

(No Model.)

A. CAMPBELL.

CUPPED LEATHER PISTON PACKING.

No. 308,239.

Patented Nov. 18, 1884.

Fig. 1.

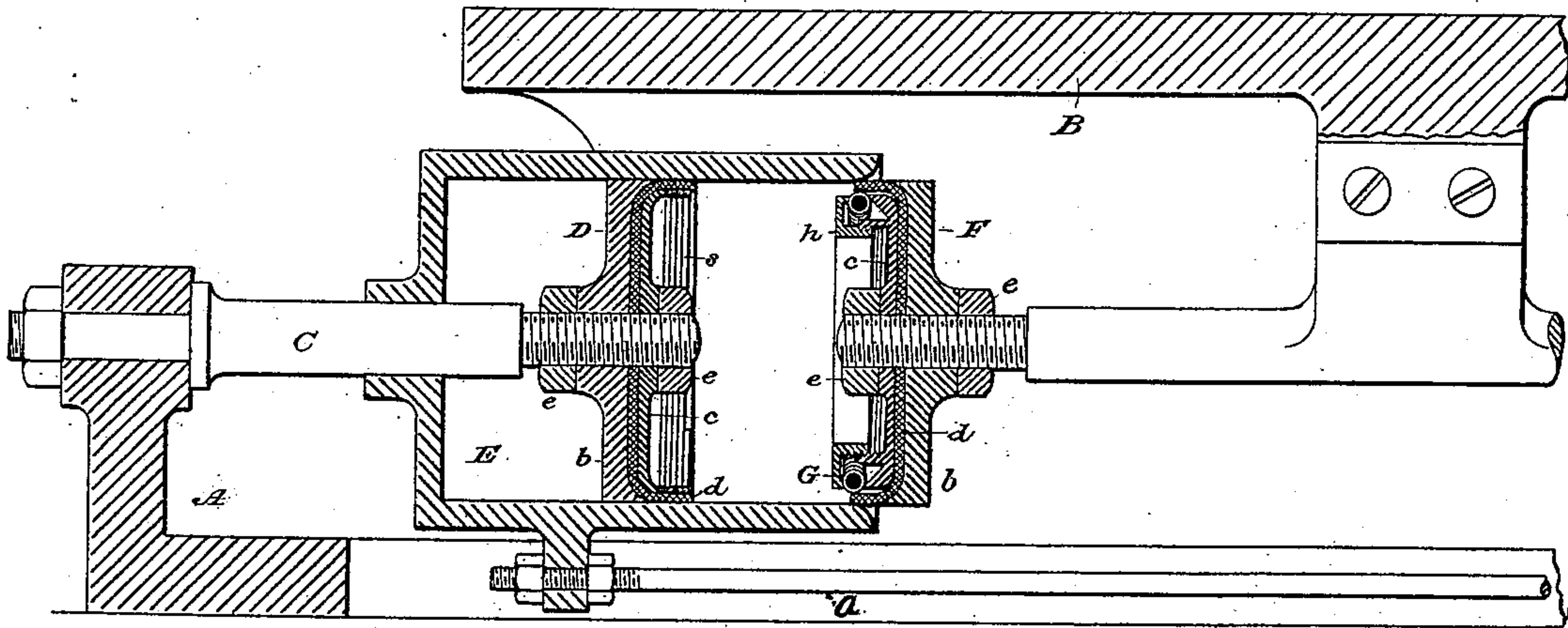


Fig. 2.

