

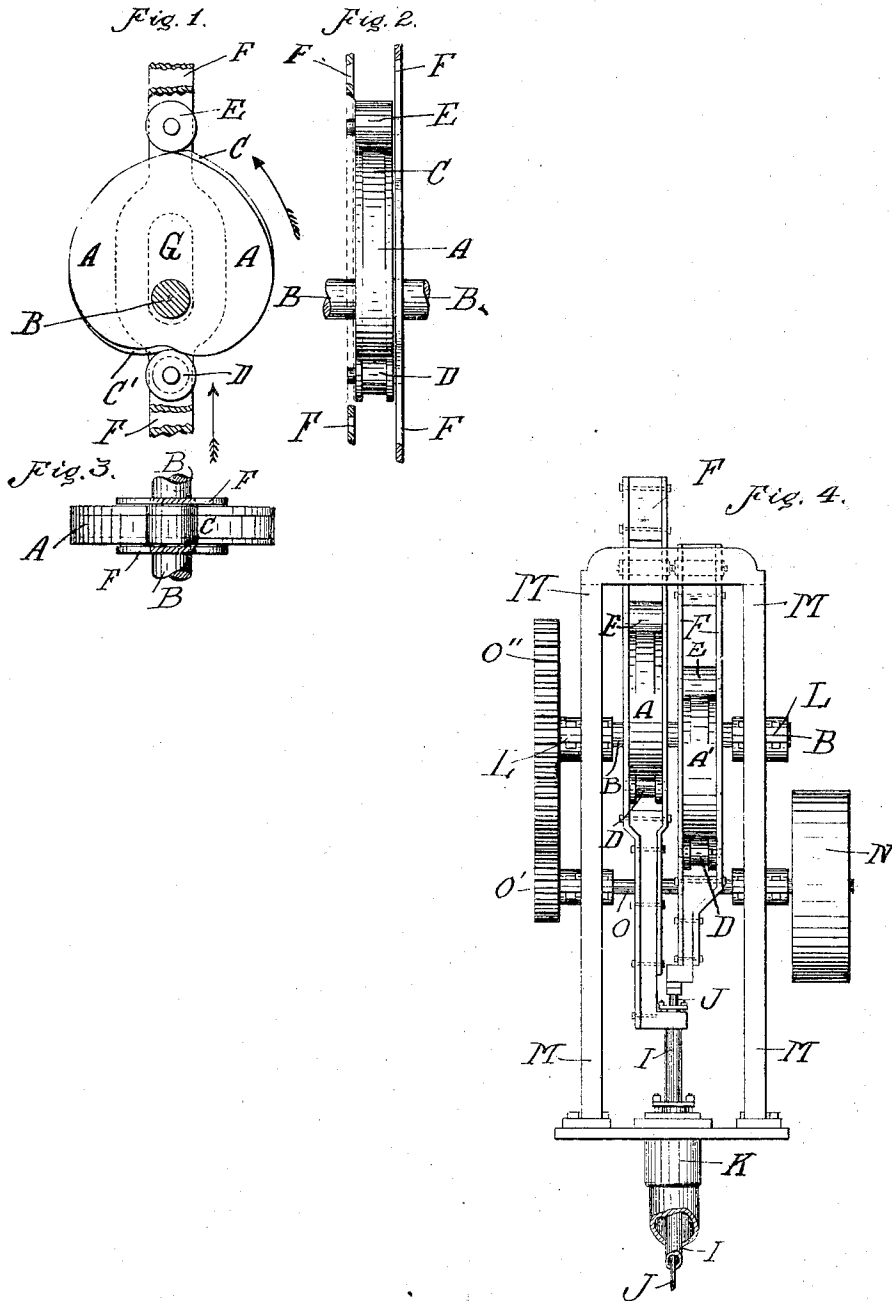
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Patented July 18, 1899.

S. W. LUITWIELER & M. L. WILKINSON.
MECHANISM FOR PRODUCING RECIPROCATING MOTION.

Application filed May 16, 1898.

No Model.



WITNESSES.

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MECHANISM FOR PRODUCING RECIPROCATING MOTION.

SPECIFICATION forming part of Letters Patent No. 629,039, dated July 18, 1899.

Application filed May 16, 1898. Serial No. 680,890. (No model.)

To all whom it may concern:

Be it known that we, SAMUEL W. LUITWIELER and MELVILLE LINCOLN WILKINSON, citizens of the United States, and residents of the city of Los Angeles, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Mechanism for Producing Reciprocating Motion, of which the following is a full, clear, and exact description, reference being had to the annexed sheet of drawings and to the letters marked thereon.

Our said invention, which relates to certain new and useful improvements in mechanism for producing reciprocating motion, has for its object to obtain a variable reciprocating motion by means of a revolving compound cam having two contours operating upon antifriction-rollers carried upon studs in the rod or bar to be reciprocated.

