

(Model.)

C. P. DEANE.
Steam Pumping Engine.

No. 242,817.

Patented June 14, 1881.

Fig. 4.

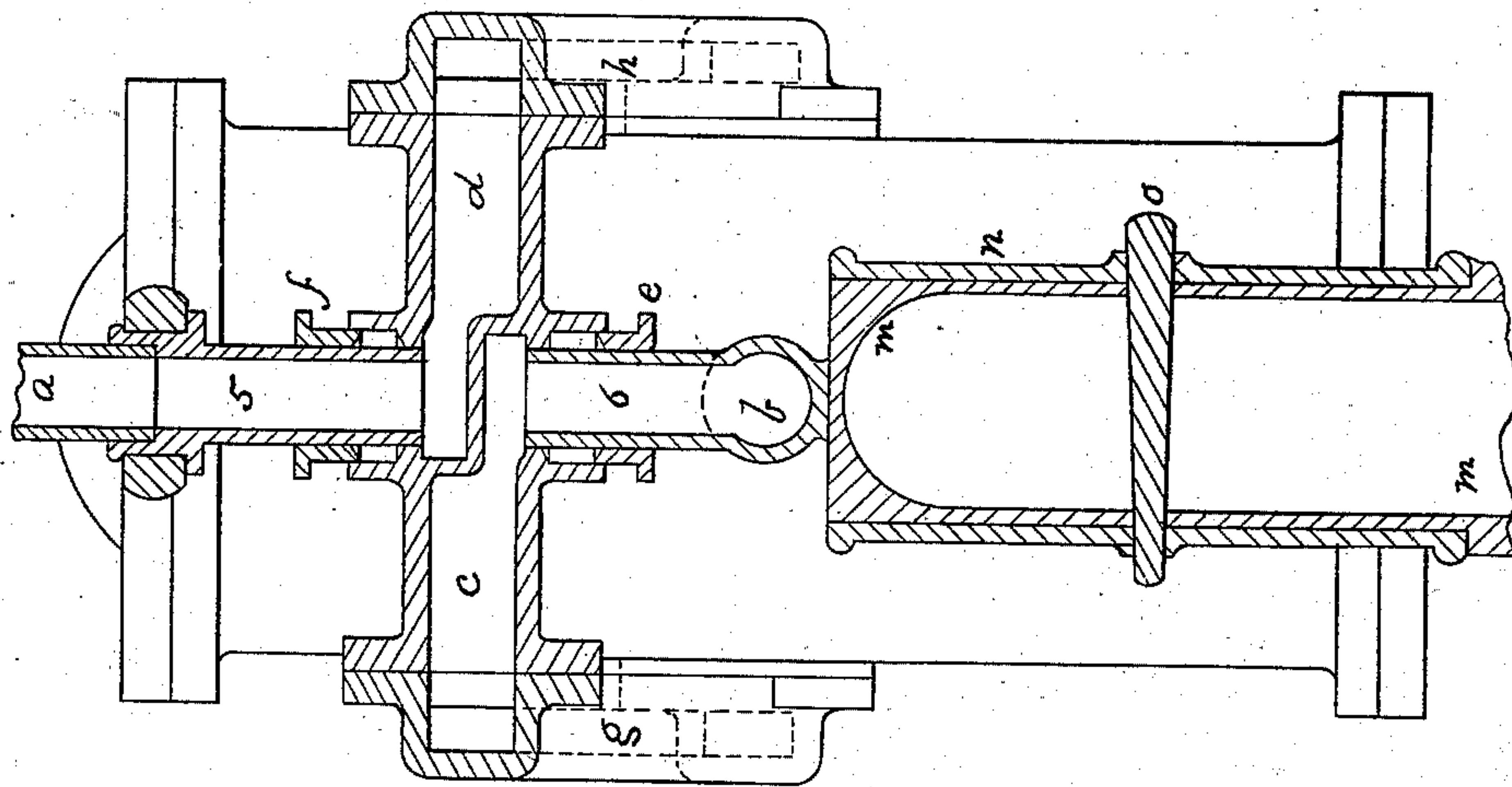


Fig. 2.