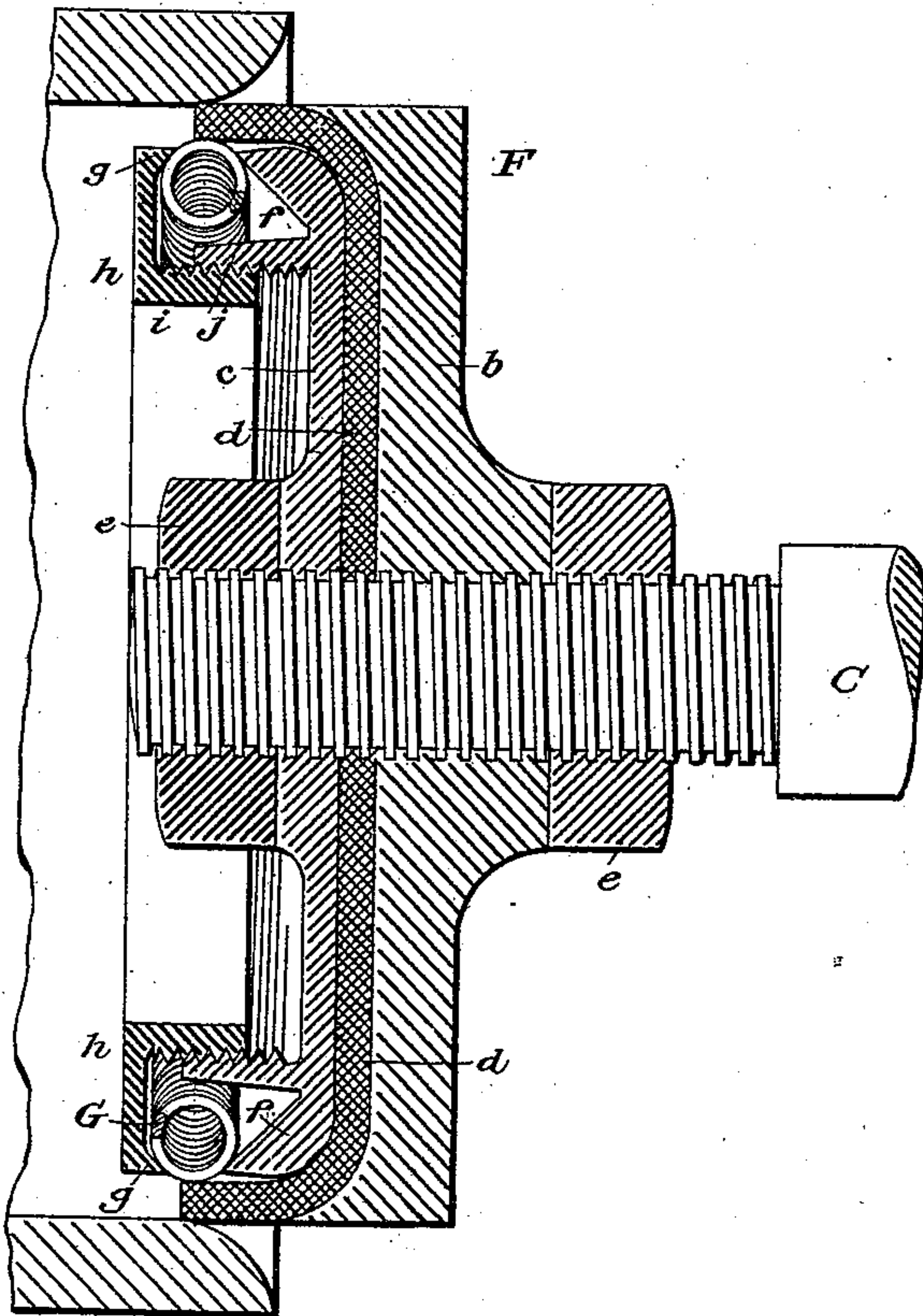
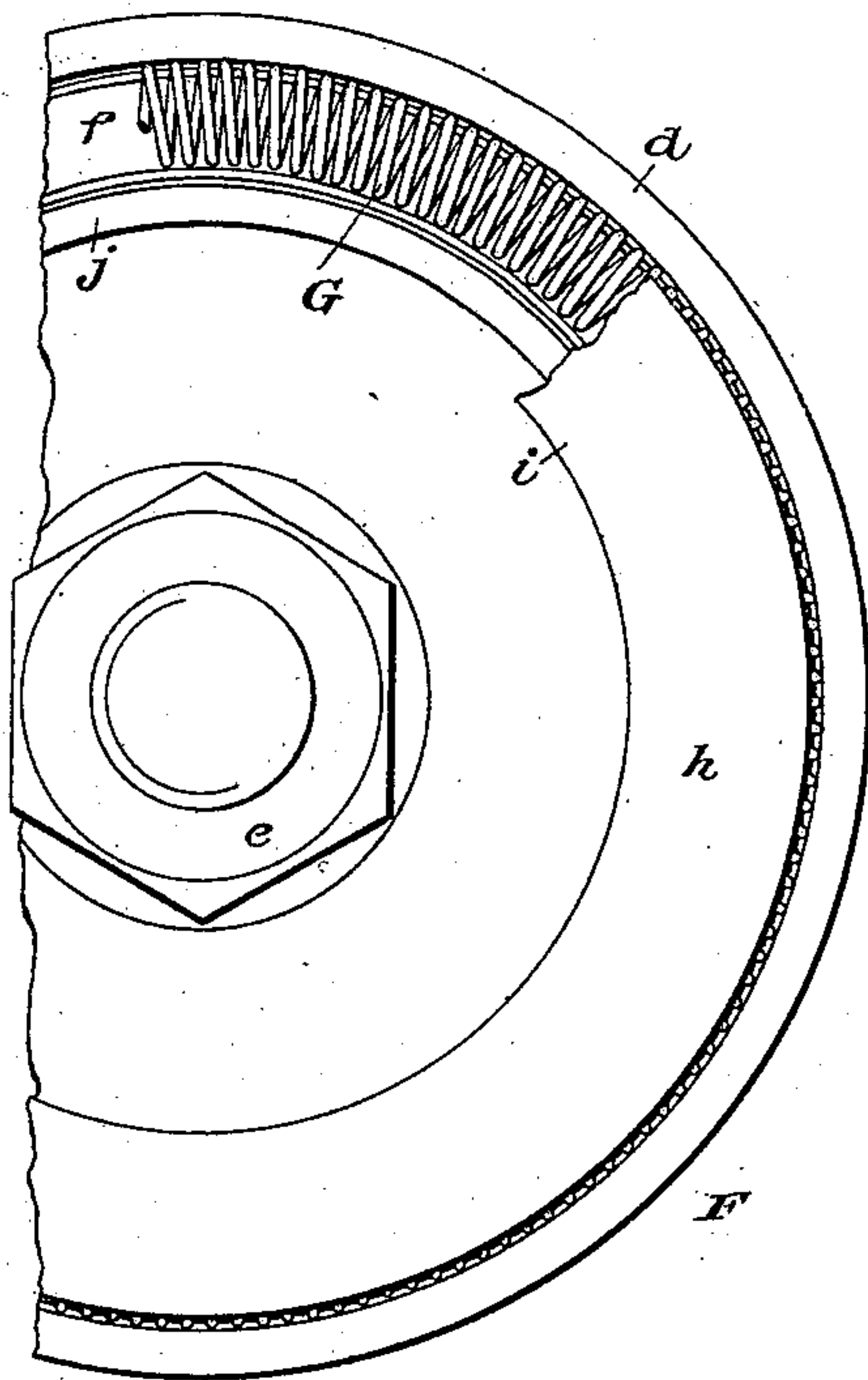


