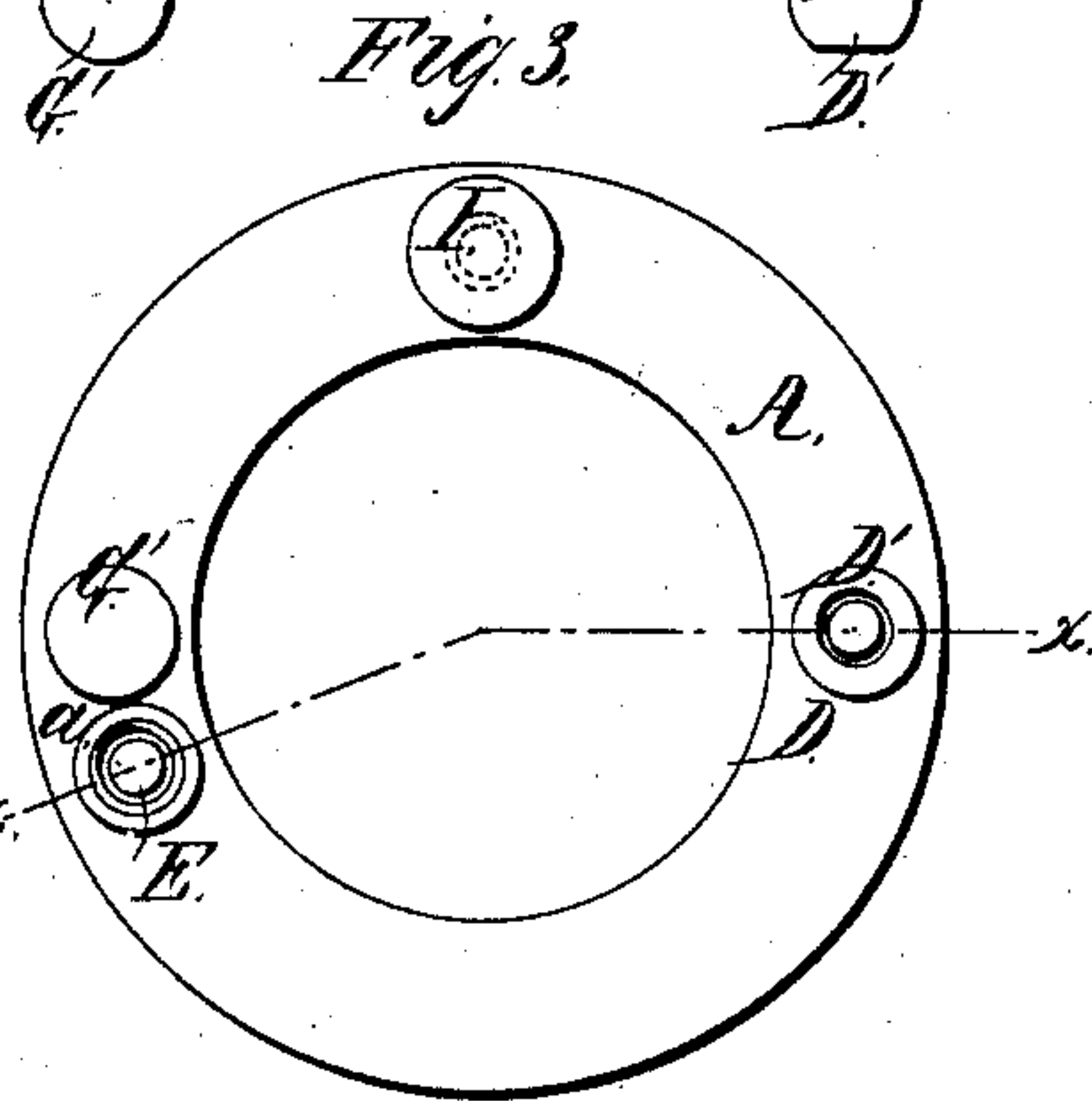
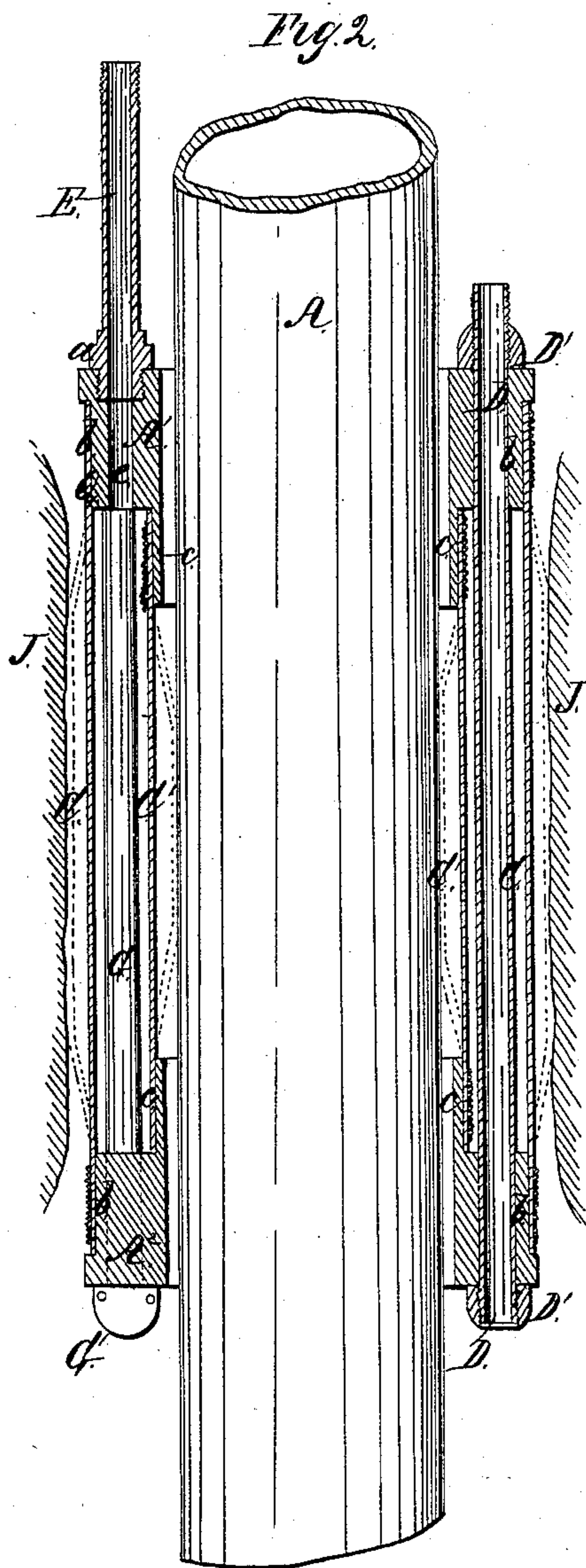
