

No. 753,550.

PATENTED MAR. 1, 1904.

E. M. CORYELL.  
VERTICAL PLUNGER SINKING PUMP.

APPLICATION FILED OCT. 16, 1903.

NO MODEL.

Fig. 1.

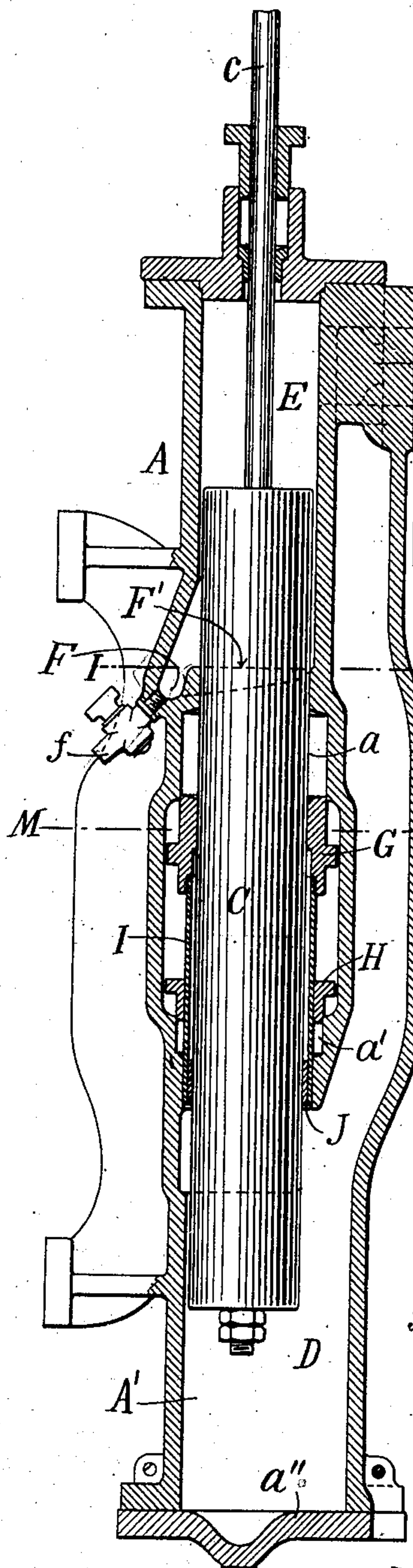


Fig. 2.

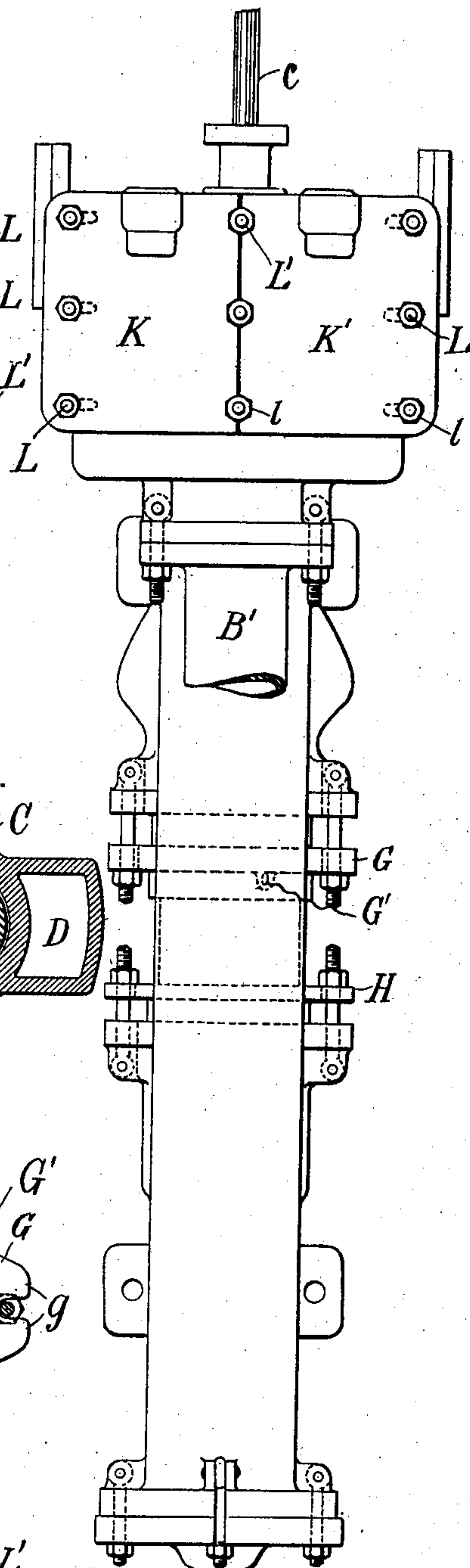


Fig. 3.

