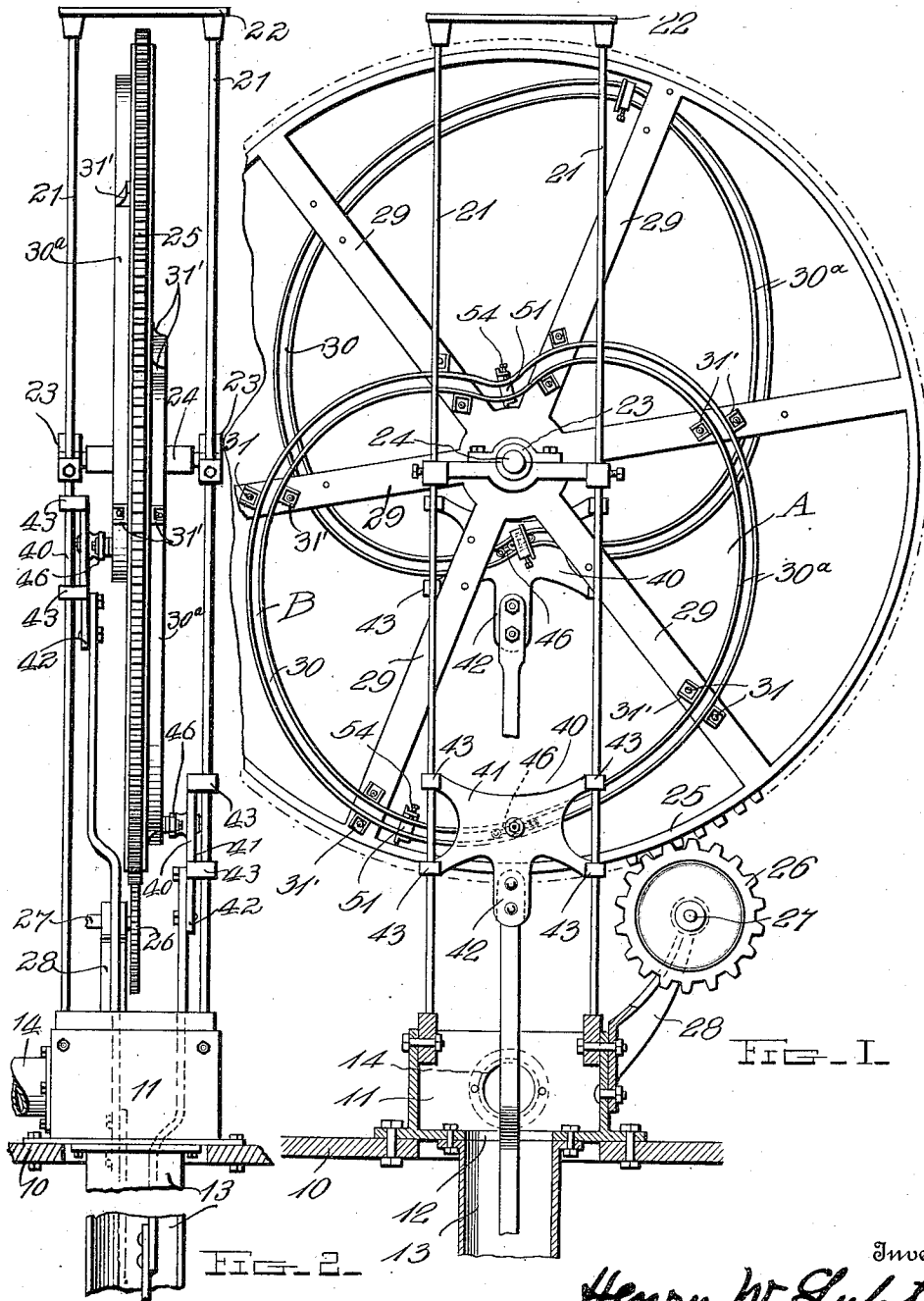


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APPLICATION FILED JULY 11, 1911.

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Patented May 6, 1913.

