

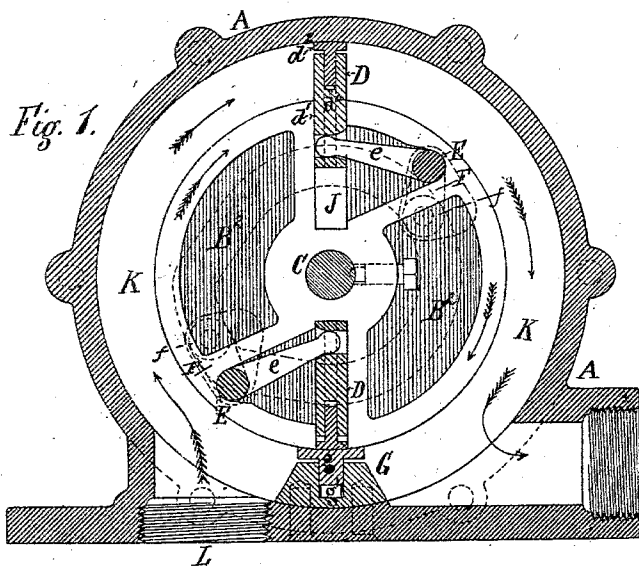
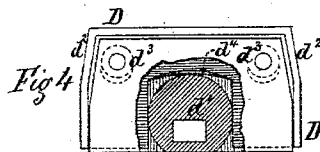
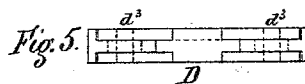
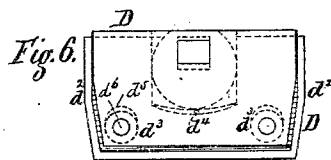
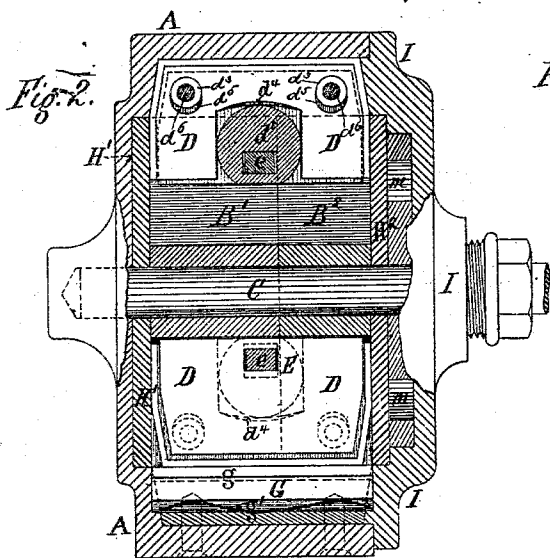
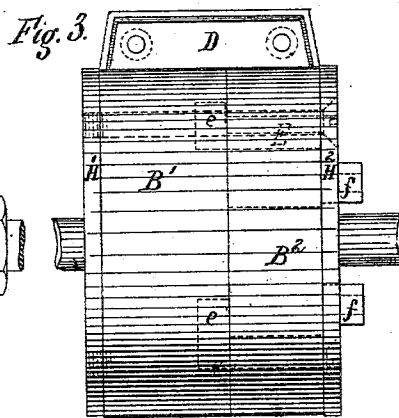
(No Model.)

2 Sheets—Sheet 1.

C. COMSTOCK.
ROTARY PUMP.

No. 283,377.

Patented Aug. 21, 1883.



Witnesses:-
Arthur C. Webb
Chas. de L. Young

Inventor:
Chester Comstock
By Ernest C. Webb
Atty.

