

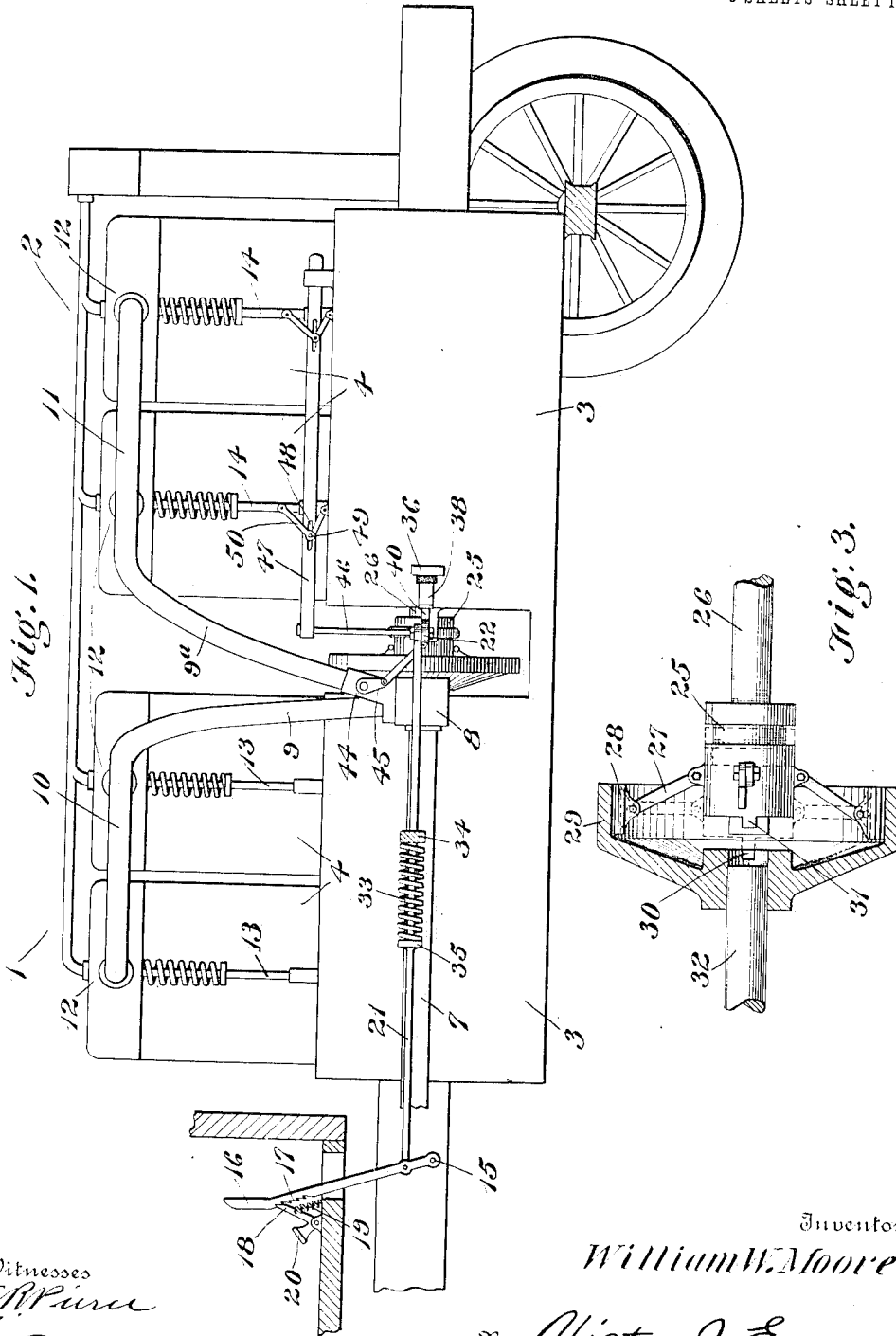
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ENGINE.

APPLICATION FILED AUG. 6, 1912.

1,121,114.

Patented Dec. 15, 1914.

3 SHEETS-SHEET 1.



Witnesses

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3 SHEETS-SHEET 2.

