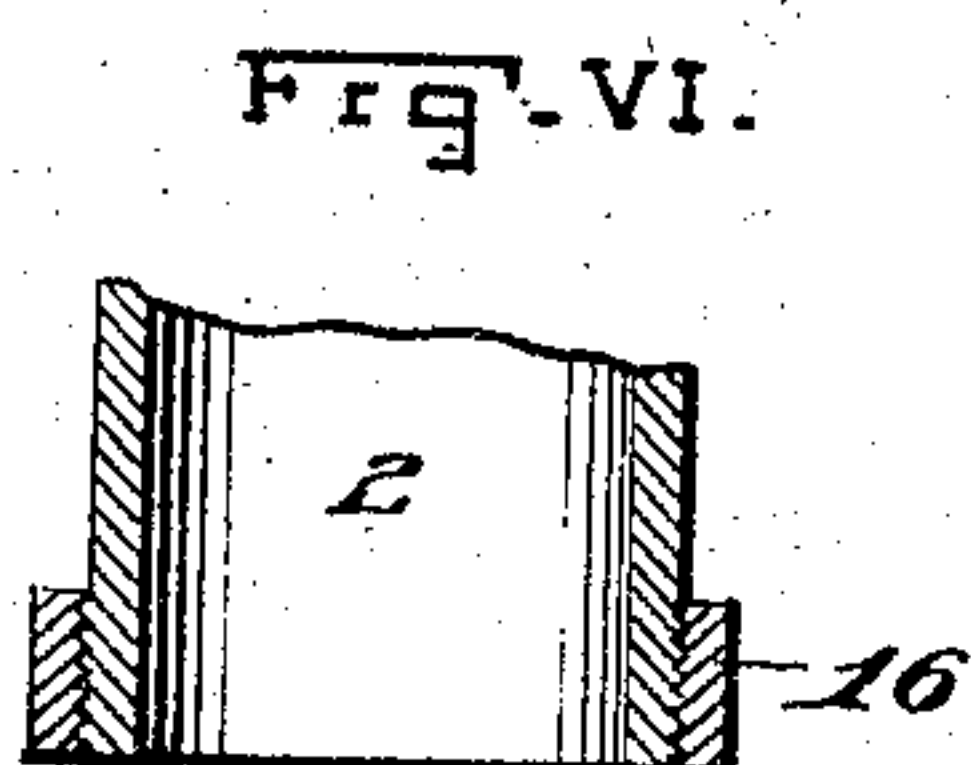
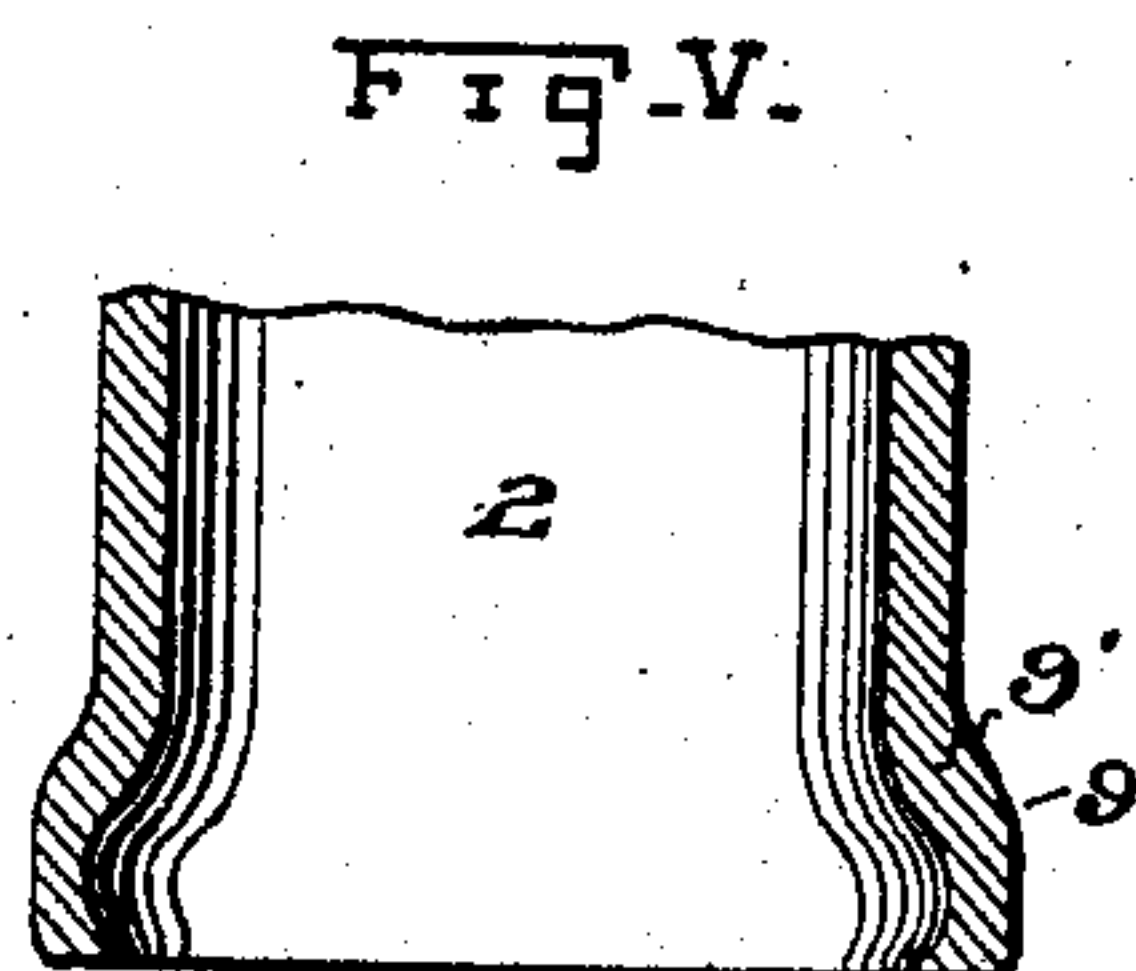
