Sept. 18, 1923. 1,468,567

C. W. HONABACH

INTERNAL COMBUSTION ENGINE

Filed Aug. 21, 1922 4 Sheets-Sheet 1

Fig. 1.

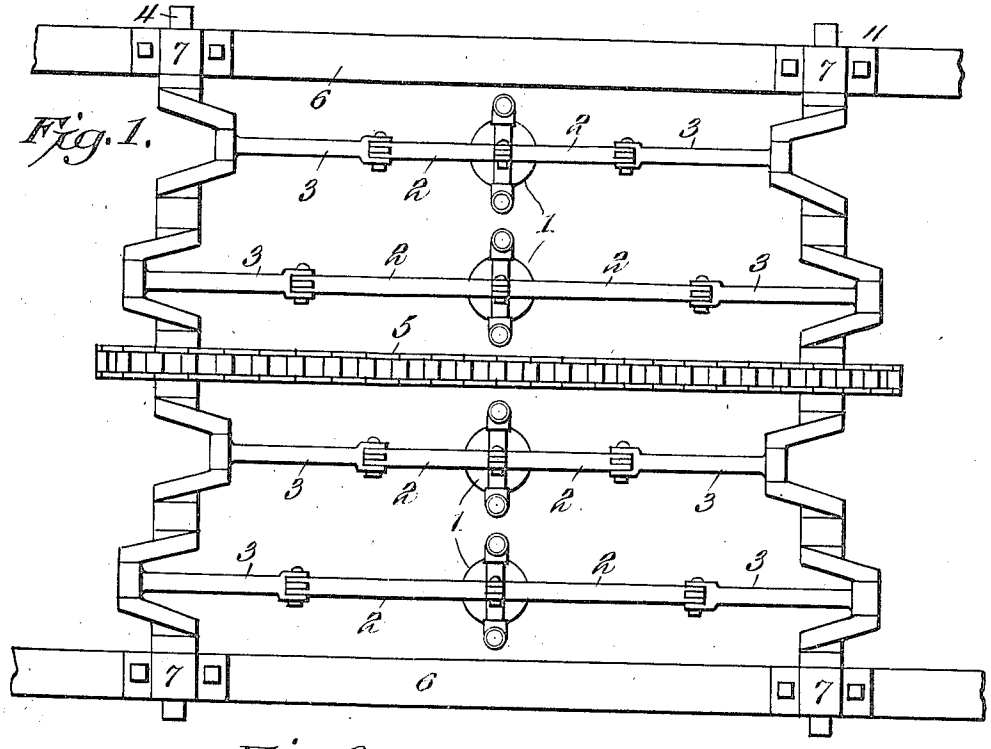
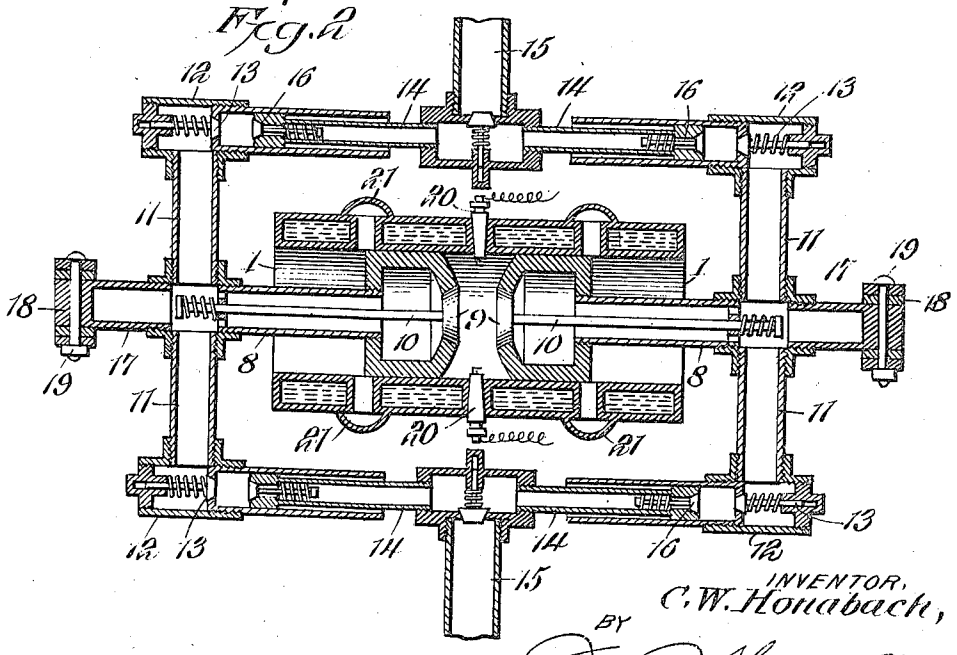


