

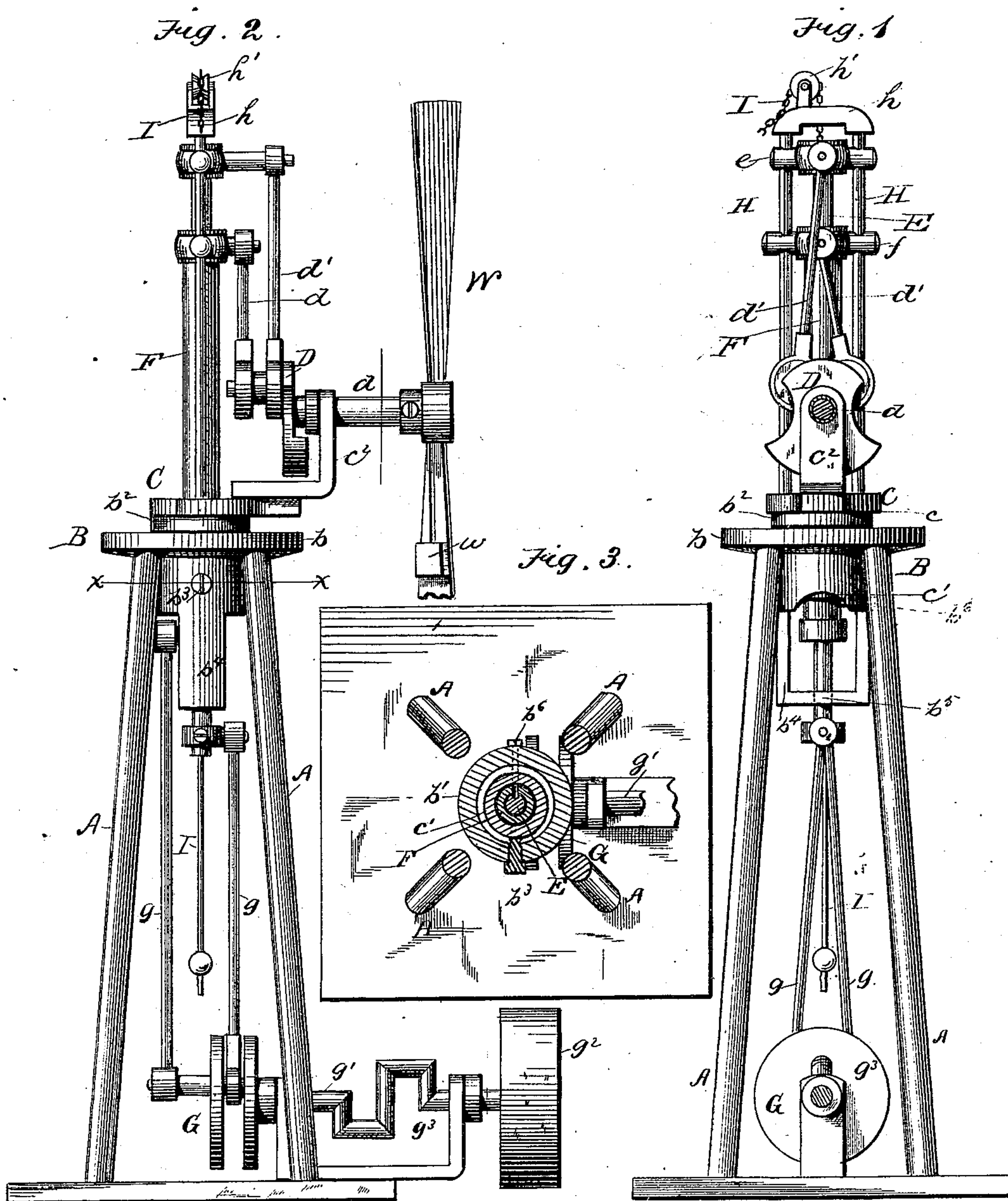
(No Model.)