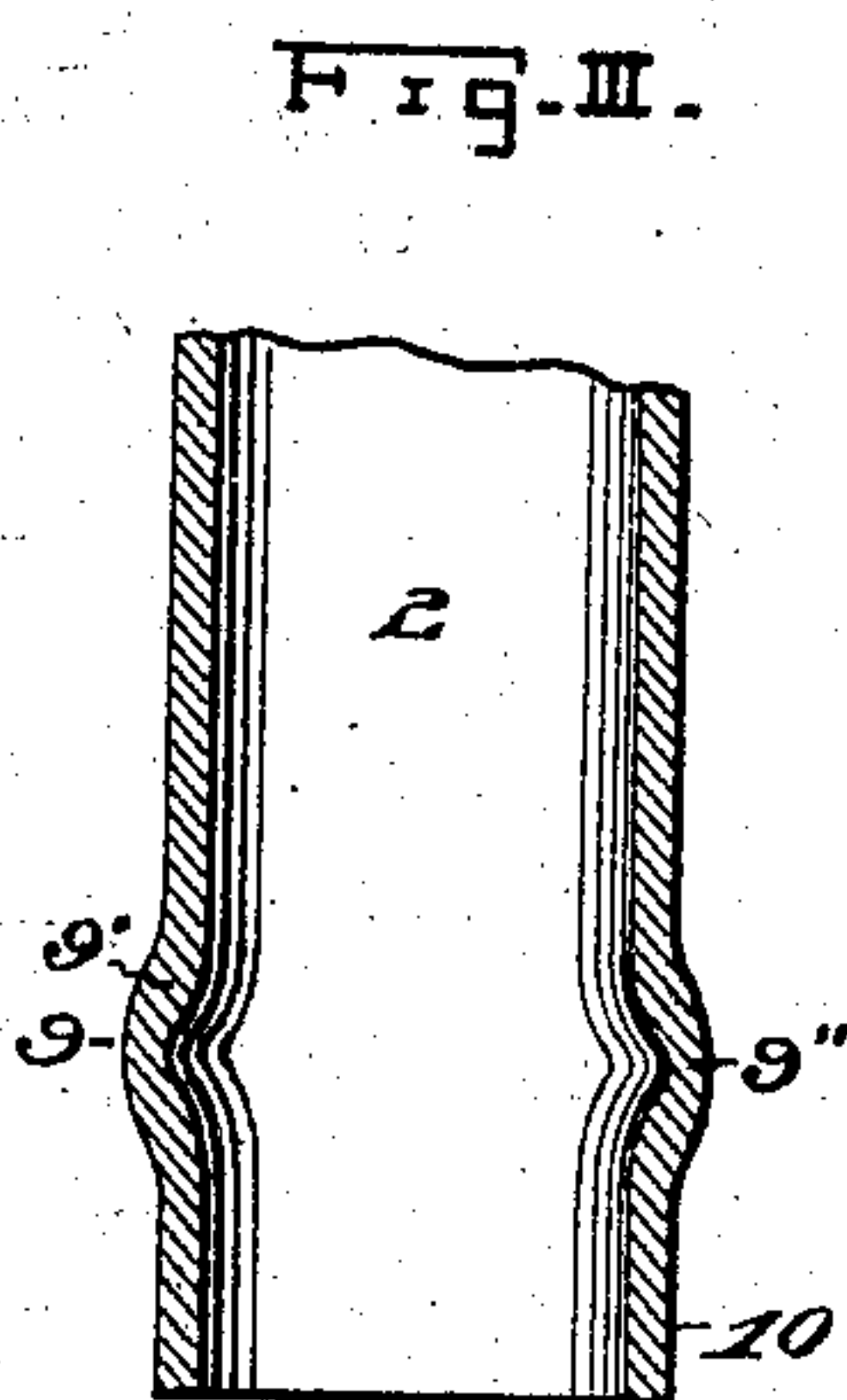