2 SHEETS-SHEET 1.



Witnesses

*E. C. Lupton*  
*J. H. Woodward*

Inventor

*Henry W Lupton*

By

*H. Woodward*

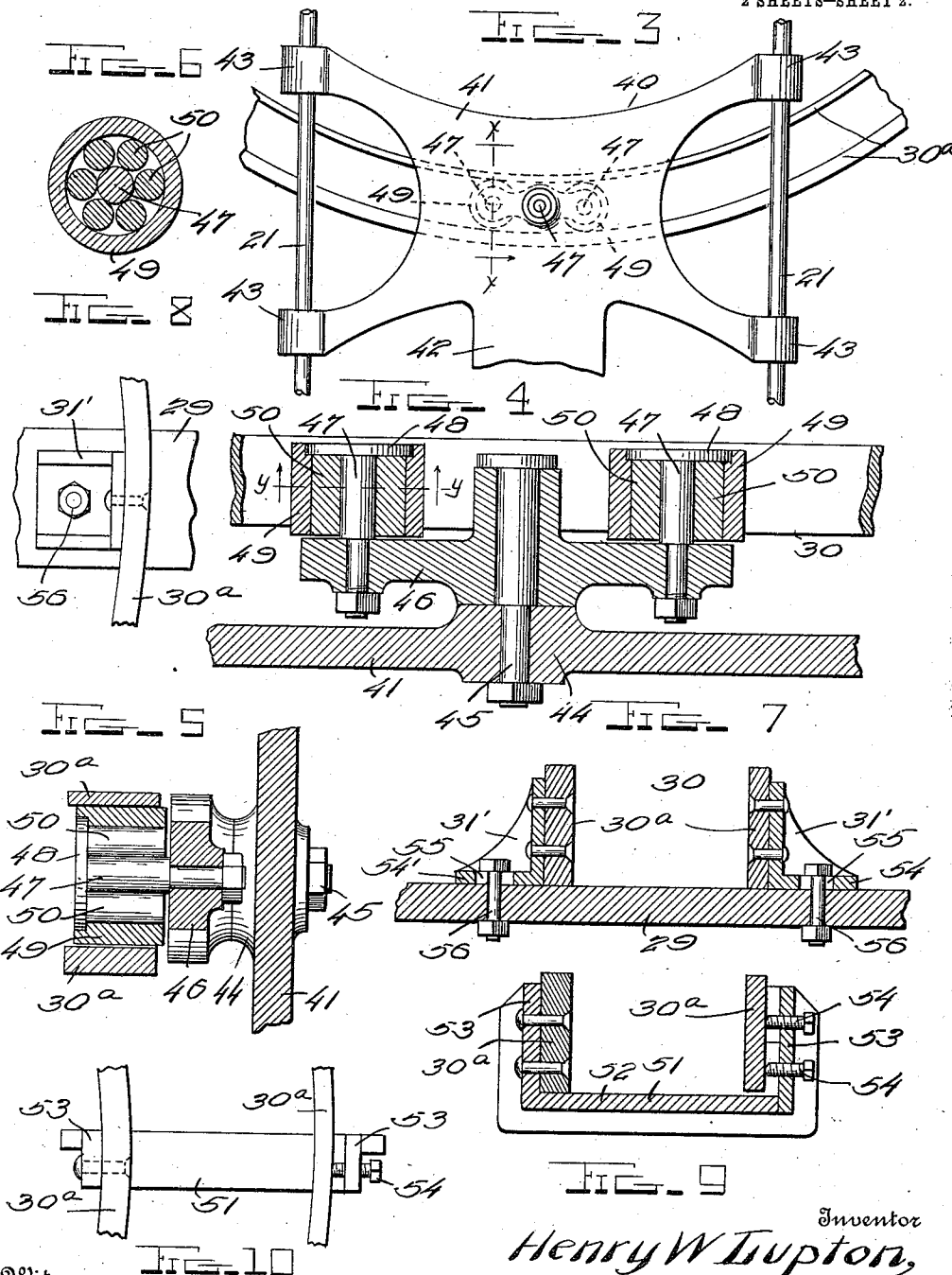
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Inventor  
*Henry W. Lupton,*

By *H. L. Woodward*  
Attorney

# UNITED STATES PATENT OFFICE.

HENRY W. LUPTON, OF WILLCOX, ARIZONA, ASSIGNOR OF ONE-HALF TO A. I. McALISTER, OF WILLCOX, ARIZONA.

