

(No Model.)

J. O'NEIL.
PUMP.

No. 591,004.

Patented Oct. 5, 1897.

Fig. 2.

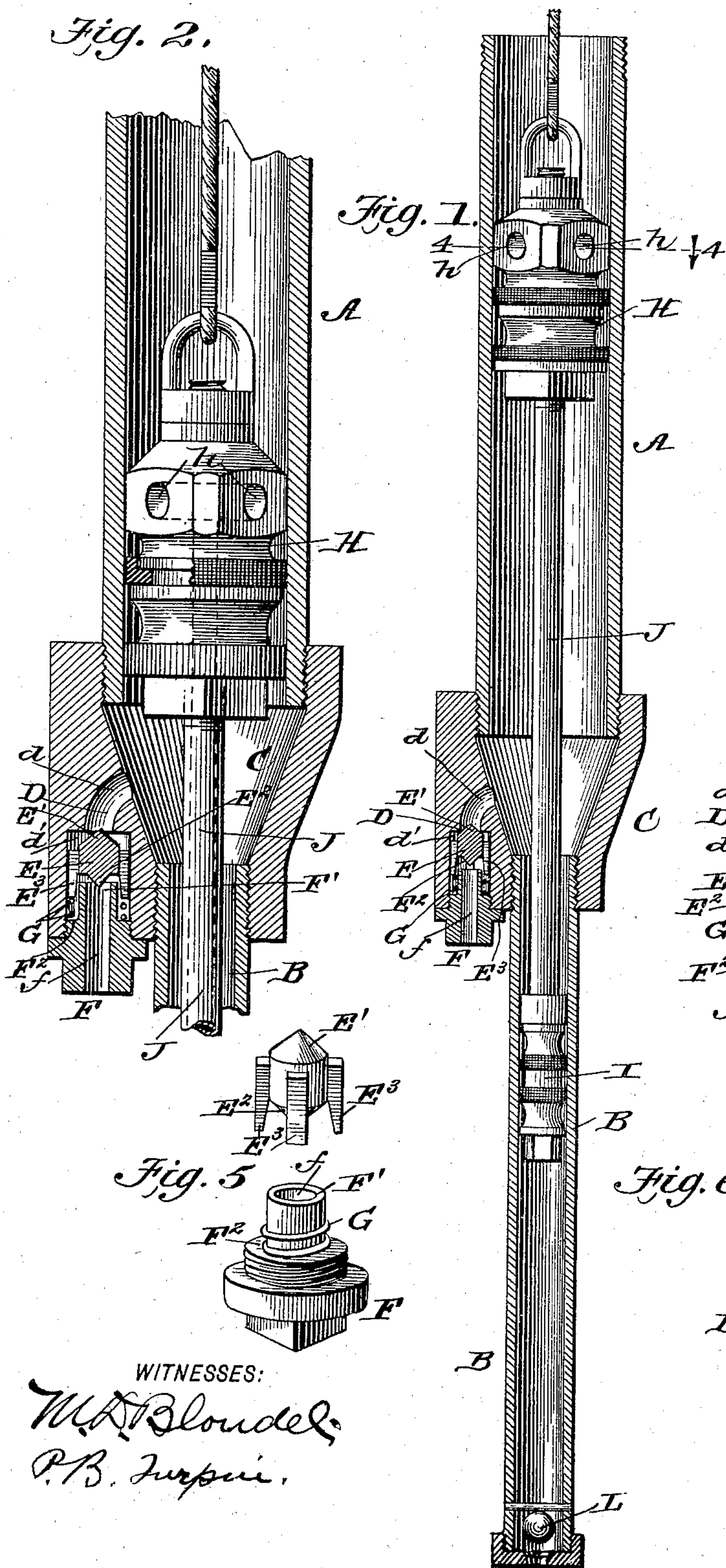


Fig. 4.