Fig. 2.



INVENTOR,
C. W. Honabach,
BY
James J. Sheehy & Co.,
ATTORNEYS.

Sept. 18, 1923. 1,468,567

C. W. HONABACH

INTERNAL COMBUSTION ENGINE

Filed Aug. 21. 1922 4 Sheets-Sheet 2

Fig. 3.

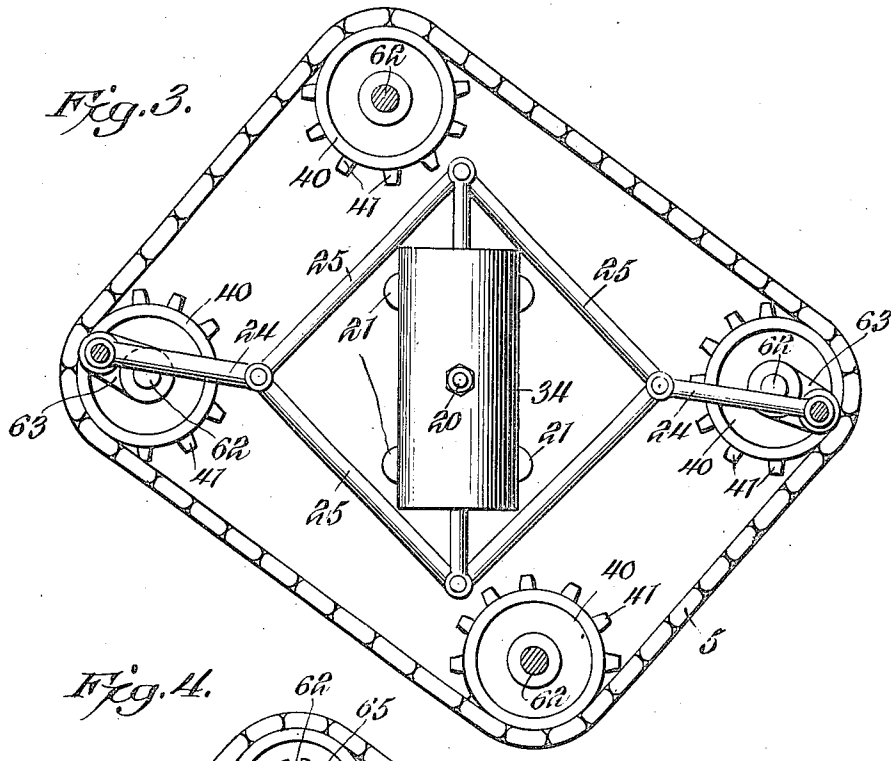
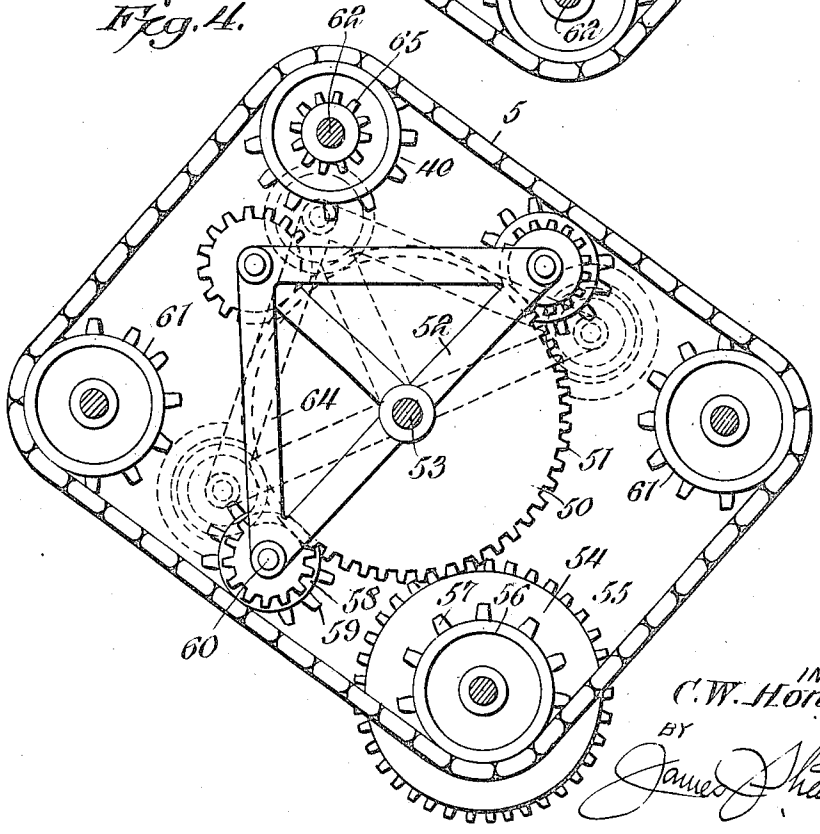