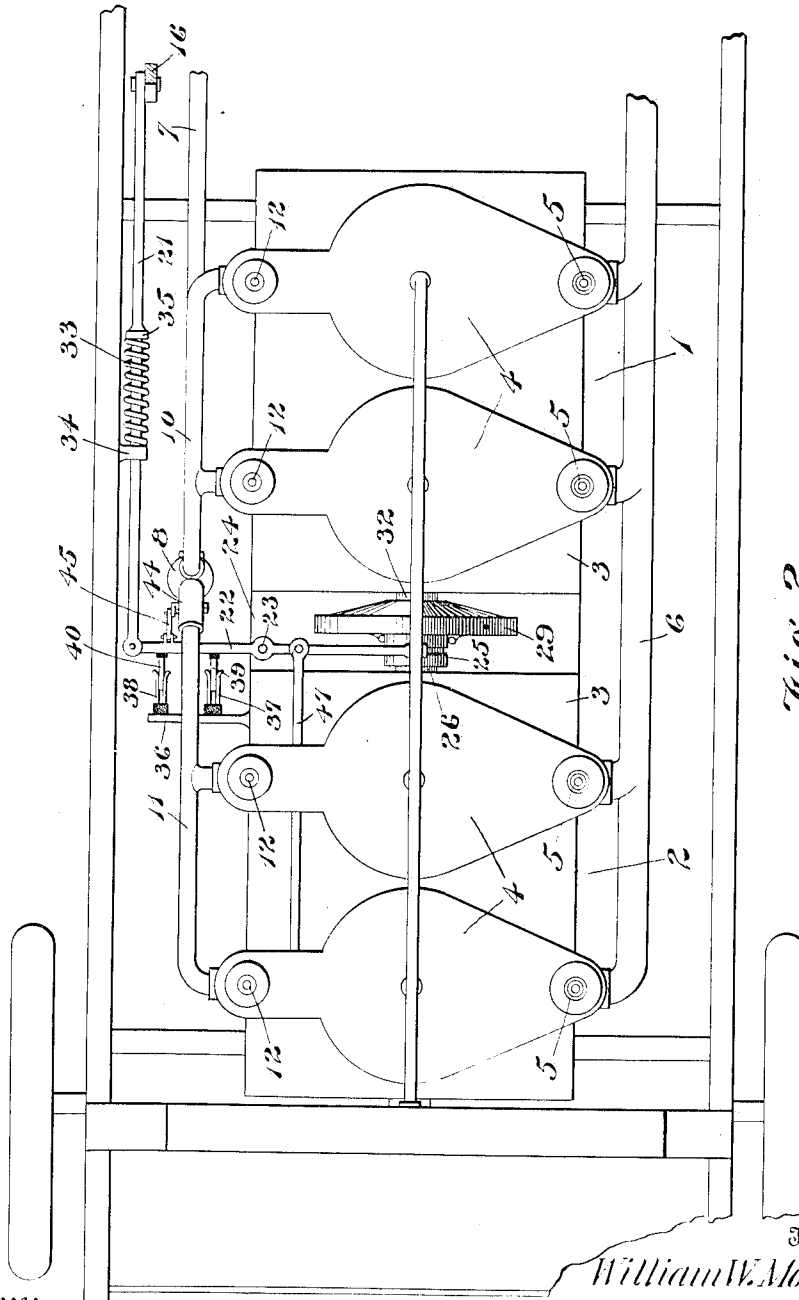


Fig. 2.

Witnesses
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3 SHEETS-SHEET 3.

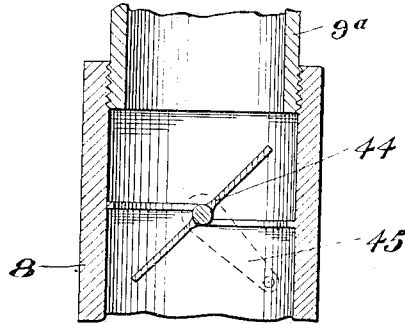


Fig. 4.

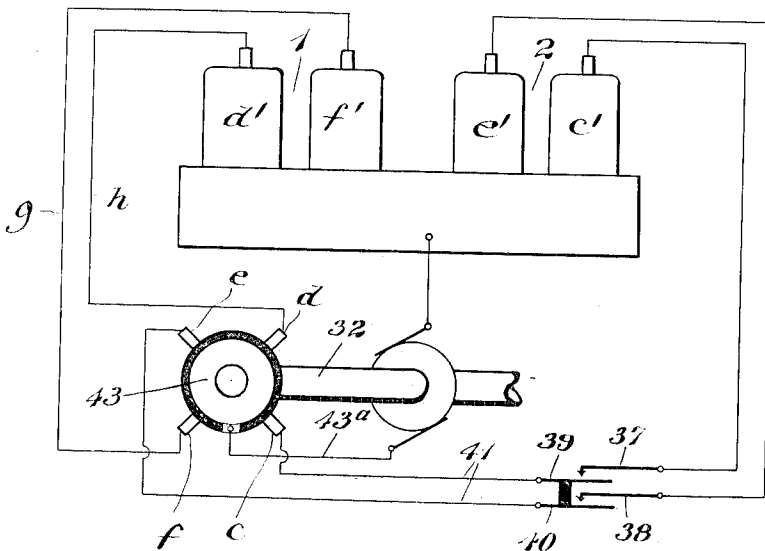


Fig. 5.

