Dec. 9, 1930. L. S. TISDALE 1,784,712

INTERNAL COMBUSTION ENGINE

Filed July 21, 1928 3 Sheets-Sheet 1

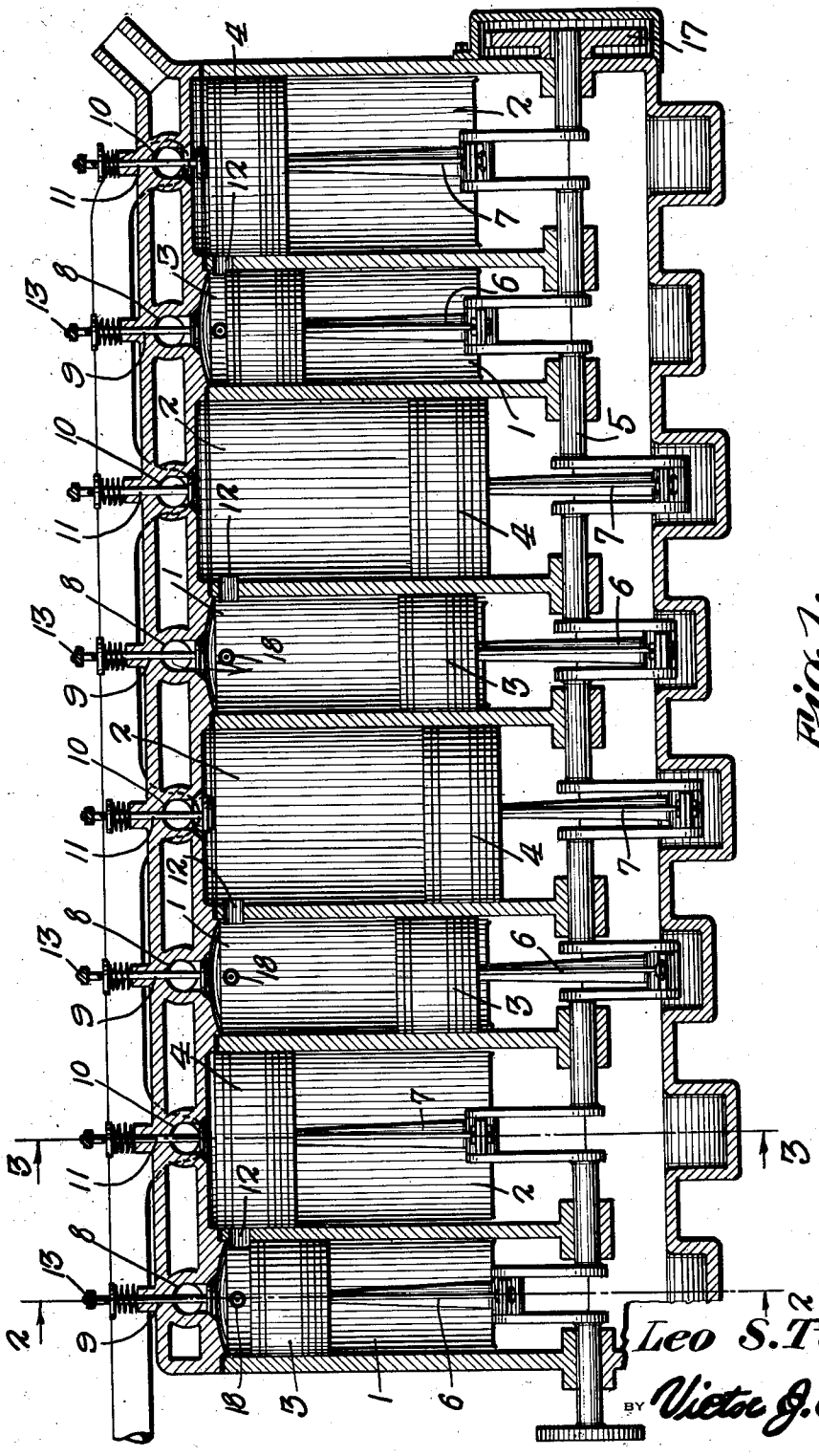


Fig. 1.

