

No. 713,642.

Patented Nov. 18, 1902.

R. O. HOPKINSON.
LIFTING JACK.

(Application filed Dec. 9, 1901.)

(No Model.)

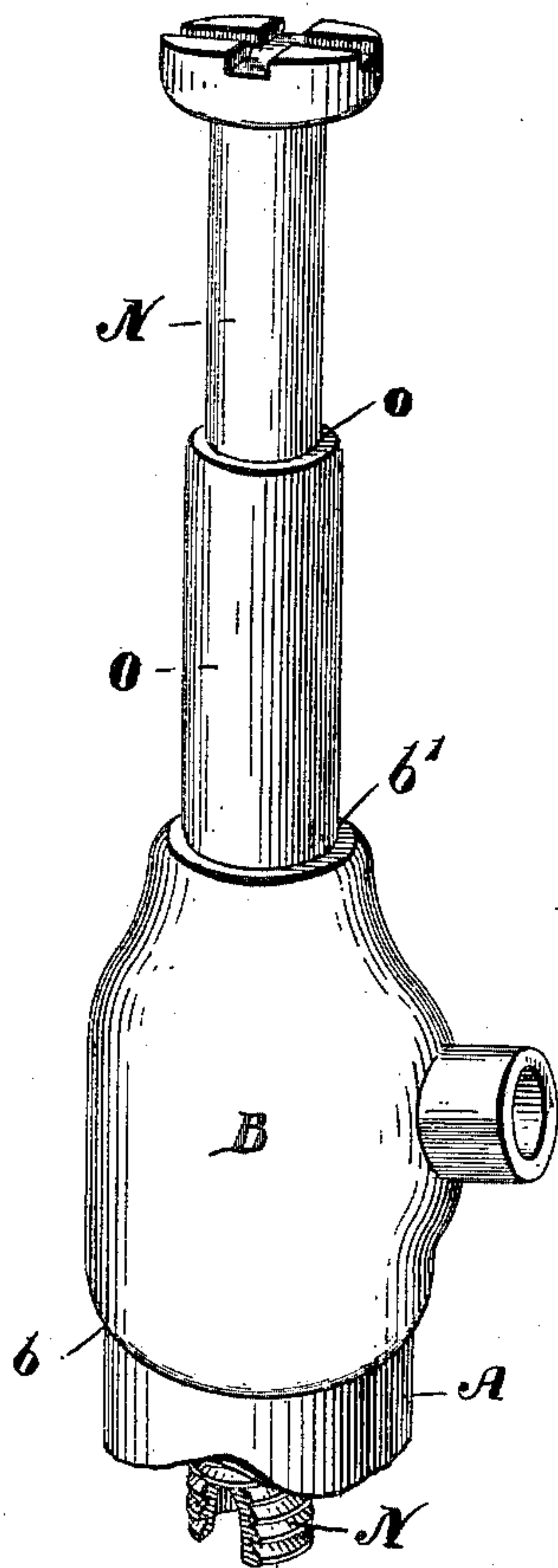


Fig. 2.