Fig. 4.



INVENTOR,
C. W. Honabach,
BY
James J. Shelby Co.,
ATTORNEYS.

Sept. 18, 1923.

1,468,567

C. W. HONABACH

INTERNAL COMBUSTION ENGINE

Filed Aug. 21. 1922

4 Sheets-Sheet 3

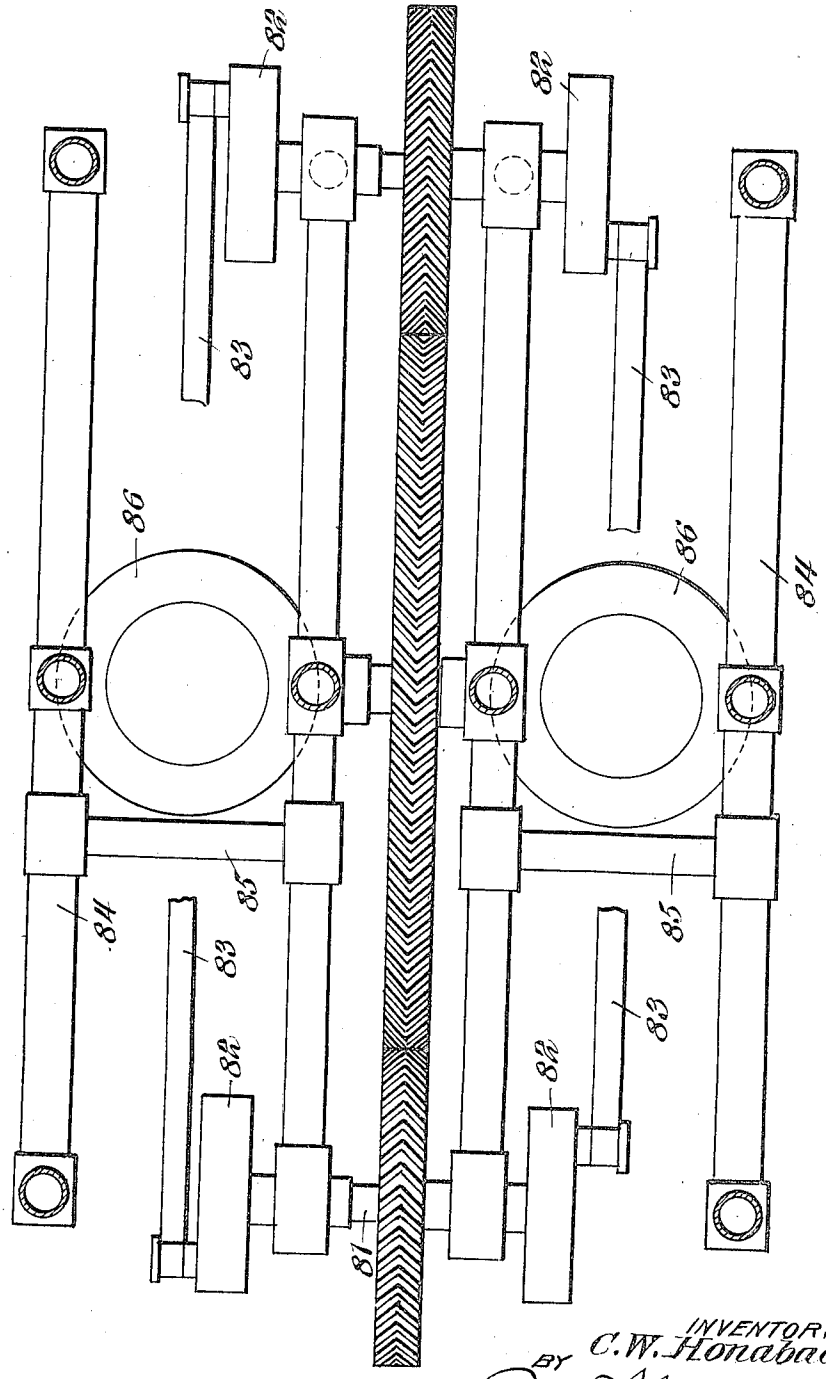


Fig. 5.

INVENTOR,
BY C. W. Honabach,
James J. Sheehy & Co.,
ATTORNEYS.

