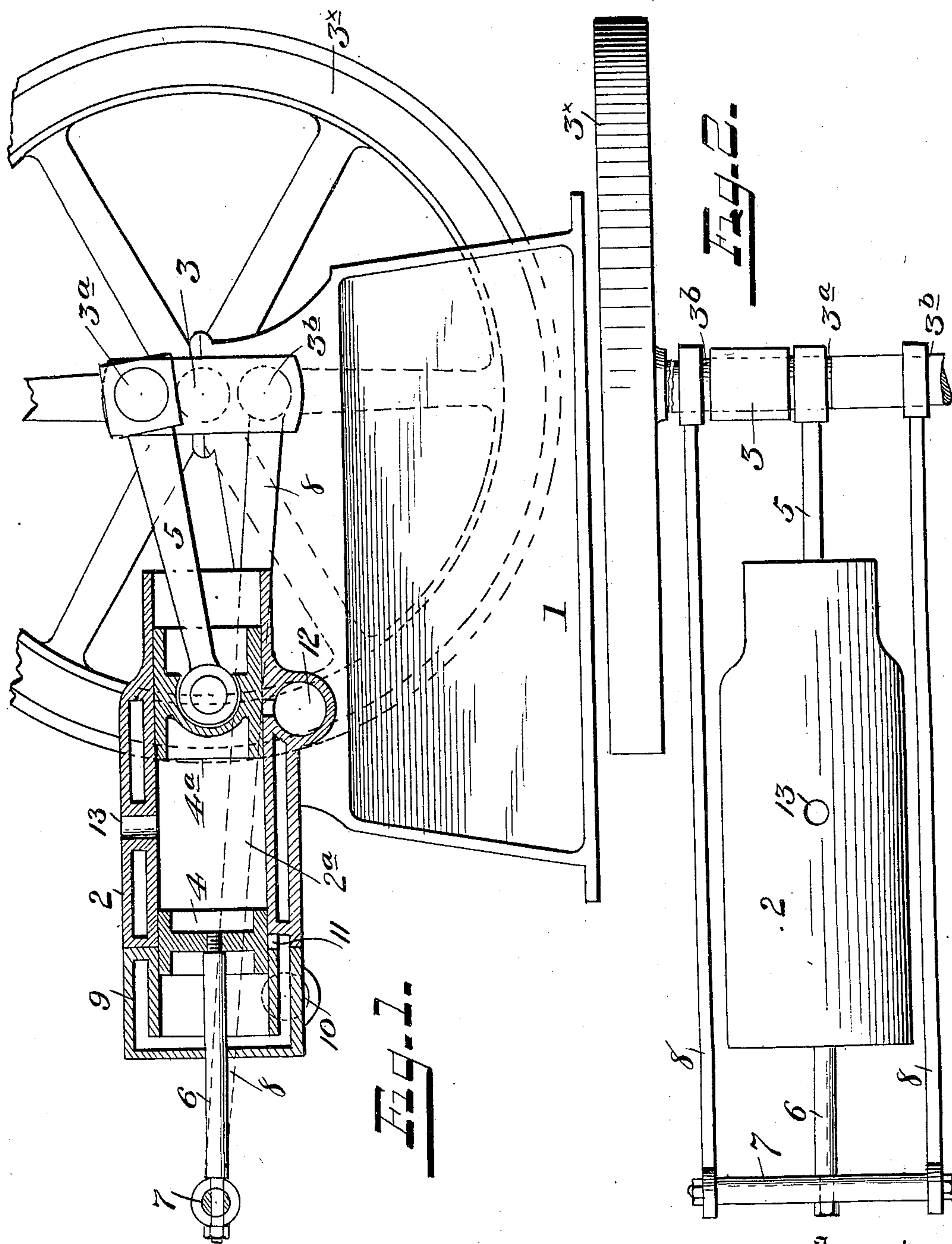


No. 817,706.

PATENTED APR. 10, 1906.

A. O. HANEY.
AIR AND GAS ENGINE.
APPLICATION FILED DEC. 21, 1904.

2 SHEETS—SHEET 1.



Witnesses:

J. A. Weston
L. L. Barker

Inventor:
Allen O. Haney.

