

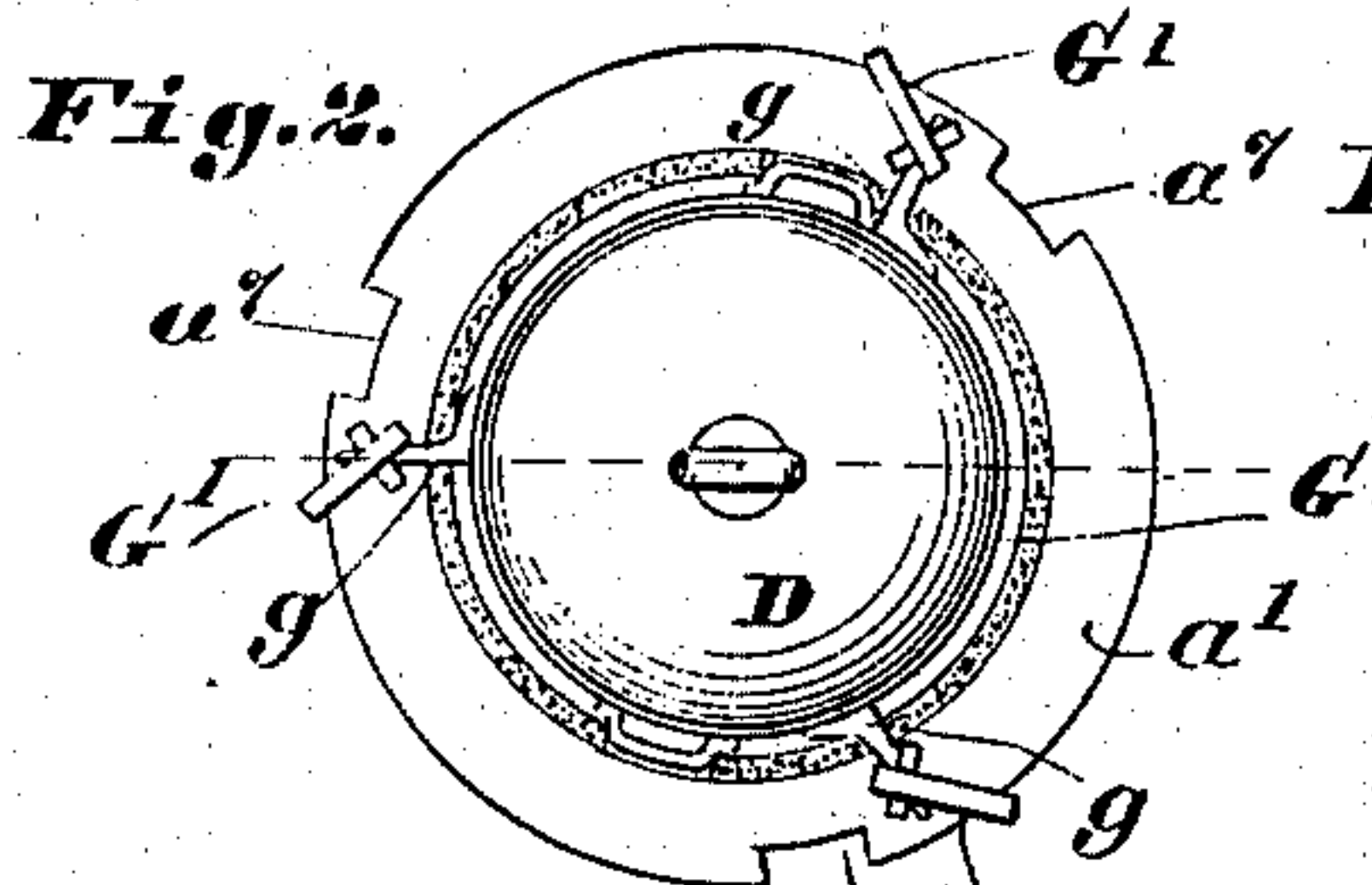
(No Model.)

