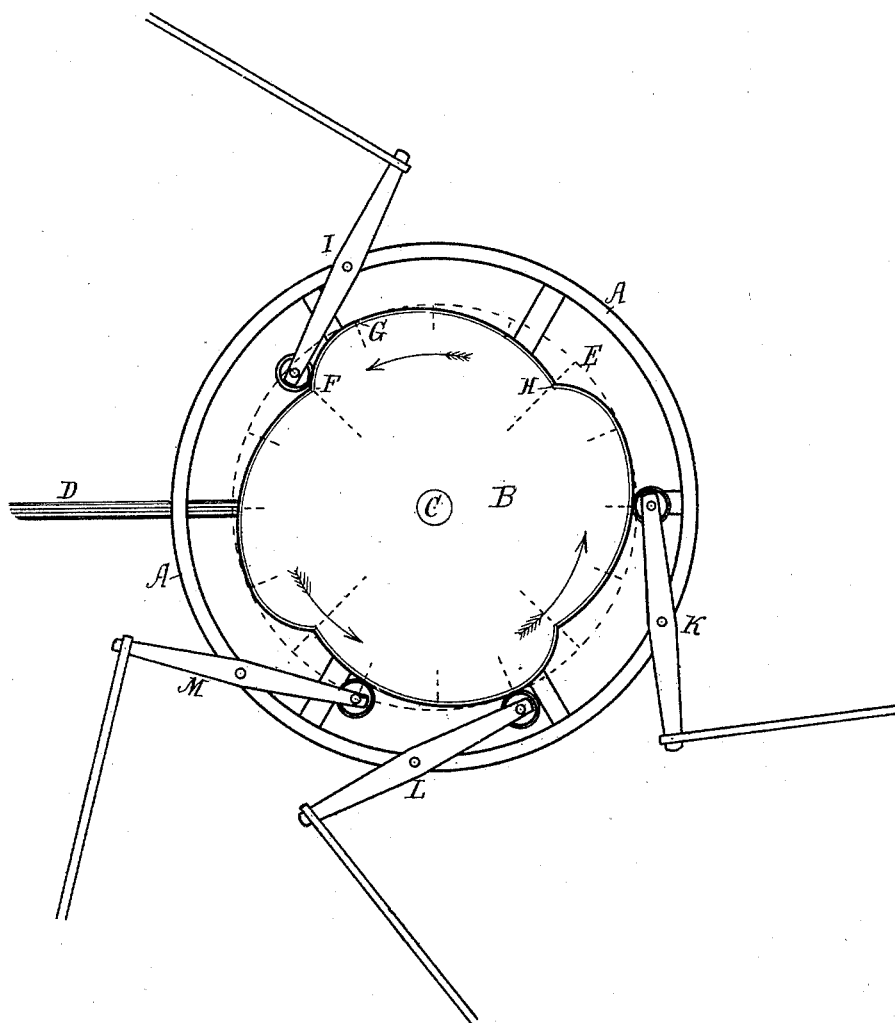


(No Model.)

H. S. EDWARDS.
MACHINERY FOR PUMPING OIL WELLS.

No. 489,073.

Patented Jan. 3, 1893.



WITNESSES:
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HERBERT S. EDWARDS, OF TITUSVILLE, PENNSYLVANIA.

MACHINERY FOR PUMPING OIL-WELLS.

SPECIFICATION forming part of Letters Patent No. 489,073, dated January 3, 1893.

Application filed February 11, 1892. Serial No. 421,084. (No model.)

To all whom it may concern:

Be it known that I, HERBERT S. EDWARDS, a citizen of the United States, residing at Titusville, in the county of Crawford and State of Pennsylvania, have invented a new and useful Improvement in Machinery for Pumping Oil-Wells, of which the following is a specification.

My improvement relates to those devices where the power is placed centrally in a cluster of wells, with connecting rods radiating to the different wells; and consists of the device for imparting motion to the rods; my object being to more fully equalize the strain upon the engine; to lessen the liability of breaking the connecting rods; and to produce a quicker motion in raising the pump rods in each well.