The nature of the variability of the reciprocating motion which it is the object of this invention to obtain is that of producing a quicker rate or stroke of movement in one direction than that which is performed in the opposite direction, and our improvements are applicable to various kinds of machinery wherein such variable reciprocating motion is used—such, for example, as in certain kinds of pumps, where the return or non-pumping stroke of a bucket or plunger is made more quickly than the acting or pumping stroke thereof—or in some classes of shaping or planing mechanism wherein the return or non-cutting stroke is made more quickly than the outward or cutting stroke. To obtain this variability of motion, we use a compound revolving cam of a more or less heart-shaped type. This cam under our present improvements is constructed with two driving-surfaces, one of which deviates from the true heart shape of the other by swelling outward to any required degree and at opposite points of the cam. The degree of this swelling of the one cam-surface at opposite points from the more or less true heart-shaped surface of the other is varied according to the difference to be maintained in the time occupied by the driving or acting stroke and the re-

turn stroke. The swelling portions of the cam are those which produce the driving or positive stroke, and a portion of the heart-shaped surface of the compound cam is that which regulates the duration of or time occupied in making the return or negative stroke. When the cam operates upon two antifriction-rollers carried by the reciprocating rod or bar, that portion of the cam which produces the driving or positive stroke operates upon the upper antifriction-roller, which is cylindrical, and the lower antifriction-roller has a recess formed in it through which the swelling-out portions of the cam pass during the descending or negative stroke—that is to say, while the upper antifriction-roller bears against that portion of the true heart-shaped segment of the cam. From this it will be seen that the projecting or swelling-out portions of the cam operate only upon the upper antifriction-rollers, the lower antifriction-roller being made with a sufficient recess therein to admit of the projecting or swelling portions of the cam passing there-through without jamming or impediment. For the purpose of steadying the reciprocating bar or guide-rod to which the antifriction-rollers are attached that portion of the said bar or rod situated between the antifriction-rollers is or may be formed with an oblong opening or slot, through which the cam-shaft passes, and the cam-shaft may thus act as a stay and guide to the reciprocating bar or rod.

On the annexed drawings, Figure 1 is a front elevation of a revolving heart-cam constructed with our improvements applied to operate a reciprocating bar or rod with the antifriction-rollers carried thereon. Fig. 2 is an end elevation corresponding to Fig. 1. Fig. 3 is a plan corresponding to Figs. 1 and 2. Fig. 4 is a front elevation of a double set of our new or improved variable reciprocating mechanism shown as applied to driving a double-plunger pump.

In Figs. 1, 2, and 3 the heart-cam is marked A, and it is keyed or otherwise suitably attached to the revolving cam-shaft B, carried in bearings, which are not shown in the drawings. The heart-cam A has formed upon it

two opposite projecting midway portions C and C', which are raised from the periphery of the cam, and the lower antifriction-roller D is formed with a portion of less diameter than the other portions thereof, so that the projecting portions C and C' of the cam A may pass freely through the cut-away portion of the lower antifriction-roller D, while the opposite projecting portion C or C' operates upon the upper antifriction-roller E. By means of the construction of the heart-cam A with these projecting portions C and C', as shown in the drawings, the upper portion C or C' produces a positive motion upon the reciprocating rod F without the lower projecting portion interfering therewith. Therefore by reason of the combination of the two sets of curves in one and the same heart-cam a difference of speed for the opposite strokes of the reciprocating bar F is thus obtained, whereby the return stroke of the reciprocating bar is performed in less time than the acting or positive stroke, the variation in time between the two strokes corresponding to the difference in form of the variably-curved portions of the heart-cams driving-surfaces.

The reciprocating rod or bar F is by preference constructed double, as shown in the drawings, so that the heart-cam A may be operated between the two bars F F, but this is not essential. The bars F F are formed with the slot G, Fig. 1, through which the cam-shaft passes and steadies the reciprocating bars F F, as hereinbefore described.

In Fig. 4 two cams A A' are shown mounted upon the same cam-shaft B, and they each operate upon antifriction-rollers D and E, constructed as hereinbefore described with reference to Figs. 1, 2, and 3 and carried on or by studs in the reciprocating rods F. One of the reciprocating rods F is coupled to the tubular rod I of the upper piston of a double-plunger pump and the other reciprocating rod or bar F is coupled to the rod J of the lower bucket or plunger of a double-plunger pump, the upper portion of the barrel of which is shown in Fig. 4 and marked K. In

Fig. 4 the cam-shaft B is carried in bearings L in the framing M and is driven by an endless belt operating the driving-pulley N on the counter-shaft O, and thence through the spur-gearing O' O'', or the driving-pulley N may be placed directly upon the cam-shaft B.

It is to be understood that when using our improved mechanism in cases where gravity is free to act, so as to allow the return stroke of the reciprocating bar or rod to be made by its own weight plus the weight of the parts attached to it, then the lower antifriction-roller on the reciprocating bar may be dispensed with, and the variations in speed are produced by the alternate action of the two variable cam-surfaces of the heart-shaped cam upon the upper antifriction-roller.

Having now described the nature of our said invention and the best system, mode, or manner we are at present acquainted with for carrying the same into practical effect, we desire to observe, in conclusion, that what we consider to be novel and original, and therefore claim as the invention to be secured to us by Letters Patent, is as follows:

The combination with a shaft, and a heart-shaped cam mounted thereon, said cam being provided at certain points on its periphery with raised or projecting portions which extend only along the central line thereof; of a reciprocating rod, antifriction-rollers journaled to the rod above and below the cam, the diameter of one of said rollers being reduced at a point near its center for the reception of the projecting portions on the periphery of the cam to prevent the same from operating on the roller, substantially as and for the purpose set forth.

In testimony whereof we have hereunto set our hands and seals, this 25th day of February, 1898, in the presence of two subscribing witnesses.

SAMUEL W. LUITWIELER. [L. S.]

MELVILLE LINCOLN WILKINSON. [L. S.]

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