F. SHICKLE.

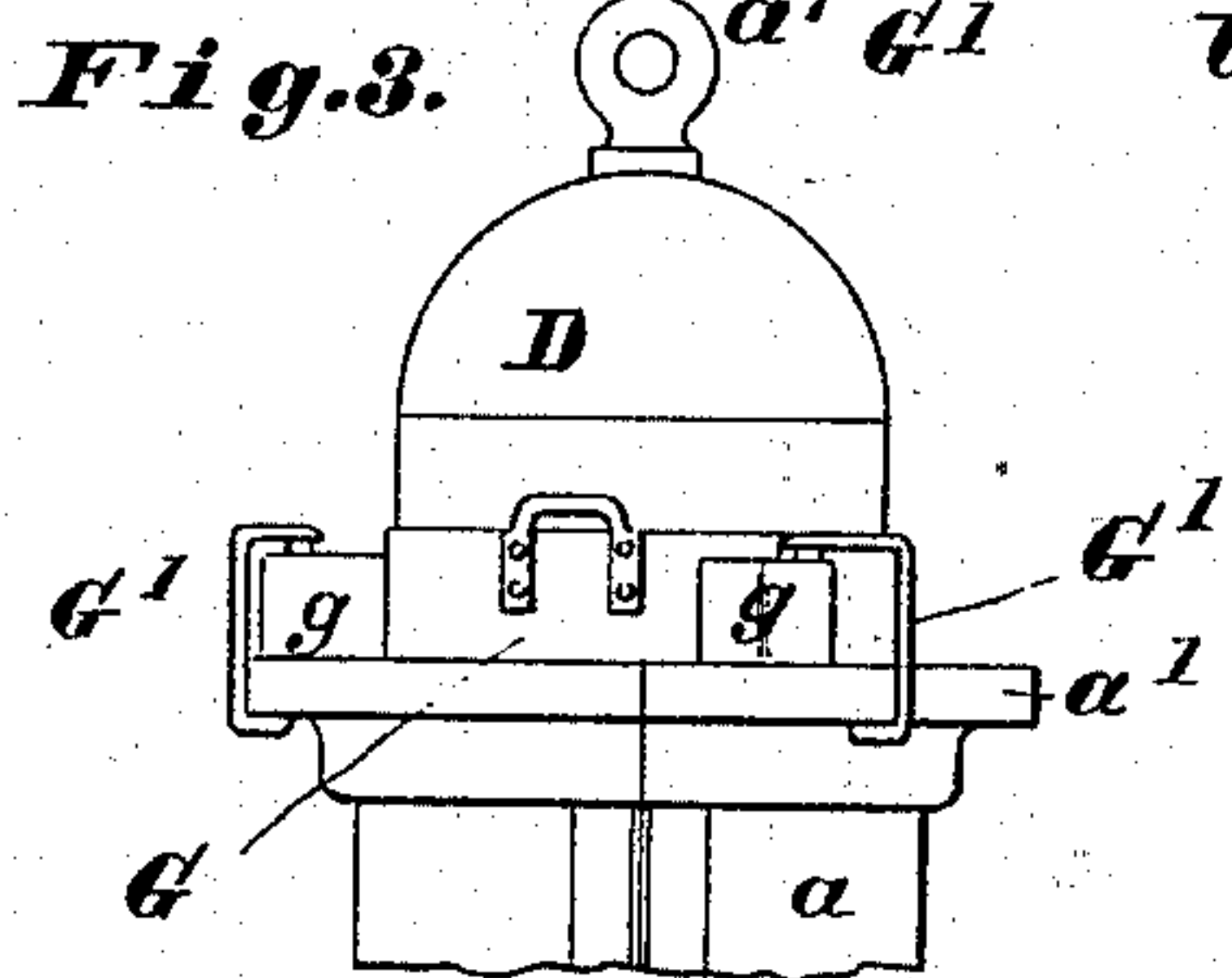
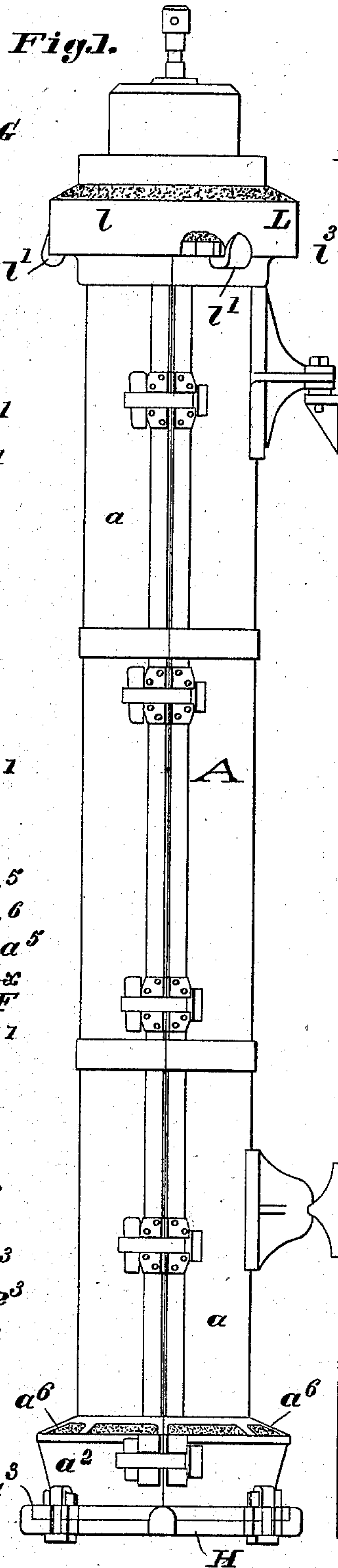
PIPE MOLDING AND CASTING APPARATUS.

No. 255,891.