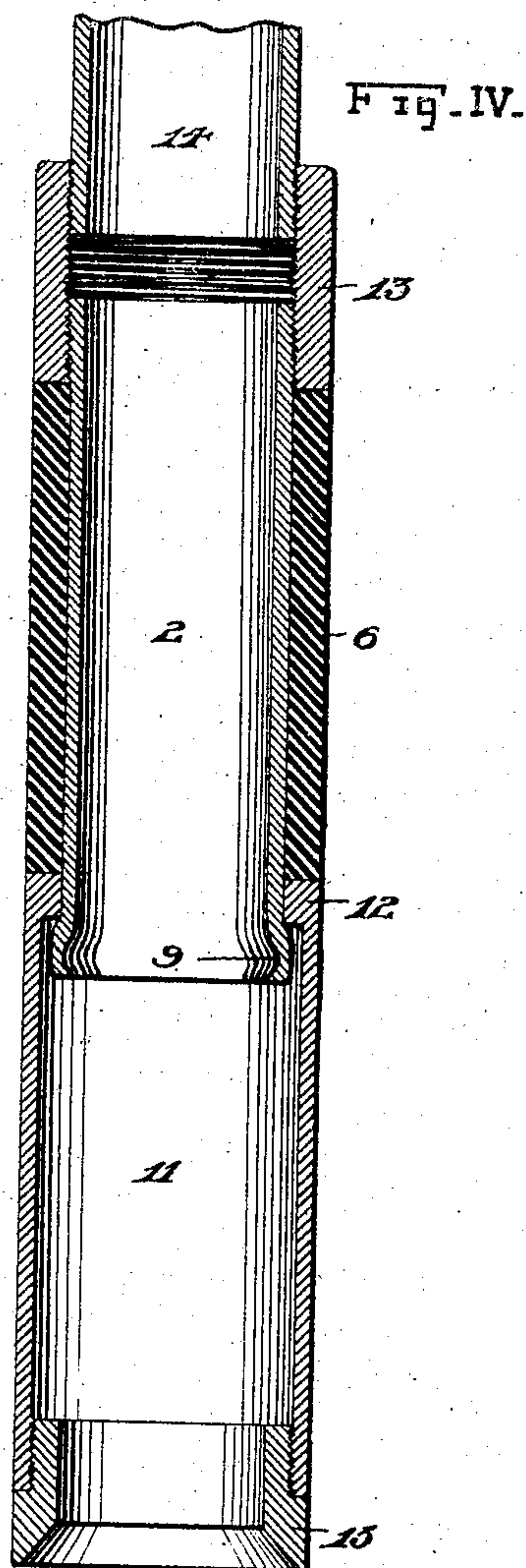
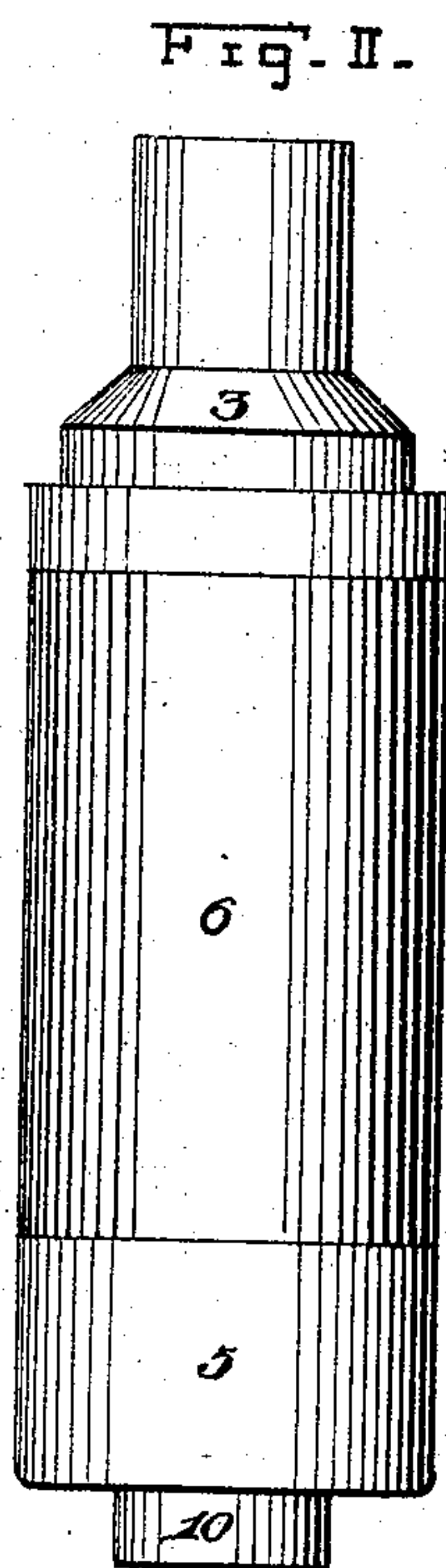
