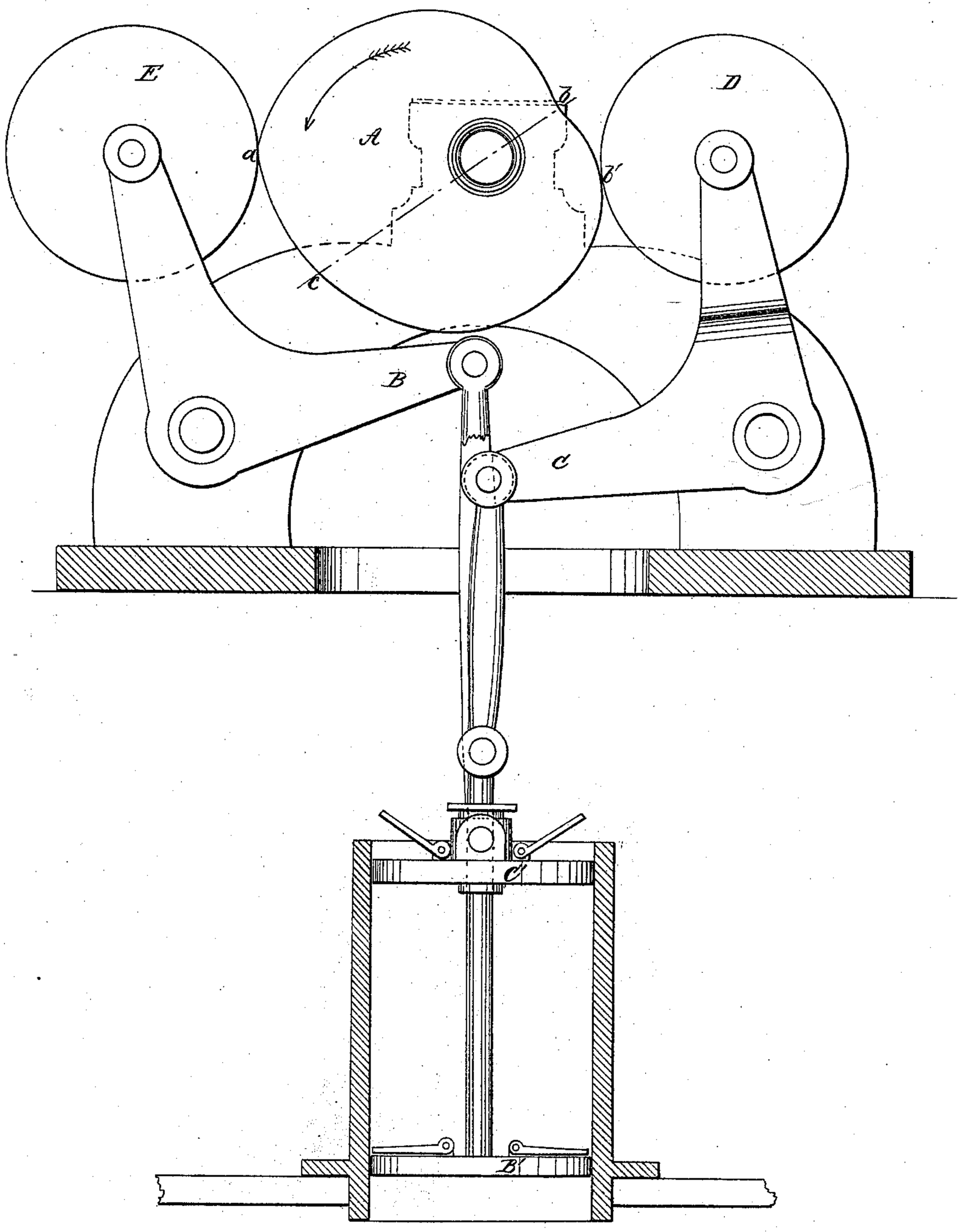
W. Wright,

Pump Lift,

No. 17,009. Patented Apr. 7, 1857.



UNITED STATES PATENT OFFICE.

WILLIAM WRIGHT, OF HARTFORD, CONNECTICUT.

METHOD OF WORKING PUMPS.

Specification of Letters Patent No. 17,009, dated April 7, 1857.

To all whom it may concern:

Be it known that I, WILLIAM WRIGHT, of Hartford, county of Hartford, and State of Connecticut, have invented certain new and useful Improvements in Working Pumps; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being made to the annexed drawing, making a part of this specification—that is to say:

My invention consists of an improved arrangement of mechanism for working the pump known as the "double-bucket pump."

