

No. 791,074.

PATENTED MAY 30, 1905.

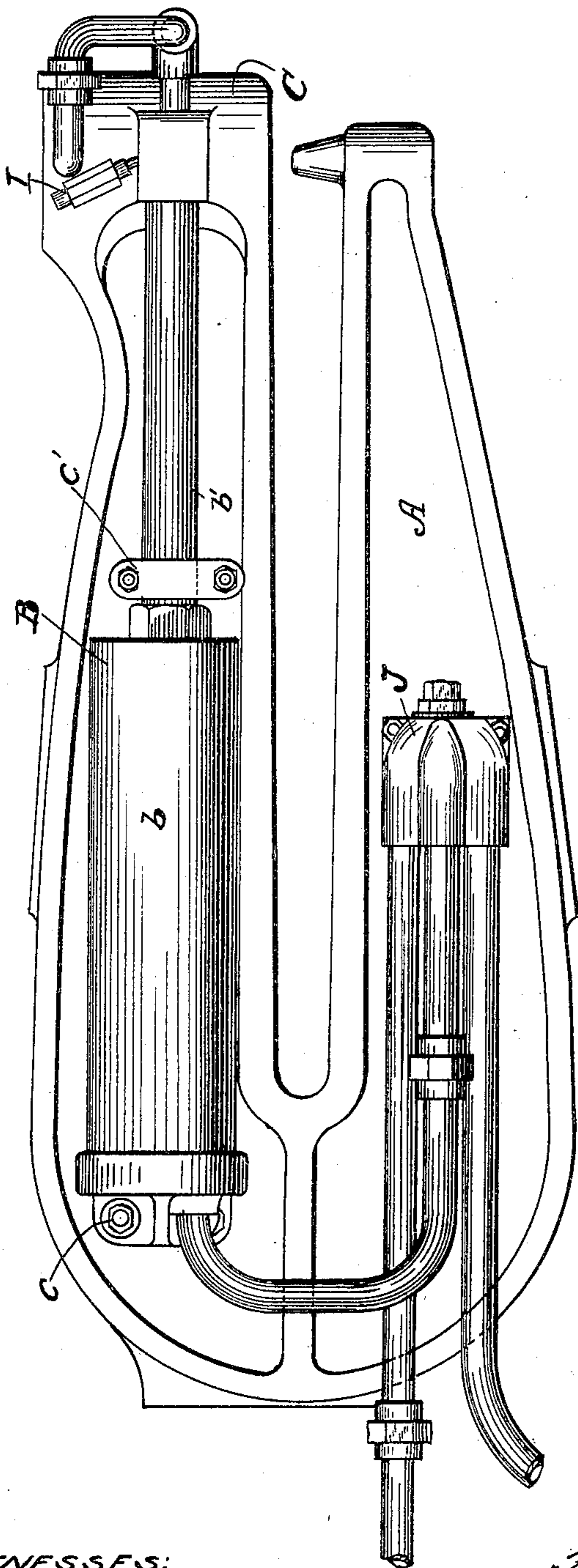
H. A. CARPENTER.

HYDRAULIC PLATE CLOSING AND RIVETING MACHINE.

APPLICATION FILED APR. 9, 1898.

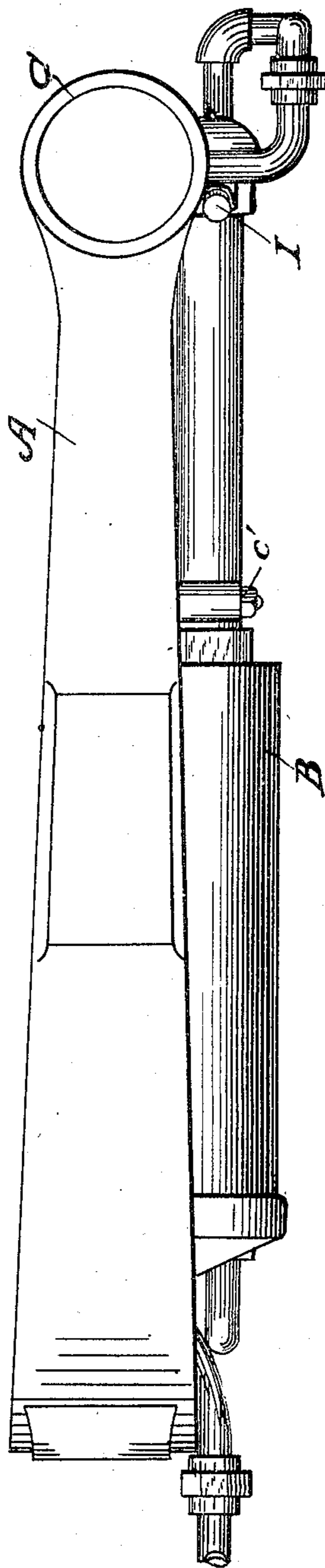
4 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:
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Fig. 2.

