May 7, 1940. B. W. BRADFUTE, JR 2,200,199

INTERNAL COMBUSTION ENGINE

Filed Nov. 8, 1938 4 Sheets-Sheet 1

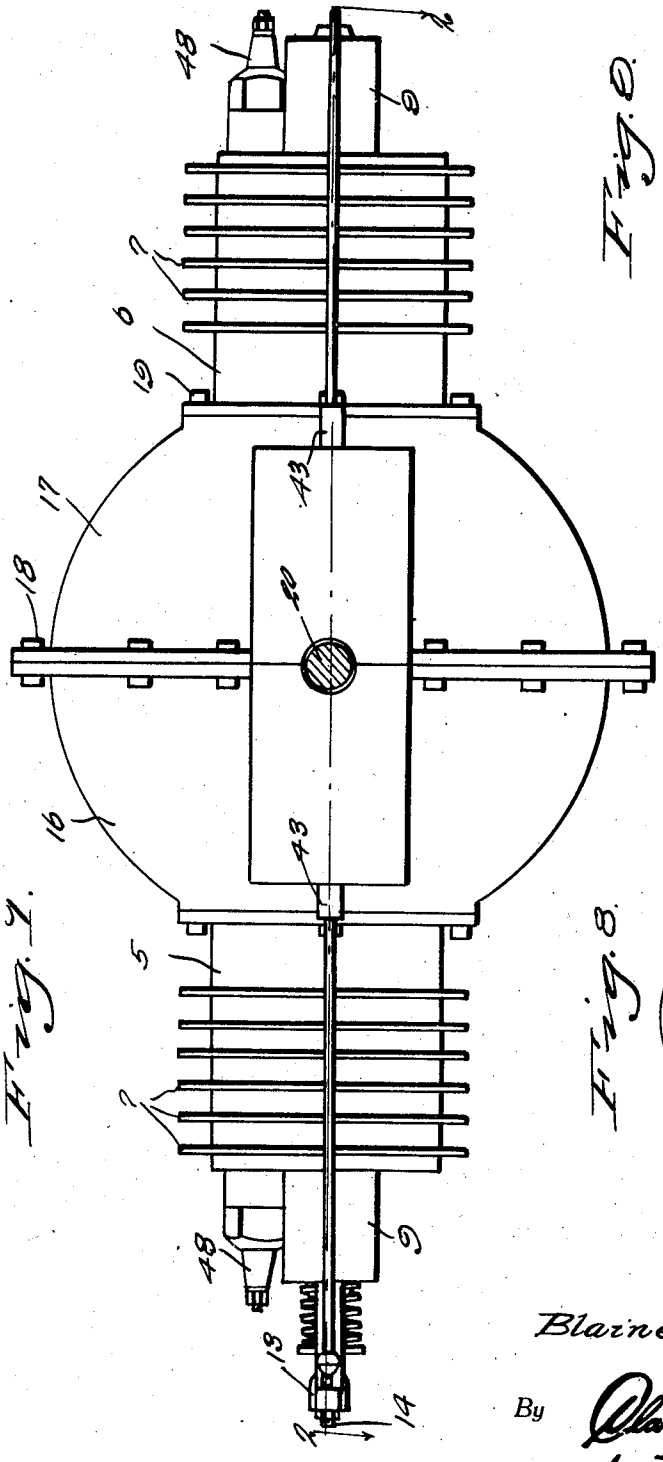


Fig. 1.

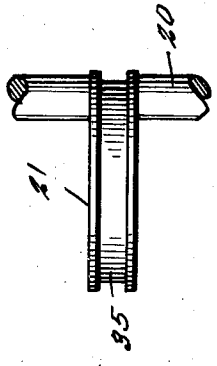


Fig. 9.

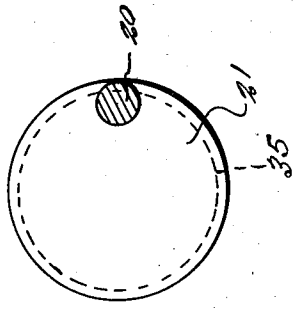


Fig. 8.

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May 7, 1940. B. W. BRADFUTE, JR 2,200,199

INTERNAL COMBUSTION ENGINE

Filed Nov. 8, 1938 4 Sheets-Sheet 2

Fig. 2.