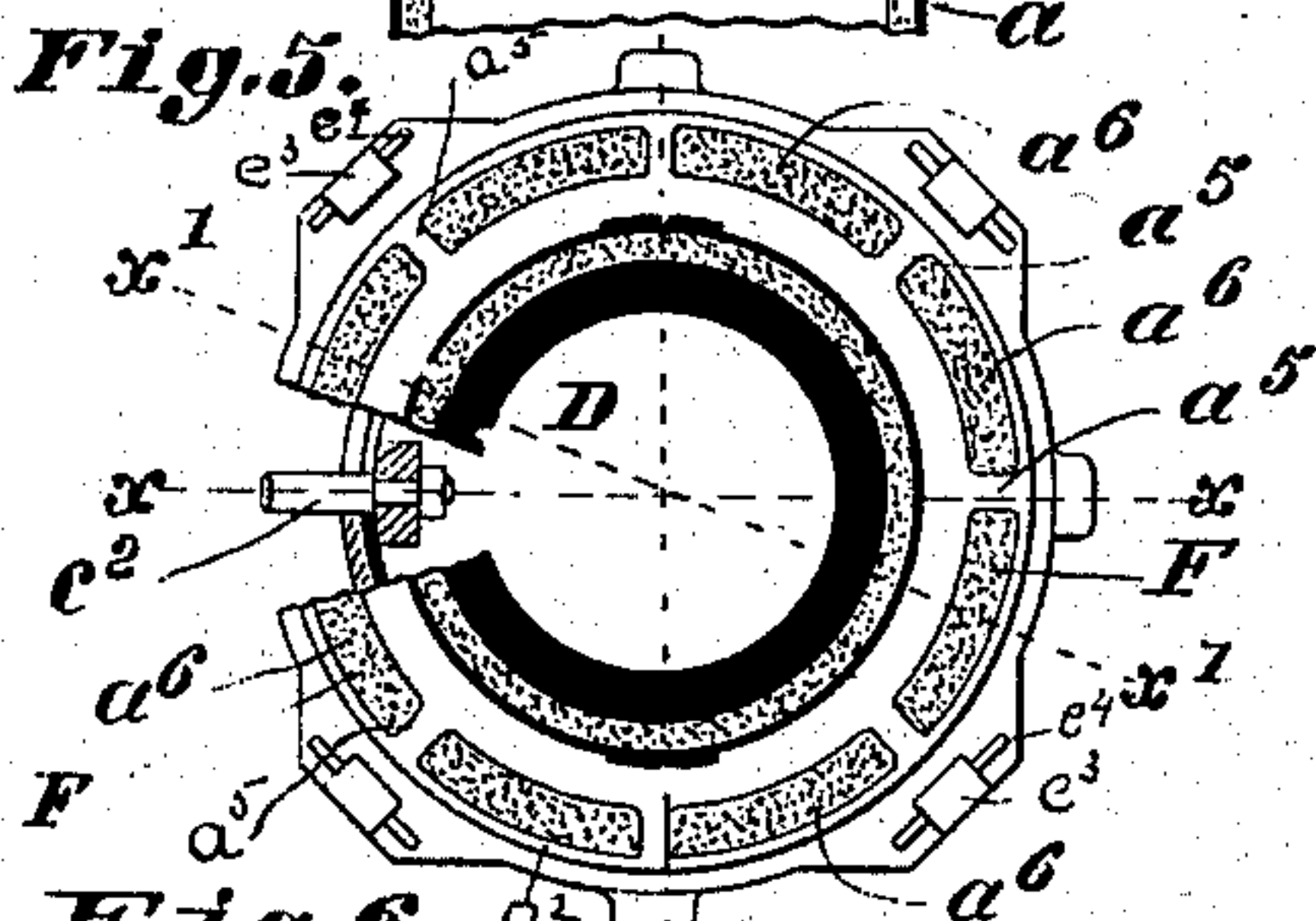
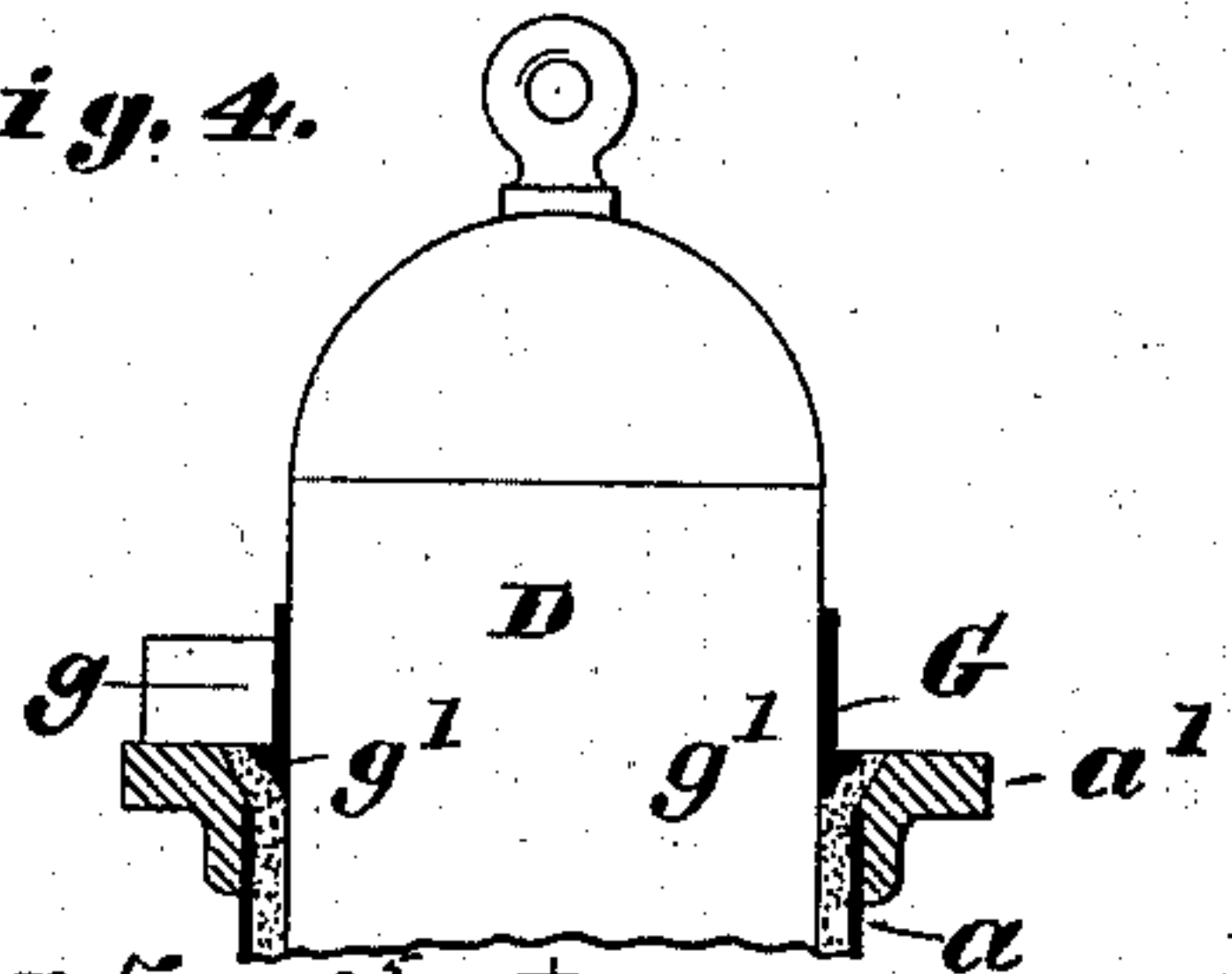
Patented Apr. 4, 1882.