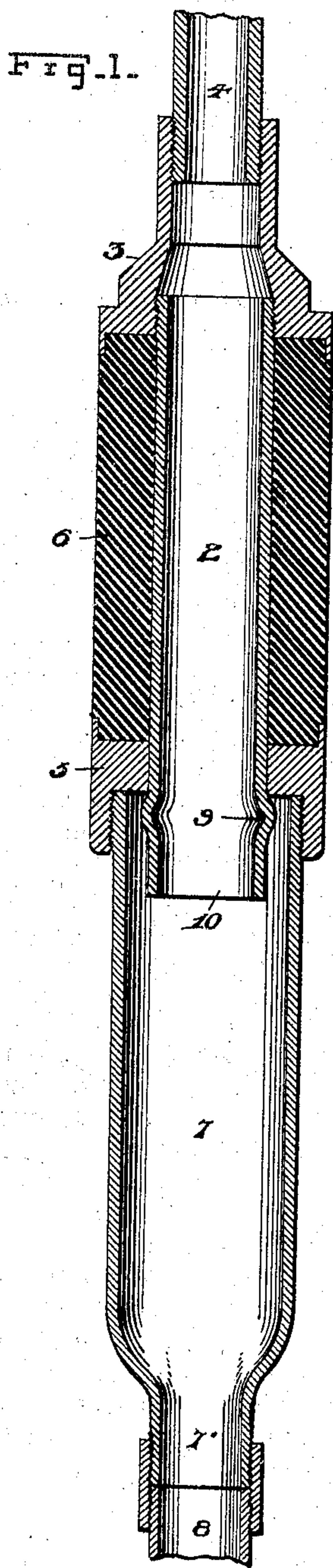


