

[54] **MECHANICAL MOVEMENT**

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[51] **Int. Cl.** **F16h 33/00**

[58] **Field of Search** 74/60, 18.1

[56] **References Cited**
UNITED STATES PATENTS

3,201,094	8/1965	Ligon et al.	74/18.1
2,077,986	4/1937	Cassani	74/60
2,551,025	5/1951	Linderman, Jr.	74/60
2,607,233	8/1952	Bosch	74/18.1

FOREIGN PATENTS OR APPLICATIONS

827,441	1/1952	Germany	74/60
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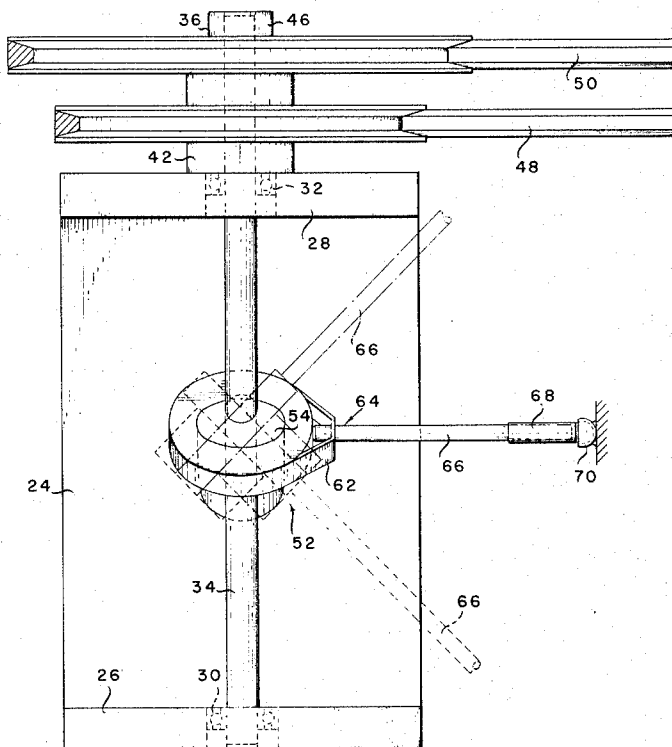
289,160 2/1953 Switzerland..... 74/60

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[57] **ABSTRACT**

This invention is a mechanical movement for converting reciprocating linear motion to rotary motion. An arm is pivotally connected at one end to a source of reciprocating motion. The opposite end of the arm is connected to a driving member mounted on a rotatable shaft at approximately a 45° angle to the longitudinal axis of the member. As the arm moves in response to the reciprocating motion, corresponding movement of the opposite end of the arm is effected, producing actuation of the driving member to rotate the shaft on which the driving member is mounted.

