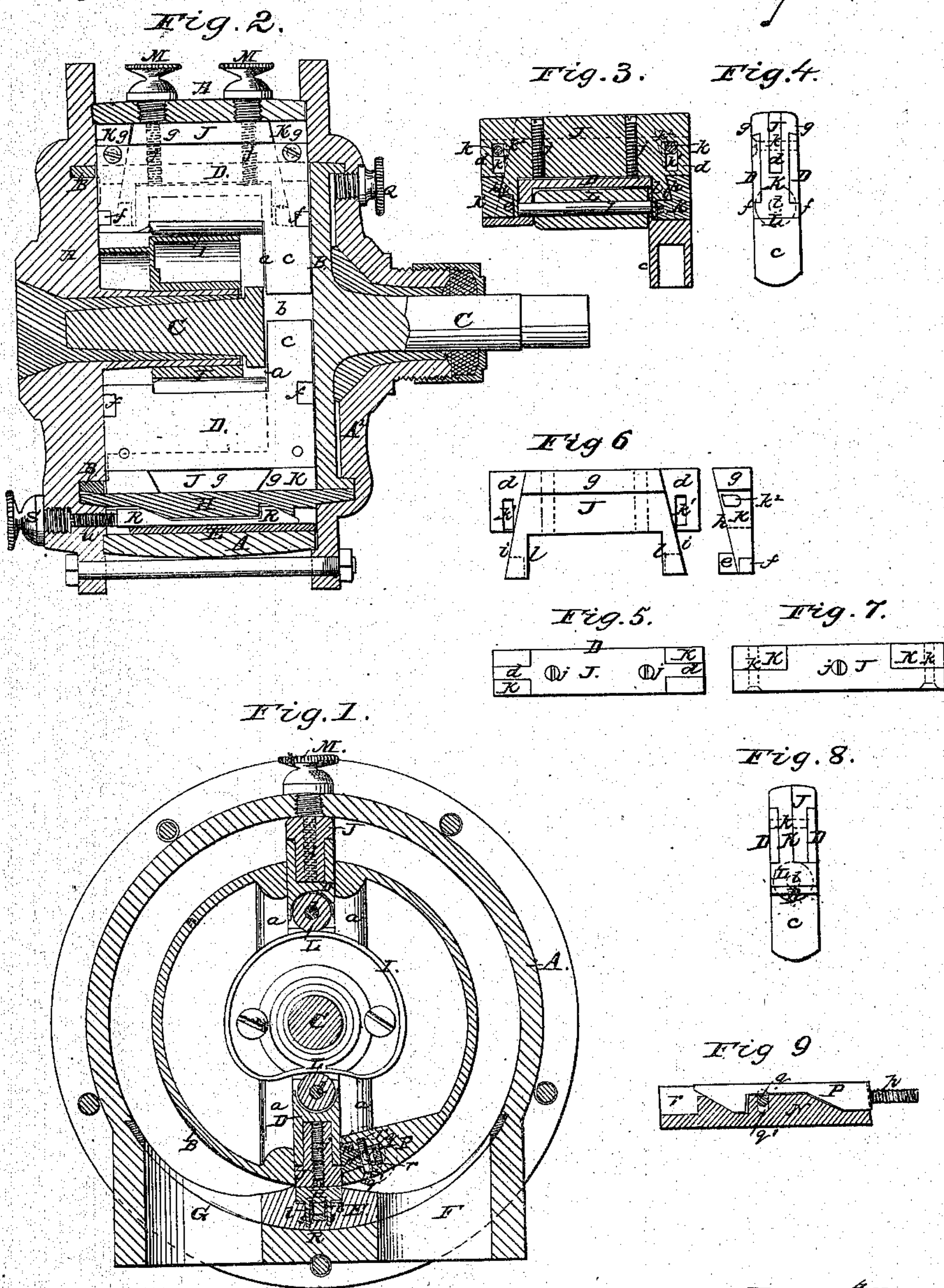


*F. B. Pierce,*

*Rotary Pump,*

*N<sup>o</sup> 35,388.*

*Patented May 27, 1862.*



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# UNITED STATES PATENT OFFICE.

FRANKLIN B. PIERCE, OF BROCKPORT, NEW YORK.

## ROTARY PUMP.

Specification of Letters Patent No. 35,388, dated May 27, 1862.

