

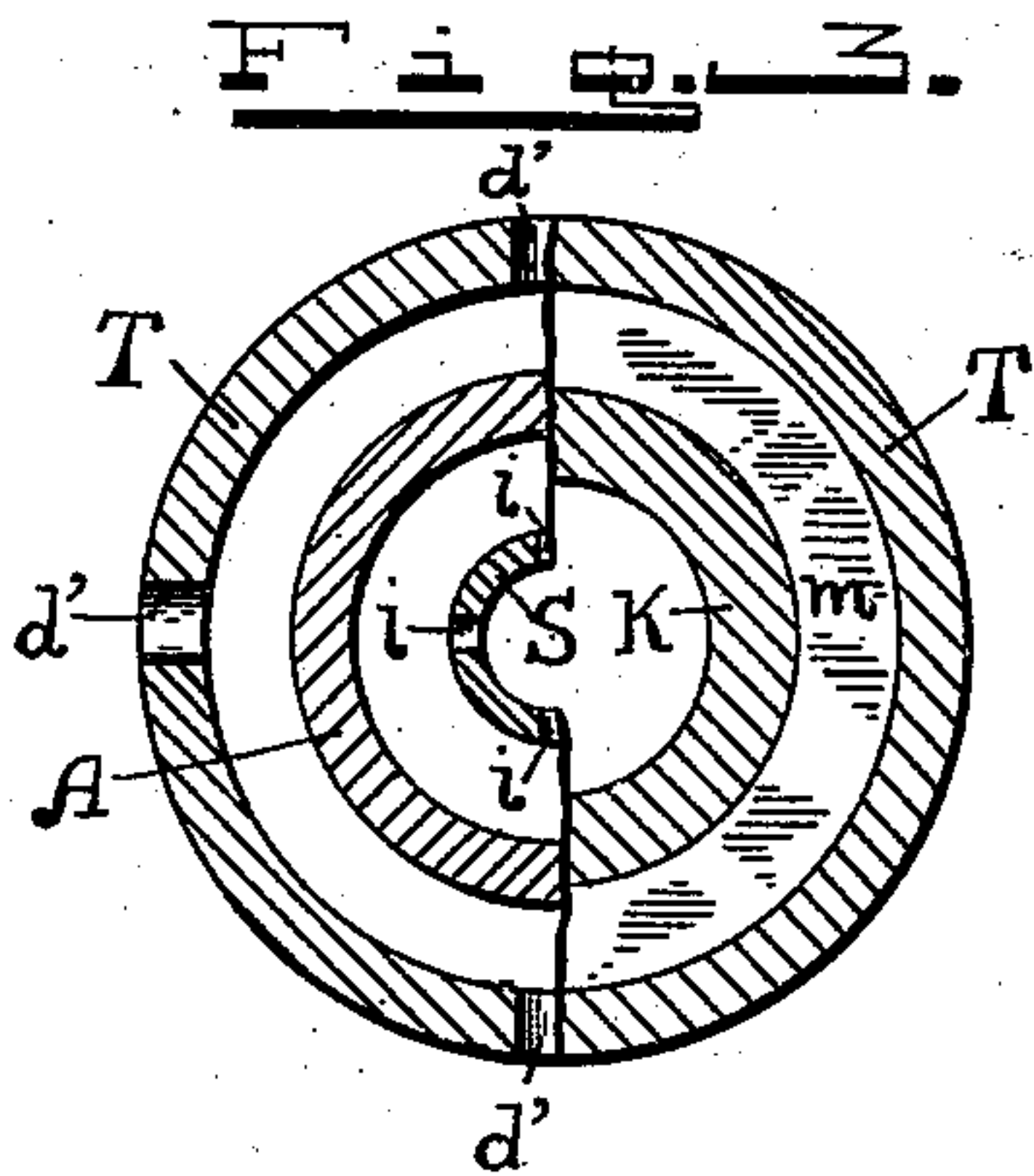
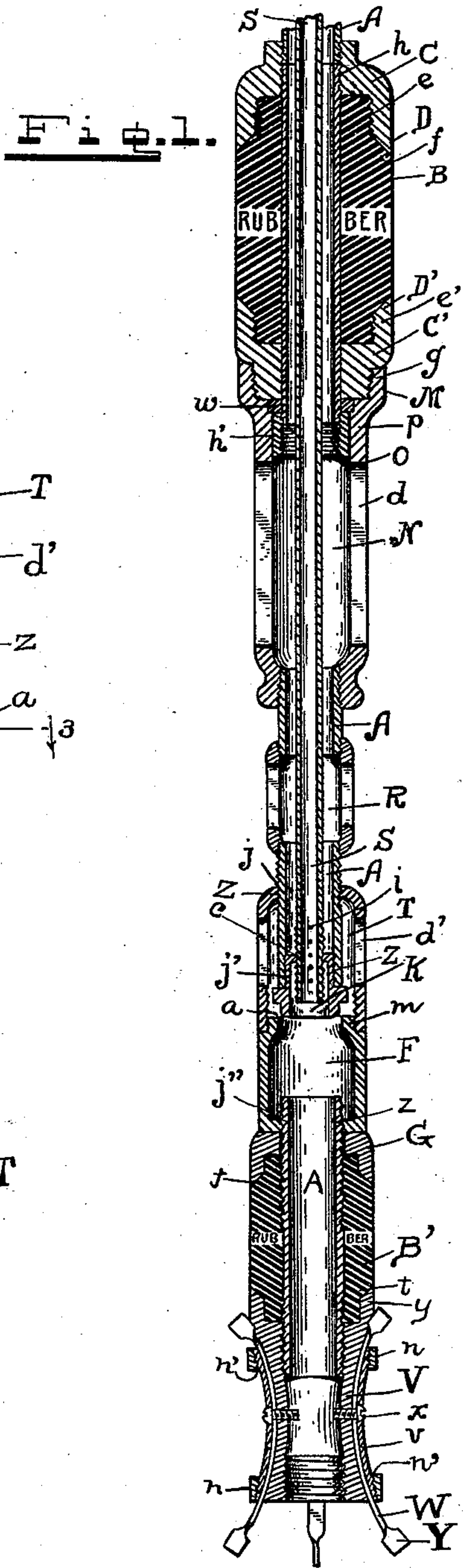
