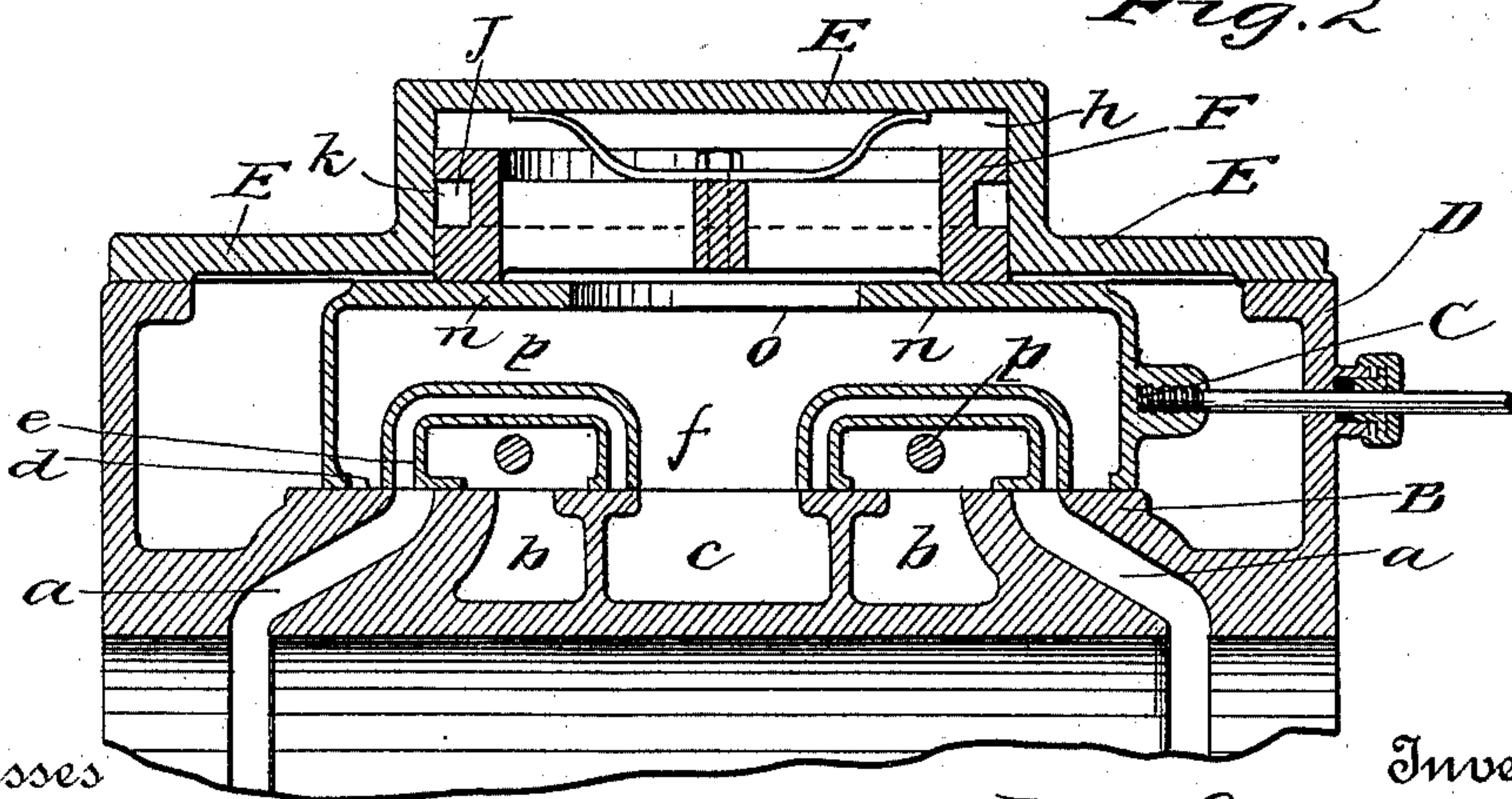
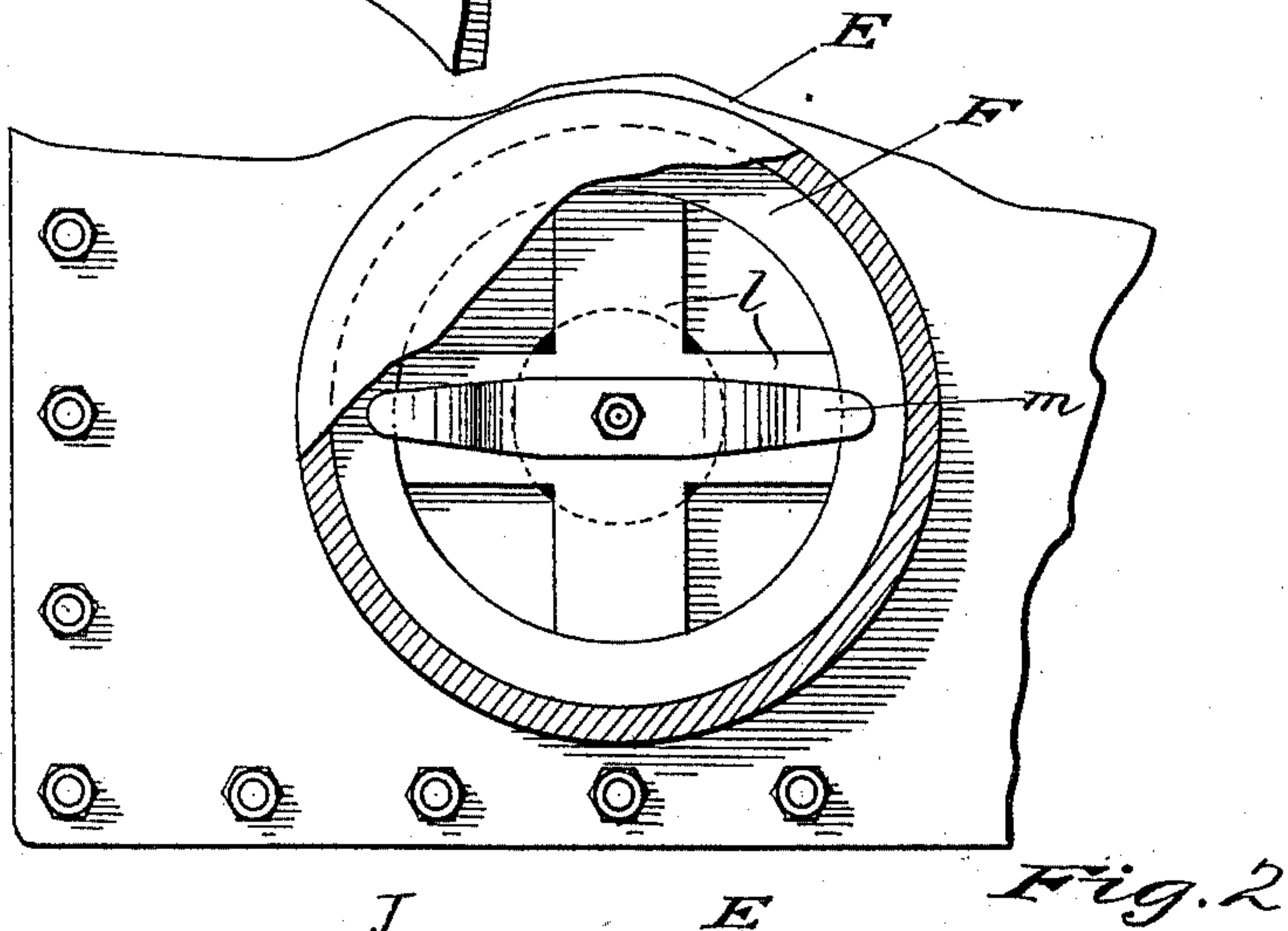