*To all whom it may concern:*

Be it known that I, FRANKLIN B. PIERCE, of Brockport, in the county of Monroe and State of New York, have invented a new and useful Improvement in Rotary Pumps; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, is a vertical section of a rotary pump taken in a plane perpendicular to the axis of rotation. Fig. 2, is an axial vertical section of the same, Fig. 3, is a longitudinal section of one of the pistons. Fig. 4, is an end view of the same. Fig. 5 is a view of the outer face of the same. Fig. 6, presents longitudinal views of the packing pieces of the piston. Fig. 7, is an outer face view of a modification of the piston. Fig. 8, is an end view of the same. Fig. 9, is a longitudinal section of the packing of one of the slots of the piston drum.

Similar letters of reference indicate corresponding parts in the several figures.

This invention consists in certain improvements in the construction of and modes of fitting and adjusting the packing of the pistons and abutments, whereby leakage is more effectually prevented and greater convenience is afforded for adjustment.

To enable others skilled in the art to apply my invention I will proceed to describe it with reference to the drawings.

A, is the cylinder or outer shell of the pump having one or both of its heads A', A<sup>2</sup>, movable; and B, is the rotating cylindrical piston-drum made of the same piece with or otherwise rigidly attached to the central shaft C. This drum has radial slots in its periphery for the reception of the radially working pistons D, D, and on the interior of one end of the said drum there are formed guides *a*, *a*, connecting with a slot *b*, extending right through the shaft, such guides each receiving between them one end of one of the pistons and the slot in the shaft receiving an arm *c*, provided at one end thereof to give steadiness in the operation.

E, is the abutment fitted to the cylinder or shell A.

F, G, are the induction and eduction openings on opposite sides of the bearing surface or packing piece H, of the abutment.

I, is the stationary central hub or cam

between the outer periphery of which and the inner periphery of the cylinder or shell A, the pistons rotate, corresponding in form with the form of the cylinder and abutment.

The pistons D, D, shown in Figs. 1, 2, 3, 4, 5, 6, have each three packing-pieces of brass or other soft metal or alloy, viz., a face piece J, and two end pieces K, K, all of which are fitted into deep grooves in the bodies D, D, thereof. The end-pieces K, K, are mortised for the reception of tenons *d*, *d*, at the ends of the face piece J, and they are furnished each with a tenon *e*, entering a mortise in one end of the face piece and with square lugs *f*, *f*, on opposite sides entering notches of corresponding form in the body D. Both the face piece J, and the end pieces K, K, have flanges *g*, *g*, which lap over the body D, as shown in Figs. 1, and 4, so that the whole face of the piston which is toward the inner peripheral surface of the cylinder is composed partly of the packing piece J, and partly of those K, K.

The inner edges of the end pieces K, are inclined as shown at *h*, *h*, in Figs. 3, and 6, and the edges *i*, *i*, of the face piece J, are inclined to correspond in order that in setting out the piece J, to adjust it or compensate for wear it may act as a wedge against the two pieces K, K, and set them out at the same time, thus causing the whole of the packing of the piston to be set out at once. The angle of the edges *h*, *h*, and *i*, *i*, should be such as will enable both the relative wear of the outer faces and ends of the pistons to be compensated for in a proper degree. The adjustment of the packing is effected by means of one or more screws *j*, *j*, screwing through tapped holes in the piece J, and bearing against the bottom of the groove provided in the body D, for the reception of the packing pieces, the screwing in of the said screw or screws setting out the piece J. The packing pieces are secured in the pistons by means of screws *k*, *k*, screwed through the whole in a transverse direction, the said screws passing through slots *k'*, *k'*, in the piece J, and slots *k*<sup>2</sup>, *k*<sup>2</sup>, in the pieces K, K, the said slots being at right angles to each other. The slots *k'*, *k'*, are covered by the pieces K, K and those *k*<sup>2</sup>, *k*<sup>2</sup>, by the body of the piston so that water or steam cannot leak through them. The lugs *f*, *f*, serve to keep the end pieces K, K, from moving outward toward the inner periphery of the cyl-



inder and the tenons  $e, e$ , are made to cover the passage through the piston that would otherwise be left open by the moving out of the end pieces  $K, K$ .

- 5 Each piston is fitted with a roller  $L$ , to run on the hub or cam  $I$ , said roller working on a pin or axle  $l$ , inserted through the ends of the body  $D$ . The packing piece  $J$ , has its ends so formed as shown at  $l', l'$ , in Figs. 3, 10 and 6, that it will cover the ends of the axle  $l$ , and so secure it and the roller in place.

- 15 One of the results of the above construction and mode of fitting the packing pieces of the pistons is that the face piece  $J$ , as it is moved outward is always well supported at its ends by the end pieces  $K, K$ , which only move toward the ends of the cylinder and whose flanges  $g, g$ , always have a bearing on the edges of the body  $D$ .

