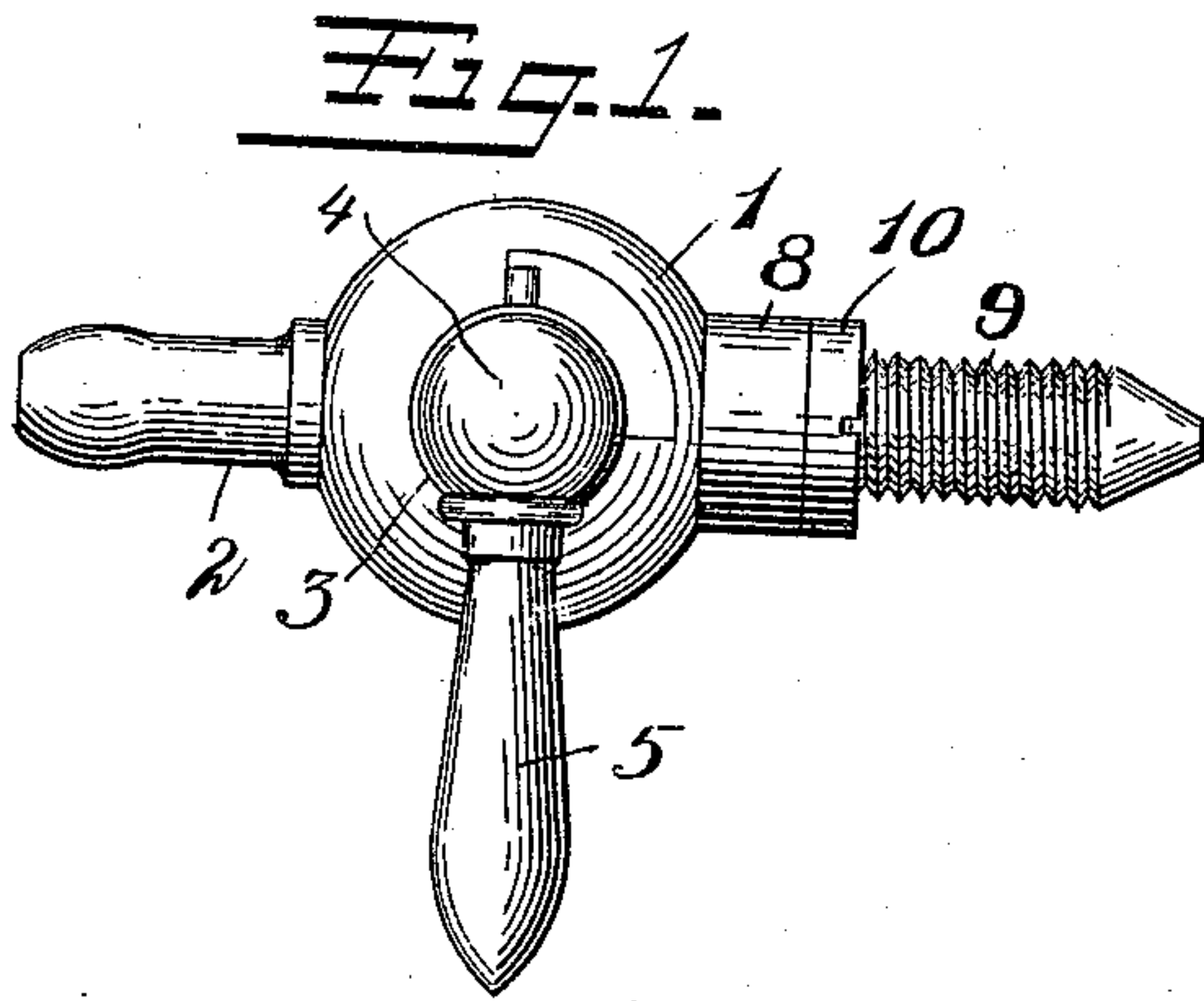


L. E. SHAW.
 COMBINED COCK AND NEEDLE VALVE.
 APPLICATION FILED AUG. 21, 1909.

975,469.

