B. W. TRAYLOR.

INTERNAL COMBUSTION ENGINE.

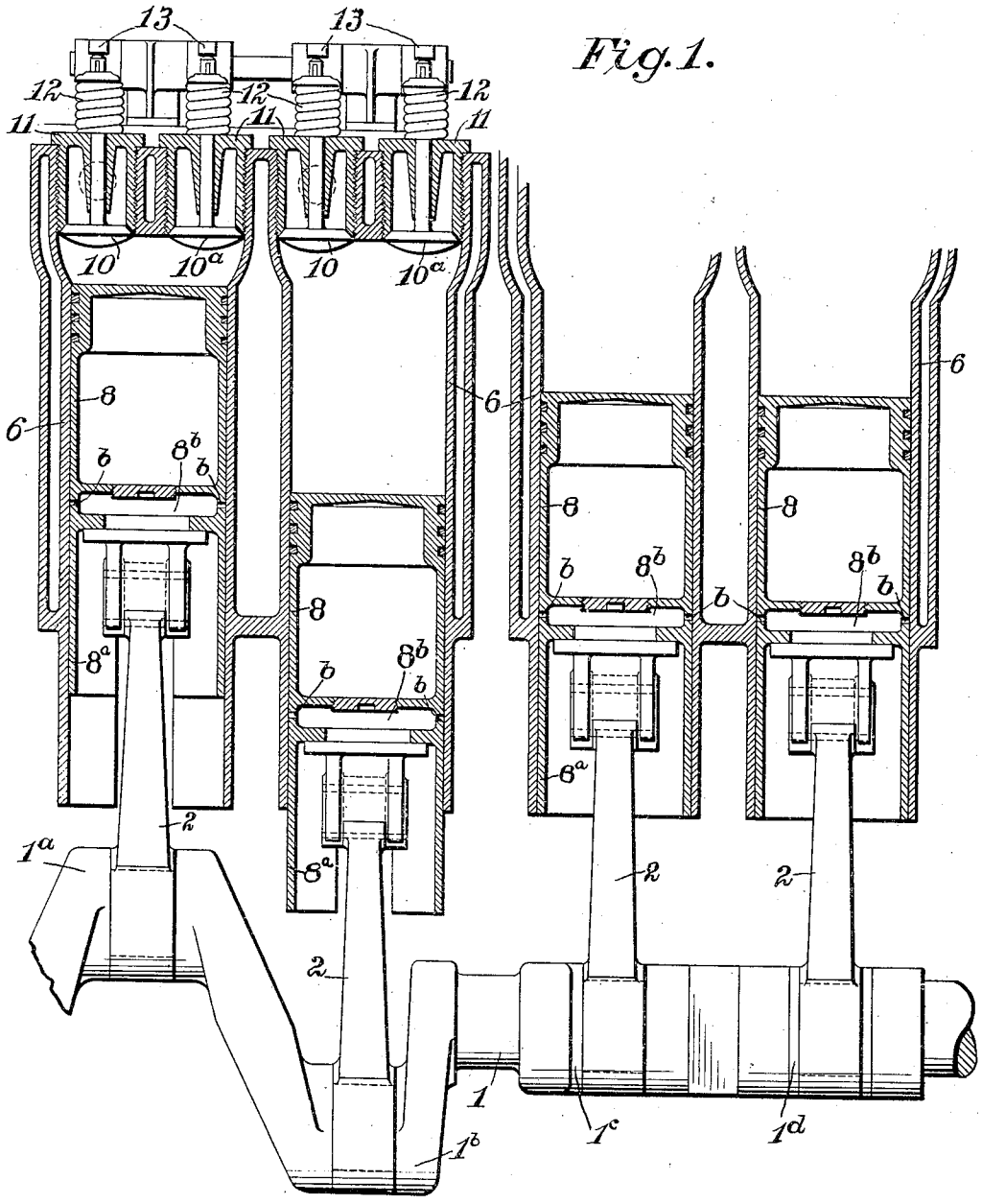
APPLICATION FILED OCT. 9, 1916.

