July 7, 1942. J. FRISONE 2,289,005

ENGINE

Filed Feb. 7, 1941 2 Sheets-Sheet 1

Fig. 1.

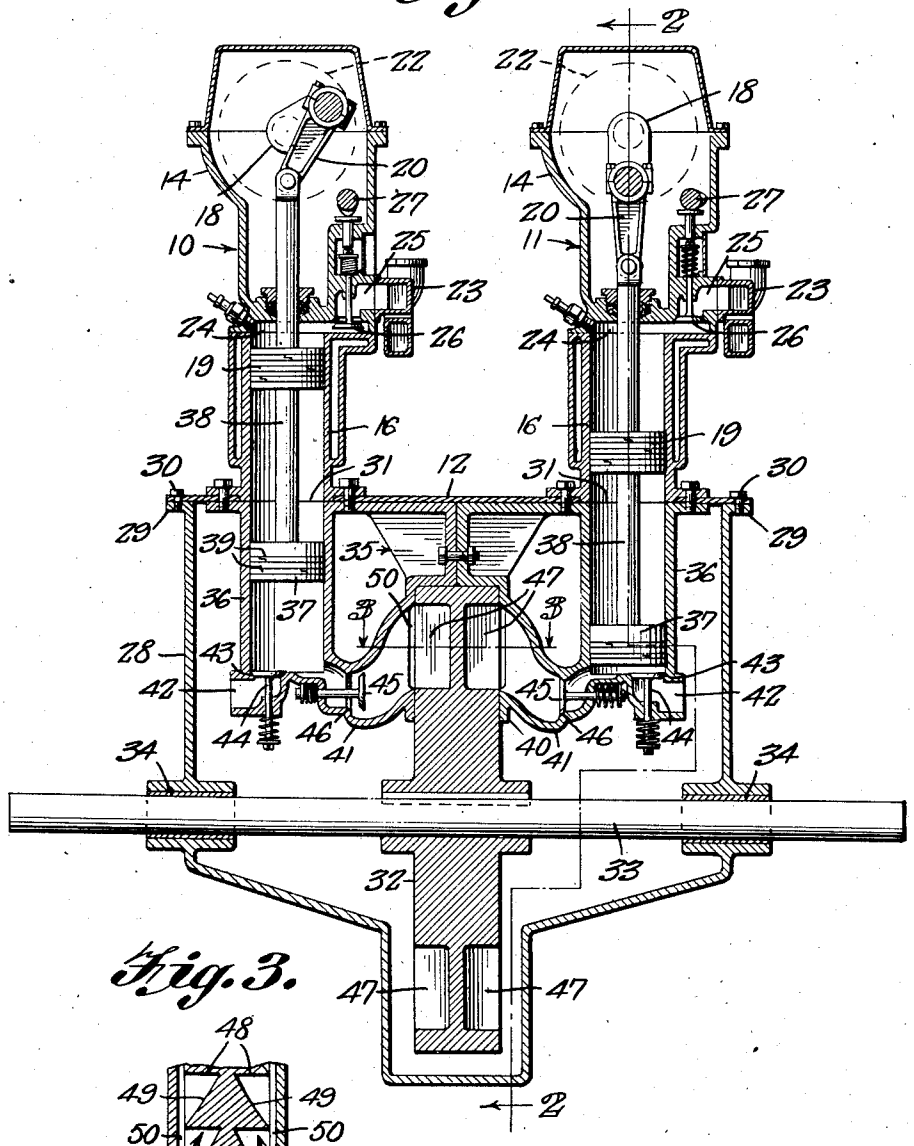
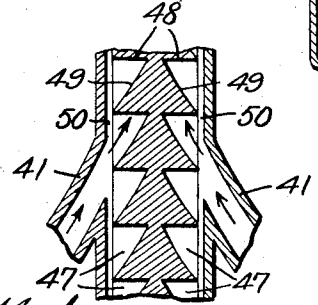


Fig. 3.



