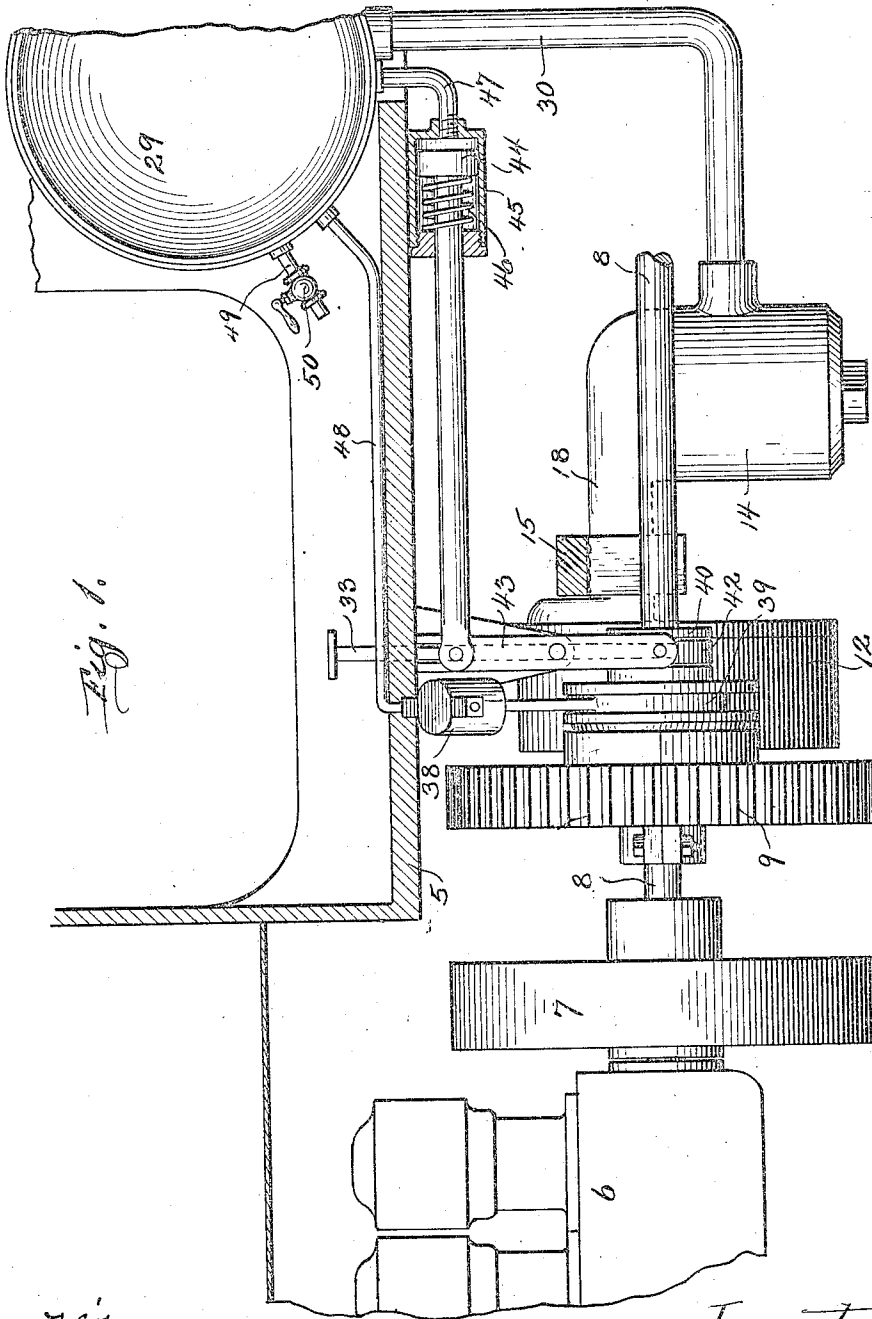


B. POULSON.
GAS ENGINE STARTER.
APPLICATION FILED NOV. 10, 1911.

Patented Dec. 26, 1916
2 SHEETS—SHEET 1.

1,210,360.



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UNITED STATES PATENT OFFICE.

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GAS-ENGINE STARTER.

1,210,360.

Specification of Letters Patent.

Patented Dec. 26, 1916.

Application filed November 10, 1911. Serial No. 652,664.

To all whom it may concern:

Be it known that I, BRITTON POULSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Gas-Engine Starter, of which the following is a specification.

