No. 666,738. Patented Jan. 29, 1901.

D. DE L. CULVER.

MEANS FOR CONVERTING MOTION.

(Application filed Nov. 20, 1899.)

(No Model.)

Fig. 1.

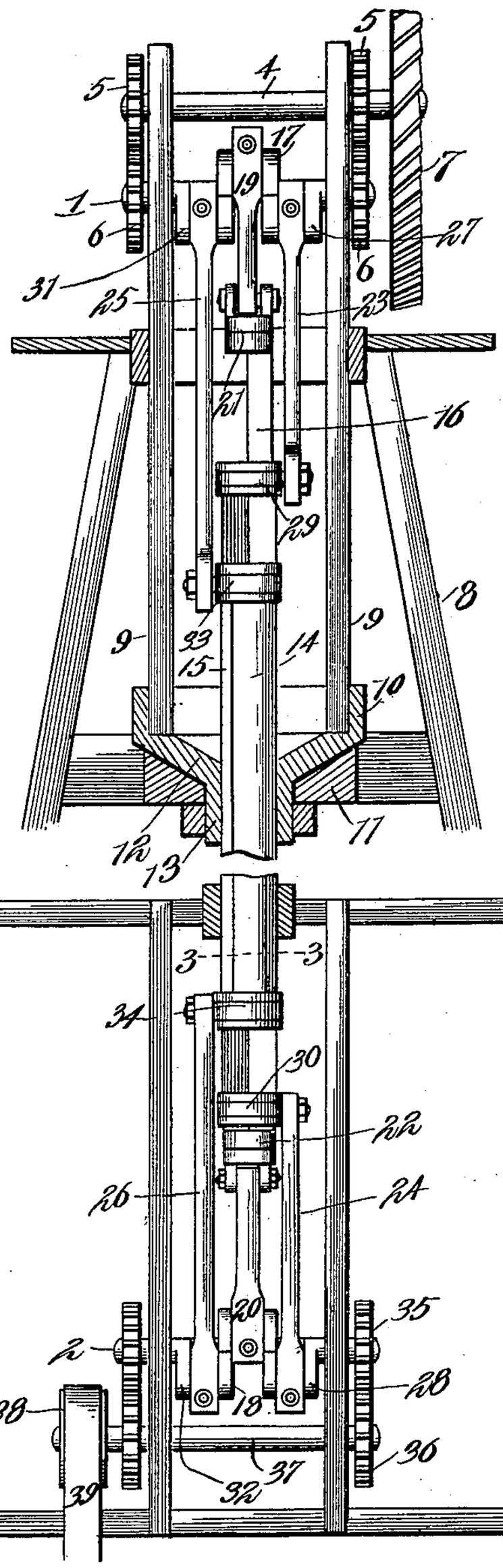


Fig. 2.

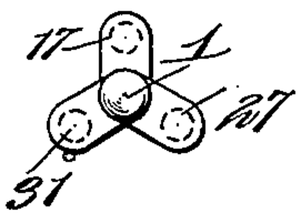
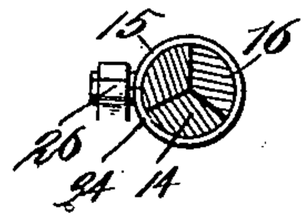


Fig. 3.



Witnesses
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UNITED STATES PATENT OFFICE.

DARWIN DE LOS CULVER, OF AURORA, ILLINOIS.

MEANS FOR CONVERTING MOTION.

SPECIFICATION forming part of Letters Patent No. 666,738, dated January 29, 1901.

Application filed November 20, 1899. Serial No. 737,723. (No model.)

To all whom it may concern:

Be it known that I, DARWIN DE LOS CULVER, a citizen of the United States, and a resident of Aurora, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Means for Converting Motion for Windmills and the Like; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

The invention relates to improvements in means for converting motion for windmills and the like.

The object of the present invention is to improve the means employed for converting motion for windmills and the like and to provide a simple and comparatively inexpensive construction whereby power may be obtained from a windmill or the like without lost motion or power and without any dead-center or interference with the governing of the windmill or its turning with the wind.

The invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims hereto appended.

In the drawings, Figure 1 is an elevation, partly in section, of a portion of a windmill provided with means for converting motion constructed in accordance with this invention. Fig. 2 is an end elevation of one of the crank-shafts. Fig. 3 is a horizontal sectional view on line 3 3 of Fig. 1.

Like numerals of reference designate corresponding parts in all the figures of the drawings.

1 and 2 designate upper and lower crank-shafts, each provided with three cranks arranged at intervals on one-third of a circle, as clearly indicated in Fig. 2 of the accompanying drawings, and the upper crank-shaft 1, which is journaled in suitable bearings of a rotary frame, is connected at its ends with a horizontal wind-wheel shaft 4 by vertically-disposed spur gear-wheels 5 and 6, arranged in pairs at opposite sides of the rotary frame. The spur gear-wheels, which are located at each end of the upper crank-shaft, are firmly keyed to the shafts 1 and 4 and are capable of effectually preventing any torsion of the crank-shaft as the latter is driven from each end. One end of the wind-wheel shaft is extended beyond the rotary frame and receives a suitable wind-wheel 7, and the rotary frame, which is mounted in the upper portion of the tower 8, consists of vertical standards 9, supported by a suitable turn-table 10 and extending upward through a circular opening of the top of the tower to a point above the same. The turn-table 10, which is mounted in a suitable bearing 11, is provided with a tapered central portion 12, and it has a lower reduced portion 13, the bearing conforming to the configuration of the portions 12 and 13 of the table, as clearly shown in Fig. 1.