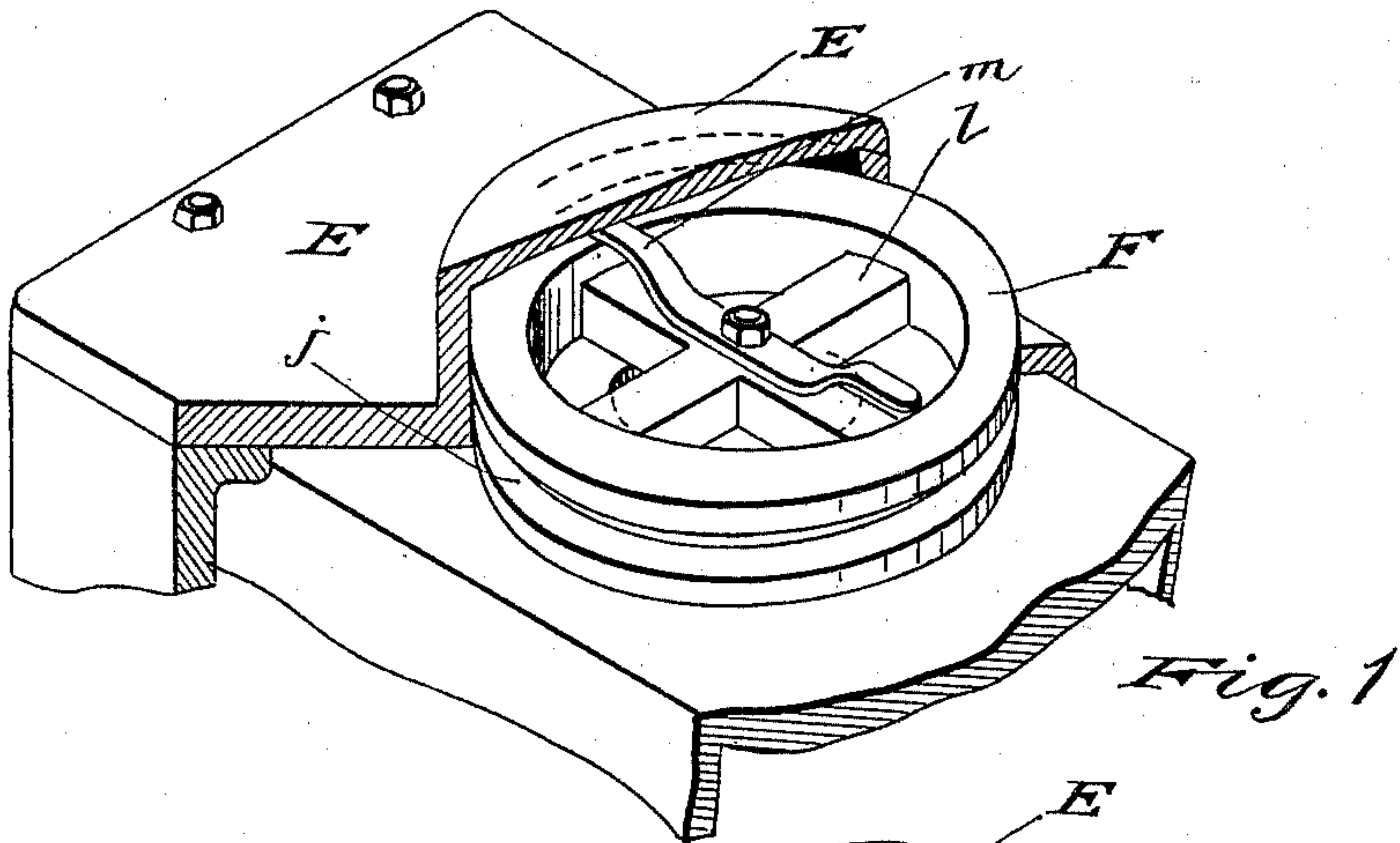


