Feb. 24, 1925.

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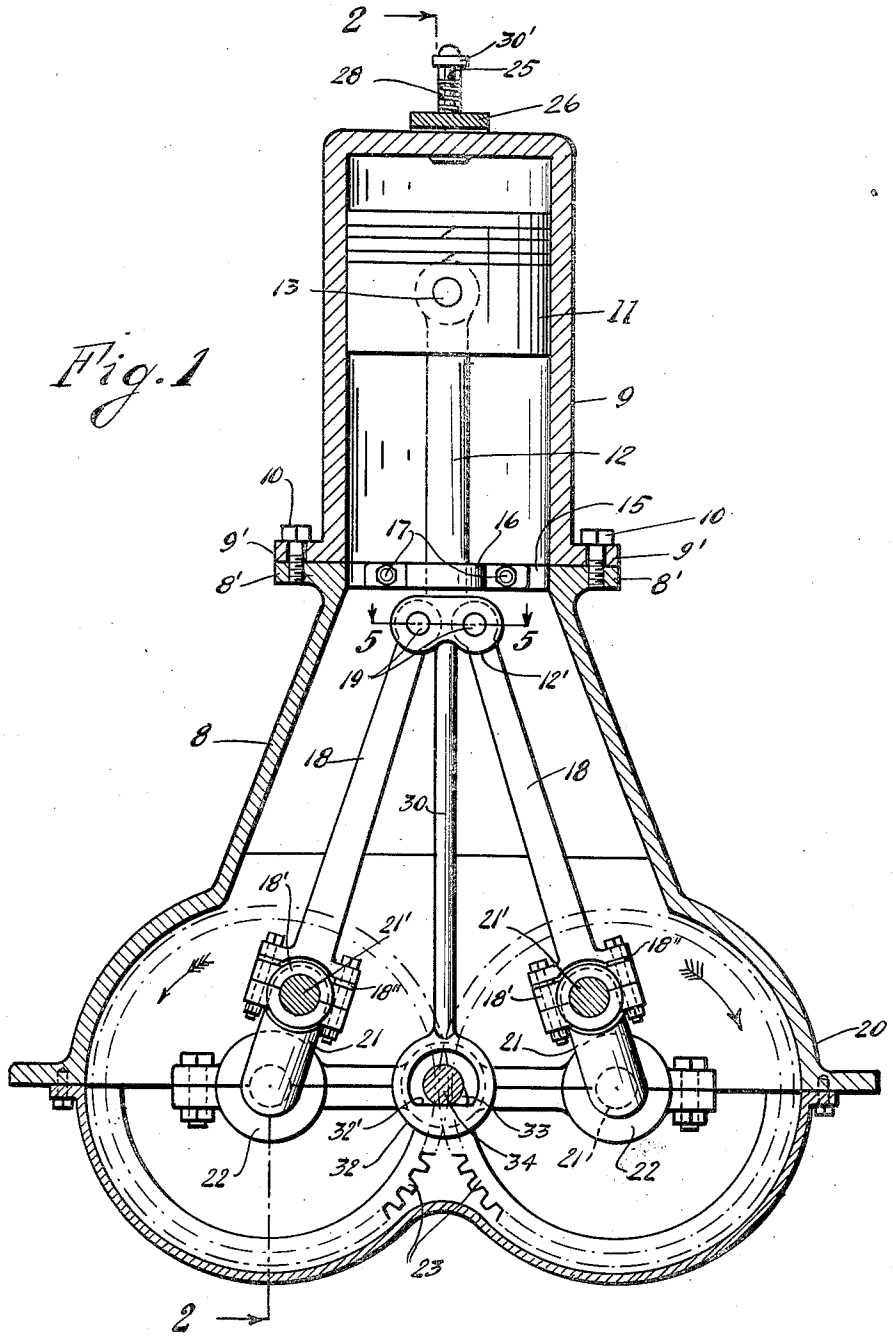
M. M. DUDAS