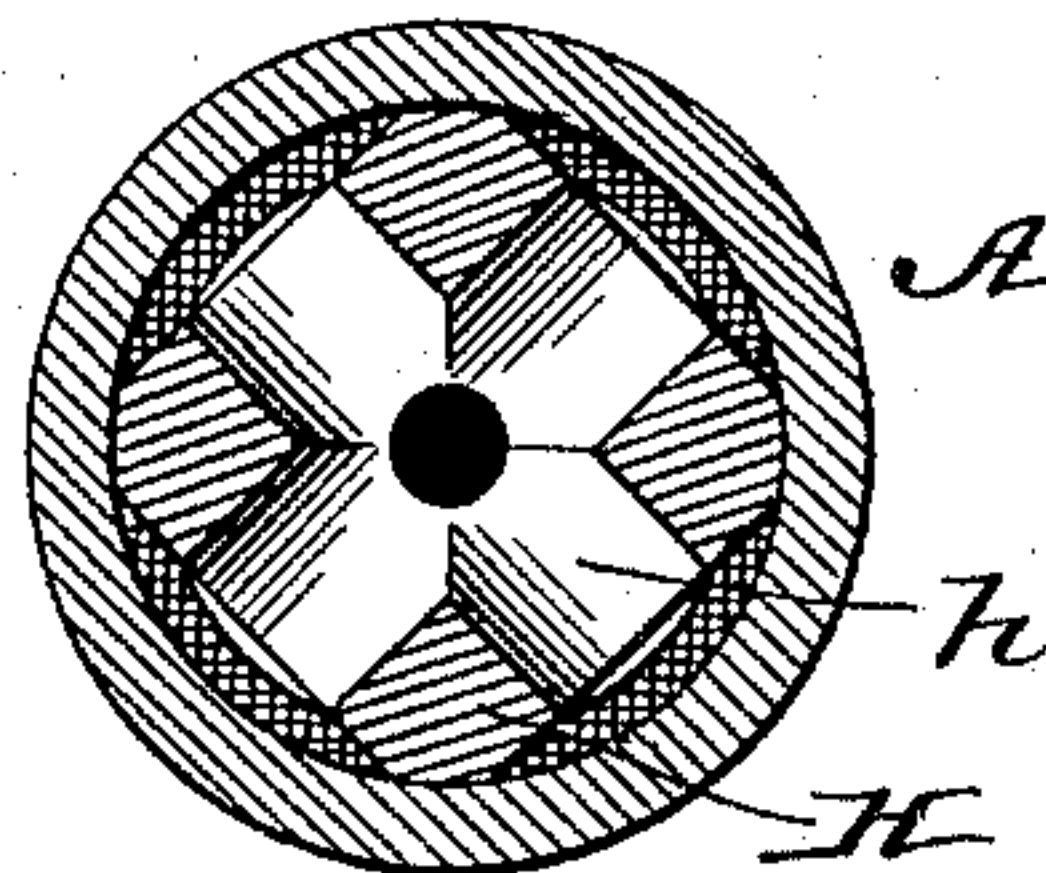


Fig. 3.

