(No Model.)

T. S. E. DIXON.

Device for Transmitting Circular Motion.

No. 229,875. Patented July 13, 1880.

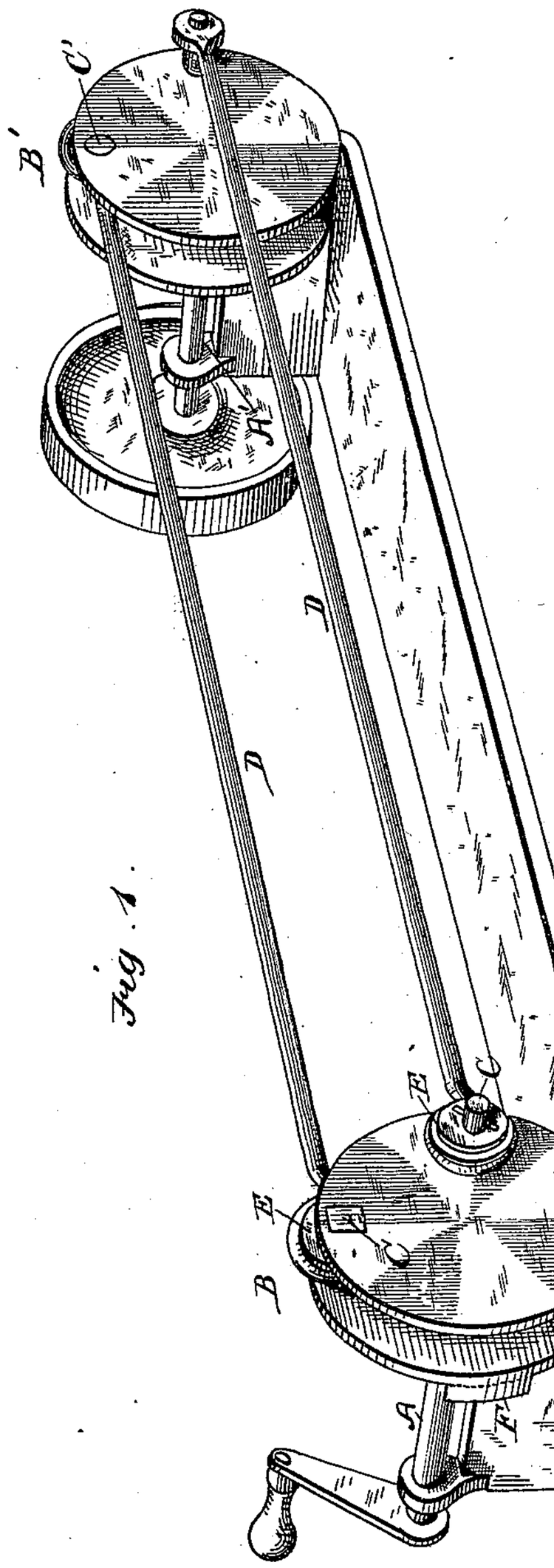

Fig. 1.

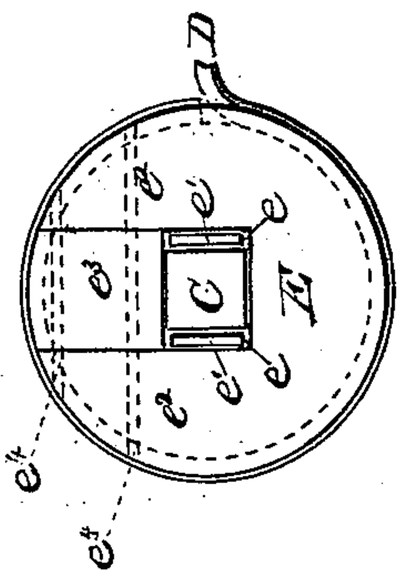

Fig. 3.

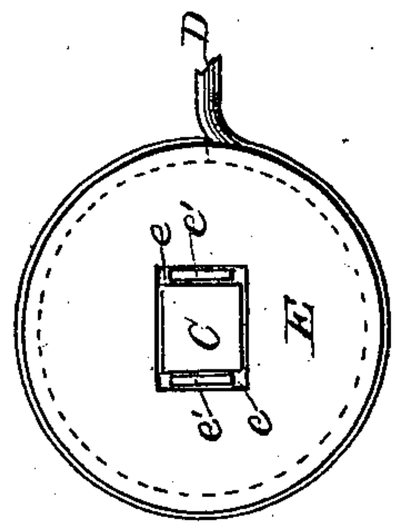

Fig. 2.

Attest

W. H. A. Knight

M. Church.

Inventor,

T. S. E. Dixon.

By Dixon & Smith

His Attys.

UNITED STATES PATENT OFFICE.

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

DEVICE FOR TRANSMITTING CIRCULAR MOTION.

SPECIFICATION forming part of Letters Patent No. 229,875, dated July 13, 1880.

Application filed June 19, 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 Circular Motion, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of a mechanical movement embodying my improvement. Fig. 2 is an enlarged detached plan view of the crank-pin box or collar. Fig. 3 is a plan view of a modification of the same.

The object of my invention is to afford a simple, cheap, and effective device for transmitting circular motion and overcoming the dead-centers. This has been attempted hitherto by providing two shafts each with a double crank, with its crank-pins at an angle to each other of about ninety degrees at the axis of the shaft, and connecting the double cranks to each other by ordinary crank-rods.

