J. S. WARD.

DRIVING MECHANISM FOR PUMPS.

APPLICATION FILED MAR. 7, 1910.

978,682.

Patented Dec. 13, 1910.

2 SHEETS—SHEET 1.

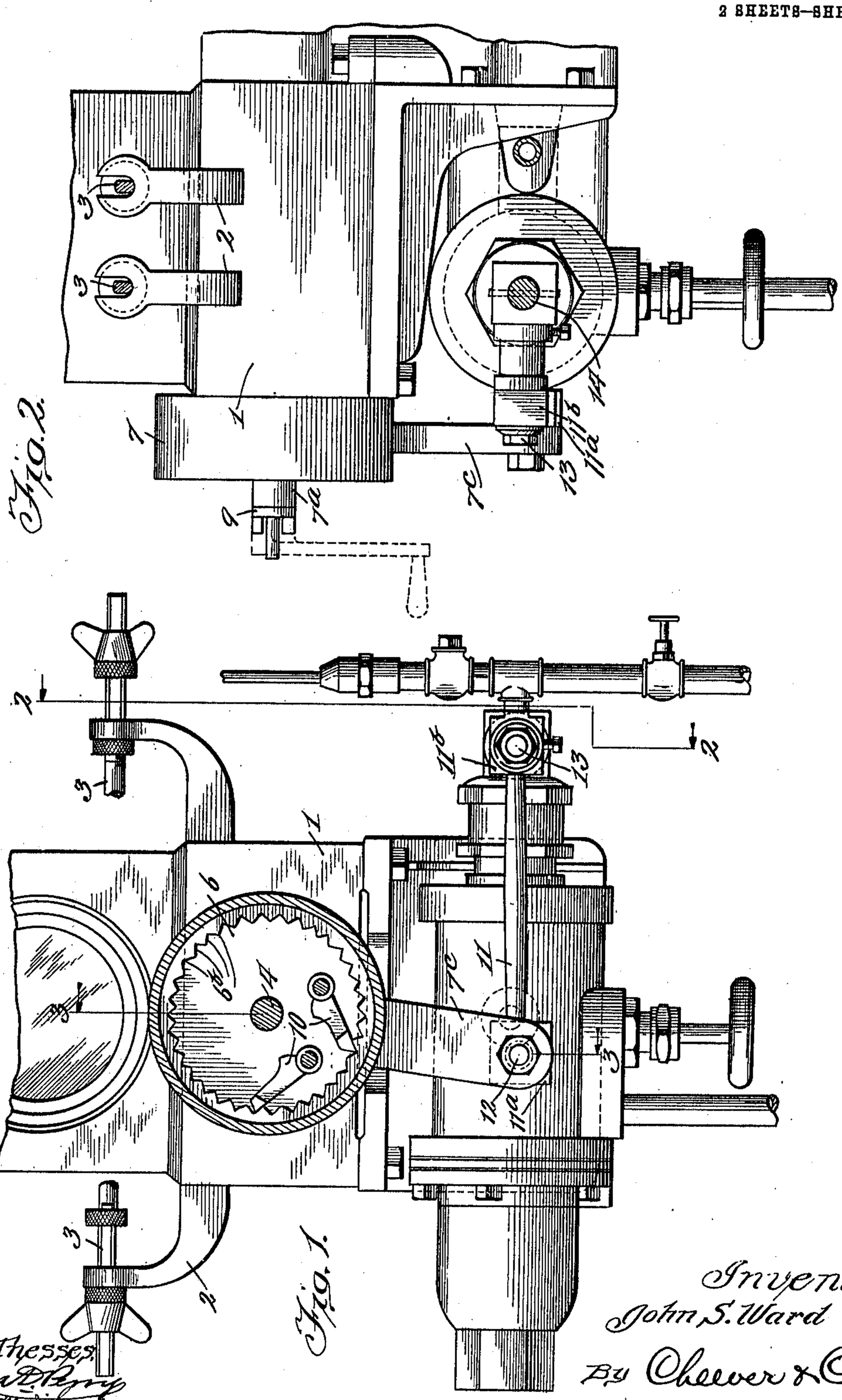

Fig. 1.