1,234,971.

Patented July 31, 1917.

3 SHEETS—SHEET 1.

Fig. 1.



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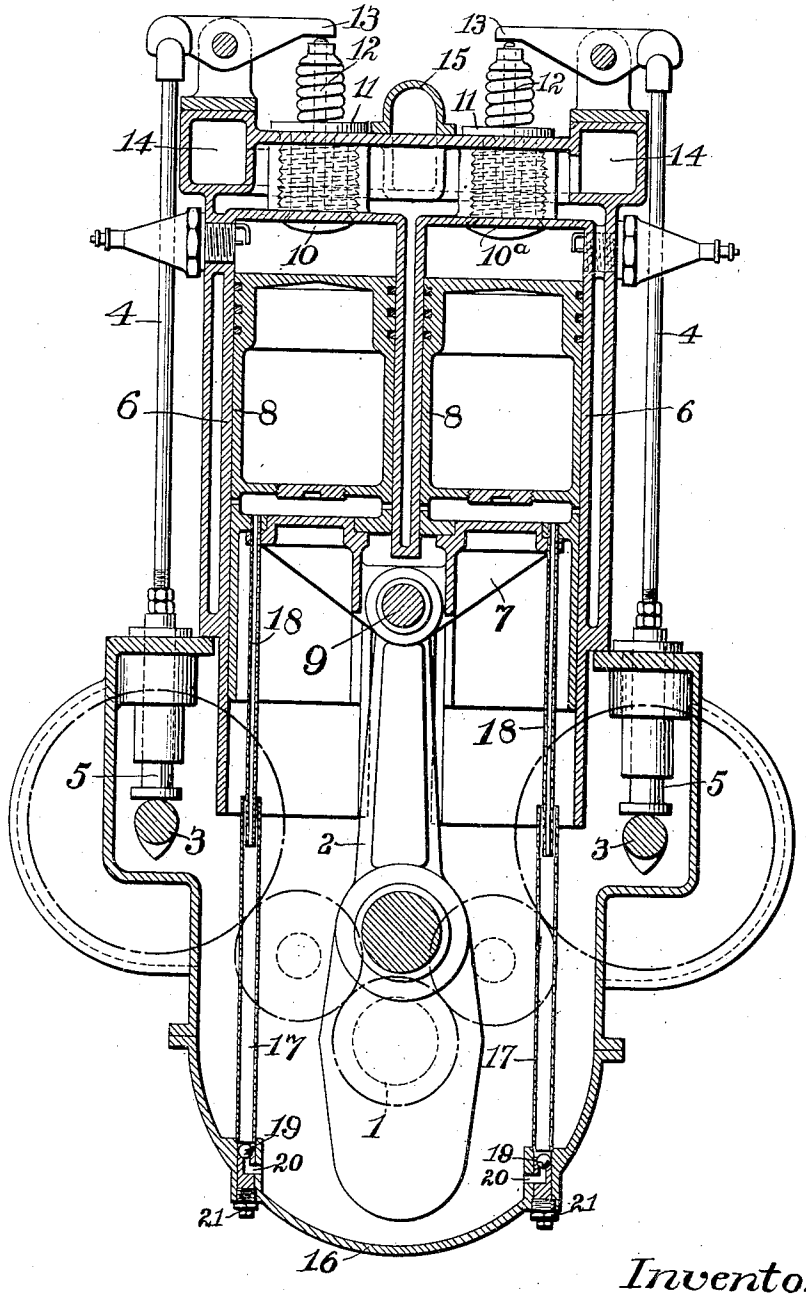
3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