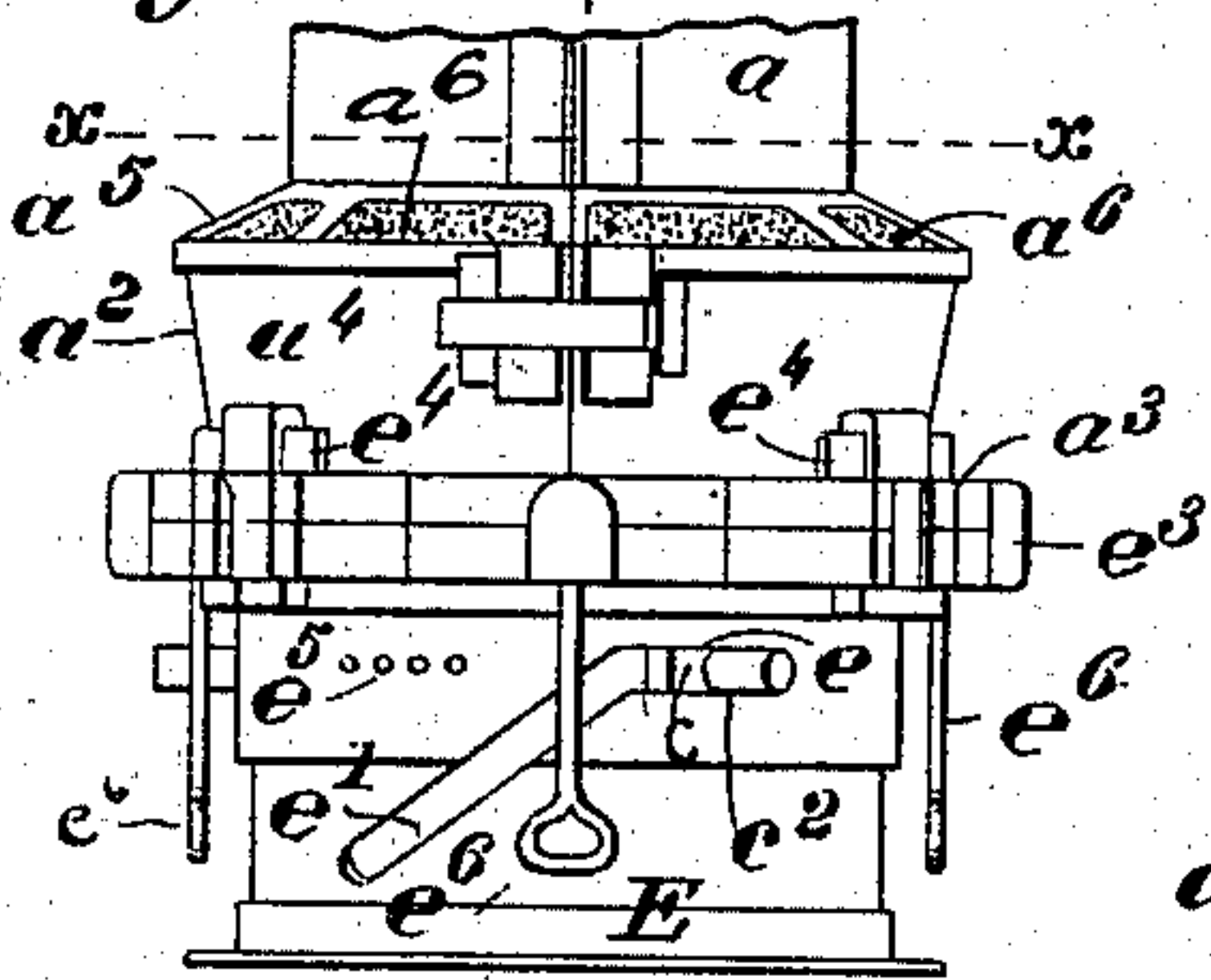
**Fig. 1.**



**Fig. 4.**



**Fig. 6.**

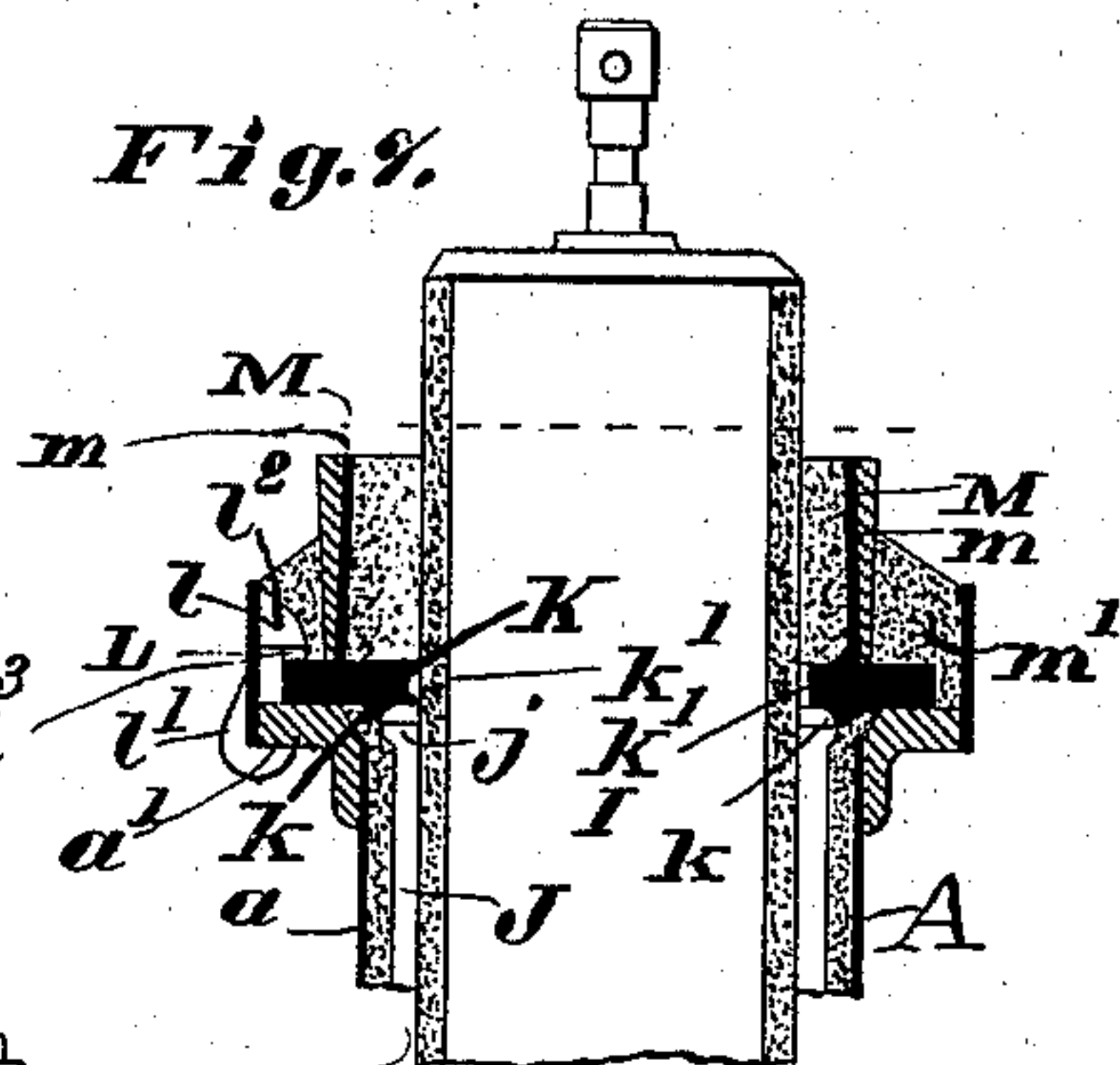


Attest:

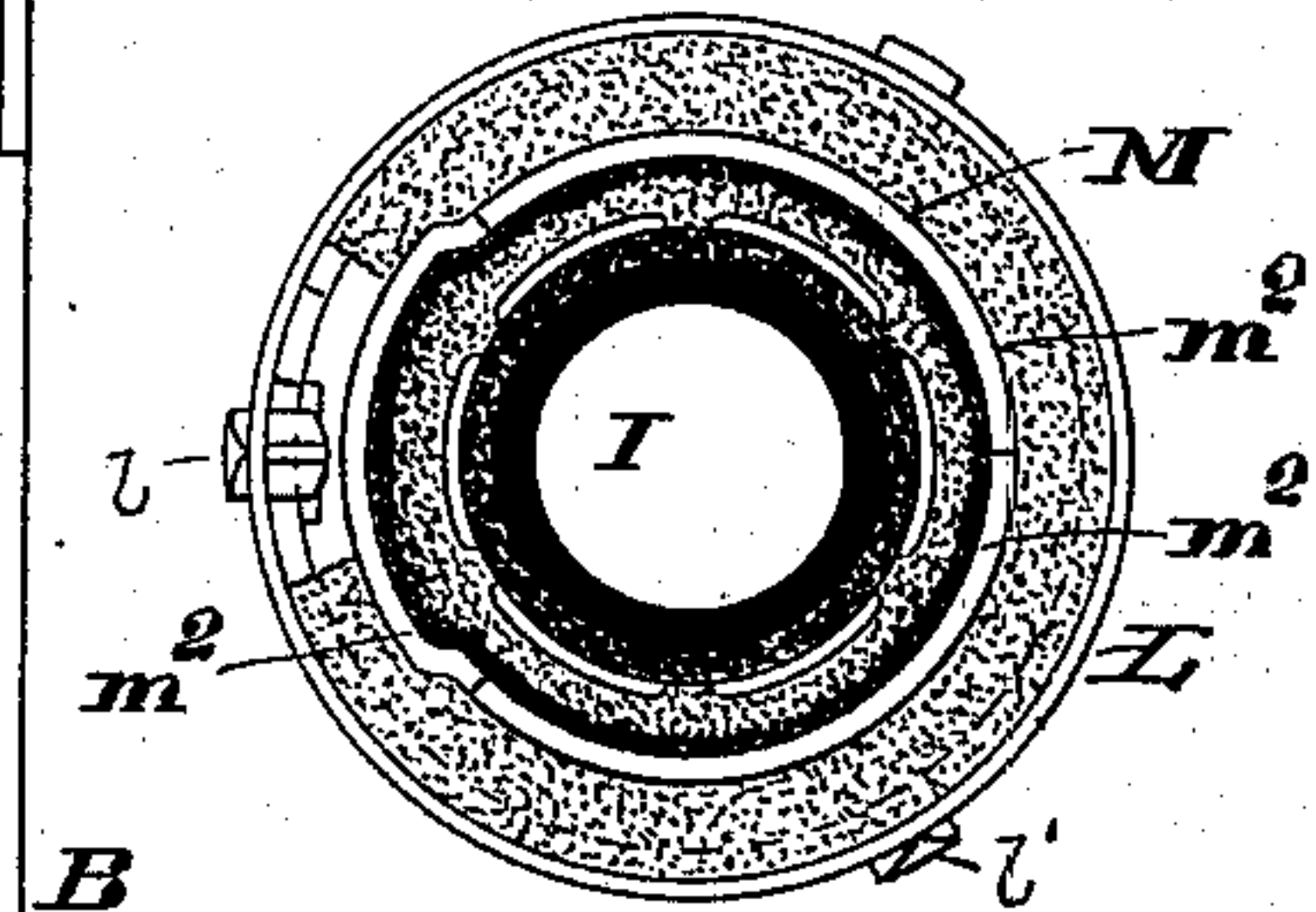
Charles Pickles

Sam'l S. Boyd

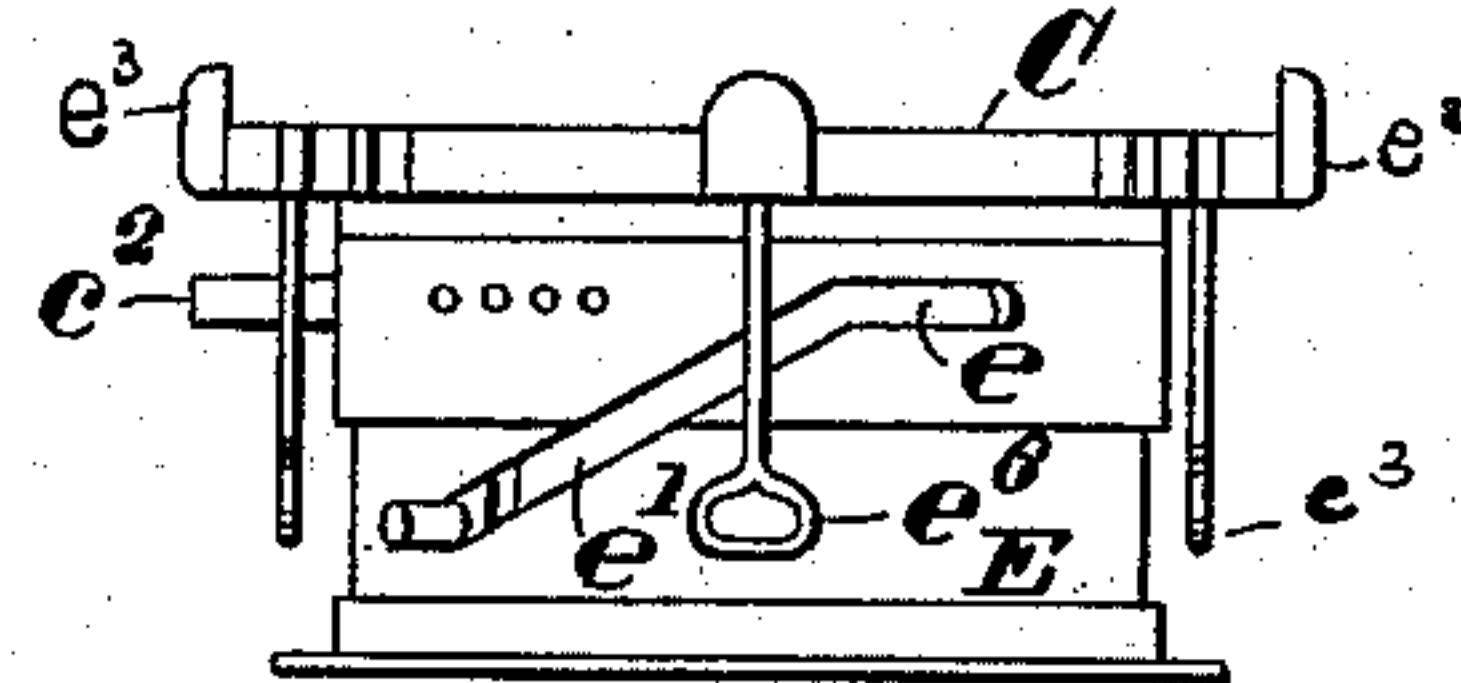
**Fig. 7.**



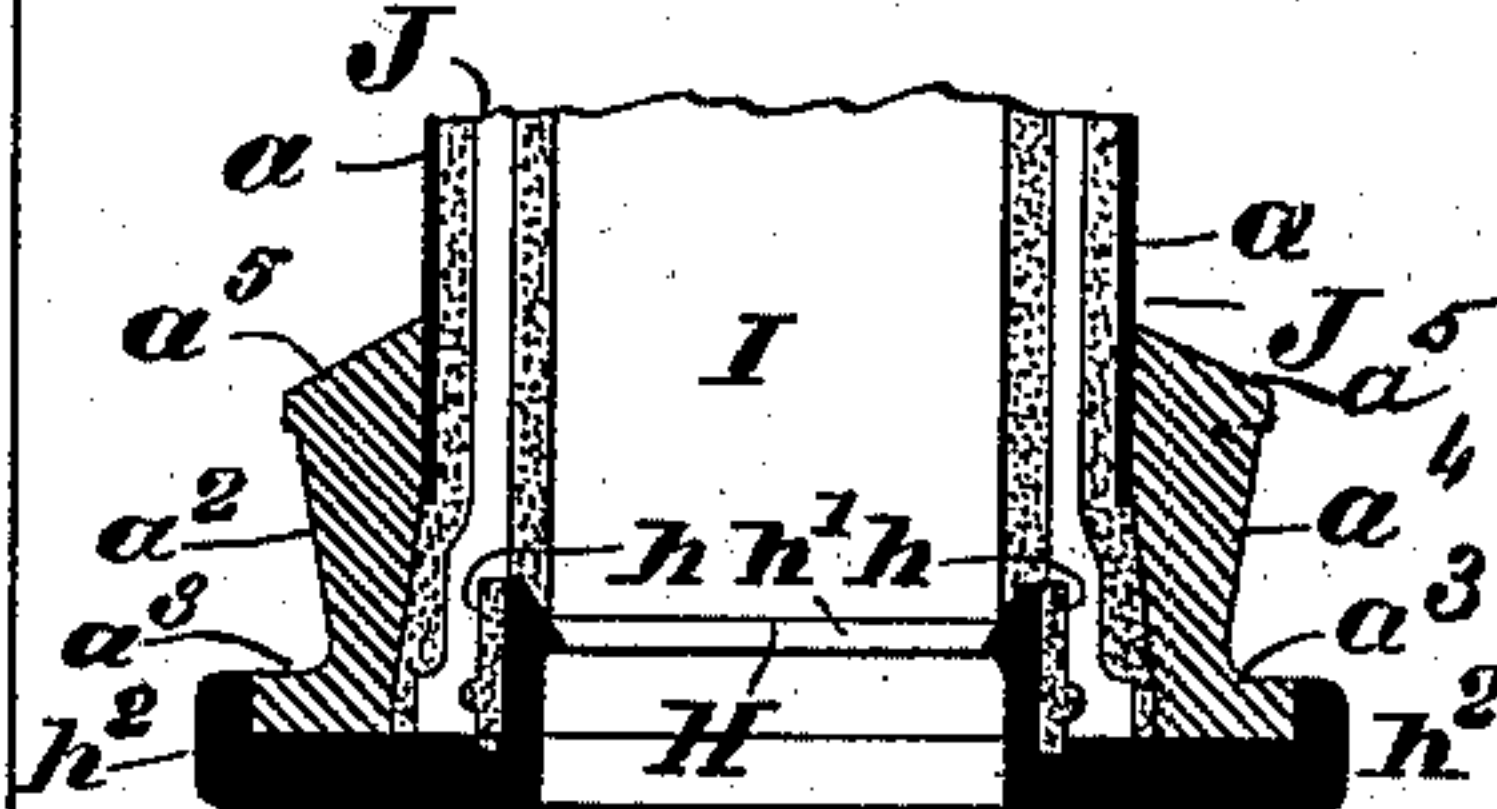
**Fig. 8.**



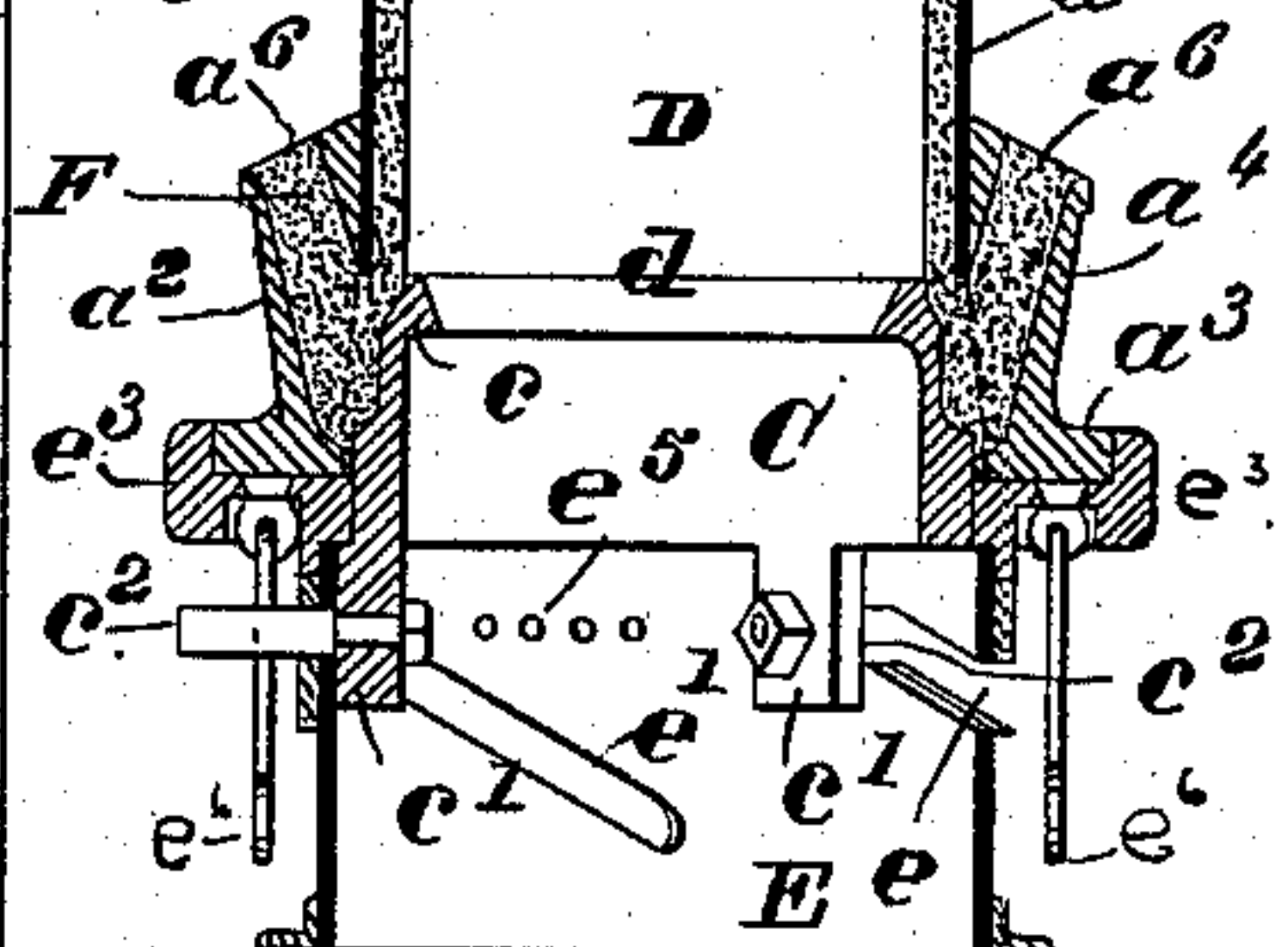
**Fig. 9.**



**Fig. 10.**



**Fig. 11.**



Inventor:

Frederick Shickle,  
by C. P. Moody, atty.



# UNITED STATES PATENT OFFICE.

FREDERICK SHICKLE, OF ST. LOUIS, MISSOURI, ASSIGNOR OF TWO-THIRDS  
TO JOHN W. HARRISON AND THOMAS HOWARD, BOTH OF SAME PLACE.

## PIPE MOLDING AND CASTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 255,891, dated April 4, 1882.

Application filed November 21, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, FREDERICK SHICKLE, of St. Louis, Missouri, have made a new and useful Improvement in Pipe Molding and Casting Apparatus, of which the following is a full, clear, and exact description, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is a side elevation of the improved flask; Fig. 2, a plan of the parts shown in Fig. 3; Fig. 3, a side elevation of the parts shown in Fig. 2, being the upper end of the flask and pattern; Fig. 4, a vertical section taken on the line  $x x$  of Fig. 2; Fig. 5, a horizontal section taken on the line  $x x$  of Fig. 6, a portion being broken away; Fig. 6, a side elevation of the lower end of the flask, and showing the temporary bottom in position; Fig. 7, a vertical section taken through the upper end of the flask and core; Fig. 8, a plan of the flask as ready for casting; Fig. 9, a side elevation of the temporary bottom and supporting-stand; Fig. 10, a vertical section taken through the lower end of the flask upon the line  $x x$  of Fig. 5, showing the pattern and other parts as for casting, and Fig. 11 a vertical section taken on the line  $x' x'$ , Fig. 5, through the lower end of the apparatus, the parts being as when the sand is being rammed.

The same letters denote the same parts.

