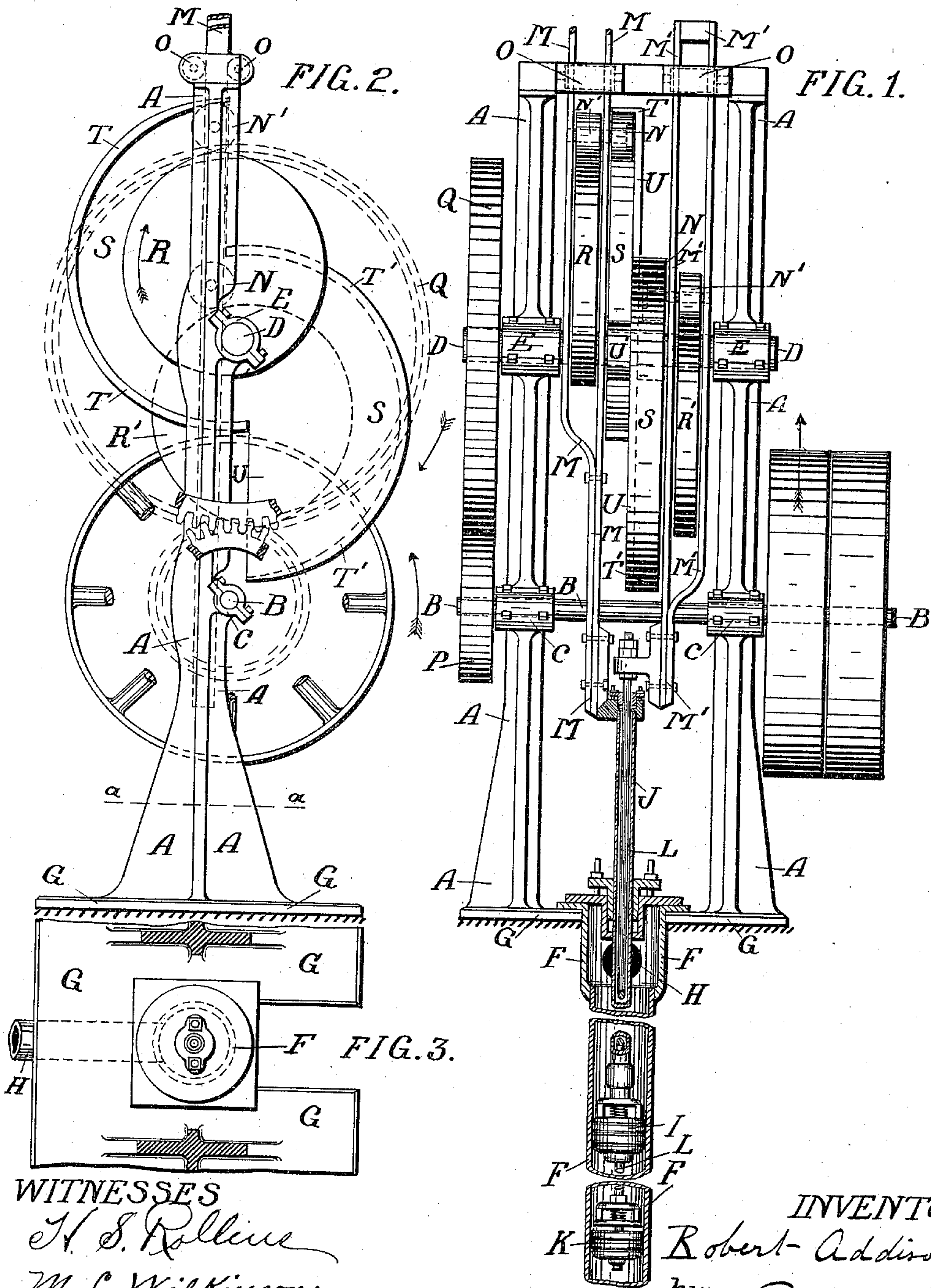


(No Model.)