## PUMP-OPERATING MECHANISM.

1,060,774.

Specification of Letters Patent.

Patented May 6, 1913.

Application filed July 11, 1911. Serial No. 637,878.

*To all whom it may concern:*

Be it known that I, HENRY W. LUPTON, a citizen of the United States, residing at Willcox, in the county of Cochise and State of Arizona, have invented new and useful Improvements in Pump-Operating Mechanism, of which the following is a specification.

This invention relates to pump operating mechanism, and more particularly to that type utilizing compound cams for operating two pistons forcing water into a common discharge pipe, the movement of the pistons being so modulated that an even flow of water is maintained without acceleration.

It is an object of the invention to obviate the necessity for casting or otherwise forming a cam member integrally in one block and adapt it to be assembled upon a spoked wheel or gear.

In the operation of pumps by means of cams, it has been difficult to provide for adjustments to compensate for wear, in an inexpensive way, and without provision for such adjustment the mechanism will operate with a knock when the direction of force applied to the piston is changed.

It is therefore an object of this invention to provide an efficient means of adjustment in such a device to compensate for wear on the cam surfaces.

It is an important object to make such adjustment without varying the mean path traveled with respect to the cam by the parts engaging the cam.

An important object is to reduce the friction developed in the wiper element, and to enable the construction of this element of a maximum strength and comparatively light weight, for the operation of large pumps, or in lifting water to great heights where the weight of the water sustained is considerable.

Another object is to present a construction occupying a comparatively small amount of space, which is of great value, especially in mine shafts.

Other objects and advantages will be apparent from the following description, and from the drawings, in which,

Figure 1 is a front view of the device partly in section, Fig. 2 is an edge view thereof, partly in section, Fig. 3 is a detail of the carriage on an enlarged scale, Fig. 4

is a horizontal section centrally of Fig. 3, Fig. 5 is a vertical transverse section on the line  $x-x$  of Fig. 3, Fig. 6 is a detail section on the line  $y-y$  of Fig. 4, Fig. 7 is a section through a portion of a spoke, Fig. 8 is a fragmentary top plan thereof, Fig. 9 is a detail section of the track showing the adjusting means, Fig. 10 is a plan view thereof.

There is illustrated a base element 10, which, if desired, may comprise simply a heavy flooring, centrally of which there is located a base casting 11, upon which the operating mechanism is supported, as will be described. The casting 11 is substantially in the form of a box or housing, open at its upper side, if desired, as shown, and having the circular opening 12 in its bottom from which is suspended the discharge pipe 13, connected at its lower end to the pump proper. A lateral discharge pipe 14 communicates with the box through one of its sides, by which liquid lifted may be carried off.

Extended upwardly from the box 11 in quadrilateral parallel spaced relation, there are four guide rods 21 connected at their upper ends by a crown piece 22, journal bearings 23 being supported by opposite pairs of the rods intermediately of their height, upon which is supported revolvably the shaft 24 carrying the large wheel 25, which may be provided with peripheral gear teeth, as shown, meshed with a small driving gear 26, secured upon a driving shaft 27 journaled in suitable brackets carried upon the side of the box 11. The wheel 25 is provided with a plurality of radial spokes 29, secured upon which are the parallel cam rails 30<sup>a</sup>, forming the track 30, the contour and relation of which to the axis of the wheel as a cam element is well understood in the art and is approximately shown in the patent to Dickerson and Root, Number 14,186. The rails are preferably made of heavy flat steel bars, bolted to the spokes as at 31, by means of angle brackets 31' suitably secured to the rails as in Fig. 3.

The cam track as shown is approximately heart shaped, the wheel 25 rotating evolutely, or clockwise, as shown in Fig. 1, the right hand lobe A of the nearest cam track being larger than the left lobe B, their outermost portions being formed in arcs ec-

centric to the wheel 25 and converging, the cam track on the opposite side of the wheel 25 being similar in form but exactly reversed in position relatively to the axis of the wheel.

