

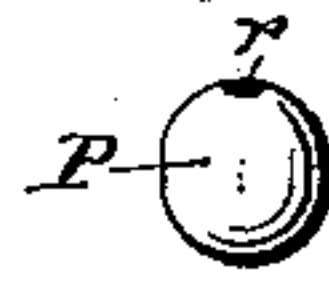
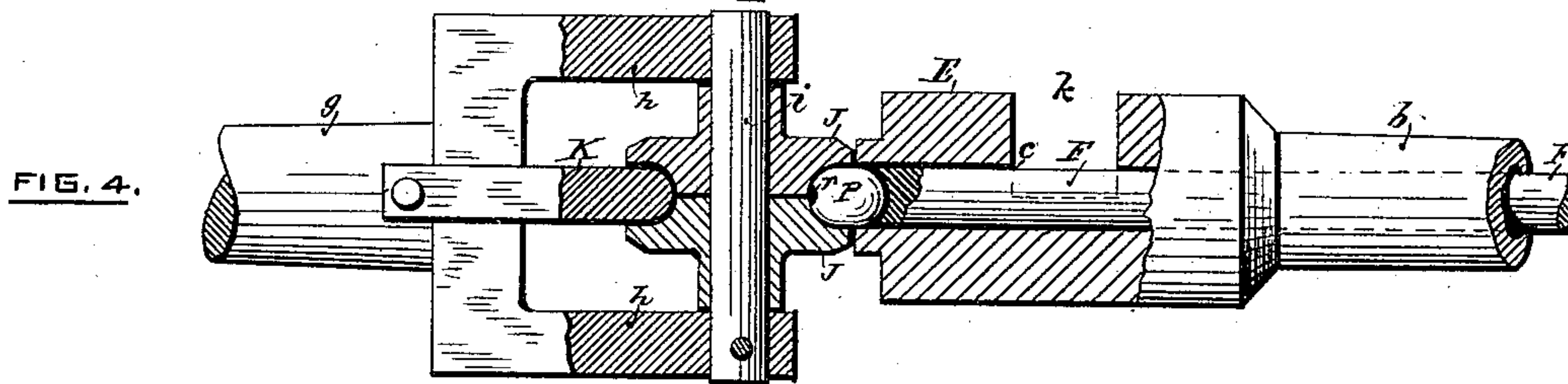