ENGINE

Filed June 7, 1923

3 Sheets-Sheet 1

Fig. 1



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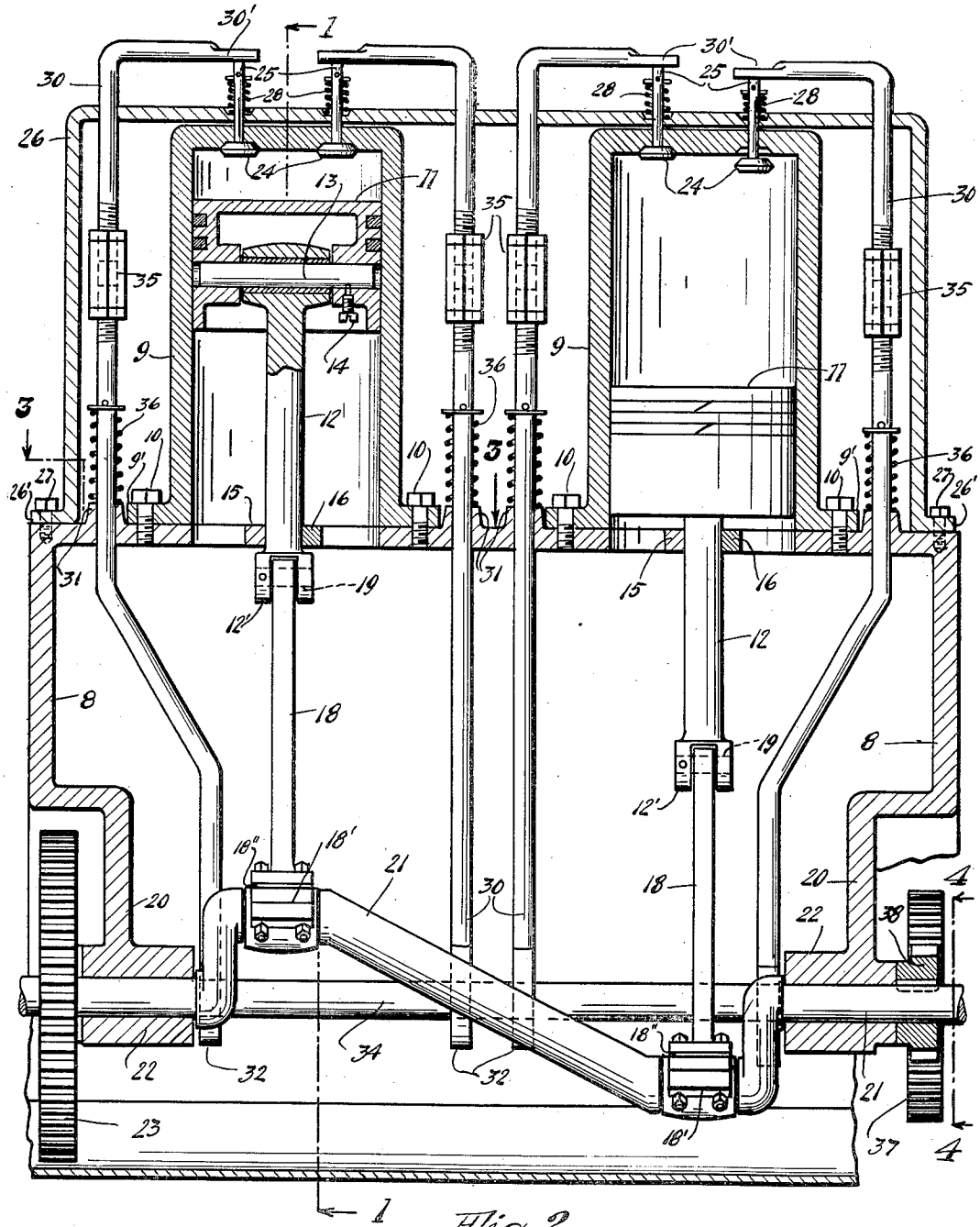


Fig. 2

Witnesses:
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ENGINE

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Fig. 3

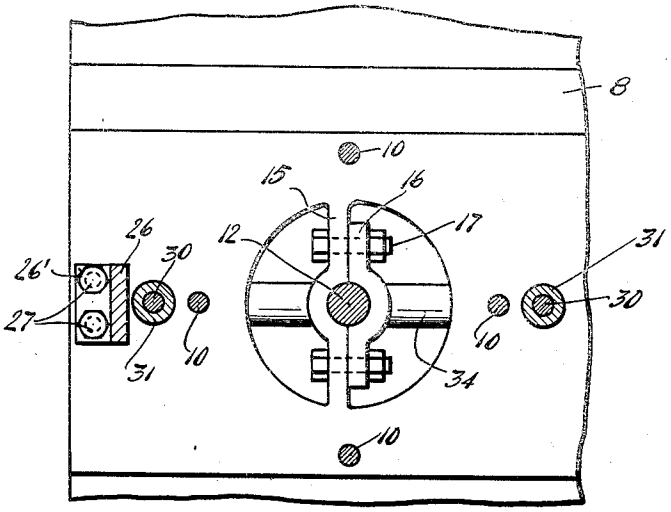
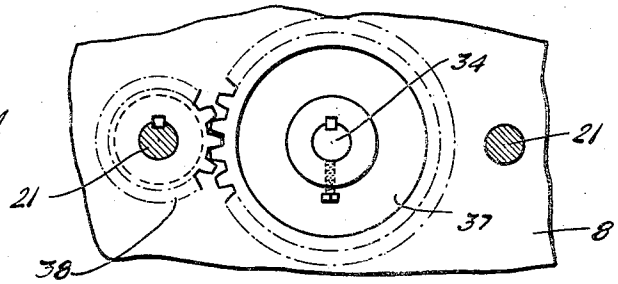