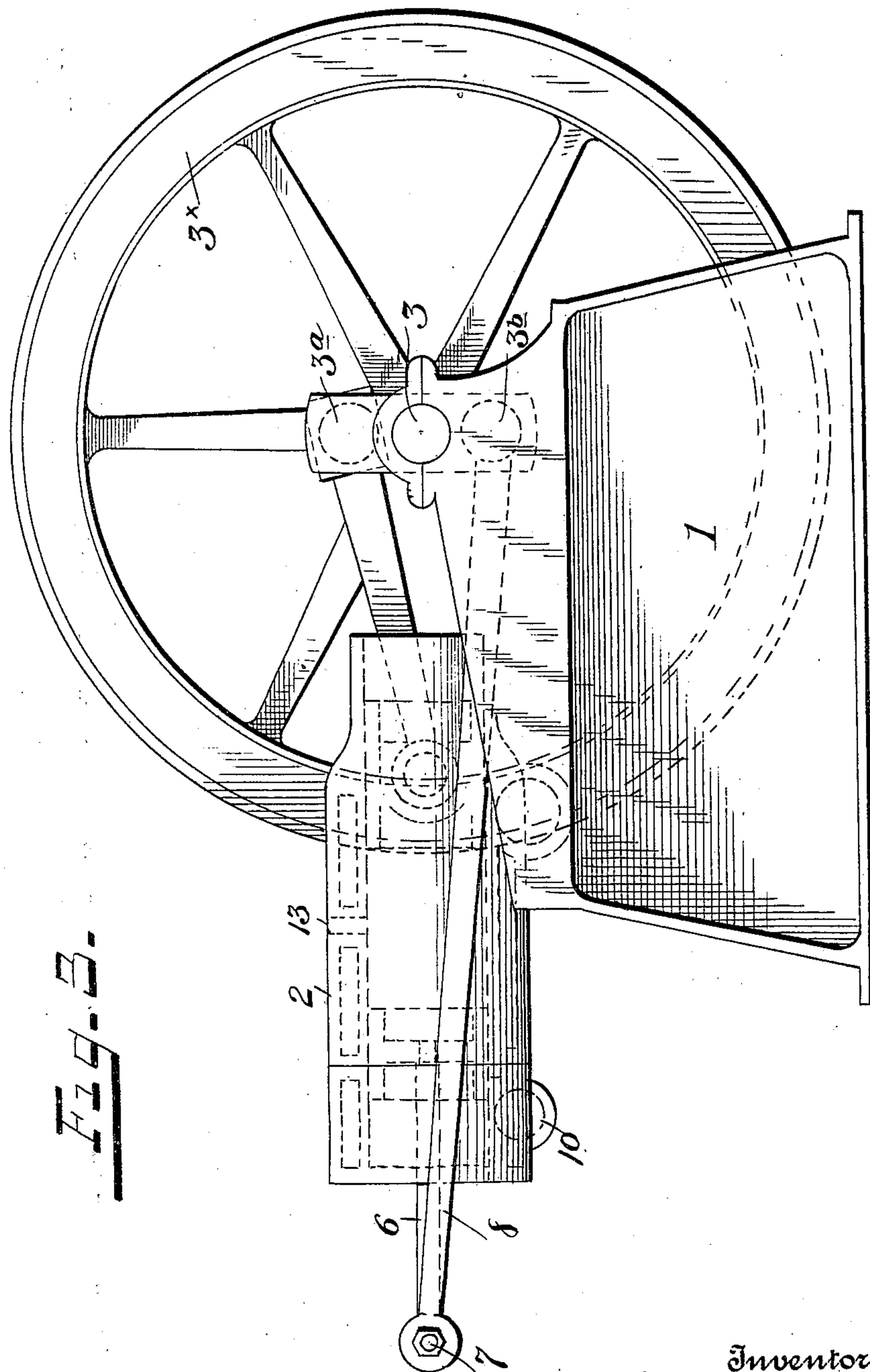
By *Louis Faggey & Co.,*
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

ALLEN O. HANEY, OF SHAKESPEARE, INDIANA.

AIR AND GAS ENGINE.

No. 817,706.

Specification of Letters Patent.

Patented April 10, 1906.

Application filed December 21, 1904. Serial No. 237,778.

To all whom it may concern:

Be it known that I, ALLEN O. HANEY, a citizen of the United States, residing at Shakespeare, in the county of Kosciusko and State of Indiana, have invented new and useful Improvements in Air and Gas Engines, of which the following is a specification.

My invention relates to improvements in what is known as "air and gas engines."

Said invention has for its object to greatly simplify the structure and its operation, accordingly economizing cost of manufacture and expense of running the same, while certain other advantages are secured thereby as will be made apparent later; and to these ends said invention consists of the combination and arrangement of parts substantially as hereinafter more fully disclosed and particularly pointed out by the claim.

In the accompanying drawings, illustrating the preferred embodiment of my invention, Figure 1 is a vertical longitudinal section thereof. Fig. 2 is a plan view, and Fig. 3 is a side elevation of the same.

In the carrying out of my invention I mount upon a suitable support or base 1 a cylinder 2 and a fly or balance wheel equipped crank-shaft 3, in practice adapted to be coupled or connected with the machinery or object to be actuated, the balance or fly wheel being designated as 3^x. Within said cylinder are arranged two pistons 4 4^a, suitably actuated to reciprocate longitudinally therein, one having pivotally connected thereto a single pitman 5, in turn correspondingly connected to the central crank 3^a of the crank-shaft 3. The other piston has fixed thereto one end of a rod 6, suitably fitted to be moved and guided through an opening in one end or head of the cylinder 2 and extending beyond the same the requisite distance. Said piston-rod has its outer end suitably connected to a cross-bar 7 about centrally of the latter, said cross-bar having suitably connected thereto near its ends the outer ends of duplicate pitmen 7, whose inner ends are connected to the lateral cranks 3^b of the crank-shaft 3, said cranks extending in nearly a diametrically opposite direction from that of the aforesaid crank 3^a, the purpose of which is obvious.