Fig. 3.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## CUPPED-LEATHER PISTON-PACKING.

SPECIFICATION forming part of Letters Patent No. 308,239, dated November 18, 1884.

Application filed November 23, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, ANDREW CAMPBELL, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain Improvements in Cupped-Leather Piston-Packing, of which the following is a specification.

My invention relates to pistons for any purpose where cupped-leather packings are employed, its object being to provide a practicable means for imparting to the cupped edge of the leather a tendency to expand, in order that it shall fill and conform closely to the interior of the cylinder in which the piston works.

In my patent for improvements in air-cushions for the reciprocating beds of printing-presses, No. 291,875, dated January 15, 1884, I have shown the pistons provided with cupped-leather packings, and it is for the packing of those pistons that my present invention was primarily designed.

Figure 1 of the accompanying drawings shows a portion of the apparatus illustrated in Fig. 2 of the drawings of my said patent provided with my present invention, this view being a longitudinal vertical mid-section corresponding to said Fig. 2, but on a larger scale. Fig. 2 of the accompanying drawings is an enlarged section of the reciprocating piston, and Fig. 3 is a mutilated front elevation thereof.

Let A designate the fixed frame of the printing-press; B, the reciprocating bed; C, a stud fastened to the frame A; D, a stationary piston fixed on the end of said stud; E, a movable cylinder mounted on the stud and inclosing said fixed piston; *a*, a rod attached to said cylinder, and by which it is moved; and F a reciprocating piston mounted upon the bed B. The piston D forms a false bottom for the cylinder E, and the piston F enters the cylinder as the bed nears the end of its reciprocation, and moves into the latter until it nearly touches the piston D. For a further description of this air-cushioning device reference is made to the aforesaid patent.