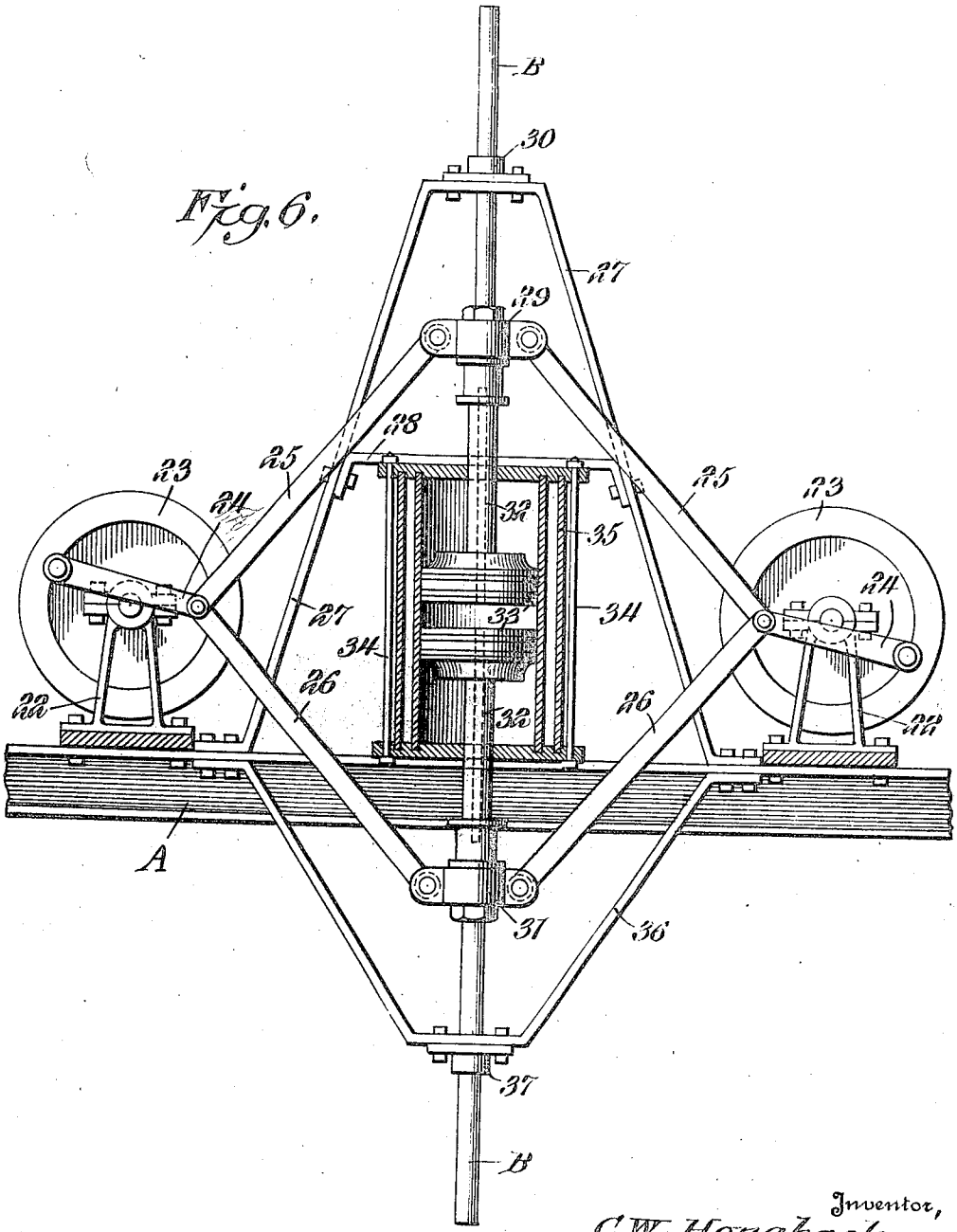
Sept. 18, 1923. 1,468,567

C. W. HONABACH

INTERNAL COMBUSTION ENGINE

Filed Aug. 21, 1922 4 Sheets-Sheet 4

Fig. 6.



Inventor,
C. W. Honabach,
By James Steele & Co,
Attorneys.

Patented Sept. 18, 1923. 1,468,567

UNITED STATES PATENT OFFICE.

CLARENCE W. HONABACH, OF GLENLYON, PENNSYLVANIA.

INTERNAL-COMBUSTION ENGINE.

Application filed August 21, 1922. Serial No. 583,243.

To all whom it may concern:

Be it known that I, CLARENCE W. HONABACH, a citizen of the United States, residing at Glenlyon, in the county of Luzerne and State of Pennsylvania, have invented new and useful Improvements in Internal-Combustion Engines, of which the following is a specification.

My present invention pertains to internal combustion engines and it contemplates the provision of vertical double acting pistons through the medium of which a high amount of driving power is developed and this in a simple and economical manner.

The invention further contemplates the provision of means for conveying this power to a drive chain of a motor vehicle and means for reversing the direction of travel in a positive and simple manner of the vehicle or drive mechanism.

The invention further contemplates means for feeding gas to the explosion chamber of the cylinders and the cooling of said cylinders as well as the removal of the particles of combustion subsequent to the explosion in each cylinder by means of the vacuum system in conjunction to cooling cylinder.

The device further contemplates the provision of a silent chain drive that not only imparts motion to the vehicle but is also self oiling and in turn oils the various elements it contacts with.

Other objects and characteristic features of the invention will be fully understood from the following description and claims when the same are read in connection with the drawings accompanying and forming part of this specification, in which—

Figure 1 is a top plan of the cylinders of the engine and showing the crank and connecting rods secured thereto, as in the present type of internal combustion engine where firing takes place on alternate revolutions.

Figure 2 is a vertical sectional view of one of the cylinders and showing the means for feeding fuel to the explosion chamber, note tubing 14 can be used reversed, acting on the outside as well as on the inside.

Figure 3 is a view showing one of the cylinders and the means for driving the chain.

Figure 4 illustrates the means for reversing the direction of travel of the mechanism by means of gears meshing into the chain and other series of gears.

Figure 5 illustrates the driving mechanism of the device in a two cylinder type of engine and can also be made in three cylinder type and the explosion of gas to take place at each and every revolution and the burned gases to be removed by means of a vacuum system working in conjunction with the air cooling device.

Figure 6 shows a view of one of the cylinders and another arrangement of drive mechanism.

Similar numerals of reference designate corresponding parts in all the views of the drawings.

