(No Model.)

C. T. COLEBROOK.

ROTARY PUMP OR SIMILAR APPARATUS.

No. 345,885. Patented July 20, 1886.

FIG. 1.

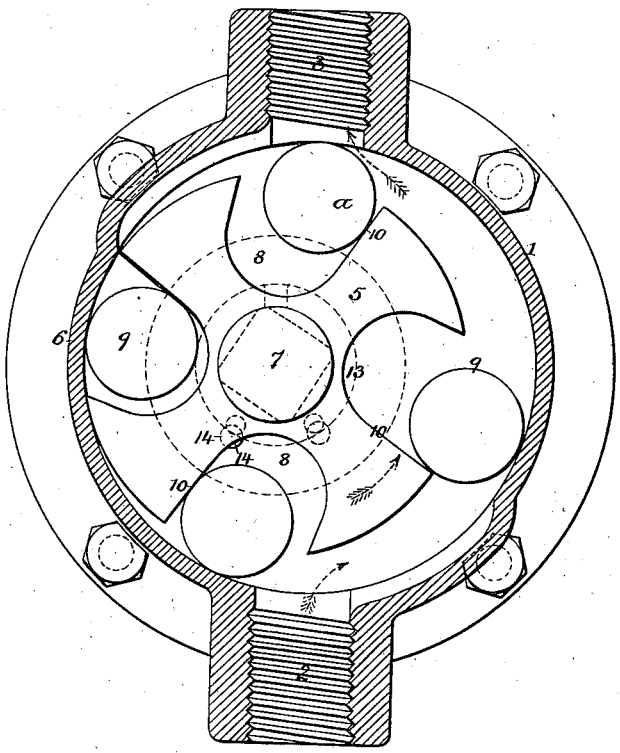
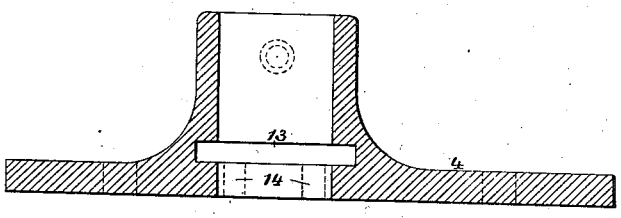


FIG. 2.



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UNITED STATES PATENT OFFICE.

CEMER THOMAS COLEBROOK, OF ISLINGTON, COUNTY OF MIDDLESEX, ENGLAND.

ROTARY PUMP OR SIMILAR APPARATUS.

SPECIFICATION forming part of Letters Patent No. 345,885, dated July 20, 1886.

Application filed January 14, 1886. Serial No. 188,558. (No model.) Patented in England April 1, 1885, No. 4,143.

To all whom it may concern:

Be it known that I, CEMER THOMAS COLEBROOK, a subject of the Queen of Great Britain and Ireland, and a resident of Islington, in the county of Middlesex, England, have invented certain Improvements in Rotary Pumps or Similar Apparatus, (for which I have obtained British Letters Patent No. 4,143, dated April 1, 1885,) of which the following is a specification.

The invention has especial reference to that class of such rotary apparatus in which there is mounted within and eccentrically or otherwise in relation to an outer cylinder or casing formed or provided with inlet and outlet passages and with end covers, a cylindrical rotary drum or center piece accurately fitting (with facility of turning) against a segment of the inner surface or periphery of the cylinder, and also between such end covers, and keyed or fixed upon or securely fitted on or to an axle or shaft passing through one or both such end covers, and formed in its periphery with a series of longitudinal recesses or grooves, in which loosely-fitting cylindrical rollers or equivalent devices of a solid or hollow formation are placed.

The principle of action sought to be attained in rotary apparatus of this class is that when the drum is rotated the said rollers shall roll freely around in their respective grooves in such a manner as to remain at all parts of their revolution round the center of the said casing, or for such part thereof as they are required to act in contact with the inner surface or periphery thereof, so as to act as true pistons at all times and parts of their said revolution, or for such times and parts of their said revolution as required to act in effecting a tight joint both between their peripheries and the driving or driven edges of their respective grooves and between their peripheries and the inner periphery of the said containing casing.

The principal defect in such apparatus as hitherto constructed is that the roller-pistons have been liable to be carried around with the drum in some constructions without being in the desired contact with the inner eccentric periphery of the casing, and in other constructions for the earlier part of its revolution after leaving the said segment and until after they are required to begin acting in concert with the inner peripheries of the casing without being in contact therewith, and to be then suddenly impelled outward against the said inner periphery of the casing with a considerable and destructive force, rendering the apparatus practically useless on account of the physically unbearable hammering noise thus caused. It has been sought to remedy these defects by forming bosses upon the end covers concentric with the inner periphery of the casing, so as to cause the rollers to travel always in contact therewith, but this provision of necessity prevented the eccentric drum from rotating in even contact with the end covers, and thus prevented the apparatus from having any useful effect.

The special object of the present improvements is to remedy such defects, and to apply such improvements to such apparatus as will cause the above referred to principle of action to be attained.