My invention relates to gas engine starters which will start the engine irrespective of the position of the crank shaft and the objects of my improvement are first, to make the device to operate automatically; second, to provide a novel fluid motor; third, to arrange the parts in a compact form; fourth, to make the device detachable; fifth, to have the operating parts normally detached from the engine; sixth, to make a simple, cheap and efficient device and other features to become apparent from the description to follow.

It is somewhat objectionable to start a gas engine by cranking, especially those on automobiles, and by the use of my invention the cranking is entirely eliminated, however, my newly invented device is so arranged with relation to the gas engine that the engine may be cranked if so desired without in any way interfering with the starting device.

Generally speaking my invention consists of providing a pressure fluid motor which is normally disengaged with the gas engine and a tank containing compressed air or other suitable fluid connected to the fluid motor by suitable piping in which is provided a controlling valve.

The device is preferably made so that one operating lever will serve the double purpose of throwing the fluid motor into operative connection with the gas engine and admitting the compressed fluid to the fluid motor. The compressed air stored in the tank is kept replenished by automatic means connected to the gas engine and its use is preferably not limited to driving the fluid motor but is also used to inflate the tires and sound an alarm such as a horn for a danger signal.

To describe my invention so that others versed in the art to which it pertains can make and use the same I have illustrated it on the accompanying two sheets of drawing forming a part of this specification in which:—

Figure 1, is a fragmental longitudinal sectional view of an automobile showing a de-

vice embodying my invention applied thereto: Fig. 2, is a cross section through the fluid motor and the engine shaft showing the parts in their normal position, Fig. 3 is a sectional view taken on line 3—3 of Fig. 2 and Fig. 4 is a sectional view taken on line 4—4 of Fig. 3.

Similar reference characters refer to similar parts throughout the several views.

Only a sufficient part of the automobile is shown to show the relative position of the parts, although the said parts may be placed in any other position relative to one another and still come within the scope of my invention. The automobile gas engine is shown at 6, the fly wheel at 7 and the engine or crank shaft at 8.

A large gear wheel 9 is rigidly mounted on shaft 8 and is preferably made of split construction so that it can be applied to a complete machine without disassembling any part of the machine. In some instances it may be preferable to make the gear wheel 9 integral with the fly wheel 7. Arranged to be moved into mesh with the gear 9 is a small gear 10 (best seen in Figs. 2 and 3) which is rigidly mounted on the exposed end of the motor shaft 11 whose other end is rigidly connected to the rotating part of the fluid motor 12, which is mounted to swing about the pivot 13, mounted in a suitable socket 14 rigid with the frame 15 of the machine.

The casing of the fluid motor 12 is preferably made in two parts, the cylinder 16 and the end cap 17. The cap 17 has the extension or arm 18 which terminates in the pivot 13, thus it is clear that the gear 10, the motor 12 and the arm 18 swing in unison about the pivot 13. The purpose of having these parts swing about a pivot is to move the gear 10 into and out of mesh with the gear 9, hence only a slight movement of the gear 10 is necessary, say about two inches. A portion 19 of the arm 18 is made to fit snugly and slide in a slot 20 provided therefor in a portion of the frame 15 of the machine. The portion 19 is preferably made of such suitable width as to hold the motor 12, rigid against the twisting strain transmitted thereto by reason of the gear 10 driving the gear 9 when said gears are placed into mesh.

The cylinder 16 is provided with one integral head or cap 21 which is pierced by

the shaft 11. The other end of the cylinder 16 is closed by the cap 17 which is provided with a socket bearing for the end of shaft 11 and is secured rigidly to the cylinder 16 by any desirable means as for instance by cap screws 22. Within the cylinder 16 is mounted the rotating hub 23 arranged eccentric to the cylinder so that said hub 23 will constantly be in contact with one side (the top as viewed in Fig. 2) of the cylinder 16 and fits snugly against both caps 17 and 21 so as to prevent fluid passing between said hub 23 and the cylinder 16 and caps 17 and 21. The hub 23 is rigidly mounted on shaft 11 and is provided with a plurality of radial slots into which are fitted to slide the flat blades 24. Each blade 24 is provided with the outwardly extending lugs 25 on opposite edges which are arranged to fit and slide in the circular grooves 26 provided in each cap 17 and 21, said grooves are made concentric to the cylinder so that the outer end of the blades 24 are held in contact with the inner surface of the cylinder 16 at all times.

An inlet for the compressed air is provided at 27 and an outlet is provided at 28 so that when the air is admitted at 27 it will pass around clockwise as viewed in Fig. 2, in the cylinder 16, carrying the blades 24 around also and pass out of said cylinder at 28. Of course, it is clear that as the blades 24 are carried around in cylinder 16, the shaft 11 is rotated in unison therewith, and the shaft 11 carrying the gear 10 transmits rotary motion to the gear 9 and shaft 8.

