

(No Model.)

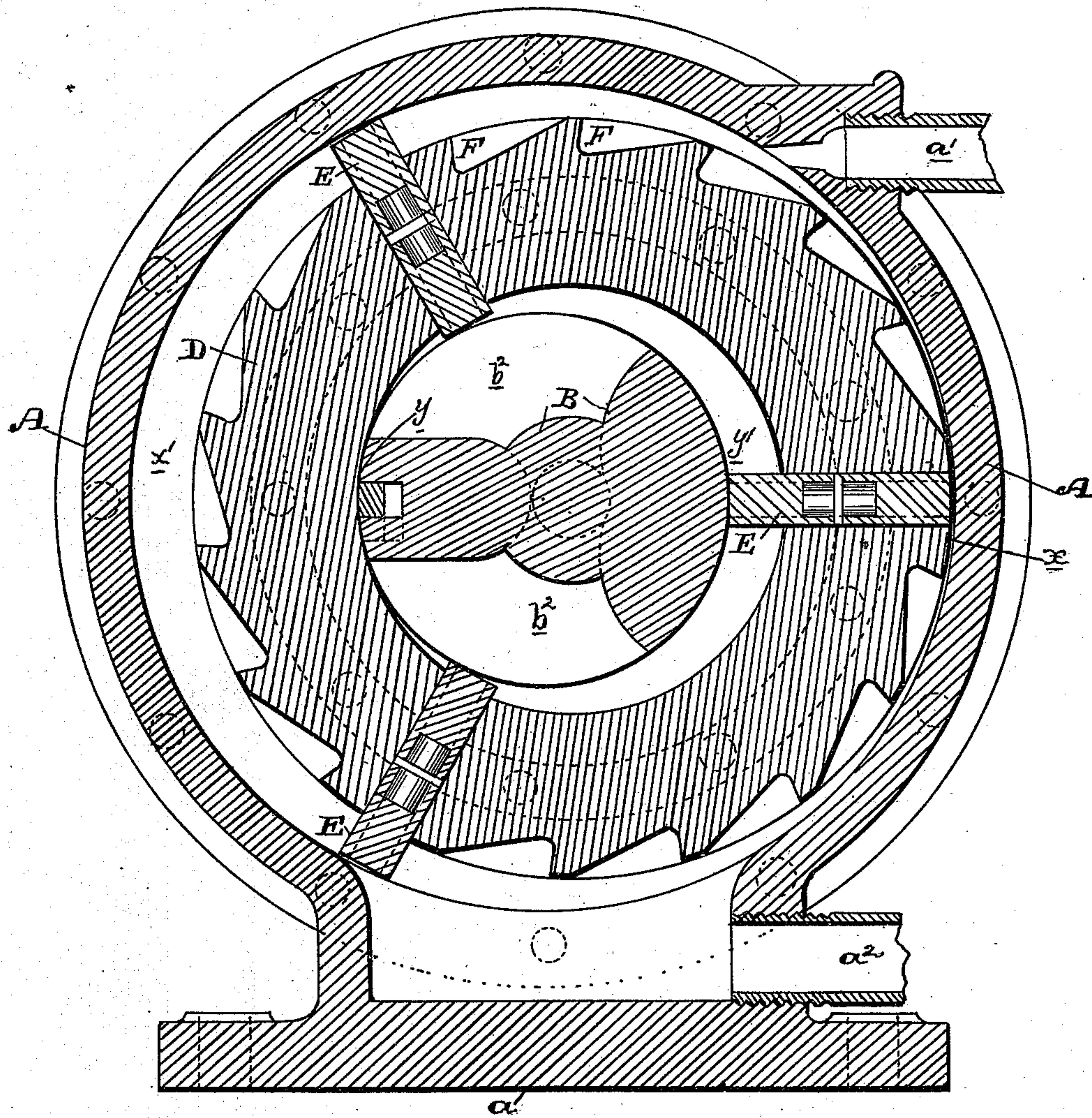
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E. I. NICHOLS.
ROTARY STEAM PUMP.