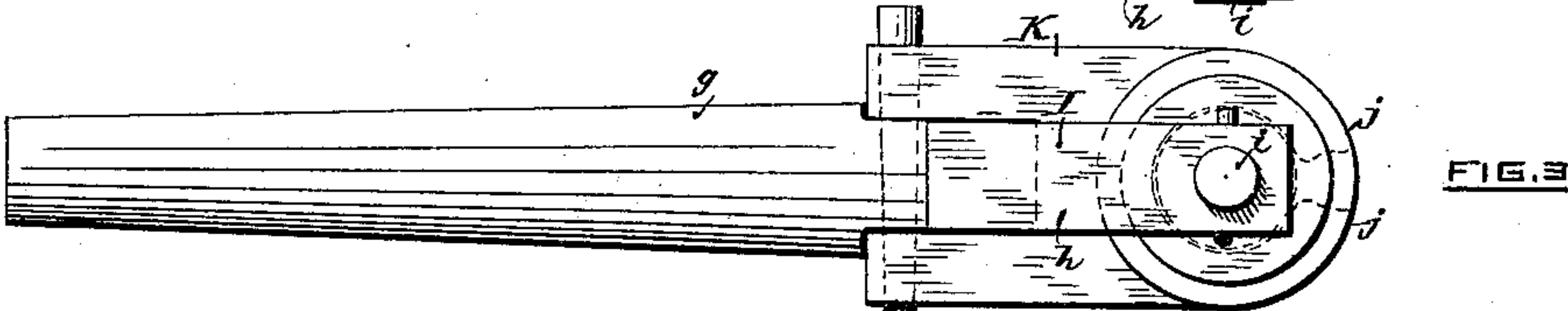
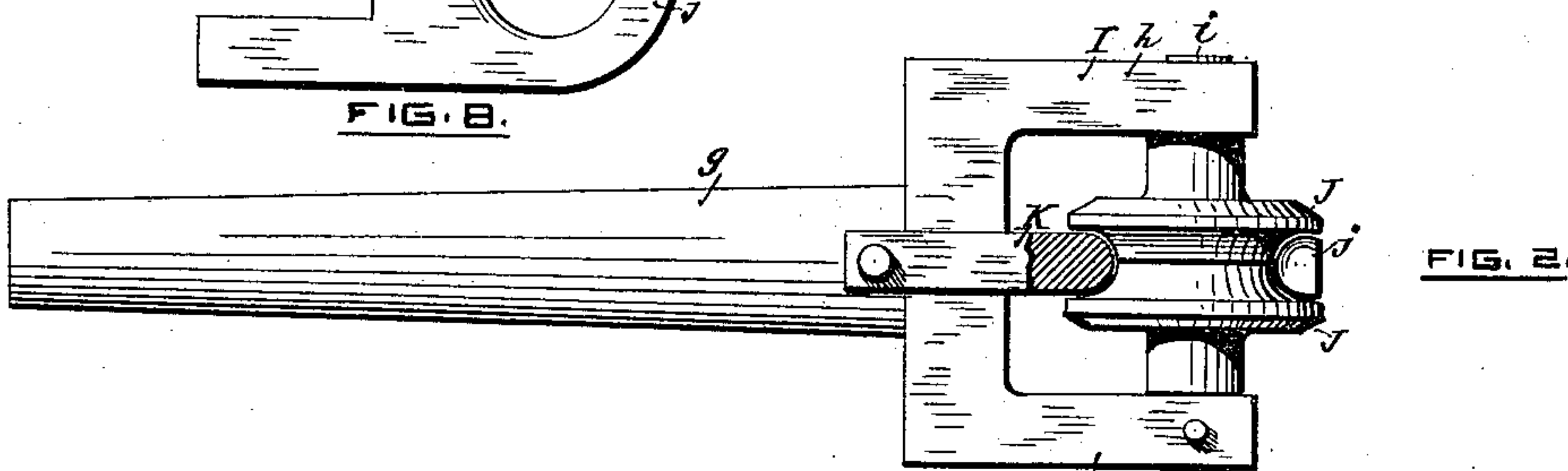