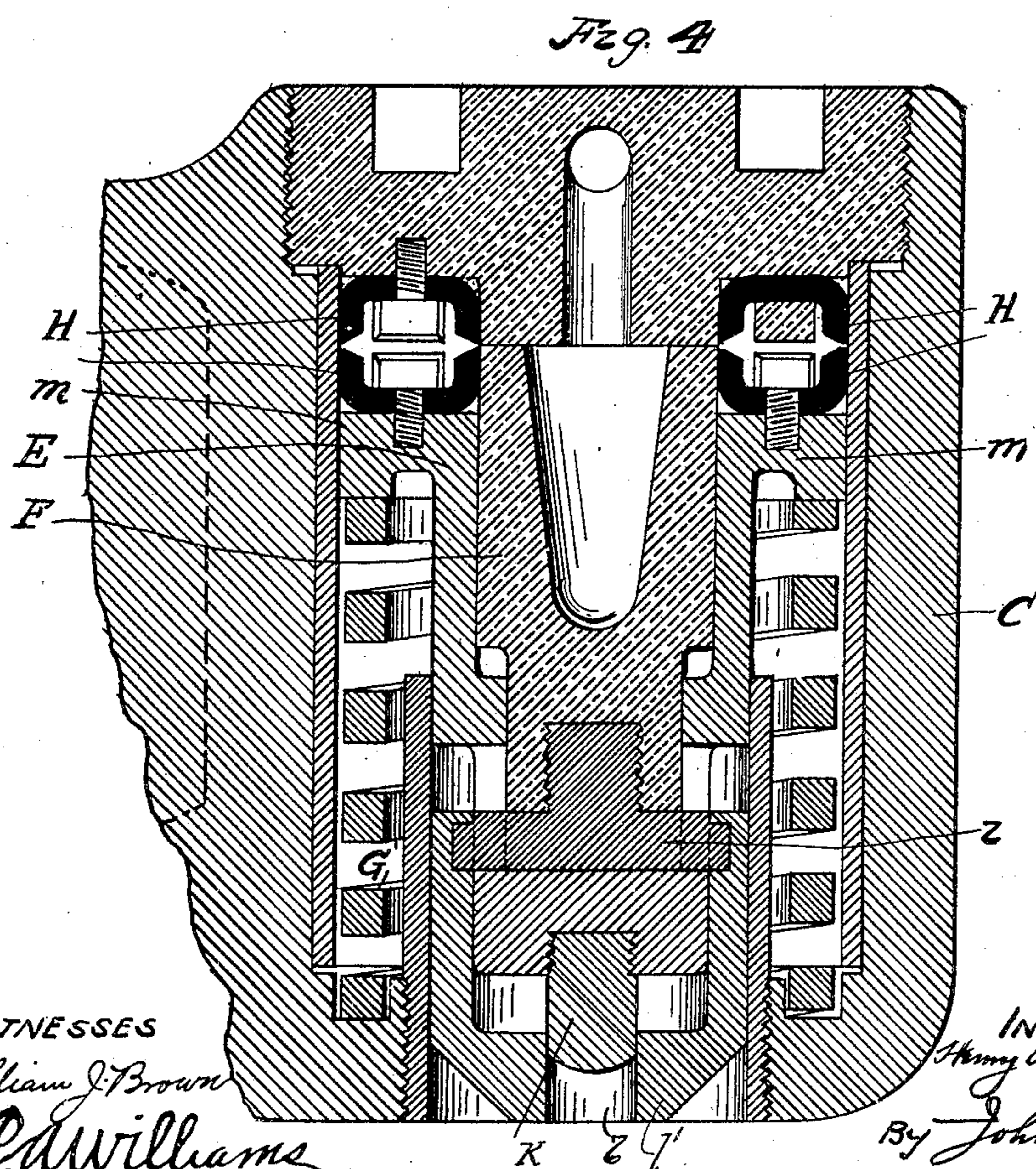
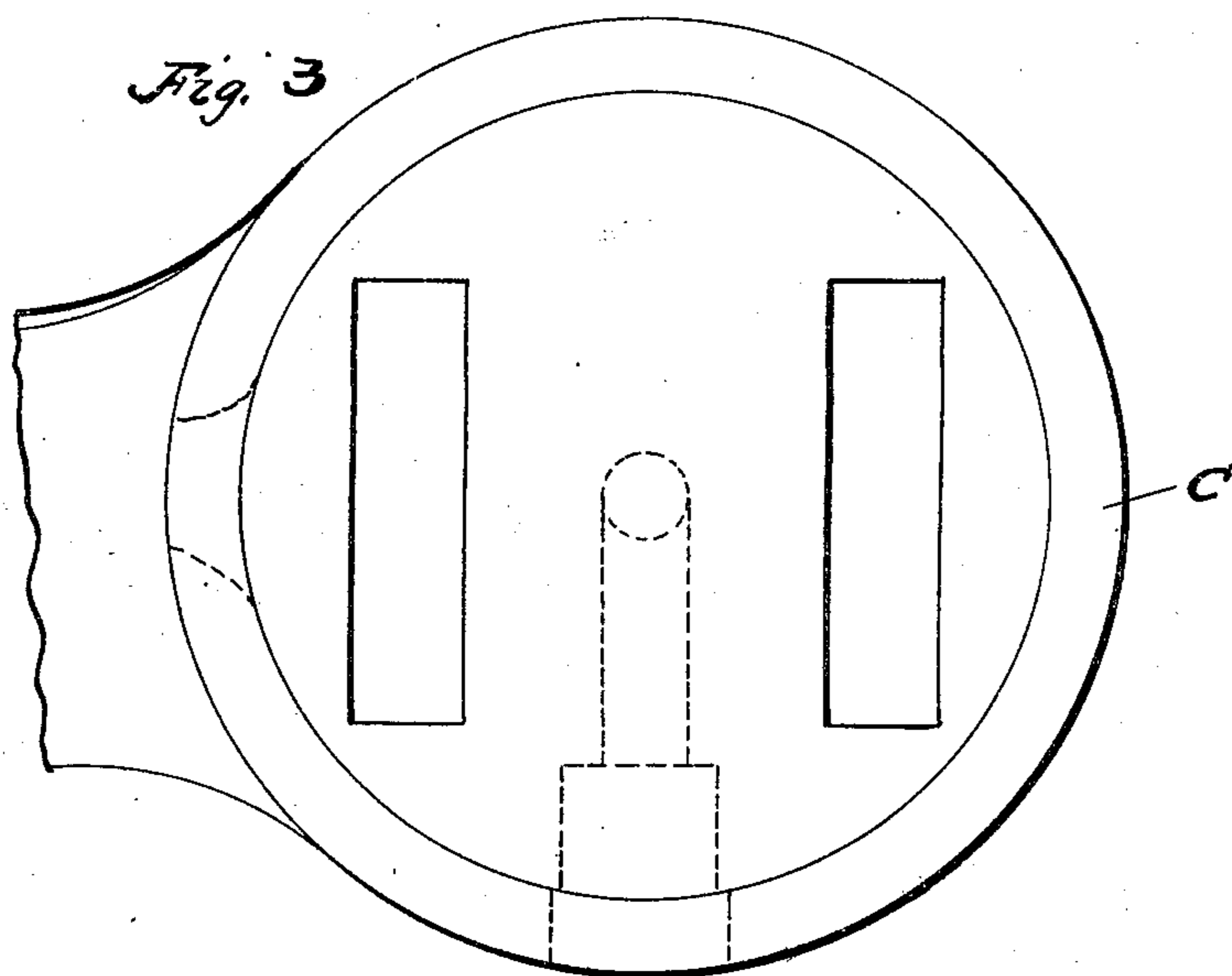