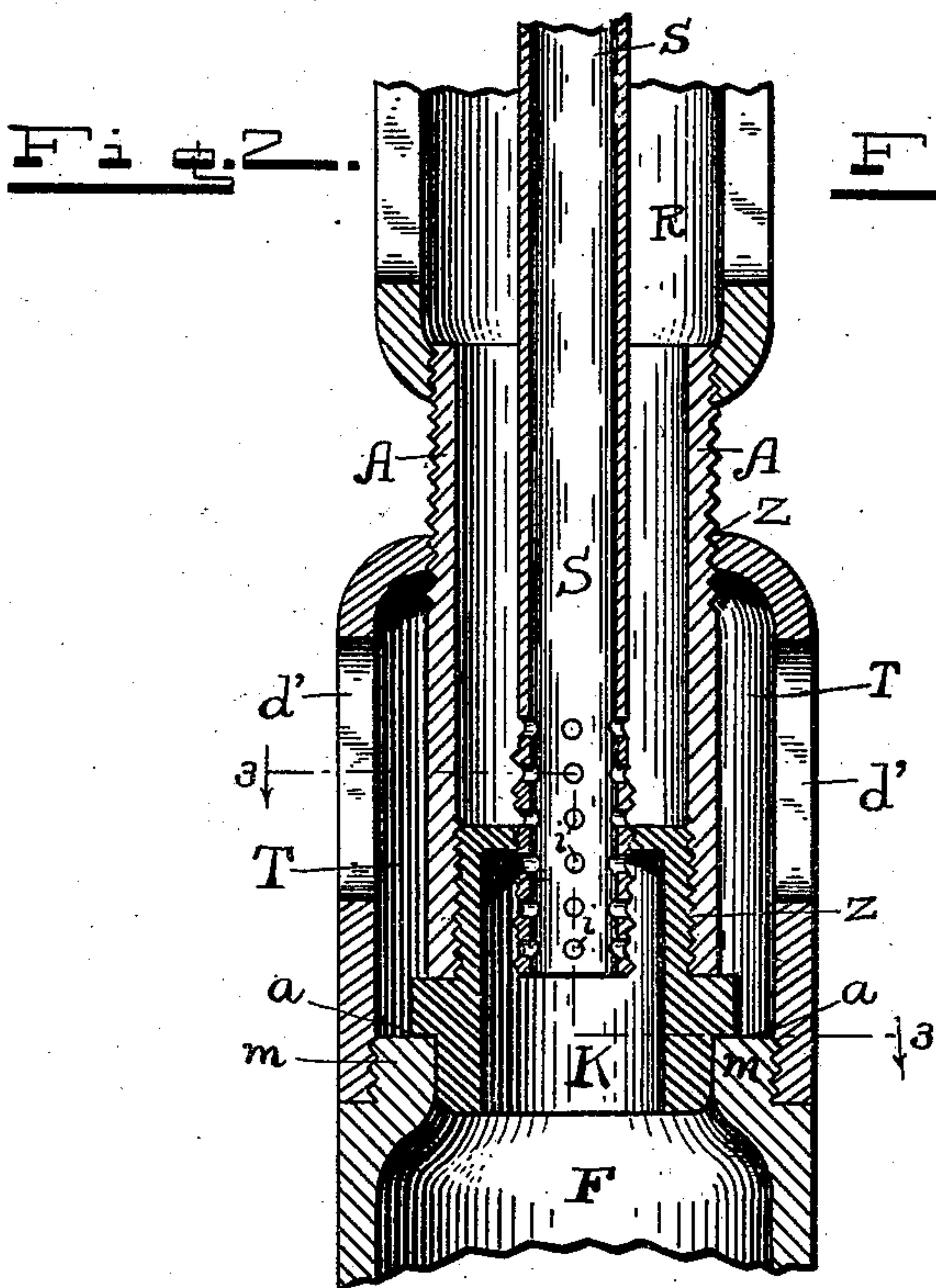
(No Model.)