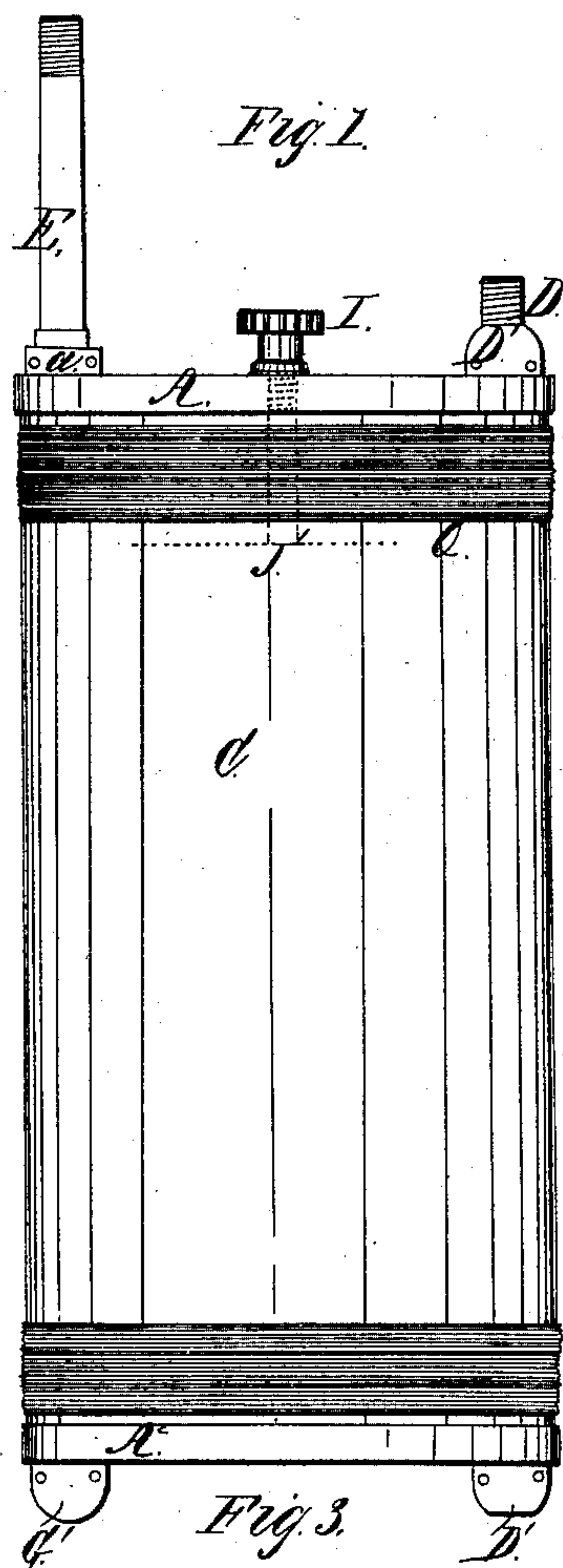


