C. E. EDWARDS.

MEANS FOR CONVERTING MOTION.

APPLICATION FILED MAR. 27, 1913.

1,177,609.

Patented Apr. 4, 1916.

2 SHEETS—SHEET 1.

Fig. 1.

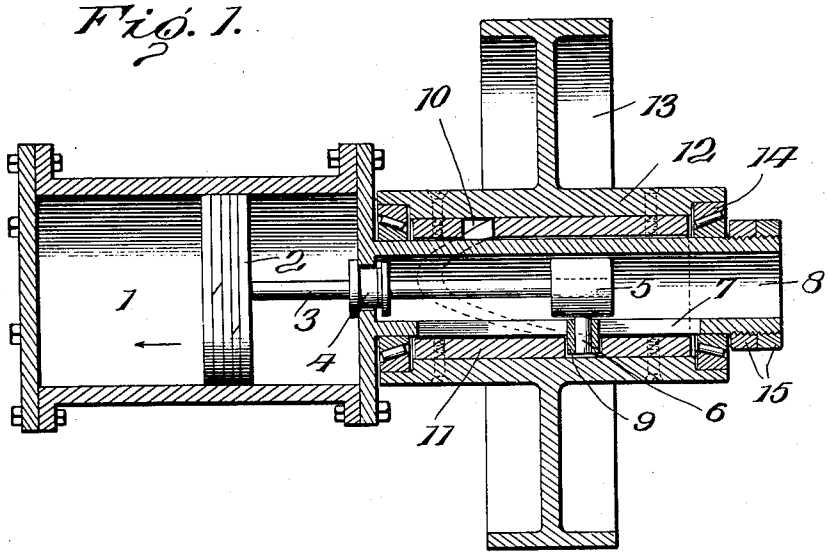
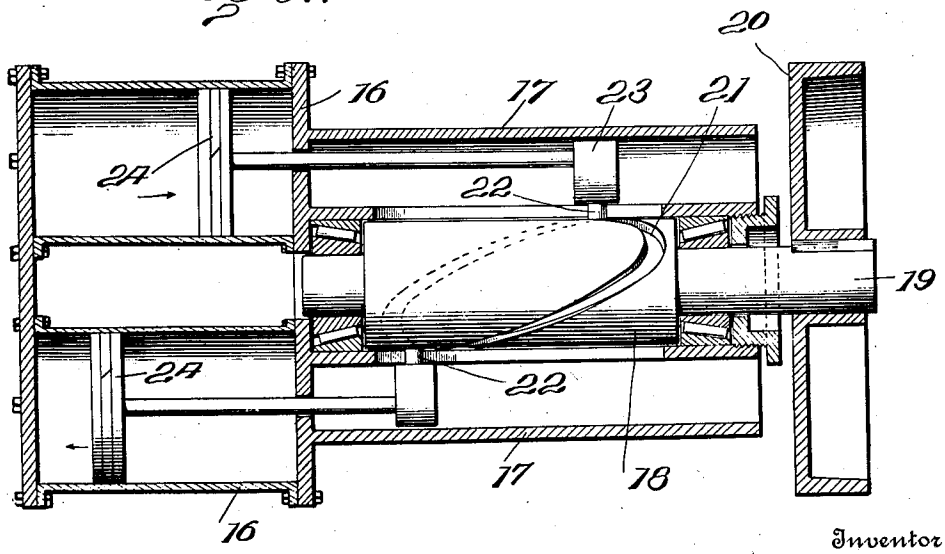


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

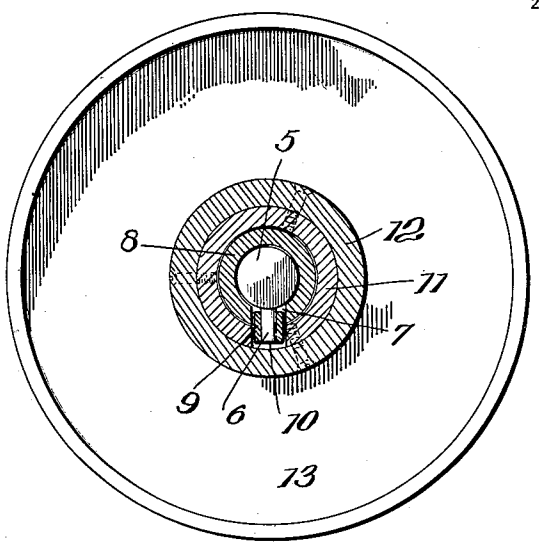


Fig. 4.