2 Sheets—Sheet 1.

E. T. WARNER.
WELL PACKING.

No. 549,591.

Patented Nov. 12, 1895.



Witnesses:

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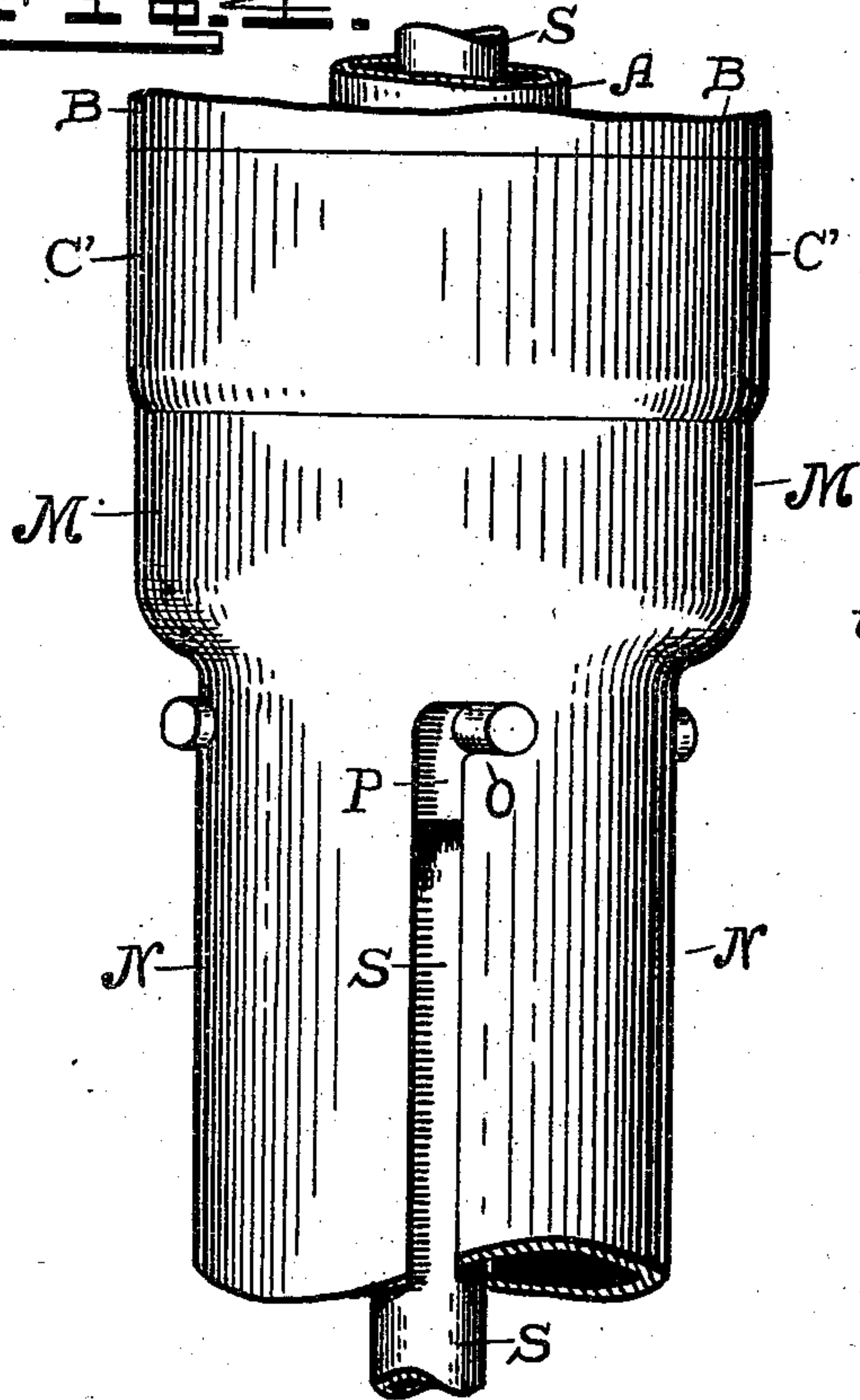
ATTORNEY.

(No Model.)

E. T. WARNER.
WELL PACKING.

2 Sheets—Sheet 2.

No. 549,591.
Fig. 4.



Patented Nov. 12, 1895.
Fig. 5.