Fig. 4



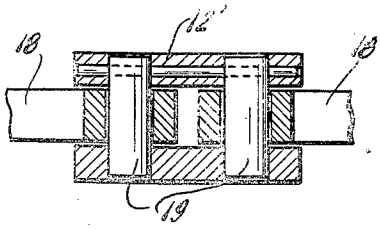


Fig. 5

Witnesses:
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Patented Feb. 24, 1925. 1,527,296

UNITED STATES PATENT OFFICE.

MICHAEL M. DUDAS, OF CHICAGO, ILLINOIS.

ENGINE.

Application filed June 7, 1923. Serial No. 643,909.

To all whom it may concern:

Be it known that I, MICHAEL M. DUDAS, a citizen of the United States, and a resident of the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Engines, of which the following is a specification.

My invention relates to new and useful improvements in engines, and its main object is to provide means to eliminate the customary side draft and side friction of the piston during its travel in the engine cylinder.

In the engines generally in use, only one piston rod or connecting rod is provided in each cylinder for connecting the piston to its associated crank shaft and as the crank shaft with the attached end of the piston rod is swung from side to side of the crank case during operation, a consequent side to side thrust and draft are produced on the piston during its travel in the cylinder. This side thrust and draft creates vibration and causes considerable friction and wear at diametrical opposite parts of the piston and the parts of the cylinder engaged thereby, which results in considerable loss of power. And as a consequence of said side draft and wear, spaces are soon formed between the piston and the cylinder at diametrical opposite parts of each, thereby creating suction and drawing lubricating oil from the crank case up into the cylinder and permitting it to move above the piston. It is my object to entirely avoid the above mentioned and other defects by my improved construction, and I preferably do this by the use of a plurality of similar connecting rods connecting each piston with a like plurality of crank shafts in balanced relation.

A further object is to improve the valve operating means by the use of cams on the cam shaft for pulling down valve rods which directly engage valve stems for opening the valves in the heads of the cylinders.

Other objects will appear hereinafter.

The invention consists in the combinations and arrangements of parts hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings forming a part of this specification and in which,

Fig. 1 is a vertical cross section on line 1—1 of Fig. 2;

Fig. 2 is a lateral vertical section on line 2—2 of Fig. 1;

Fig. 3 is a horizontal section on line 3—3 of Fig. 2;

Fig. 4 is a vertical section on line 4—4 of Fig. 2, and

Fig. 5 is a horizontal section on line 5—5 of Fig. 1.

The form of my invention illustrated comprises a crank case 8 and one or more cylinders 9 removably mounted on the upper end 8′ of said case, as by the use of lower flanges 9′ and bolts 10, or in any approved manner, said cylinders preferably having open connection with said crank case. A piston 11 reciprocates in said cylinder and has a short piston rod 12 pivotally connected thereto, as by the use of a pin 13, held in position by a lock screw 14. Said piston rod is preferably correctly centered by a cross bar formed in the upper wall of the crank case and providing a half collar 15, and a co-operating half collar 16 which is fastened thereto with bolts 17 or the like.

The particular means for eliminating all side draft or side thrust of the piston in the cylinder comprises a plurality of similar connecting rods 18 pivotally connected with their upper ends to the lower end 12′ of the piston rod 12, as with pins 19, below the collar members 14 and 16. These connecting rods are arranged at properly spaced points around said end 12′ of the piston rod and extend at an equal slant from said piston rod so as completely counterbalance the lateral thrust of each other and entirely eliminate any resulting lateral drafts upon the piston rod or through it upon the piston, as does occur with the use of a single piston rod which has its lower end swinging laterally to and fro with the crank of the crank shaft during operation. These connecting rods are preferably connected in pairs on each piston rod, as shown in the drawings, but may be used in various numbers and may be arranged in various manners, as long as they provide balanced power transmitting means which is free from side thrust upon the piston.

The crank case 8 is constructed in accordance with the number of connecting rods used, and in the form illustrated has its side walls slanting outward and contains a pair of curved lower portions 20 to mount a pair of crank shafts 21 journalled in bearings 22 in the ends of said portions 20.