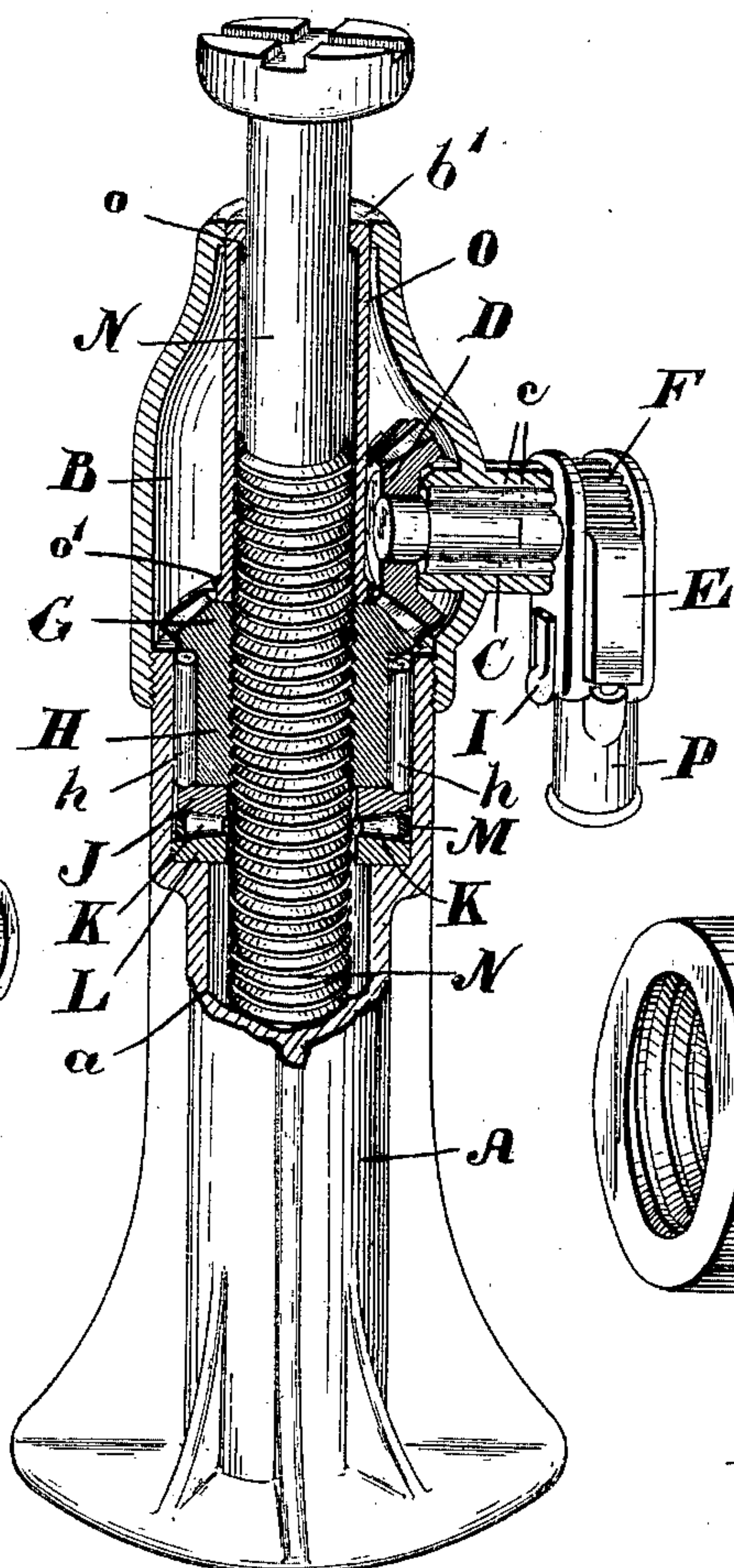


Fig. 1.

