

No. 795,901.

PATENTED AUG. 1, 1905.

P. E. DOWSON.
BALANCING HIGH SPEED MOTORS.

APPLICATION FILED OCT. 3, 1903.

2 SHEETS—SHEET 1.

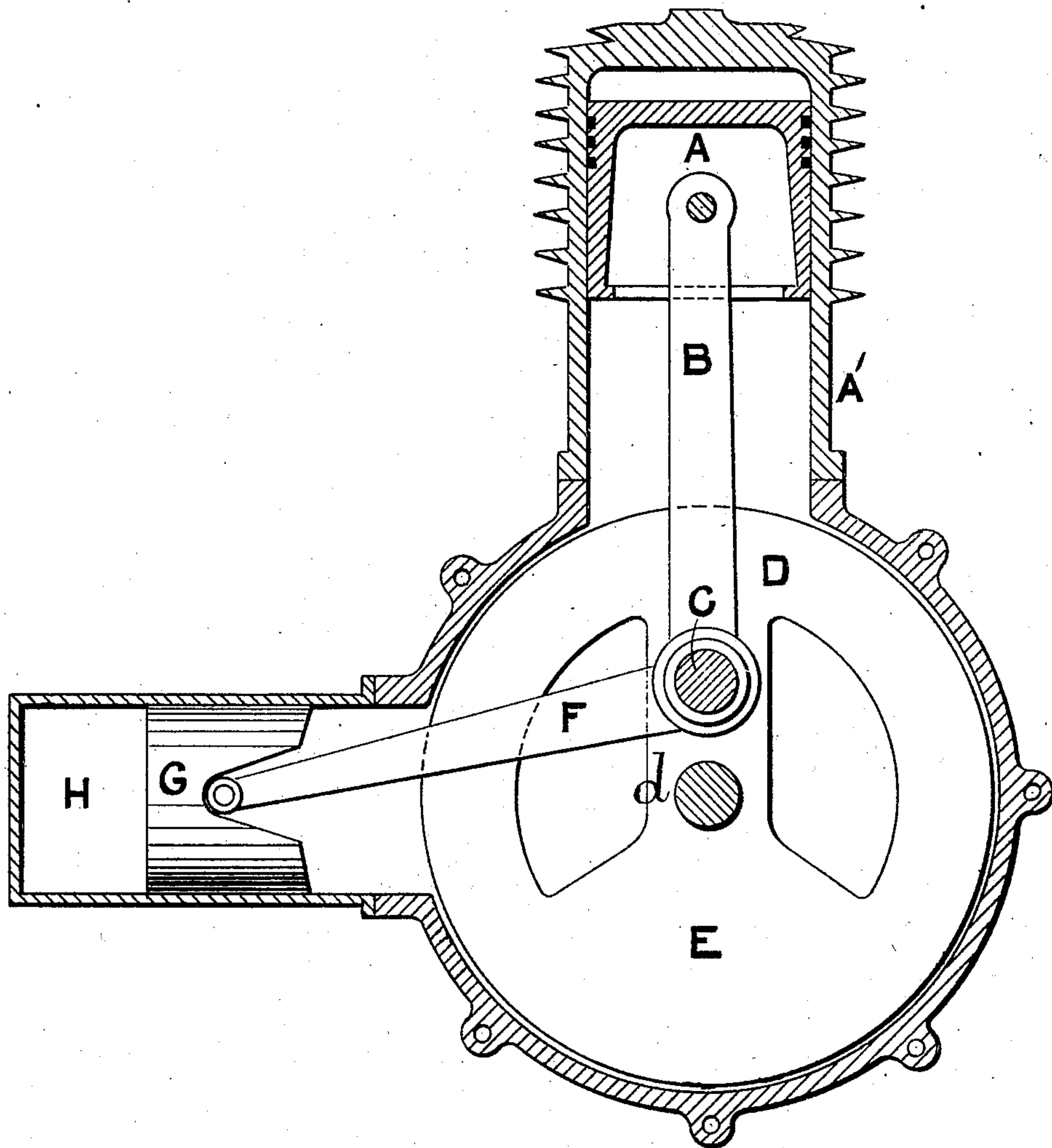


FIG. 1.

WITNESSES.