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INVENTOR

BY Victor J. Evans & Co.
ATTORNEYS

WITNESS

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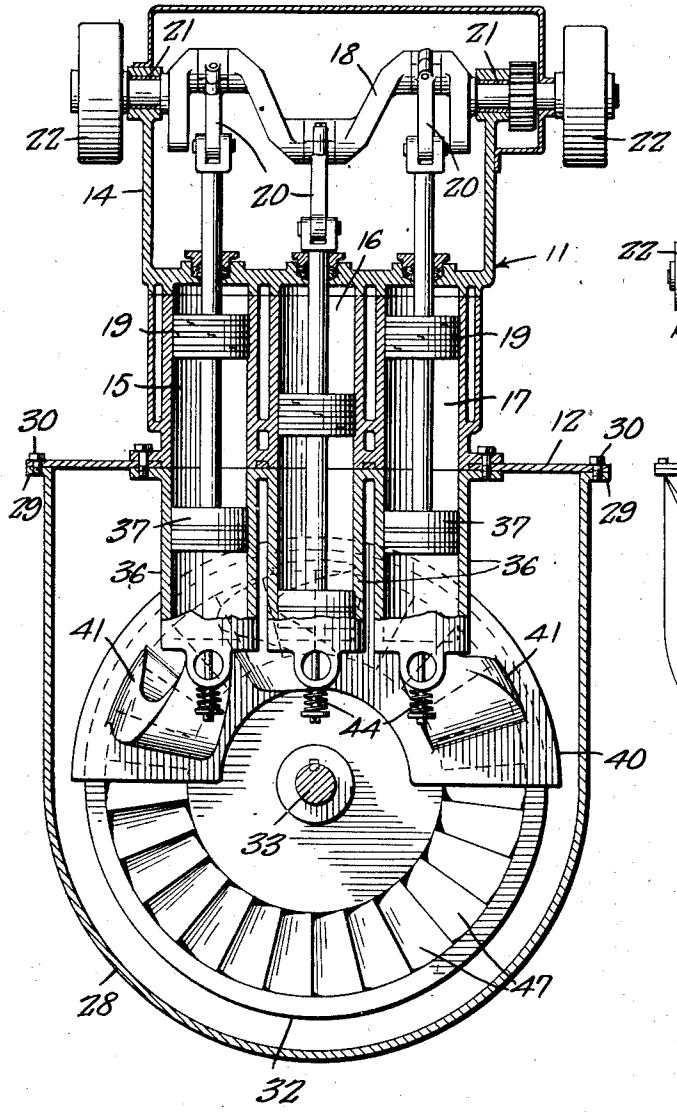
ENGINE

Filed Feb. 7, 1941 2 Sheets-Sheet 2

Fig. 2.



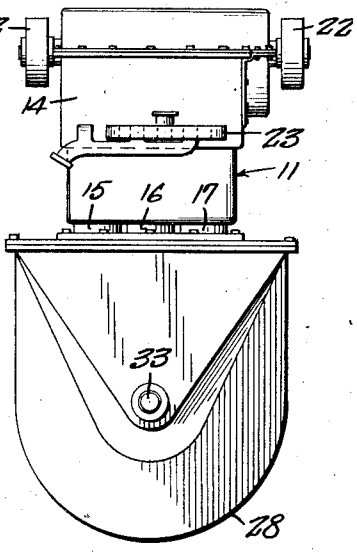


Fig. 4.

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Patented July 7, 1942

2,289,005

UNITED STATES PATENT OFFICE

2,289,005

ENGINE

John Frisone, Quantico, Va.

Application February 7, 1941, Serial No. 377,907

5 Claims. (Cl. 60—12)

My invention relates to new and useful improvements in internal combustion engines.

An important object of my invention is the provision of an internal combustion engine having a fluid reservoir uniquely associated therewith in a manner whereby a rotor mounted within the reservoir may be hydraulically actuated by means of the conventionally operated pistons of the engine.

Another object of my invention is the provision of an internal combustion engine of the above-mentioned character that is simple in its construction, inexpensive to manufacture and efficient and efficacious in its operation.

Other objects and advantages of my invention will be apparent during the course of the following description.

In the drawings, forming a part of this specification, and wherein like numerals are employed to designate like parts throughout the same;

Figure 1 is a vertical sectional view of a device embodying my invention,

Figure 2 is a vertical sectional view taken on the line 2—2 of Figure 1,

Figure 3 is a fragmentary transverse sectional view taken on the line 3—3 of Figure 1, and

Figure 4 is a side elevation of the device.

In the accompanying drawings, wherein for the purpose of illustration, is shown a preferred embodiment of my invention, the numerals 10 and 11 designate generally spaced internal combustion engines mounted in an inverted position and maintained in fixed relation with each other by means of the plate 12, which is bolted or otherwise fixedly secured to the outer open ends of the cylinders 15, 16 and 17. Each of the engines 10 and 11 is identical in its construction and operation and each includes a crankcase 14 having the spaced parallel cylinders 15, 16 and 17 associated therewith in the conventional manner. The crankshaft 18 extends through the crankcase and operatively connects with the pistons 19 reciprocally mounted in the cylinders 15, 16 and 17 through the medium of the conventional connecting rods 20. As best illustrated in Figure 2 the opposite ends of the crankshaft are journaled for rotation in the bearings 21 provided in the ends of the crankcase and the portions of the shaft ends extending exteriorly of the crankcase carry balance wheels 22. Each of the engines is provided with the usual intake manifold 23 which permits fuel vapors to be introduced into the compression chamber 24 of the cylinders through the intake passage 25 and the flow of the fuel vapors through the passage 25 is controlled in the conventional manner by valve 26, the valves being operated in the well known manner by means of the cam shaft 27.