The cylinders 1 are of the double acting vertically arranged type and are provided with the connecting rods 2 and 3 the latter of which are secured to the crank arms 4. These arms are of the peculiar construction illustrated and are mounted in the frames 6 by means of the bearings 7. The crank 4 are provided at their approximate centers with respect to their length, with a silent drive chain 5 that imparts power to the driven elements of a vehicle, aeroplane and the like.

The chain is self oiling and serves to oil the elements of my novel engine.

The cylinders 1 of my invention are provided with the piston casings or rods 8 having the valve seats at their inner ends and adapted to operate in the casings 8 are check valve rods 10 having the valve-heads 9. Manifestly these valve heads control passage of fuel to the explosion chamber of each cylinder and it will be noted that each cylinder is provided with double opposed pistons.

Surrounding the cylinders is a cooling space and arranged in the cylinders and extending into the explosion chamber thereof are spark plugs 20. The cylinders are provided with series of exhaust outlets 21 and surrounding the cylinders is a vacuum fuel feeding mechanism comprising the tubings 11 secured to the casings 16. These tubings 11 are provided with a passage at their lower ends into which the stem 10 having the lower springs are adapted to enter.

The passage is indicated by the numeral 17 and is provided with a head 18 through which a bolt 19 passes and the tubings 11 communicate with the pressure regulating and fuel feeding casings comprising the members 12 having a check valve stem 13 and the cylinders 14 having the valve 16.

The fuel conduits 15 are in direct com-

munication with the cylinders 14 and on firing of the double acting pistons, the fresh charge passes the check valves 16 and 12, enters the tubing 11 thence travels to the casings 8 and pass the valve heads 9 into the explosion chamber. It will be seen that the double action of the pistons is simultaneous and that the passage of fuel from the conduit 15 to the explosion chamber takes place on the down stroke of the pistons. This will permit the pressure of a fresh charge to open the check valves and permit passage of the fresh charge to the explosion chamber, this explosion takes place at each complete revolution instead of alternate revolution as in the type of engine used at the present time.

The driving mechanism of the cylinders comprises the rods 25, Figure 3, that are secured to the rods 24, and in order that the piston due to gravity will be governed to its proper stroke, guide rods may be secured to the junction points of the rods 24 and 25, and rollers secured at said junction and movable longitudinally with respect to the rods. Said rods 24 and 25 in turn are fast to the crank 63 on the shaft 62. The wheels 40 having teeth 41 are adapted to engage the chain 5. The construction of the rods 24 and 25 and the eccentric arrangement of the crank 63 assured rotary motion of the wheels 40 on movement of the pistons of the cylinders. The arrangement of the rods moreover permits of the driving of all four wheels 40 notwithstanding the fact that only two of the wheels are directly connected to the connecting rods of each cylinder.

By reference to Figure 4 it will be seen that I employ a reversible mechanism comprising a shaft 53 to which the arm 52 is secured. This arm in turn is balanced or pivoted on shaft 53 on which is arranged the wheels 58 having teeth 59. The large gear 50 is mounted on the shaft 53 and is provided with teeth 51 that mesh with the teeth 55 of the gear 54 which gives slower speed. The gear 56 is for direct or high speed while other slower speed mechanism gears 54, 50, 58 are entirely idle. Secured on the shaft 60 are arms 64 and when desired the triangular arm comprising the reducing mechanism may be thrown to the position shown in Figure 4 by pull lines to reduce the speed of travel of chain 5. Manifestly the gears of triangular arms that engage the chain for reverse movement are only driven on the shaft 60 in reverse direction. Change of speeds and motion are made by clutch pistons attached to 54 and 56 gears, the one being idle while the other is running. Figure 4 shows low speed while gears 56 clutch is out. By throwing the mechanism to the dotted line position in Figure 4 uninterrupted forward movement of the chain is assured.

In Figure 5 it will be seen that the crank shaft 81 is provided with crank arms or discs 82 and the rods 83 to the cylinders 86 and the elements of this construction are supported on the frames A, Figure 6.