Joseph Prates.
E. Howard

INVENTOR

P. E. Dowson
by A. Lawson & Co.
attys

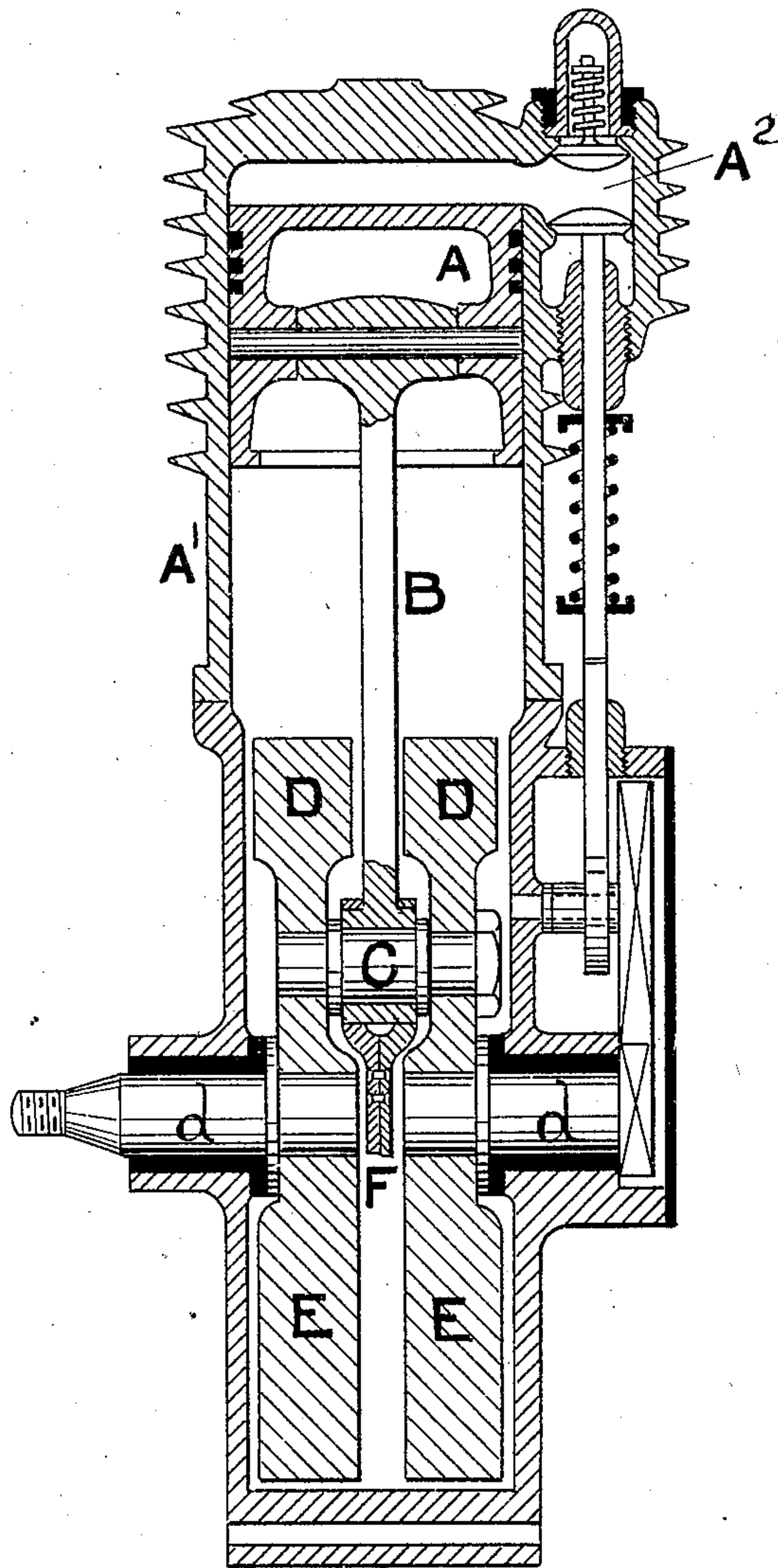
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2 SHEETS—SHEET 2.



WITNESSES.

Joseph Bates.
E. Howard

FIG. 2

INVENTOR

P. E. Dowson
By J. L. O'Neil
att'y

UNITED STATES PATENT OFFICE.