T. S. E. DIXON.

## Device for Transmitting Motion.

No. 230,250.

**Patented July 20, 1880.**



Attest,  
W. H. Knight  
Notary

Inventor.  
T. S. E. Dixon  
By Dixon & Smith  
His Atty's



# UNITED STATES PATENT OFFICE.

THERON S. E. DIXON, OF CHICAGO, ILLINOIS.

## DEVICE FOR TRANSMITTING MOTION.

SPECIFICATION forming part of Letters Patent No. 230,250, dated July 20, 1880.

Application filed June 26, 1880. (No model.)

*To all whom it may concern:*

Be it known that I, THERON S. E. DIXON, of the city of Chicago and State of Illinois, have invented a new and useful Improvement in Devices for Transmitting Motion, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a front-plan view of my improvement shown as applied to a windmill. Fig. 2 is a side-plan view of the same. Fig. 3 is a detailed horizontal section taken on the line *x x*, Fig. 2.

The object of my invention is to provide a simple and effective device for transmitting circular motion without dead-centers, and in such a manner as to permit of the free rotation of one of the revolving shafts while the other revolving shaft remains fixed in position, being especially adapted to windmills which require such a movement.

My invention consists in the combination of two double cranks each united by means of crank-rods to the ends of two hollow shafts which telescope or play one within the other, the upper or driving double crank being mounted upon a turn-table and the crank-rods being united to such shafts at one or both ends by collars which permit of the rotation of the turn-table without interfering with the reciprocation of the shafts; and, also, in the provision of guides which retain the shafts in proper position, all of which will be hereinafter more fully explained, and pointed out definitely in the claims.

In the drawings, A A represent the supporting-frame, which may be constructed in any of the usual and appropriate forms. The preferable construction is that of four posts united to each other so as to form in outline the frustum of a pyramid.

Upon the top of the frame is attached the tower-thimble B, of the usual form, having the flange *b* resting upon the top of the frame, and the lower tube or hollow axis *b'* extending down within the frame, and also preferably having upon its upper end the annular ring *b*<sup>2</sup> as an intermediate support for the turn-table. The turn-table C is also made, preferably, in the form of a thimble having the flange *c*, and the lower tube or axis, *c'*, fitting within the thimble B, and held in place therein by set-screws *b*<sup>3</sup>,

which, passing through the tube *b'*, engage within a groove cut around the tube *c'*, so as to permit the latter to rotate while held in position.

The turn-table C is provided upon one side with a support, *c*<sup>2</sup>, fitted with bearings, within which is placed, in the usual manner, the horizontal wheel-shaft *d*, to the outer end of which the wind-wheel W is attached.

The horizontal wheel-shaft *d* is provided at its inner end with a double crank, D, the crank-pins of which are placed at an angle to each other at the center, preferably of ninety degrees, and certainly at an angle varying considerably from one hundred and eighty degrees.

The crank-pins should be made rectangular in form, and provided with crank-pin collars having rectangular central openings and adjusted so as to be capable of play on the crank-pins only to and from the axis of the crank, and containing buffers of rubber or other elastic substance, or leather or other firm material, in the spaces adjacent to the crank-pins, all for the purpose of overcoming the pressure in passing the dead-centers, and a full and detailed description of which is given in the specification of Letters Patent of the United States granted to me, and dated July 13, 1880, and entitled "a device for transmitting motion."

The double crank D is provided with crank-rods *d'* *d'*, which are attached to the upper ends, respectively, of two hollow vertical shafts, E and F, the smaller shaft E telescoping or playing up and down within the shaft F. The two vertical shafts E and F pass down through the center of the turn-table thimble C *c'*, and have attached at their lower ends, respectively, the crank-rods *g g*, which are connected with the double crank G, corresponding in size and in the angle of its crank-pins with the upper double crank, D, and mounted upon a horizontal shaft, *g'*, which is held in position by suitable supports attached to the main frame, and has upon its outer end a band or gear wheel, *g*<sup>2</sup>, and is further provided, if desired, with a second double crank, *g*<sup>3</sup>, having its crank-pins on opposite sides. The lower crank-rods, *g g*, are preferably wooden bars with metallic fastenings at their ends, which are provided with means for readily varying the



length of the crank-rod in adjustment, such as a joint in which the two parts are united by a nut having the threads in its ends turning in opposite directions.