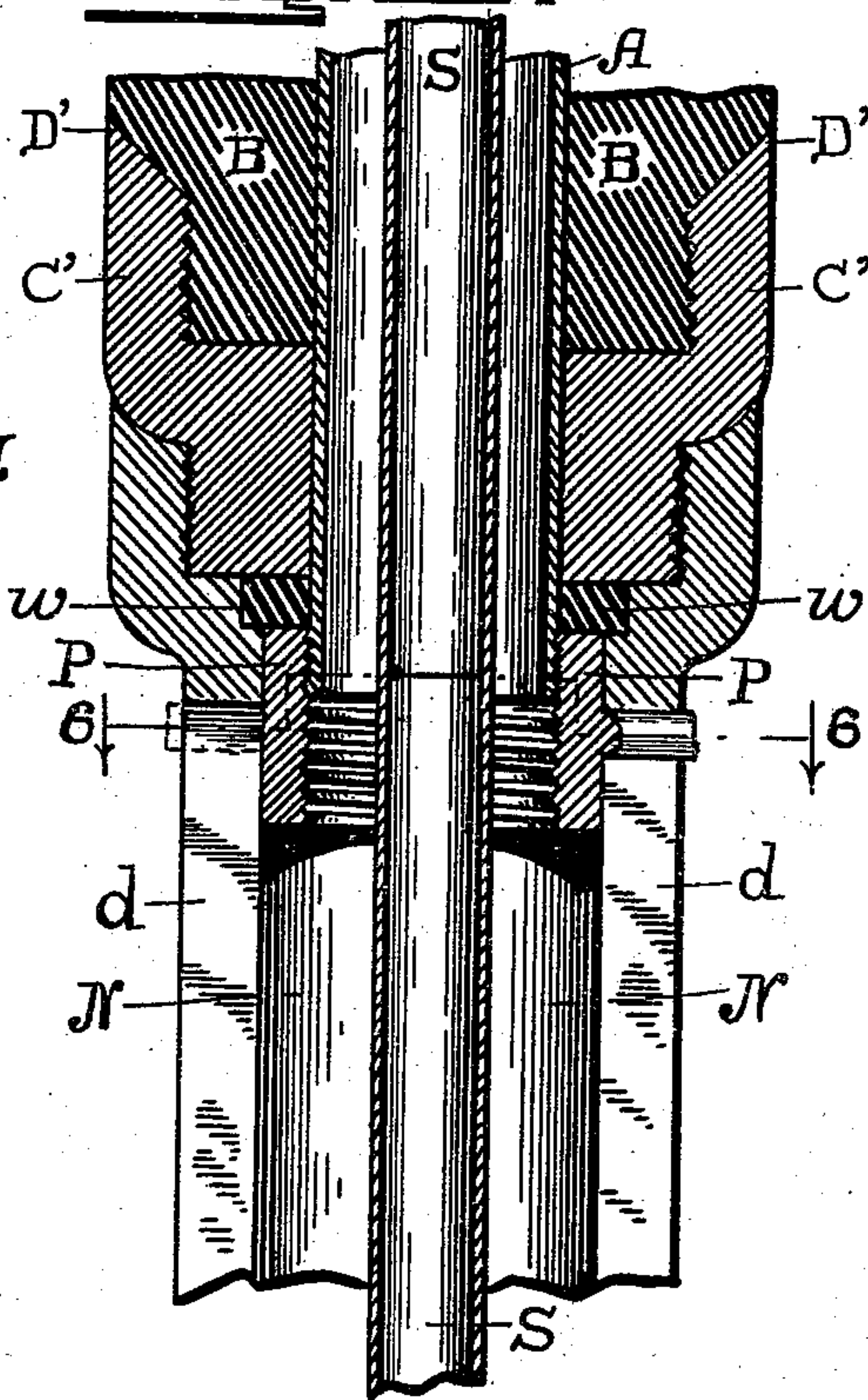