S. L. Fox

Well Packing.

N^o 45,822.

Patented Jan. 10, 1865.



Witnesses:
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UNITED STATES PATENT OFFICE.

SAMUEL L. FOX, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN TUBE-PACKING.

Specification forming part of Letters Patent No. 45,822, dated January 10, 1865.

To all whom it may concern:

Be it known that I, SAMUEL L. FOX, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Packing Tubes and Joints; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is an elevation of my improved apparatus. Fig. 2 is a longitudinal section taken on the line *x* of Fig. 3, showing the apparatus as it appears when applied about a tube. Fig. 3 is a top view.

Similar letters of reference indicate corresponding parts.

This invention consists, in general terms, in a novel method of packing the tubes of oil and other wells, or any other surfaces, fixed or movable, by the use of a packing-box whose body is made of flexible or elastic material, and is made to act as a packing by means of the expansion of its walls.

The example of my invention here shown consists of an apparatus in which it is applied to pack the tubes of oil or other deep or Artesian wells in which pump-tubes of great length are used. In operating such wells it is usually necessary or desirable to cut off the flow of surface and spring water from the oil or other matters to be raised from the bottom of the well. The common mode of doing this is to tie a seed-bag around the pump-tube on a line below the lowest source or vein of fresh water or other matter to be excluded, and which will gradually swell under the action of the water so as to fill the annular space between the pump-tube and the sides of the well, and thereby pack the tube and cut off communication through said space between the part of the well below the seed-bag and the part above it. This method is very imperfect, and is attended with several disadvantages. For instance, when it becomes necessary to take up the pump-tube to repair it, or for any other purpose, since it is impossible to remove the packing first before raising the tube, it follows that the seed-bag must be torn away in the operation of lifting the tube out of the well. Besides the additional

duty thus put upon the lifting apparatus, this apparatus must also lift the water and other refuse matter held between the seed-bag and the top of the well. The force required to do this work is enormous, and the pump-tube is sometimes broken apart in the operation. When this takes place, the well is abandoned, since it has not been found practicable to remove the fragments of the tube from the well.

My invention prevents the loss of wells from such a cause, and enables one to pack and unpack a pump-tube at any depth with facility, as hereinafter explained.

In the accompanying drawings, J J represent the sides of an oil or Artesian well, and A a pump-tube supposed to have been sunk therein.

Q is a hollow air-tight case, made partly of metal or its equivalent, and partly of elastic or flexible material. In the example here shown, the ends of the case are metallic rings or sections of hollow cylinders A' A², of an interior diameter a little greater than the exterior diameter of the pump-tube connected to each other by elastic or flexible cylinders C C', whose opposite ends are joined to the said rings, as seen in the drawings. The said rings A' A² are made substantially alike, each being turned down upon the ends which face each other to form a collar or flange, *c*, about which the inner cylinder, C', is fitted, and to which it is secured by copper wire or other suitable means. Both rings are also turned down near their ends, as at *b*, to receive the outer cylinder, C, which is secured in like manner, being so fitted as that the binding-wire, as well as the cylinder, shall be protected from abrasion by the greater diameter of the ends of the rings. When the cylinders C C' are in place, they inclose an annular space, bounded at top by the ring A', at bottom by the ring A², and at its sides by the said cylinders.