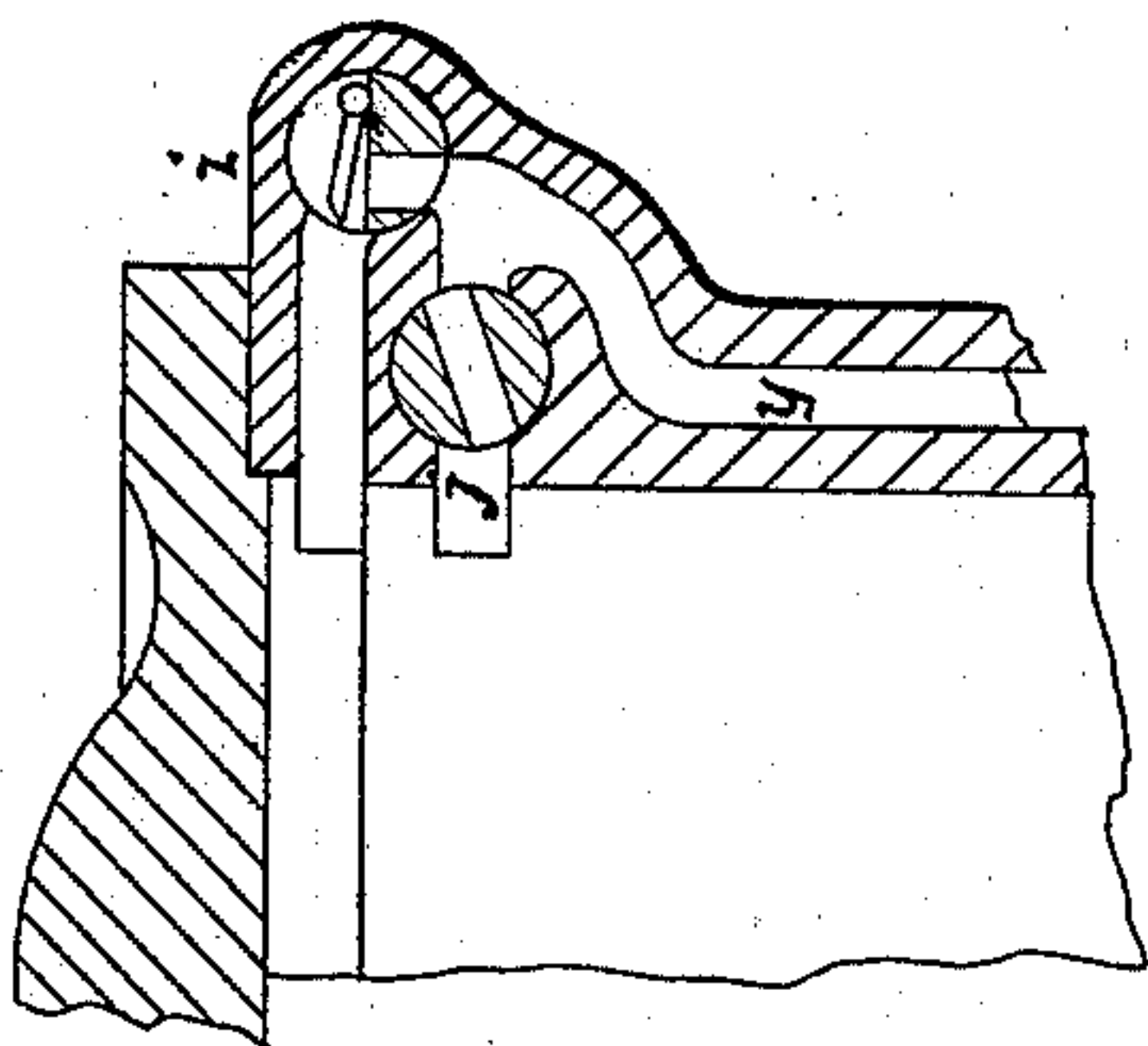


Fig. 3.