No. 413,830.

Patented Oct. 29, 1889.

Fig. 1.



Witnesses,
Geo. H. Strong
J. H. Strong

Inventor,
E. I. Nichols
By Devery & Co.
attys

(No Model.)

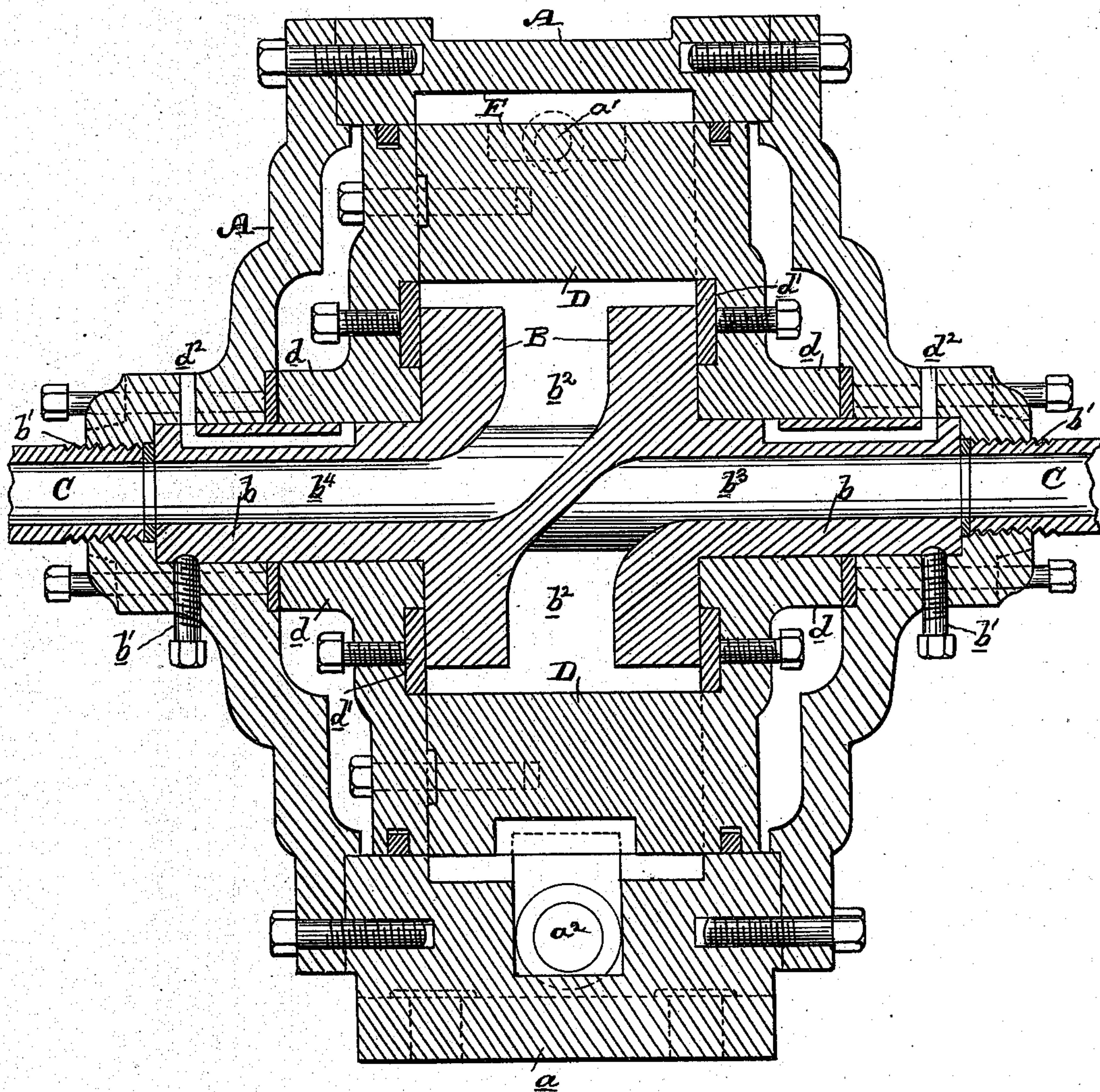
2 Sheets—Sheet 2.

