

(No Model.)

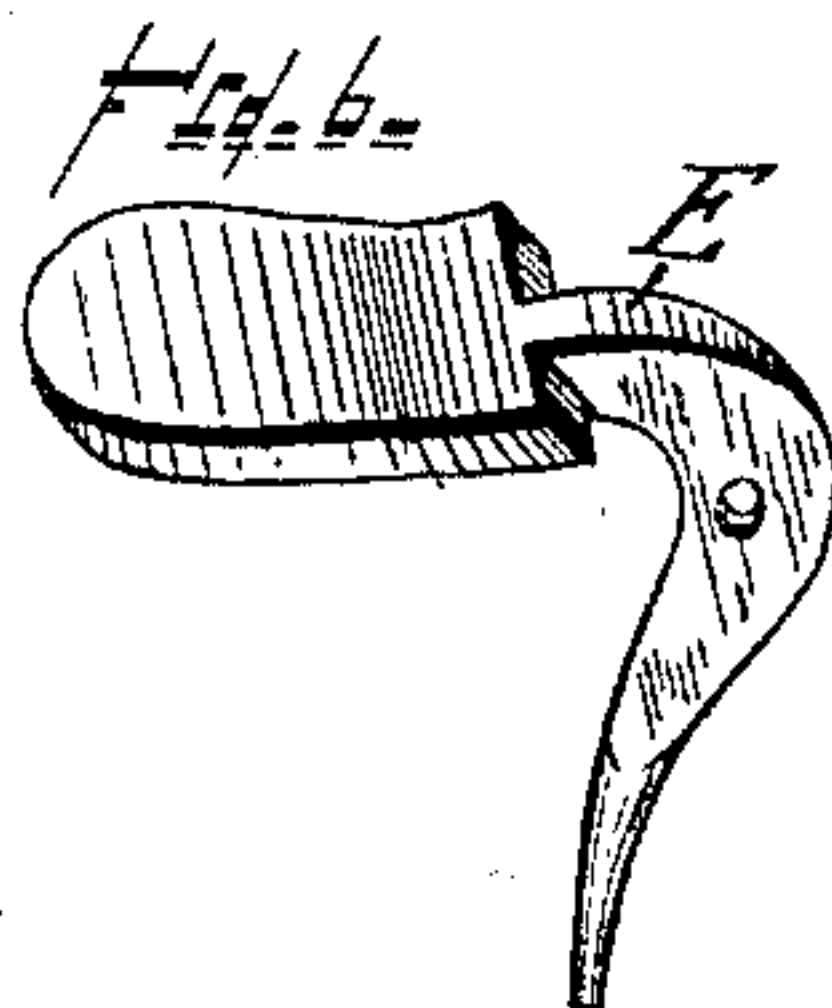
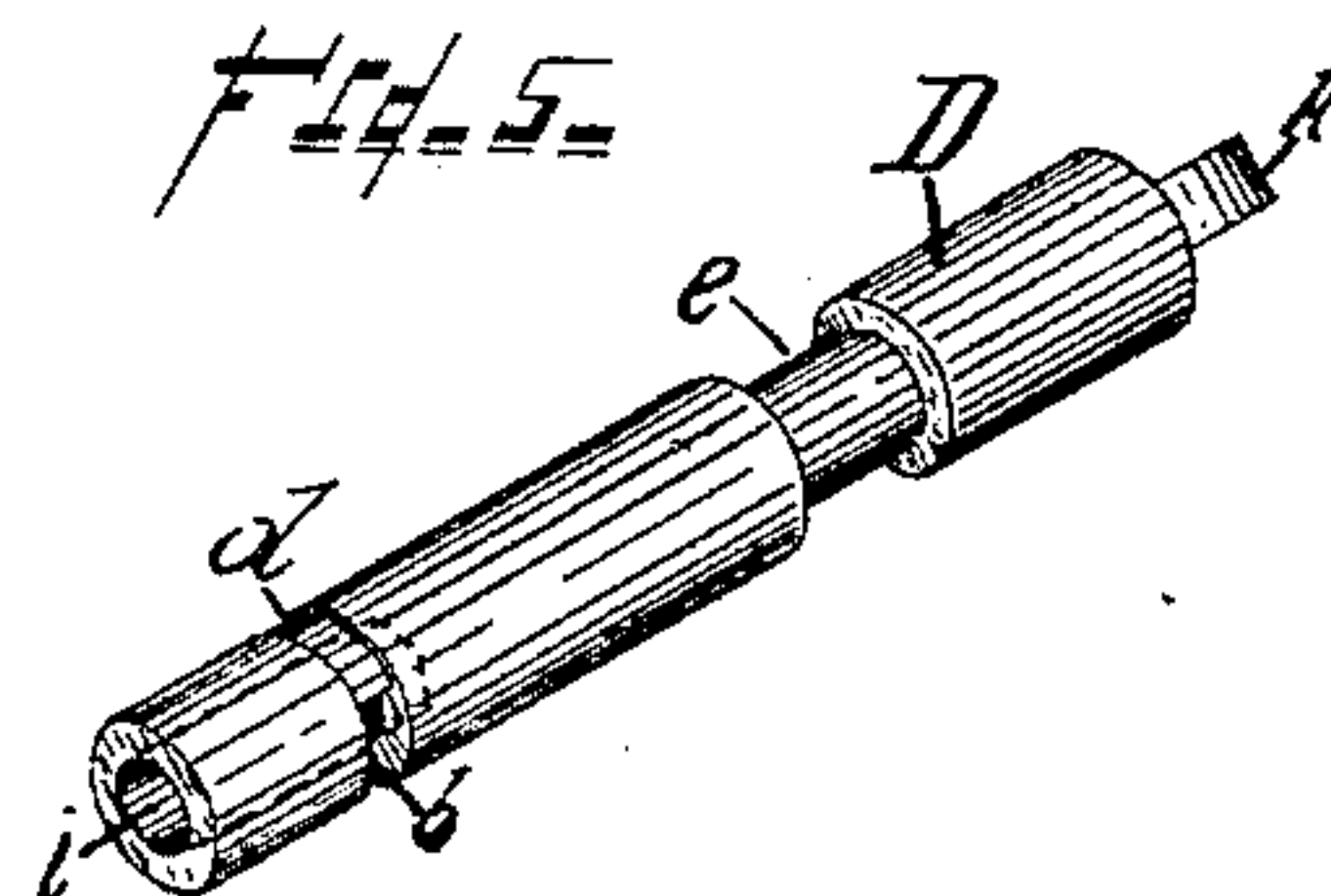