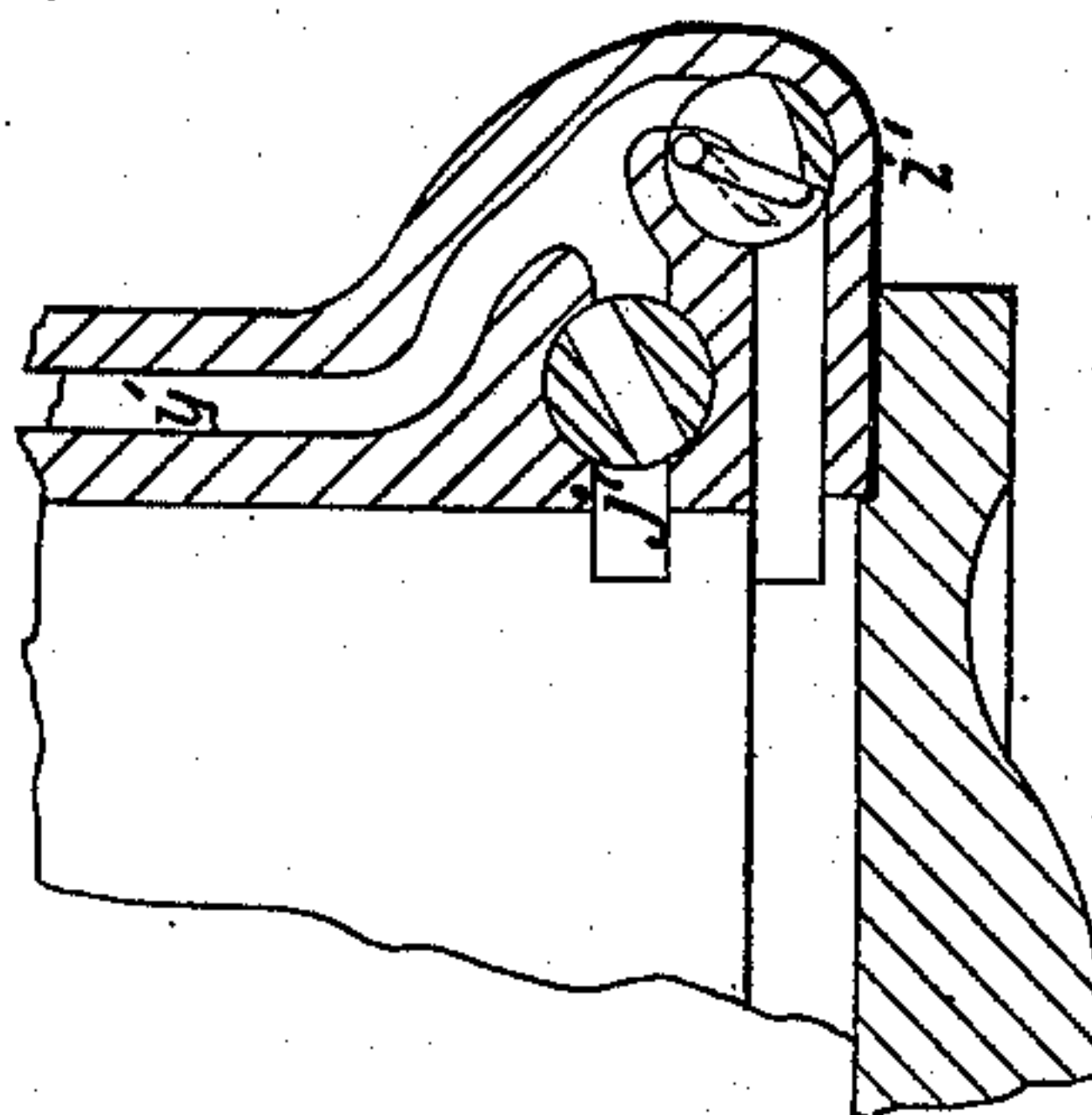
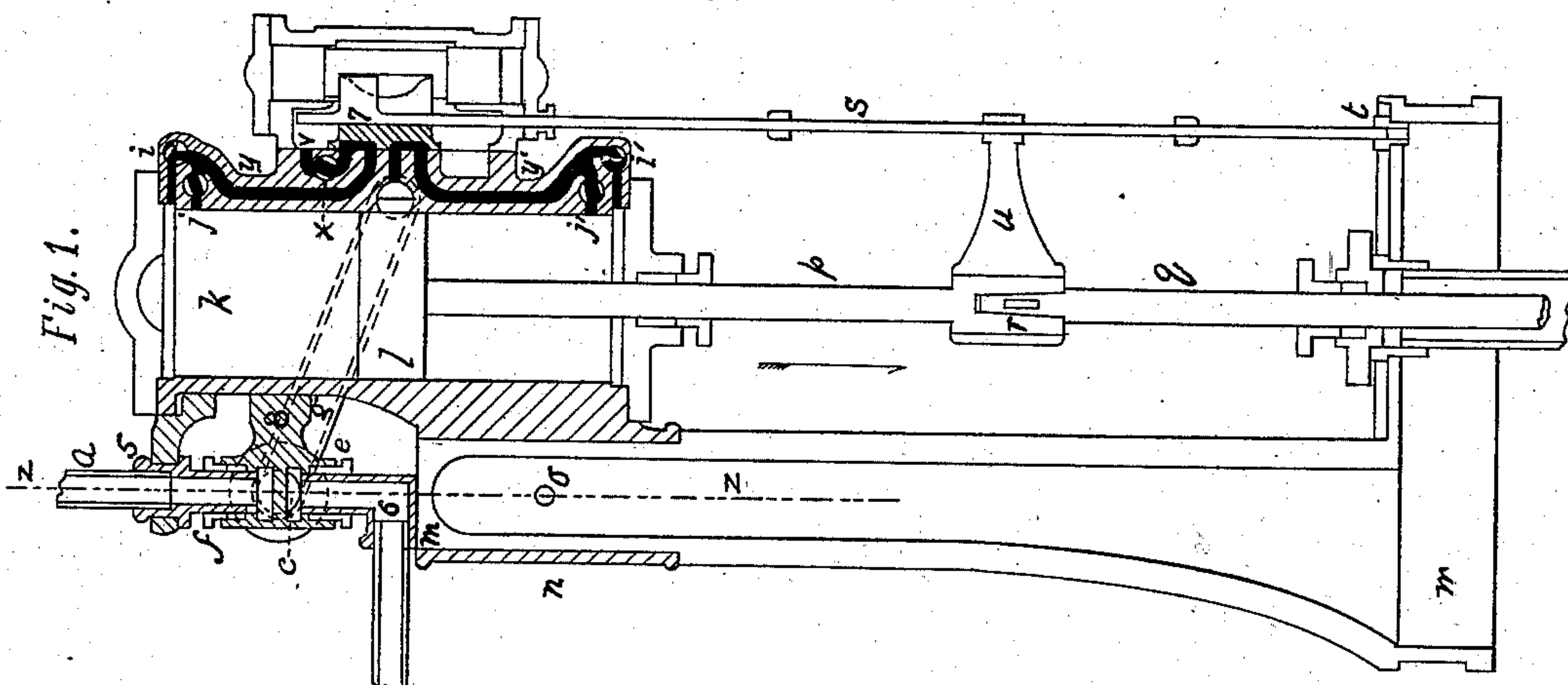


