

No. 31,597.

PATENTED MAR. 5, 1861.

D. D. HARDY & J. J. MORRIS.
ROTARY PUMP.

Fig. 3.

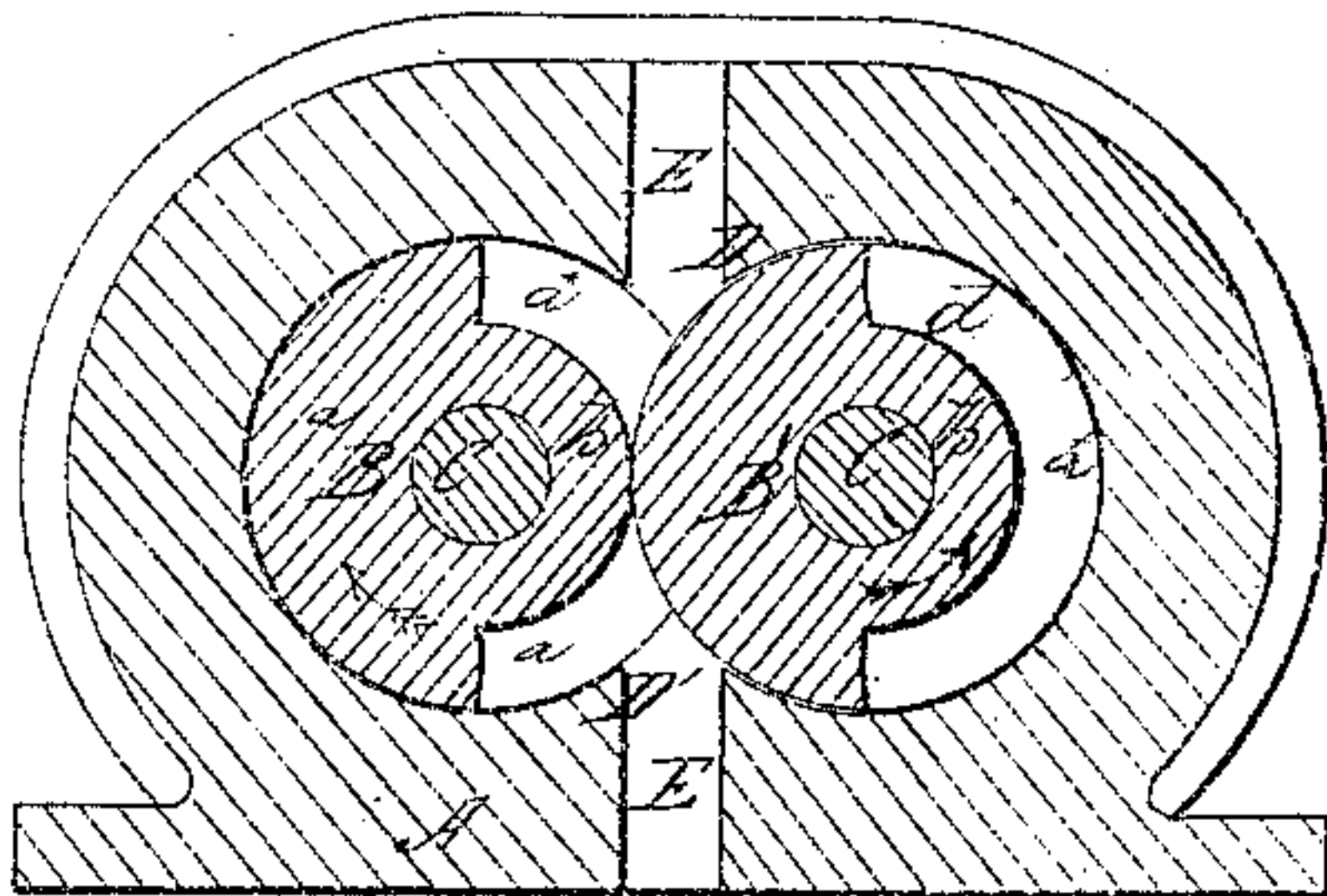


Fig. 1.