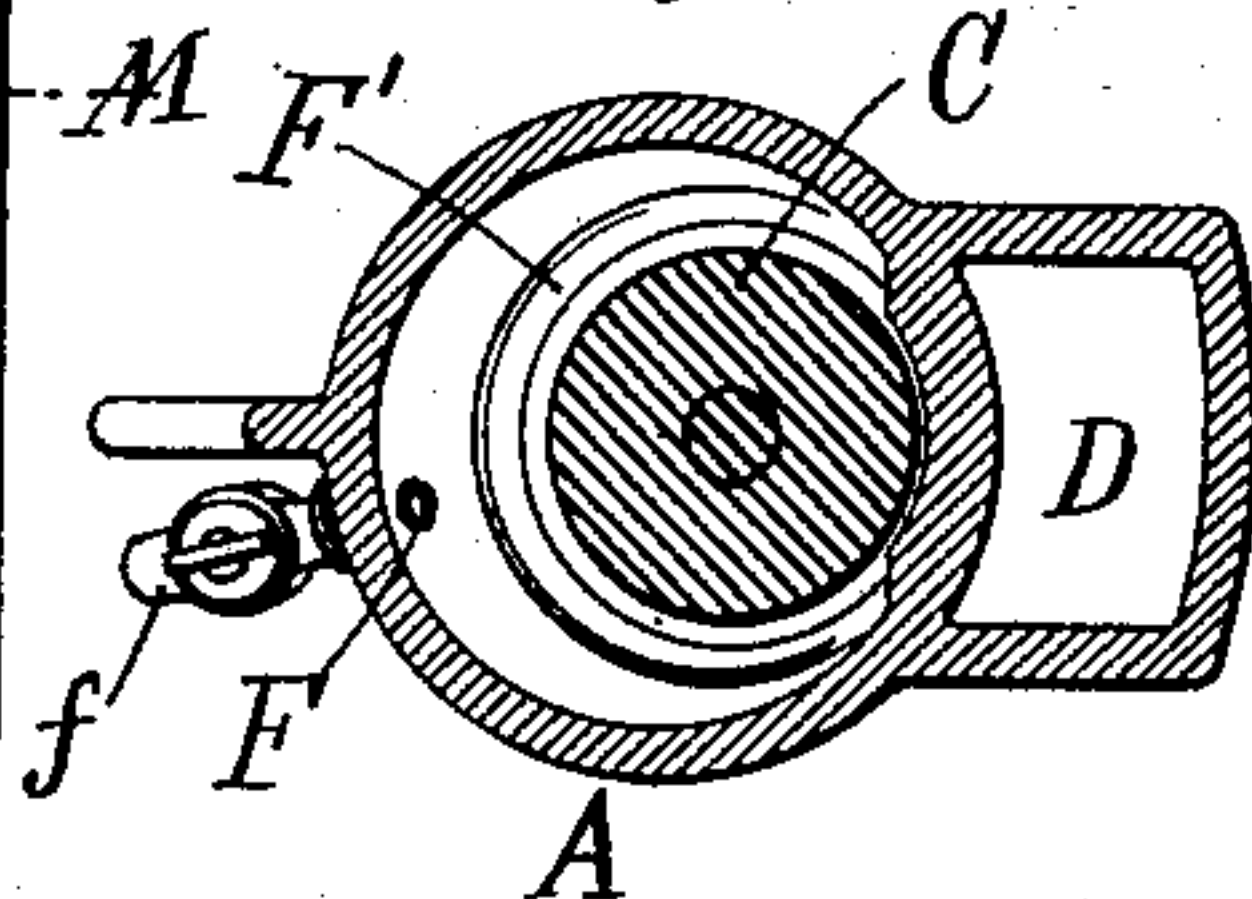


Fig. 4.