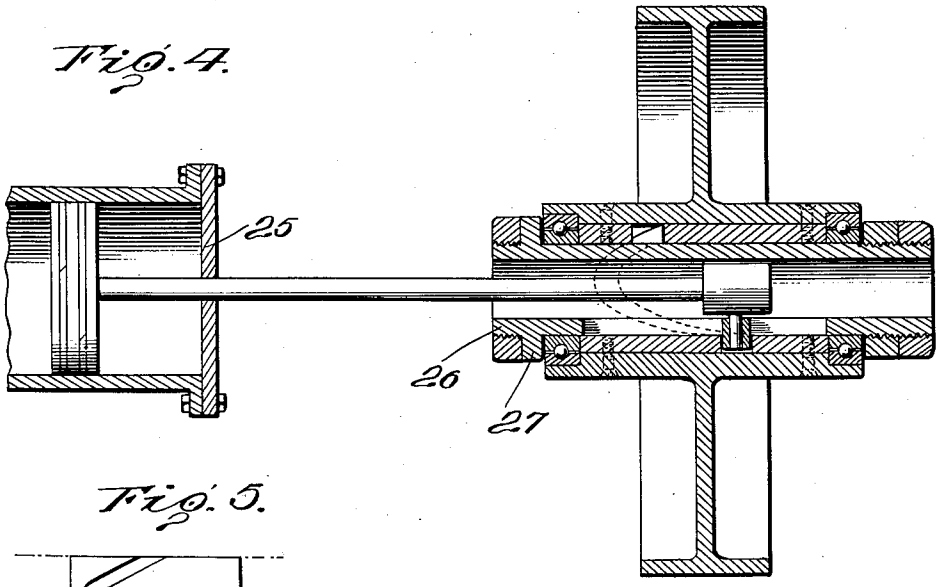
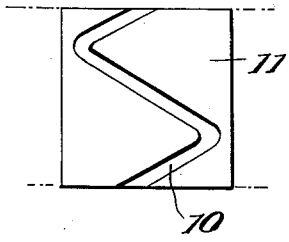


Fig. 5.



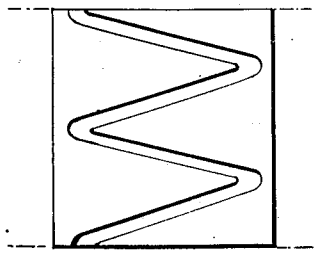


Fig. 6.

Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES E. EDWARDS, OF MANSFIELD, OHIO, ASSIGNOR OF ONE-THIRD TO WILLIAM E. POST AND ONE-THIRD TO HOWARD S. TWITCHELL, OF MANSFIELD, OHIO.

MEANS FOR CONVERTING MOTION.

1,177,609. Specification of Letters Patent. Patented Apr. 4, 1916.

Application filed March 27, 1913. Serial No. 757,232.

To all whom it may concern:

Be it known that I, CHARLES E. EDWARDS, a citizen of the United States, residing at Mansfield, in the county of Richland and State of Ohio, have invented certain new and useful Improvements in Means for Converting Motion, of which the following is a specification.

This invention relates to means for converting reciprocatory motion into rotary motion, and has for its object the provision of simple and efficient means for the stated purpose which will dispense with the use of a connecting rod and crank shaft and which will be composed of few parts compactly arranged and not liable to get out of order.

The invention is illustrated in the accompanying drawings and will be hereinafter fully described, the novel features being subsequently pointed out in the claim following the description.

In the drawings: Figure 1 is a sectional view of one embodiment of the invention; Fig. 2 is a similar view showing a different embodiment of the invention; Fig. 3 is a transverse section of the arrangement shown in Fig. 1; Fig. 4 shows a further modification, and Figs. 5 and 6 are diagrams of different forms of cams which may be employed.

