

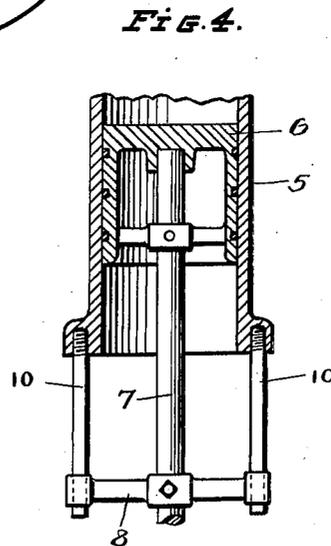
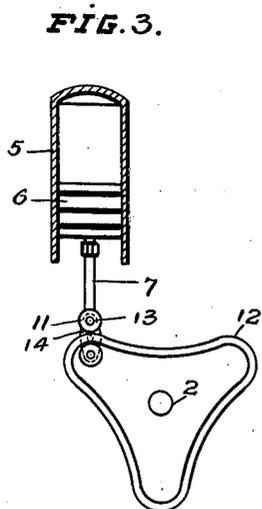
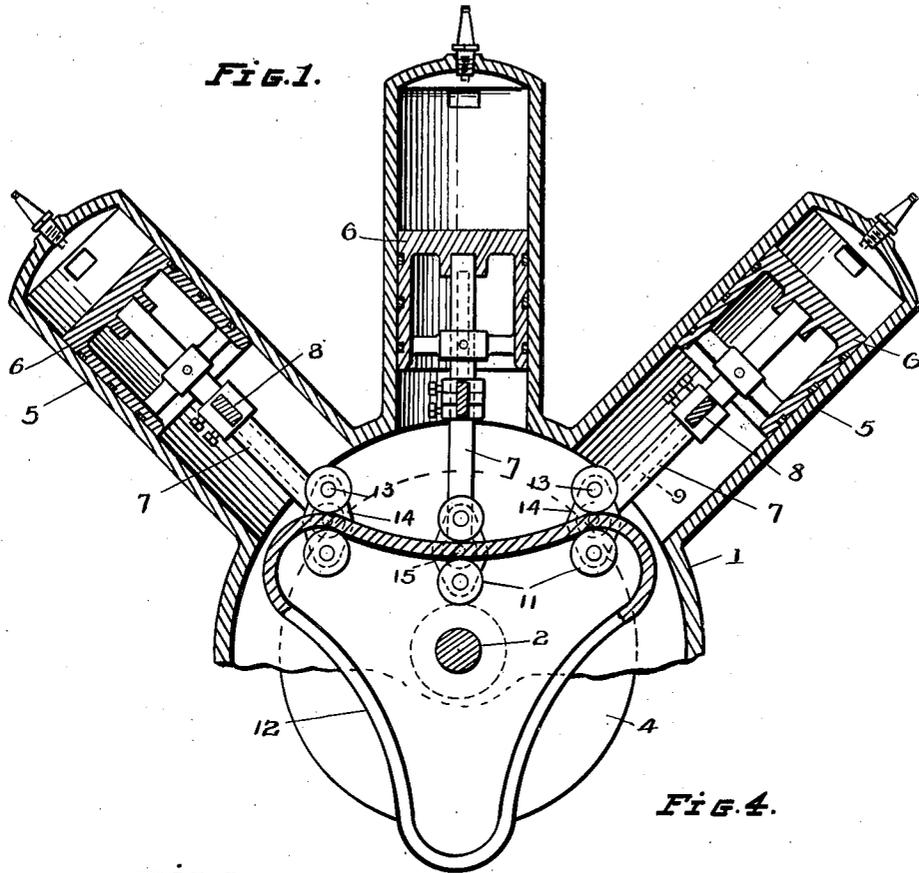
Dec. 27, 1927.

1,654,378

P. MARCHETTI

ENGINE

Original Filed April 17, 1924 2 Sheets-Sheet 1



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2 Sheets-Sheet 2

FIG. 2.