Patented Nov. 15, 1910.



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UNITED STATES PATENT OFFICE.

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COMBINED COCK AND NEEDLE VALVE.

975,469.

Specification of Letters Patent.

Patented Nov. 15, 1910.

Application filed August 21, 1909. Serial No. 513,958.

To all whom it may concern:

Be it known that I, LOUIS E. SHAW, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Combined Cocks and Needle Valves, of which the following is a full, clear, and exact description.

My invention relates to combined cocks and needle valves for gas control, and particularly, though not exclusively, to such as are used for the control of acetylene gas for needle valve burners.

It is essential to perfect combustion, particularly of acetylene gas, at a needle valve burner, that the full pressure of the gas be supplied to the jet at the moment the needle valve is opened sufficiently to maintain combustion. It is also essential that prior to cutting off the gas supplied to a needle valve, the needle valve should be so closed as to not permit sufficient gas to pass to maintain combustion.

To this end, therefore, my invention has for its object to provide a construction whereby communication between the jet and gas supply must be turned on so as to give full pressure at the jet just prior to such opening of the needle valve.

It further has for its object to provide a construction whereby the needle valve must be closed prior to cutting off the communication between the jet and the gas supplied.

The invention further contemplates a construction by which these sequences of operations may be accomplished automatically by the opening of the gas supply.

A further object of the invention is to provide for fine adjustment of the needle valve relatively to its valve seat, and at the same time to so mount the needle valve that the latter will not become jammed at the seat, thus avoiding the possibility of injury to these parts.

With these and other objects in view, as will appear from a detailed description of the device, the invention consists in the construction and arrangement of parts, preferred embodiments of which are illustrated in the accompanying drawings, in which,—

Figure 1 is a plan view of a combined cock and needle valve embodying my invention; Fig. 2 is a central longitudinal sectional view of the device shown in Fig. 1. Fig. 3 is a view of the plug of the cock valve, de-

tached; Fig. 3^a shows a detail partly in section. Fig. 4 is a view of the needle of the needle valve, detached; Fig. 5 is a view of a modified form of the invention. Fig. 6 is a sectional view on the line 6—6 Fig. 5. Fig. 7 shows a detail of the device of Fig. 5, in transverse section.

In the embodiment of my invention illustrated in Figs. 1 to 4 inclusive, 1 indicates the body or casing of the cock valve, which is provided with a suitable connection 2 for communication with the gas supply, as by means of a flexible tube and the like. The cock valve casing is provided with the usual valve chamber 3 in which rotates the plug 4 having a handle 5. The plug is provided with the usual aperture 6 for controlling the gas supply by turning the same into and out of alinement with the passage 7 communicating with said supply.

The form of cock valve having a rotating plug has been found particularly desirable for cutting off the flow of gas, and I therefore prefer to use that form in embodying my invention.

8 indicates a boss on the body of the cock valve, having an inside thread to adjustably receive the threaded jet piece 9. Also threaded on the jet piece is a lock nut 10, which serves to hold the jet piece securely in adjusted position within the boss 8.

Within the jet piece is mounted a needle 11 having ridges or wings 12 formed longitudinally thereon to center the needle within the jet piece and provide gas passages to the jet. The needle is provided with the usual tapered end 13, which is adapted to seat within the tapered portion 14 adjacent the jet aperture 15, and surrounding the needle is a spring 16 acting to open the valve. The rear end of the needle is provided with a stem 17, which, when the parts are assembled, extends through an aperture 18 affording communication between the valve chamber 3 of the cock valve and the jet piece 9.

As will be seen from an inspection of Fig. 2, the passage 18 is of greater diameter than the stem 17, thereby permitting the flow of gas around said stem and through the passages between the ribs 12 of the needle and to the jet opening 15. The cock plug 4 is cut away upon its opposite sides, leaving the substantially flat surfaces 19, extending transversely of the passage 6 in said plug.