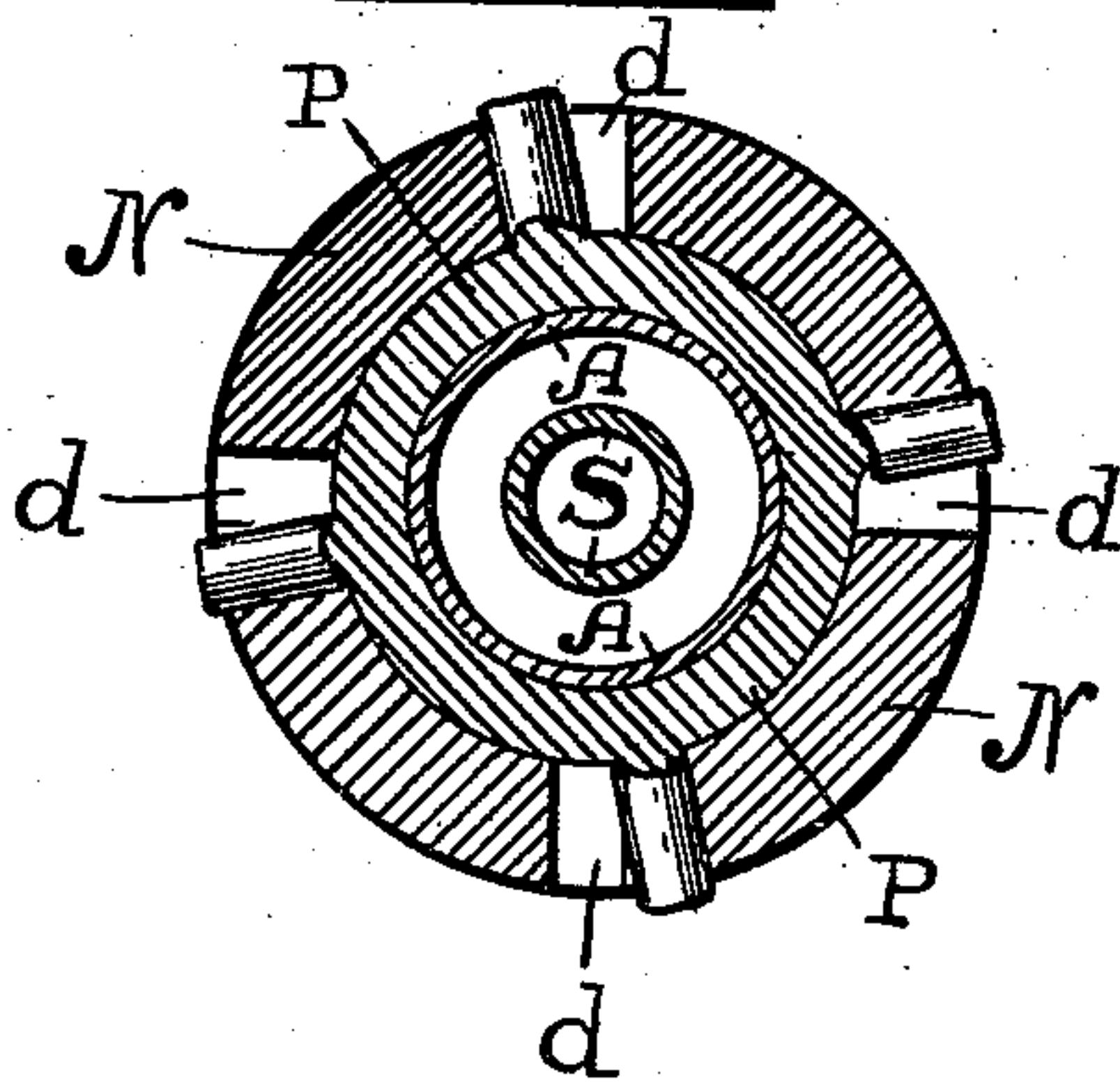