No. 781,470.

PATENTED JAN. 31, 1905.

G. A. SPANG.  
PACKER FOR DEEP WELLS.  
APPLICATION FILED SEPT. 4, 1903.



WITNESSES

*J. P. Spleman,*  
*Ernest W. Diggall.*

INVENTOR

*George A. Spang,*  
*By J. M. Harbit*  
*att.*



# UNITED STATES PATENT OFFICE.

GEORGE A. SPANG, OF BUTLER, PENNSYLVANIA.

## PACKER FOR DEEP WELLS.

SPECIFICATION forming part of Letters Patent No. 781,470, dated January 31, 1905.

Application filed September 4, 1903. Serial No. 171,957.

*To all whom it may concern:*

Be it known that I, GEORGE A. SPANG, a citizen of the United States, residing at Butler, in the county of Butler and State of Pennsylvania, have invented certain new and useful Improvements in Packers for Deep Wells, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to packers for deep wells, and has particular reference to the construction of the packer-body, the object being to provide against accidental detachment or separation of the telescoping members of the packer.

A further object is to provide a stronger and more durable packer and at the same time decrease the cost of manufacture as compared with packers of present usual construction.

In the accompanying drawings, Figure 1 is a vertical sectional view of a packer embodying my invention. Fig. 2 is a view of the upper portion of the same. Fig. 3 is a detail view of the lower end of the packer-body. Fig. 4 illustrates my invention applied to a packer of different form, and Fig. 5 is a detail view of the lower portion of the packer-body shown in Fig. 4. Fig. 6 is a sectional view of the lower end of a packer-body as at present constructed.

Referring to the drawings, 2 represents the tubular packer-body uniting at its upper end with head 3, which couples with well-tubing 4. Slidable on body 2 is head 5, and confined on the body between heads 3 and 5 is rubber sleeve 6. Depending from head 5 is sleeve 7, contracted at its lower end at 7' to unite with tube 8, which may be an anchor-tube of usual form or an extension of the well-tubing of any desired length. With tube 8 resting on the bottom of the hole the weight of well-tubing 4 compresses the rubber between heads 3 and 5, with body 2 moving downward through the latter, all as usual and well known in this class of devices.

For movably confining head 5 on body 2, the latter is provided with an integral annular

extension 9, which in the present adaptation of the invention consists of a bulge formed by longitudinally contracting the packer-body by means of suitable forming mechanism, which comprises no part of the present invention. The formation is such that the metal of the bulge is thickest or heaviest at the upper side thereof, or that part engaged by or immediately adjacent the bottom extremity of head 5, as shown at 9', thereby reinforcing the bulge at the point of greatest strain. This reinforcement is gained in part from an appreciable thinning of the metal of the intermediate part of the bulge, or that portion of largest diameter, as indicated at 9". Furthermore, the bulge with the grooved interior reinforces the packer-body and adds very materially to the strength thereof. It is a common and well-known practice in various arts to operate on the interior surfaces of tubular or hollow metallic articles with expanding or beading tools for the purpose of beading or bulging the same. By such operation the metal comprising the bead or bulge is necessarily thinned and its grain ruptured and distorted, thereby very materially weakening the tube or body at such point. By forming the bulge at the expense of the tube's length—*i. e.*, by longitudinally contracting the tube—I preserve the grain of the metal and substantially the original thickness thereof and increase rather than diminish its strength.