Fig. 1.



Witnesses:

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CHARLES P. DEANE, OF SPRINGFIELD, MASSACHUSETTS.

STEAM PUMPING-ENGINE.

SPECIFICATION forming part of Letters Patent No. 242,817, dated June 14, 1881.

Application filed July 10, 1880. (Model.) Patented in England October 21, 1880.

To all whom it may concern:

Be it known that I, CHARLES P. DEANE, of Springfield, in the county of Hampden and State of Massachusetts, have invented a new and useful Improved Steam Pumping-Engine for Pumping Water from Artesian Wells; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings and the letters of reference thereon, in which—

Figure 1 is a central vertical section of the improved engine with pump-rod attached. Fig. 2 is an enlarged view of the controlling and regulating device at the upper end of the cylinder. Fig. 3 is the same for the lower end of the cylinder. Fig. 4 is a central vertical section on the line $z z$, Fig. 1.

The nature of my invention in this improved engine consists in so arranging and combining with each other and with the main valve certain other valves, substantially as hereinafter described, that the steam passing into and out of either end of the main cylinder may for each end be controlled and exactly adjusted to suit the conditions of the work in which the engine is engaged, so as to regulate and equalize the up-and-down strokes, and also prevent the striking of the piston upon the lower cylinder-head, thereby giving an equable, safe, and quiet movement to the engine, notwithstanding it carries no load except on the upstroke, the water being only lifted by the pump.

My invention further consists in so constructing the vertical bed or support of the engine, and connecting and arranging the same with the cylinder and with the stock and stuffing-boxes which receive the steam and exhaust pipes, substantially as hereinafter described, that the cylinder, with its appurtenances, may at any time be readily swung aside without the removal of bolts, and without disconnecting or disturbing the steam and exhaust pipes, thus giving ready and easy access to the pump-piston and valves, which require frequently to be drawn out for clearing, repairing, or renewal.

To enable others skilled in the art to make and use my invention, I will now describe its construction and operation.

Fig. 1 of the drawings represents the engine (which is of the kind known as "direct-

acting") with its piston-rod p connected with the pump piston-rod q by a key at r . The main parts of the engine need simple mention only, being of the ordinary description. Thus k is the main cylinder, l its piston, p the piston-rod, and s the valve-rod, moved by a tappet-arm, u , attached to the piston-rod p . The main valve shown (7) is of the **B** construction, and the lower half of its seat is arranged in the ordinary way; but the upper half, as will be seen, is so arranged that the steam which passes to the cylinder through port y passes first from the chest to the upper chamber of the valve through a curved passage, v , in the body of the seat. Now, in this passage v , I place what I call a "regulating-valve," x , whose stem is carried outside the engine and there furnished with a handle. The construction of this valve x , as plainly shown in the drawings, is such that by giving it a slight rotary movement with the outside handle aforesaid the amount of steam passing through it to the main valve, and thence to the port y , may be increased or diminished at will to suit the particular conditions under which the engine is working. In Figs. 2 and 3 it will be seen that each of the ports y and y' has two openings into the cylinder, and that each of these openings is controlled by a valve. Valves i and i' are check-valves, opening to the ingress of steam to the cylinder and closing to its egress. Valves j and j' are hand-valves, constructed and having stems carried outside the engine and there mounted with handles, the same as valve x , already described, and are in like manner adjustable at will, to suit the conditions, the engineer very readily ascertaining, by trial, after a few strokes, the proper position to give each of these regulating-valves x , j , and j' to secure an easy and equable movement of the engine.