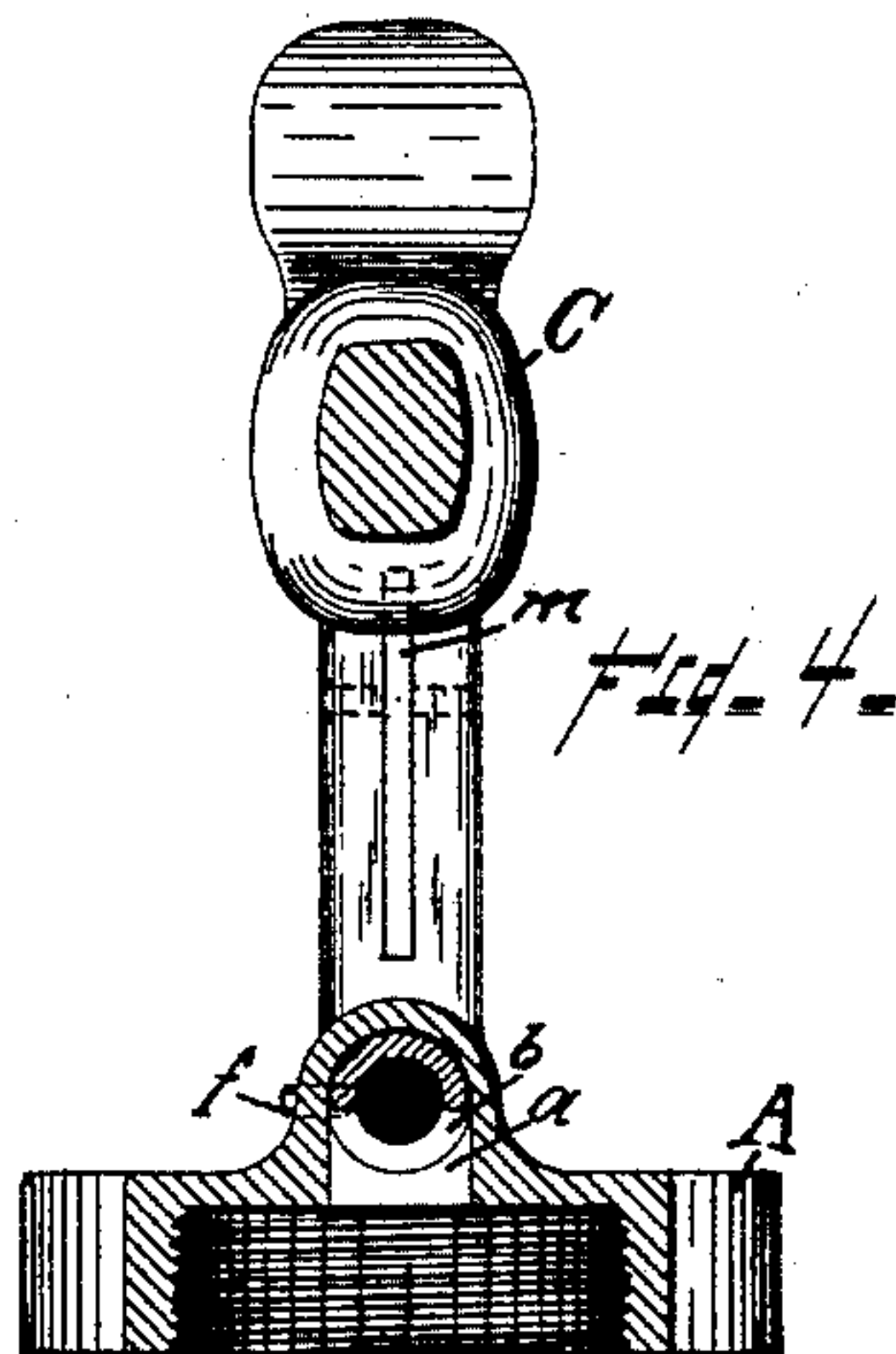
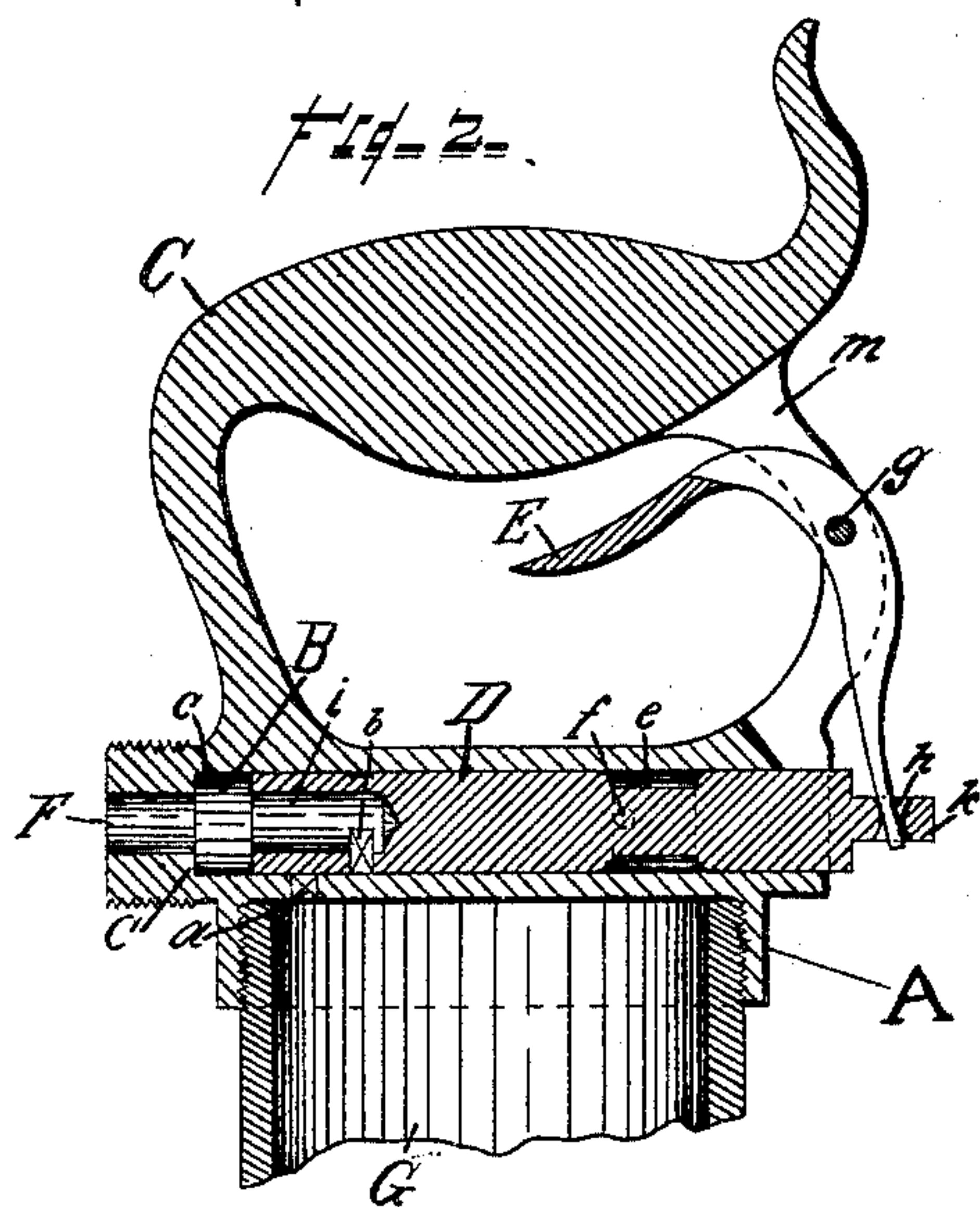