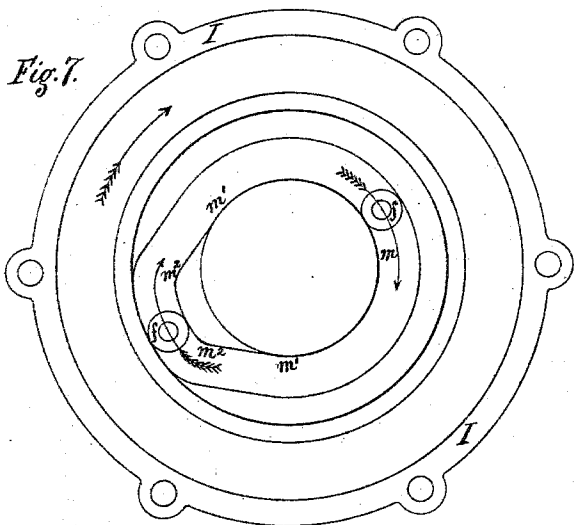
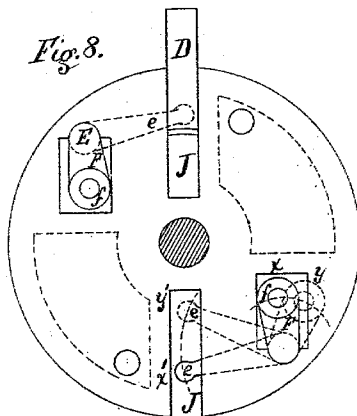
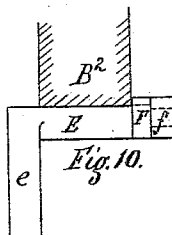
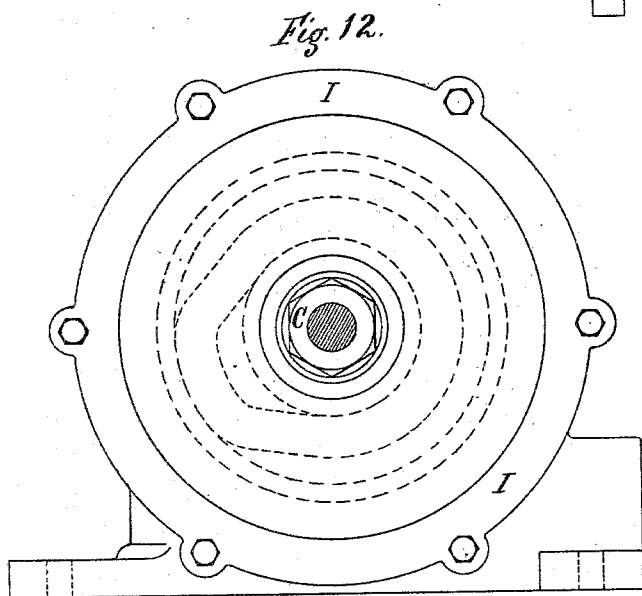
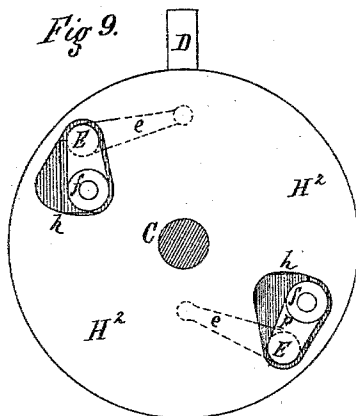
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2 Sheets—Sheet 2.

C. COMSTOCK.
ROTARY PUMP.

No. 283,377.

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UNITED STATES PATENT OFFICE.

CHESTER COMSTOCK, OF NEW CANAAN, CONNECTICUT.

ROTARY PUMP.

SPECIFICATION forming part of Letters Patent No. 283,877, dated August 21, 1883.

Application filed January 21, 1882. (No model.)

To all whom it may concern:

Be it known that I, CHESTER COMSTOCK, of New Canaan, in the county of Fairfield and State of Connecticut, have invented a new and
5 Improved Rotary Pump, of which the following specification is a description.

This invention relates to certain improvements in rotary pumps, whereby simplicity and strength in construction and great efficiency in operation are obtained; and my invention consists, first, in making the sides of the water-path in the annular chamber converge toward each other, so as to make a very tight joint, compensating for the wearing of
15 the parts; second, in tapering the bearing-edges of the buckets or blades for taking up and delivering the water to conform to the converging sides of the annular chamber, so that they will wear evenly therewith, and hence insure
20 a tight joint at all times; third, in adapting the buckets or blades to be projected from or withdrawn into recesses in the revolving cylinder by means of engaging levers operating in a guide-groove; fourth, in making the buckets
25 or blades in two parts, the bearing portions of which are adapted to be self-adjusting independent of any pressure from the revolving cylinder, all as hereinafter more fully described.