By this construction, as the plug is turned to bring the passage 6 into the same plane as the passages 7 and 18, communication will be opened between said passages 7 and 18 before the needle stem 17 is released by the rounded periphery of the plug 4, so that the full pressure of gas will be admitted to the space surrounding the needle adjacent the jet 15 before the needle valve is opened. Upon further rotating the plug 4, the stem 17 of the needle will ride over the adjacent flattened face 19 of said plug through the influence of the spring 16, thereby permitting the needle valve to open more or less as desired after full pressure of gas has been admitted thereto. In order that the stem 17 may not interfere with the free passage of the gas through the passage 6 in the plug, said passage is located above the line of contact of the stem 17, with the flattened portion 19 of said plug as indicated in Fig. 3^a.

During the closing of the cock valve, the flat cam face 19 thereof in contact with the needle valve stem 17 moves the needle outwardly until the engagement of the rounded periphery of the plug with said stem seats the needle in its seat, and, as will be seen from an inspection of Fig. 2, this final closing movement of the needle valve takes place approximately when the adjacent edge of the cam face reaches the center of the stem 17 and while the position of the parts is such that free passage of gas is still open from the source of supply to the needle valve. Hence, during the opening movement of the plug, full pressure of gas is admitted to the needle valve before the same is opened, and further movement of the plug thereupon serves to open the needle valve more or less as desired, and, conversely, the needle valve will be closed before the pressure is shut off by the cock valve.

In order that the needle and its seat may be preserved from injury by the jamming of one against the other by the cam action of the plug, the parts are assembled in the following manner: With the plug in the position indicated in Fig. 2, the jet piece 9 with the needle mounted therein is screwed into the boss 8 until the needle 11 is just firmly seated between the plug and the needle valve seat. The jet piece is then given a slight reverse turn to relieve the needle from undue pressure against its seat, and the lock nut it then screwed home to hold the jet piece in such adjusted position. By this adjustment the needle may be given any desired degree of intimate contact with its seat. In practice it is not necessary to have the needle valve, when closed, absolutely cut off the gas, since its function is to regulate or control the rate of flow of the gas and it thus constitutes a regulating valve. The cock valve is relied on to completely cut off the flow and thus constitutes a cut off valve.

After the closing and prior to the opening of the needle valve, the flow of gas through it should not be sufficient to maintain combustion at the burner, even when full pressure is admitted to the jet.

In the modified form of the invention illustrated in Figs. 5 and 6, the same comprises the valve body 1', supply connection 2', valve chamber 3', plug 4', and handle 5', boss 8', jet piece 9' and lock nut 10', all of which parts correspond in construction and arrangement with the similar parts illustrated in Figs. 1 and 2. The needle valve operating mechanism, however, comprises a cam stem 19' (Fig. 6) having a flat cam face 20 and mounted for rotation in an aperture 21 of the jet piece 9' near the jet opening 15' thereof. Said cam stem 19' may be provided with a stuffing box 22, for the usual purpose. The outer end of the cam stem is provided with an actuating arm 23, which is connected by a link 24 with a similar arm 25 projecting from the stem of the plug 4'. Within the outer end of the jet piece 9' is seated a needle 26 having the wings or ridges 27, to center the same within the jet piece, and the short stem 28, which is held against the cam stem 19' by spring 29. The cam stem 19' and the plug 4' are so relatively positioned that when the cock valve is closed, as indicated in Fig. 5, the stem 28 of the needle valve will contact with the rounded surface of the cam stem 19' and the needle valve will be likewise closed. When, however, the cock valve is opened, the cam stem will be actuated through the link 24 to bring the flat cam surface 20 of the cam stem into contact with the needle valve stem 28, whereupon the needle valve will be opened by its spring 29 in the manner described for the similar construction illustrated in Figs. 1 and 2. The distance between the cam stem 19' and the needle seat is so determined that the needle will be firmly seated when the valve stem 28 contacts with the rounded portion of the cam stem 19'. It is to be understood, also, that the plug is provided with flattened surfaces 19² corresponding to the surfaces 19 shown in Figs. 2 and 3, and that these surfaces are substantially parallel with the flat surfaces 20 of the cam stem 19' when the cock valve is closed, so that the full pressure of gas will be admitted to the needle valve before the latter is opened and the needle valve will be closed just prior to the shutting off of the full gas pressure by the plug 4', as above described. The link 24 may be slotted at 30 so as to permit of lost motion and delay the opening of the needle valve.