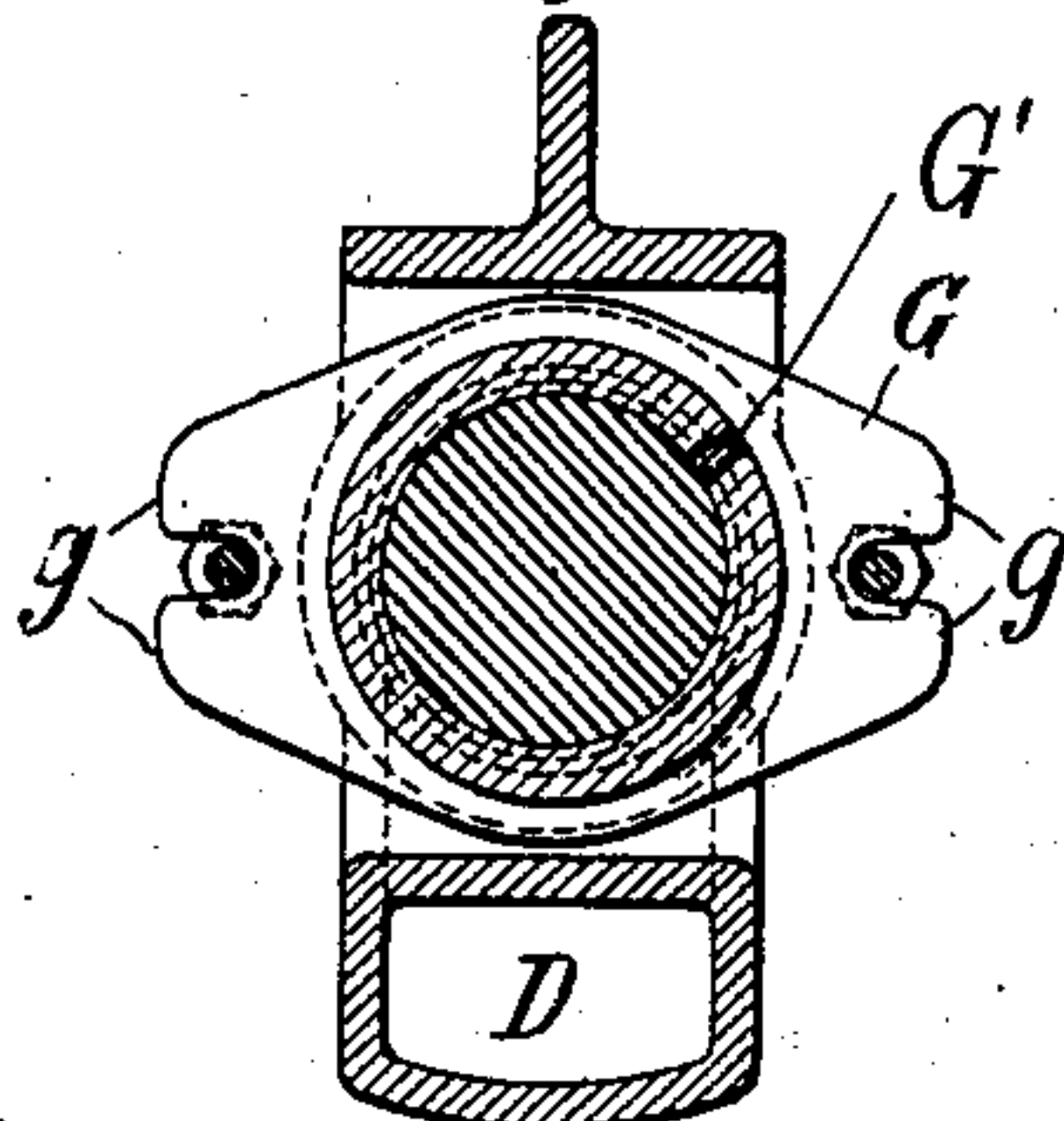
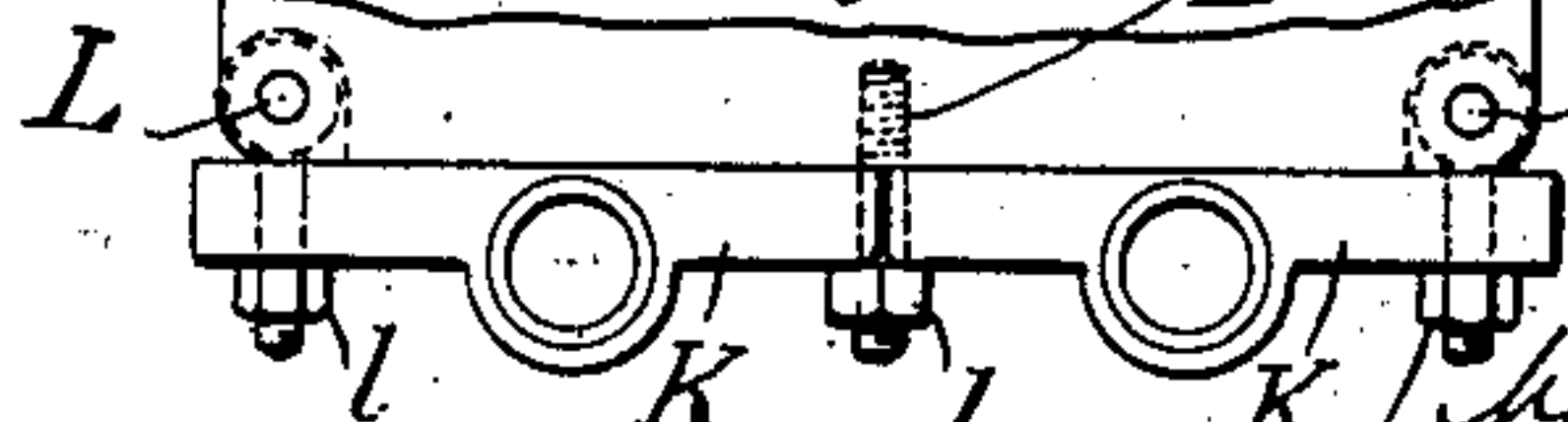