I propose to mount the plate 12 holding the engines in fixed association with each other and in the inverted position on the open top of a fluid reservoir or casing 28. The open top of the casing is formed with an outstanding lip 29 to which the plate is fixedly secured by means of the bolts 30 in a manner to provide a fluid-tight container with which the open outer ends 31 of the cylinders are freely communicable. The rotor 32 is keyed or otherwise fixedly mounted on the driven shaft 33 and, as best illustrated in Figure 1, the rotor is located intermediate of the spaced banks of cylinders and the opposite ends of its supporting shaft extend through the bearings 34 provided in the opposite sides of the casing. The casing is normally filled or substantially filled, with a suitable hydraulic fluid such as oil, or the like, and the rotor is adapted to operate within the fluid.

A supporting structure 35 mounted within the casing is attached to the plate 12 and includes cylinder portions 36 which register with each of the cylinders 15, 16 and 17 of the engines 10 and 11. The cylinders 36 are preferably of the same size as the engine cylinders and pistons 37 mounted for reciprocation therein connect with the pistons 19 through the medium of the piston rods 38. The cylinders 37 are provided with conventional piston rings 39 which wipingly engage the cylinder walls to prevent fluid entering the cylinders from the casing from having access to the portion of the cylinders intermediate the pistons 19 and 37. The supporting structure is formed intermediate the cylinders 36 with a segmental housing 40, which is of U-shaped formation in cross-section and which snugly receives the upper peripheral portion of the rotor 32. It is to be understood that while the housing is thus applied to the rotor it does not prevent the free independent rotation of the rotor. The lower end of each of the cylinders 36 is connected to the adjacent side wall of the housing 40 by an integral tubular extension 41 which extensions close the outer end of the cylinders. However, in order that fluid from the casing may have access to the cylinders 36 I have provided each of the extensions with an inlet passage 42. The inner end of each of the passages is formed with a valve seat 43 and a spring influenced valve 44 normally engages the valve seat to prevent the fluid within the casing from having access to the

cylinders. Similarly, communication between the cylinders and the rotor is controlled by a valve 45 which seats in the direction of the cylinder and against an annular valve seat 46 provided in the extension.

It may thus be seen that the valves 44 open upwardly into the cylinders and that the valves 45 open in the direction of the rotor and away from the cylinders. Thus, if the engines 10 and 11 are operated the pistons 19 will reciprocally actuate the pistons 37 in the lower cylinders 36. As the pistons 37 travel upwardly on their suction stroke they will create a suction in the lower ends of their cylinders which will unseat the valves 44 and permit fluid from the casing to enter the cylinders. As soon as the pistons complete their suction stroke the valves 44 will seat and, immediately upon beginning their power stroke, the valves 45 will be opened by pressure of the fluid within the cylinders, whereby the valves will unseat to permit the fluid to egress from the cylinders through the tubular extensions 41 and be impinged into the pockets 47 in the opposite sides of the rotor. As best illustrated in Figures 1 and 2, each side of the rotor is formed with an annular series of spaced pockets and each of the pockets is formed with a transverse wall 48 and an obliquely disposed wall 49. The manner in which the wall 48 extends normally to the side wall of the rotor and the manner in which the wall 49 extends from the inner end of the wall 48 to the side of the rotor, provides a unique means for permitting the fluid impinged therein to impart rotation to the rotor. As illustrated in Figures 2 and 3, each of the extensions 41 approaches its respective side of the rotor housing obliquely so that the fluid discharged therefrom will impinge substantially directly against the transverse wall 48 of the pockets. The portion of the side walls of the housing covering the series of rotor pockets is formed with an inner channel 50 so that the fluid impinged into the pockets through the tubular extension may flow back into the casing and need not be carried in the pockets until such time as the pocket is moved to a position below the housing 40. The pistons 37 will operate independently and it is readily apparent that at least one of the pistons will be making a power stroke at all times whereby the rotor will be constantly urged by the fluid impinged into the pockets 47. As hereinabove set forth, as each piston begins its power stroke, the valve 44 controlling communication between the cylinder and the casing will be closed to prevent additional fluid from flowing into the cylinder and the fluid thus trapped in the cylinder will be forced outwardly through the extension 41 and against the transverse walls 48 of each pocket of the rotor which moves into register with the discharge end of the extension during the power stroke. A portion of the fluid will remain in the pocket in which it is impinged and be returned to the casing as soon as the pocket has moved to a position below the housing 40 and a portion of the fluid may flow between the rotor and the confronting side wall of the housing through the channel 50.