- 20 To provide for setting out the piston packing without removing the pistons from the cylinder or taking off the cylinder heads one or more holes according to the number of screws  $j, j$ , in each piston, are made in the 25 cylinder at a suitable point or points to permit the introduction of a screw driver or other implement to turn the said screw or screws, which are brought opposite the said holes by turning the cylinder to bring the 30 pistons one after the other to the required position. The said hole or holes in the cylinder are closed except at the time of adjustment of the screw or screws  $j, j$ , by one or more screw plugs  $M, M$ , or their equivalents. 35

- I propose to use packing in the slots of the piston drum. The drawing (Fig. 1) only represents it applied on one side of one piston; but it is to be applied on the 40 back side of each piston, and in pumps that are required to be reversed for any purpose it should be applied on each side of each piston. This packing consists of a strip  $N$ , of brass or other soft metal fitted into a 45 groove provided for its reception in the side of the piston slot, said piece being made with a flange  $n$ , on one side as shown in Fig. 1, or on both sides or without flanges on its sides and its back is grooved for the 50 reception of a wedge piece  $P$ , whose form is best shown in Fig. 9, the bottom or back of its groove having inclinations on its surface to correspond with the inclinations on the face of the wedge piece, the back of the 55 said wedge piece having a bearing against the bottom or back of the groove in the side of the piston slot.

- The wedge piece is moved longitudinally to set out the packing  $N$ , by means of a 60 screw  $p$  screwing through a tapped hole in one end of the piston drum, said screw being reached by a screw-driver or other suitable tool inserted through a suitably arranged hole in one of the cylinder heads, 65 such hole being plugged up by a screw plug

$Q$ , at all times but when the packing pieces  $N$ , are to be set out, when it is removed and the screws  $p$ , belonging to the several packing pieces are one after the other brought opposite to the said hole to be screwed up 70 against their respective wedge pieces.

In order to prevent the packing pieces  $N$ , from dropping into the piston-slots in case of the removal of the pistons therefrom they are each secured in place by a screw  $q$ , 75 which screws into the drum but passes through a slot  $q'$ , in the packing piece the length of the slot being sufficient to enable the packing to move outward toward the piston till entirely worn out. 80

By grooving the packing piece  $N$ , for the reception of the wedge piece  $P$ , or in other words providing the said packing piece with flanges  $r, r$ , on each side of the wedge piece, the open space which would 85 be left at one or other end of or at both ends of the wedge piece within the groove provided in the drum for the reception of the packing piece is covered, so that the water or steam cannot so easily pass through 90 it as it could if the said space were not so covered. This space is shown at the left hand of Fig. 9 in front of the wedge.

The abutment packing piece  $H$ , has applied and fitted to it a wedge piece  $R$ , substantially like the wedge piece  $P$ , applied to the piston-slot packing piece  $N$ ; but this packing piece  $H$ , is made with two flanges  $s, s$ , (Fig. 1) at a distance apart greater 100 than the width of the wedge piece and grooves are provided in the abutment  $E$ , for the above flanges such grooves forming, of parts of the abutment  $E$ , on each side of the main groove which receives the wedge piece, flanges  $t, t$ , which enter grooves provided in the packing piece  $H$ . By means 105 of the double set of flanges  $s, s, t, t$ , the passage of the water through the spaces left at the end or ends of the wedge piece, is more effectually and perfectly prevented 110 than it would be by a single pair of flanges like those  $r, r$ , of the piston slot packing strip. The single pair of flanges will be very effective in pumps. The wedge piece 115  $R$ , of the abutment packing is operated to set up the packing piece  $H$ , by means of a screw  $u$ , (Fig. 2) screwing through a tapped hole in one of the cylinder heads, and this screw hole is closed at all times but while setting up the packing, by means of a screw 120 plug  $S$ .

What I claim as my invention and desire to secure by Letters Patent, is:

1. The construction of the piston packing pieces  $J$ , and  $K, K$ , with oblique surfaces  $i, i$ , 125 and  $h, h$ , fitting together substantially as described whereby the piece  $J$ , in being set out is caused to act like a wedge upon  $K, K$ , and set them out also as herein set forth.
2. In combination with the foregoing the 130



tenons *e*, *e*, constructed and arranged substantially as and for the purpose herein specified.

3. The setting out of the pieces J, by  
5 means of set screws *j*, *j*, applied and operating in the manner herein specified.

4. The combination of the abutment and piston-slot packing pieces H, and N, or either of them with the wedge pieces R, P,  
10 and screws *u*, *p*, applied and operating sub-

stantially as and for the purpose herein specified.

5. The packing pieces H, and N, with flanges *s*, *t*, *r*, substantially as and for the purpose herein set forth.

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Witnesses:

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