Fig. 6.



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UNITED STATES PATENT OFFICE.

EGERT T. WARNER, OF ELWOOD, INDIANA.

WELL-PACKING.

SPECIFICATION forming part of Letters Patent No. 549,591, dated November 12, 1895.

Application filed March 18, 1895. Serial No. 542,087. (No model.)

To all whom it may concern:

Be it known that I, EGERT T. WARNER, a citizen of the United States, residing at Elwood, in the county of Madison and State of Indiana, have invented certain new and useful Improvements in Well-Packings, of which the following is a specification.

This invention relates to a well-packing for gas or oil wells, and has for its object to effect certain improvements in well-packers for gas and oil wells over an invention for the same purpose patented to me December 11, 1894, and numbered 530,631. Efficient means shall be provided for entirely separating the lower fluid or water which accumulates in oil or gas wells below the upper fluid or gas.

With this end in view the main object of this invention is to construct a combination-packer, the parts of which may be used either jointly or separately, according to the depth of the well; to provide means for properly separating the gas or oil from the lower fluid which may have collected below said gas or oil by either conducting the lower fluid out of the well separately or entirely cutting off the same from communication with the upper fluid or gas, and to admit of its advantageous use in a gas or oil well of greater capacity than the devices shown in Patent No. 530,631, and that may be placed in a well without serious inconvenience from heavy gas-pressure.

With these objects in view the invention consists in the construction, combination, and arrangements of parts hereinafter more fully described, illustrated, and claimed.

In the accompanying drawings, Figure 1 is a central longitudinal sectional view of a well-packer embodying my improvements. Fig. 2 is an enlarged sectional view of the screw-valve whereby the gas-pressure on the lower fluid is regulated. Fig. 3 is a transverse sectional view on the line 3 3 of Fig. 2. Fig. 4 is a perspective view of that portion of my packer consisting of the lower packer-cap *c'* and the upper portion of the coupling-cage N. Fig. 5 is a vertical sectional view of the same parts shown in Fig. 4, and Fig. 6 is a horizontal sectional view on the line 6 6 of Fig. 5.