The cylinder 2 has in its headed end an air and gasoline mixture containing chamber 9, having a delivering valved port 10 communicating via the port 11 with the explosion or piston chamber 2^a of the cylinder 2. Said

cylinder has near its opposite or open end an exhaust-port 12 also communicating with its chamber 2^a. Said pistons 4 4^a are generally of what I term "cup" shape, one having a depth in its effective surface or area of about an inch and a half, and the other piston a depth in its corresponding surface or area of about two and a half inches, whereby when said pistons have reached the end of their maximum inward strokes, at which time they are only an interval of about an inch apart, (the adjustment of their strokes being predetermined with that end in view,) a chamber, as it were, will be thus formed within the cylinder-chamber of considerably reduced cross-sectional area or diameter. Therefore the gasolene and air charge initially received into the cylinder-chamber will, as the pistons are performing their inward or approaching strokes, be taken in between said pistons into their cup-shaped or sunken effective surfaces or areas, finally forming, as above noted, the contracted inner chamber. Thus said air and gasolene charge is subjected to a high state or degree of compression in a relatively reduced area and at a much more rapid rate than has otherwise heretofore been possible without reducing cross-sectionally the bore or chamber of the piston-cylinder itself, which would result in proportionately reducing the air and gasolene charge, and accordingly the working capacity of the engine. It is also noted that the air and gasolene is driven into the explosion or ignition chamber of the cylinder by the outward stroke of one piston, while the oppositely-moving piston provides simultaneously for the relatively increased expansion action of the gasolene and air charge when ignited or exploded.

A prelighting or priming valved port 13, arranged in the cylinder 2 in its upper portion and communicating with its chamber, is designed, as intimated, for effecting there-through by the employment of suitable means the initial igniting of the gasolene and air charge. The valve arranged in said port may be of any approved or other form, as a common jump-spark plug.

The operation of my engine, it is thought, is apparent from the foregoing, it probably being necessary to only state that the pistons 4 4^a having been initially put into motion manually, as well understood, the air and gasolene charge is admitted via the port 11 as one piston 4 reaches a certain point in its forward stroke into the cylinder-chamber 2^a in

rear of said piston. As said piston makes its return movement or stroke when the other piston 4^a of course will make its corresponding stroke, said charge will be duly compressed by the aforesaid piston, and as the latter reaches the maximum of its said stroke it will uncover the port 11, permitting the passage of said charge in between the two pistons. As the latter make their reverse or approaching strokes it is obvious that said charge will be further compressed thereby, also, as before specially noted, be taken in between said pistons and finally be wholly substantially encompassed within a contracted subchamber formed by said pistons at their nearest point or interval of approach. The charge will by this action, it is apparent, be doubly compressed, as it were, in a relatively contracted compass within the same cylinder initially by the approaching action of the pistons and ultimately by the separate congestive action of the interior lesser areas or surfaces of the pistons, whereby it is found in actual practice by me that the friction or impingement produced thereby is effective for the ignition and consequent explosion of said charge, and that without the aid of any additional means as usually employed for the purpose and which is so common that no further elaboration thereof is necessary herein. The exploding action of the air and gasoline charge will of course have the effect to drive the pistons back to their initial positions, thus effecting their return strokes, consequently permitting the exhausting of the burned charge via the port 12, and by the momentum thus given the various parts, including the fly or balance wheel 3^x, said pistons will be caused to also again repeat their for-

ward or approaching strokes, allowing the recharging of the cylinder-chamber, which aforesaid operation of parts, together with the recharging of the cylinder-chamber, will be continued as long as the supply of the mixture of air and gasoline or fuel is maintained, as is obvious. It is also noted that no complication of valves, cams, or cog-wheels is present in my engine, while a perfectly balanced motion is obtained thereby in addition to its being absolutely reliable because self-exploding and in practice has been found never to miss "fire."

Latitude is allowed as to details herein, as they may be changed as circumstances suggest without departing from the spirit of my invention.

I claim—

An air and gas engine, employing a cylinder having an inner piston-chamber opening into the intake end of said cylinder, and oppositely-moving pistons, said piston-chamber having a single inlet-port also communicating with said cylinder-intake end and delivering the gas and air charge, after initial compression, to the opposing action of the pistons, said inlet-port also adapted to be shut off by one of said pistons in its forward or compressing movement, and said piston-cylinder also having a single exhaust-port adapted to be uncovered by the opposite piston, in its rearward movement, after the exploding of said charge, substantially as set forth.

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

ALLEN O. HANEY.

Witnesses:

BERT DANSMAN,
JAMES FULLER.