To provide an improved flask and apparatus for molding and casting pipes the bell end downward is my present aim.

It relates partly to the construction of the flask at the lower end, partly to the apparatus employed in forming the lower part of the mold, partly to the means used in forming the upper part of the mold, and partly to the means used at the upper end of the flask in casting the pipe.

In the drawings, A represents the improved flask, having the shell or body  $a$ , the flange  $a'$  at the upper end of the body  $a$ , and the part  $a^2$  at the lower end of the part  $a$ , and being the part immediately used in molding the bell of the pipe. The sand in this part of the flask as heretofore made cannot be rammed from the top of the flask, and therefore it has been customary to ram it separately in a part which, for the time being, is detached from the main portion of the flask, and afterward to attach it to

the main portion of the flask and complete the ramming from the top of the flask. In the present construction the part  $a^2$  is permanently attached to the body  $a$  of the flask, and it is made as shown in Figs. 1, 6, 10, and 11, being in diameter sufficiently large for molding that end of the pipe, and consisting of a base,  $a^3$ , and a flange,  $a^4$ , that extends upward past the lower end of the shell  $a$ , and at its upper end being larger in diameter than the shell  $a$ , but connected therewith by the ties  $a^5$ . Between the ties are openings  $a^6$ , through which the sand and the ramming implements can be introduced. The parts  $a a' a^2$  are thus permanently connected, and in practice swing as one piece, and in the usual manner, upon the pit-wall B.

C represents a temporary bottom used in forming the mold. It is of the size and shape externally of the bell end of the pipe being molded, and at  $c$  has a seat to receive the end  $d$  of the pattern D, and at  $c' c' c'$  is furnished with lugs which project downward from the main portion of the