This mechanism is intended for use with a pump including two reciprocating pistons independently operable by respective rods. Connected to each rod respectively are the laterally offset cross-head guides 40 comprising a central oblong body portion 41 having the pendant inset arms 42 connected to respective piston rods and having oppositely projected guide arms 43, each pair receiving respective guide rods 21 at each side of the wheel 25. The central body portion 41 is provided with a boss portion 44 concentrically of which it is bored to receive a heavy stub shaft 45 suitably secured therein and projecting into the adjacent track 30. Revolvable thereon there is a cradle carriage 46 or rocking arm, and extended longitudinally of the adjacent track portion, being provided at each end with pintles 47 having the enlarged heads 48, rollers 49 being engaged revolvably around the pintles having bores considerably larger than the major portions of the pintles but of less diameter than the heads 48, roller members 50 being engaged within the rollers 49 around the pintles and being held therein by the heads 48 and adjacent end portions of the carriage 46.

It will be understood that upward movement of the pump pistons is caused by the engagement of the carriage device of the respective cross-heads by the outer rail of the lobes A, while more rapid downward movement of the piston will be produced by engagement of the inner rail of the lobes B upon the carriage rollers. It will be well understood that in the wear of the device a knock will tend to develop at the points where engagement with the carriage changes from one rail to the other. It will be apparent that to prevent such knock a movement of the rails into closer relation at the points mentioned will suffice, without change of their relation over intermediate portions of the track. In order to accomplish such adjustment I have provided U-shaped yokes 51 including a central back portion 52 extended transversely across the inner edges of the rails 30<sup>a</sup> and having short arms 53 projected outwardly over the rails, one arm 53 being secured to the adjacent rail, holding the yoke in position, while a plurality of set screws 54 are engaged through the opposite arm and against the adjacent rail, whereby the rails may be borne toward each other when desired. One of these is located at the outermost junction of the lobes A and B, and it will be noted that this section of the track is located intermediately of two of the spokes. The other point of

adjustment is located slightly without the lobe A adjacent its inner junction with the opposite lobe on a section of the track extending obliquely with respect to the mean direction of the track, the securing flange portion 54' on the adjacent portions of the rails secured to the spokes being provided with oblong slots 55 extending in suitable direction and receiving therethrough headed bolts 56 engaged with the spokes, loosening of which will allow relative movement of the rails under action of the adjusting device, after which the bolts may be again tightened and the rails firmly secured in place. It will be seen that while such adjustment of the rails changes slightly, the cam formation of the rails, the variations are in opposite directions so that a mean line between the two is the same before and after adjustment. The advantage of the use of such an adjusting means will be obvious. By its use the opposite rails may be caused to almost, if not quite, engage opposite sides of the rollers of the carriage when passing the points of change, so that a minimum or no play will be allowed. It will be understood that if suitably tempered steel is used for the rails 30<sup>a</sup>, the amount of adjustment necessitated by wear will be very slight, especially with efficient antifriction roller mounting.

What is claimed:

1. In a device of the class described a support, spaced vertical guide ways thereon, a driven gear member revolvable therebetween, cam tracks on each side of the gear each comprising two continuous approximately parallel flexible rails secured thereupon, reciprocable members carried by the guide ways, a wiper device carried thereby and disposed between the rails and adapted to be engaged alternately thereby for reciprocation of the reciprocable members, portions of the rails at the point of change of engagement of the wiper device from one rail to the other being movable relatively, and means for moving the said portions in opposite directions toward each other, for the purpose described.

2. In a device of the class described, the combination of a driven revolvable member, cam devices thereon comprising approximately parallel rails, a reciprocating member, a rocking arm carried pivotally by the reciprocating member, bolts at each end thereof disposed between the rails, roller cylinders revolvable on the bolts, roller bearings between the bolts and cylinders, and heads on the bolts projecting over the roller bearings and partly over the cylinders for retention of each.

3. In a pump mechanism, a driven revolvable body, a plurality of brackets thereon, approximately parallel cam rails carried respectively by respective sets of

brackets, certain brackets being adjustable, transversely of the rails a yoke having spaced arms engaged outwardly of respective rails, and a bolt in threaded engagement through one arm to impinge against one rail for flexure and relative inward movement of the rails, whereby a continuous cam track is provided for the reception of a wiper to be reciprocated, and the rails may be adjusted to prevent a knock at the limits

of reciprocation, without change of the mean direction of the track.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

HENRY W. LUPTON.

Witnesses:

H. C. ROBB,

CHARLES H. WAGNER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."