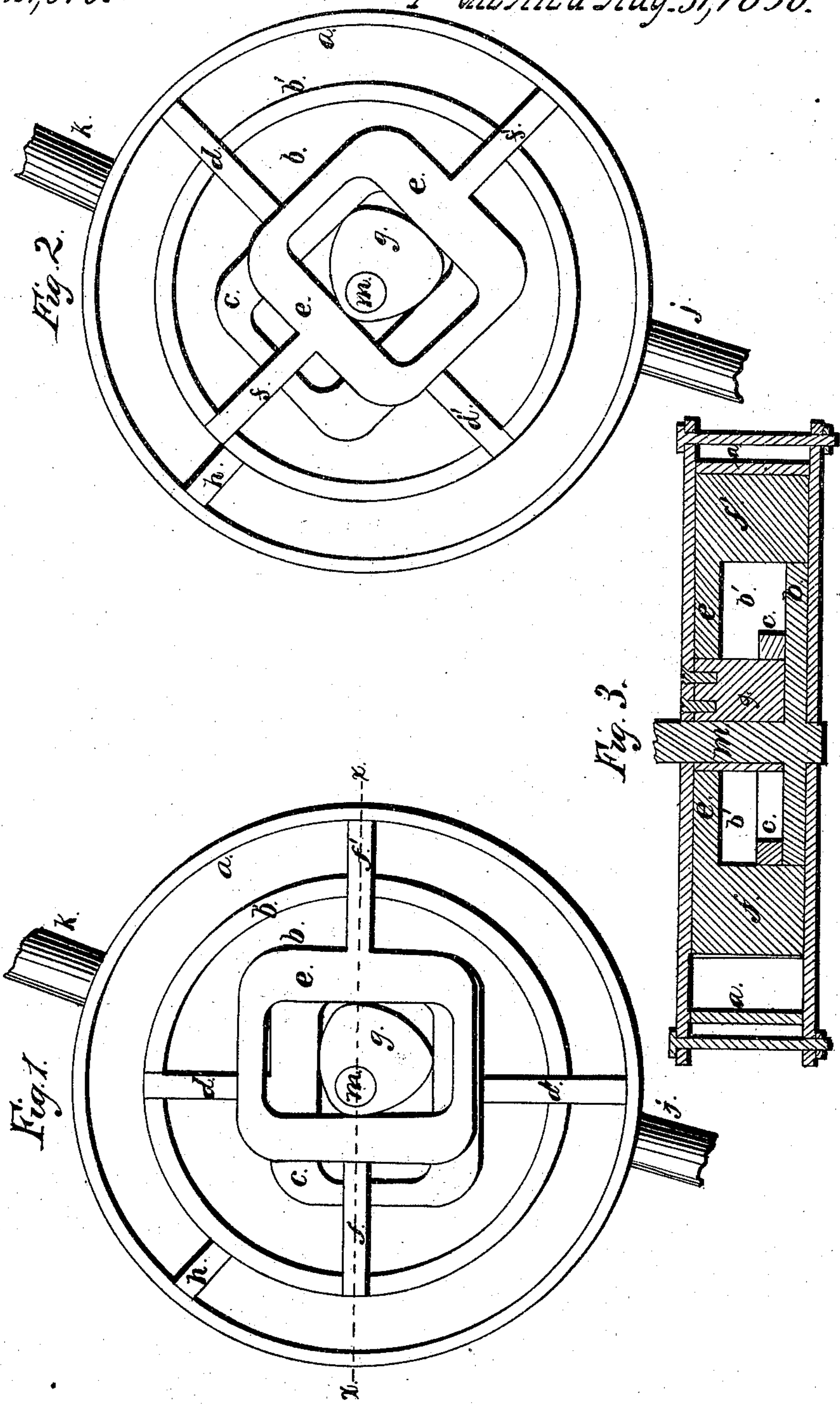


*L. Burnell,*

*Rotary Pump.*

*N<sup>o</sup> 2,318.*

*Patented Aug. 31, 1858.*





# UNITED STATES PATENT OFFICE.

LEVI BURNELL, OF MILWAUKEE, WISCONSIN.