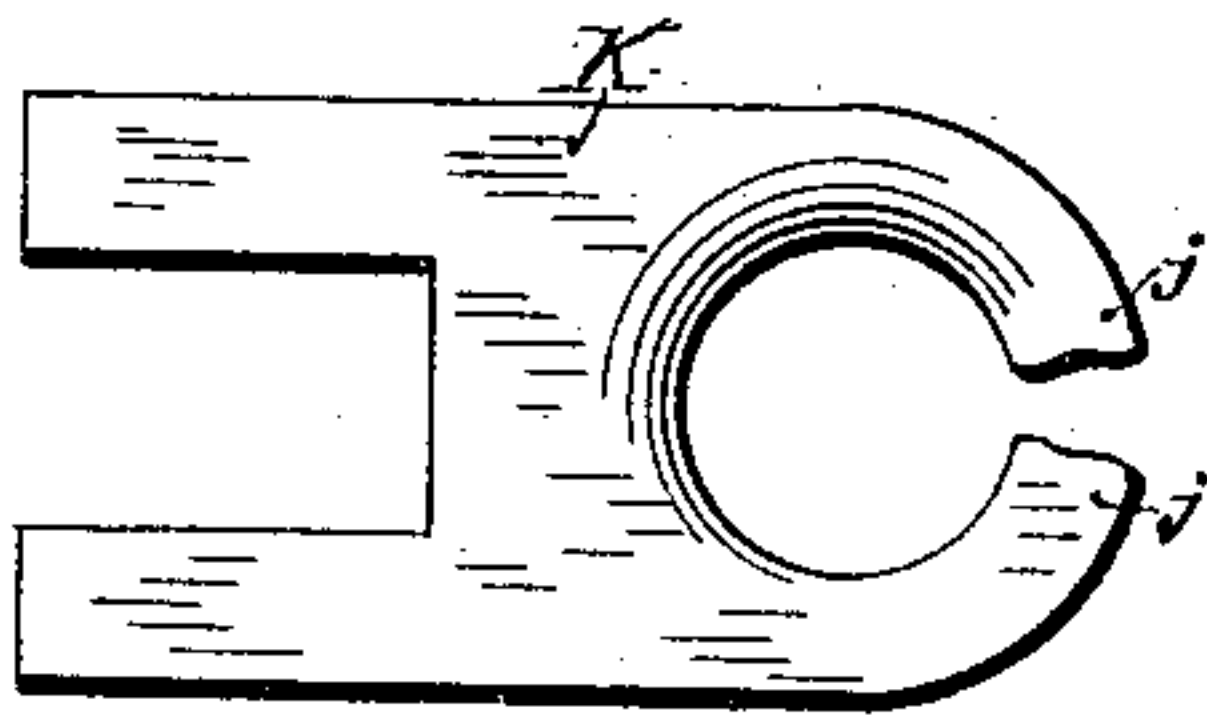
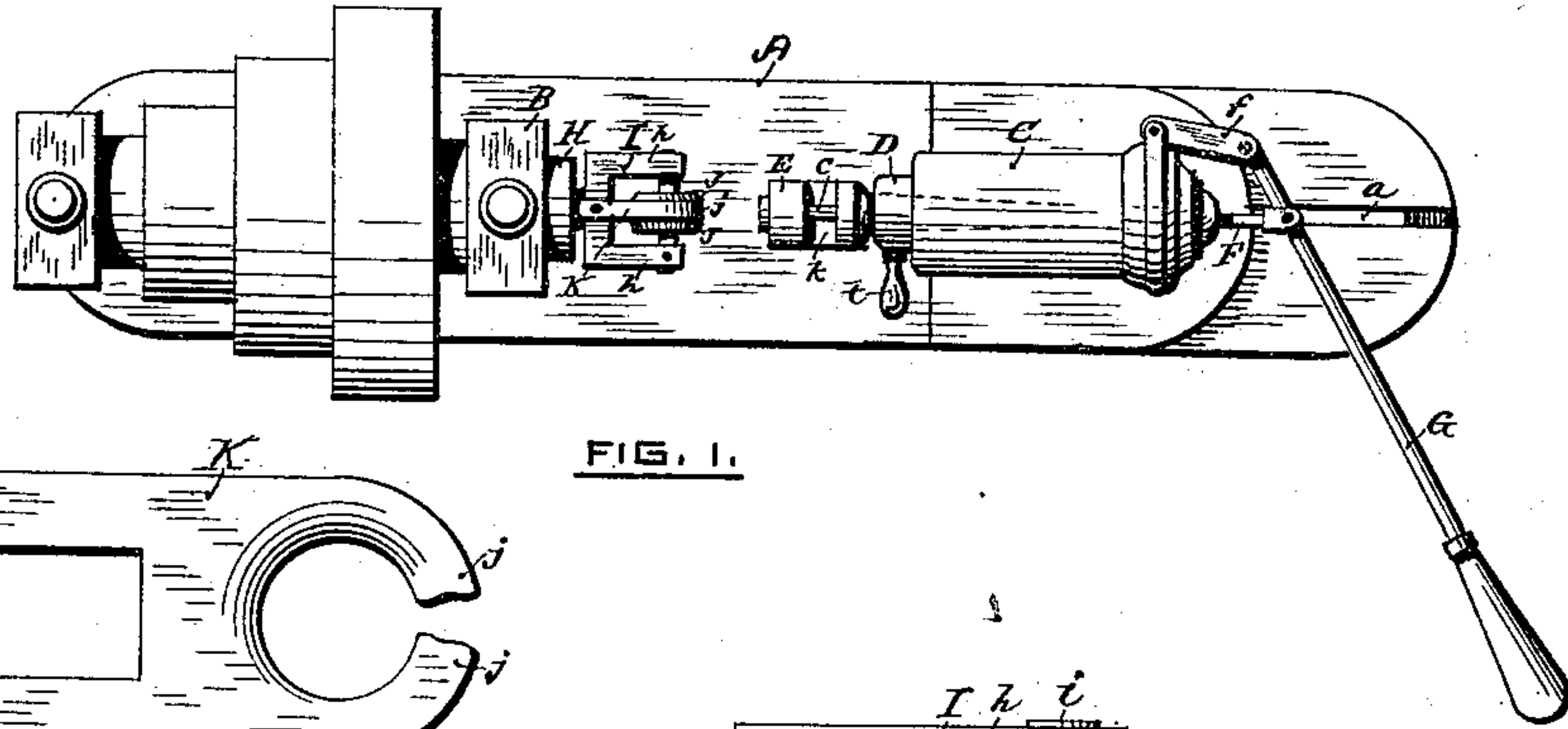
(No Model.)