R. ADDISON.
PUMP FOR RAISING AND FORCING LIQUIDS.
No. 598,466. Patented Feb. 1, 1898.



WITNESSES

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PUMP FOR RAISING AND FORCING LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 598,466, dated February 1, 1898.

Application filed March 1, 1897. Serial No. 625,685. (No model.)

To all whom it may concern:

Be it known that I, ROBERT ADDISON, of Pasadena, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Pumps for Raising and Forcing Liquids, of which the following is a full, clear, and exact description or specification, reference being had to the accompanying sheet of drawings and to the letters marked thereon.

My invention, which relates to certain new and useful improvements in pumps for raising and forcing liquids, has reference more especially to the gearing or mechanism for raising and lowering the pump rods and buckets of that class of pumps whereby a continuous flow of the liquid raised is produced by two plungers or buckets operating in the same pump-barrel, the upper plunger or bucket being attached to a tubular pump-rod, and the lower pump-bucket being attached to a pump-rod of less diameter operating within the tubular pump-rod of the upper bucket or plunger, the buckets or plungers in the pump-barrel being arranged at such distances apart that their relative motions do not interfere one with the other, and by the upward or lifting stroke of either commencing before the conclusion of the upward or lifting stroke of the other bucket, producing a constant discharge of the water or other liquid being raised.

In gearing for driving pumps of this class as hitherto constructed it has been usual to actuate the same by means of a driving-shaft carrying spur-pinions gearing into elliptical or variable-motion spur-wheels, each carried upon a separate counter-shaft, each such counter-shaft being connected by a pitman with one of the pump-rods, said pump-rods being provided with cross-heads and slides or guides for maintaining them in parallel movement.

The object of my present improvements is to very considerably simplify the gearing or mechanism for driving pumps of the class hereinbefore mentioned, and my main object has been to dispense with the counter-shafts and the duplex elliptical spur driving-gear. This object, according to my present invention, I accomplish by actuating the pump-

rods by means of specially-constructed cams which are carried upon the same shaft as the spur-wheel, by which it is driven through the gearing thereinto of a toothed pinion carried upon a shaft driven by a belt operating upon driving-pulleys.

My specially-constructed cams are so arranged as to give a positive upward lift to each pump-rod during the lifting or pumping stroke and an equally positive downward movement to each pump-rod during its descending stroke, and with this object in view I attach to each pump-rod a guide having two antifriction-rollers, each carried upon a stud, one of which is urged upward by that cam which causes the lifting stroke and the other of which is urged downward by the cam which causes the descending stroke. These guides pass between antifriction-rollers in the upper part of the framing which carries the mechanism, so that the use of slide-rods with cross-heads operating thereon is dispensed with.

On the annexed sheet of drawings, Figure 1 is a front elevation of my improved gearing or mechanism for driving the pistons or buckets of a duplex piston-pump such as is adapted for being placed at any desired depth within a well and having pump-rods of any corresponding length. The lower part of the figure shows the double-piston pump in section and the tubular casing and pump-rods broken through. Fig. 2 is a side elevation corresponding to Fig. 1. Fig. 3 is a horizontal section on the line *a a*, Fig. 2, showing the head of the pump in plan.

In the figures the main framing in which the mechanism or gearing is carried is marked A, which is fastened down to or cast in one piece with a bed-plate and bolted or otherwise fixed to a suitable foundation. In the lower part of the framing A the driving-shaft B is carried in bearings C, and the upper or cam-shaft D is carried in similar bearings E on the framing A, as shown. The pump F is carried in the base-plate G and bolted thereto, as shown more particularly in Figs. 1 and 3. The outer tubular pump-rod carrying the upper bucket I is marked J in Fig. 1, and the inner pump-rod carrying the lower bucket K is marked L in Fig. 1. The buckets are provided with valves and springs for closing the