5 Attached to the top of the turn-table C are two vertical rods, H H, placed upon opposite sides of the shafts E and F, and united at the top by the cross-piece *h*. These rods serve as guides to the shafts E and F, the crank-rods 10 *d' d'* being attached to collars *e* and *f* upon the vertical shafts, and these collars being provided with projections, through holes in which they slide freely up and down the guide-rods H H. As the turn-table rotates, also, the guides turn 15 the collars upon the vertical shafts without interfering with their reciprocation and without any strain upon the crank-rods *d' d'*. The cross-piece *h* may be provided with a small pulley, *h'*, over which and down through a central opening in the cross-piece, and into and 20 through the center of the hollow vertical shafts E and F, pass the operating chain and rod I, which is thus placed in convenient position for adjusting the vane and regulating the 25 power and speed of the wind-wheel.

It is obvious that when other means are employed for regulating the vane and wheel the vertical shaft E may be, if desired, a solid rod instead of a hollow tube.

30 Similar means be employed for guiding the lower ends of the vertical shafts E and F and uniting them to the crank-rods *g g*, guide-rods corresponding to the rods H H being attached to the lower end of the tower-thimble B, and 35 collars similar to *e* and *f* attached to the lower ends of the vertical shafts, when the shafts will reciprocate vertically with perfect freedom, whatever the position of the turn-table. The collars may then be so adjusted that the ver- 40 tical shafts shall be free to turn within them at one or at both ends, as preferred.

Another form of construction is illustrated in the drawings, in which the tower-thimble B is provided upon its lower end with a projec- 45 tion, *b<sup>4</sup>*, in the form of a bail or a bar bent so as to form three sides of a rectangle.

The lower end of the bail *b<sup>4</sup>* is at the center provided with a bearing, *b<sup>5</sup>*, through which the smaller vertical shaft E passes, and is at- 50 tached to the crank-rod *g* in any appropriate manner.

The turn-table thimble C *c'* is provided with a bearing in which the larger vertical shaft F is fitted, and through which it passes, and 55 is attached at its lower end to the other crank-rod *g* by a pin which vibrates up and down within the limits of the bail *b<sup>4</sup>*.

In this construction the vertical shafts may be prevented from turning with the turn-table 60 by a set-screw, *b<sup>6</sup>*, which passes through the lower portion of the tower-thimble *b'*, below the tube *c*, into longitudinal slots cut in the vertical hollow shafts E and F, thus preventing their revolution upon their axis and with- 65 out impeding their reciprocation.

If preferred, the tube or hollow axis *c'* of

the turn-table may be extended also above the flange *c*, and provided with an interior bearing fitted to the vertical shaft F as a substitute for the guide-rods H H, and also provided at its 70 end with a bail similar to the bail *b<sup>4</sup>*, as an upper bearing for the vertical shaft E; or, if preferred, the vertical shaft E may be guided by bearings within the vertical shaft F.

In still another form of construction the 75 central opening in the turn-table C may be made sufficiently large to permit the crank-rods *d' d'* to extend downward within the turn-table to the vertical hollow shafts, instead of upward, as shown in the drawings. 80

The advantages of this latter form of construction are that it permits, when desired, the double crank to extend across the central opening in the turn-table, with supporting-bearings upon both sides thereof, and also dispenses 85 with the guide-rods H H, as projections or grooves within the interior or at the lower end of the tube *c'* may serve as guides to the vertical shafts, which would be of much shorter length in this construction. The disadvantage 90 of this form is in the enlargement of the central opening and consequent great increase in the size of the turn-table C, and also of the tower-thimble B, with consequent increase of friction. 95

A modification may be adopted in which one crank-rod *d'* may extend above and the other below; or the crank-rods *d' d'* may be dispensed with, and in place thereof the vertical shafts may each be provided with pro- 100 jecting shoulders having horizontal slots within which the crank-pins play, in conformity with this well-known substitute for the crank-rod connection; or double cams may be substituted for the driving double crank, crank- 105 pin collars being then placed on the driven double crank.