## ROTARY PUMP.

Specification of Letters Patent No. 21,318, dated August 31, 1858.

*To all whom it may concern:*

Be it known that I, LEVI BURNELL, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a new and Improved Rotary Pump; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making a part of this specification.

Figures 1 and 2 of the said drawings represent the form and arrangement of the individual portions of my improved rotary pumping engine as they present themselves when one of the heads of the outer casing thereof is removed, and Fig. 3 is a section of said pump in the line  $x, x$ , of Fig. 3.

The annular portion  $a$ , of the casing of the pump may be cast in one piece with one of the heads of the same, and the opposite head of said casing may be secured to the cylindrical portion thereof in any suitable manner.

A cup-shaped rotary cam-box  $b, b'$ , is placed within the pump casing and is rigidly secured to the driving shaft  $m$ , which works in central apertures in the heads of said casing. The cylindrical portion  $b'$ , of the said cam-box is of such a length and diameter as to form the inner periphery of the annular piston-way of the pump.

A stationary head  $h$ , is placed in the piston-way of the pump and is secured therein in such a manner as to form, with suitable packings, a water-tight partition between the induction pipe  $j$ , and the education pipe  $k$ , of said pump.

A cam  $g$ , which has three equal sides, is bolted to one of the heads of the pump-casing and passes into the open mouth of the cam-box  $b, b'$ . An aperture near one of the rounded projections of the cam  $g$ , loosely receives the shaft  $m$ , and allows it to work therein without friction.

Slots are formed in the periphery  $b'$ , of the cam-box for the four sliding pistons  $d, d'$  and  $f, f'$ , to work in. The sliding pistons  $d, d'$ , radiate from opposite sides of the cam-yoke  $c$ , and the pistons  $f, f'$ , radiate from opposite sides of the cam-yoke  $e$ , in directions at right-angles to the line of movement of the aforesaid pistons  $d, d'$ .

The oblong aperture in each of the cam-yokes  $c, e$ , exactly correspond with each other in size and shape, and the size and shape of the said cam-yoke apertures bear such a relation to the size and shape of the cam  $g$ , which is embraced thereby, that opposite

sides of the said cam will at all times be in contact with opposite sides of the interior faces of the said cam-yokes as they are made to rotate around the axis of the cam-box by imparting a rotary movement to the shaft  $m$ , which is rigidly connected to the said cam-box; and consequently, the revolutions of the cam-box  $b, b'$ , will cause the stationary cam  $g$ , to impart to the pairs of pistons  $d, d'$ , and  $f, f'$ , a series of smooth and steady reciprocating sliding movements, through the slots in the periphery of the cam-box, into and out of the piston-way of the pump.

By inspecting Fig. 1 of the drawings, it will be perceived that the piston  $f'$ , does not commence to recede into the cam-box until after the piston  $d'$ , which immediately succeeds it, has been thrust out to its extreme actuating position to take the place of the said piston  $f'$ , in carrying forward the body of water in the piston-way; and also, that the piston  $d'$ , does not commence to recede back into the cam-box until after the piston  $f$ , has been thrust forward into its actuating position, and so on with the other pistons. It will therefore be perceived, that as neither of the pistons of my improved pump is allowed to perform any propelling duty during its outwardly or inwardly gliding movements, there will be no lateral or grinding friction exerted upon them during said movements, and consequently, there will be a considerable saving of power in operating my improved pump, and the durability of its operating parts will be correspondingly increased.

It may perhaps be expedient to use the within described rotating machine as a steam engine, a water-wheel or a meter, and therefore I do not intend to restrict myself to the use of said machine as a pump merely.

Having thus fully described my improved rotary engine for pumping and other purposes, what I claim therein as my invention and desire to secure by Letters Patent, is—

Operating the double sets of radially sliding pistons  $d, d'$ , and  $f, f'$ , in directions at right angles to each other by means of the three-sided stationary cam  $g$ , the rotating cam-box  $b, b'$ , and the cam-yokes  $c, e$ , arranged and operating with each other in the manner herein set forth.

LEVI BURNELL.

Witnesses:

Z. C. ROBBINS,  
J. Q. ADAMS.