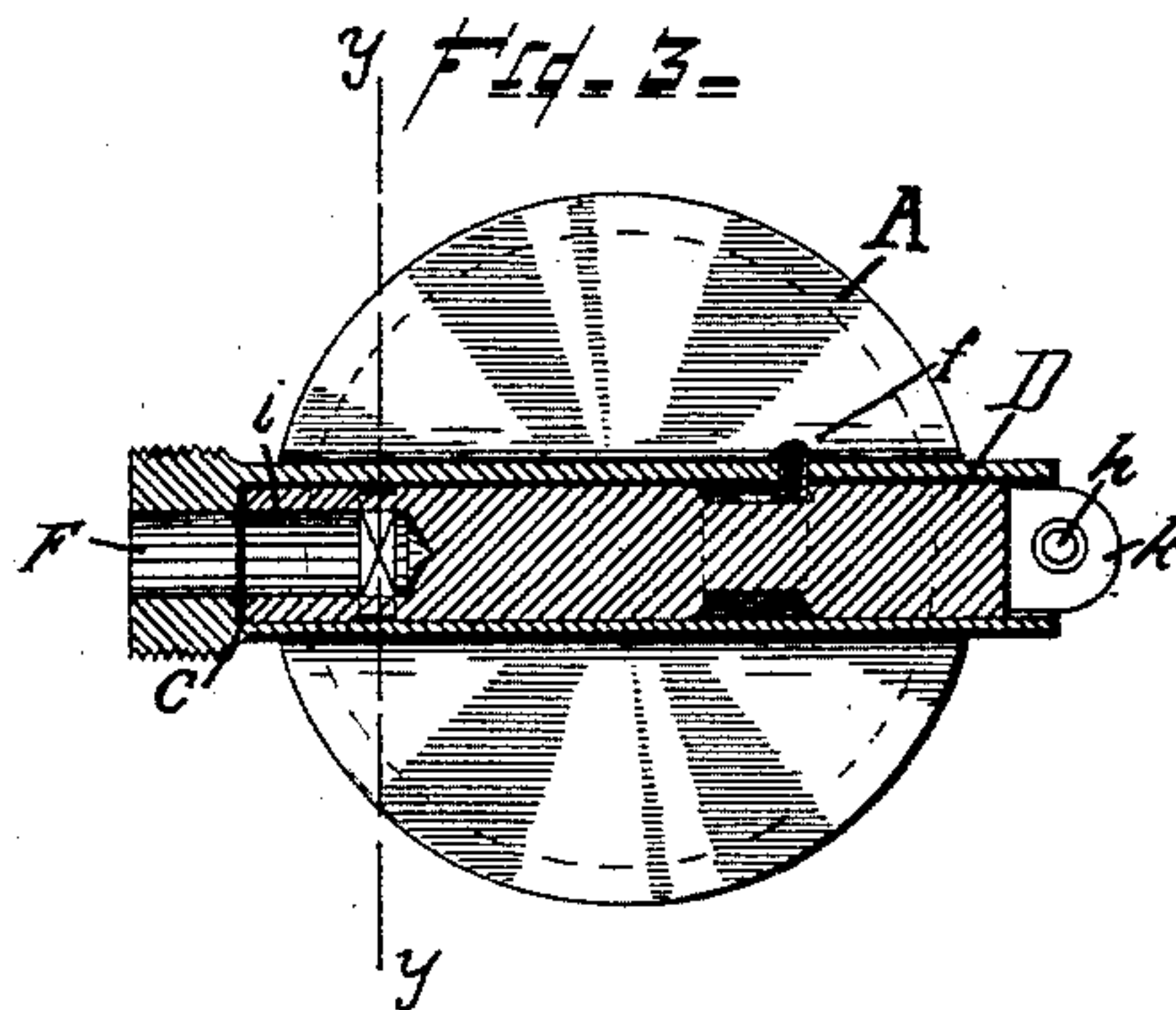
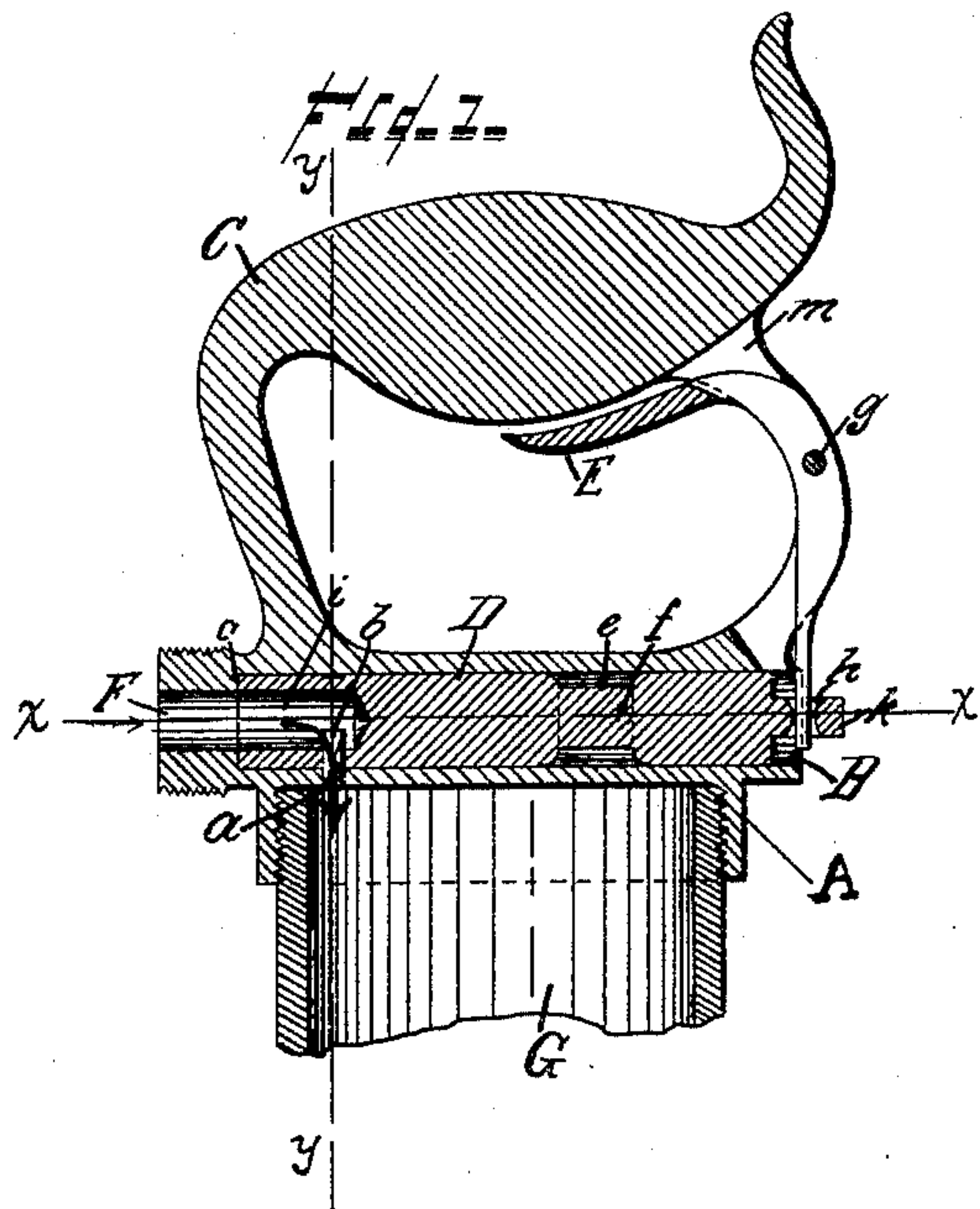
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W. F. SCHMIDT.