10 Claims, 8 Drawing Figures



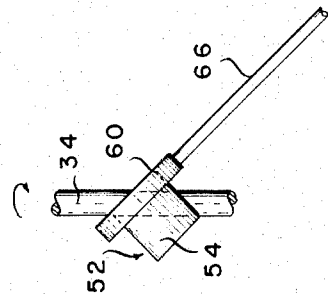
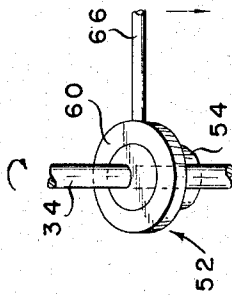
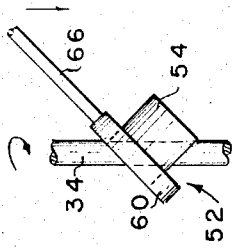
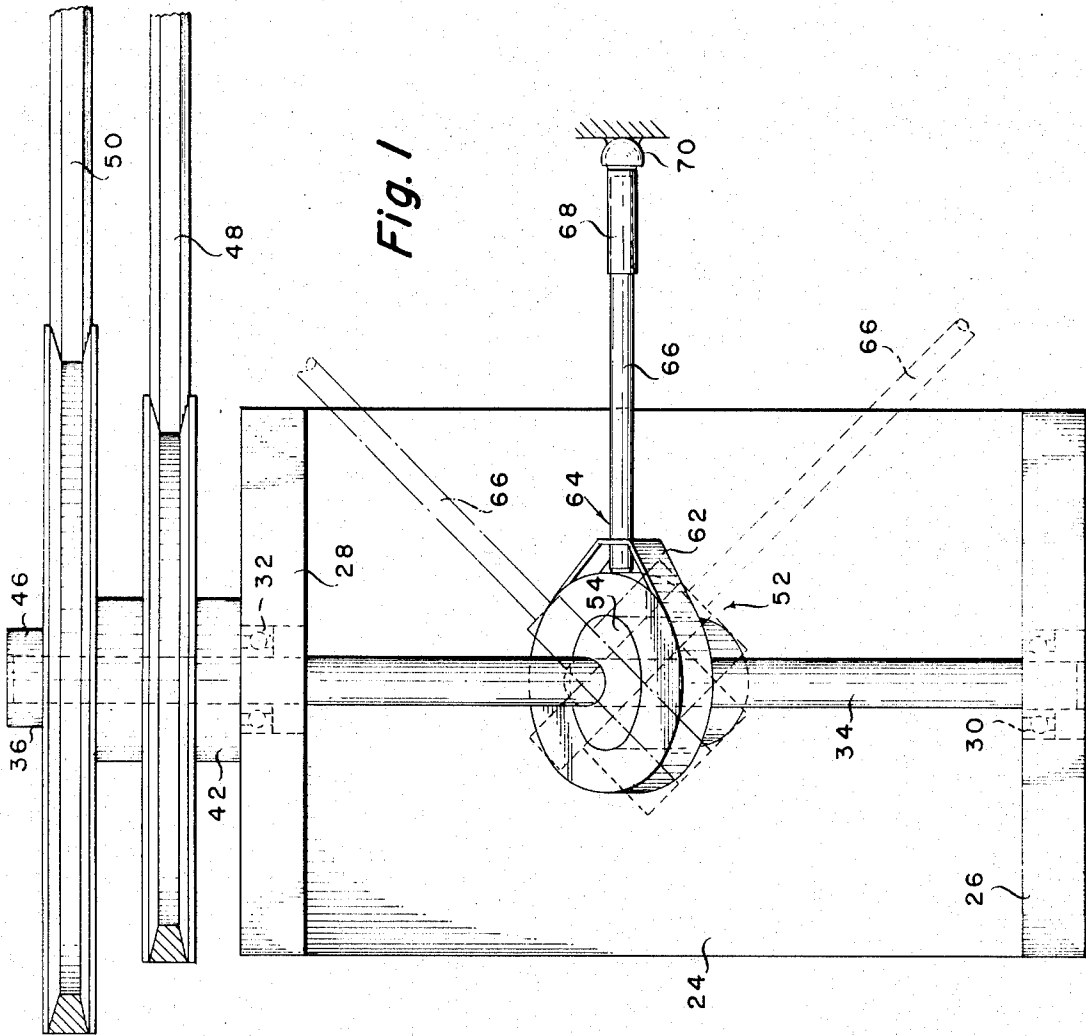