Fig. 5.



Witnesses:  
Raphael Petter  
Gustave R. Thompson.

Inventor:  
Edwin M. Coryell  
Charles Cameron Lewis, Marie.  
Attys.



# UNITED STATES PATENT OFFICE.

EDWIN M. CORYELL, OF MOUNT VERNON, NEW YORK, ASSIGNOR TO  
JULIA E. CAMERON, OF NEW YORK, N. Y.

## VERTICAL-PLUNGER SINKING PUMP.

SPECIFICATION forming part of Letters Patent No. 753,550, dated March 1, 1904.

Application filed October 16, 1903. Serial No. 177,272. (No model.)

*To all whom it may concern:*

Be it known that I, EDWIN M. CORYELL, residing at Mount Vernon, New York, have invented a new and useful Improvement in Vertical-Plunger Sinking Pumps, which invention is fully set forth in the following specification.

The present invention relates in particular to pumps adapted for use in deep shafts, mining, and the like, where access to the pump is difficult, which pumps are generally equipped with a vertical plunger.

The purpose of my invention is to improve the efficiency and durability of these pumps, while rendering them simpler in construction and in making it comparatively easy to obtain access to the working parts for the purpose of repairs, &c.

My invention consists in the particular manner of packing for the plunger, in providing for access to this packing, and in providing a (two-part) bonnet with hinged bolts for convenient access to the working parts.

The invention further consists in the details and constructions hereinafter pointed out.

The invention will best be understood by reference to the accompanying drawings, which illustrate one embodiment.

Figure 1 is a vertical sectional view of a sinking pump containing my invention. Fig. 2 is an elevation viewed from the right of Fig. 1. Fig. 3 is a horizontal section through the line I I of Fig. 1. Fig. 4 is a transverse section through the line M M, shown at right angles to Fig. 3. Fig. 5 is a detail of the bonnet construction.

A represents as a whole the working barrel of the sinking pump.

B is the water-valve chest.

C is the vertical plunger—a double-action plunger—operated by the shaft *c*, driven from the engine. (Not shown.)

The water-valve chest is of the well-known "Cameron" construction, having four valves in as many separate compartments. Each of the two lower valves controls the flow from the suction-pipe B' into its own compartment, and each of the two upper valves controls the

flow from the compartment below it into the discharge.

DD represent the passage leading from one of the two lower compartments to the bottom portion A' of the working barrel below plunger C, and EE represent a corresponding passage from the other lower compartment of the chest to the upper chamber of the barrel A above plunger C. When the plunger descends, a vacuum is created in the space E and the difference in pressure lifts the proper lower water valve to admit water into the corresponding lower compartment of the water-valve chest and ultimately into the passage E. At the same time the descent of plunger C compresses the air in passage D and thereupon lifts the corresponding upper valve of the water-valve chest and ultimately will force water out through this last-named valve. Similarly when the plunger rises a vacuum is created in passage D, the corresponding lower valve in the water-valve chest is raised, and water drawn in, while at the same time the upward travel of the plunger forces the contents of passage E out through the corresponding upper valve of the water-valve chest. The construction so far explained is old.