Witnesses

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UNITED STATES PATENT OFFICE.

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1,121,114.

Specification of Letters Patent.

Patented Dec. 15, 1914.

Application filed August 6, 1912. Serial No. 713,601.

To all whom it may concern:

Be it known that I, WILLIAM W. MOORE, a citizen of the United States, residing at Campbell, in the county of Hunt and State of Texas, have invented new and useful Improvements in Engines, of which the following is a specification.

This invention relates to engines and more particularly to twin engines of the hydrocarbon or internal combustion type.

The principal object of the invention is to provide a simple and efficient means for connecting and disconnecting the separate units of the engine when necessary and in such a manner that the cylinders will fire in sequence or in order when connected.

A further object of the invention is to provide means for connecting the separate units of the engine so that the cylinders of the units may be used independently or collectively and whereby the sparking connections and intake manifold for one of the units are cut out when the crank shaft is separated or disconnected and whereby these parts are simultaneously thrown into operation with the positive connection with the crank shaft.

Further objects of this invention will appear as the following specific description is read in connection with the accompanying drawings, which form a part of this application, and in which:—

Figure 1 is a side elevation. Fig. 2 is a top plan view. Fig. 3 is a detail vertical section through the clutch. Fig. 4 is a detail vertical sectional view. Fig. 5 is a diagrammatic view of the circuits employed.

In carrying out the invention, I have shown the same connected to the chassis of an automobile but it will be, of course, understood that this type of engine may be adapted to any field where increased power is occasionally necessary and any number of cylinders may be employed without departing from the spirit or scope of the invention. In the present construction, I have shown a four cylinder two-cycle engine formed in separate units 1 and 2, each of which consists of a crank case 3 and two cylinders 4. These cylinders are here shown to be of the T-head type with exhaust valves 5 and exhaust manifold 6 connected to one side of the same. The intake pipe 7 on the opposite side of the engine is connected by means of the union 8 to separate manifold

pipes 9 and 9^a which are connected to the intake manifolds 10 and 11 connected to the cylinders of the units 1 and 2, respectively. These cylinders are also provided with intake valves 12 which are controlled by valve rods 13 and 14, the latter of which are adapted to hold the valves of their respective cylinders in open position, as will be hereinafter described.

Pivoted upon the chassis at 15 is a foot lever 16 having a rack face 17 adapted to be engaged by the foot operated pawl 18 which is normally drawn into engagement with the rack face by a spring 19 so that when the lever is pushed forward for a purpose to be hereinafter described, the pawl will lock the same in operated position and until thrown out of engagement by the heel piece 20. Connected to this foot lever between its pivotal point and its operating end is a link 21 whose opposite end is pivoted to the outer end of a lever 22 which is in turn pivoted intermediate its length, as at 23, on the crank case 24 of the engine. This lever is bifurcated at its inner end so as to engage the grooved collar 25 of the sliding clutch sleeve, as will be readily understood. This clutch sleeve is, of course, splined upon the crank shaft 26 of the forward unit number 2 and carries a plurality of links 27 which have pivotally connected to their outer ends the friction shoes 28. These friction shoes are adapted to engage the inner periphery of a clutch drum 29 whose hub has a notch 30 extending half way across the same to receive the lug 31 extended from the sleeve 25 on one side of the shaft 26 only. The drum 29 is keyed upon the shaft 32 of the rear unit number 1, which shaft is of course connected in any suitable manner to the transmission gear of the vehicle. This shaft and the shaft 26 have their cranks arranged at 180° angles. The clutch thus described is thrown out of operation immediately upon release of the pawl 18 from the lever 17 by means of a compression spring 33 which has one end in engagement with the stationary lug 34 formed on the chassis and its opposite end in engagement with the collar 35 secured to the link 21. When the lug 31 is in engagement with the notch 30, the crank shafts 26 and 32 will be connected but in order to connect these parts positively while one engine is running and without jar, the fric-

tion shoes 28 are provided so that forward cylinders will be started to rotating gradually so as to overcome their inertia before bringing the parts of the clutch into positive engagement.