A. BISBEE.

MACHINE FOR MAKING HOLLOW METALLIC BALLS.

No. 338,656.

Patented Mar. 23, 1886.



WITNESSES:

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MACHINE FOR MAKING HOLLOW METALLIC BALLS.

SPECIFICATION forming part of Letters Patent No. 338,656, dated March 23, 1886.

Application filed June 20, 1884. Serial No. 135,548. (No model.)

To all whom it may concern:

Be it known that I, ALBERT BISBEE, of Plainville, in the county of Norfolk, in the State of Massachusetts, have invented a new and useful Improvement in Machines for Manufacturing Hollow Metal Balls or Beads, of which the following is a specification.

The nature of my invention consists in the combination of opposite circularly-grooved rotating rollers and intervening guides for hemispherically closing the open end of a tube or cup to form a hollow ball or bead, and means for feeding tubular or cup-formed blanks to the said rollers, as hereinafter fully set forth.

Figure 1 is a plan view of my improved machine. Fig. 2 is a side elevation of the rolling-tool adapted to impart a hemispherical form to the hollow blanks. Fig. 3 is a side elevation of the rolling-tool, taken at right angles to the view shown in Fig. 2. Fig. 4 is a detail section showing the combination of the rolling-tool with the holding-tool. Fig. 5 represents a plan view of an original metal blank cut out to form a hollow bead or ball. Fig. 6 represents a side elevation of a cylindrical cup formed from the blank shown in Fig. 5. Fig. 7 shows the result of the action of the rolling-tool upon the open end of the cup shown in Fig. 6. Fig. 8 is a plan view of the intervening side guides of the rolling-tool.

In the accompanying drawings, A is the bed of the machine, B the head-block, and C the tail-block, which is adjustably held within the groove *a* of the bed by means of a tightening-screw.

Within the bore of the tail-block is loosely fitted the spindle D, adapted to receive the shank *b* of the holding-tool E. In the central bore, *c*, of the holding-tool E is arranged the sliding forcer F, which is hollowed out at its forward end to fit the hemispherical base *n* of the cup N, and at its rear end is jointed to the hand-lever G, which is connected by means of the pivoted link *f* to the rear of the tail-block.