(No Model.)

C. O. HEGGEM.
BALANCED SLIDE VALVE.

No. 489,867.

Patented Jan. 10, 1893.



Witnesses

E. J. Kane

Chas. R. Miller

Inventor

Fig. 3 Charles O. Huggins

By W H Miller

Attorney

UNITED STATES PATENT OFFICE

CHARLES O. HEGGEM, OF MASSILLON, OHIO, ASSIGNOR TO THE RUSSELL & COMPANY, OF SAME PLACE.

BALANCED SLIDE-VALVE.

SPECIFICATION forming part of Letters Patent No. 489,867, dated January 10, 1893.

Application filed August 3, 1892. Serial No. 441,999. (No model.)

To all whom it may concern:

Be it known that I, CHARLES O. HEGGEM, a citizen of the United States, and a resident of Massillon, county of Stark, State of Ohio, have
5 invented a new and useful Improvement in Balanced Slide-Valves, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

10 My invention relates to an improvement in balanced slide valve, the object of which is to provide a simple economical and durable structure resulting in the construction of a slide valve which may be held at equilibrium
15 or as nearly so as is practical, the percentage of downward pressure of which may be previously determined.

20 With these ends in view my invention relates to certain features of construction and combination of parts as will be hereinafter described and pointed out in the claims.

25 Figure 1 of the accompanying drawings is a view in perspective, showing valve chamber cut away disclosing the upper portion of the valve, the packing ring, and a portion of the inclosing cylindrical cap. Fig. 2 a plain view, with a portion of the cylindrical cap removed, to show the top or upper portion of the packing ring and spring. Fig. 3 is a longitudinal section showing the parts in position.

