

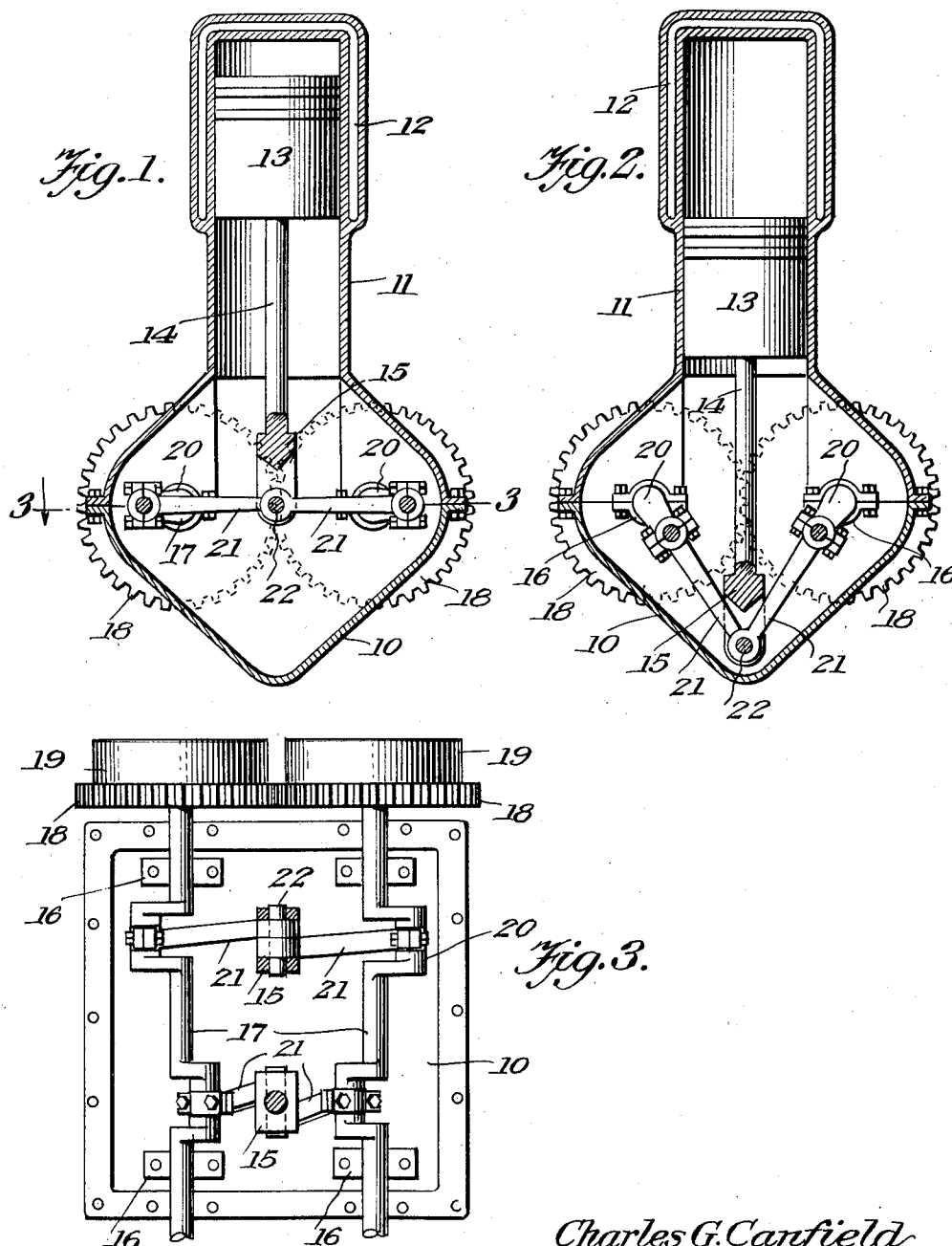
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ENGINE

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ENGINE.

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This invention relates to engines either of the internal combustion or the fluid pressure type and has for its object the provision of a novel engine embodying plural shafts having drive connection with each other and so arranged and connected with the piston as to give the engine increased power, as compared with ordinary types, on account of the power stroke being of longer duration than the idle or return stroke.

An important object is the provision of an engine of this character having a pair of shafts located at opposite sides of the longitudinal axis of the cylinder or cylinders, both shafts being operatively connected with each piston, the connections being opposed or reversed so that each shaft will have power applied thereto during the major portion of its revolution, the application of power to the two shafts being alternate so there will be no idleness at any time.

Yet another and more specific object is the provision of an engine having a peculiar mode of connection between the pistons and the two power shaft so that upon two successive power strokes applied to each shaft the shaft through successively operating pistons will move through substantially two-thirds of a revolution.