Referring to the accompanying drawings, A represents a section of ordinary well-tubing, such as is used in tubing an ordinary gas

or oil well, and is adapted to pass through an ordinary rubber packer-collar B, such as is usually employed in well-packing, and which is adapted to be expanded outward against the sides of the well to hold the packer in position. The packer-cap C is interiorly threaded at *h* to receive the threaded portion of the well-tube A and is provided with the beveled flange D, said flange being interiorly threaded, as at *e*. The rubber collar B is shouldered at *f* to fit within the beveled flange D and is firmly cemented thereto. The lower packer-cap C' is reversely disposed to the upper packer-cap C and is likewise provided with the beveled flange D', interiorly threaded at *e'*, and the lower end of the rubber collar B is shouldered the same as at *f* and is laid in cement in the lower packer-cap C'.

The lower packer-cap C' is unthreaded and receives the tube A loosely, permitting it to work freely therein, but said packer-cap is exteriorly threaded at *g* to removably engage the upper threaded neck M of the longitudinally-slotted coupling-cage N.

It will be understood that the rubber-packer B, being free from the sides of the well-tube A, is free to yield to the weight of the well-tubing from above, and when such pressure is put upon it the rubber will expand or swell out against the sides of the well, and the rubber B, being cemented to the upper packer-cap C and to the lower packer-cap C', in removing the packer, the weight of the pipe below will stretch the rubber back to its natural shape, permitting its easy removal. The coupling-cage N is provided with a series of longitudinal slots *d*, having at their upper ends shouldered offsets O to receive the wings of the winged coupling P, adapted to slide in said slots. The coupling P is interiorly threaded, as at *h'*, to engage the lower threaded end of the tube A, and the wings of said coupling are adapted to rest on the shoulders of the slot offsets when the packer is being placed in position in the well, so as to relieve the rubber B from the weight of the line of tubing above the coupling-head.

A packing-washer *w* is arranged on the tube A above the coupling P for the purpose of preventing gas or liquid from entering between the tube A and rubber collar B and thus interfering with the easy manipulation thereof,

and serves to keep the rubber B from swelling or becoming inflated when placing the packer in a large well—that is, one having a heavy pressure of gas or other liquid from below.

5 The object in using the cement in addition to the threads for attaching the rubber packer-collar B to the packer-caps C and C' is to prevent the water from working between the packing and the tube A, the threads alone
10 having been found insufficient to accomplish that purpose. The disadvantage of having the water accumulate between the packing and the tube is that it prevents the packing-collar from collapsing when it is desired to re-
15 move it from the well.

The above-described construction completes the upper-pressure packer of the combination-packer as adapted to be placed in position in a well. Below the slotted cage N is coupled
20 a slotted cage R to admit the upper fluid or gas. Below said slotted cage R is coupled a slotted cap T, by means of a section of tube A, having a left-handed thread j . The lower end of said section of tube A is interiorly
25 threaded with a left-handed thread at j' , and within said lower end of the tube a cup-shaped valve K, having an annular shoulder around its outside circumference threaded likewise, is adapted to be screwed. The lower end of
30 the slotted cap T is interiorly threaded and is adapted to be screwed onto a closed cylindrical chamber F, having a shoulder m , the top of which serves as a seat a for the valve K and around which the cap T is screwed. A
35 section of the tube A, having a left-handed thread, is adapted to screw into the lower end of the cylindrical chamber F at j'' . The valve K, when brought down on the seat a , closes the top of the chamber F and has in its cen-
40 ter a threaded opening through which the similarly-threaded end of the small tube S protrudes. The threaded end of said tube S is provided with a number of small openings and is adapted to be screwed up or down, as
45 may be required, to give the desired pressure of gas to force the lower fluid up through said tube. The gas entering through the slotted cage R surrounds the tube S and forces its way through the openings i in the tube S and
50 by its pressure causes the lower fluid entering below the screw-packer to raise in said tube and be discharged. In Fig. 1 the valve K is shown open as when the packer is being lowered.