Crank portions 21′ of crank shafts 21 are journalled in bearings 18′ mounted at the lower ends of the connecting rods 18, preferably by the use of interposed removable shims 18″ of suitable thickness, with which said rods can be accurately adjusted for length; and said shafts 21 are provided with intermeshing gears 23 of equal size to force said crank shafts and connecting rods to operate in unison. And since the connecting rods 18 slant outwardly toward their lower ends there will be a resulting outward thrust at said lower ends as well as a downward thrust, and the normal tendency of such lower ends and the crank portions 21′ of crank shafts 21 will consequently be downwardly and outwardly, thus rotating the gears in the same manner when the piston descends as indicated by the arrows in Fig. 1, and the upward movement of the piston and connecting rods will normally tend to draw the lower ends of said rods inwardly and upwardly thereby maintaining the rotation of gear wheels 23 in the direction indicated by the arrows.

Valves 24 are mounted in suitable valve seats at the inner face of each cylinder head and are provided with stems 25 which protrude through the valve head and through guide bars 26 extending down along the outside of the cylinder and mounted with flanges 26′ and suitable bolts 27 on the top of member 8′ of the crank case. A spring 28 is mounted on each valve stem and seated on the guide bar 26 to automatically close the valve.

My means for opening the valves comprises valve rods 30 which extend down the sides of each cylinder and through the guide bars 26 and collars 31 on the top of the case 8, said valve rods having laterally bent ends 30′ engaging the tops of the valve stems to press the valves open. The lower end of each valve rod is provided with a stirrup 32 having a flattened lower part 32′ which is engaged by a cam finger 33 on a cam shaft 34 passing through said stirrup, the cam thus pulls the valve rod down instead of pushing it up as in the usual forms, and directly engages the valve stem and pulls it down to open the valve, thus by using tension instead of compression upon the rod the use of a valve rod of smaller cross section is permitted than in the ordinary form. The valve rods are also provided with turnbuckles 35 or the like to adjust them for length, and with springs 36 seated on collars 31 to retain said rods in raised position. A gear wheel 37 is fastened on the cam shaft 34 and meshes with a smaller gear pinion 38 fastened on the crank shaft to drive the cam shaft and crank shaft at proportionate speeds, or said shafts may be connected and driven in any approved manner to operate the cams and valves at the proper times.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In combination, a cylinder and a crank case mounted on one end thereof, a piston in said cylinder and provided with a piston rod extending beneath said piston, guide means stationary in said crank case for centering said rod, a plurality of crank shafts mounted in said crank case, and a plurality of members pivoted oppositely at one end of said rod and diverging at equal angles therefrom to said crank shafts, said members being provided with replaceable means for varying their effective length.

2. In combination a cylinder provided with a piston having a rod extending beneath said piston, a crank case connected with said cylinder, a guide means for centering said rod, a pair of parallel crank shafts mounted in said case and provided with a pair of equal sized intermeshing gears, and a pair of similar connecting rods pivoted to said piston rod and to said crank shafts and being provided with replaceable means for varying their effective lengths.

3. In combination with a cylinder, a piston with a piston rod therein, a crank case connected to said cylinder, a plurality of crank shafts mounted therein, a plurality of connecting rods pivotally connected to said piston rod, and a plurality of bearing means mounted on the free ends of said connecting rods for embracing the crank shaft, one of said bearing means being mounted with interposed exchangeable means on the end of one of said connecting rods for adjusting the effective length of said rod.

4. In combination, a cylinder and a crank case removably mounted on one end thereof, a piston with a rod mounted in said cylinder, detachable collar means mounted on said crank case adjacent said cylinder for centering said rod, a pair of crank shafts in said case, a pair of oppositely inclined connecting rods pivoted to said piston rod beneath said means and to said crank shafts, said rods being provided with flanged means and replaceable shims for varying the effective lengths of said rods, and means connecting said crank shafts to make them run at equal speed.

5. In combination, a cylinder and a crank case removably mounted on one end thereof, a piston in said cylinder, a rod having its

upper end in said piston and its lower end extending beneath said piston and said cylinder, a collar for guiding and centering said rod and having a portion formed on said crank case and a portion removably attached thereto, a pair of crank shafts in said case, a pair of oppositely inclined connecting rods pivoted to said piston rod beneath said collar and to said crank shafts, said rods being each provided with a pair of flanged means and replaceable shims for varying the effective lengths of said rods and with bearings for journalling said crank shafts, and intermeshing gears for connecting said crank shafts to make them run in unison.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MICHAEL M. DUDAS.

Witnesses:
JOSHUA R. H. POTTS,
FREDA C. APPLETON.