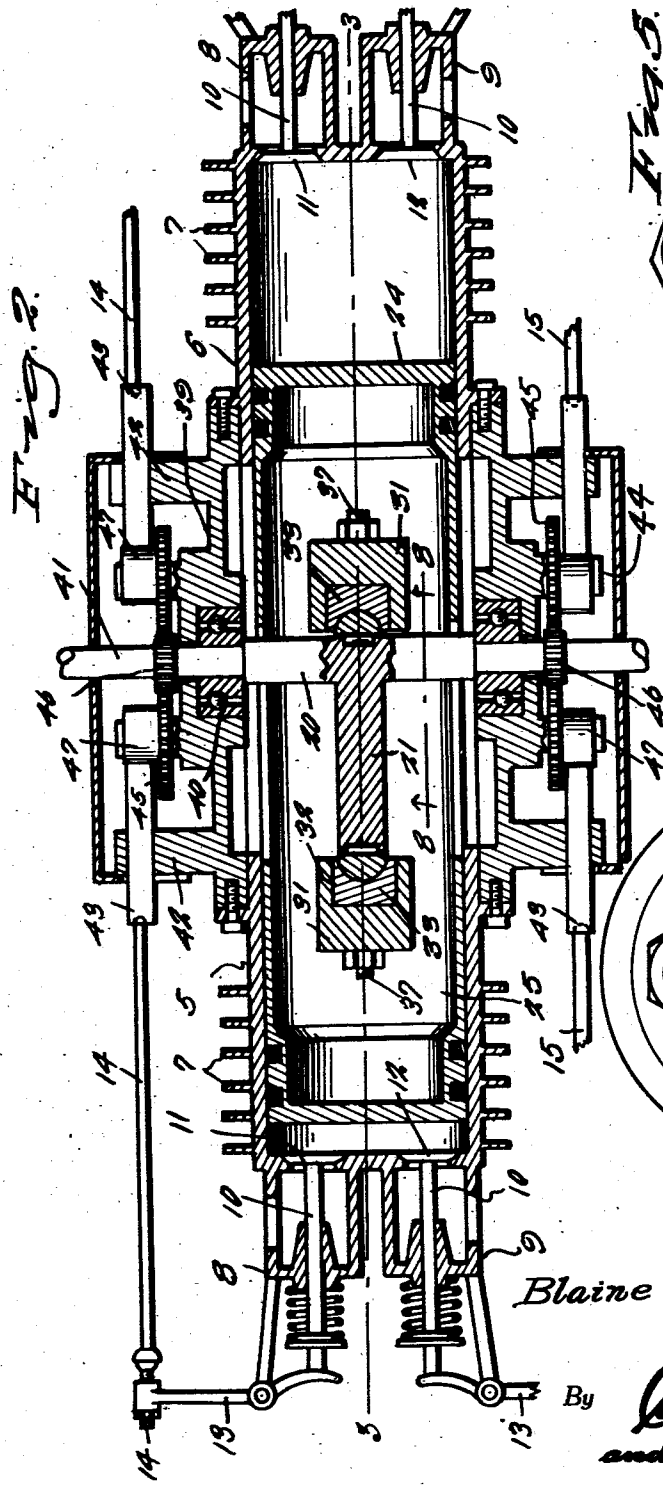


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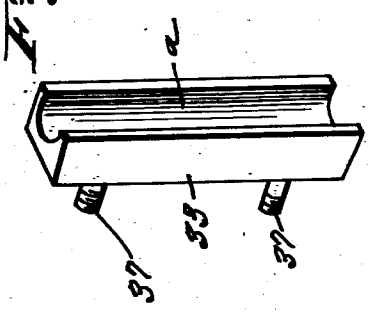
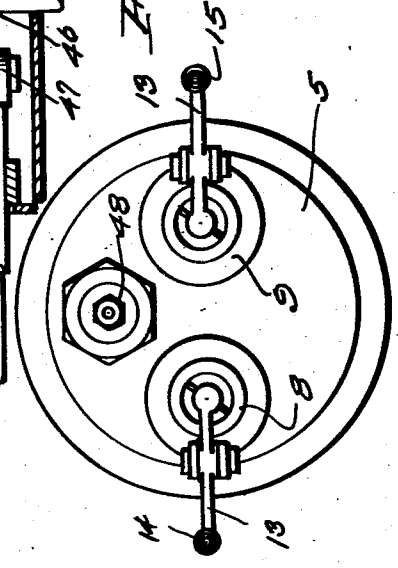


Fig. 4.



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May 7, 1940. B. W. BRADFUTE, JR 2,200,199

INTERNAL COMBUSTION ENGINE

Filed Nov. 8, 1938 4 Sheets-Sheet 3

Fig. 3.