In the accompanying drawings, Figure 1 represents a rotary pump constructed in accordance with one modification of the present improvements. Fig. 2 represents a detail view of the cover.

1 represents the outer cylinder or casing of the apparatus; 2 3, the inlet and outlet passages, respectively; 4, the end covers; 5, the cylindrical rotary drum or center piece; 6, the segment of the cylinder 1, against which the drum 5 rotates; 7, the shaft of the drum; 8, longitudinal recesses or grooves in the periphery of the drum, and 9 the roller-pistons which are required to be carried round thereby in contact with the periphery of the cylinder 1, as and at the times required.

The invention consists, essentially, in adapting such improvements to the drum as will be effective in causing it to have a constant positive tendency to thrust such roller-pistons outward, and to keep them in contact with the inner periphery of the casing at all parts of their said revolution or while they are required to operate therewith.

In such cases wherein the rollers 9 are required to be severally independent from each other, as illustrated in Fig. 1, the improved means of actuation consist in constructing the

drum in such a manner as that the driving (or driven) side 10 in single-acting rotary apparatus, or sides 10 in double-acting or reversible rotary apparatus of the grooves 8 for the whole extent of such side or sides, or for such acting part thereof as is effective or instrumental in propelling the roller-pistons from the position they occupy at the time they begin to act after leaving the said segment until the position they occupy at the time of reaching the outlet is or are disposed in relation to the center of the drum as the center of actuation in a plane either radial therefrom, as in the modification represented, or radial from any point (referring to a transverse sectional view) on either side of such center of actuation situated anywhere within a circle drawn about such center, and of the diameter of the rollers in use, making the grooves, when applying the drum to a rotary pump, of such a width as to leave plenty of lateral clearance for the rollers and for the fluid being pumped, and when applying the drum to an engine, making the grooves with the least amount possible of clearance for the rollers. When the drum thus formed is mounted within the casing or cylinder 1, formed or provided as herein referred to, and as illustrated in the accompanying drawings, and is rotated by hand by means of a handle on a squared extremity of the drum-shaft 7, or is otherwise rotated or driven, the rollers 9 will have a positive force tending to roll them out of the said grooves and away from the center of the drum and against the internal surface of the casing, so that there will be a complete avoidance of such sudden impulses and destructive hammering in such apparatus as hitherto constructed. The rollers 9 are made of such proportional sizes or diameters in relation to the width of the space between the drum and casing, (or to the greatest width of such space, if varying,) as that while or throughout the time they are traversing the periphery of the casing between the inlet and the outlet, the rollers are positively supported, with the said outward tendency, by or against the edges or acting parts 10 of the grooves of the drum at some part of them nearer the center of actuation than the distance therefrom of their axes. To attain this result the rollers may be made of a diameter somewhat less than double the width (or greatest width) of such space, of a diameter so much larger than the width (or greatest width) of such space as will avoid any liability of the rollers jamming in any part thereof, or of any intermediate diameter.

For the purpose of securing the most advantageous operation and evenness of work in a pump constructed as represented in Fig. 1, I cause the outlet 3 therefrom to be situated at or to extend from the commencement of the segment 6 of the casing 1, against which the drum 5 rotates, to that point of the crescent or other shaped space (where the drum and casing are eccentric) at which the forward roller, *a*, will be situated at the moment when or immediately after the space between the two acting rollers *a b* is fully charged, and the inlet I cause to extend to that part of the said space at which the roller *b*, coming into operation, will be situated at the moment when the varying cubic capacity between the two acting roller-pistons *a b* is the greatest, or when or immediately after the said space is fully charged. The cylinder may, however, be so shaped as that the cubic capacity between the two acting roller-pistons will remain constant from the moment of being fully charged until the moment of the commencement of escape of the material under treatment, by so forming and constructing the casing as that the part traversed by the rollers from the time of passing the inlet until the time of reaching the outlet shall be concentric with the periphery of the drum, the concentric parts of the casing of different diameters being connected by parts so shaped as to cause or allow of the rollers gradually altering their radial distances from the center of actuation.

I prefer, in apparatus of small size, to construct the drum 5 in one piece, with projecting ends or axles 7. I form the end cover or covers 4 of rotary pumps in such an improved manner as that they require no packing-glands, and form and adapt the rotating drum thereto where it abuts thereagainst, so as to prevent leakage more than sufficient to lubricate the adjacent parts, and this result I attain by annularly recessing the end covers at parts 13, surrounding the shaft near adjacent to their faces, as represented in the sectional detail view, Fig. 2, and by leading ducts 14 from such recesses to the faces of the covers on the suction side of the drum, when in operation, so that any small leakage around the shaft on the delivery side of necessity finds its way into these annular recesses, and is immediately drawn back into the casing on the suction side.

I claim as my invention in rotary apparatus of the class hereinbefore described—

The combination of a casing having inlet and outlet passages with a rotary drum or center piece having recesses in its periphery and roller-pistons therein, the said recesses having acting faces substantially radial from the center of rotation, as and for the purpose set forth.

In testimony I have signed my name to this specification in the presence of two subscribing witnesses.

CEMER THOMAS COLEBROOK.

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