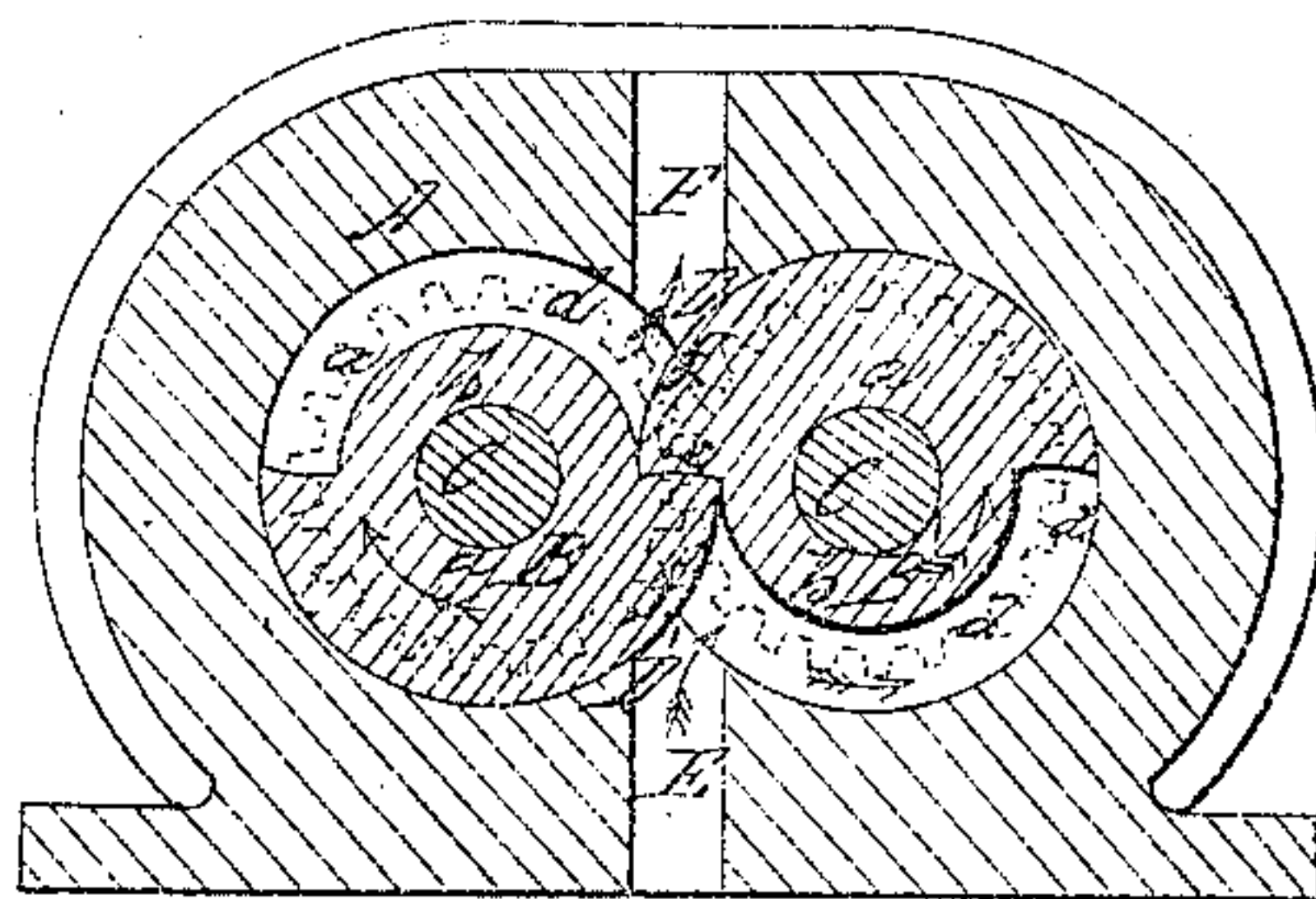


Fig. 5.

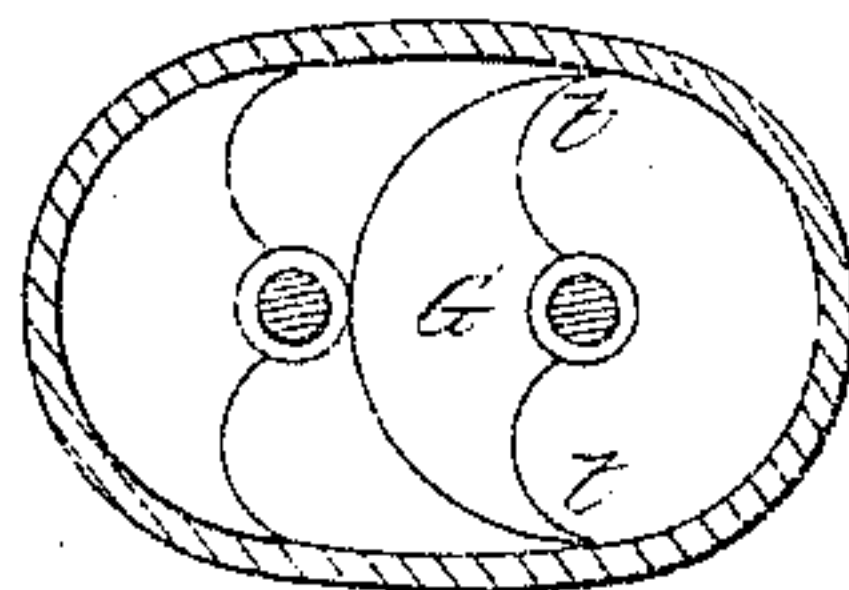


Fig. 4.