In both forms the regulating or needle valve is interlocked with the cut-off or cock valve, so that the regulating valve closes before and opens after the cut-off valve. In the forms shown, a single operating handle

5 serves to actuate both valves asynchronously so as to produce the desired sequences of operations.

While I have herein described particular
5 embodiments of my invention, it is to be understood that the same may be altered in details and in general arrangement of parts without departing from the spirit and scope thereof.

10 What I claim is:

1. The combination of a cut-off valve with a regulating valve connected in series therewith and a common means for operating said valve asynchronously, so that said cut-off valve is opened before said regulating valve is opened.

2. The combination of a cut-off valve with a needle valve connected in series therewith, and a common means for operating said valves asynchronously, so that said needle valve is closed before said cut-off valve is closed.

3. The combination of a cock valve with a regulating valve connected in series therewith and a common means for operating said valves asynchronously, so that said cock valve is opened before said regulating valve is opened, and said regulating valve is closed before said cock valve is closed.

4. The combination of a cut-off valve with a regulating valve connected in series therewith, the movable portions of said valves being interlocked so as to prevent the opening of said regulating valve until after said cut-off valve is open.

5. A combined cock and needle valve comprising a cock valve casing, a plug therein, a needle valve casing connected to said cock valve casing and a needle therein, said plug and needle being interlocked so as to move asynchronously, whereby said cock valve is opened prior to the opening of said needle valve.

6. The combination of a cock valve comprising a casing and plug therein, a needle valve comprising a casing and needle therein and connected in series with said cock valve, said second casing having a seat for said needle, said plug having a cam surface moving with said plug and engaging said needle, said cam surface being positioned so that said needle valve opens only after said cock valve is opened.

7. The combination of a cock valve comprising a casing and plug therein, said plug having cut away sides and a passage connecting said sides, a needle valve comprising a casing and needle therein and connected in series therewith, said second casing having a seat for said needle, said plug having a

cam surface moving with said plug and engaging said needle, said cam surface being positioned so that said needle valve closes before said cock valve closes.

8. The combination of a cock valve comprising a casing and plug therein, a needle valve comprising a casing and needle therein and connected in series therewith, said second casing having a seat for said needle, said plug having a cam surface moving with said plug and means for holding said needle against said cam surface and tending to open said needle valve, said cam surface being positioned so that said needle valve opens only after said cock valve is opened and closes before said cock valve closes.

9. The combination of a cock valve comprising a casing and a plug therein, a needle valve comprising a casing and a needle therein, said plug having a cam surface actuating said needle, said needle valve being connected in series with said cock valve.

10. A combined cock and needle valve comprising a cock valve casing, a plug therein, a needle valve casing, a needle therein, said needle and needle valve casing regulating the flow of fluid from said cock valve casing and plug, said plug having a cam surface, and means for yieldingly holding said needle against said cam surface, said cam surface being positioned so that said needle valve opens only after full pressure has been admitted thereto by said cock valve.

11. The combination of a cock valve comprising a casing and plug therein, a needle valve comprising a casing and needle therein, and connected in series with said cock valve, said second casing having a seat for said needle, said plug having a cam surface moving with said plug and means for holding said needle against said cam surface and tending to open said needle valve, said cam surface being positioned so as to permit said needle valve to be opened only after said cock valve is opened and means for adjusting the relative relations of said needle and its seat.

12. In a combined cock and needle valve comprising a casing and a plug therein, a jet piece on said valve casing carrying a needle valve-seat, a needle mounted in said jet piece and adapted to cooperate with said seat, means for adjusting said seat relatively to said needle, and a common means for actuating said plug and needle asynchronously.

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Witnesses:

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