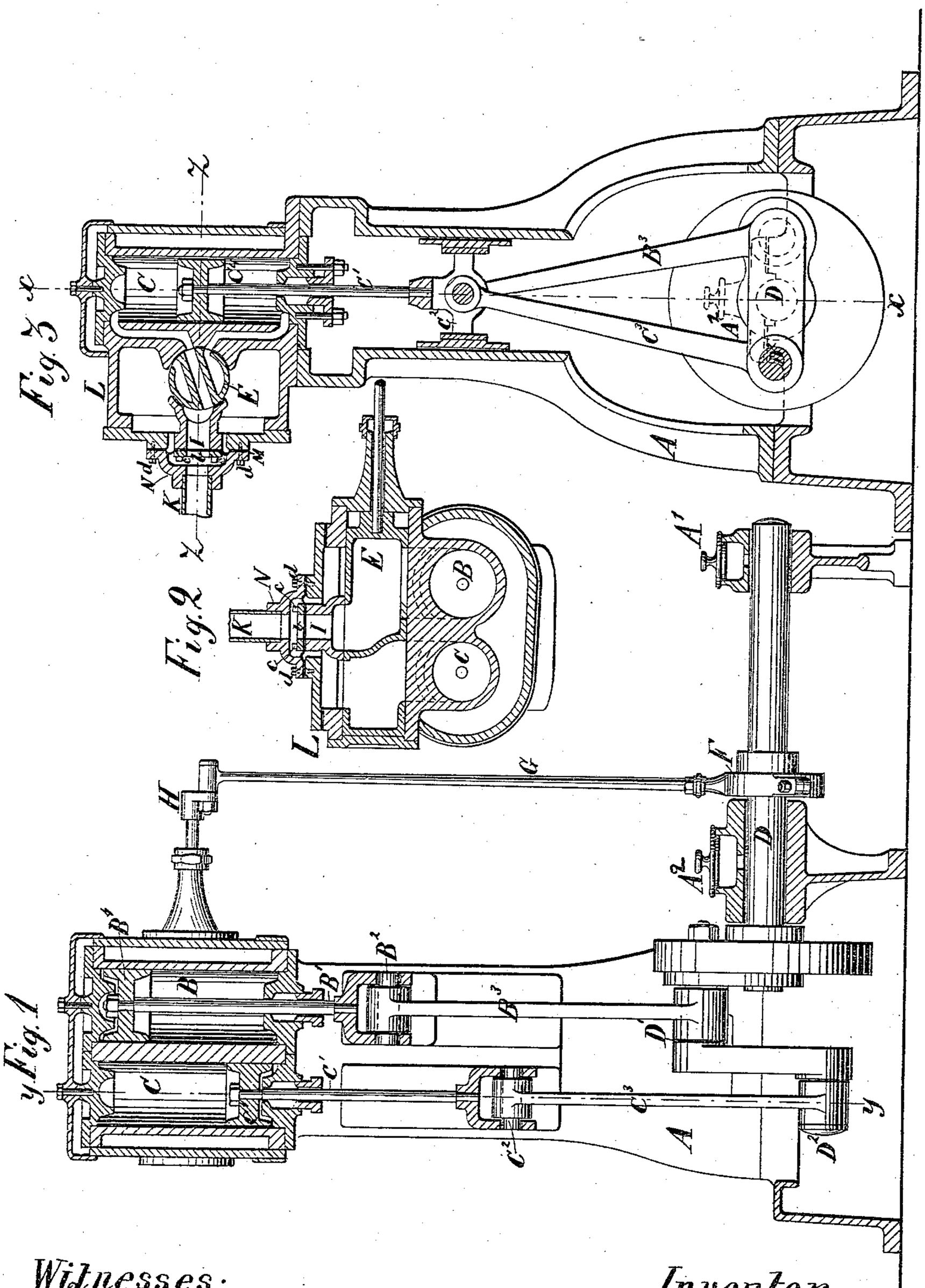
(No Model.)

J. O. BAIRD.

BALANCED STEAM ENGINE.

No. 259,458. Patented June 13, 1882.



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UNITED STATES PATENT OFFICE.

JAMES O. BAIRD, OF BROOKLYN, NEW YORK.

BALANCED STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 259,458, dated June 13, 1882.

Application filed January 28, 1882. (No model.)

To all whom it may concern:

Be it known that I, JAMES O. BAIRD, of the city of Brooklyn, in the county of Kings, State of New York, have invented a new and useful Improvement in Balanced Steam-Engines, of which the following is a specification.

The object of this invention is to construct a steam-engine so that the ordinary strain arising from the action of the piston upon the crank-shaft during its movement is avoided, thereby permitting the engine to be run at very high speeds without transmitting any jar or irregularity of motion through said shaft.

The invention consists of an engine having two cylinders of unequal areas with alternately-working pistons that have independent connections with the crank-shaft, the said cylinders being so proportioned relatively to each other that the pressures on their crank-pins are in inverse ratios to the distances of said crank pins from the center of the outboard-bearing; or, in other words, the pressures on the respective crank-pins multiplied by their distances from center of outboard-bearing are equal; and it consists, further, in connection with the engine, of a valve mouth-piece fitting loosely in the steam-chest cover and held in place by a flexible diaphragm.

Figure 1 is a sectional side elevation of the engine on line *x x*, Fig. 3. Fig. 2 is a cross-section on line *z z*, Fig. 3. Fig. 3 is a vertical section on line *y y*, Fig. 1.

Similar letters of reference indicate corresponding parts.

In the drawings, A represents the engine-frame supporting the two cylinders; B, the larger cylinder, and C the smaller cylinder, and A^2 the inboard-bearing. The piston-rod B′, pertaining to the piston B^4 of the larger cylinder B, is connected by cross-head B^2 and connecting-rod B^3 with the crank-pin D′ of the crank-shaft D that is nearest the pillow-block or outboard-bearing A′, while the piston-rod C′, pertaining to the piston C^4 of the smaller cylinder C, is connected by cross-head C^2 and connecting-rod C^3 with the crank-pin D^2 that is farthest from the pillow-block or bearing A′. Hence the smaller piston-rod C′ has a better leverage than has the rod B′ on the crank-shaft D; but the said cylinders B C are so proportioned and arranged relatively to each other that the pressure or leverage exerted by their respective piston-rods upon that part of the crank-shaft within the bearing A′ is in inverse ratio of the distances of their respective crank-pins from the said bearing or pillow-block A′. Hence by this accurate counterbalancing of forces the unequal and disturbing strains exerted on or transmitted to their crank-shafts by ordinary engines are entirely avoided, the inequalities of motion and force of the one piston-rod being neutralized, as it were, by the action of the other piston-rod.

The valve E is cylindrical and is designed so that the steam shall pass through it into the steam-cylinders, and a semi-rotary reciprocating motion is imparted to it by the combined action of the eccentric F, rod G, and crank H.

The mouth-piece I, which is common to valves of this type, serves to conduct the steam from the induction-pipe K to the valve E.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

An engine having two cylinders of unequal areas, with alternately-working pistons that have independent connections with the crank-shaft, said cylinders being constructed of such relative proportions that the pressures on their crank-pins are in inverse ratios to the distances of said crank-pins from the outboard-bearing, substantially as and for the purpose described, whereby the crank-shaft may be reversed without uneven motion, as set forth.

JAMES O. BAIRD.

Witnesses:

JOSEPH BOYCE,

C. SEDGWICK.