Similar letters of reference indicate corresponding parts in all of the figures of the drawings.

35 A, represents the engine cylinder and B, the valve seat, having steam ports *a* and exhaust ports *b* *c* the steam port by which steam is admitted into the slide valve C, in the face of which are provided admission ports *d*, *e* and
40 *f* through which steam is admitted from the inside of the valve C, and the steam port *c*. The ports *e* serve to reduce the stroke or movement of the valve, and the eccentric by which motion is given thereto.

45 In operation the valve moved to the right six eighths of an inch, will bring ports *d* and *c* over port *a* leading to the engine cylinder and port *f* over steam port *c* through which steam will flow from the inside of the valve
50 C, and steam port *c* to the cylinder, the same

movement of the valve will uncover or open the port *a* in the right hand end of the cylinder to allow the steam in that end of the cylinder to escape through the port *a* under the valve and out through the exhaust *b*. 55

D, represents the valve chamber, and E the lid or cap, in which is provided a cylindrical socket *h*, having placed therein a ring F, having a peripheral groove *j*, in which packing rings *k* are placed, or if preferred a few small
60 grooves adapting the ring for water packing, will serve to form a steam joint between the walls of the recess or socket *h*, and the periphery of the ring. The ring F serves as a continuation of the valve C, which slides there-
65 under, and is provided with arms L as shown; central to the ring is secured the spring *m* having turned up ends that rest against the under side of the cap E, and serve to hold the ring down on the back *n* of the valve. 70
The size of the recess is determined by the combined areas of the ports *d*, *e*, *f*. If the area of the recess *h* is equal to the combined area of the ports *d*, *e*, *f*, the valve will be held in equilibrium, plus the energy of the spring
75 *m* which is provided with just sufficient energy to hold the ring to the back of the valve. But to secure the seating of the valve, the area of the recess *h* should be from fifteen to twenty five per cent. less than the combined area of
80 the ports *d*, *e*, *f*.

In operation steam will pass from the inside of the valve through aperture *o* against the under side of the cap E within the recess *h* and the upper side of the ring by which it is
85 held down on the back of the valve, the up lifting force of the steam being limited to the combined area of the ports *d*, *e*, *f* is overcome by the difference in the area of the ports *d*, *e*, *f* and the area of the recess *h*. The ring F
90 being held in equilibrium by the up pressure of the steam under the back *n* of the valve. Apertures as *p* in the side of the valve connect the valve chamber and the exhaust ports
95 *b* through which whatever steam may have reached the chamber, may pass out, thus relieving the valve from outside steam pressure in the chamber. The top surface of the back
100 *n* of the valve is surfaced, as the face, and the ring F, ground and adapted thereto, to form

a steam joint between the back of the valve and the ring, the valve to slide under the ring. The advantage gained by this structure in addition to that of balancing the valve is that
5 the face of the valve is not held hard against the valve seat, the ring F being adapted for a slight vertical adjustment for the relief of the valve.

Having thus fully described the nature and
10 object of my invention, what I claim and desire to secure by Letters Patent is:

1. The combination with a steam cylinder having ports *a, b, c, d*, of the slide valve C, having ports *d, e* and *f*, valve chamber D, cap
15 E having a cylindrical recess *h* and a ring F adapted to move vertically therein, and to rest on the back of the valve, and aperture O in said back, circumscribed by said ring, sub-

stantially as described and for the purpose set forth. 20

2. The combination with a steam cylinder having ports *a, b, c* of the valve chamber D, slide valve C, having ports *d, e, f*, cap E, having therein recess *h*, the area of which is less than the area of the ports *d, e, f*, whereby the
25 pressure on the valve may be previously determined, and ring F, adapted for vertical adjustment in said recess, substantially as described and for the purpose set forth.

In testimony whereof I have hereunto set
my hand this 12th day of July, A. D. 1892. 30

CHARLES O. HEGGEM.

Witnesses:

W. K. MILLER,

CHAS. R. MILLER.

It is hereby certified that the assignee, "The Russell & Company," in Letters Patent No. 489,867, granted January 10, 1893, upon the application of Charles O. Heggem, of Massillon, Ohio, for an improvement in "Balanced Slide Valves," should have been described and specified as *Russell & Co.*, instead of "The Russell & Company"; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 6th day of March, 1894.

[SEAL.]

JNO. M. REYNOLDS,
Assistant Secretary of the Interior.

Countersigned:

JOHN S. SEYMOUR,
Commissioner of Patents.