Leo S. Tisdale,
INVENTOR
BY Victor J. Evans
ATTORNEY

Dec. 9, 1930. L. S. TISDALE 1,784,712

INTERNAL COMBUSTION ENGINE

Filed July 21, 1928 3 Sheets-Sheet 2

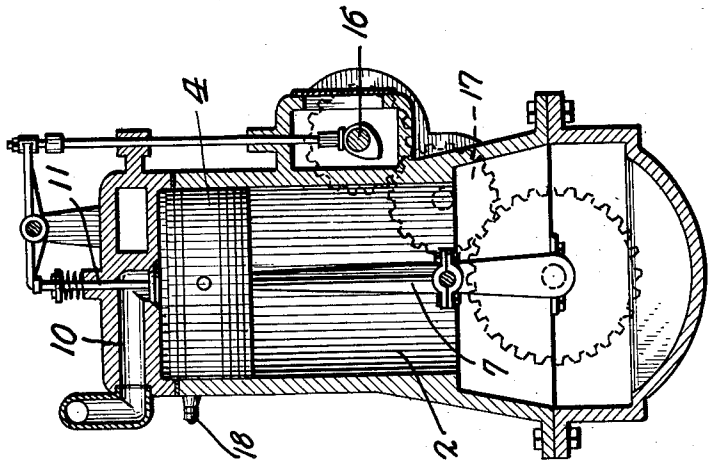


Fig. 3.

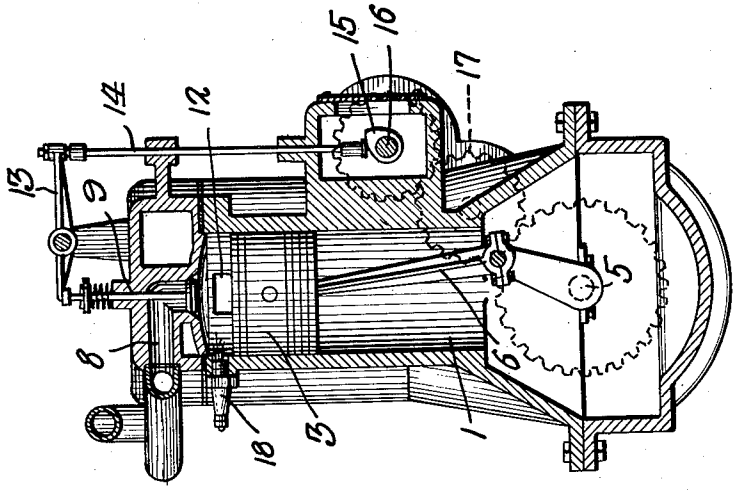


Fig. 2.

Leo S. Tisdale,
INVENTOR

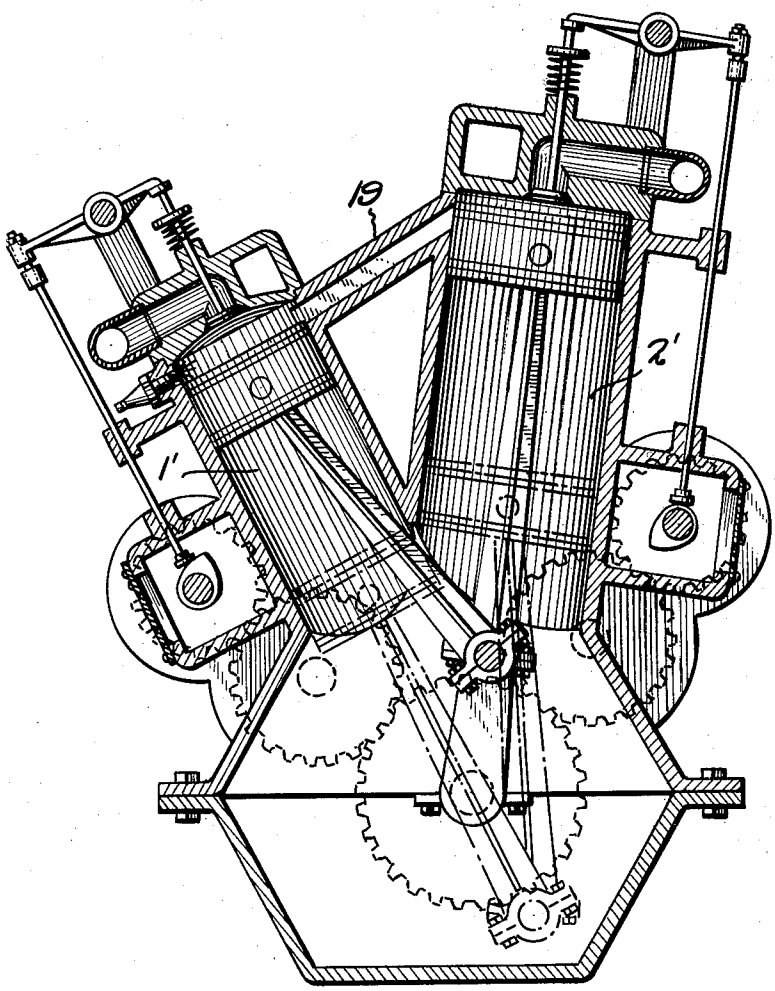
BY Victor J. Evans
ATTORNEY

Dec. 9, 1930. L. S. TISDALE 1,784,712

INTERNAL COMBUSTION ENGINE

Filed July 21, 1928 3 Sheets-Sheet 3

Fig. 4.