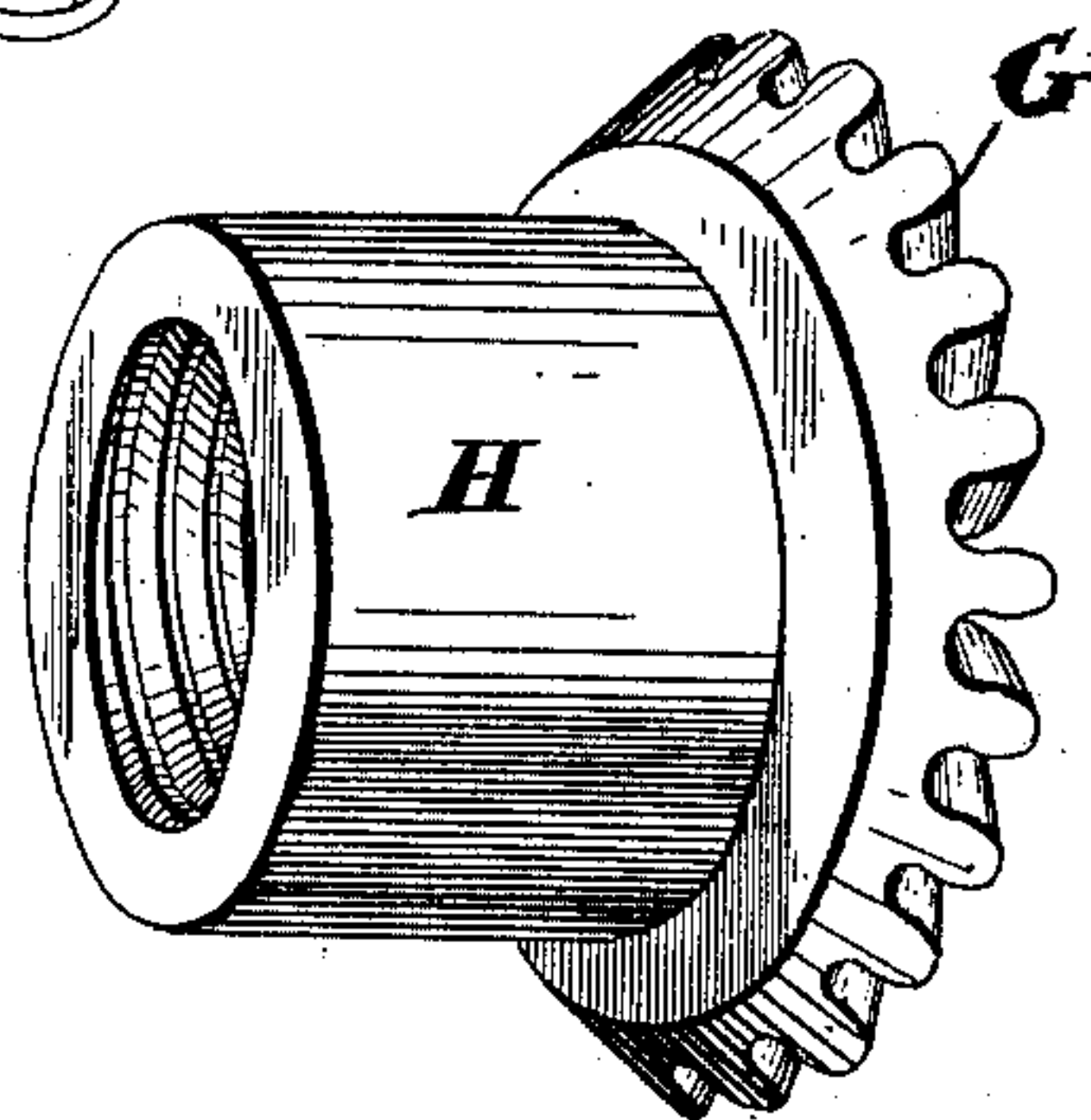


Fig. 3.