PERCY E. DOWSON, OF HYDE, ENGLAND.

BALANCING HIGH-SPEED MOTORS.

No. 795,901.

Specification of Letters Patent.

Patented Aug. 1, 1905.

Application filed October 3, 1903. Serial No. 175,647.

To all whom it may concern:

Be it known that I, PERCY ENFIELD DOWSON, a British subject, and a resident of Gee Cross, Hyde, county of Chester, England, have invented certain new and useful Improvements in Balancing High-Speed Motors, of which the following is a specification.

This invention is designed to provide for the balancing of high-speed engines, more particularly explosion-engines, such as oil and gas motors.

It consists, essentially, in constructing the motor with a balancing or dummy piston in a cylinder at right angles to the working piston and cylinder connected with the crank-pin, the working and the dummy pistons being balanced by a counter weight or weights, so that angular momentum of the counterweight balances as nearly as possible the combined momentum of the two pistons and their connecting-rods, cranks, and crank-pin.

The invention will be fully described with reference to the accompanying drawings, in which, as an example, it is shown as applied to a bicycle-motor.

Figure 1 is a side elevation, partly in section; Fig. 2, a transverse section.

The motor is constructed with a working piston A in a cylinder A' and with valves A² of any ordinary construction, the piston being connected by the connecting-rod B with the crank-pin C. At right angles to the cylinder A', I place a second cylinder H (or guides or their equivalent) with a balancing or dummy piston G sliding in it at right angles to the working piston, such piston being equal in weight to the working piston A. The dummy or balancing piston G is connected by a connecting-rod F with the crank-pin C, and preferably in the same plane.

The two pistons A and G and connecting-rods B and F, cranks D D, and crank-pin C are counterpoised or balanced by a suitable counterweight E, placed opposite the cranks D, so that when running the mass accelerations of the oscillating weights are at each point equal and opposite to the component of the centrifugal force of the counterweight resolved along the directions of motion of the oscillating weights. The exact relation of the counterweight dimensions to those of the working and dummy pistons required is that the mass multiplied by the radius of its cen-

ter of gravity must be equal to the product of the mass of either of the pistons and the radius of the crank-throw, the weights of the connecting-rods and crank-pin also being taken into account.

In the drawings the weight E is shown as part of the disk-cranks or fly-wheels D; but any other suitable arrangement by which the counter weight or weights are placed opposite the cranks may be adopted. Two or more cylinders may be placed to work side by side, with their pistons each balanced according to this plan by a dummy piston working at right angles, or a single dummy piston of larger dimensions may be arranged to balance two or more working pistons.

The driving power may be transmitted direct from the crank-shaft *d* by a strap or chain from a pulley or chain, or a second or counter shaft may be geared thereto to rotate at a slower (or faster) speed, from which the power may be transmitted.

What I claim as my invention, and desire to protect by Letters Patent, is—

1. A high-speed motor comprising in its construction a cylinder and working piston, a balancing-piston set in a plane to move at right angles to the working piston, guides in which the balancing-piston moves to and fro, connecting-rods connected with the pistons, a common crank-pin for the two connecting-rods, and a counterpoise placed opposite to the crank, the component of the centrifugal force of the circular motion of which is very nearly equal and opposite to the mass accelerations of the two pistons, connecting-rods, crank and crank-pin, substantially as described.

2. In a high-speed motor the combination with the working piston A and cylinder A', of a dummy piston G and cylinder or guides H at right angles to the cylinder A' the pistons being connected with the same crank-pin, and a counterweight opposite the crank the component of the centrifugal force of the circular motion, substantially as and for the purpose described.

3. In a high-speed motor the combination with a cylinder A' and working piston A, connecting-rod B and crank-pin C, of a balancing-piston G, set at right angles to the working piston A, a guide-cylinder H in which the balancing-piston is moved to and fro, a con-

necting-rod F by which the crank-pin C is connected with the balancing-piston, and a counterpoise E placed opposite the crank, the component of the centrifugal force of the circular motion of which is very nearly equal and opposite to the mass accelerations of the two pistons, connecting-rods, crank and crank-pin, substantially as described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

P. E. DOWSON.

Witnesses:

I. OWDEN O'BRIEN,

B. TATHAM WOODHEAD.