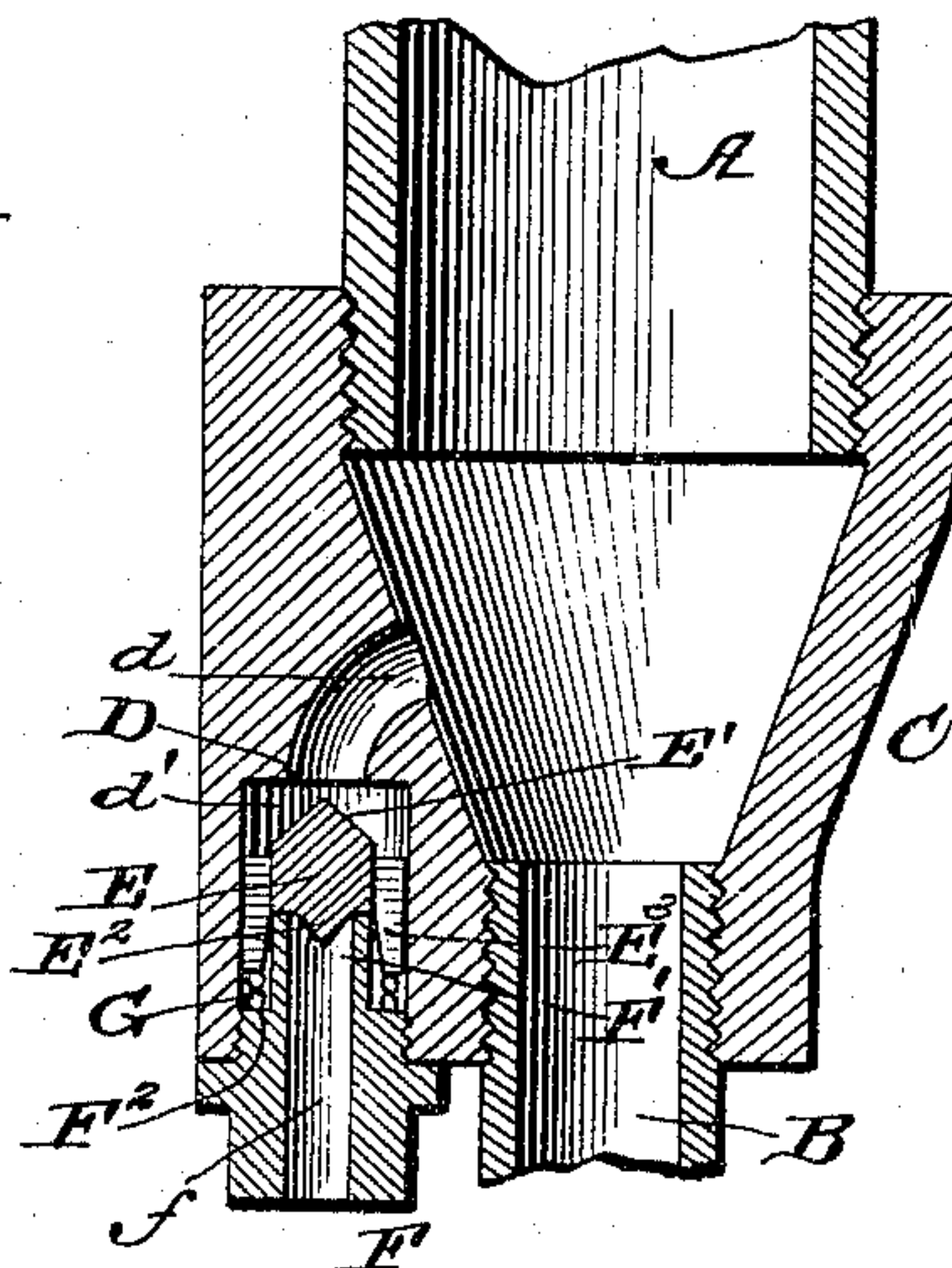


Fig. 5.