THROTTLE VALVE FOR DIRECT ACTING ENGINES.

No. 433,150.

Patented July 29, 1890.



Witnesses
C. R. Ramey
Wm. M. Byrne.

Inventor.
William F. Schmidt
Paul Bakerwell
his attorney

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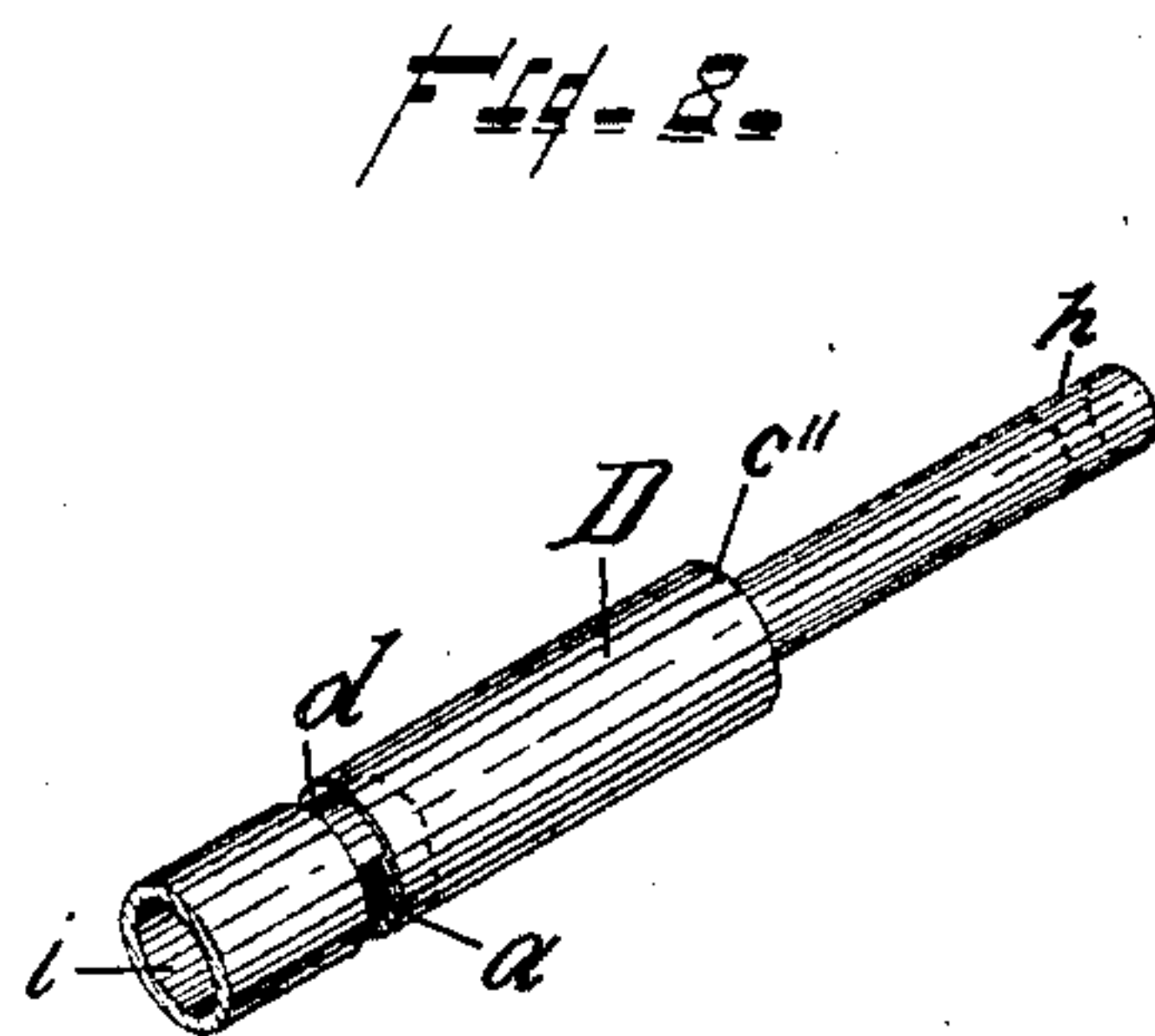
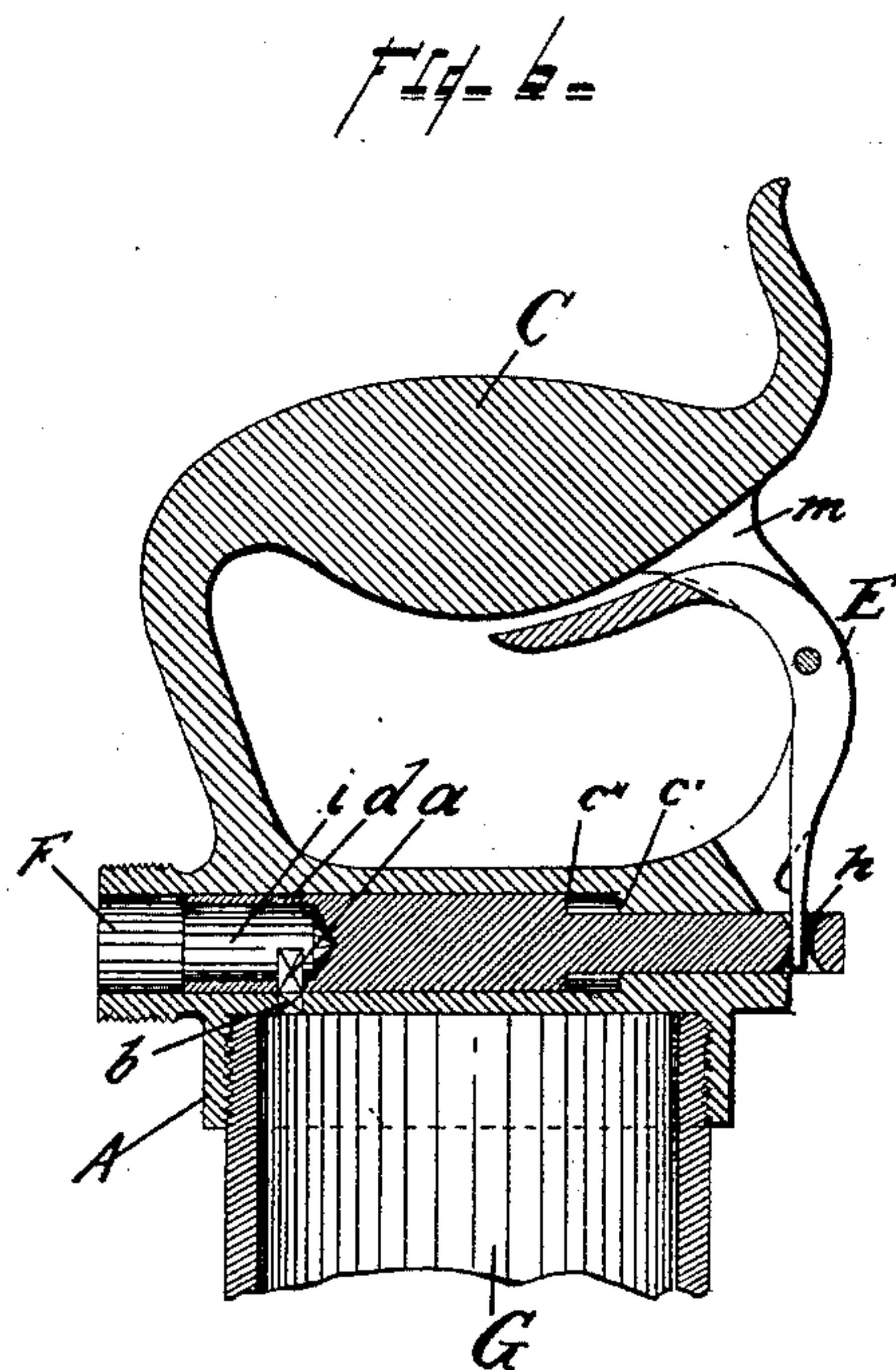
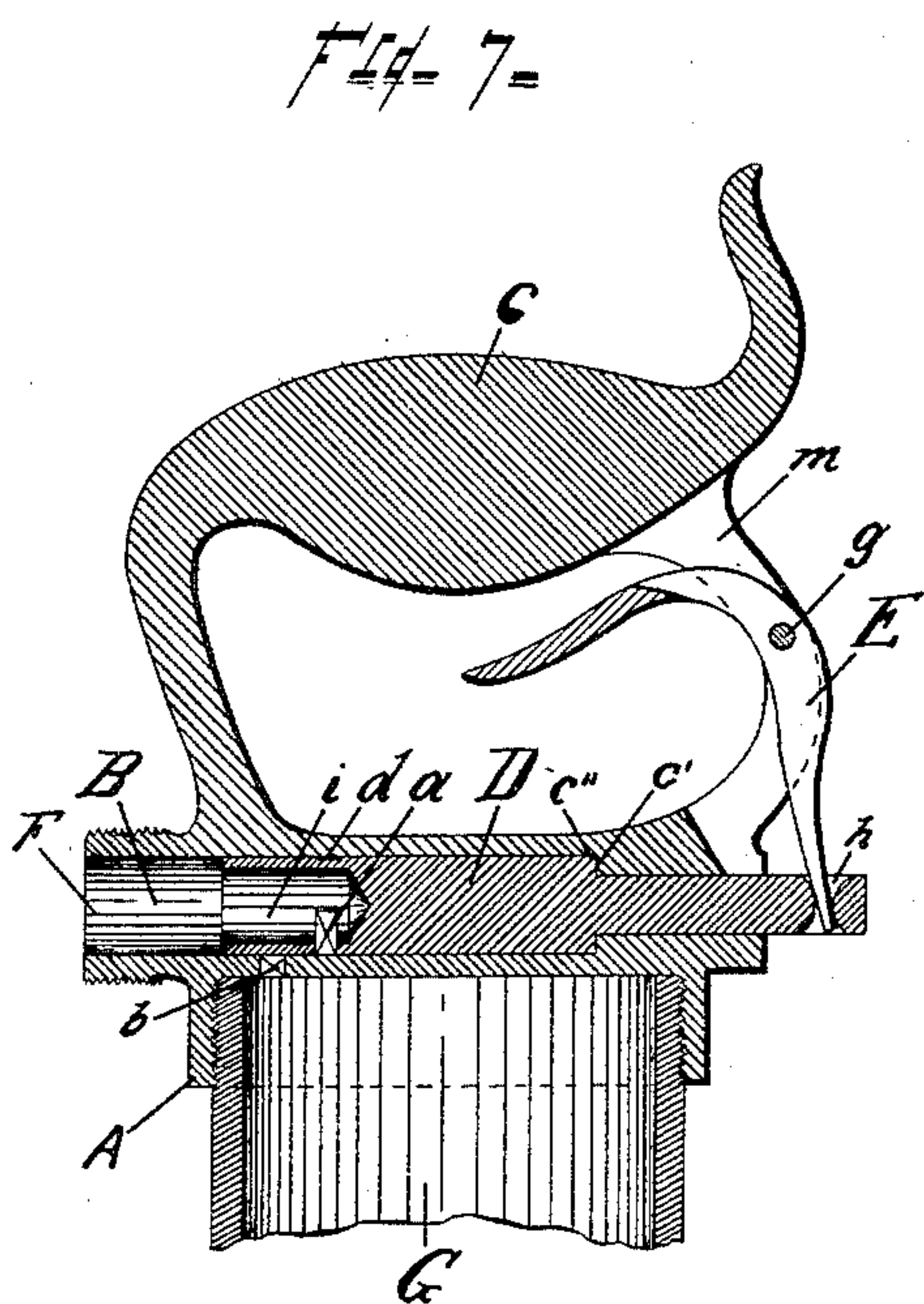
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UNITED STATES PATENT OFFICE.