Leo S. Tisdale,
INVENTOR

BY Victor J. Evans
ATTORNEY

Patented Dec. 9, 1930

1,784,712

UNITED STATES PATENT OFFICE

LEO SINGLETON TISDALE, OF NEW ALBANY, MISSISSIPPI

INTERNAL-COMBUSTION ENGINE

Application filed July 21, 1928. Serial No. 294,360.

This invention relates to an internal combustion engine, the general object of the invention being to arrange the cylinders in pairs, with the combustion spaces of the cylinders of each pair connected together and with the power piston and its cylinder of smaller diameter than the other cylinder and piston of the pair, with the larger piston having a greater stroke than the smaller piston, with the parts so arranged that the smaller piston is beyond dead center when the charge is fired so that the motor has the maximum power due to the increased area of the combustion chambers and of the pistons and also due to the greater compression of the charge and to the firing taking place with the power piston beyond dead center. This arrangement also eliminates back firing and makes the motor easier to start.

This invention also consists in certain other features of construction and in the combination and arrangement of the several parts, to be hereinafter fully described, illustrated in the accompanying drawings and specifically pointed out in the appended claim.

In describing my invention in detail, reference will be had to the accompanying drawings wherein like characters denote like or corresponding parts throughout the several views, and in which:—

Figure 1 is a longitudinal sectional view through the improved motor.

Figure 2 is a section on line 2—2 of Figure 1.

Figure 3 is a section on line 3—3 of Figure 1.

Figure 4 is a transverse sectional view showing a modification.

As shown in these drawings, the cylinder block is formed with a plurality of cylinders arranged in pairs, the cylinder 1 of each pair being of less diameter than the cylinder 2 of each pair. The piston in the small cylinder is shown at 3 and that in the large cylinder is shown at 4.

The crank shaft is shown at 5 and the connecting rod 6 which connects each piston 3 with the shaft is of less length than the rod 7 which connects the large piston of each pair with the shaft. Thus the large piston has a longer stroke than the small piston and said piston 4, on its upward stroke will pass to a point practically at the top of the large cylinder, while the small piston stops a distance from the top of its cylinder so as to leave a combustion chamber between itself and the top of the cylinder. An inlet port 8 is in communication with each of the cylinders 1 and this port is controlled by the inlet valve 9. An exhaust port 10 is in communication with each of the cylinders 2 and is controlled by the exhaust valve 11. A port 12 connects the upper ends of the cylinders 1 and 2 together.

The valves are controlled by the usual rocker arms 13 and push rods 14 which are operated by the cams 15, the shaft 16 of which is geared to the crank shaft by the gears 17. The cranks of the shaft 5 are so arranged that when each piston 4 is on dead center, each piston 3 will be beyond dead center, as shown in Figures 2 and 3, so that as soon as the charge is fired by the spark plug 18, one of which is arranged in each cylinder 1, the thrust of the connecting rod of the piston 3 on the crank of the shaft will be instantly effective as the crank has moved beyond dead center and after this action takes place, the crank of the shaft which is connected with the piston 4 will move said piston downwardly past the port 12 so that some of the expanding gases can act on this piston as well as the piston 3.

Thus I have produced an internal combustion motor of the maximum power and in which the mixture is highly compressed before being exploded, as both pistons act to compress the charge, with the small piston giving the crank shaft its initial movement. The motor is also easy to start and there is no danger of back-firing.

In the modification shown in Figure 4, each pair of cylinders 1′ and 2′ is arranged in V formation and the upper ends of the two cylinders are connected together by the pipe 19. In other respects, this form of the invention is similar to that just described.

It is thought from the foregoing descrip-

tion that the advantages and novel features of my invention will be readily apparent.

It is to be understood that I may make changes in the construction and in the combination and arrangement of the several parts, provided that such changes fall within the scope of the appended claim.

What I claim is:—

An internal combustion engine comprising a plurality of cylinders arranged in pairs, with one cylinder of each pair of greater diameter than the other cylinder of the pair, a piston in each cylinder, a crank shaft, connecting rods connecting the cranks of the shaft with the pistons, the connecting rod for each large piston being of greater length that the connecting rod for each small piston whereby each large piston will be moved upwardly to a point close to the top of its cylinder, while each small piston will have its upward movement terminate a distance from the top of its cylinder, the cranks being arranged with the cranks for the small pistons beyond dead center when the cranks of the large pistons are on dead center, exhaust means connected with the top of each large cylinder, inlet means connected with the top of each small cylinder, an unobstructed passage connecting the top of each small cylinder with a large cylinder a distance from the top of said large cylinder, said passage being closed by the large piston on the upward movement of the same and the upward stroke of each small piston terminating short of the passage and means in each small cylinder for firing the explosive mixture when the large piston is on dead center and the small piston is beyond dead center.

In testimony whereof I affix my signature.

LEO SINGLETON TISDALE.