E. I. NICHOLS.
ROTARY STEAM PUMP.

No. 413,830.

Patented Oct. 29, 1889.

Fig. 2.



Witnesses,
Geo. H. Strong,
J. H. House

Inventor,
E. I. Nichols
By Dewey & Co.
attys

UNITED STATES PATENT OFFICE.

EMORY I. NICHOLS, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO THE
NICHOLS MANUFACTURING COMPANY, OF SAME PLACE.

ROTARY STEAM-PUMP.

SPECIFICATION forming part of Letters Patent No. 413,830, dated October 29, 1889.

Application filed January 16, 1889. Serial No. 296,542. (No model.)

To all whom it may concern:

Be it known that I, EMORY I. NICHOLS, of the city and county of San Francisco, State of California, have invented an Improvement in Rotary Steam-Pumps; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to that class of rotary pumps in which the sliding pistons are successively projected into and withdrawn from the water-space.

My invention consists in a shell or casing having a steam-inlet and a steam-outlet, an annular rotary piston-carrier mounted within and having its periphery eccentric to the inner circumference of the shell, whereby on one side the contact of the two forms an abutment and on the other side a steam-space, a fixed center within the annular piston-carrier, and having its periphery eccentric to the inner circumference of said carrier, whereby at one side it forms an abutment and at the other side a water-space, said center having an inlet and an outlet port, and sliding pistons mounted in the carrier and extending between the inner circumference of the shell and the periphery of the fixed center, all of which I shall hereinafter fully describe, together with details of construction and arrangement.

The object of my invention is to provide a rotary pump adapted to be operated by steam, the whole machine being practically a combination of a rotary steam-engine and a rotary pump, the former being the motive power for the latter.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a sectional side elevation of my rotary steam-pump. Fig. 2 is a vertical cross-section of the same.

A is the shell of the machine, having a base a , a steam-inlet a' , and an exhaust a^2 . Within this shell is the fixed center B, the ends b of which are seated in the ends of the shell and are secured thereto suitably, as by the screws b' , so that the center and the shell are fixed and secured together. In this center are made circumferential ports b^2 , one of which communicates with the water-inlet port b^3 and the other with the water-outlet port b^4 , said

inlet and outlet ports being formed in the ends of the center and communicating with connecting-pipes C, secured to the ends of the shell.

Between the fixed center and the outer shell is a rotary piston-carrier D. This has its ends d mounted upon the ends b of the center and adapted to rotate thereon, suitable packing being provided, as shown at d' , or at any other points which may be found desirable, and the journals may be lubricated through oil-holes such as are represented at d^2 .

The piston-carrier D is an annular piece or ring, and is so shaped that its periphery is eccentric to the inner circumference of the outer shell, forming an abutment-contact therewith at one side, as shown at x , and a steam-space at the other side, as shown at x' , and its inner circumference is eccentric with the periphery of the fixed center, forming at one side a contact-abutment, as shown at y , and at the other side a water-space, as shown at y' . It will be seen that the relative arrangements of the two abutment-contacts outside and inside are the reverse of each other, as are also the steam and water spaces—that is to say, the steam-space is at one side of the machine opposite to the water-space on the other side, and the steam-abutment is at that side of the machine opposite to the water-abutment.

Mounted radially in the piston-carrier D are the pistons E, which slide in and out and may be made of one piece or two pieces, with intervening packing, as may be desired. These pistons have a length sufficient to extend between the periphery of the fixed center and the inner circumference of the shell, being in contact with both, so that when one of the pistons is gradually withdrawn from the steam-space as said space merges toward and into the steam contact-abutment it is projected at the other end into the water-space. Consequently the same set of pistons serve for both the steam and the water. The periphery of the piston-carrier, though it might be a plane surface, is preferably made with a series of small pockets, (represented by F,) and the steam-inlet a' is arranged to deliver its steam directly into these pockets, thus gaining whatever advantage there may be from

the forcible injection of steam against the piston-carrier.