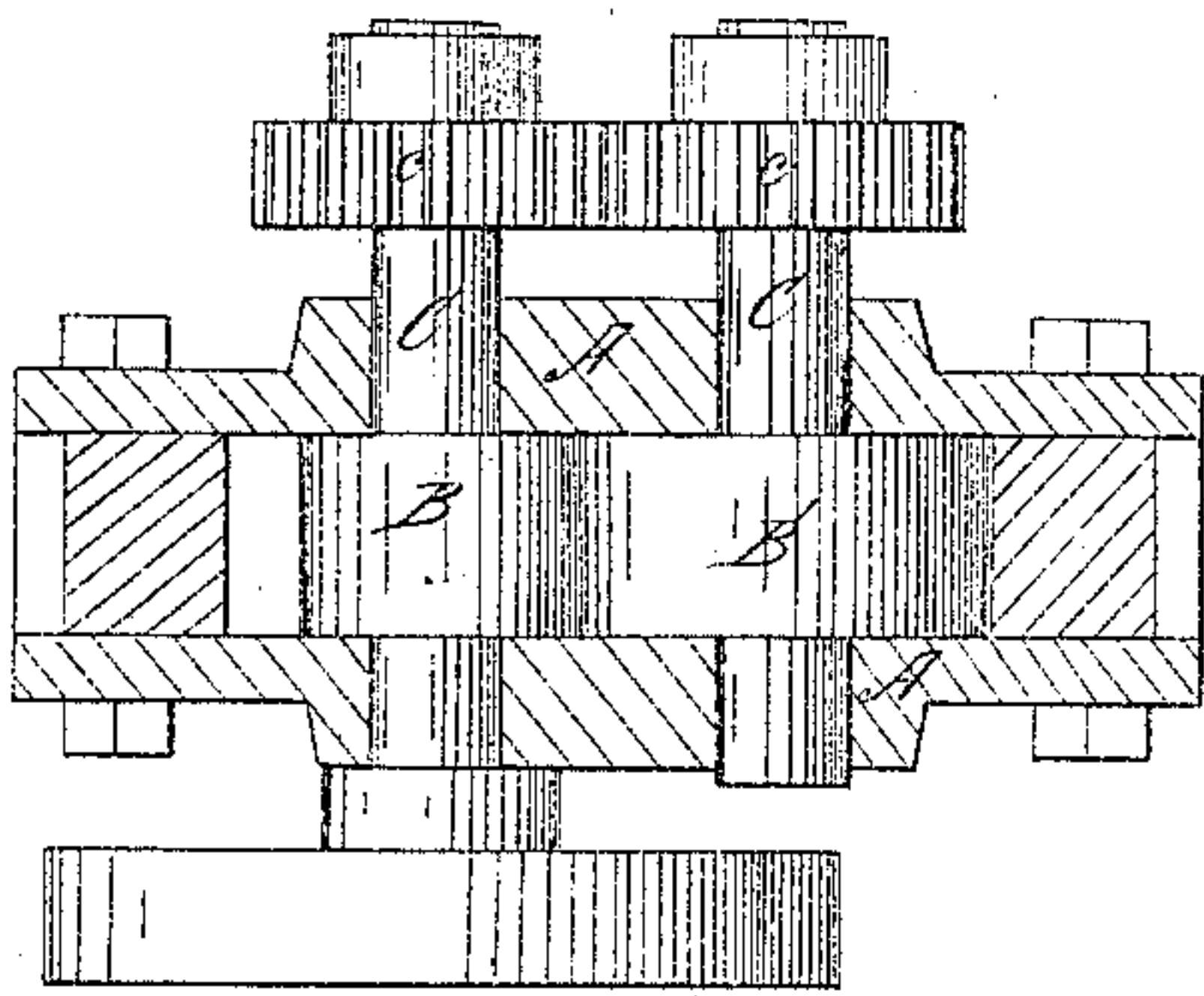
