No. 869,503. PATENTED OCT. 29, 1907.

W. L. MORROW.

DOUBLE TWO CYCLE ENGINE.

APPLICATION FILED MAR. 13, 1903.

Fig. 1

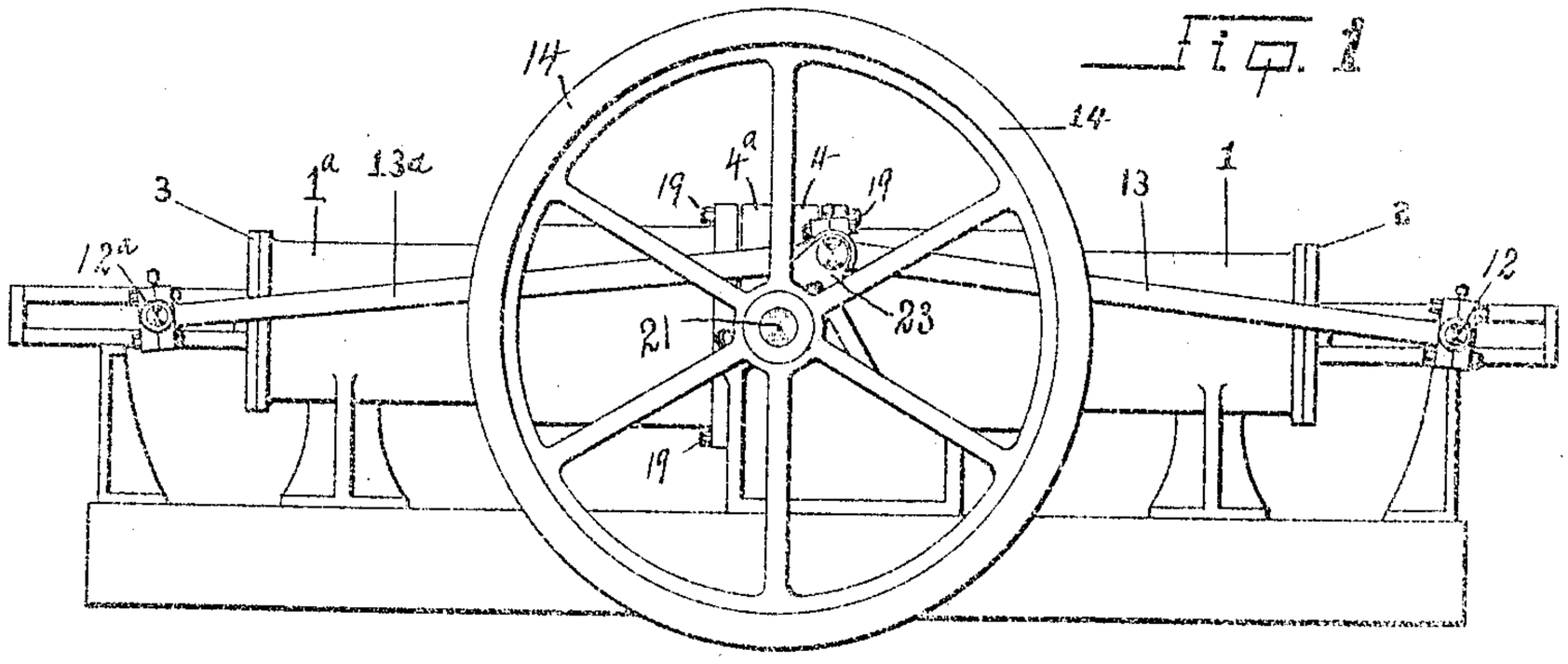


Fig. 2

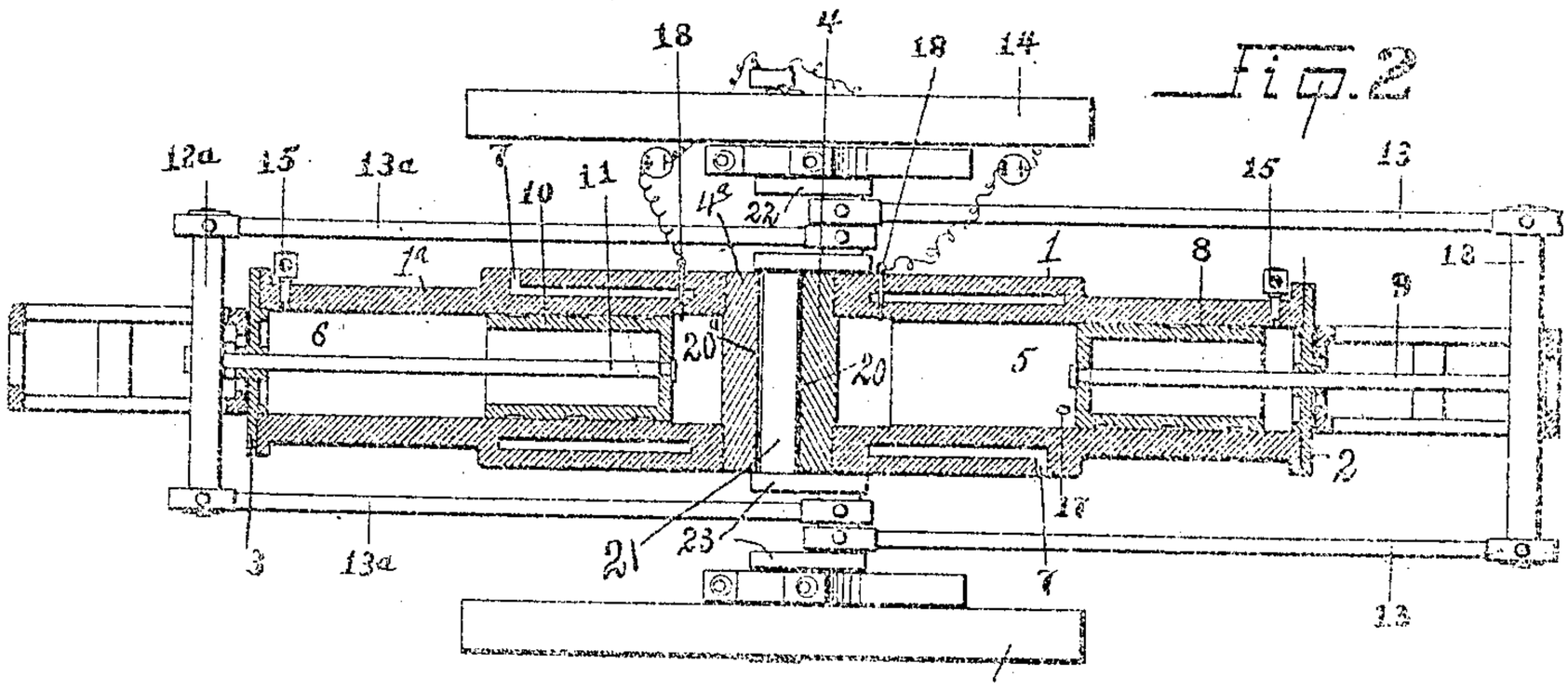
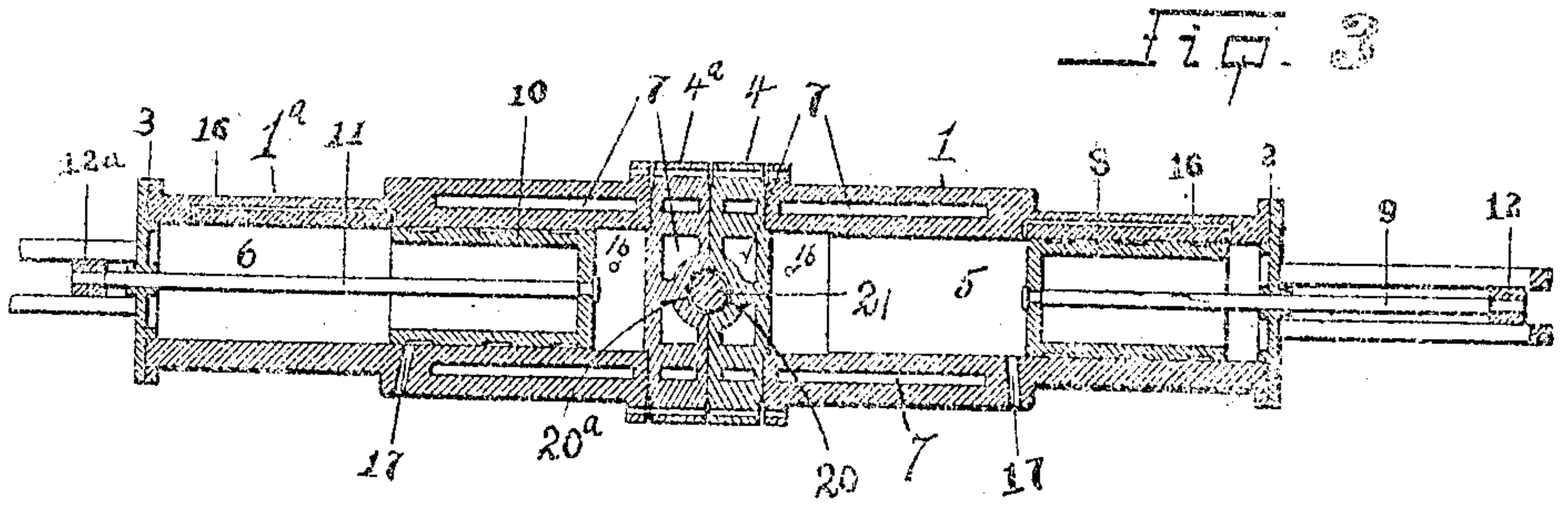