Fig. 2.

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2 SHEETS—SHEET 2.

Fig. 3.

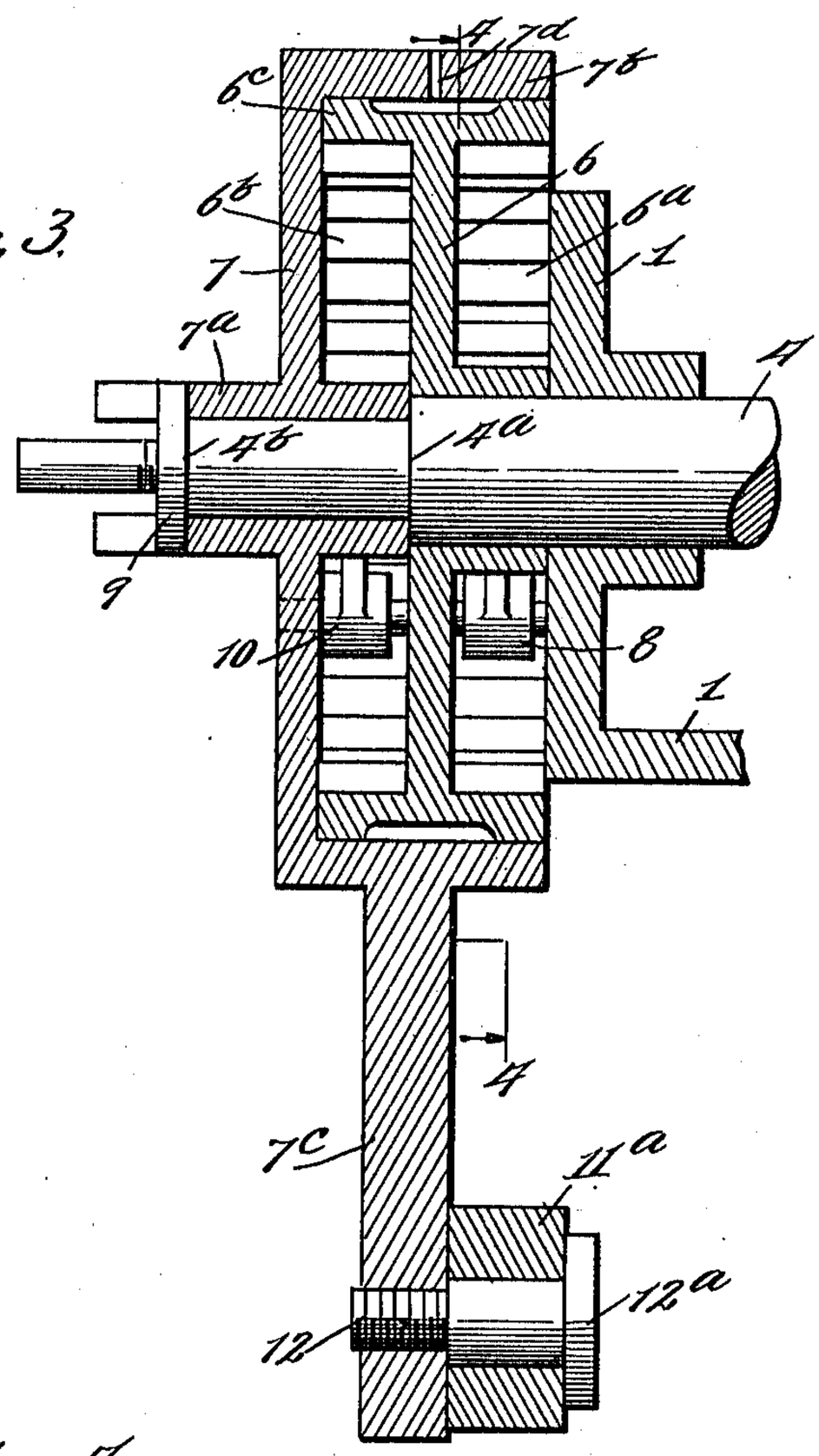
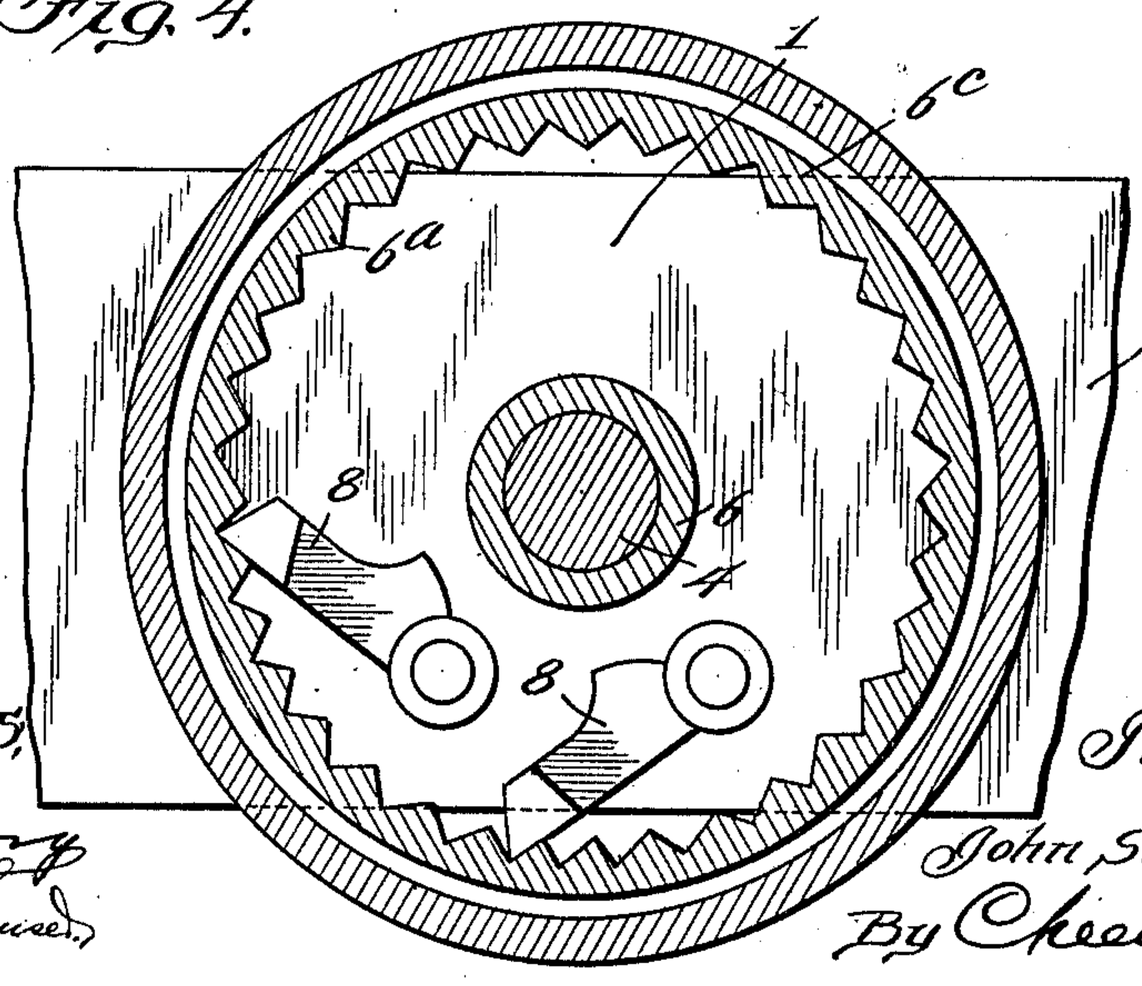


Fig. 4.