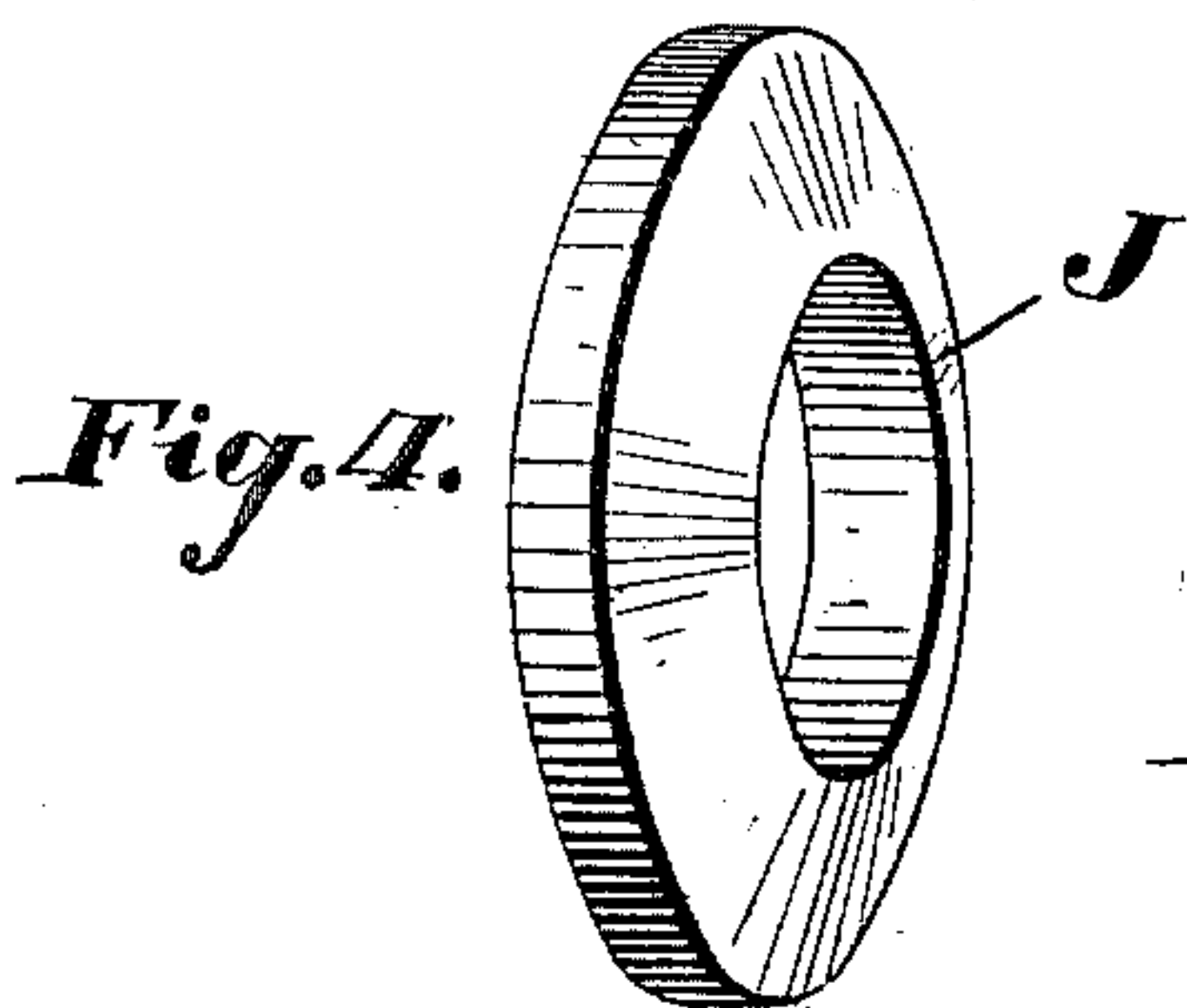


Fig. 4.

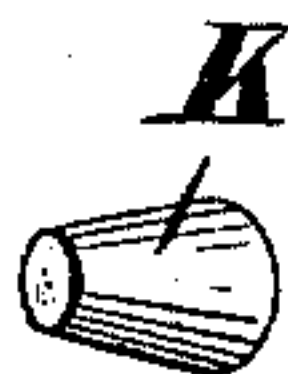


Fig. 5.