WILLIAM F. SCHMIDT, OF ST. LOUIS, MISSOURI, ASSIGNOR TO THE
CHOUTEAU MANUFACTURING COMPANY, OF MISSOURI.

THROTTLE-VALVE FOR DIRECT-ACTING ENGINES.

SPECIFICATION forming part of Letters Patent No. 433,150, dated July 29, 1890.

Application filed March 24, 1890. Serial No. 345,023. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. SCHMIDT, a citizen of the United States, residing in the city of St. Louis, State of Missouri, have invented certain new and useful Improvements in Throttle-Valves for Direct-Acting Hand-Engines, of which the following is a full, clear, and exact description.

My invention relates to improvements in devices and appliances used to control or regulate the supply of motive fluid employed to operate that class of direct-acting steam or pneumatic engines adapted to light work and generally held and directed to their work by hand.

My object is to provide a throttle or controlling valve that shall be simple in its construction and operation, one that is adapted to and combined with a handle convenient and suitable to hold and direct the engine in its work, and, further, one that shall be, without the intervention of springs or complicated mechanism, self-closing. How I accomplish this object will be made more plain by the following description, reference being had to the accompanying drawings, in which—

Figures 1 and 2, respectively, are vertical sections of the handle, valve, and cylinder end of engine, taken longitudinally through the center of the valve-chamber, hereinafter described, showing the valve open and closed. Fig. 3 is a longitudinal section taken on the line $x x$ in Fig. 1, or through the center of the valve-chamber, showing the valve open. Fig. 4 is a vertical section taken on line $v v$ in Figs. 1 and 3, or through the port-opening, hereinafter described, in cap end of cylinder, at right angles to the central line of the valve-chamber, showing the valve open. Figs. 5 and 6 are perspective views, respectively, of the valve-piston or plunger and the valve-lever handle, hereinafter described. Figs. 6, 7, and 8 are views showing a modified form of the valve-piston and a corresponding modification in the form of the valve-chamber. Figs. 6 and 7 are vertical sections taken as in Figs. 2 and 3, showing, respectively, the position of the piston in its modified form when the valve is

open and closed. Fig. 8 is a perspective view of the modified form of the valve-piston.

Like letters of reference denote like parts in the several figures.

To the cap end A of the engine-cylinder G is diametrically attached or preferably formed in the same casting a valve-chamber B, preferably cylindrical, the whole being extended so as to form the handle C, peculiarly shaped, for the purposes hereinafter specified. One end, or what I will call the "front end," of the chamber-valve B terminates in the inlet-passage F, which is preferably an extension of the valve-chamber bored out concentrically therewith, but of smaller diameter, forming the shoulder c . The other or back end of the valve-chamber is left open for the purpose of inserting the piston, hereinafter described. Near the front end of the valve-chamber B the opening or port a is cut, which connects the valve with the interior of the engine-cylinder G.

Placed in the valve-chamber B, and capable of sliding backward and forward therein, is the valve-piston D. In one end of this piston, preferably concentric therewith, a hole i is bored to such a depth that it shall extend to a point a little beyond the port b , hereinafter described. The piston being in the position as shown in Fig. 1, at a point exactly opposite to the port a and corresponding to the opening in same, the material of the piston is cut away, forming the port b . (See Fig. 5.) As an extension of the port b corresponding to the width of the same on the opposite side of the piston, a shallow circumferential groove d is cut, (see Fig. 5,) for the purpose hereinafter specified. At some convenient point in the length of the valve-piston D a recess e (preferably a circumferential groove, as in Fig. 5) is cut to accommodate the end of the screw f , which is screwed into the body material of the valve-chamber. The width of the groove e is somewhat greater than the necessary length of movement of the piston D in opening and closing the valve. The outer end of the piston D is extended so as to form a lug k , through which a hole h is

cut to receive one end of the lever-valve handle E. This lever-valve handle is formed in the shape of a trigger, (shown more plainly in the perspective view, Fig. 6,) and moves about the bolt *g* as a fulcrum in the slot *m* cut in the engine-handle C to accommodate the same. Its free end is flattened out and lies immediately under the handle C, so as to be included with it in the grasp of the person taking hold of the same.