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4 SHEETS—SHEET 2.



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4 SHEETS—SHEET 3.

Fig. 5

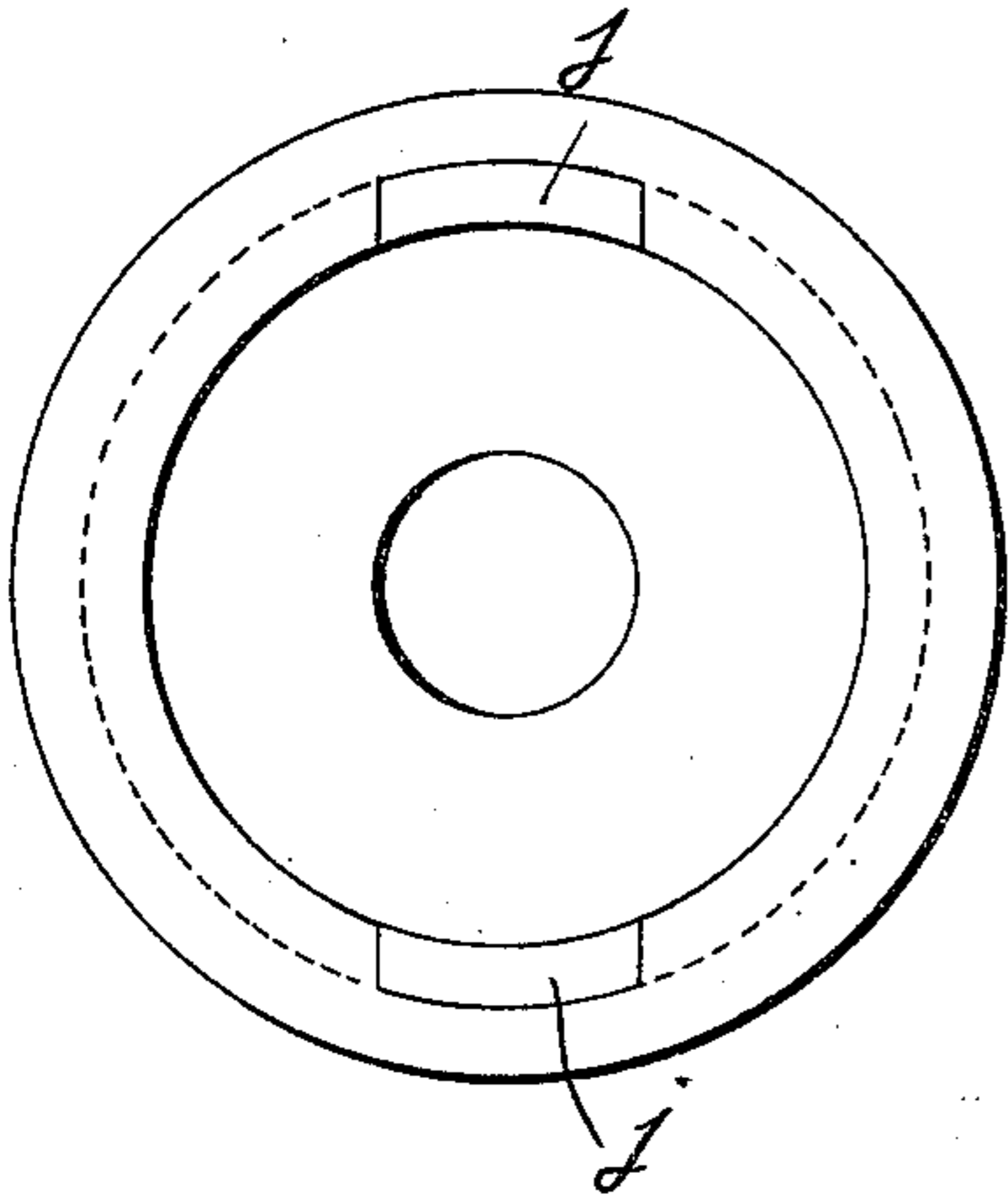