In the accompanying drawings, Figure 1 is a longitudinal section of my improved rotary pump, taken through the cylinder and inlet and outlet nozzles, (the portion B' of the revolving cylinder being removed,) and showing
35 that portion, B', of the revolving cylinder containing the operating rock-shaft and arms. Fig. 2 is a cross-section through the pump-chamber and revolving cylinder, showing the slots in which the forward and backward movements of the buckets or blades are made. Fig.
40 3 is an outside view of the revolving cylinder, with the upper bucket or blade projecting therefrom. Figs. 4, 5, and 6 are detail views of the self-adjusting buckets or blades. Fig.
45 7 is a plan view of the guide-groove for operating the levers to adjust the buckets or blades. Fig. 8 is an end view of the revolving cylinder, showing the method of operating the rock-shaft and lever-arms engaging with the levers
50 to adjust the buckets or blades. Fig. 9 is an

end view of same with wearing-cap in place. Figs. 10 and 11 are detail views of the rock-shaft and lever-arms. Fig. 12 is an outside view of the pump-chamber cover I, showing
55 by dotted lines the relative position of the parts shown in Fig. 7.

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

A is the fixed body or case of the pump, consisting of a hollow cylinder closed at both ends.
60 The revolving cylinder or piston of the pump is composed of two portions, B' B², arranged within the body A, and keyed or otherwise fastened to the shaft C, which works in bearings formed in the two ends of the pump-case.
65 This shaft C can be operated by hand, steam, or other motive power.

J J designate two slots in the revolving cylinder, in which are placed the self-adjusting
70 buckets or blades D D, each formed of two parts, d' and d². The buckets or blades D D are each operated by a lever, e, attached to the rock-shaft E, which is itself rotated to and fro by means of the roller f, attached to the
75 lever-arm F, and wearing within the guide-groove m of the pump-chamber cover I. It will be seen that the guide-groove is for about three-fourths of its length, as designated by
m' m', concentric with the shaft C, and the remaining portion, m² m², is eccentric thereto,
80 and by this means the levers controlling the buckets or blades act to keep the buckets or blades to their places in the annular pump-chamber, and act to withdraw them successively to pass the partition or division G, which
85 is bolted to the lower portion of the pump-chamber, between the inlet or suction and outlet or discharge nozzles L and M, respectively.

K designates the annular chamber of the
90 pump, and when the buckets or blades D D are thrown out for operation they divide it into two water-tight compartments, and as the shaft C, carrying the cylinder, rotates, the capacity of each compartment increases and
95 diminishes proportionately as the water is drawn in and forced out by the rotation of the shaft. The annular chamber K is the water way or chamber of the pump; and its sides converge, and the blades or buckets are also
100

made with converging sides to correspond therewith, so as to always insure a correct fit of the blades in the water-way, when they are adjusted, as they become worn.

5 The partition G is provided with a longitudinal slot or groove, and an independent adjustable plate, *g*, with a broad bearing-surface, is fitted therein to bear against the revolving cylinder B' B², and this plate *g* is
10 kept up to its position against the revolving cylinder B' B² by means of a pressure-spring, *g'*, and thereby adjusts itself to conform to the wearing. Instead of this spring, set-screws or other like devices may be used for this purpose.
15

There are two wearing-caps, H' H², one fastened to each end of the revolving cylinder, which revolve each in a counter-bore at the ends of the pump-chamber. The wearing-cap
20 H² is provided with slots or openings *h*, to provide for the sweep of the lever F'. The cylinder or piston is made in two parts, B' B², in order to facilitate the formation therein of the cavities, recesses, or slots to receive its
25 several attachments. These two parts may be connected by set-screws or equivalent means, substantially as indicated by dotted lines in Fig. 3. The self-adjusting buckets or blades D D are made in two pieces, one
30 within the other. The body of the blades has an edge kerf or recess, in which fits the wearing portion *d'*. This wearing portion has two legs straddling the operating-hub *d'*, and a spring, *d'*, is interposed between said hub and the horizontal wearing-rib connecting the
35 legs of said portion *d'*. The portion *d'* has in it slots *d'' d''*, and in these slots, and within the kerf of the body of the blade, are arranged rings *d'' d''*, through which pins *d'' d''* pass to connect the wearing portion and body and permit the movement of said wearing portion
40 without cramping. (See Fig. 2 and dotted lines, Figs. 3, 4, 5, and 6.)