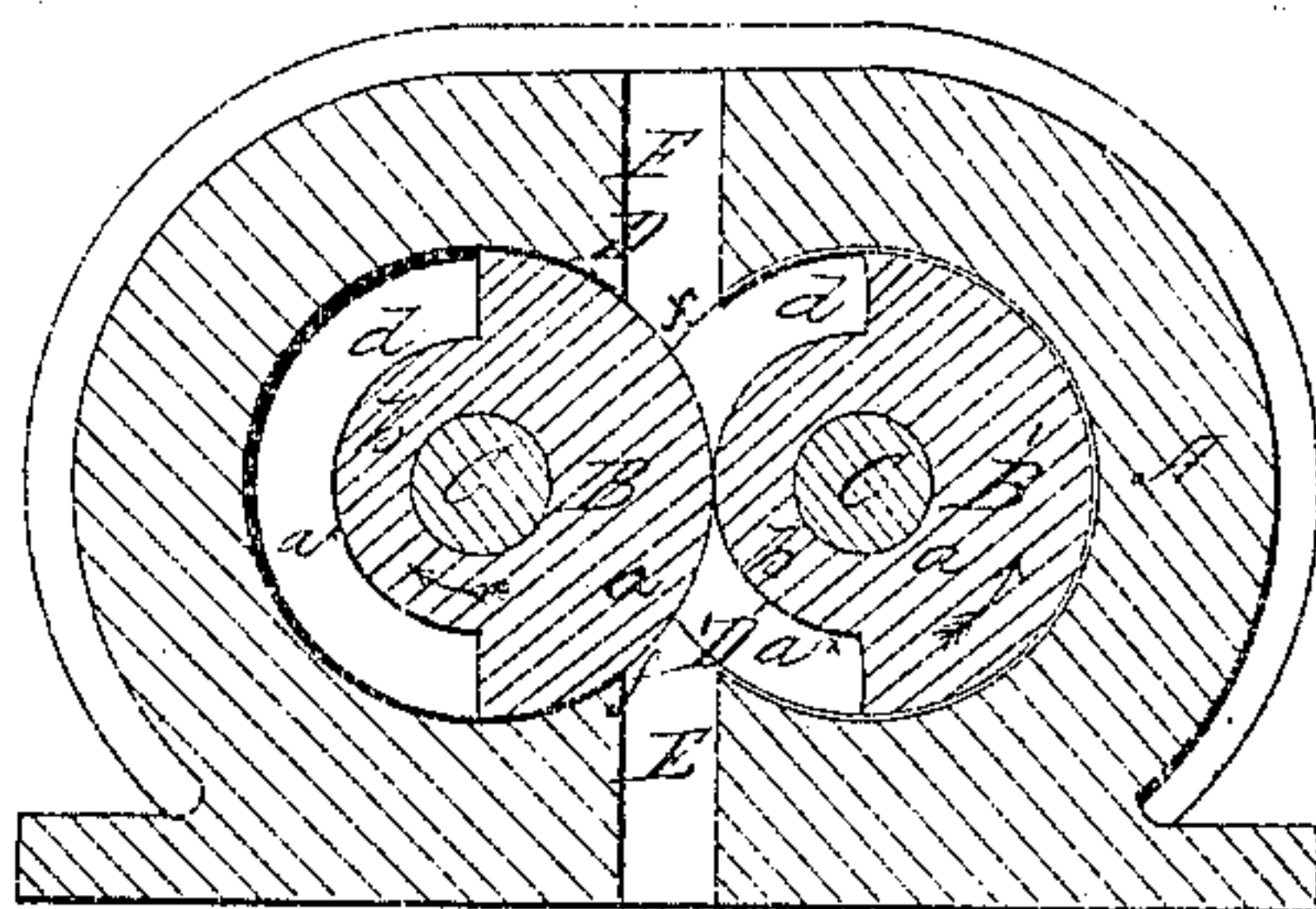