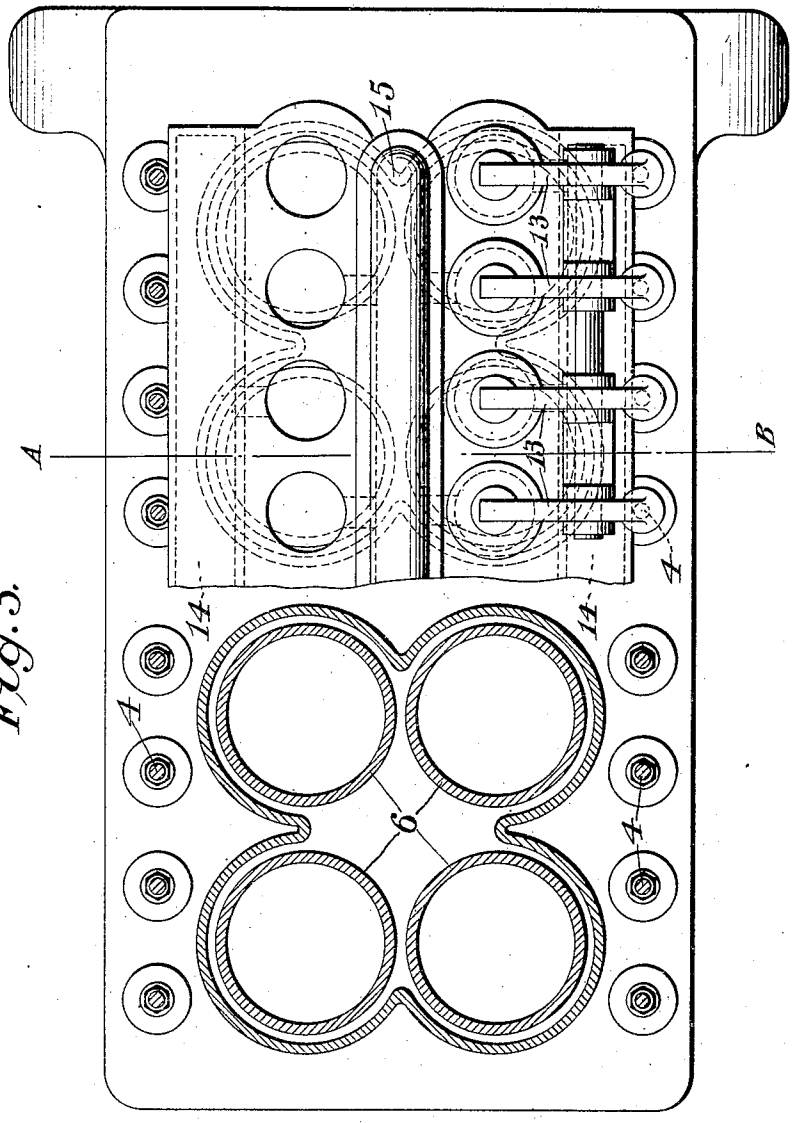

Fig. 3.

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UNITED STATES PATENT OFFICE.

BRUCE W. TRAYLOR, OF ALLENTOWN, PENNSYLVANIA.

INTERNAL-COMBUSTION ENGINE.

1,234,971. Specification of Letters Patent. Patented July 31, 1917.

Application filed October 9, 1916. Serial No. 124,691.

To all whom it may concern:

Be it known that I, BRUCE W. TRAYLOR, a citizen of the United States, and resident of Allentown, Pennsylvania, have invented certain new and useful Improvements in Internal-Combustion Engines, of which the following is a specification.

My present invention relates to improvements in internal combustion engines and has among its objects to provide a multiple cylinder engine of the twin cylinder type, which, by reason of the vertical arrangement of its cylinders, will be free from the "piston slaps" so likely to occur where the cylinders are disposed at an angle to the vertical.

A further object is to provide an engine in which the pistons of each pair of cylinders will be connected to the crank shaft by a single connecting rod, though the cylinders are fired alternately.

I have further aimed to so construct and arrange the pistons and connecting rod of each pair as to produce a balanced effect and reduce or remove the tendency to rock under the push on the connecting rod.

I have further aimed to provide an improved lubricating system for the cylinder walls, which will keep them supplied with the proper amount of oil.