My improvement is illustrated in the accompanying drawing which is a plan of the central power, and a short section of the connecting rods leading to the wells. The drawing shows it as used for pumping four wells; this number may be increased or diminished as hereinafter explained.

A. is the outer rim of the frame, and is stationary.

B. is a central cam or disk, revolving on the center pin C. Power may be communicated to this cam in any ordinary manner, as a pinion on the shaft D. meshing in a circular rack on the under side of the plate, (pinion and rack not shown.) The direction of revolution of the cam is shown by the arrows. The cam is of irregular form as shown in the drawing, where the dotted line E. indicates the circumference of a circle touching the extreme outer points of the cam. As here shown and described the circle is divided into quadrants, each quadrant being sub-divided into four equal parts, as shown by the dotted lines. Each quadrant is so constructed that the throw is one fourth of the quadrant, and the retiring surface three fourths, or the outward force is given during one-sixteenth of an entire revolution of the cam, and the retiring the following three-sixteenths; thus giving the outward thrust in one third the time that is allowed for the return. The four quadrants are constructed alike. Pivoted on the outer frame A. are the levers I. K. L. M. of such length that in an inclined position, the inner end will

bear against the cam B. these inner ends being provided with antifriction rollers, as shown. These levers must also be so placed on the frame that the inner ends shall bear against the cam-lobes, one at each one fourth point of subdivision of the quadrant, or at the corresponding point of one of the other quadrants. To the outer end of each lever is attached a connecting rod, leading each to a well.

It is understood that all the force required in pumping is in the lifting of the column of fluid in the well: the weight of the fluid producing the return motion, drawing the connecting rods back. By an examination of the drawing it will be seen that as the cam B. revolves, the inner end of each lever is in rotation forced out, and of course the outer end withdrawn, pulling on the connecting rod and raising the fluid in the well with which it is connected. After passing the projecting point on the cam, the cam recedes, and the weight of fluid pulls the rods back, holding the end of the lever against the cam, until it strikes the next projection. It will also be seen that but one well is being lifted at a time, the outward thrust being one fourth, while the retiring surface is three fourths. In the drawing, the inner end of the lever I. is at one of the points of lowest depression; the lever I. being at the highest point, and K. and M. on the retiring surface. As the cam revolves, the lever I. is thrust outward, all the others receding until the point G is reached, when the thrust on I. ceases, and commences in turn on the lever M; and so with each in succession; there being four full strokes to each pump at each entire revolution of the cam. It will be seen therefore that there is force exerted on one, and only one lever at a time, therefore the strain on the motive power is uniform. Also, that the thrust being in one fourth the space of the return motion, the upward lift at the well is quick, which produces the best result.

In other devices for pumping, the ends of the rods are attached to the motive power, and must move backward and forward with it. Consequently when the return motion at the well is not as quick as the machinery, the power presses the connecting rods back, causing them to "buckle," and oftentimes to break.

In this device the rods are not forced back at all, but if the return motion is not sufficiently quick, the end of the lever is held away from the cam for a time. In this drawing and description I have shown my device as applied to pump four wells. It is evident that this same cam can be used to pump eight, twelve, or sixteen, by connecting two, three, or four to each quadrant. Also by varying the comparative length of the thrust with the retiring surface by changing the form of each lobe three or five wells can be applied to each quadrant, and three or five be the multiple of wells connected. Also the cam may be so constructed as to have one, two, three or more thrusts at each revolution; the vital point being that, if possible an equal number of wells shall be lifting at any one time, and that the lift shall be more rapid than the return.

I make no claim for the broad idea of locating the power in the field, and leading con-

necting rods to the several wells, as that is old.

What I do claim as my invention is:

As a device for pumping oil wells; a frame set in the field; a horizontally revolving multi-lobed cam, actuated by any power, in the center of the frame; a series of levers pivoted on the exterior frame and swinging horizontally, the inner ends of the levers bearing against the operating portions of the cam progressively; and with the outer end of each lever attached to a rod leading horizontally, or approximately parallel with the surface of the ground, and adapted to be connected with the pumping mechanism of a well; all working in combination, substantially as shown and described.

HERBERT S. EDWARDS.

Witnesses:

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