

TITLE: POWER TRANSMISSION MECHANISM

The present invention relates to a power transmission mechanism to interconvert the reciprocating motion of a piston and the rotational motion of a crankshaft.

A conventional power transmission mechanism, e.g., an internal combustion engine generally has a cylinder with a piston connected to a crank via a connecting rod. However, the connecting rod wobbles in a plane, yet the piston is linearly guided by the cylinder wall, which renders a non-uniform frictional force between the piston rings and the cylinder wall, thereby reducing the lives of the elements. Furthermore, the piston has to connect the crank via a connecting rod, which is a bulky mechanism having a low-power transmission efficiency.

The present invention provides an improved power transmission mechanism which is compact and more efficient in power transmission.

According to the present invention there is provided a power transmission mechanism for interconverting reciprocating motion and rotational motion comprising a cylinder which receives a piston with two piston heads therein, a block extending inward from an inner surface of each of said piston heads, defining a space between said blocks, each said block having a length, at right angles to the cylinder axis, equal to the diameter of said cylinder, a crankshaft penetrating transversely through said cylinder between said piston heads, with a crank portion thereof fittingly located in said space between said blocks.

By such an arrangement, the reciprocating motion of the piston and the rotary motion of the crankshaft are interconvertible.

1 Other advantages and novel features of the invention
2 will become more apparent from the following detailed
3 description when taken in conjunction with the accompanying
4 drawings.

5 In the drawings:

6 Fig. 1 is an exploded view of a power transmission
7 mechanism in accordance with the present invention;

8 Fig. 2 is a schematic perspective view of the power
9 transmission mechanism with a portion thereof cutaway to
10 show the structure thereof; and

11 Fig. 3a through 3d are schematic views taken along line
12 3-3 in Fig. 2, which respectively show intake, compression,
13 power, and exhaust strokes of the power transmission
14 mechanism which functions as an internal combustion engine
15 in this case.

16 Referring to the drawings and initially to Figs. 1 and
17 2, a power transmission mechanism for interconverting
18 reciprocating motion and rotational motion in accordance
19 with the present invention generally includes a cylinder 10
20 which receives a double-head piston 12 therein. The double-
21 head piston 12 has a block 14 extending inward from an inner
22 surface of each of two piston heads 16 thereof, defining a
23 space between the two blocks 14. In this embodiment, the
24 piston heads 16 are connected by four posts 13 to form an
25 integral unit. A crankshaft 20 penetrates transversely
26 through the cylinder 10 between the piston heads 16 with a
27 crank portion 22 having a diameter substantially equal to
28 the distance between the two blocks 14, thereby being
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1 fittingly located in the space between the two blocks 14.
2 The transverse length of each block 14 is equal to the
3 diameter of the cylinder 10 to assure that the crank portion
4 22 always contacts the two blocks 14, i.e., during
5 operation, the crank portion is guided in the space between
6 the two blocks 14.

7 For illustration, the following example shown in Figs.
8 3a through 3d is an application of the power transmission
9 mechanism acting as an internal combustion engine. The
10 cylinder 10 has two bores 24 and 26 for respectively
11 installing an intake valve 25 and an exhaust valve 27 in
12 which the controlling of ignition thereof is conventional
13 and as such further description is not required. Optionally,
14 the cylinder 10 may have intake and exhaust valves provided
15 on both end walls thereof to form a double-action piston.

16 In operation, the piston 12 in Figs. 3a through 3d is
17 respectively shown in its intake stroke, compression stroke,
18 power stroke, and exhaust stroke. As clearly shown in these
19 figures, upon combustion of a gas mixture in the cylinder,
20 the piston's linear and reciprocal motion in the cylinder 10
21 is converted into rotary motion of the crank of the
22 crankshaft.

23 At least one piston ring 18 (in this embodiment only
24 one piston ring is shown) is provided to each piston head
25 for sealing and lubrication.

26 It is appreciated that the invention has alternative
27 uses as a power transmission mechanism such as a compressor
28 in which rotary motion of the crankshaft is converted into
29

reciprocating motion of the piston to pressurize the working fluid.

Although the invention has been explained in relation to its preferred embodiment, it is to be understood that many other possible modifications and variations can be made without departing from the spirit of the invention as hereinafter claimed.



CLAIMS:

1. A power transmission mechanism for interconverting reciprocating motion and rotational motion comprising a cylinder which receives a piston with two piston heads therein, a block extending inward from an inner surface of each of said piston heads, defining a space between said blocks, each said block having a length, at right angles to the cylinder axis, equal to the diameter of said cylinder, a crankshaft penetrating transversely through said cylinder between said piston heads, with a crank portion thereof fittingly located in said space between said blocks.
2. A power transmission mechanism substantially as hereinbefore described with reference to and as shown in the accompanying drawings.