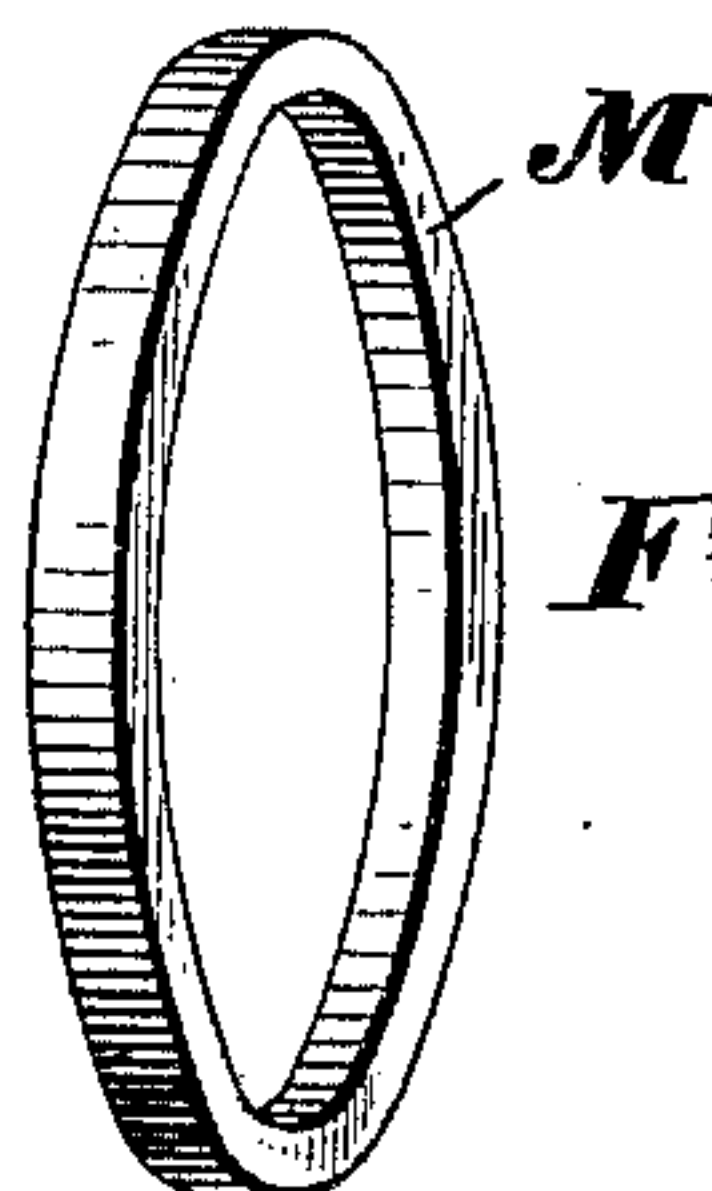


Fig. 6.

Witnesses.

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LIFTING-JACK.

SPECIFICATION forming part of Letters Patent No. 713,642, dated November 18, 1902.

Application filed December 9, 1901. Serial No. 85,240. (No model.)

To all whom it may concern:

Be it known that I, RICHARD ORION HOPKINSON, a subject of the King of Great Britain, residing at Waterville, in the county of Compton, in the Province of Quebec, Canada, have invented certain new and useful Improvements in Lifting-Jacks, of which the following is a specification.

My invention relates to improvements in lifting-jacks; and the object of the invention is to design a strong and durable lifting-jack which shall be of much lighter construction than those now in use and in which also considerable friction will be saved in the working thereof; and it consists, essentially, of a standard having a central vertical orifice, a cap suitably attached to the top of the standard, and a hollow screw designed to have free movement in the central bore and through an orifice in the top of the cap, a rotatable nut and gear revolving in roller-bearings through which the screw extends, and a sleeve carried over the top portion of the thread on the hollow screw, the various parts being constructed in detail as hereinafter more particularly described.

Figure 1 is a sectional perspective view of my device. Fig. 2 is a detail of the upper portion thereof, showing the screw extended to its full length upwardly. Fig. 3 is a detail of the nut and gear-ring. Fig. 4 is a detail of the ring-plate. Fig. 5 is a detail of the cone roller-bearing. Fig. 6 is a detail of the guide-ring.

Like letters of reference indicate corresponding parts in each figure.

A is the standard, constructed of iron or other suitable material and preferably having a flaring base.

B is the cap, which screws onto the top of the standard at *b* and at its top end has the orifice *b'*. The cap B also carries on one side thereof the shaft C, journaled in suitable roller-bearings *c*. The shaft C carries at its inner end the bevel-gear D, and on the outer end of the shaft C is the pawl E and the ratchet F, a similar pawl being on the opposite side. The lever I serves to change the purpose of the pawls, according as the weight is being raised or lowered. This arrangement

is common and need not be described at length.

The bevel-gear D meshes with the gear G, forming the top end and shoulder of the nut H. The nut H revolves in the roller-bearings *h*, set in any suitable manner immediately over the ring-plate J. The plate J has a rotatory movement on the cone-bearings K, set between the plate J and the ring-plate L. The heads of the cone-bearings K abut the guide-ring M.

It must be understood that I do not limit myself to any particular construction in the matter of bearings. The ring-plate J forms a base for the nut H and is capable of rotating therewith.

N is a hollow screw-threaded to within a short distance of its top end and designed to have free movement in the orifice *a* in the standard and at its upper end protrude through the orifice *b'* in the cap B. The screw N enters the orifice *a* through the nut H. The latter by its rotary movement raises or lowers the said screw N. The sleeve O at its upper end has an inwardly-projecting flange or shoulder *o* and at its lower end an outwardly-flaring shoulder *o'*.

Having described the various parts of my invention in detail, I shall now more particularly explain the operation thereof.