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DRIVING MECHANISM FOR PUMPS.

978,682. Specification of Letters Patent. **Patented Dec. 13, 1910.**

Application filed March 7, 1910. Serial No. 547,732.

To all whom it may concern:

Be it known that I, JOHN S. WARD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Driving Mechanism for Pumps, of which the following is a specification.

My invention relates to driving mechanism for pumps and the object of the invention is to provide ratchet mechanism of improved construction wherein the interior parts are efficiently protected from dust and lubricated, and the movable parts are efficiently held in their proper positions with broad bearing surfaces advantageously placed.

Another object is to provide simple, durable, and easily operated connections between the ratchet mechanism and a rectilinearly moving driving member.

I accomplish my objects by the mechanism illustrated in the accompanying drawings, in which:

Figure 1 is a front elevation of the driving mechanism showing a portion of the pump mounted thereon. The casing of the ratchet device is shown in section. Fig. 2 is an end elevation viewed from the line 2—2, Fig. 1. Fig. 3 is a sectional view taken on the line 3—3, Fig. 1. Fig. 4 is a sectional view taken on the line 4—4, Fig. 3.

Similar numerals refer to similar parts throughout the several views.

The form of pump to be operated is not especially concerned with my present invention and, therefore, it is only partially indicated in the drawings, the parts here shown being the casing 1, and the slide bars 2 which operate the pump pistons 3. These slide bars are operated by eccentrics (not shown) rotated by the shaft 4. The function of the driving mechanism is to rotate said shaft to thereby cause the reciprocation of the slide bars and plungers.

The ratchet mechanism shown in detail in Figs. 3 and 4 is carried on the projecting end of shaft 4 and consists of two interfitting parts 6 and 7. Part 6 is rigidly secured to shaft 4 and is prevented from rotating backward by means of dogs 8 pivoted to the stationary casing 1. Said dogs coöperate for this purpose with the inner annular toothed surface 6^a of the inner ratchet member 6. The cover part 7 is rotatable upon shaft 4, independently thereof, and by preference its hub 7^a abuts a shoulder 4^a formed in the shaft as best shown in Fig. 3. In this the preferred construction part 7 is retained upon the shaft by a nut 9 which abuts a second shoulder 4^b formed upon the shaft.

Dogs 10 are pivoted to the inner surface of the cover part 7 so as to be oscillated back and forth to cause the inner ratchet part 6 to advance intermittently. Said dogs cooperate for this purpose with the inner annular toothed surface 6^b formed on the inside of part 6 as clearly shown in Figs. 1 and 3. In certain respects my present ratchet device resembles the one shown in my previous Patent No. 893,118, issued July 14, 1908. In the present case, however, the inner part 6 has at its periphery annular flanges 6^c extending in both directions from a central web, as shown. By preference said flanges extend equal distances in both directions from the web, thus producing symmetry and a balanced support for the cover member 7. The outer surface of the flanges 6^c is turned smooth so as to form a slip fit with the inside of the flange 7^b of the part 7. Said part 7 fits entirely over part 6, thereby effectually excluding dust and at the same time presenting a long bearing surface to the part 6, considered in the direction of the axis shaft 4. On account of this long bearing surface the movable parts are at all times held to their true position and rattling of the cover upon its support is effectually prevented. Moreover, after lubricating oil is once introduced at the periphery of the inner member 6 the parts will remain lubricated for a long time without further attention. The lubricating oil, which may be introduced through the oil hole 7^d in part 7 forms a seal between parts 6 and 7.

From the above description it will be seen that the cover part 7 is cylindrically recessed and that the inner member 6 consists of a cylindrical ring fitting into the cover member and having internal ratchet teeth and having a central internal partition by which it is secured to the shaft.