Fig. 5

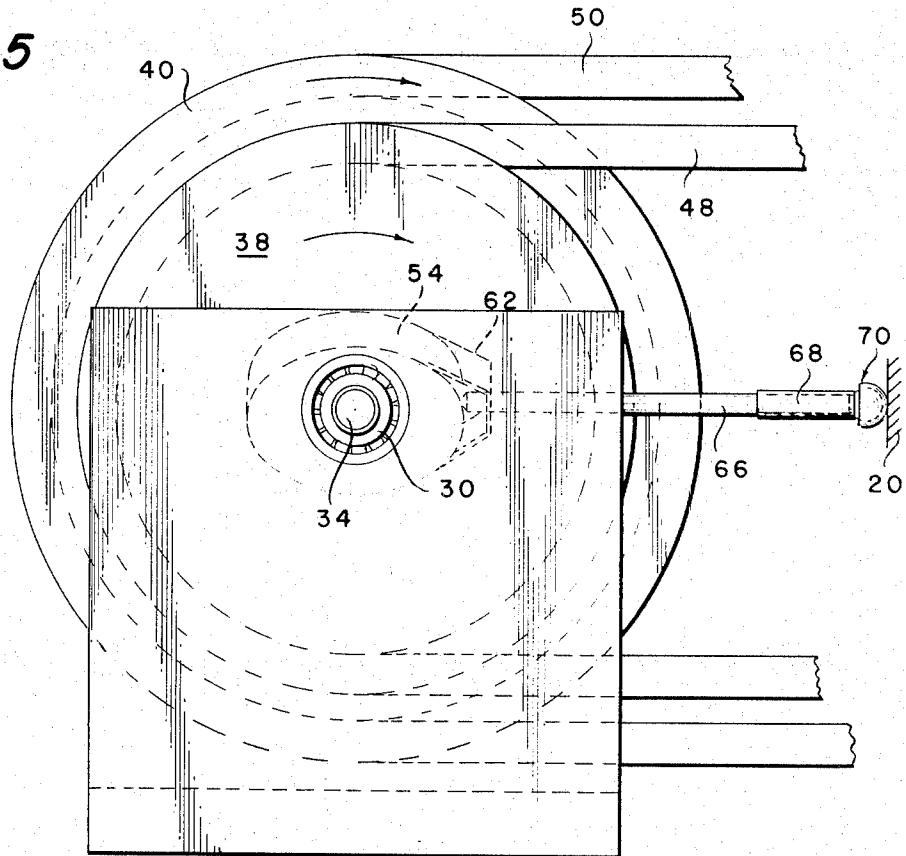


Fig. 6

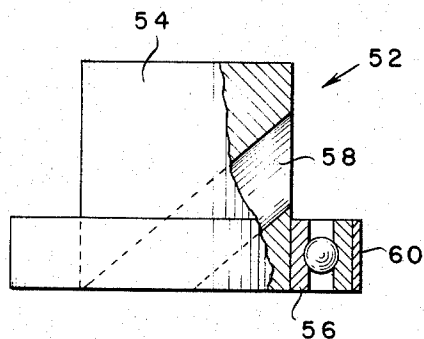


Fig. 7

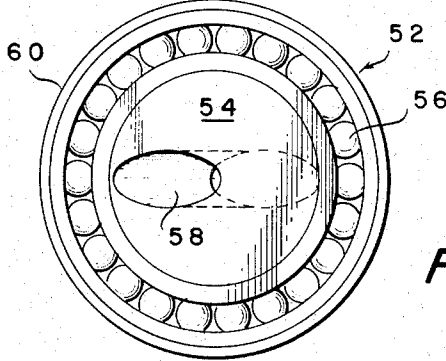
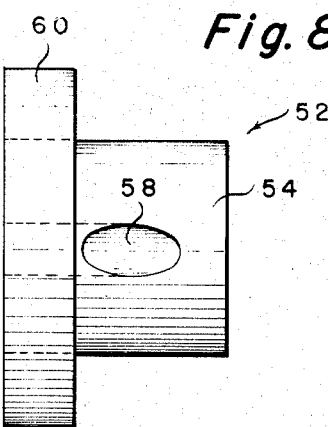


Fig. 8



MECHANICAL MOVEMENT

BACKGROUND AND OBJECTS OF THE INVENTION

In parts of the United States and other countries where electrical power is not readily available, it is common practice to employ windmills for raising water to the surface. In the operation of the windmill, there is a reciprocating movement of the windmill lifting rod in response to actuation of the wind wheel by the wind. This reciprocating linear motion of the windmill shaft constitutes a potential power source for operating electrical generators, or other mechanical and electrical equipment.

It is therefore an object of this invention to provide a mechanical movement for converting reciprocating linear motion from a reciprocating power source to rotary motion of a shaft for driving mechanical or electrical equipment.

Another object is to provide a mechanical movement of the character described wherein a rotatable driven member is positioned adjacent a reciprocating linear power source, and a connecting assembly converts the linear motion of the power source to a rotary motion of the driven member.

A further object is to provide a mechanical movement including an arm connected at one end to a reciprocating shaft, the opposite end of the arm being joined to a cylindrical driving member which is mounted on a rotatable shaft at an angle to the longitudinal axis of the cylindrical member, the rotatable shaft being actuated by reciprocating linear movement of the arm.