In operation, the cap end A, with its attached and extended parts, as described, having been attached to the engine-cylinder G and a supply-pipe attached by some suitable means at the inlet-opening F, the engine is grasped by the handle C. The valve remains closed, the piston D and controlling-lever handle E being in the position as shown in Fig. 2 until the lever-handle E is pressed up close to the handle C. When this is done, the valve-lever E oscillating about the bolt *g* and the other end being engaged in the hole *h* with the lug end *k* of the piston, the piston is thrown forward until its inner end abuts against the shoulder *c*, which definitely limits its movement in this direction, as shown in Figs. 1 and 3. When the piston is in this position, the valve-port *b* is immediately opposite to port *a* in the engine-cylinder and a continuous opening is offered to the flow of the motive fluid from the inlet-opening F through the hollow part *i* of the piston and ports *b* and *a* into the interior of the engine-cylinder G. The instant the valve-lever E is released the pressure of the motive fluid on the front end of the piston will throw the piston back to the closed position. The screw *f*, with its end projecting into the recess *e*, limits this backward movement of the piston by abutting against the shoulder of the recess *e*, as shown in dotted lines in Fig. 2. By this construction and combination of its several parts the valve is made self-closing without the aid of a spring or like contrivance. The purpose of the shallow groove *d* is to allow the motive fluid and consequent pressure to get in at the back of the piston, so as to more evenly balance the lateral pressure against the same, thereby making its longitudinal movement more free.

The description and specifications given pertain as well to the modified form of the valve shown in Figs. 6, 7, and 8 in all particulars, except the detail description of the form of the valve-piston and the valve-chamber and the consequent change in the means of limiting the longitudinal movement of the valve-piston.

The characteristic features and the functions of the essential parts are alike in both.

In the modified form the valve-chamber B is bored out concentrically to the two different diameters, forming the abutting shoulder *c'* at or near the middle of its length, the part of larger diameter being the end at which the inlet-passage F is placed. The inlet-

opening is strictly, in this case, an extension of the valve-chamber, being of the same size. The valve-piston D is introduced into the valve-chamber from this end, and it is turned down in part of its length to fit the reduced portion of the valve-chamber, forming the shoulder *c''* at such a distance from the front or hollow end of the piston, so that when the piston is pushed back by the pressure of the motive fluid with its shoulder *c''* home against the abutting shoulder *c'* the valve shall be closed, as shown in Fig. 7. This shoulder in the valve-chamber, in connection with the shoulder on the piston, limits the backward movement of the piston, thereby dispensing with screw *f* and groove-slot *e*, as described. The forward movement of the piston to the open-valve position, as shown in Fig. 6, is controlled and limited by the relative length of the back or lug end of the piston, and the bend in the lever-valve handle being so adjusted that when the ports *a* and *b* are opposite each other the handle part of the lever is abutting against the under side of the engine-handle C, as shown in Fig. 6.

I claim—

1. In a hand-engine, the combination, with the cylinder, of a valve set to be actuated in one direction by the pressure of the working medium and provided with a hand-lever for actuating it in the reverse direction, substantially as and for the purposes described.

2. In a hand-engine, the combination, with the cylinder having a valve-chamber in its head, said chamber having a port communicating with the cylinder, of a cup-ended slide-valve extending into said chamber and having a branch port in line with the cylinder-port, a shoulder for arresting the movement of said slide to cause the said ports to register, a supply-port in line with said cup-shaped end of the slide, and a pivoted hand-lever for actuating the slide to open the ports, substantially as and for the purposes described.

3. In a hand-engine, the combination, with the cylinder having a port in its head and a handle, substantially as described, formed thereon, of a slide-valve extending into said port and having a slotted projecting end, a lever pivoted on said handle, one end of which lever is located below the handle and the other end engaging said slot in the slide, and ports in said slide adapted to register with a port communicating with the cylinder-head, substantially as and for the purposes described.

4. In a throttle-valve, the combination of cap end A of engine-cylinder G, valve-chamber B, and inlet-passage F, of smaller diameter, placed concentrically therewith, forming abutting shoulder *c*, piston D with recess *e* cut therein, screw *f*, handle C, valve-lever handle E, and ports *a* and *b*, substantially as described, and for the purposes specified.

5. In a throttle-valve, the combination of

the cap end A of engine-cylinder G, valve-chamber B, bored out concentrically to two different diameters, forming the shoulder *c'*, inlet-passage F, piston D, turned down to
5 two different diameters, forming the shoulders *c''*, handle C, valve-lever handle E, bent so as to abut against the under side of engine-handle C, ports *a* and *b*, substantially as described, and for the purposes specified.

In testimony whereof I affix my signature, in presence of two witnesses, this 8th day of March, 1890.

WILLIAM F. SCHMIDT.

Witnesses:

J. W. CROOKES,

J. L. HORNSBY.