same, as shown at Fig. 1, which being of the usual construction and constituting no part of my present invention need not be here further referred to. To the upper part of the tubular pump-rod J, operating the upper bucket I, there is attached, as shown, the guide-piece M, which is formed of two parallel bars upon which are carried the antifriction-rollers N and N' on the said axial line, these guides operating between the antifriction-rollers O. (Shown in dotted lines in Figs. 1 and 2.) The upper end of the inner pump-rod L passes through a stuffing-box in the upper end of the outer tubular pump-rod J, as seen in Fig. 1, and to the outer or upper end of this pump-rod L there is attached another parallel guide M', corresponding to the guide M, attached to the tubular rod of the upper pump-bucket. This guide M' also operates between antifriction-rollers O in the upper end of the framing, and it carries two antifriction-rollers N² and N³, corresponding to the two antifriction-rollers N and N', carried in the guide M, attached to the tubular piston-rod of the upper bucket of the pump. Upon the cam-shaft D, which is driven by a pinion P on the driving-shaft B, gearing into the large spur-wheel Q, carried upon the cam-shaft D, there are also carried two cams R and R'. These cams R and R' are situated on the shaft D so that they operate between the upper parts of the two guides M and M'. In operating therein their curved surfaces bear upon the upper antifriction-rollers N', so that in the act of rotating in the direction of the arrows shown in Figs. 1 and 2 these cams R and R' bearing against the upper antifriction-rollers N' thereby produce the upward or pumping lift of each of the plungers I and K. Between the two cams R and R' there is situated a double cam S, which is shaped, as shown in the figures, to have two projecting lips T and T', whose contour is shown at Fig. 2. These lips T and T', as shown more particularly in Fig. 1, each project from opposite sides of a plate or diaphragm U, which is carried by a boss U' between the cams R and R' upon the shaft D. The object of the cam-lips T and T' is to engage with the other antifriction-rollers N, carried upon the outer side of the upper parts of the guides M and M', facing each other, so that at the moment when the positive lifting strokes produced by the cams R and R' are completed a positive descending stroke is produced by means of the lips T and T' engaging with the other antifriction-roller N. By means of this mechanism the constant relation and varia-

tion of distances or positions between the pump buckets or plungers I and K is maintained at all times, so that before the termination of the pumping stroke of either bucket or plunger the pumping stroke of the other bucket or plunger is commenced, resulting in the production of a continuous discharge of the water or other liquid being pumped.

Having now described the nature of my said invention and the best system, mode, or manner I am at present acquainted with for carrying the same into practical effect, I desire to observe, in conclusion, that it is not absolutely essential that the cams R and R' and the double cam S, with the lips T and T', should be formed in three separate castings, as they may be formed in one casting as grooved curves, the antifriction-rollers N' and N³ operating in a cam-groove on each face of the casting. The construction of the said cams in separate pieces, as shown and described, is, however, more convenient and therefore preferable.

What I consider to be novel and original and therefore claim as the invention to be secured to me by Letters Patent is as follows:

The gearing for operating duplex bucket or plunger pumps consisting of the combination of the duplex parallel guides for actuating the pump rods and buckets, the antifriction-rollers carried by each pair of such guides and between said guides, against each of which the lifting-cams respectively operate, the lifting-cams operating between said parallel guides, the antifriction-roller coaxial with the aforesaid antifriction-rollers and situated on the outside of the parallel guides against which the lips of the cams for producing the positive descending strokes of the pump operate, these last-named cams being situated on the cam-shaft between the lifting-cams having their respective lips projecting on opposite sides so that each lip engages with the antifriction-roller carried on the outside of the parallel guides, all operating so as to produce continuous, positive motion of the pump rods and buckets throughout their upward and downward strokes, substantially as set forth.

In testimony whereof I have hereunto set my hand and seal, in the presence of two subscribing witnesses, this 25th day of January, A. D. 1897.

ROBERT ADDISON. [L. S.]

Witnesses:

SAMUEL W. LUITWEILER,
ST. JOHN DAY.