The operation of the machine is as follows: Steam entering the inlet-port a' directly into the pockets of the carrier and into the steam-space between the carrier and the outer shell is confined between the contact-abutment on one side and the piston of the carrier on the other, so that, acting against the piston, it rotates the carrier and exhausts when the piston has passed the exhaust-port a^2 below. The pistons are withdrawn from and projected into the steam-space by the contact of their inner ends with the periphery of the fixed center. This rotary movement of the piston-carrier, it will be seen, effects the inward projection and withdrawal of the pistons into and from the water-space by the outer ends traveling in contact with the inner circumference of the shell, whereby said pistons successively act to suck in the water through the inlet-port, pass it around the circumferential port of the fixed center, and force it out the discharge-port, thus acting as both a suction and a force pump.

I am aware that rotary engines have been used in which sliding pistons have been mounted in a rotary carrier within and eccentric to another shell, thus forming an abutment by contact with one side; and I am also aware that substantially the same arrangement has been used in rotary pumps, and I do not therefore claim such, broadly; but I am not aware that in any single apparatus have the principles herein involved been so combined as to produce the rotary steam-pump herein described.

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

1. In a rotary steam-pump, a revoluble piston-carrier forming a separate steam and water abutment and a separate steam and water space and having a single set of pistons, each of which alternately traverses and withdraws from said steam and water spaces, and a fixed center bolted to the main frame and having the inlet and outlet ports in its ends, substantially as described.

2. In a rotary steam-pump, the combination of the outer shell having a steam-inlet and a steam-exhaust port, an inner fixed center bolted to said shell and having a water-inlet port and a water-outlet port formed in its ends, a rotary annular piston-carrier between the outer shell and the fixed center, forming with each a contact-abutment and a steam and water space, respectively, and pistons mounted in said carrier and adapted to

be projected into and withdrawn from said steam and water spaces, substantially as described.

3. In a rotary steam-pump, the combination of the outer shell having a steam-inlet and a steam-exhaust port, an inner fixed center having a water-inlet port and a water-outlet port formed in its ends and communicating with pipes at the ends of said center, a rotary annular piston-carrier between the outer shell and the fixed center, forming with each a contact-abutment and a steam and water space, respectively, and sliding pistons mounted on the piston-carrier, their ends bearing against the shell and the fixed center, whereby they are withdrawn from and projected into the steam and water spaces, substantially as described.

4. A rotary steam-pump comprising an outer shell having a steam-inlet and a steam-exhaust port, an inner center fixed to the shell and having a port with inlet and outlet connections through its ends and the ends of the outer shell, a rotary annular piston-carrier between the outer shell and the fixed center and mounted upon the ends of said center, said carrier having peripheral pockets and being so arranged as to form a contact-abutment with the outer shell and contact-abutment with the fixed center and steam and water spaces, as described, and sliding pistons mounted in the carrier and extending between the periphery of the fixed center and the inner circumference of the outer shell, whereby they are adapted to be projected into and withdrawn from the steam and water spaces, substantially as described.

5. In a rotary steam-pump, the combination of the outer shell with inlet and outlet steam-ports, the ported center fixed to the outer shell and having water inlet and outlet ports, the rotary piston-carrier located between the fixed center and the outer shell and forming opposite contact-abutments with each and opposite spaces for steam and water, said carrier having pockets upon its periphery, into which the steam is projected from the inlet-port, and sliding pistons mounted in the carrier and bearing between the fixed center and the outer shell, whereby they are projected into and withdrawn from the steam and water spaces, substantially as described.

In witness whereof I have hereunto set my hand.

EMORY I. NICHOLS.

Witnesses:

S. H. NOURSE,
H. C. LEE.