A still further object is to provide a mechanical movement of the character described wherein the driving member is mounted on the rotatable shaft at approximately a 45° angle to the longitudinal axis of the driving member, and said reciprocating and rotatable shafts are in substantially parallel relationship to each other.

Other objects will be apparent from the following description of the presently preferred form of this invention taken in conjunction with the appended drawings.

DESCRIPTIONS OF FIGURES OF THE DRAWINGS

FIG. 1 is a top plan view of the mechanical movement of the present invention illustrating its use;

FIG. 2 is a top plan view of the mechanical movement of the present invention per se illustrating the position of the actuating arm at its lower limit;

FIG. 3 is a view similar to FIG. 2 illustrating an intermediate position of the arm;

FIG. 4 is a view similar to FIGS. 2 and 3 illustrating the upper limit of movement of the mechanical movement of the present invention;

FIG. 5 is an end elevation view of the device of the present invention;

FIG. 6 is a side elevational view partly in section of the driving member forming a part of the present invention;

FIG. 7 is an end elevational view of the driving member, and

FIG. 8 is a view similar to FIG. 6 showing the driving member in rotated position.

DESCRIPTION OF THE FIGURES OF THE DRAWINGS

In FIG. 1, there is illustrated a reciprocating power

source in the form of a shaft 20 such as a windmill lifting rod which is adapted for reciprocating linear motion upon actuation by a wind wheel. The mechanical movement assembly of the present invention is generally designated 22 and is positioned adjacent shaft 20.

Assembly 22 includes a stationary frame member embodying a base 24 and end walls 26 and 28. As shown in FIGS. 1 and 5, standard bearing member 30 and 32 are mounted in walls 26 and 28, which bearings are adapted to receive a rotatable shaft 34.

As seen in FIG. 1, shaft 34 extends through and beyond end wall 28, as indicated at 36 to provide an extension member on which are suitably mounted drive pulleys 38 and 40 which are spaced from wall 28 and each other by spacers 42 and 44. A shaft end cap is indicated at 46. Drive belts 48 and 50 are driven by pulleys 38 and 40, the drive belts extending to an electric generator or other apparatus (not shown) to be driven in a well known manner.

The assembly of the present invention further includes a driving member generally designated 52 which serves to rotate shaft 34 and is mounted thereon. As shown in FIGS. 6 and 8, driving member 52 includes a solid cylindrical body 54 at one end of which is peripherally mounted a conventional ball and race assembly 56. A bore 58 extends angularly through the central portion of member 54 at approximately a 45° angle to the longitudinal axis of the member. As shown in FIG. 6, the bore extends from an end wall of the cylindrical member at the peripheral limit thereof, and extends through a diametrically opposite wall periphery of the member at a point intermediate the length of the cylindrical body. Bore 58 is of substantially the same diameter as rod 34 and is adapted for mounting thereon.

A collar 60 is fixed to the outer periphery of ball and race assembly 56. As shown in FIG. 1, collar 60 is contiguous with assembly 56 through the major portion thereof, but a portion is spaced from the periphery of the bearing as indicated at 62. Spaced portion 62 is further provided with an opening 64 through which an arm 66 extends into fixed engagement with the outer periphery of assembly 56. A telescoping sleeve 68 engages the opposite terminal of arm 66, the sleeve being engaged with a universal connection 70 fixed to reciprocating shaft 20 to permit swiveling engagement of arm 66 with respect to the shaft. Sleeve 68 compensates for the difference in distances between driving member 52 and reciprocating shaft 20 as the arm moves between its upper and lower limits.

OPERATION

In use of the assembly of the present invention, actuation thereof is initiated by connection of arm 66 and sleeve 68 through universal connection 70 to reciprocating shaft 20 which constitutes the power source of the present invention. As the shaft 20 begins its reciprocating linear motion, a corresponding reciprocating movement of arm 66 occurs, as shown to advantage in FIG. 1. The movement of arm 66 in turn creates a progressive movement of cylindrical member 56 by virtue of the angular relationship of bore 58 to rotatable shaft 34 in which it is mounted. This progressive movement is illustrated in FIGS. 2, 3 and 4. By virtue of the frictional engagement of that portion of the cylindrical member surrounding rotatable shaft 34 with the surface thereof, a corresponding rotation of the shaft occurs, the shaft rotating one-half a revolution for each

movement of arm 66 from its upper to its lower position and vice versa. A complete revolution of the shaft is effected by a complete cycle of the reciprocating shaft 20 from its upper limit to its lower limit and back to its upper limit. Bearing assembly 56 permits relative rotary movement between the assembly and cylindrical member 54.