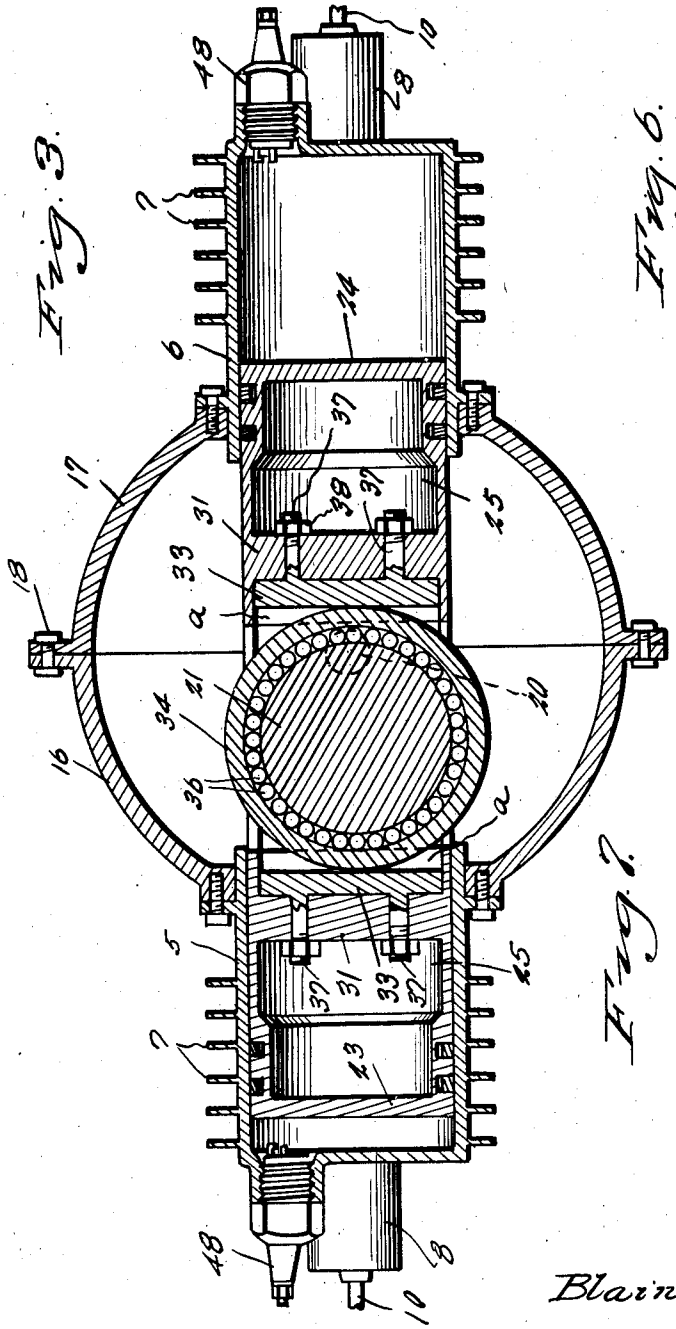


Fig. 6.

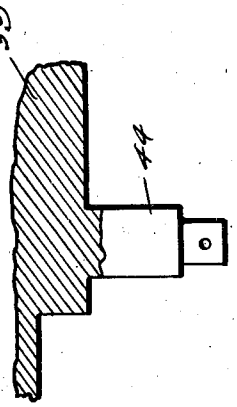
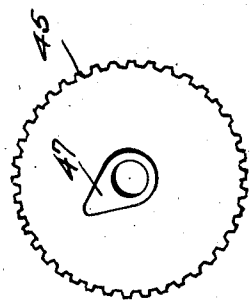


Fig. 7.



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May 7, 1940. B. W. BRADFUTE, JR 2,200,199