With these and various other objects in view, the invention includes the novel features of construction and arrangement and combination of parts hereinafter described and defined in the appended claim.

An embodiment of my invention is illustrated in the accompanying drawings.

In these drawings,

Figure 1 is a longitudinal vertical section through the cylinders and showing the crank shaft and connecting rods in elevation, the crank case and other ordinary engine accessories being omitted for clearness of illustration.

Fig. 2 is a section on line A—B of Fig. 3, and

Fig. 3 is a sectional plan.

Referring by reference characters to these drawings, the numeral 1 designates the crank shaft which, in an eight cylinder engine, as illustrated, would be provided with four cranks, two of these (1^a and 1^b) being diametrically opposed to each other in one plane, and the other two (1^c and 1^d) being similarly opposed, but lying in a plane disposed at an angle of 90° to the plane of the first two cranks.

Each crank 1^a, etc., is connected by a connecting rod 2 to a wrist pin 9 carried by a cross head 7, which rigidly connects the pistons 8 of the corresponding pair of cylinders 6. I prefer to cast these cylinders four *en bloc* as shown, and provide overhead inlet valves 10 and exhaust valves 10^a, the inlet manifold, or pipe, being applied to the head centrally of the cylinders as indicated at 15, and the exhaust pipes, or passages, being cast integral at the outer corners as indicated at 14.

The inlet and exhaust valves may be carried in valve cages 11 and opened against the tension of springs 12 by rocker arms 13 and push rods 4, adjustably connected to lifters 5 actuated by cam shafts 3 in the ordinary or any desired manner.

The valve timing is supposed to be such that while one piston of each pair is on its power stroke, its companion is on the suction stroke and at the same time the pistons of the adjoining pair of cylinders are respectively on the compression and exhaust strokes. This gives an impulse or firing of the charge for each half rotation of the crank shaft for each block of four cylinders, and as the cranks of one engine block are disposed at an angle of 90° to the cranks of the other engine block, I secure a firing of a charge on every quarter turn of the crank shaft.

In a twin six engine, or one using three blocks of four cylinders, such as above described, the cranks of the three sets would be arranged in correspondingly different planes.

In order to prevent any side working or lash to the pistons, I have provided each pair with a skirt or projecting flange of material length, as indicated at 8^a, which is cut away at the center up to a certain point to allow the connecting rod to work through the sides of the skirt or sleeve.

By this arrangement, I secure practically the same results that would be secured by a separate cross-head or slide.

For securing the most efficient lubrica-

tion of the pistons and cylinder walls, I provide, within the pistons, oil chambers 8^b, which communicate by a plurality of annular ports b with the exterior faces of the pistons. An individual oil pump for each piston is provided for keeping chamber 8^b filled with oil.

This comprises two telescoping tubular sections 17 and 18, the latter being secured to one of the pistons and the former to a valve casing at or near the bottom of the crank case 16, containing an oil passage 20 leading to the interior of the crank case and controlled by a check valve 19, the valve casing being rendered accessible by the screw plug 21.

As the pistons reciprocate, the telescoping of the tubes 17 and 18 will cause oil to be forced up into the chambers 8^b, whence it will be evenly distributed and exactly in the proper amount to the cylinder walls.

Having thus described my invention, what I claim is:—

In an internal combustion engine, a crank shaft having four cranks arranged in opposed pairs, said pairs lying in planes perpendicular to each other, and eight vertical cylinders arranged in pairs in planes transverse to said shaft, the cylinders of each pair being adapted to fire alternately, pistons in said pairs of cylinders, a cross head directly connecting the pistons of each pair, each pair of cylinders having integral circular extensions forming cross head guides, and each pair of pistons having integral circular skirt extensions depending below the cross head and coöperating with the extensions of the cylinders to guide the cross head and prevent side lash of the pistons, and a single connecting rod connecting each cross head with a crank on the crank shaft.

BRUCE W. TRAYLOR.