The compressed air is stored in tank 29 mounted in any convenient place on the machine and the air as seen in Fig. 1 passes from tank 29 through the pipe 30, through a valve 31 formed by and between the pivot 13 and socket 14, thence through the passageway 32 formed in arm 18 and thence to the inlet 27.

The valve 31 is normally in a closed position as seen in Fig. 3, but when the gear 10 is moved into mesh with the gear 9 the pivot 13 turns a sufficient distance to open valve 31 and permits the passage of compressed air from the tank 29 to motor 12. To move the gear 10 into and out of mesh with gear 9 I have arranged a foot pedal in the shape of a bell crank lever 33, best seen in Fig. 2, which is pivoted at 34, having the free end of one arm pivotally connected at 35 to a suitable lug 36 provided on the cap 17, and the free end of the other arm projecting up through the floor of the car to within easy reach of the operator's foot. Thus it is seen that a downward movement on the horizontal arm of the bell crank lever 33 will move the motor 12 and therefore also the gear 10 to the left as viewed in Fig. 2 against the tension of the spring 37

which is connected to normally yieldingly hold the motor 12 in its extreme position to the right as viewed in Fig. 2.

The air pressure in tank 29 is replenished or kept up automatically by means of the air pump 38 which is operated by means of the eccentric 39 mounted on the clutch member 40 loosely mounted on shaft 8 and provided with a conical extension to fit into a conical depression in the hub of gear wheel 9 at 41, so arranged that when the clutch member 40 is pressed toward gear wheel 8, *i. e.* to the left as viewed in Fig. 3, it will be rotated in unison with the gear 9, and when said clutch member 40 is moved away from gear 9, *i. e.*, to the right as viewed in Fig. 3, the said clutch member 40 will remain dormant. To move the clutch member 40 to and from gear 9 on the shaft 8 a spanner ring 42 and cooperating lever 43 are connected to the piston 44 fitted to move in cylinder 45 so that when the piston 44 is moved the clutch member 40 will move also. The cylinder 45 is rigidly mounted on the machine 5 and the piston 44 is yieldingly held to the right as viewed in Fig. 1, by the spring 46. The closed end of the cylinder 45 is connected to the tank 29 by a pipe 47 and so arranged that the air pressure in the tank 29 will be constantly exerted against the piston 44 and the tension of spring 46. The pressure of the spring 46 against the piston 44 is adjusted to equal the pressure of air desired in the tank 29, say about two hundred pounds to the square inch, and when the pressure in the tank attains or exceeds said pressure the piston 44 is moved to the left as viewed in Fig. 1, against the tension of the spring and by reason of the connecting arm 43 and spanner 42 the clutch member 40 is moved to the right out of engagement with the hub of gear wheel 9 and ceases to be rotated therewith. Thus it is clear that when the pressure in tank 29 is below the desired or predetermined pressure the pump 38 will be set into operation and force air through pipe 48 into tank 29, and as soon as the pressure in tank 29 equals or exceeds the said desired or predetermined pressure the pump 38 will be inoperative. The clutch member 40 is also made of split construction so that it can be applied to the shaft 8 without disassembling any portion of the machine.

A pipe 49 is connected to the tank 29 and is provided with a stop-cock 50 so that air under pressure can be taken from the tank 29 for the purpose of inflating the tires of the vehicle or for any other purpose.

Having thus fully described my invention what I claim as new and desire to secure by Letters Patent of the United States is:—

In a device of the class described, an internal combustion engine having a shaft, a gear rigidly mounted on said shaft, a second

gear normally out of mesh with said first
named gear arranged to be moved into mesh
therewith, a fluid pressure motor mounted to
rotate said second named gear and provided
5 with a pivot about which it swings, said
pivot provided with a passageway communi-
cating with the fluid pressure motor, a
source of pressure fluid supply, a suitable
socket into which said pivot is fitted pro-
10 vided with a passageway communicating
with said source of pressure fluid supply,
said passageways in the pivot and the socket

arranged to act as a valve which is nor-
mally closed and is opened when the second
named gear is moved into mesh with the 15
first named gear.

In testimony whereof I have signed my
name to this specification in presence of
two subscribing witnesses this 7th day of
November, 1911, at Chicago, Illinois.

BRITTON POULSON.

Witnesses:

R. J. JACKER,

C. B. SACKHEIM.