In Fig. 1 it will be seen the main valve is in position to admit steam to the upper end of the cylinder through passage v , port y , and valves i and j , and exhaust it from the lower end through valve j' and port y' . The piston is therefore moving downward, and as it carries no load on the downstroke (the water being only lifted by the pump) its own weight and the weight of the attached rods and pump-piston would alone carry it down with a jerk

if there were no pressure of steam below it; but the position of the hand-valve j' (determined by previous trial, as stated) is such that the exhaust is sufficiently checked to insure a measured downward movement, and the position of valve x is such as to admit only steam enough above the piston to insure positive action. In this way the downstroke is made equal to the upstroke, and the ordinary cushion formed by the piston pressing over and closing the upper opening of the port, (as that controlled by j'), while the opening below it is closed by a valve, is made effective, as it otherwise entirely fails to be, and a uniform, safe, and quiet action of the engine is secured. It is plain from the drawings that the amount of steam admitted above the piston through the valves i and j is governed by the previously-adjusted position of the valve x , and the egress of steam from below is in like manner governed by the position of the valve j' , the check-valve i' being closed by the outward pressure. And it will be seen that on the upstroke—when the load is on—the main valve 7 being reversed, full steam will pass unchecked through port y' and valve i' to the lower end of the cylinder, while a sufficiently free exhaust from the upper end is allowed by the comparatively open position of the hand-valve j , as seen in Fig. 2, the check-valve i being now closed by the outward pressure.

I will now describe the construction and operation of that part of my invention which relates to the swinging aside of the engine to give quick and easy access to the pump-piston and valves.

It will be seen by reference to Figs. 1 and 4 of the drawings that the cylinder is supported on a vertical supporting-piece, m , rising from a firm base. a is the steam-pipe from the boiler; b , the exhaust-pipe from the "swivel," (hereinafter described;) c , the exhaust-passage from the engine to the swivel, and d the steam-passage from the swivel to the engine. A portion of the upper part of the supporting-piece m is turned to a cylindrical form, and a sleeve, n , forming a part of the cylinder-casting, is bored to fit it, so that the cylinder may swing back and forth on its support as an axis. Above m is what I call a "swivel." It consists of two tubular receiving-pieces, 5 and 6, for the steam and exhaust pipes a and b , and two stuffing-boxes, e and f , all supported by projections

from the cylinder and by the supporting-piece m . The receiving-pieces, being fixed, (5 is firmly attached to pipe a , and 6 to the support m), serve as axes around which the stuffing-boxes attached to a projection, g , from the cylinder readily turn, as the sleeve n turns on the support m , and as the centers of all are coincident it is plain that the cylinder may be swung aside without disconnecting or disturbing the pipes a and b ; hence it is only necessary to remove the pin o and the key r , which connects the piston-rod with the pump-rod q , and to detach the valve-rod by lifting its guide t out of its sockets, and the engine may be turned out of the way, so as to admit of easy access to the pump-piston and valves; and when it is swung back it is brought instantly to and kept firmly in its true position by simply driving in the taper pin o .

I would say that my improved engine, though specially designed for pumping from Artesian wells, is also well adapted for pumping in mines, and for other purposes, whether the pump used be single or double acting.

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

1. The combination, with the main valve 7 and check-valves i and i' , of the regulating-valves x and j and j' , substantially as and for the purpose described.
2. The combination, with the main valve 7 and check-valve i' , of the regulating-valves x and j' , substantially as and for the purpose described.
3. The combination of the main valve 7 and check-valve i or i' , of the regulating-valve j or j' , substantially as and for the purpose described.
4. The arrangement, with the cylinder, of the projections 8 and the receiving-pieces 5 and 6, holding the pipes a and b , so that the cylinder may be moved on the receiving-pieces as axes, substantially as and for the purpose described.
5. The combination, with the cylinder and its support m , of the sleeve n and the receiving-pieces 5 and 6, holding the pipes a and b , and serving as axes, substantially as and for the purpose described.

CHARLES P. DEANE.

Witnesses:

GEO. H. DEANE,
HOMER G. GILMORE.