Fig. 4.



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UNITED STATES PATENT OFFICE.

D. D. HARDY AND J. J. MORRIS, OF CINCINNATI, OHIO.

ROTARY PUMP.

Specification of Letters Patent No. 31,597, dated March 5, 1861.

To all whom it may concern:

Be it known that we, D. D. HARDY and J. J. MORRIS, both of Cincinnati, in the county of Hamilton and State of Ohio, have
5 invented a new and Improved Rotary Pump; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this
10 specification, in which—

Figure 1 is a side sectional view of our invention. Fig. 2, a horizontal section. Figs. 3 and 4, side sectional elevations. Fig. 5, is an explanatory diagram.

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

This invention consists in the employment of two rotary pistons each formed of two semi-cylinders of different diameters in
20 combination with two central inner tongues or projections within the shell, the whole being constructed and operated as hereinafter described.

To enable those skilled in the art to fully
25 understand and construct our invention we will proceed to describe it.

A represents the pump case, the interior of which is formed into two cylindrical shaped chambers a^x as shown in Fig. 1.
30 These chambers are arranged together so as to leave between them two central inner tongues or projections D, D', each chamber containing a piston B, B'. These pistons are formed each of the semi-cylinders a b ,
35 one part or semi-cylinder a , being larger in diameter than the other part b as shown clearly in Fig. 1. The pistons B are placed on parallel shafts C, C which pass through the chamber or case A and are connected at
40 one end by gears e .

The larger semi-cylindrical parts a of the pistons are equal in diameter to the parts of the chamber A in which they are placed and consequently a space d is allowed in each
45 part of the chamber equivalent in dimensions to the difference between the larger and smaller portions of the pistons. This will be fully understood by referring to Fig. 1. The periphery of the larger part a of
50 one cylinder works in contact with the periphery of the smaller part b of the other, the pistons being rotated in the direction indicated by the arrows 1 see Fig. 1.

E is the induction and F the eduction pas-
55 sage. These passages intersect the interior

of the pump chamber at the junction of its two parts a^x a^x as shown clearly in Fig. 1.

The faces or ends e of the larger parts a of the pistons are of concave form as shown
in Fig. 1.

The operation is as follows: The pistons B, B' are rotated in the direction indicated by the arrows Fig. 1, by the application of power to either of the shafts C, and as the
60 pistons rotate they alternately draw the water up through the passage E into their chambers d , the chamber of each piston acting alternately as the draw and force, each
65 piston drawing as its smaller diameter b , passes underneath its shaft C, and forcing
70 as said diameter leans over its shaft. The pump it will be seen forces a continuous stream.

By having the faces c' of the larger part a of the pistons made of concave form, the
75 faces are allowed to work over each other and form a perfect cut off between the two chambers d , d , a result which could not be obtained were the faces perfectly straight
80 and causing the pump to operate far more efficiently than it otherwise would and without involving any additional expense in construction.

By the employment of the tongues D D' the bearing surfaces presented to the pis-
85 tons at the central part of the case are very greatly augmented. The inner surfaces of the tongues D, D' correspond to the circular form of the pistons so that when either of the latter approach the center of the case, so
90 as to occupy the positions shown by Figs. 3 and 4, the pistons alternately have a bearing surface extending from a point shown by vertical lines drawn through the centers of the axes of the pistons (indicated by red
95 line, Fig. 1, a^2 , b^2) to the points f f of the tongues D, D.

Pistons of the form here shown have always heretofore been employed in combination with oval shaped cases, so that
100 the only bearing which the pistons had when they approached the center of the case, was at the tips of the pistons. An illustration of this construction is shown in the expired patent of Baker and Baldwin, 1839,
105 a diagram of which, for the purpose of more clearly exemplifying our improvement is given in Fig. 5. By reference to this figure it will be seen that it is only the tips,
110 t , of the piston G that have a bearing upon

the surface of the case. But referring to Fig. 3, where our pistons of analogous form, occupy the same position as those in Fig. 5, it will be noticed that nearly two thirds of the surface of our piston B' has a bearing upon the inner surface of the case.

The bearings of pistons that touch the case only at their tips as shown in Fig. 5, are so narrow that the steam or water very readily passes the ends of the pistons thus impairing the utility of the pump. Another disadvantage is that the bearing points being so small, the tips, or packing at the tips soon wears away, rendering the pump useless until repaired. Almost all of the rotary pumps with which we are acquainted and in which two pistons are employed are obnoxious to this objection. It has been our study to overcome this long experienced difficulty, and we have succeeded. We have produced a pump in which the pistons as they approach the center have a surface of nearly two thirds the extent of their faces; whereas,

in other pumps of this character, the bearing surfaces amount to mere narrow lines at the tips of the pistons. Our pump is therefore more durable and effective, whether used for drawing water or as a steam engine.

We do not claim separately the invention of pump cases that have the central inner tongues, nor do we claim separately the invention of half moon shaped pistons. But

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is—

The employment of the rotary pistons B, B' formed of two semi-cylinders of different diameters, in combination with the two central inner tongues or projections D, D' of the case A, substantially as herein shown and described.

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