When the parts are moved to bring them into positive engagement, the links will assume a position shown in dotted lines in Fig. 3 slightly beyond the vertical plane and, as the crank shaft 26 slows down by having the friction shoes partially disconnected from the drum 29, the lug 31 will move around relatively to the hub of the drum 29 until said lug comes into engagement with the notch 30, at which time the frictional connection between the parts of the clutch will be inoperative and the positive engagement effective to drive the shafts 32 and 26 as one. When the shaft 26 is coupled to the shaft 32 through the friction clutch the shaft 26 will gradually pick up speed until the clutch is in full operation, when both shafts will rotate at equal speeds. Further movement of the shiftable clutch member will cause the shoes to partially release from the drum, which action in effect withdraws the driving power from the shaft 26 and it, therefore, necessarily slows down. The pressure being continued on the foot lever the shiftable clutch member is moved nearer and nearer to the drum and with the face of its sleeve in engagement with the clutch sleeve on the drum or in other words with the lug on the shiftable clutch sleeve in engagement with the sleeve on the drum. If there were no movement between these shafts 26 and 32 then the lug on the shiftable sleeve would never engage the notch on the drum sleeve and no positive engagement could be effected unless the lug and notch happened to be alined when the shiftable member of the clutch was moved into frictional engagement with the drum. The slowing down of the shaft 26 after originally having the same speed as the shaft 32 permits the positive engagement of the lug with the notch without any jar. Until this positive engagement is effected, it is not policy to connect up the spark plugs of the cylinders of the forward unit or to open communication from the intake pipe 7 to the manifold 11. In order to accomplish these results properly, I secure to the crank case an arm 36 which has mounted thereon and insulated therefrom the contact members 37 and 38 which lead to the separate cylinders of the forward unit 2. Suitable contact fingers 39 and 40 are carried by the lever 22 and are connected by means of conductors 41 to the timer 43 shown in diagram in Fig. 5. This timer is connected by means of conductors 43^a to the usual generator which is preferably driven by a crank shaft 32. When the lever 22 is thrown forwardly to connect the clutch,

the contacts 37 and 39 and 38 and 40 are brought into engagement with each other only after the lug 31 is engaged in the notch 30. Simultaneous with the connection of the contacts as described, a butterfly valve 44 is operated by means of a lever and link connection 45 with the lever 22, as shown in Figs. 1 and 4.

It has been found advisable to hold the valves 12 of the forward unit in open position when this unit has its crank shaft 26 disconnected from the crank shaft 32. In order to do this, there is extended vertically from the lever 22 between its pivotal point and its engagement with the clutch, a rod 46 which is connected to an operating link 47 slotted at 48 to receive the pivoting pins 49 of the toggles 50. One end of each toggle lever is pivoted to the crank case, while the opposite end of this toggle lever is pivoted to its respective valve rod 14. Therefore, when the lever is thrown to disconnect the clutched parts, the link 47 will move sufficiently to operate the toggle levers and raise the valves from their seats, thus holding them open continuously during the time the lever 17 is held in operative position by the spring 33. The pivotal pins 49 of the levers are arranged approximately midway of the slots 48 when the link 47 is in inoperative position so that these toggle levers will have free movement when operated by the valve rods 14. It will, of course, be understood that when the engine is started, both units must be connected up in order that the engine may be cranked from the forward end of the machine. After this is done, the forward engine may be cut out before or after the vehicle has been started according to the condition of the roads or the speed at which it is desired to travel. It will, of course, be understood that when the crank shaft of the forward unit is connected with the crank shaft of the rear unit that the cam shaft of the forward unit is in proper position to move the valves in proper relation to the timer or distributor which in this instance is shown to complete the circuits to the spark plugs, when both units are connected, in the following order: *c'-d', e'-f'*. When the forward unit is cut out the contacts of the timer which communicate with the spark plugs of the rear unit will be arranged 180° apart.

What is claimed is:—

1. The combination with a multiple cylinder internal combustion engine having a two-part crank shaft, pistons and operating instrumentalities including inlet valves, a clutch for connecting the parts of the shaft, means for operating the clutch and for simultaneously placing the operating instrumentalities of one part of the crank shaft in operative position together with means actuated by said operating means when th

clutch is disconnected for opening the inlet valves of said last-mentioned part.

2. The combination with a multiple cylinder internal combustion engine having a two-part crank shaft and a cylinder provided with a piston connected to each part, a source of fuel supply for both cylinders, a sparking circuit connected to both cylinders, a clutch for connecting the parts of the crank shaft, and means for operating the clutch for disconnecting the parts of the

shaft and simultaneously disconnecting the source of fuel supply to one of the cylinders and the sparking circuit from said cylinder.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM W. MOORE.

Witnesses:

J. B. BERRY,
J. H. SMITH.