Fig. 9

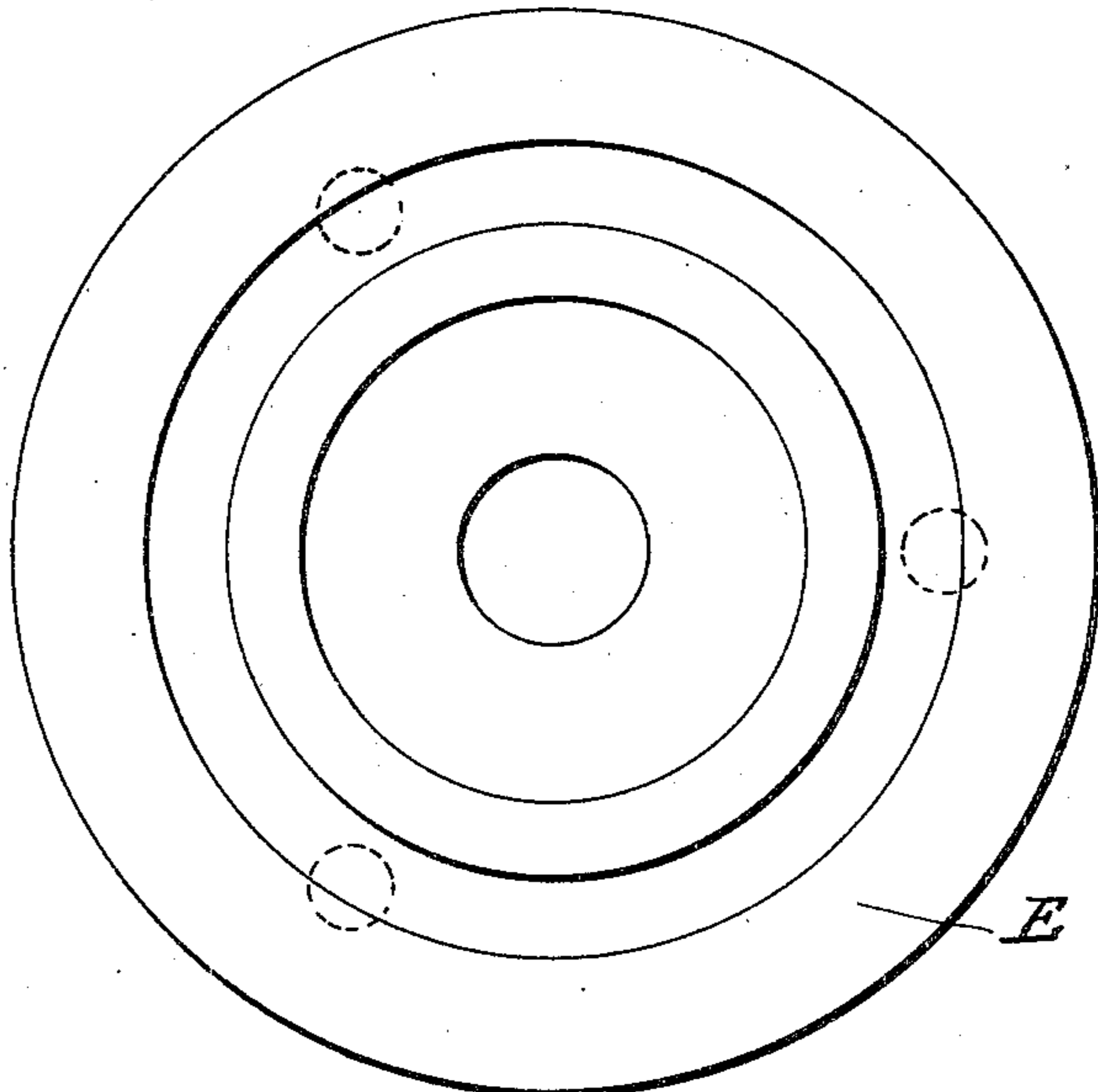


Fig. 6

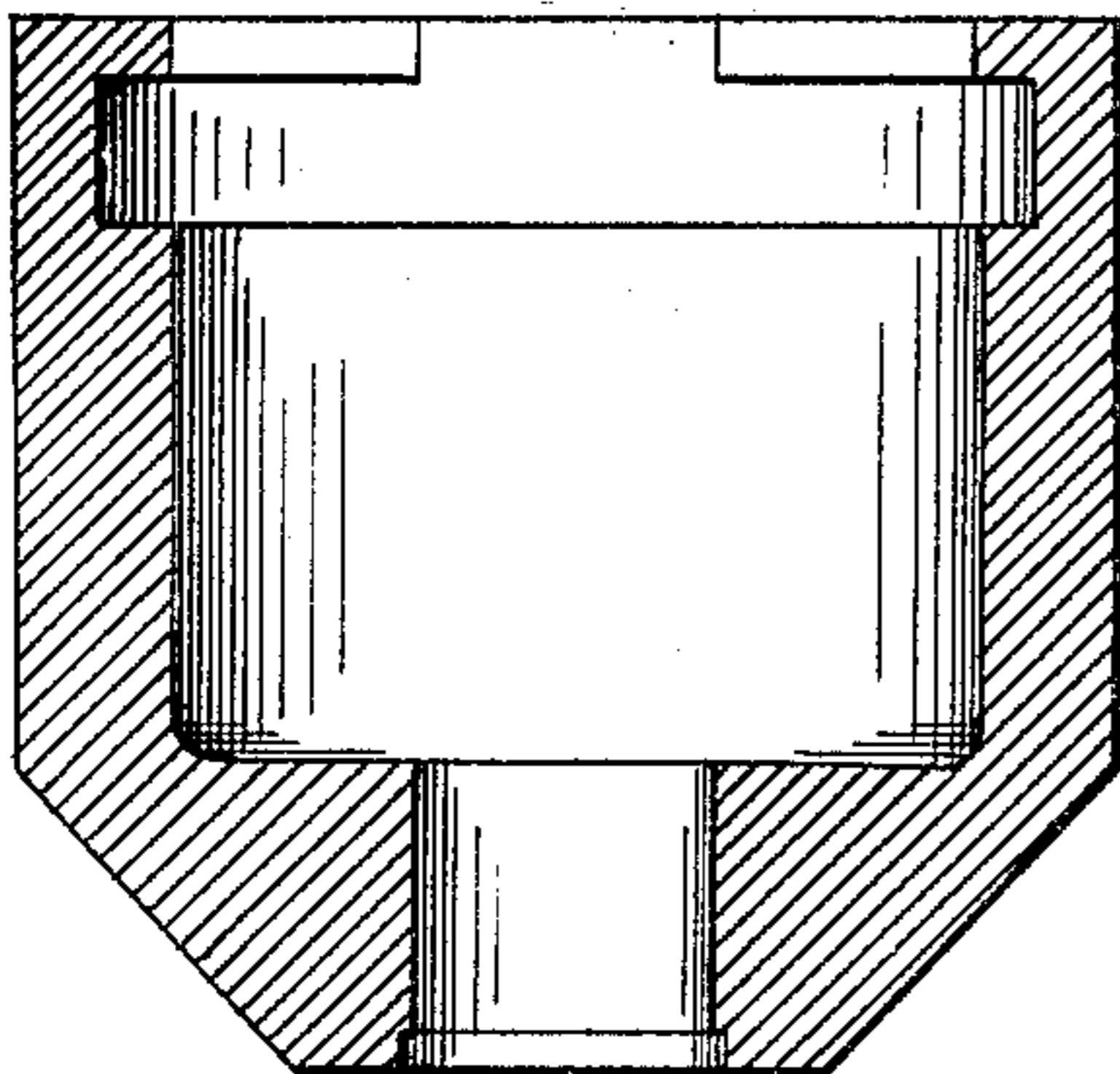