When desired the cylinder may be secured on a tube support in preference to stand as illustrated as support A (Figure 6) having the brace arms 22 on which are mounted wheels 23 having the eccentric arms 24 that in turn are secured to the arms or rods 25 fast to the collar 29 of the shaft B. In order to brace the elements of this construction I provide the rods 36 and 27 in the latter of which the cylinder 34 is secured by means of the brace 28. These rods 27 and 36 are fast on the collars or cross heads and arm supports and 37 respectively of shaft B.

The cylinder 34 is provided with the jacket 35 and the double acting pistons 32 as well as the explosion chamber and the piston heads 33.

The stroke of the pistons 32 will cause movement of the rods 26 and 25 and this movement will be imparted in turn to the arms 24 and suitable guides to cause each piston to travel its required full stroke and in turn to the wheels 23.

The invention assures the even operation of the crank at all times and the construction of the cylinders causes the double acting of the piston rods to be synchronous. The device moreover, increases the power of each cylinder two-fold and hence a motor car equipped with two of the cylinders of my invention is equivalent in power to a six or eight cylinder engine. Movement of each piston is about one-half the complete stroke or travel of crank pin, which controls expansion of gases in proper manner.

The arrangement of fuel feed mechanism permits of the even and steady flow of fuel to the combustion engine and by use of my novel fuel feeding mechanism, the necessity of providing a distributor is overcome.

The reversing mechanism is simple to operate and permits of the reversing of the drive mechanism in a smooth manner and relieves any strain on the cylinders and driving mechanism because of its positive operation.

I would distinctly have it understood that such changes in size, mode and manner of construction and materials of elements may be made in the future practice of the invention as fairly fall within the scope of the claims appended.

In order to expel the exhaust products from the cylinders, a casing or manifold (manifestly a series of such casings one to each cylinder) may be and preferably are employed. These casings or manifolds are arranged on the outside of each cylinder and in connection with the tubing 84 in such a manner as to act not only for the purpose of

assisting the expelling of burned products of combustion but also to cause a pre-heating of the fresh gases on their passage through the tubing to the explosion chamber.

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

1. In a double acting internal combustion engine, the combination of a cylinder, a combustion chamber arranged in the cylinder, pistons mounted in the cylinder, full feeding mechanism actuable on the firing stroke of the pistons; said pistons movable synchronously, rods connected to the pistons, a crank shaft secured to the rods, a chain and gears movable by the shaft and means for reducing the speed of travel of the gears.

2. In means for the purpose set forth, the combination of a cylinder, pistons movable synchronously in the cylinder, crank shafts arranged adjacent the cylinder, gears formed on the crank shafts, driving mechanism actuable by the gears, rods secured to the pistons for imparting motion to the arms; said arms being connected in an eccentric manner to a series of gears, and means for reversing the speed control mechanism; said means comprising a shaft, a toothed gear mounted on the shaft, a triangular frame mounted on the shaft and toothed gears secured on the ends of the frame and adapted to be thrown into and out of engagement with the driving chain mechanism.

3. In an internal combustion engine, the combination of a double acting cylinder, pistons movable in the cylinder, rods secured to the pistons and actuable by the pistons, pitmen secured to the rods and connected in an eccentric manner to toothed gears, a silent drive chain actuable by the gears, means for reversing the position of speed control mechanism and comprising a large toothed gears mounted on a shaft, a frame arranged on the shaft, toothed wheels secured to the frame and means for feeding fuel to the cylinder and comprising conduits in direct communication with the fuel inlet pipes and means arranged in the conduits for interrupting the flow of fuel to the combustion chamber of the cylinder.

4. In means for the purpose set forth, the combination of a cylinder, pistons actuable within the cylinder, rods secured to the pistons and actuable synchronously therewith, pitmen secured to the rods and movable therewith, said pitmen being secured to gears in an eccentric manner, drive mechanism actuable by the gears, mechanism for reducing the speed of travel of the drive mechanism and comprising a comparatively large gear mounted on a shaft, a frame arranged on the shaft, toothed gears secured to the frame, and means for supplying fuel to the cylinders.

In testimony whereof I have hereunto set my hand in presence of a subscribing witness.

CLARENCE W. HONABACH.

Witness:

EDNA JAMES SHEEHY.