It will be noted that any gravel or sand drawn up through the suction-pipe of the water-valve chest will be deposited either in the bottom of passage D or upon the upper shoulder or top of the plunger C. The accumulations may be cleared from the bottom of the passage D by removing the plate *a''*. The accumulations (that would otherwise gather upon the top of the plunger and would serve to grind the face of the plunger and the wall of the barrel A) collect in the sand-pocket F. This latter consists, preferably, of a somewhat annular or semi-annular or crescent-shaped channel or pocket whose bottom slopes to a stop-cock *f* or similar device and is further defined by an upward rim F'.

The working barrel is completely cut away at its middle portion, leaving the two portions A and A', whose opposing orifices are counter-sunk at *a a'* and may be screw-threaded. G is a casting or ring having a flange that pre-



sents the two pairs of ears *g* and fitting snugly around plunger C. It has also an oil-duct G'. It may be screw-threaded to take into the threads at *a*. In the lower side of the ring is secured a pipe or tube I, whose lower end may receive a ring J to guide the plunger. Another ring, H, surrounds the tube, but is not made fast thereto and may be screw-threaded to engage the threads at *a'*. Packing is located in the spaces above ring G and below ring H; but the former alone is in contact with the plunger. The tube I being attached to ring G and ring H being placed upon the tube, the whole is put in place from the side, (as may be plainly seen from the sectional view in Fig. 4, which shows the sides of the working barrel as cut away at this portion,) the packings inserted, and the two rings secured in their seats. The rings may be held in place by hinged bolts, which are mounted on the barrel A and take into the seats between the ears on the rings. The packings and the working parts may be easily gotten at for repairs, &c.

Instead of forming the bonnet for the water-valve chest of a single plate and securing it in place by ordinary bolts, I may provide a two-part bonnet K K and employ hinged bolts. The meeting edges of the bonnet parts are recessed to receive fixed studs L', that project from the main casting; but at L L are bolts hinged to the main casting, so as to be swung in a horizontal plane. The bonnet-sections K K are provided with elongated slots for receiving these hinged bolts. Nuts *l* are screwed down securely upon both L and L'. In order to open the water-valve chest it is not necessary that the nuts *l* be entirely removed. It suffices to loosen them a few turns, whereupon the bonnet-section may be forced apart and then swung out without trouble. The peculiar advantage of this construction is at once manifest when we consider the seriousness of the attendant dropping one of the nuts (in case of the old construction) and losing it in the bottom of a deep mine or shaft. With my present construction access is gained to the chest in far less time and in the second place none of the nuts are removed. A similar hinged-bolt construction may be employed for securing the bottom plate *a''*, for attaching the suction-pipe at B', for obtaining access to the plunger-packing, as already indicated, and in similar

locations. Instead of providing a two-part bonnet a single plate may be employed with the hinged-bolt construction,

I have thus particularly described the various features of my improved pump for the sake of clearness; but it will be understood that modifications may be made in construction and arrangement without departing from the spirit of my invention, and likewise parts may be used to the exclusion of other parts.

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

1. The combination of a valve-chest or the like, a two-part cover or bonnet therefor, a rigid stud upon said main portion adjacent the meeting edges of said bonnet-sections, a hinged bolt upon said main portion adjacent the outer edge of each bonnet-section, said sections having suitable openings to take over said stud and hinged bolts, and nuts upon the latter.

2. In a pump, the combination with a two-part working barrel containing two water-chambers substantially as described, and a double-action plunger extending into both chambers, of a connection for the barrel comprising a packing adjacent to the plunger and closing the bottom of the upper chamber, a second packing that closes the top of the lower chamber, and a tube interposed between the plunger and the second packing, whereby the plunger encounters friction from one packing only while ready access may be obtained to the parts from the side.

3. In a pump, the combination with a two-part working barrel containing two water-chambers substantially as described, and a double-action plunger extending into both chambers, of a connection for the barrel comprising a packing adjacent to the plunger and closing the bottom of the upper chamber, a second packing that closes the top of the lower chamber, a tube interposed between the plunger and the second packing, and a ring carried by said tube for holding in place the first-named packing.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

EDWIN M. CORYELL.

Witnesses:

C. A. L. MASSIE,  
R. L. SCOTT.