An additional object is the provision of a mechanism of this character which will be comparatively simple and inexpensive to manufacture, positive in action, efficient and durable in service and a general improvement in the art.

With the above and other objects and advantages in view, the invention consists in the details of construction and the arrangement and combination of parts to be hereinafter more fully described and claimed, and illustrated in the accompanying drawings, in which:

Figure 1 is a vertical cross section taken through an engine constructed in accordance with my invention, and showing the power shaft in one position.

Figure 2 is a similar view showing the moving parts in a different position, and

Figure 3 is a bottom plan view or section taken on the line 3—3 of Figure 1.

Referring more particularly to the drawings I have shown the engine as comprising a crank case 10 upon which are mounted any desired number of cylinders 11 of any ordinary or preferred construction preferably water-jacketed as indicated at 12. Operating

within the respective cylinders are pistons 13 of conventional pattern carried by piston rods 14 each of which terminates at its lower end in a yoke or U-shaped member 15 which may be formed integrally upon or suitably secured to the piston rod. Any desired means may be provided for permitting the inlet of fluid under pressure or of a combustible gas mixture to the cylinders and similarly any desired means may be provided for permitting the exhaust of steam or other fluid pressure, in case of the steam engine, or the outlet of burnt gases in the case of an internal combustion engine. These details are not shown as they form no part of the present invention and furthermore as they may be varied within such wide limits.

Extending longitudinally of the crank case 10 and journaled in suitable bearings 16 are spaced parallel shafts 17 which project beyond both ends of the crank case. At one end these shafts carry intermeshing gears 18 and suitable fly wheels 19 while at the other end of either one may be provided any suitable power take-off device, not shown. The shafts 17 are formed with crank portions 20 upon which are engaged connecting rods 21 arranged in pairs as shown and having their other ends pivoted as at 22 within the yokes or U-shaped members 15 carried by the piston rods 14.

In the operation, it will be apparent that the pistons are intended to have only one power stroke, namely the downward stroke, and assuming that the parts are in the position shown in Figure 1, it will be seen that by the time successive pistons successively reach their lowermost positions, as shown in Figure 2, each crank shaft will have been turned through successive arcs of substantially one hundred and twenty degrees. Since the pistons are arranged to move in alternation and connected with the crank shaft in the manner specified there will be no unevenness in the movement owing to the fact that the crank shafts are geared together and both provided with the fly wheels. Obviously it will be clear that power may be applied successively to the intergeared crank shafts through successive power strokes of the pistons providing a substantially two-thirds revolution of each crank shaft.

From the foregoing description and a study of the drawings it will be apparent that I have thus provided an engine of novel design embodying several characteristics and

features of advantage whereby the efficiency will be greatly increased and power and smoothness of operation likewise increased. Owing to the absence of a large number of parts, resulting from the simplicity in the design, it will be seen that there is little to get out of order and that the mechanism should have a long and satisfactory life.

While I have shown and described the preferred embodiment of the invention, it should be understood that I reserve the right to make such changes in the form, construction and arrangement of parts as will not depart from the spirit of the invention or the scope of the subjoined claims.

Having thus described the invention, I claim:

1. In an engine, a crank case, a cylinder mounted thereon, a piston reciprocating in the cylinder and carrying a piston rod, a pair of parallel crank shafts journaled through the crank case lying in a plane at right angles to the longitudinal axis of the cylinder and disposed at equal distances from the longitudinal median line of the cylinder greater than the cylinder radius, intermeshing gears and fly wheels on said spaced crank shafts, cranks on each of said shafts in line with the cylinder and oppositely disposed, a pair of pitmen pivotally connected in common to the piston rod and having their other ends pivotally connected to said cranks, the points of pivotal connection of the pitmen with the

piston rod and cranks being in substantial alinement at the beginning of the power stroke of the piston.

2. In an engine, a crank case, a plurality of cylinders mounted thereon, a piston reciprocating in each cylinder and carrying a piston rod, a pair of parallel crank shafts journaled through the crank case with their axes lying in a plane at right angles to the longitudinal axis of the cylinder and disposed at equal distances from the longitudinal axis of the cylinder greater than the piston radius, intermeshing gears on the crank shafts for reverse rotation thereof and a fly wheel on each shaft, a pair of cranks on each of said crank shafts in line with each cylinder, the cranks so alined being oppositely disposed, a pair of pitmen pivotally connected in common to each piston rod and having their other ends pivotally mounted on the alined oppositely disposed cranks of their cylinders, the relative proportion of crank and pitman length and piston rod travel being such, as will, at the beginning of the power stroke of the piston, position the pivotal points of the pitman connections to their respective piston rods and cranks in substantial alinement with the said right angular plane of the crank shafts axes with the pair of cranks extended oppositely outward from the longitudinal median lines of the cylinders.

In testimony whereof I affix my signature.
CHARLES G. CANFIELD.