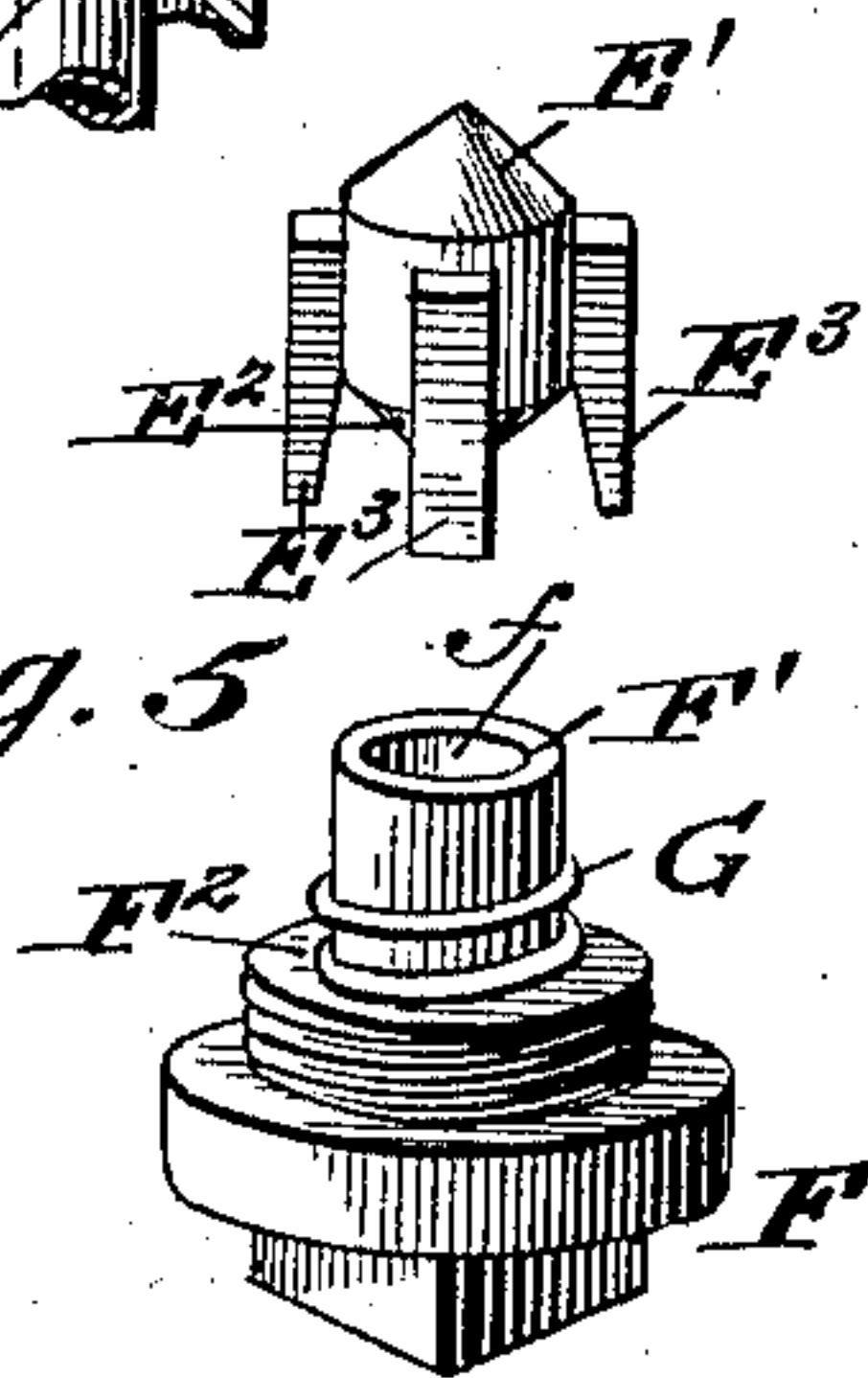
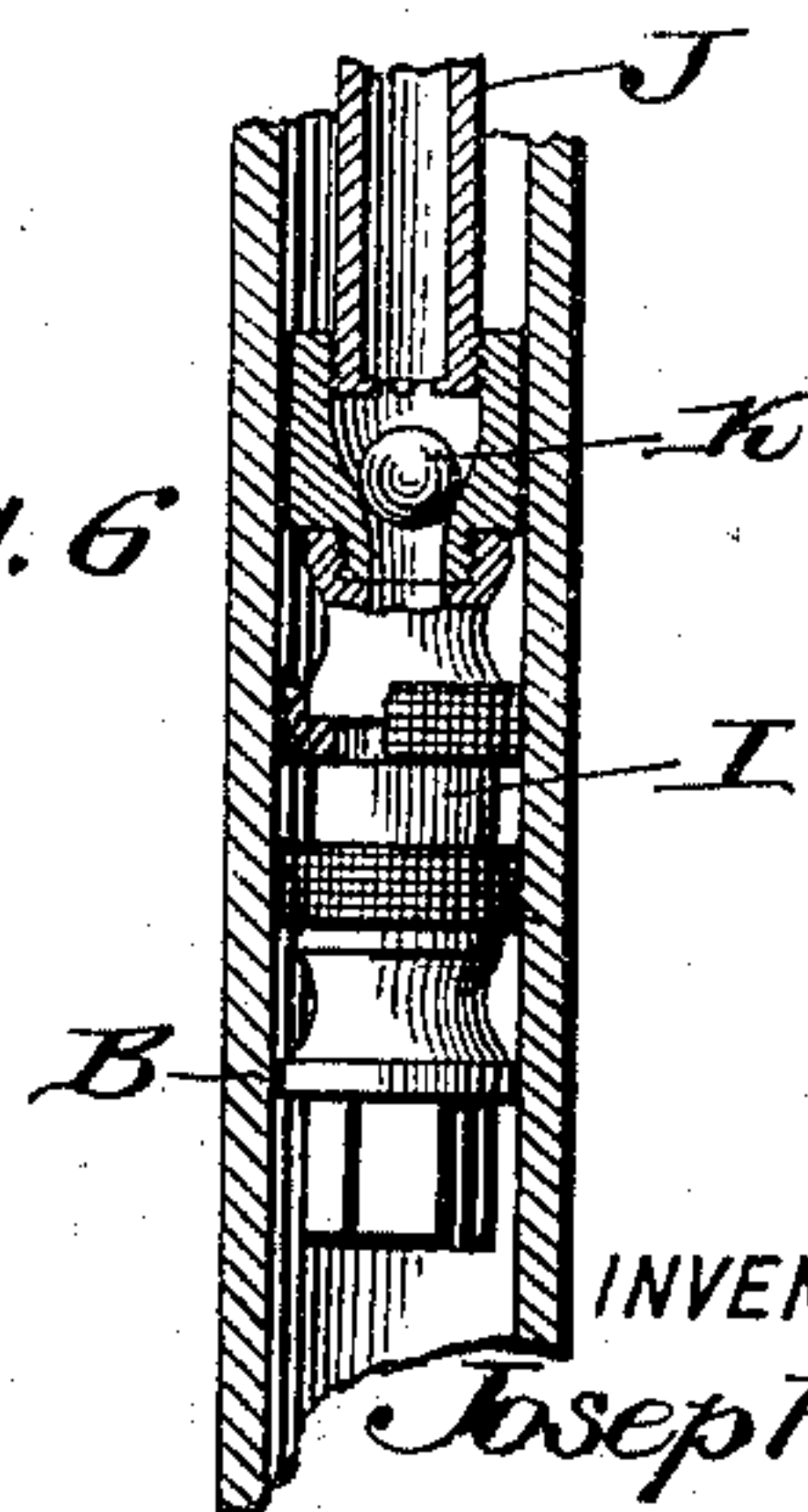