It is to be understood that I have here illustrated the engines 10 and 11 as being provided with three cylinders each merely by way of illustration and that I do not wish to restrict the device to any particular number of pistons. It is obvious that one or more pistons operating to impinge the fluid into the pockets of the rotor would impart rotation to the rotor. However, if a greater number of pistons are used for this purpose, the operation of the rotor will be smoother and more efficient. If either of the engines 10 or 11 be rendered inoperative, the other of the engines may still operate to effect rotation of the rotor.

It is to be understood that the form of my invention, herewith shown and described, is to be taken as a preferred example of the same, and that various changes in the size, shape and arrangement of parts may be resorted to without departing from the spirit of my invention, or scope of the appended claims.

Having thus described my invention, I claim:

1. In an internal combustion engine of the type having cylinders, pistons operating within said cylinders, and means for driving the said pistons, a casing mounted on the engine and enclosing the open outer ends of the cylinders; a driven shaft journaled for rotation in said casing; a rotor fixedly mounted on the shaft and having a plurality of annularly spaced pockets, a housing mounted within the casing enclosing a segmental portion of the rotor and having parts thereof arranged in confronting relation with the rotor pockets, each of said cylinders being formed with a tubular extension having an inlet opening permitting direct communication between the cylinder and casing, the said extension extending in the direction of and connecting with the mentioned parts of the housing and openings therethrough in confronting relation with the pockets in the rotor; valve means disposed in the said inlet openings adapted to seat during the power stroke of the piston and to unseat during the suction stroke thereof to permit fluid in the casing to enter the cylinders; and valve means for controlling the flow of fluid through the extensions, said last valve means being adapted to seat during the suction stroke of the piston and to unseat during the power stroke thereof whereby the fluid in the cylinders will be forced through the extensions and impinged into the rotor pockets to effect rotation thereof.

2. In an internal combustion engine of the type having cylinders, pistons operating within said cylinders, and means for driving the pistons, a fluid casing mounted on the engine and receiving the open outer ends of the cylinders; a rotor mounted for rotation within the casing, said rotor having a plurality of annularly spaced pockets and said pockets being formed with a transverse wall and an obliquely disposed wall; a housing mounted within the casing enclosing a portion of the rotor and having parts thereof arranged in confronting relation with the rotor pockets; a tubular extension formed on the open outer end of each of the cylinders, one end of the extensions opening into the casing and the other end thereof extending obliquely toward the rotor and connected with the mentioned parts of the housing to open against the transverse wall of the said pockets; normally seated valve means disposed in the first-mentioned end of the extensions adapted to open on the suction stroke of the pistons to permit a fluid within the casing to enter the cylinders; and normally seated valve means mounted in the second-mentioned end of the extensions adapted to open on the power stroke of the pistons to permit the fluid within the cylinders to be forced through the extensions and impinged against the transverse walls of the pockets.

3. An internal combustion engine having spaced banks of cylinders, pistons operating

within said cylinders, and drive means for the said pistons, a casing mounted on the engine and receiving the open outer ends of the cylinders; a rotor mounted for rotation within the casing intermediate the said banks of cylinders, the opposite sides of the rotor being formed with an annular series of pockets; a supporting structure mounted in the casing rotatably receiving a peripheral portion of the rotor and having separate tubular extensions leading from the rotor pockets to each cylinder of the engine; valve means for closing the outer ends of the cylinders from the casing during the power stroke of the pistons but opening communication therebetween during the suction stroke of the pistons to permit fluid from the casing to enter the cylinders; and valve means mounted in the said extensions for controlling communication between the cylinders and the rotor pockets, said last-mentioned valve means being adapted to seat during the suction stroke of the piston to prevent communication therebetween and to open on the power stroke thereof to permit the fluid in the cylinder to be impinged into the rotor pockets whereby to drive the said rotor.

4. In an engine, a fluid casing, a housing mounted within the casing having spaced side walls, a rotor mounted in the casing and between the side walls of the housing, the said rotor being formed with pockets which traverse the side walls of the housing during rotation of the rotor, conduits opening through the side walls of the housing and into the pockets of the rotor, and mechanism for alternately drawing fluid from the casing and discharging the same under pressure thru the said conduits and into the rotor pockets for actuating the said rotor.

5. In an engine, a fluid casing, a housing mounted within the casing having spaced side walls, a rotor mounted in the casing and between the side walls of the housing, the said rotor being formed with pockets which traverse the side walls of the housing during rotation of the rotor, conduits opening through the side walls of the housing and into the pockets of the rotor, mechanism for alternately drawing fluid from the casing and discharging the same under pressure through the said conduits and into the rotor pockets for actuating the said rotor, and channels formed in the side walls of the housing for conducting the fluid from the rotor pockets back into the casing.

JOHN FRISONE.