Continued reciprocating movement of shaft 20 produces a constant rotation of shaft 34 and this rotary motion is transmitted through a shaft extension 36 to pulleys 38 and 40 which are fixed thereto. This effects a corresponding movement of belts 48 and 50 for transmitting the rotary motion to a generator or other apparatus to be driven.

It is to be of course understood that the present invention is capable of adaptation for translating any reciprocating linear motion to rotary motion for directly driving any apparatus directly connected to rotatable shaft 34 as well as using the shaft as a power take off for driving the apparatus through a belt and pulley arrangement.

While there has been herein shown and described, the presently preferred form of the present invention, it should be understood that such has been done for purposes of illustration only, and that various changes may be made therein within the scope of the appended claims.

What I claim is:

1. A mechanical movement assembly including:

- a. a first shaft,
- b. means for producing a reciprocating linear motion of said first shaft,
- c. a second shaft adjacent said first shaft, and
- d. means connecting said first shaft and second shaft for converting the reciprocating linear motion of said first shaft to a rotary movement of said second shaft.

2. The mechanical movement assembly of claim 1 wherein:

- a. said means joining said first and second shafts includes an arm,
- b. one terminal of said arm being swivelly connected in fixed relation to said first shaft,
- c. drive means sleeved over said second shaft,
- d. the other terminal of said arm being connected to said drive means,
- e. whereby said drive means is actuated by said arm to rotate said second shaft upon reciprocating movement of said first shaft.

3. The mechanical movement assembly of claim 2 wherein:

- a. said drive means includes a cylindrical member,
- b. a bore extending through said cylindrical member at an angle to the longitudinal axis of said cylindrical member,
- c. said bore being adapted to receive said second shaft, and
- d. means joining a terminal of said arm to said cylindrical member for effecting rotation of said cylindrical member,

e. said cylindrical member frictionally engaging said second shaft to effect corresponding rotation thereof.

4. The mechanical movement assembly of claim 3 wherein:

- a. said means joining a terminal of said arm to said cylindrical member includes an annular race and bearing sleeved over the outer periphery of said cylindrical member, and
- b. means fixedly engaging a terminal of said arm to said cylindrical member.

5. The mechanical movement assembly of claim 4 wherein:

- a. said means fixedly engaging a terminal of said arm to said cylindrical member includes a collar in fixed, contiguous engagement with the outer periphery of said annular race and bearing.

6. The mechanical movement assembly of claim 3 wherein:

- a. the bore of said cylindrical member extends at approximately a 45° angle to the longitudinal axis of the cylindrical member,
- b. said bore extending from the peripheral limit of one end of said cylindrical member to a diametrically opposed side wall thereof at a point intermediate the wall length.

7. A mechanical movement assembly including:

- a. a first shaft.
- b. means for producing a reciprocating linear motion of said first shaft,
- c. a second shaft in spaced, substantially parallel relation to said first shaft,
- d. an arm fixed at one end to said first shaft, and
- e. a drive member mounted on said second shaft,
- f. said drive member including a cylindrical body,
- g. said cylindrical body being provided with a bore which is angularly disposed with respect to the longitudinal axis of said cylindrical body and adapted to receive said second shaft,
- h. an annular race and bearing in peripheral engagement with said cylindrical member, and
- i. means for connecting the other terminal of said arm to the annular race and bearing.

8. The mechanical movement assembly of claim 7 wherein:

- a. the bore of said cylindrical member is at approximately a 45° angle to the longitudinal axis of said cylindrical body.

9. The assembly of claim 8, wherein:

- a. the bore extends from an end wall of said cylindrical member at the peripheral limit and extends through a diametrically opposite wall periphery of the cylindrical member at a point intermediate the length thereof.

10. The assembly of claim 9, wherein:

- a. said race and bearing are positioned at one end of said cylindrical member with a portion thereof proximate the bore at the peripheral limit thereof.

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