Fig. 10

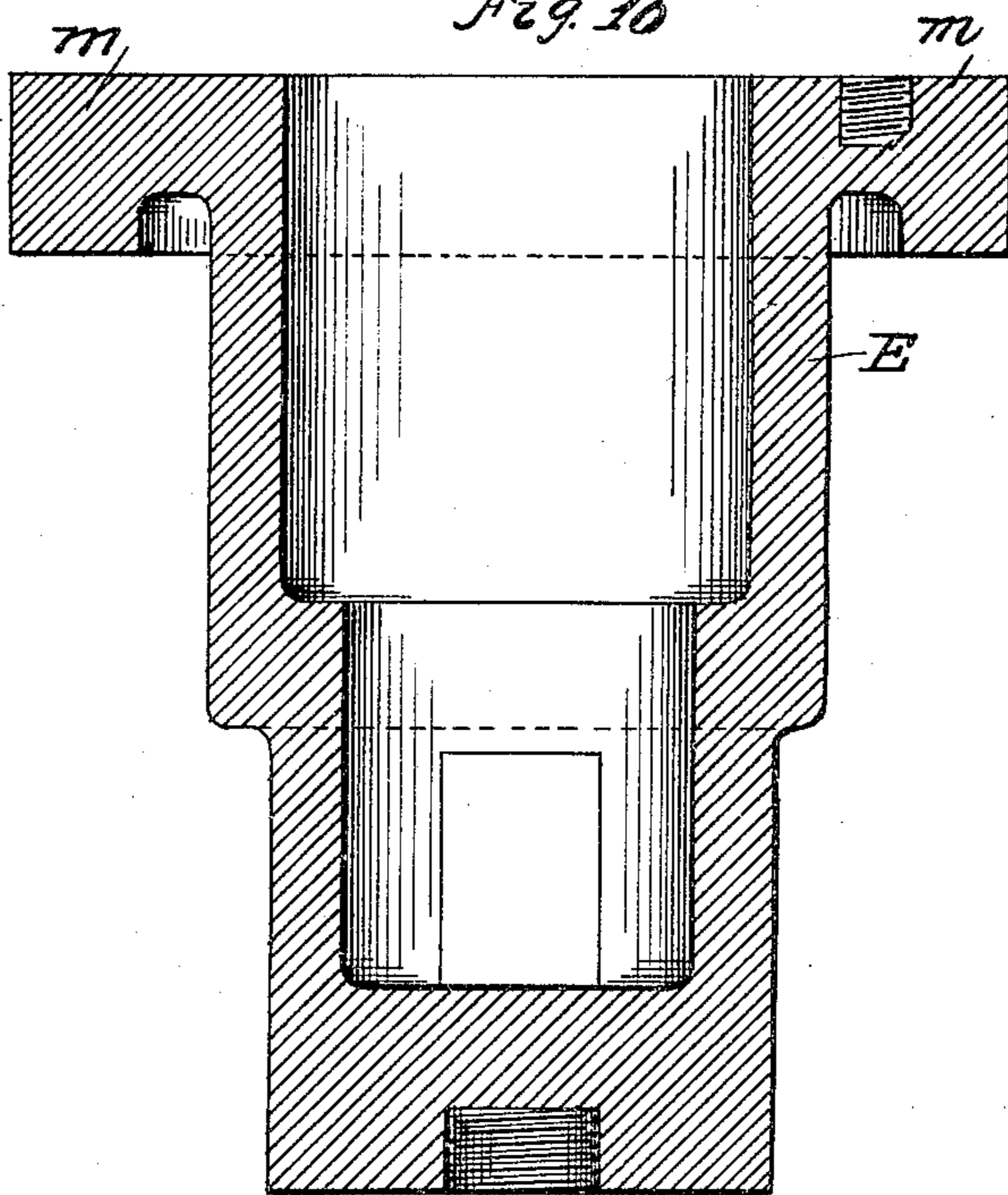
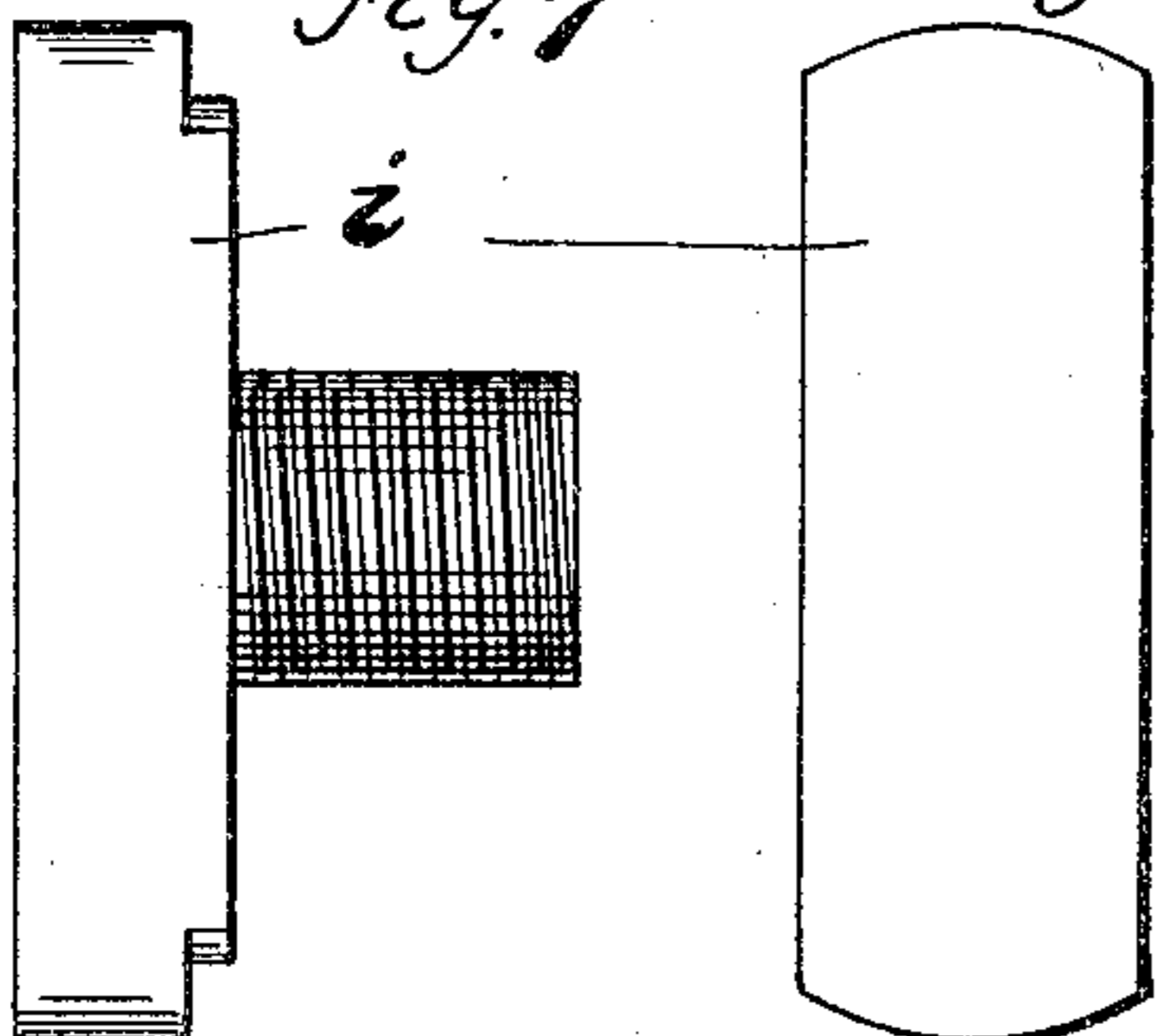