INTERNAL COMBUSTION ENGINE

Filed Nov. 8, 1938 4 Sheets-Sheet 4

Fig. 10

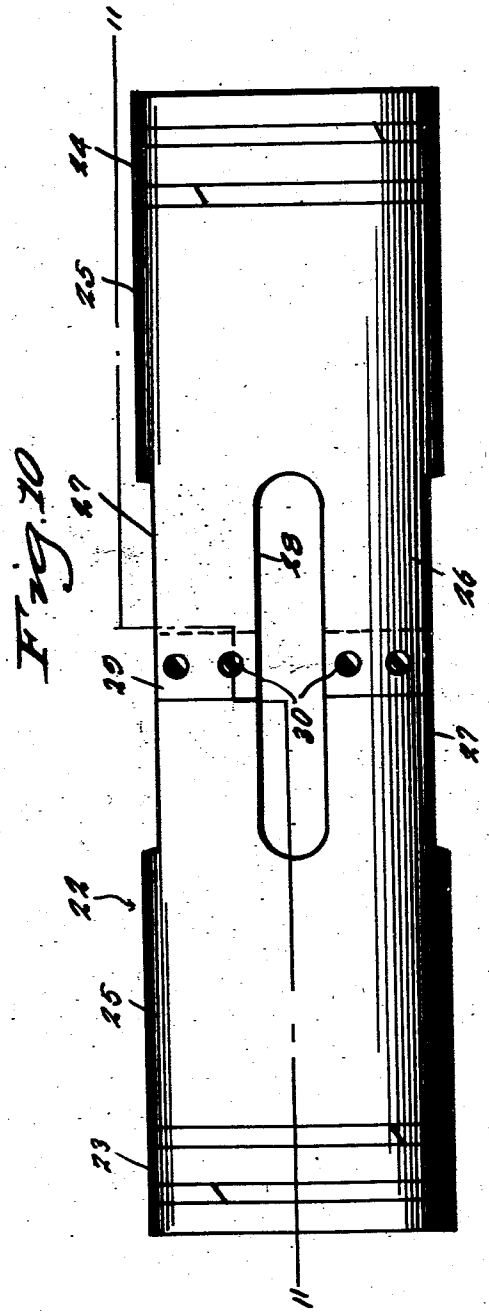
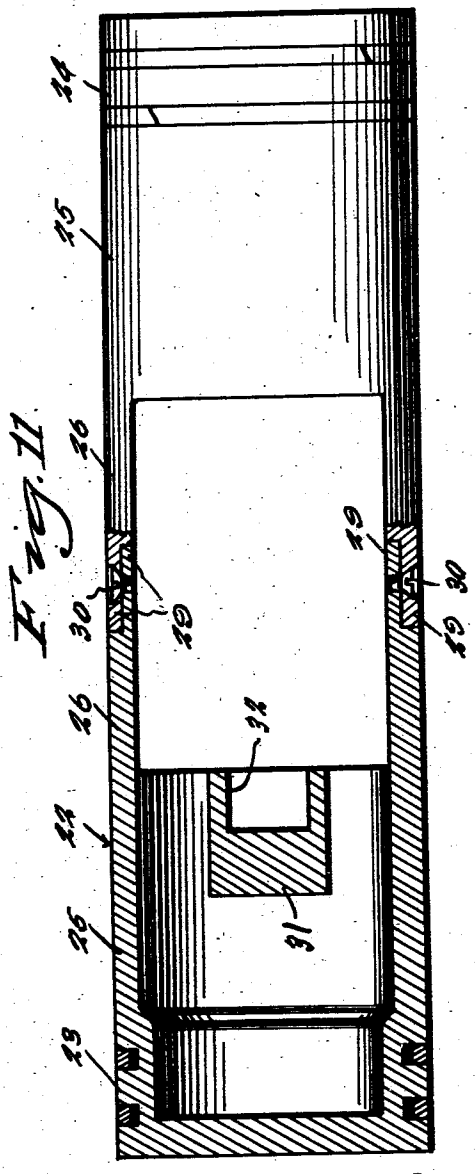


Fig. 11



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UNITED STATES PATENT OFFICE

2,200,199

INTERNAL COMBUSTION ENGINE

Blaine W. Bradfute, Jr., Bloomington, Ind.

Application November 8, 1938, Serial No. 239,576

1 Claim. (Cl. 123—56)

This invention appertains to new and useful improvements in internal combustion engines and more particularly to an engine constructed in such a manner to eliminate a number of the parts of the present-day types of engines, thus reducing the cost and operating expenses.

An important object of the present invention is to provide an engine of the aligned cylinders type wherein the pistons are associated and constructed in such a manner as to eliminate connecting rods.

Another important object of the invention is to provide an engine of the character stated which will be smooth-running and not susceptible to the ready development of defects.

These and various other important objects and advantages of the invention will become apparent to the reader of the following specification.

In the drawings:

Figure 1 represents a side elevational view of the engine.

Figure 2 is a longitudinal sectional view on line 2—2 of Figure 1.

Figure 3 is a longitudinal vertical sectional view taken substantially on line 3—3 of Figure 2.

Figure 4 is an end elevational view.