The pistons D and F are constructed in the usual way, with two plates, *b* and *c*, between which the disk of leather *d* is clamped by means of nuts *e e*. The turned-up or cupped

edge or flange of the leather *d* is designed to fit closely against the inner surface of the cylinder, and to be expanded against the same by a fluid-pressure on the side of the piston toward which this edge is turned. In practice, however, it is found that this free cupped edge does not fit as closely to the cylinder as is desirable, a considerable leakage frequently occurring before the fluid-pressure within it expands it sufficiently to effect a tight packing against the cylinder. This leakage is easily remedied in the case of the piston D, which always remains in the cylinder, by inserting an annular spring of coiled wire, *s*, within its cupped leather, so as to press the latter outwardly against the inner surface of the cylinder; but with the piston F, which passes out of and re-enters its cylinder, the difficulty has been encountered that any spring which would sufficiently expand the cupped edge of the leather to prevent leakage would expand it so far that it would not properly enter the cylinder, but its edge would strike the end of the cylinder and be buckled or turned back in entering. My invention aims to overcome this difficulty and enable an expanding-spring to be applied to any piston with cupped-leather packing, whether it passes out of its cylinder or not. To this end I employ an expanding-spring which is readily collapsible, in connection with a guide or stop to limit its expansion, in order that it may press out the cupped leather sufficiently to prevent leakage, and yet be restrained from pressing it out too far to enable it to properly enter the end of the cylinder. The expanding-spring is of annular shape, fitting within the edge of the cupped leather, and is retained in place by a guide or guides, the latter being also preferably of annular form.

Referring to Figs. 2 and 3, which show in detail the preferred construction embodying my invention, G is the annular expanding-spring, which consists of a helix of light elastic wire bent into the form of a ring. This is the preferable construction of spring, as its outward tension is uniform, and it is readily collapsible by external pressure, as by the contraction of the cupped leather in entering the beveled end of the cylinder. The helix is



bent into a ring after being wound, and is inserted into the cupped leather, and arranged to press against the edge thereof.

The preferred form of guides for retaining the spring in place and limiting its expansion consists of opposite beveled flanges *f* and *g*, the former being formed upon the plate *c* and the latter upon a ring, *h*. These flanges *f* and *g* are so beveled as to form internal cones, against which the spring presses in its effort to expand, and by which it is directed into the space between them, whence it projects and presses against the edge of the leather. The extent to which the spring can project is determined by the width of the space between the flanges *f* *g* relatively to the diameter of the helix of which the spring is made, and may be adjusted by bringing the flanges nearer together or farther apart. In order to provide for this adjustment I make the ring *h* movable toward or from the plate *c*, either by a screw adjustment or in any other suitable way. I have shown it provided with a turned-in flange, *i*, which is screw-threaded and screws upon an annular rib or flange, *j*, upon the plate *c*. In lieu of this, however, the ring *h* might be connected to the plate *c* by three bolts (more or less) arranged equidistantly, springs being placed over the bolts to keep the ring pressed outwardly against the bolt-heads.

I have found by practical experience that the expanding-spring should bear against the extreme edge of the cupped leather to effectually prevent leakage.

My invention is not confined by any means to the exact construction shown, but may be varied in several particulars without departing from its essential features.

What I claim as new, and desire to secure by Letters Patent, is—

1. A cupped-leather piston-packing provided with a collapsible expanding-spring arranged within the cupped leather, and with a stop adapted to limit the expansion of the spring, combined and operating substantially as set forth.

2. A cupped-leather piston-packing provided with a collapsible expanding-spring arranged within the cupped leather against the edge thereof, in combination with an annular guide or stop adapted to retain said spring in place and to limit its expansion, substantially as set forth.

3. The combination, in a piston-packing, of cupped leather *d*, expansive ring-shaped spring *G*, and coned flanges *f* and *g* on opposite sides thereof, substantially as set forth.

4. The combination, in a piston-packing, of cupped leather *d*, plates *b* and *c*, coned flanges *f* and *g*, ring *h*, means for adjusting ring *h* toward or from plate *c*, and ring-shaped spring *G*, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ANDREW CAMPBELL.

Witnesses:

ARTHUR C. FRASER,  
GEO. BAINTON.