It is important that the crank-rods should be so attached to the vertical shafts and the guides so arranged that when the turn-table 110 is rotated the corresponding turning either of the vertical shafts or of the collars thereon should be effected independently of the crank-rods, for if these be relied upon to effect such turning they will be subjected to strain and a 115 cramping pressure upon the pins to which they are attached, which should be avoided.

The form of construction first herein described is deemed the preferable one.

Upon the wind-wheel W, at a point nearly 120 opposite the middle point between the crank-pins on the double crank D, a counterpoise, *w*, is attached to balance the weight of the vertical shafts and their connections and render the motion perfectly uniform. If preferred, 125 this counterpoise may be attached directly to the wheel-shaft *d* independently of the wheel; but the attachment to the wheel is deemed preferable. Also, if desired, large portions of the vertical shafts may be cut away from their 130 sides or dispensed with, or they may be formed in their main length from rods to diminish



their weight or to give additional space at any point along their length or to cheapen their construction.

A suitable vane or rudder may be attached to the turn-table C in any of the usual forms.

In the operation of my improvement it is obvious that whatever the relative position of the turn-table, upon the revolution of the wind-wheel the motion is instantly transmitted through the vertical shafts to the horizontal shaft below, which is thus driven in corresponding motion with the wind-wheel and with scarcely an appreciable diminution of power.

The advantages of this construction are very great, as it obviates the considerable friction produced by gearing, as well as the side draft, tending to throw the wheel out of the wind, occasioned by its use. It also transmits the motion in a steady, even, and noiseless manner, and it utilizes so perfectly the entire power of the wind in the production of rotary motion that the complete construction might not inappropriately be termed a "wind-engine."

It is evident, also, that by attaching two piston-rods to the double crank  $g^3$ , and the use of a double-cylinder pump, a continuous stream of water may be thrown, thus utilizing the entire revolution of the wind-wheel, instead of throwing away one-half of it, as is done in the use of the single crank and piston.

Rotary motion may also be transmitted from the band-wheel  $g^2$  for the operation of corn-shellers, churns, lathes, saws, grinding-mills, sewing-machines, and a great variety of useful machinery.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of two double cranks mounted upon shafts and united to each other

by connections which permit of the free rotation of one of the shafts upon a turn-table and which yield to pressure in passing the dead-centers and are unyielding at one or more other points in the revolution of the cranks, substantially as described.

2. The combination of two double cranks united to each other by double shafts attached by connecting crank-rods, and which telescope or play one within the other, and a rod or chain passing through the shafts for the purpose of aiding in the control of the power and speed of the driving double crank, substantially as described.

3. The combination of two double cranks united to each other by double telescoping-shafts attached by connecting crank-rods and which are provided with collars at one or both ends, to which the crank-rods are attached, for the purpose of permitting the free rotation of the driving double crank about the axis of the double shafts, substantially as described.

4. The combination of two double cranks united to each other by double telescoping-shafts attached by connecting crank-rods and guides exterior to the shafts, for the purpose of holding the shafts in position while permitting their free reciprocation, substantially as described.

5. The combination of two double cranks united to each other by double shafts attached by connecting crank-rods and guides for the purpose of effecting the rotation of the double shafts or of the collars thereon independently of the aid of the connecting-cranks, substantially as described.

THERON S. E. DIXON.

Witnesses:

JAS. H. LANGE,  
MELVILLE CHURCH.