Figure 5 is a perspective view of one of the eccentric riders.

Figure 6 is a fragmentary detail sectional view showing one of the pintles.

Figure 7 is a side elevational view of one of the gears.

Figure 8 is a sectional view taken substantially on line 8—8 of Figure 2 showing only the eccentric.

Figure 9 is a fragmentary top plan view of the eccentric.

Figure 10 is a top plan view of the pistons assembly.

Figure 11 is a sectional view taken substantially on line 11—11 of Figure 10.

Referring to the drawings wherein like numerals designate like parts, it can be seen that the invention includes the two aligned cylinders 5 and 6 each provided with heat-dissipating fins 7. The outer end of each of these cylinders 5—6 is provided with an intake shell construction 8 and an exhaust shell structure 9, each of which has a valve stem 10 apertured therethrough and with one stem equipped with the inlet valve 11 and the other with the exhaust valve 12. These stems are provided with rockers 13 for operating the same, the rockers of the valves 11 being operated by the rods 14, while the rockers of the valves 12 are operated by the rods 15.

As shown in Figure 1, the eccentric oil case consists of the pair of semi-cylindrical sections 16 and 17 flanged and bolted together as at 18 and as can be further seen, the inner ends of the aforementioned cylinders 5 and 6 are secured by screws 19 to the case sections 16 and 17.

Numeral 20 represents the drive shaft (see Figure 2) which has the cam disk 21 thereon operating within the confines of the pistons assembly generally referred to by numeral 22. This assembly consists of the two aligned piston heads 23—24, each having its skirt portion 25, and these skirt portions are provided with tubular extensions 26—26 slotted as at 27 and 28 so that when they are joined together as shown in Figure 10 elongated slots are formed through which the eccentric can operate and also through which the drive shaft 20 can operate.

As can be seen in Figure 11, the adjacent end portions of the extensions 26 are reduced and interlapped as at 29 and in this interlapping position secured together by screws 30.

The pistons 23 and 24 are placed within the cylinders 5 and 6 respectively, and inside of each of the pistons 23 and 24 is a diametrically disposed bridge 31 which is channeled to form the pocket 32 for receiving the grooved block or rider 33, in the groove *a* of which rides the ring 34, which ring is formed with a transversely convex peripheral surface for even riding engagement in the grooves *a* of the said blocks or riders 33. As shown the groove *a* in each block or rider 33 is of substantially trough shape in cross section, the walls of which conform to the convex peripheral surface of the ring or eccentric strap 34.

The peripheral portion of the eccentric disk 21 is formed with the circumferentially extending channel 35 (see Figure 9) for receiving the roller bearings 36 thus affording anti-frictional means between the disk 21 and the annulus 34.

As can be clearly seen in Figures 2 and 3, the backside of the riders 33 are each provided with a pair of threaded members 37 for disposition through openings in the corresponding bridge 31. The threaded members are provided with nuts 38 to prevent displacement of the riders.

At each side of the engine construction is a casting 39 which has a bearing construction 40 at its intermediate portion through which the reduced portion 41 of the drive shaft 20 extends. The casting 39 is provided with side walls 42 through which the pitmans 43 are operative, these pitmans 43 being connected to the corresponding rods 14 and 15.

From the intermediate portion of each of the castings 39 extends a pair of pintles 44 on each of which is mounted a gear 45 and these gears mesh with the pinion 46 carried by the corresponding reduced portion 41 of the drive shaft 20. These gears 45 carry cams 47 which ride against the corresponding ends of the pitmans 43 to result in the operation of the same.

As can be seen, each cylinder is equipped with a spark plug 48.

While the foregoing specification sets forth the invention in specific terms, it is to be understood that numerous changes in the shape, size and materials may be resorted to without departing from the spirit and scope of the invention as claimed hereinafter.

Having described the invention what is claimed as new is:

An engine comprising a pair of aligned cylinders, a pair of pistons in the cylinders, means for connecting together the inner ends of the pistons, a shaft passing between the inner ends of the pistons, an eccentric on the shaft, an eccentric strap surrounding the eccentric, a transverse member extending across each piston adjacent its inner end and having a channel in that part which is adjacent the eccentric strap, said channel extending transversely, a block of elongated form fitting in each channel and having a longitudinally extending groove in its outer edge, said groove being of substantially trough-shape in cross section to provide arcuate walls and the outer circumference of the strap being of arcuate shape in cross section to engage the arcuate walls of the groove and means for detachably connecting the block to the transverse member.

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