Fig. 6.



WITNESSES:

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PUMP.

SPECIFICATION forming part of Letters Patent No. 591,004, dated October 5, 1897.

Application filed May 31, 1895. Serial No. 551,254. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH O'NEIL, residing at Taylorstown, in the county of Washington and State of Pennsylvania, have invented a new and useful Improvement in Pumps, of which the following is a specification.

My invention is an improvement in pumps, especially deep-well pumps, and seeks, among other objects, to provide a novel efficient form of pump in which the pumping device can be operated by means of a wire cable or other flexible connection, thus cheapening the construction of the pump and rendering the removal of the pumping devices easy and capable of being effected in much less time than is possible in the use of the ordinary jointed pumping-rod.

The invention consists in certain novel constructions, combinations, and arrangements of parts, as will hereinafter be described, and pointed out in the claims.

In the drawings, Figure 1 is a vertical longitudinal section of a part of a pump, the outlet-valve being shown in the position it assumes in the ascending motion of the head. Fig. 2 is a somewhat similar view with the outlet-valve in the position it assumes on the downstroke of the head. Fig. 3 is a similar view showing the outlet-valve as unseated by the down pressure of the fluid when the pumping devices are removed. Fig. 4 is a cross-section on about line 4 4 of Fig. 1, and Figs. 5 and 6 are detail views.

In the embodiment of my invention shown I employ an upper working barrel A and a lower working barrel B, of different areas, the lower working barrel B being considerably less in area than the upper working barrel A, and these barrels are connected at their adjacent ends, preferably, by means of a joint-piece C, constituting a connection or support into which the barrels are threaded, the bore C of said joint-piece being flared upward from the upper end of the lower barrel B, thus forming a conical guide which aids in directing the lower pumping head or valve into its barrel B in inserting the pumping devices, as will be readily understood.

At the lower end of the upper working barrel A, I provide a valve-controlled outlet D, the purpose of which will be more fully described hereinafter, and by preference I form this outlet D and support its controlling de-

vices in the connection-piece C, which manifestly may be made integral with either or both of the working barrels, if desired, but is preferably made separate, as shown. The purpose of this valve-controlled outlet is to provide for forming a semi or partial vacuum below the draft-head which operates in the working barrel A when said head is lifted from its lowermost position and also to automatically close by the pressure of fluid above when the pumping-heads are entirely removed, and so avoid the disturbing of the well by the discharge thereinto of the oil within the tube. The opening *d*, which leads from the interior of the barrel, communicates with a chamber *d'*, in which the valve E operates. This valve E is double-ended, having one valve portion or end *E'* moving upward to close the channel *d*, and a valve portion or point *E''*, which moves downward and closes the channel *f*, leading out into the well. This channel *f* is preferably formed in the plug F, which closes the lower end of the chamber *d'*, and the valve vibrates between the channels *d* and *f*, being set to close either one or the other or held intermediate its two seats, as the operation may require. This valve is preferably actuated by a spring G, and to facilitate the engagement of the spring with the valve and to also accurately guide such valve I provide it with lateral and depending arms *E''*, which fit down over and along the tubular upper portion *F'* of the plug F and form an upper bearing for the spring G, which spring bears between the lower ends of the arms *E''* and a shoulder *F''*, formed on the plug. This spring, it will be seen, operates to normally force the valve upward to close the channel *d* and thus close the outlet from the pump-barrel. The spring G is so adjusted in tension that it will partially yield to permit the channel *d* to open without such valve moving down to close the channel *f* by the pressure resulting from the downward movement of the pumping devices, as will more fully appear hereinafter. At the same time this tension is such that when the pumping devices are entirely removed from the tubing the column of oil or water in such tubing above the outlet-controlling valve will exert such force on the latter as to close the channel *f*, and so prevent the fluid within the tubing from passing into and disturbing the well.