This method has proved to be practically inoperative, as it requires the utmost nicety of construction to work even in a model, and in practical use, owing to the expansion and contraction of the connecting-rods and the resistance of the driven shaft, there is increased pressure and binding force at the dead-centers sufficient to either stop the motion or greatly impair its efficiency.

This difficulty is wholly overcome by my improvement, which consists in such an adjustment of the connections between such double cranks as to permit of their yielding to the pressure and consequent freedom of movement in passing the dead-centers, while they are unyielding at the quarters of the revolution, all of which will be hereinafter more fully set forth, and pointed out definitely in the claims.

In the drawings, A A′ are the shafts between which circular motion is to be transmitted. Mounted upon the ends of the shafts A A′ are the double cranks B B′, each having its crank-pins preferably at an angle of ninety degrees, as above described, but certainly at an angle varying considerably from one hundred and eighty degrees. These double cranks may be of any of the ordinary forms of construction. They are illustrated in the well-known form of double disks, in which C C′ are the crank-pins, and D D the connecting-rods. Each connecting-rod is attached at one end to a crank-pin, C, which is rectangular in form, as clearly shown in Fig. 2. This rectangular crank-pin is adjusted upon the double crank so that two of its opposite sides are at right angles to the radius passing through their middle to the axis of the shaft. There is fitted upon each of the rectangular crank-pins a round box or collar, E, to the circumference of which the end of the connecting-rod is fitted in the usual manner.

The central opening of the collar E is rectangular, and is so adjusted upon the crank-pin C as to fit it closely upon two of its opposite sides and so as to leave an open space, *e*, between the collar and the pin upon each of its other two opposite sides, the open spaces being upon the sides of the pin which are at right angles to the radius aforesaid.

In the preferable construction buffers of rubber or other firm elastic material, *e′*, are placed within the spaces *e*, which will act as cushions for the crank-pin. Springs may be employed for this purpose, but buffers are deemed the better.

The depth of the spaces *e* should be determined by the circumstances under which the cranks are to be employed. In small machines, and where nicety of construction is permissible, a depth of one-sixteenth of an inch, or even less, is ample for the purpose, while in larger machines, and when the connections are liable to expansion and contraction, a depth of one-eighth of an inch is permissible, or even more, owing to the use of buffers. The corresponding thickness of the buffers, and whether they shall fit snugly or very loosely, is to be determined by the same circumstances. It may be observed that with very light power and slow motion the buffers may fit very loosely, allowing perfect freedom of play, while with great power and rapidity of motion the buffers should fit more snugly. The intelligent mechanic, by the use of ordinary skill, will readily effect these adjustments.

The buffers may be prevented from slipping out of the spaces *e* by washers placed upon each side of the collars E. The collars E may be made in parts bolted or riveted together,

so as to adapt them to some forms of cranks where it is impracticable to slip them upon the crank-pins. This construction in one of its many possible forms is illustrated in Fig. 3, where the two parts e^2 and e^3 are united by bolts or rivets e^4.

While a rectangle is the preferable form for the crank-pin C, it is obvious that other forms, such as octagonal, may be employed. Also, sufficient space may be given so that the buffers may be extended entirely around the crank-pin; but this method is far inferior and liable to obvious and serious objections.

The crank-pins may be placed at unequal distances from the axis of the crank, or at equal distances, as preferred.

The rectangular crank-pins may be placed both upon one double crank or one upon each crank, as preferred.

A counterpoise, F, may be attached to one or both the double cranks to balance the weight of their connections, and this is preferably placed nearly opposite the middle point between the two crank-pins.

As an aid for counteracting the influence of changes of temperature in expanding or contracting the connections between the double cranks, each connecting-rod may be provided with means for readily varying its length, such as a joint in the rod, in which the two parts are united by a nut having the threads in its ends turning in opposite directions.

In the operation of my improvement, when each connecting-rod arrives at the dead-center, instead of binding, as in the ordinary construction, with a single connecting-rod and stopping the driven shaft, it yields to the pressure, owing to its freedom of movement in the collar E, while the other connecting-rod, being at the quarter-revolution, is rigidly unyielding, and consequently wholly overcomes the dead-center, and continues the revolution of the driven shaft.

The advantages of this construction, briefly stated, are that in transmitting power it imparts to the driven shaft positive motion without the loss of power by friction attendant upon the use of gearing, and free from the objections connected with the use of belting, and it may also be substituted with great advantage for the sprocket-wheel and chain when used to transmit motion. It wholly overcomes the dead-centers in crank motion, the driven shaft starting and turning with equal ease at every point in its revolution. It also avoids the necessity for a fly-wheel.

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 united by connections which yield to pressure in passing the dead-centers, but are unyielding at one or more other points in the revolution of the cranks, substantially as described.

2. The combination of two double cranks provided, one or both, with a counterpoise placed nearly opposite the middle point between the two crank-pins to balance the weight of the connections, substantially as described.

3. A crank-pin box or collar adjustable upon the crank-pin, so as to be capable of play thereon only to and from the axis of the shaft, substantially as and for the purpose set forth.

4. A crank-pin box or collar adjustable upon the crank-pin, so as to be capable of play thereon only to and from the axis of the shaft, and provided with buffers, substantially as and for the purpose set forth.

5. A crank-pin box or collar having a rectangular central opening and made in parts, to permit of its ready adjustment upon a crank-pin, substantially as and for the purpose set forth.

THERON S. E. DIXON.

Witnesses:
JAS. H. LANGE,
MELVILLE CHURCH.