Fig. 7

Fig. 8



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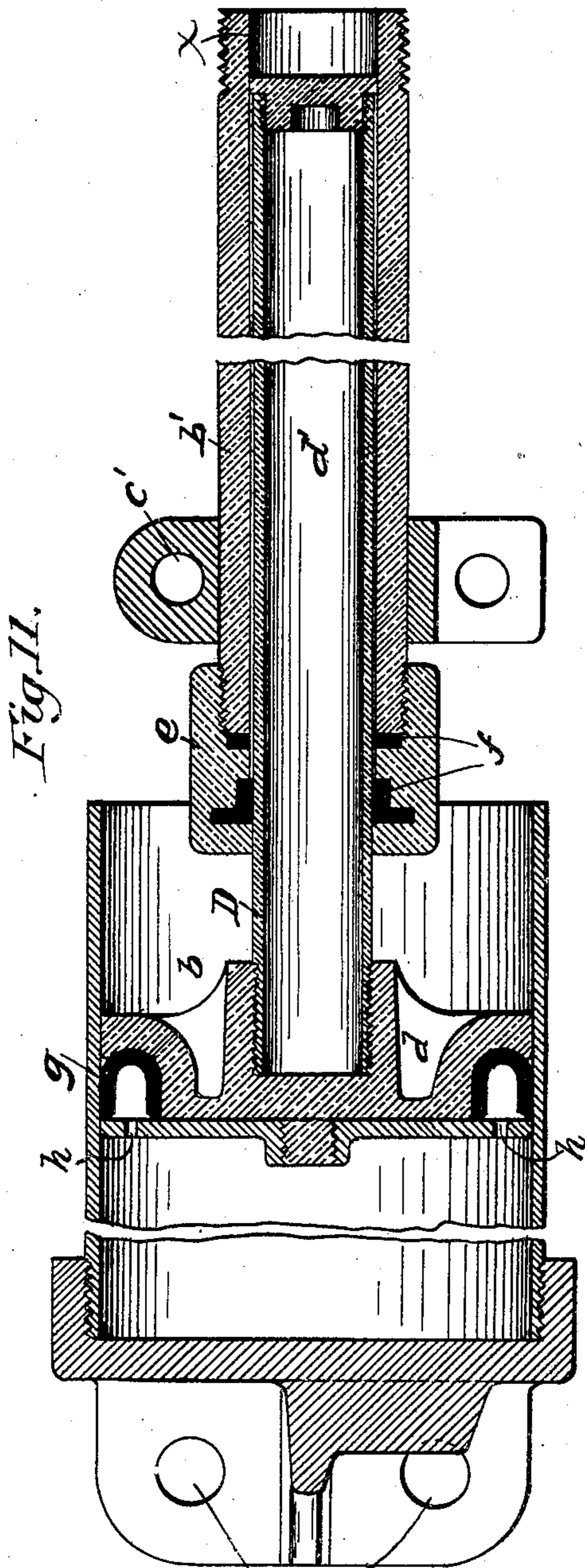
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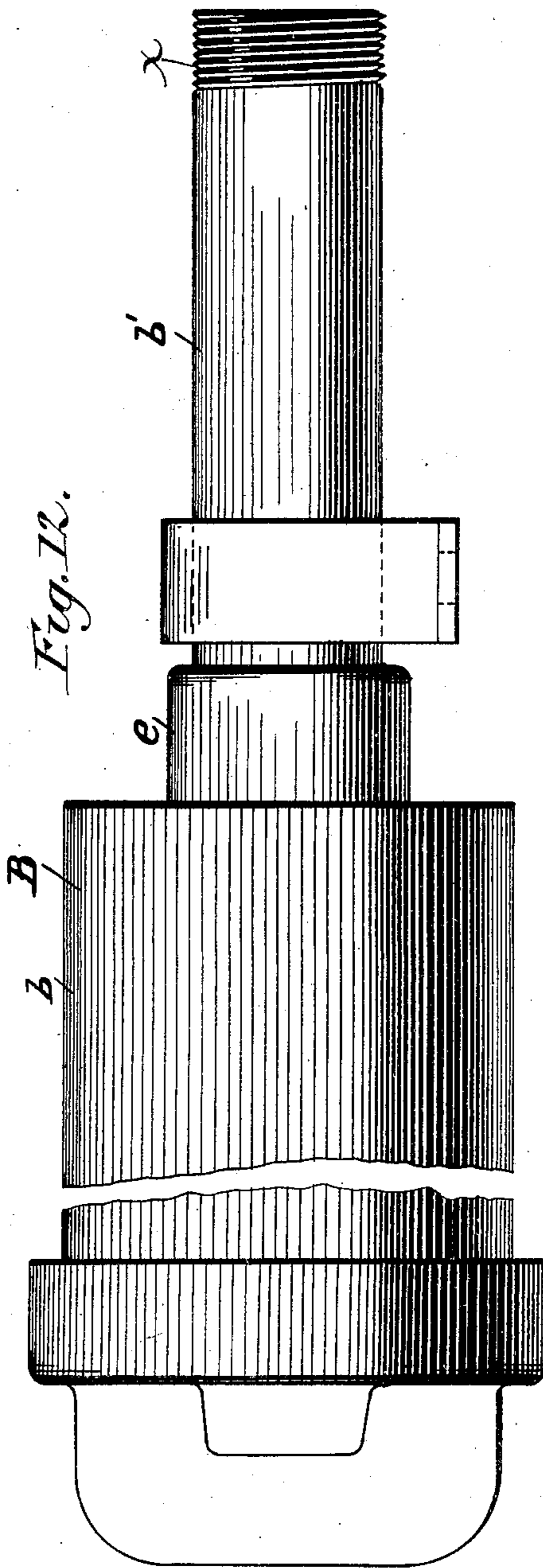
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

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HYDRAULIC PLATE CLOSING AND RIVETING MACHINE.

SPECIFICATION forming part of Letters Patent No. 791,074, dated May 30, 1905.

Application filed April 9, 1898. Serial No. 677,106.

To all whom it may concern:

Be it known that I, HENRY ALBERT CARPENTER, a citizen of the United States of America, residing at Sewickley, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Hydraulic Plate Closing and Riveting Machines; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form a part of this specification, in which—

Figure 1 indicates a side elevation of my improved hydraulic pneumatic plate closing and riveting machine. Fig. 2 is a plan view of the same. Fig. 3 is a plan view of the hydraulic cylinder. Fig. 4 is a longitudinal section of the same. Fig. 5 is a plan view of the inner end of the plate-closing tool. Fig. 6 is a longitudinal section of the same. Fig. 7 is an elevation of the connecting-cap. Fig. 8 is a plan view of the same. Fig. 9 is a plan view of the riveting plunger or piston. Fig. 10 is a longitudinal sectional view of the same. Fig. 11 is a longitudinal section of the pneumatic attachment. Fig. 12 is an elevation of the same.

My invention relates to improvements in direct-acting hydraulic pneumatic plate closing and riveting machines. Heretofore, so far as I am aware, machines of this character have been provided with a number of movable packing-rings and the admission and exhaust of the operating fluid or element controlled by a number of valves or cocks.

The object of my invention is to produce an improved plate closing and riveting machine in which but one packing-ring is needed in the hydraulic cylinder and the entire operation of the machine controlled or operated by one three-way valve or cock, which not only simplifies the construction of the machine, but adds largely to the efficiency and capacity of the same.