bottom, and are provided with studs  $c^2 c^2 c^2$ . The lugs come inside a circular stand, E, and the studs  $c^2$  project through and are arranged to work in slots  $ee' ee' ee'$  in the stand E. The portion  $e$  of the slots is horizontal, and the remaining portion,  $e'$ , inclined, as shown. The stand, through the studs  $c^2$ , supports the bottom C, whether in the flask, as in Figs. 6 and 11, or detached from the flask, as in Fig. 9. To enable the bottom to be supported in position within the flask, the stand E is furnished with a flange,  $e^3$ , which is shaped to fit the base  $a^3$  and be clamped thereto by suitable clamps, such as  $e^4$ . The stand may have perforations  $e^5$ , for the purpose hereinafter explained, and handles  $e^6$  for lifting it. The flask being ready for receiving the sand, the bottom C is attached thereto, as shown in Figs. 6, 11, and the pattern D placed in position, being dropped into place and held by its end  $d$  entering and resting in the seat  $c$ . The sand F is then rammed, being introduced and rammed first through the openings  $a^6$  and until the mold is formed to above the bell part, and then down from the top of the flask. A ring, G, is slipped onto the upper end of the pattern and upheld in position by means of the wings  $g$ , with which the ring is provided, resting upon a flange,  $a'$ , as seen in Figs. 2, 3,



4. The ring has a bead,  $g'$ , which for the time being forms a portion of the pattern and enables a recess of corresponding shape to be formed in the sand, which, as afterward explained, is made use of in forming the bead at the upper end of the pipe. The sand having been rammed up to the level of the ring G, and as shown in Fig. 4, the main pattern D is withdrawn from the flask, as well as the bottom C and ring G. The latter serves to keep the sand from breaking away as the pattern is lifted from the flask, the ring being held in place by means of the clamps  $G' G'$ .