The cranks of the upper and lower crank-shafts are connected by upper and lower pitmen with three connecting-rods 14, 15, and 16, sector-shaped in cross-section and fitted together and guided on each other, as clearly shown in Fig. 3, the three rods forming a round body, as clearly shown in Fig. 1.

The central cranks 17 and 18 of the upper and lower crank-shafts are connected by upper and lower central pitmen 19 and 20 with the connecting-rod 16, which is provided at its ends with upper and lower swivel connections 21 and 22, each consisting of a head rigid with the connecting-rod, and a rotary member or disk pivotally connected with the head and provided with perforated ears which are pivoted to the adjacent end of the central pitman. By this construction the pitman is permitted to oscillate and a rotary movement is also permitted.

The central pitmen are the shortest, and the side pitmen 23 and 24, which are shorter than the other side pitmen 25 and 26, are connected with the side cranks 27 and 28 and with the ends of the connecting-rod 15 by swivel connections 29 and 30, each consisting of a ring or collar mounted in an annular groove of an enlargement or head of the rod and provided with a horizontal pivot which is received in an opening of the adjacent end of the side pitmen. These joints admit of an oscillation and rotary motion similar to the swivel connections at the ends

of the rod 14. The longer side pitmen 25 and 26 are connected with the adjacent side cranks 31 and 32 and with the ends of the connecting-rod 14 by swivel connections 33 and 34, constructed the same as the swivel connections 29 and 30 and consisting of collars or rings having horizontal pivots. The upper and lower pitmen are similarly constructed and arranged, and the central pitman of the upper crank-shaft has its lower end centrally arranged, and the lower ends of the upper side pitmen are disposed at opposite sides of the center of the connecting-rods and are adapted to swing around the same with the movements of the rotary frame.

The lower crank-shaft, which is suitably journaled in stationary bearings at the base of the tower, is connected at its ends by vertically-disposed spur gear-wheels 35 and 36 with a counter-shaft 37. The counter-shaft 37, which is located beneath the lower crank-shaft, is extended at one end and it receives a pulley 38, on which is arranged a belt 39, by means of which motion may be communicated to any device or machine to be operated.

The connecting-rods, which are sector-shaped in cross-section, are adapted to slide on each other, and by means of the three cranks and pitmen, which are connected with the said rods, there is produced a continuous lifting stroke, for before one crank has reached the top and has ceased to lift another crank has passed the center at the bottom and is lifting. Besides affording a continuous lifting stroke the construction also prevents any dead-center, and it will be apparent that the rotary frame which carries the wind-wheel shaft and the upper crank-shaft is permitted to rotate freely without affecting the connections between the crank-shafts.

What is claimed is—

1. The combination of the upper and lower crank-shafts provided each with central and side cranks, the connecting-rods approximately sector-shaped in cross-section fitting together and arranged to slide on each other, said connecting-rods being of different lengths, the short central pitmen extending from the central cranks to one of the connecting-rods and having a hinged and pivoted connection with the same, the side pitmen of different lengths extending from the side cranks to the ends of the other connecting-rods, and the swivel connections arranged at the ends of the same and provided with collars or bands having laterally-extending oppositely-disposed pivots receiving the side pitmen, substantially as described.

2. The combination of the upper and lower crank-shafts provided with the central and side cranks, the central and side pitmen connected with the cranks and being of different lengths, the connecting-rods sector-shaped in cross-section, fitted together and adapted to slide on each other, the centrally-arranged swivel connections 21 and 22 located at the ends of the longest connecting-rod and connected with the shortest pitman, the swiveled collars or bands mounted on the ends of the other connecting-rods and provided with laterally-extending pivots receiving the other pitmen, the wind-wheel shaft located above the upper crank, the counter-shaft located below the lower crank-shaft, and the spur gear-wheels arranged at each end of the said shafts, substantially as and for the purpose described.

3. The combination of a tower, a rotary frame mounted on the upper portion of the tower, the lower crank-shaft journaled in suitable bearings at the base of the tower, the upper crank-shaft mounted on the rotary frame, said crank-shafts being provided with central and side cranks, the sector-shaped connecting-rods fitted together and arranged to slide on each other, and being of different lengths, and the central and side pitmen of different lengths connected with the cranks and having a swivel and hinge connection with the rods, a wind-wheel shaft mounted on the rotary frame, and gearing connecting the wind-wheel shaft with the upper crank-shaft, substantially as described.

In testimony whereof I affix my signature in the presence of two witnesses.

DARWIN DE LOS CULVER.

Witnesses:

O. WILLSON,

C. C. THOMAS.