In operation, motion is imparted to the revolving cylinder B' B² by means of the shaft
45 C, which projects out through a stuffing-box in the cover I of the pump-chamber. As the cylinder B' B² revolves on its axis the rock-shafts E are carried with it, and the levers F
50 thereto attached are forced to and from the center of the shaft by means of the friction-rollers *f*, connected to the levers F and wearing in the guide-groove *m*. While the friction-rollers *f* are in the circular portion of the
55 guide-groove from *m'* to *m'*, the distance of the friction-rollers *f* from the center of the shaft remains the same and has no effect on the motion of the rock-shafts E; but when the rollers pass through the portion from *m''* to *m''*
60 they are gradually carried away from the center of the shafts and the rock-shafts E are caused to rotate, carrying with them the levers *e*, engaging in the buckets or blades D, into and toward the center of the shaft, so
65 that the buckets or blades will be able to pass the partition G, as shown by the position of

the lower lever, *e*, and bucket or blade D in Fig. 1 of the drawings. This operation is kept up while the revolutions of the cylinders are being made, the levers *e* and F changing their positions, as shown by dotted lines in Fig. 8, the lever F', with roller *f*, moving
70 from position *x* to position *y*, and the lever-arm *e* from *x'* to *y'*, being the throw backward and forward of the buckets or blades D D in each revolution. It will be seen that sufficient clearance is provided in the wearing-cap
75 H², by means of the slots or openings *h*, to permit the movement of the levers F', with the rollers *f* moving in the guide-groove *m*.
80

By my invention I produce a rotary pump which can be operated by hand, steam, or other motive power, and in which the construction of the different parts is such that the frictional surfaces which come in contact
85 adjust themselves to each other, so as to compensate for wear. One advantage consists in converging the sides of the water-path in the annular chamber toward each other, and in tapering the bearing-edges of the buckets or
90 blades to correspond therewith. Another advantage consists in making each bucket or blade in two pieces connected together, and adapted to be projected from or retired into the revolving cylinder at the proper time by
95 the mechanism described, the wearing-surface of each bucket or blade being held to its place against the converging sides of the water-path in the annular chamber, and adapted to accommodate itself to the wearing-surface
100 thereof by means of a spring or other like device. Another advantage consists in making the partition or division between the suction and discharge openings of a rotary pump in
105 two pieces, that portion which is in contact with the revolving cylinder being held to its place by a spring or other like device, so that it will wear itself to a perfect wearing-surface, compensating for the wear of the contact-surface of the revolving cylinder.
110

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

1. In a rotary pump having a shell and a rotary piston therein, as described, the annular water-way K between the periphery of the
115 piston and the rim of the shell, having convergent sides, and the buckets or blades D D, the edges whereof are convergent and fit and operate in such annular convergent water-way, substantially as shown and described.
120

2. The buckets or blades of a rotary pump, composed of two portions, one within the other, held together by pins and rings *d'' d''*, combined with the hub *d'* and spring *d'*, substantially as shown and described.
125

3. The combination, substantially as shown and described, of the case A, having a suitable inlet and outlet, cylinder B' B², provided with buckets working in a divided water-way in the case, the head I, having the
130 groove *m*, and the friction-rollers *f*, working in said groove and borne by levers F, which

operate the levers *e*, through the rock-shafts *E*, to project and withdraw the blades or buckets, all as set forth.

4. The wearing-cap *H*², provided with openings *h*, combined with the blade-operating levers, substantially as and for the purpose described.

5. The combination, substantially as shown and described, of the cap *I*, having the groove

m, and the wearing-cap *H*², having the openings *h*, with the operating-levers of the pump blades or buckets, as and for the purpose specified.

CHESTER COMSTOCK.

Witnesses:

ERNEST C. WEBB,

ARTHUR C. WEBB.