Another object attained by my device is the production of a machine in which the plate-closing device is directed against the plates with sufficient force to close the same and

square the machine with the rivet before the riveting-tool touches the rivet, the maximum pressure of both tools being exerted almost immediately thereafter and simultaneously to upset the rivet and thoroughly close the plates; and to these purposes my invention consists in the novel construction and arrangement of parts hereinafter specifically set forth, reference being had to the accompanying drawings, forming part hereof, in which like reference characters indicate like parts wherever they occur.

Referring now to said drawings, A is a frame, to which said plate closing and riveting machine may be secured in any suitable manner.

B is the pneumatic attachment, consisting of the cylinders *b* and *b'*, the latter of which is connected to the hydraulic cylinder C. Said cylinders *b* and *b'* are independently secured to the upper arm of the frame at *c* and *c'*, respectively, and contain the differential plunger D, the larger end *d* of which is contained in said cylinder *b* and the smaller end *d'* projects through the sleeve *e* and enters the smaller cylinder *b'*. Said sleeve *e* is provided with packing-rings *f f*. The piston-head *d* is also provided with a U-shaped packing-ring *g*, which forms an annular chamber therein in communication with the forward end of said cylinder through the perforations *h*.

The hydraulic cylinder C is connected with the cylinder *b'* at X and contains the riveting-plunger E and the plate-closing plunger F, which is seated and works within the riveting-plunger. Said plate-closing plunger is provided with an annular plate-closing tool *l'*, connected to said plunger by means of the connecting cap or tap *i*, which is screw-threaded and screwed into the bottom of said plunger and is inserted in said plate-closing tool through the opening *j* in the top of the same.

A riveting-tool *k* is screwed into the bottom of the riveting-plunger and is seated in the opening *l* of the plate-closing tool, forming a recess for the reception of the head of the rivet.

G is a large spiral spring mounted between

the shoulder *m* on the riveting-plunger and the bottom of said cylinder, the purpose of said spring being to exert sufficient force against the riveting-plunger for the twofold purpose of maintaining the plate-closing tool normally in advance of the riveting plunger and tool for the purpose of enabling the plate-closing tool to act upon the plates being operated upon for the purpose of closing said plates and squaring the plate with the machine in advance of the pressure exerted by the riveting-tool for the purpose of upsetting the rivet and forming the head thereon. The spring must also exert sufficient force to (after the pressure has been exhausted out of the pneumatic cylinder) exhaust the water or other element from the hydraulic cylinder to cylinder *b'*, to which it is attached, and return the plunger to the position occupied by them when not acted upon by hydraulic or other pressure. It is obvious that instead of said spring the force opposed to the advance of said plunger may be produced by a small hydraulic plunger acting against said riveting-plunger. A U-shaped packing *H*, common to both plungers, serves to make a tight joint in the head of said hydraulic cylinder.

A hydraulic check-valve *I* of any ordinary construction connected to said cylinder may be used for the purpose of supplying water or other element to said cylinder in the event of leakage.

The operation of my device is as follows, viz: The operator by throwing the lever that controls the three-way valve *J* admits air to the rear of the large head of the differential piston in the cylinder *b*, which causes the small plunger to move forward, forcing the water or other element in cylinder *b'* into the head of the hydraulic cylinder *C* and the concavity of the plate-closing plunger *F*, which causes it to advance, and the continued pressure thereafter being supported by the large spring *G* until the plate-closing tool has adjusted the plates, as heretofore stated, when the maximum pressure on both plungers is exerted upon the riveting-tool, upsetting the rivet and forming the head thereon, the retraction of the spring after the exhaust of the pneumatic cylinder *b* returning the plungers to the position occupied by the same when not in operation.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a machine of the class described, the

combination with a hydraulic cylinder, of a plate-closing plunger having a plate-closing tool, and a riveting-plunger having a riveting-tool, the plate-closing plunger extending through the riveting-plunger to the head of the cylinder, means for producing and controlling the supply of hydraulic pressure to the cylinder, a cushioning and reactionary spring coöperating with the riveting-plunger, and means on the respective plungers permitting a limited relative movement thereof and whereby the action of the spring on the riveting-plunger causes the riveting-tool to be normally held farther retracted than the plate-closing tool so that said plate-closing tool is normally in advance thereof and whereby both of said plungers are returned simultaneously to normal position by the spring after the operation of riveting has been completed, said plungers being both exposed to the initial hydraulic pressure, whereby they both advance together until the plate-closing tool is arrested by the plate and thereupon the riveting-tool receiving the maximum hydraulic pressure.

2. In a machine of the class described, the combination with a hydraulic cylinder, of a riveting-plunger having slots or openings in its sides, a plate-closing plunger working in the riveting-plunger, a plate-closing tool which receives the end of the riveting-plunger, and a connecting-cap secured to the plate-closing plunger and to the plate-closing tool which is adapted to move in the two slots of the riveting-plunger.

3. In a machine of the class described, the combination with a hydraulic cylinder, of a riveting-plunger movable therein having slotted sides, a plate-closing plunger working in the riveting-plunger, a plate-closing tool loosely receiving the end of the riveting-plunger and provided with a concavity or groove in its end which has entrance-slots, and a connecting-cap having a portion secured to the plate-closing plunger and provided with arms which are received in the groove of the plate-closing tool and adapted for movement in the slots of the riveting-plunger.

In testimony that I, HENRY ALBERT CARPENTER, claim the foregoing I have hereunto affixed my signature in the presence of two subscribing witnesses.

HENRY ALBERT CARPENTER. [L. s.]

Witnesses:

H. J. GRAHAM,
C. A. WILLIAMS.