To prevent breaking the sand away at the lower end of the flask, the bottom C is not drawn directly downward, but is first rotated a short distance around and then dropped, the desired movement of the bottom being accomplished by moving the studs  $c^2$  in the slots  $e e'$ , the direction in which the latter are extended causing the bottom first to be twisted horizontally sufficiently to part from the sand, and then to drop sufficiently for the bottom to be well clear of the part  $a^2$  of the flask. The clamps  $e^4$  are then loosened and the stand and bottom entirely detached from the flask. The temporary bottom, pattern, and ring G being withdrawn from the flask, the bottom H (which to distinguish it from the temporary bottom may be styled the "permanent" bottom) and the core I are attached and inserted in the flask.

The bottom H is of the usual description, having a suitably-shaped coating at  $h$  to form the inside of the bell end of the pipe J, Fig. 10, and having a seat,  $h'$ , to receive, guide, and hold the core I, and a flange,  $h^2$ , which, by means of suitable fastenings, is attached to the flange  $a^3$  of the flask, thereby serving to hold the bottom H in place and uphold the core I during the casting.

Before the casting is performed the core is centered at the upper end, and means are brought into requisition for completing that part of the mold used in forming the bead  $j$  at the upper end of the pipe, and for pouring the metal into the flask and preventing the escape of the metal at the upper end of the flask, and are as follows:

K represents a baked-clay ring, which, when in place, rests, as shown in Fig. 7, upon the flange  $a'$  encircling the core I. At its under side, next to the core, the ring is shaped, as shown, to complete that part of the mold used in forming the upper half of the bead  $j$  of the pipe. The projection  $k$  on the ring also serves, by fitting into the depression in the sand at that point, to center the ring, and ultimately the core. The ring K is then clamped down to the flange  $a'$ , and by means of the clamp L, which in turn consists of a band,  $l$ , having hooks  $l' l' l'$ , made to fit and catch on the under side of the flange  $a'$ , and having projections  $l^2 l^2 l^2$ , which project inwardly and to come above the ring K, as shown in Fig. 7. Wedges  $l^3$  are then inserted between the projections  $l^2$  and ring K, holding the latter se-

curely down in place, and so that when the metal is poured it will not, by reason of its ferromagnetic force, escape or leak between the ring and flange.

To enable the hooks  $l'$  to pass the flange  $a'$  in putting the clamp L in place, the flange  $a'$  has openings  $a^7$ , through which the hooks  $l'$  are passed, and then the ring is turned around until the hooks are out of line with the openings  $a^7$ . The ring K and clamp L being in place, a basin is formed at the top of the mold by means of a ring, M, which rests upon the ring K, and is suitably coated with clay,  $m$ . No sand is placed within the ring M, as the aim of this feature of the improvement is to provide for pouring the metal, so that no sand shall be carried with the metal into the mold—a difficulty liable to occur when a cope lined with sand is employed. Sand, however, is placed between the ring M and band  $l$ , the basin and sand  $m'$  aiding in holding the ring K down in place and the sand packing the joint between the rings K and M. The metal is then poured into the basin, and thence into the flask, the metal running from the basin through passages  $k'$  in the ring K.

By not employing a sand-basin at the top of the flask, as hitherto has been customary, and instead using a metallic ring, M, having simply a clay wash or lining,  $m$ , the liability of carrying sand or clay along with the molten metal into the flask is practically obviated. The ring M is made preferably somewhat larger at the lower end, enabling the ring to be readily detached from the runner that forms in casting at the top of the flask. When the ring M is made smaller at the lower end it is made in sections  $m^2 m^2 m^2$ , Fig. 8, to enable it to be detached from the runner.

The turning of the bottom C in the stand E is conveniently effected by inserting a lever (not shown) in one of the perforations  $e^5$  as a fulcrum and connecting the lever and one of the studs  $c^2$  by a suitable tie—such as a chain—and then applying power to the lever.

I claim—

1. In a pipe-molding apparatus, the bottom C, said bottom being rotatable horizontally and movable vertically in its support, for the purposes described.

2. In a pipe-molding apparatus, the bottom C, said bottom being rotatable horizontally in its support, for the purpose described.

3. In a pipe-molding apparatus, the bottom C, said bottom being movable vertically in its support, for the purpose described.

4. The combination of the bottom C, having the lugs  $c'$  and studs  $c^2$ , and the stand E, having the slots  $e e'$ , substantially as described.

5. The flask A, having the part  $a^2$ , having openings  $a^6$ , for the purpose described.

6. The flask A, having the openings  $a^6$ , and the bottom C, for the purpose described.

7. A pipe-molding flask for molding pipes the bell end downward, having openings, such as  $a^6$ , for the purpose described.



8. The combination of the flask A, having the openings  $a^6$ , the bottom C, and the stand E, substantially as described.

5 9. The combination of the bottom C, lugs  $c'$ , studs  $c^2$ , and the slotted stand E, having the perforations  $e^5$ , substantially as described.

10. The combination of the flask A, pattern D, and ring G, having the wings  $g$ , and bead  $g'$ , substantially as described.

10 11. The combination of the flask A, having the flange  $a'$ , the ring K, and the clamp L, substantially as described.

12. The combination of the flask A, flange

$a'$ , having the openings  $a^7$ , the clamp L, having the band  $l$ , hooks  $l'$ , and projections  $l^2$ , and 15 the ring K, substantially as described.

13. The combination of the flask A, the ring K, the clamp L, and the ring M, substantially as described.

14. The combination of the flask A, the ring 20 M, the band  $l$ , and the sand  $m'$ , substantially as described.

FREDERICK SHICKLE.

Witnesses:

CHAS. D. MOODY,  
THOS. L. JONES.