Fig. 3



Witnesses

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UNITED STATES PATENT OFFICE.

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DOUBLE TWO-CYCLE ENGINE.

No. 869,503. Specification of Letters Patent. Patented Oct. 29, 1907.

Application filed March 13, 1906. Serial No. 305,790.

To all whom it may concern:

Be it known that I, WILLIAM L. MORROW, a citizen of the United States, residing at Stockton, in the county of San Joaquin and State of California, have invented certain new and useful Improvements in Double Two-Cycle Engines; and I do declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and the characters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in gas engines, and particularly to the cylinders thereof, and my object is to produce a double two cycle engine of this class of improved construction and increased utility and efficiency.

This object I accomplish by a cylinder having a solid division wall dividing said cylinder into two distinct chambers provided with an open port mechanism, all as will appear by a perusal of the following specification and the claims appended thereto.

In the drawings similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of my improved engine. Fig. 2 is a longitudinal section of the said engine. Fig. 3 is a vertical section of portions.

The improved device comprises two cylinders 1 and 1^a arranged in longitudinal alinement with their inner ends spaced apart and connected to a central dividing member, the latter formed in two parts 4 and 4^a, these parts being detachably united by bolts 19, and the outer members 4 and 4^a being provided with half bearings 20 and 20^a in their adjacent faces to receive a shaft 21, the latter having cranks 22, 23, at the ends exteriorly of the members 4 and 4^a. The cylinders 1 and 1^a are provided with the usual water jacket spaces denoted at 7, and the members 4 and 4^a are likewise provided with interior hollow spaces through which water is adapted to be passed to prevent the heating of the parts. The outer ends of the cylinders 1, 1^a, are provided with heads 2 and 3. Operating in the cylinder 1 is a piston 8 having a rod 9 extending through the head 2, and the cylinder 1^a is provided with a piston 10 having a rod 11, extending through the head 3.