At the forward end of the rotating shaft H of the head-block B is secured the rolling-tool I, having a tapering center shank, *g*, adapted for ready insertion or removal from the center bore of the shaft H. The shank *g* is provided at its outer end with the opposite arms *h h*, which are centrally perforated to receive the

transverse bearing-pin *i*, upon which, in the space between the arms *h h*, are loosely placed the circumferentially-grooved opposite rollers J J, the cross-section of the groove in each roller forming a quadrant, so that when the two rollers are arranged upon the bearing-pin *i* the cross-section of the combined grooves of the rollers will form a semicircle.

K is a guide-piece, also secured to the forward end of the shank *g* and terminating in the two opposite jaws *j j*, which are held in the hemispherical groove formed between the rollers J J.

The holding-tool E is cut away at the point *k*, in order to provide for the ready insertion of the cup *n* into the central bore, *c*. The spindle D is to be prevented from rotation by means of a suitable spline or pin and groove, as usual in such devices, and is provided at its forward end with a handle, *t*, by means of which the spindle D may be moved back and forth within the bore of the tail-block.

In operating the machine to form a hollow ball a sheet-metal blank, M, is to be first formed by suitable dies into a cup, N, having a closed hemispherical end, *n*, as shown in Fig. 6. A rapid rotary movement being imparted to the shaft H, which carries the rolling-tool I, and the tail-block so set as to bring the holding-tool E in proper proximity to the rolling-tool, the lever G is to be thrown back, as shown in Fig. 1, thus carrying the hollowed face of the forcer F back of the receiving-notch *k*, into which the cup N is to be inserted, the hemispherical base of the cup being made to rest in the concavity of the end of the forcer.

The bore *c* of the holder E, at its forward end, is made slightly smaller than the outside diameter of the cup N, so that upon moving the lever G forward the initial movement of the forcer will, by the frictional resistance of the cup N, be imparted to the spindle D until the face of the holding-tool is brought against the edges of the rollers J J, or in close proximity thereto, as shown in Fig. 4, being in the latter case held from farther forward movement by means of a suitably-arranged stop. The continued forward movement of the forcer will then serve to force the cup N forward along the bore *c* of the holder and into the chamber formed by the grooved edges of the

rollers J J and the intervening guides *j j*, the rapid rotation of the rollers serving to compress the open end of the cup, and to close the stock inward, as shown in Fig. 7, leaving
 5 a small opening, *r*, which, if desired, may be further closed by the finishing operation usually employed in the manufacture of such articles.

The cup N, will be securely held, when under
 10 the operation of rolling, by the friction between the sides and bottom of the cup and the contracted bore of the holding-tool and the hollowed face of the forcer. Upon moving back the lever G the forcer F will be withdrawn
 15 from the base of the closed ball or bead, and then the holding-tool E may be withdrawn from the rolling-tool I by means of the handle *t*, which projects from the forward end of the sliding spindle D. The closed ball or bead P,
 20 being still frictionally held in the bore of the holding-tool, will by the said backward movement of the holding-tool be withdrawn from between the rollers J J and guides *j j*, and then, in order to remove the ball or bead from
 25 the bore of the holding-tool, the spindle D is to be firmly held in its backward position while a forward movement is being imparted to the forcer F, which will cause the ball or bead to drop from the bore of the holding-tool,
 30 after which another cup-blank may be placed

in the opening *k*, to be operated upon as before.

In the manufacture of beads a hole corresponding to the hole *r* may be made in the blank M, or in the bottom of the cup N, previous to insertion into the bore of the holding-tool. 35

I claim as my invention—

1. In a machine for making hollow balls or beads, the combination of the revolving
 40 grooved rollers with the intervening guides, and means for forcing the hollow-formed blanks into the chamber between the said revolving rollers and guides, substantially as described. 45

2. The combination of the revolving grooved rollers and the intervening guides, the hollow holder, and the sliding forcer, substantially as described.

3. The combination of the head-block, the
 50 revolving grooved rollers, and intervening guides, with the tail-block, the sliding spindle, the holder provided with the inlet-opening, and the sliding forcer, substantially as described.

ALBERT BISBEE.

Witnesses:

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