The object is by means of the use of cams to produce the highest effect from a given expenditure of power.

The double-bucket-pump is an old contrivance for obtaining double action in an open top pump, that is to say, to throw water by both the up and down stroke of the handle. This is accomplished by giving play to the foot valve as well as to the sucker. In a late improvement for which Letters Patent were granted to Root and Dickerson dated Feb. 5th, 1856, an arrangement of cams is exhibited whereby the water is made to flow continuously. In said patent the mechanical devices described are not practically operative for producing the result claimed to be accomplished. Two methods are therein set forth—the one effecting the movement of the pump buckets by means of narrow cam grooves cut in the opposite sides of a driving pulley. The power being transmitted through a pin projecting from the head of each piston rod and entering the cam grooves, said projecting end playing upon a small roller to reduce friction. Such arrangement it will be seen must be weak, inefficient, and liable to rapid wear. The second consists of two separate cams placed a short distance apart upon the same shaft, each cam working one of the buckets, and although the action is from the edge of these cams yet the arrangement is one of weakness both from the lateral pressure upon the links which embrace the sides of the cam and hold the friction roller, as well as from the fact that the piston being set to one side of each cam must be lifted against the angular side thrust consequent upon that position. And herein the friction and wear must be very great in addition to the want of strength and stability of the parts. My improvement consists in an arrangement whereby a single cam is made to operate both pump-buckets by means of a combination of two bell-cranks with said cam on the one hand, and the pump pistons on the other, whereby the periphery of the cam is applied to move the bell-cranks through the intervention of large friction wheels. By this arrangement the friction is reduced to a minimum, while in consequence of the directness with which the power is applied the greatest effect is obtained together with the greatest strength and stability of parts.

The operating cam is shown at A in the figure, keyed to the engine-shaft. On each side at a proper distance behind are two strong bell-cranks B and C. The ends of the lower arms of these stand centrally over the pump barrel, and to them are attached the buckets, the upper bucket to B and the lower one to C, as shown. Upon the upper arms of each is a large friction roller the edges of which play against the cam A, as shown, being upon opposite sides and the points of contact being in or nearly in the horizontal plane of the axis of the cam. If this cam were a true eccentric the action of the buckets would be the same as when the rack and pinion is applied to the double bucket pump, that is to say, the reciprocations would be alike, each bucket beginning and terminating its stroke at the same time. But that would involve loss of power inasmuch as the momentum would be lost at each vibration. I therefore prolong the curve on one side of the cam so as to extend beyond the semi-circumference, or from (*a*) to (*b*), following the direction of the arrow on A. The result of this will be that one bucket will always have finished its stroke and commenced its return stroke before the other bucket shall have finished its stroke in the same direction, or in other words, one bucket will always overtake the other and hence there will be a continuous lifting action maintained upon the water, as will be more clearly understood by the following explanation of the operation of my improvement.

Suppose the point (*c*) were in contact with the friction roller at the position of (*a*), then would the point (*b*) stand against roller D at (*b'*). The pump bucket attached to the arm C would have finished its downward stroke and be just ready to commence its upward one. The bucket attached to B would be still ascending and would continue

to do so over the space (*c a*); meantime the roller D has begun to ascend the major curve (*b c a*) of the cam, and the bucket C′ is thus in full lifting action before B′ arrives at the end of its stroke, and thus the column of water is maintained in an uninterrupted flow. To some extent these conditions would be obtained by a regular eccentric if its shaft were placed either above or below the plane of the axes of the rollers D and E, but this would be only an approximation toward the perfection of the arrangement I have described.

I do not claim as the equivalent of my invention the use of two spiral cams operating directly upon the heads of the piston rods in the manner shown in the aforesaid patent of Root and Dickerson, but inasmuch as that arrangement on a large scale is mechanically inoperative, and therefore useless, I do claim to have devised the method therein referred to as in use at the Hartford water works; that is to say,

I claim as of my invention—

The herein described arrangement for working a double-bucket-pump, consisting of a cam placed centrally over said pump and combined with the buckets thereof by two bell cranks so situated that one arm of each of said cranks bears at the same time upon opposite or nearly opposite points of the edge of the cam, whereby the necessary strength and stability may be given to the several parts while preserving the regular throw of the buckets, the whole being arranged and operating substantially in the manner set forth herein.

WM. WRIGHT.

Witnesses:
J. P. PIRSSON,
S. H. MAYNARD.