12 and 12^a are cross rods connected to the rods 9 and 11 respectively and working in suitable guides, and 13 and 13^a are driving rods connecting the said rods 12 and 12^a to the crank shaft 21 upon which are the fly wheels 14, the shaft being journaled through the central division portion 4.

15 are mixers connected to the chambers 5 and 6 by means of suitable intake check valves.

16 are circulating feed ports located in the sides of the chambers 5 and 6 and adapted to conduct the charge from the rear to the front of the pistons when the same are in their backward position, as will be hereafter shown.

17 are exhaust ports located in the sides of and leading from the chambers 5 and 6, said ports being disposed a trifle nearer the partition wall 4 than are the inner ends of the ports 16.

18 are the usual jump spark igniter extending into the chambers 5 and 6 near the partition wall 4.

In using the machine the check valves in the device 15 are so regulated that the suction caused by the movement of the pistons in one direction will draw into the chambers 5 and 6 an amount of the mixture equal to the charges of the cylinders. Then at the return movement of the pistons the exhaust ports open an instant before the inner ends of the circulating feed ports 16 are uncovered thus allowing the exhaust to occur before the new charge enters the chamber. When the pistons are at the end of their movement in one direction the feed port 16 opens from the rear to the front of the piston, as shown in the drawing, and the compression caused by the return movement of the pistons causes a charge to pass into the front of the piston, and the movement of the pistons compresses this charge near the wall 4 and the spark ignited explodes said charge and drives the piston in the opposite direction the pistons thus working alternately. Water running through the jacket 7 keeps the cylinders cool.

I have now described the present and preferred embodiment of my invention and shown that I have produced an engine which strikes from the center, and has continuous compression and alternative explosion and exhaust. Because of the continuous compression as set forth above, when the spark igniter is switched off the engine comes to a stop always on half compression in the front and rear of each piston, said compression being composed of the explosive mixture as described, whereby the engine can be started instantly when the spark igniter is switched on again without the necessity of cranking.

Having thus described my invention I claim.

1. In a gas engine, two cylinders disposed in longitudinal alinement and provided with closure heads at the outer ends, a dividing member between the cylinders and formed in two parts having half bearings in their adjacent faces, means for connecting said two-part dividing member between said cylinders, a shaft journaled in said bearings and with cranks at the outer ends, pistons operating respectively in said cylinders, piston rods connected to said pistons and extending through the closure heads of the cylinders, cross heads connected to the free ends of said piston rods, and coupling rods between said cross heads and cranks.

2. In a gas engine, two cylinders disposed in longitudinal alinement and with closure heads at their outer ends, a dividing member disposed between said cylinders and provided with a transverse shaft bearing, means for coupling said connecting member to said cylinders, pistons operating in said cylinders, piston rods connected to said pistons and extending through said closure heads, cross heads

connected to said pistons, connecting rods between said cross heads and cranks, spark igniters asociated with said cylinders near said dividing member, mixer devices associated with said cylinders near said closure heads, and exhaust ports in said cylinders.

3. In a gas engine, two cylinders disposed in longitudinal alinement and provided with heads at the outer ends, a dividing member between the cylinders and connected to their adjacent ends and provided with a transverse shaft bearing, a shaft member mounted for rotation in said bearing and with cranks at the ends, pistons working respectively in said cylinders, piston rods connected to said pistons and extending through said closure heads, cross heads at the free ends of said piston rods, connecting rods between said cross heads and cranks, circulating feed ports located in the sides of the cylinder and adapted to conduct the explosive charge from the rear to the front of the pistons when the same are in a predetermined position, exhaust ports extending from said cylinders slightly in advance of the inner terminals of said feed ports, spark igniters associated with said cylinders near said dividing member, mixer devices associated with said cylinders near said closure heads.

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

WILLIAM L. MORROW.

Witnesses:
PERCY S. WEBSTER,
JOSHUA B. WEBSTER.