I will now describe the means whereby the above mechanism is connected to and operated by a driving member having a rectilinear reciprocating motion. An arm 7^c extends from the cover member 7, these parts being preferably formed of a single piece of cast metal. By forming arm 7^c at

the midlength of the cover (when considered lengthwise of the shaft) torsion or racking of the parts is prevented. At its lower end said arm is attached to the eye 11ª formed at the free end of the connecting rod 11. The connection between said arm and eye is articulate but it is preferably permanent, connection being made through stud 12, which screws into the arm and has a retaining head 12ª for holding the eye in position. The other end of the connecting rod has an eye 11ᵇ formed in it and this has a bearing upon the pin 13 rigidly secured to and operated by the rectilinearly reciprocating driving member 14. Said driving member in the present instance is the piston rod of a steam motor preferably of the type described in my copending application, Serial No. 529,465 filed November 22, 1909. As a result of this form of connection the straight line reciprocating motion of the motor piston produces an oscillatory movement of the arm 7ᶜ of the ratchet mechanism and the construction is such that both friction and lost motion are practically eliminated. The relative movement of the driving parts is confined to the ends of the connecting rod and this movement is so slight as to be almost negligible.

It will become apparent upon examination of the mechanism embodying the present invention that the parts are eminently durable, that friction is reduced to a minimum with a consequent reduction in the amount of power required. It will also become apparent that the bearing surfaces are especially large compared to the general size of the mechanism and that ordinary wear and tear will have practically no effect in causing the movable parts to become loose or uncertain in their movements. Furthermore, it will be clear that dust or other foreign matter will be effectually excluded from the inside of the ratchet mechanism with the result that the mechanism may operate a long time without requiring cleaning or other attenton from the operator.

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

1. In combination, a cover member having a cylindrical recess therein, a cylindrical ring closely fitting into said recess, and having a disk-like partition transverse to its axis and located approximately midway between its edges and ratchet connections between said cover member and said ring located within the ring.

2. In combination, a cover member having a cylindrical recess therein, a cylindrical ring closely fitting into said recess and having internal ratchet teeth, and a dog pivoted to the inside of said cover member and adapted to engage the teeth in said ring, said ring having a disk-like partition within it approximately midway between its edges.

3. In combination, a cover member having a cylindrical recess therein, a cylindrical ring closely fitting into said recess and having internal ratchet teeth, a dog pivoted to the inside of said cover member and adapted to engage the teeth in said ring, said ring having a disk-like partition within it approximately midway between its edges, and a shaft whereon both the cover member and the partition of the ring are mounted.

4. In combination, an oscillating cylindrical cover member having a cylindrical recess formed in the side, a shaft whereon said cover member is loosely mounted, a cylindrical ring having ratchet teeth on the inside and fitting into and contacting the inner cylindrical surface of said cover member, said ring being secured to said shaft, and dogs coacting with the teeth on said ring, one dog being pivoted to the inside of the cover member and the other having a stationary pivot.

5. In combination, a shaft, an oscillating cylindrically recessed cover member loosely journaled thereon, a cylindrical ring making contact with the inside of said cover member, and having supporting means located approximately midway between the edges of said ring for securing it to the shaft, internal ratchet teeth formed in said ring on both sides of said supporting means, and dogs coacting with said teeth, one dog being carried on the inside of the cover member and the other having a stationary pivot.

6. Driving mechanism for pumps comprising a rectilinearly reciprocating driving member, a connecting rod articulately connected thereto, an oscillating arm articulately connected to said connecting rod, a cover member rotated by said arm, a rotating shaft, and an inner member secured to said shaft and fitting into said cover member, said inner member having a cylindrical flange extending in both directions parallel with the shaft and adapted to make close contact with the inside of the periphery of said cover member.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

JOHN S. WARD.

Witnesses:
HOWARD M. COX,
MARGARET D. ROBB.