The jack is placed beneath the weight to be raised, with the top of the screw N in immediate proximity to the top of the cap B. A suitable handle is now inserted in the holder P, and by means of the usual pawl-and-ratchet arrangement the shaft C is turned, and having the gear D fixedly attached to its inner end and meshing with the gear G the nut H is thus made to rotate. The nut H, rotating in its bearings *h* on the screw N, moves the latter upwardly in consequence of the nut H remaining stationary. The weight on the screw N rises as the shaft C continues to revolve in its bearings. During the upward movement of the shaft the sleeve O remains stationary until the thread reaches the aperture or orifice *b'* at the top of the cap B. At this point the thread, which projects beyond the periphery of the upper end of the screw catches the shoulder *o*, thereby carrying the

sleeve with it in its further movement upward, and when the screw reaches the proper limit of its upward movement the shoulder o' , which flares outwardly from the bottom of the sleeve, catches an inwardly-projecting shoulder b^2 at the top of the cap B, thus preventing any further upward movement of the screw and also completely covering that part of the screw which would otherwise be exposed. The lowering of the weight is accomplished by changing the purpose of the pawl E by means of the lever I. The motion of the shaft C is now reversed, and consequently the nut H and also the screw N, bringing the sleeve O with it in the downward movement until all the parts resume the original position as before raising.

It will be seen from the foregoing description that in the construction of my device a great saving in friction is effected, as the revolving parts are so arranged as to permit of the adoption of roller or similarly suitable bearings.

The inner sleeve and cap arrangement provided in this device must be especially emphasized here, as when the thread projects above the cap in raising the weight the protection to the screw from dust and grit is obvious, and though there are devices in a manner protecting the thread, such as carrying a casing upwardly with the screw, yet as far as I am aware the jacks at present in use only provide a loose jacket for the thread, whereas in my device the sleeve is practically closed top and bottom, and absolutely so when the screw is fully extended. The fact that the sleeve or cover does not move until the thread begins to project is of much importance, as so much weight in operation is thus saved. Besides the light construction of the sleeve renders the lifting of the same a trivial matter compared to raising a heavy jacket. The screw is also preferably made hollow in order to save weight in the construction, as in the use of a jack the portability is a most important feature.

What I claim as my invention is—

1. In a lifting-jack, the combination with a standard having a central vertical orifice, of a cap suitably attached to the top of the standard, a screw having a vertical movement, a nut mounted therein and revolving in suitable bearings, a sleeve loosely mounted on the screw and having a limited vertical movement therein, and means for ro-

tating the nut, as and for the purpose specified.

2. In a lifting-jack, the combination with a hollow standard and a cap suitably secured to the top thereof, of a nut located within the standard and through which the screw extends, a sleeve loosely mounted on the screw, a bevel gear-ring attached to or forming part of the nut, suitable bearings for the nut, a coacting bevel gear-ring, and means for rotating the same, as and for the purpose specified.

3. In a lifting-jack, the combination with a hollow standard and a cap suitably secured to the top thereof, of a nut located within the standard and through which the screw extends, the circumferential roller-bearings located between the wall of the standard and nut, the annular plates located below the nut and supported on a suitable shoulder within the standard and the cone-bearings located between them, and means for rotating the nut, as and for the purpose specified.

4. In a lifting-jack, the combination with a hollow standard and a cap suitably secured to the top thereof, of a nut located within the standard and through which the screw extends, a bevel gear-ring attached to or forming part of the same, suitable bearings for the nut, a sleeve encircling the screw and designed to receive at the lower end thereof the upper end of the screw, said sleeve being provided with an outwardly-extending flange at the bottom, and an inwardly-extending flange at the top, and means for rotating the nut, as and for the purpose specified.

5. In combination, a standard having a central and vertical orifice and suitably capped at the top end, a hollow screw, a sleeve with a limited vertical movement on the upper end of the screw, a nut revolving in roller-bearings, a bevel gear-ring attached to or forming part of the nut, a coacting bevel-gear fixedly attached to a shaft revolving in roller-bearings, and the annular plates located below the nut supported on a suitable shoulder in the standard, and suitable bearings located between them, as and for the purpose specified.

Signed at Montreal this 3d day of December, 1901.

RICHARD ORION HOPKINSON.

Witnesses:

LLOYD BLACKMORE,
FRANK C. HALL.