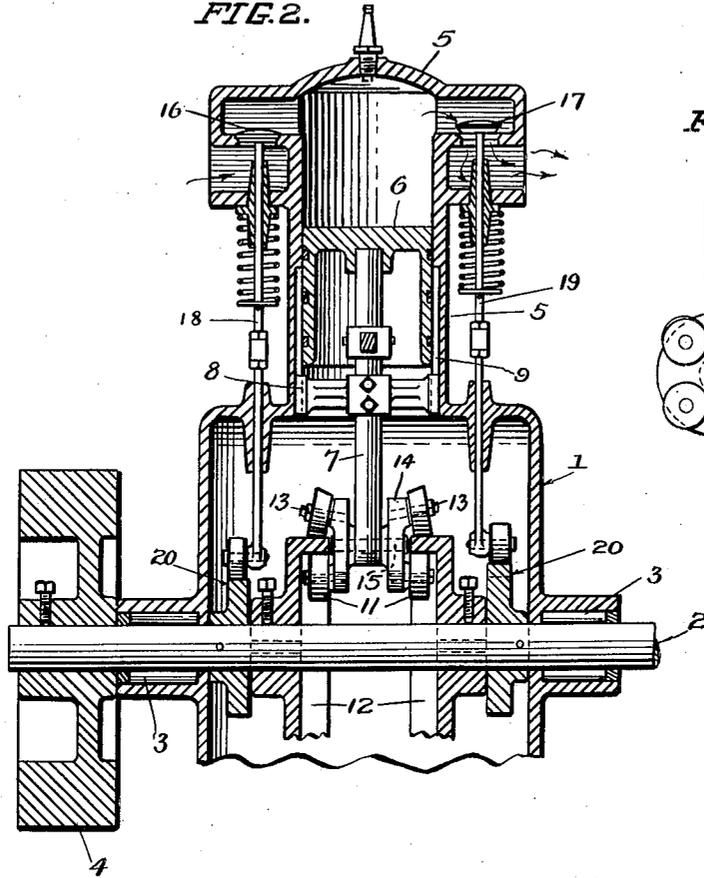


FIG. 7.

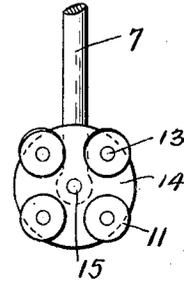


FIG. 5.

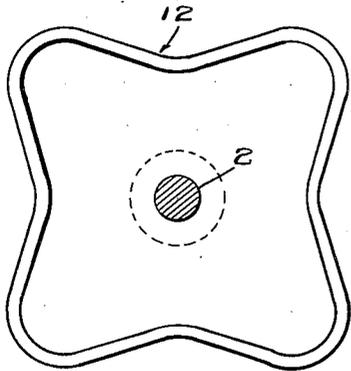
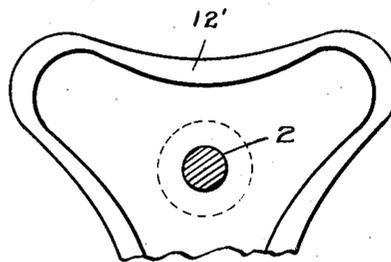


FIG. 6.



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UNITED STATES PATENT OFFICE.

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ENGINE.

Application filed April 17, 1924, Serial No. 707,211. Renewed November 15, 1927.

This invention relates to piston engines in general but to internal combustion engines of this type in particular, and has to do with a means of dispensing with the crank shaft common to such engines.

The principal object of my invention is to provide a novel mechanical arrangement for transmitting the power from the pistons to a straight engine shaft without the use of cranks or eccentric straps or the like, thus doing away with the usual babbitted bearings of these parts and their frequent adjusting and renewal.

I attain the object outlined by the engine construction shown in the accompanying drawings, and in which:—

Figure 1 is a sectional elevation of one form of my engine taken transversely through the main shaft;

Figure 2 is a longitudinal central section of the engine as seen in elevation;

Figure 3 is a diagrammatic representation of a means of increasing the effectiveness of the power stroke of my engine;

Figure 4 shows a modification in the cross head guides;

Figures 5 and 6 show modifications in the form of my driving flange; and

Figure 7 shows a modified arrangement of the driving flange rollers.

By a general review of the drawings it will be seen that my invention consists essentially of any number of cylinders with pistons therein each having a fixed piston rod working back and forth in cross head guides to stabilize them, and each rod carrying rollers at its inner end bearing against a special shaped driving flange secured to the shaft for transmitting power thereto.