55 It is frequently very difficult, in case of strong pressure, to lower a packer, as the packer closes the opening and the upward pressure of gas or other fluid prevents its descending. By leaving the valve K raised
60 while being lowered it will be seen that the gas can pass up through the chamber F into the slotted cap T and out through the slots d' . Fig. 2 shows the valve screwed down upon the seat a , as arranged when in position for
65 operation. Below the cylindrical chamber F and surrounding the lower section of tube A is the rubber packer-collar B', the upper and

lower edges of which are beveled at t . The upper beveled end has fitted over it a cap G, which is unthreaded to fit loosely over the
70 tubing A. The lower beveled end of the collar B' is confined by the beveled flange y of the anchoring-head V. When the chamber F is screwed down on the lower section of tube A, it will force the loose cap G down upon the
75 rubber collar B' and cause its sides to expand outward and engage the sides of the well.

The anchoring-head V is supported by the lower section of tube A and is provided with a series of longitudinal spring-slots v , which
80 adjustably receive the curved anchoring-springs W, projecting above and below the head and confined therein by means of the retaining-rings n , removably engaging the exteriorly-threaded ends n' of said head. The
85 anchoring-springs are adjusted to the slots v by means of the screws x and are provided with the twisted engaging-points Y, which are adapted to bite into the sides of the well and prevent the packing from turning therein
90 when placed in position.

All of the screw-joints of the combination-packer are tightened before placing the same in position, except the left-threaded joints Zz. When it is desired to leave the lower or screw
95 packer in the well, it will be seen that in the act of unscrewing the upper portion of the tubing above the slotted cap T the latter will be screwed tightly onto the cap G, causing the rubber B' to expand against the sides of the
100 well.

The two parts of the packer are preferably used together, as illustrated; but it will be understood that the lower screw-packer may be
105 separately placed in a well by coupling the tubing A in the threaded opening of the slotted cap T and subsequently removing the tubing, as above described.

It will be seen that in the event of not using the pipe S, when the lower packer is used,
110 with or without the upper packer the opening may be suitably plugged to cut off or separate the lower fluid or water from the upper gas or oil.

Minor changes in the form and details of
115 construction may be made without departing from the principle or sacrificing any of the advantages of my invention.

Having described my invention, what I claim, and desire to secure by Letters Pat-
120 ent, is—

1. In a well-packing, the combination with the well tubing, of the upper rubber packer B, cemented at its upper and lower ends with-
125 in the flanges D and D' of the upper and lower packer caps C and C', and adapted to be expanded against the sides of the well by the weight of the tubing; a longitudinally slotted coupling cage N, having a winged coupling P, a packing washer w , between the
130 coupling P, and the lower packer cap C'; a slotted inlet cage R; a slotted cap T, having a left-handed thread and containing a like threaded valve K; a small tube S; a closed

chamber F, having a left-handed thread; and a lower screw packer B', supporting the anchoring head V, substantially as shown and described.

5 2. In a well packing, the combination with a lower screw packer of the upper pressure packer adapted to fit loosely over a well tube, and consisting of the rubber B, cemented within threaded, beveled, flanges D and D' of the packer caps C and C', at each end, as set forth.

15 3. The combination in a well packer, having the tubing and packing devices arranged as shown, of the longitudinally slotted coupling cage, having shouldered offsets o, the winged coupling P, a slotted inlet cage R, a slotted cap T, and a cup shaped valve K, having an annular shoulder around its center circumference to engage with the upper end of the casing forming the chamber F, substantially as set forth.

20 4. In a combined well packer, the combination with the upper pressure packer, the lower screw packer and a line of well tubing, of a

longitudinally slotted coupling cage N, having shouldered offsets o, to receive the wings of a winged coupling P, a slotted inlet cage R, a slotted cap T, and a cup-shaped valve K, having an annular shoulder around its outside circumference as set forth.

5. In a well packer having an upper pressure packer and a lower screw packer in combination with a line of well tubing; a slotted inlet cage R, coupled above the slotted cap T, by a left-threaded section of tubing A, said slotted cap T, being threaded onto a closed cylindrical chamber F, and adapted to contain a valve K, whereby an upward pressure may be relieved when placing the packing devices within a well, substantially as described.

In witness whereof I have hereunto set my hand, in the presence of two witnesses, at Elwood, this 20th day of February, 1895.

EGERT T. WARNER.

Witnesses:

B. R. CALL,
JOHN GREENLEE.