The upper or draft head H and the lower

pumping head or valve I are adapted, respectively, to operate in the barrels A and B, and are connected by a tube J, the lower head I being provided with a suitable valve K, and
 5 a suitable standing valve L being provided at the lower end of the barrel B. These heads are suitably packed and the upper head has, above its packing, outlets *h*, preferably formed through flattened or reduced portions of said
 10 head, as shown. This head is connected with the wire cable or other suitable operating devices, being to such end provided with suitable means to facilitate such connection.

In operation as the pumping-heads descend
 15 it is obvious that the oil in the lower part of the barrel A below the draft-head H cannot all be forced into the working barrel B because of the difference in area between said barrels A and B. Consequently a portion of such liq-
 20 uid will pass out through channel *d*, the valve E opening to permit such passage and yet not being forced to such position as to close the channel *f*. Now on the return stroke it will be seen that as the draft-head rises the spring
 25 G will set the valve E to close the channel *d*, so that as the said draft-head continues to rise there will be formed below it a semi or partial vacuum which will act to draw said head downward and so aid in returning the
 30 pumping-heads to their lowermost position, drawing the lifting-cable with them, as will be readily understood. If at any time the pumping-heads be drawn entirely out of the well, the column of fluid in the tubing above
 35 the outlet will act with such force as to seat the valve E against the pressure of spring G in the channel *f*, and so close the outlet and prevent the injury to the well from the out-
 40 flow, as will be readily understood.

I do not intend herein to claim the combination of a working barrel, a piston working therein, an auxiliary pump-barrel, a draft-piston working therein, a valve-rod connecting said pistons, and a valve-vented chamber
 45 immediately below the draft-piston for the purpose of relieving the under side of said piston from pressure on the downward movement of the pump, the same forming the subject-matter, *inter alia*, of another application
 50 filed in the Patent Office by me February 17, 1897, Serial No. 623,793.

It will be understood that the pumping-heads and the connected cable are returned or moved downward by the downward pres-
 55 sure of fluid above the draft-head, the weight and pressure of such fluid pressing the draft-head down quickly and permitting a rapid operation of the pump.

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

1. In a pump substantially as described the combination of the upper barrel, the lower barrel of less diameter than the upper barrel,
 65 the heads fitting in said barrels and connected whereby they move together, the double

valve below the head operating in the upper barrel and two opposite seats for said valve substantially as set forth.

2. A pump having a draft-head a barrel in
 70 which said head fits and operates and an outlet below said head having two opposite seats one toward the head and the other out toward the well and a double valve operating between said seats, substantially as set forth. 75

3. An improved pump, substantially as described, comprising the upper barrel the lower barrel of less area than the upper barrel, an outlet being provided between said barrels and a valve controlling said outlet, substan-
 80 tially as set forth.

4. In a pump substantially as described the combination with the valve having opposite valve portions the support for said valve having ports for said opposite portions and a
 85 spring seating said valve on one of its ports and adapted to permit its movement under excessive pressure to close the other port, substantially as set forth.

5. In a pump substantially as described; 90 the combination of the upper and lower barrels of different areas, the connected heads fitted to and operating in said barrels an outlet being provided between said barrels and a valve controlling said outlet, substantially as
 95 set forth.

6. In a pump, substantially as described, the combination with the connection or support having a valve-seat, the plug also hav-
 100 ing a valve-seat opposite that of the connection or support, the valve having opposite portions fitting said valve-seats and the spring for actuating said valve, substantially as set forth.

7. The combination of the connection or
 105 support having a valve-chamber the plug closing one end of said chamber and having a tubular portion at its inner end, the valve having the opposite valve portions and provided with lateral depending arms fitting alongside
 110 the tubular portions of the plug and the spring embracing said portion and engaging the arms of the valve substantially as set forth.

8. The pump having the upper and lower working barrels and provided between the
 115 same with an outlet having opposite valve-seats and an intermediate valve-chamber the draft and pumping heads operating in said upper and lower barrels and the double-ended valve operating in the chamber and between
 120 the opposite seats and a spring normally closing said valve against the seat next the barrel and permitting said valve to move partly toward the opposite seat under some pressure and entirely against said seat under greater
 125 pressure, all substantially as and for the purposes set forth.

JOSEPH O'NEIL.

Witnesses:

JNO. C. BANE,

C. C. CHAMBERLIN.