In the drawings, (1) is the engine casing, (2) the straight main shaft passing through the casing and supported on roller bearings at (3). At (4) is a flywheel, here shown as being secured to the shaft outside of the casing, though it may be positioned inside of the casing if the latter is made large enough.

Projecting from the casing are any number of cylinders (5) directed toward the shaft though not necessarily on strictly radial lines for they may be offset slightly as indicated in Figure 3 with advantages in some cases. The cylinders may be distributed around the shaft or kept on the upper side only as illustrated, and in this case they would preferably be disposed at about 45°

to one another, and of course there may be any number arranged along the shaft, though one set only is shown as being sufficiently illustrative.

Within each cylinder is a piston (6) having a piston rod (7) rigidly mounted thereon and stabilized against side motion by a cross head (8) working in slots (9) in the cylinder walls.

If desired, however, the cross head may work on a pair of bars (10) projecting from the inner end of the cylinder as indicated in Figure 4. The rods therefore move back and forth with the pistons in a straight line and are prevented from revolving by the cross head.

Each piston rod carries rollers (11) at its inner end engaging opposite sides of a driving flange (12) secured to the shaft.

The flange is shown in Figure 1 as triangular shaped with rounded points and depressed sides, but it may assume other forms either oblong, square as shown in Figure 5, or whatever the arrangement of the cylinders, stroke, size of rollers, etc., may require in order to develop the greatest power or best results.

In practice two flanges are used for each piston rod, one on each side as shown in Figure 2, and the rod carries two sets of rollers bearing against the outer and inner surface of the flanges.

The rollers are arranged to compensate for the varying angularity of the flange presented between them during its revolution. This may be done in several ways, the one indicated being to mount the rollers on pins (13) projecting from carrier blocks (14) which are pivotally supported on the pins (15) projecting from the piston rod. If desired four rollers may be mounted on each carrier as shown in Figure 7.

The flange is preferably of even thickness and the rollers on the side toward the piston are conical and the pins (13) at an angle so that they may be adjusted to secure a perfect fit against the flange. Shims between the hub of the conical roller and the carrier block will make this a simple matter.

My invention may be used with various types of engines but is here shown with an engine of the T head construction having inlet and exhaust valves at (16) and (17) operated by cam rods (18) and (19) and which rods are operated at the proper time by suitable cams (20) so that each cyl-

inder may be fired when its piston is just over every other high point on the driving flange, the intermediate high points being of course at the end of the exhaust stroke.

5 It will thus be seen that the pistons being confined to straight line movement with rollers against the flange will force the flange and shaft to rotate, and the inner surface of the flange will pull out the piston for the suction stroke.

10 The effectiveness of the engine depends on the particular form and size of the driving flanges and their relation to the pistons. If the pistons are offset with respect to the shaft as indicated in Figure 3 it is manifest 15 the power stroke delivered against the flange will be more effective, but on the other hand this offsetting cannot be very much or the piston will not rise with the next high part 20 of the flange.

Instead of having the rollers (13) mounted on a pivoted carrier to compensate for the angularity of the flange it is possible to have the rollers rigidly spaced on the piston 25 rod and operating against a flange of variable thickness, as indicated at (12') in Figure 6, to compensate for the angularity, or the rollers on one side of the flange may be yieldingly mounted in any manner to 30 accomplish the same result.

Having thus described my invention and called attention to some of its possible variations, I do not wish to be limited to the precise showing made in the drawings but desire to cover in my claims any modifications 35 of the general type of engine shown as come fairly within the spirit of my invention.

I claim:

1. An engine of the character described comprising a casing with a straight shaft 40 therein, a pair of driving flanges spacedly secured to said shaft, a cylinder carried by the casing having a piston reciprocable therein, a piston rod rigidly secured to the piston and projecting between the flanges, 45 carriers pivotally connected to the piston rod and a plurality of oppositely disposed rollers connected to the carriers and engaging opposite sides of both flanges substantially as described.

2. In an engine of the character described a rotatable flange, a piston having a rod with rollers thereon adapted to bear against opposite sides of the flange, and means for 50 adjusting the rollers to fit closely against the flange, said means comprising a turnable angular mounting for turning the rollers relative to the flange whereby they may be 55 adjusted to and from the flange.

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