Referring more particularly to Fig. 1, 1 designates a cylinder which may be a part of a gas or steam engine or any other form of prime motor in which a piston 2 is mounted to reciprocate and actuate a piston rod 3 extending through the cylinder. In this particular embodiment of my invention, the piston rod 3 extends through a packing box and guide 4 and is provided at its outer end with a cross head 5 having a pin 6 projecting laterally therefrom and playing in a longitudinal slot 7 in a stationary guide 8 which is illustrated as a sleeve rigid with the adjacent head of the cylinder and projecting axially therefrom. The pin 6 is preferably equipped with a roller 9 to reduce the frictional wear between the same and the walls of the slot 7 and the outer extremity of the pin plays in a cam groove 10 formed in a sleeve 11 which is rigidly secured within the hub 12 of a fly-wheel or band pulley 13. Bearings 14 may be provided between the fixed sleeve or stationary guide 8 and the ends of the hub 12, and, in the particular arrangement shown, retaining nuts or collars 15 are provided on the end of the stationary guide to prevent the rotating parts slipping therefrom. It will be noted that the bearings 14 at each end of the guide member 8 are substantially similar in construction, and it is, therefore, deemed necessary to describe only one of them in detail, the member 14, which is positioned at the outer end of the guide, being chosen in this instance. The bearing 14 includes two ring or collar members 28 and 29. The member 28 is beveled on its outer face, while the member 29 is beveled on its inner face. These beveled faces of the members 28 and 29 are adapted to mate, when in assembled position, so that they may receive between them the roller bearings, indicated at 30. The roller bearings 30 are, as the result of the beveling of the adjacent faces of the members 28 and 29, so arranged that they will rotate about an axis which is inclined upwardly and outwardly with respect to the guide member 8. It will be seen that the member 15 is of such size that, when threaded on the terminal of the guide 8, it will engage only against the bearing member 28. As a result of the peculiar disposition of the rollers 30, it is not necessary to provide any additional means for holding the bearing member 29 against displacement. The adjacent terminal of the member 12 is, of course, recessed to receive the bearing member 29, so that the bearings will act to hold the driven member 12 against displacement from its proper position on the member 11. Thus the member 15 bears against neither the member 29 or 12, yet at the same time it acts to properly maintain the bearings in the necessary relation to each other and to the member 12. It will be readily seen that when the piston 2 and the rod 3 extending therefrom are reciprocated the cross head 5 with the lateral pin 6 will necessarily move in the same manner, as the cross head is rigid with the outer end of the piston rod. Inasmuch as the free end of the pin 6 plays in the cam groove 10 of the sleeve 11 and is held against rotation itself by the slot 7 of the stationary guide 8, the sleeve 11 will be forced to rotate as the cross head is reciprocated, and the cam groove may be so arranged that the sleeve will make one complete rotation during an outward and inward stroke of the piston or may make less than one complete rotation during the stated

travel of the piston. The exact form of the cam will, of course, be determined by the work to be done and the conditions under which the device is to be operated.

The illustrated arrangement is very compact so that it will not occupy much floor space when set up. The reciprocation of the piston is converted into direct rotary motion of the sleeve 11 and the fly-wheel or pulley attached thereto, and the working parts are all protected against injury from contact with objects brought near the motor.

It will be understood, of course, that the particular arrangement of the parts is immaterial and that the cross head may be connected to a single piston, as illustrated, or may be connected to a plurality of pistons and the exact form of the stationary guide is of no moment so that it may be disposed immediately adjacent the cylinder or may be at a point somewhat remote therefrom, as may be deemed most desirable under any particular circumstances.

In Fig. 1, the cam is illustrated in the form of a sleeve or hollow cylinder, but, in Fig. 2, I have illustrated an arrangement by which a solid cylinder may be utilized. This figure also illustrates one manner of employing a plurality of cylinders to drive the cam cylinder or roller. In this illustrative arrangement, the cylinders 16 are arranged with their axes parallel and stationary guides 17 are provided adjacent the ends of the cylinders. The cam 18 is in the form of a solid roller or cylinder disposed between the guides 17 and having the concentric shaft 19 rigid therewith, the fly-wheel or band pulley 20 being secured upon the end of the shaft, while the groove 21 of the cam is engaged by the pins 22 of the cross heads 23 which are connected with the pistons 24 in the cylinders 16.

In Fig. 4, the cylinder head 25 is free of the stationary guide 26 which may be at any distance from the cylinder. The end of the guide nearer the cylinder is shown provided with an annular flange or collar 27 serving as a stop for the cam cylinder and the fly-wheel in assembling the parts, but the construction and arrangement of the essential parts are the same as in Fig. 1.

The angle of the cam groove may be determined by the work to be done and is not necessarily the same for the out and return strokes of the piston. In Fig. 5, the groove is shown cut to cause one revolution of the cam cylinder for each double stroke of the piston, while in Fig. 6 the groove is cut to effect one-half a revolution of the cam cylinder during each double stroke of the piston.

In all the illustrated forms of the invention, and various other modifications of which it is susceptible, the parts may be arranged in a very compact form and are very few in number so that they are not apt to get out of order and loss of time due to accidents which will cause a stoppage of the motor is minimized.

What I claim is:—

An apparatus of the character described including a reciprocating element having a fixed concentrically arranged head at one terminal, a cross head carried at the other terminal of the said element and arranged eccentrically with respect thereto, a laterally extending pin carried by the cross head, a stationary cylindrical guide surrounding the element and having a longitudinally extending slot receiving the pin, and a driven member mounted for rotation in the guide, said driven member being provided with a cam groove freely receiving the pin.

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

CHARLES E. EDWARDS. [L. S.]

Witnesses:
MAMIE BOESCH,
WILLIAM E. POST.