D is an air or gas pipe passing through both rings and through the said annular space, and clamped to the rings by means of nuts D' D', or by any other convenient device. This pipe is open at both ends, its lower end terminating with the nut which secures it to the ring A²; but its upper end has a screw-thread cut around it to receive a connecting-pipe, which is continued by successive additions until it reaches above the surface of the ground, so that the pipe serves not only the purpose of an

air and gas vent, but also of a rod by which the packing-case Q is raised and lowered in the well.

The upper ring, A', is perforated, as at *e*, in or near the diametric line which passes through the place of the pipe D', to receive a pipe, E, which is screwed into the hole *e* and clamped to the ring A' by means of a nut, *a*. The pipe E may be screwed into the ring the whole length of the hole *e*, or for only so much of its length as will give sufficient strength to the joint. This pipe communicates with the annular space between the cylinders C C', and is continued up to the top of the well by successive additions, the same as the pipe D. It will be seen that the gas-pipe D performs the office of a stay bolt to the rings A' A² on one side of the case Q. The pipe E may be made to serve the same office on the opposite side of the case by extending it through the annular space and letting it terminate in the ring A², in which case its sides within the annular space must be perforated to establish free communication therewith; but in this example of my invention I have chosen to terminate the pipe E in the upper ring, and have connected the rings on that side of the case by means of a stay-bolt, G, which passes down through the annular space and through the rings and is clamped by nuts G'.

J' is a perforation made through the upper ring and opening into the space between the cylinders C C' for the purpose of a vent to said space, if found necessary. This hole is closed by a screw-plug, I, or by any other suitable device.

The mode of operating and using the packing-case Q is as follows: The place in the well, or, in other words, the depth at which the pump-tube is to be packed, being known or ascertained by the usual means, the case is placed around the pump-tube and lowered by means of the pipes E and D, which are to be lengthened by successive additions until the case reaches the required depth. It is then filled with water or other liquid, if not filled before it is lowered, through the pipe E, by means of a suitable pump or other device, so as to produce a pressure sufficient to expand the sides of the cylinder, as shown in red outline in Fig. 2, the outer cylinder, C, being forced and held snugly against the sides of the well, and the inner cylinder, C', being held in like manner against the exterior of the pump-tube. Air or any other suitable

fluid may be employed for this purpose instead of a liquid. A pressure-gage may be connected to the pipe E at the top of the well to indicate the pressure which is being applied to the expansible sides of the case.

When the pump-tube is to be removed from the well for repair or any other purpose, the packing-case is to be emptied of its contents sufficiently to permit its expansible sides to collapse, when it can be raised from the well by means of the pipes E D, the superincumbent water, previously held up by the packing, escaping past its sides into the well. When the packing-case has been removed, there is no hinderance remaining to prevent the lifting of the pump-tube.

As it is important that the surface and other water and foreign substances be not allowed to fall into the well during the time the pump-tube is withdrawn, I exclude them by sinking a section of a tube of about the same diameter as the pump-tube a sufficient distance down the well and packing its sides with the movable case Q in the same manner as I pack the pump-tube, thereby effectually preserving the well and preventing it from being obstructed or overflowed while the pump is out of it, and also preventing neighboring wells from being overflowed by such surface or other water.

This mode of packing may be used with good results in the case of any surface or joint which needs to be packed and which is inaccessible to ordinary manipulation. The case may be adapted to different situations by changing its form, and one or both of its sides may be made expansible, as occasion may require. When used for packing pump-tubes, the hydrostatic pressure of a column of liquid, when liquid is used in the case Q, may give pressure enough to expand its sides to the required degree without the use of a force-pump.

I claim as new and desire to secure by Letters Patent—

1. Packing pump-tubes of oil and other wells or other tubes or pipes by means of a movable packing-case with expansible sides, substantially as above described.

2. The packing-case Q, constructed and operated substantially as above described.

SAMUEL L. FOX.

Witnesses:

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SAMUEL A. MURRAY, Jr.