Bulge 9 is preferably formed at a point inward from the extremity of body 2, so as to leave an extremity portion 10, which projects beyond head 5 before sleeve 7 is attached, whereby the body may be conveniently held with a wrench or other means while head 3 is being screwed on and the rubber compressed thereby against head 5.

In the type of packer shown in Figs. 4 and 5 bulge 9 is formed at the lower extremity of body 2, and the upper end of sleeve 11 is flanged internally at 12 to fit body 2 and engage the bulge and at the same time form the lower compressing-head for rubber 6. The upper head consists of coupling-sleeve 13, which unites with casing 14. At the lower



end of sleeve 11 is shoe 15, adapted to rest on the bottom of the hole, which may be the bottom of the well, or the drilling may continue through the packer and said shoe, as is well known to those skilled in the art.

Prior to my invention the necessary shoulder at the lower end of the packer-body has been secured by threading the body and applying thereto the internally-threaded ring 16, Fig. 6. The tubing is constantly rotating while being lowered in a well, and this movement has a tendency to start said collar, and if the same becomes detached, as is frequently the case, the packer is destroyed, and all tubing below and sustained thereby drops back into the hole and must be fished out. With my improvement such an occurrence is an absolute impossibility. With the former construction when tubing of considerable length is suspended from the packer, as may be with the type shown in Fig. 1, the weight thereof is liable to strip the threads of the body-ring 16, the result being the same as with an accidental unscrewing of said ring above explained. Obviously the integral body projection herein proposed, obtained by strengthening the body rather than weakening the same, renders the packer practically indestructible in the part which has heretofore been weakest. My improvement lessens the cost of manufacture, as thereby the expense of rings 16 heretofore used is avoided, and all thread-cutting at the lower end of the packer-body is done away with.

I claim as my invention—

1. A tubular packer-body contracted longitudinally to form a bulge in its outer surface and a corresponding depression in its inner surface.
2. A tubular packer-body contracted longitudinally to form a continuous bulge in its outer surface and a corresponding continuous depression in its inner surface.
3. A tubular packer-body contracted longitudinally to form an annular bulge in its outer surface and a corresponding continuous de-

pression in its inner surface, the metal of the bulge being thickest at one end thereof.

4. A tubular packer-body having a bulge at or adjacent one end, with the metal of that portion of the bulge farthest removed from said end being heavier or thicker than the other portion.

5. A tubular packer-body having an annular bulge forming a stop, the metal forming the intermediate portion of the bulge being relatively thin.

6. An improved packer comprising a tubular packer-body, packing, and a packing-compressing member movable on the body, the body being bulged to form a stop for the compressing member, the metal of said bulge being heaviest or thickest adjacent the compressing member.

7. An improved packer comprising a tubular body having a stop at a point inward from one end to provide the body with a projecting extremity for the purpose described, packing, and packing-compressing means movable on the body and confined by the stop.

8. An improved packer comprising a tubular body having an annular bulge inward from one end to form a stop and to provide the body with a projecting extremity for the purpose described, packing, and packing-compressing means movable on the body and confined by the stop.

9. A tubular packer-body contracted longitudinally to form an annular bulge.

10. An improved packer comprising a tubular packer-body, packing, and a packing-compressing member movable over the body, the body being contracted longitudinally to form a bulge which comprises a stop or abutment for the compressing member.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE A. SPANG.

Witnesses:

A. M. CORNELIUS,  
J. L. WALKER.