(No Model.) 3 Sheets—Sheet 1.

H. WILLIAMS.

GAS MOTOR ENGINE.

No. 457,020. Patented Aug. 4, 1891.

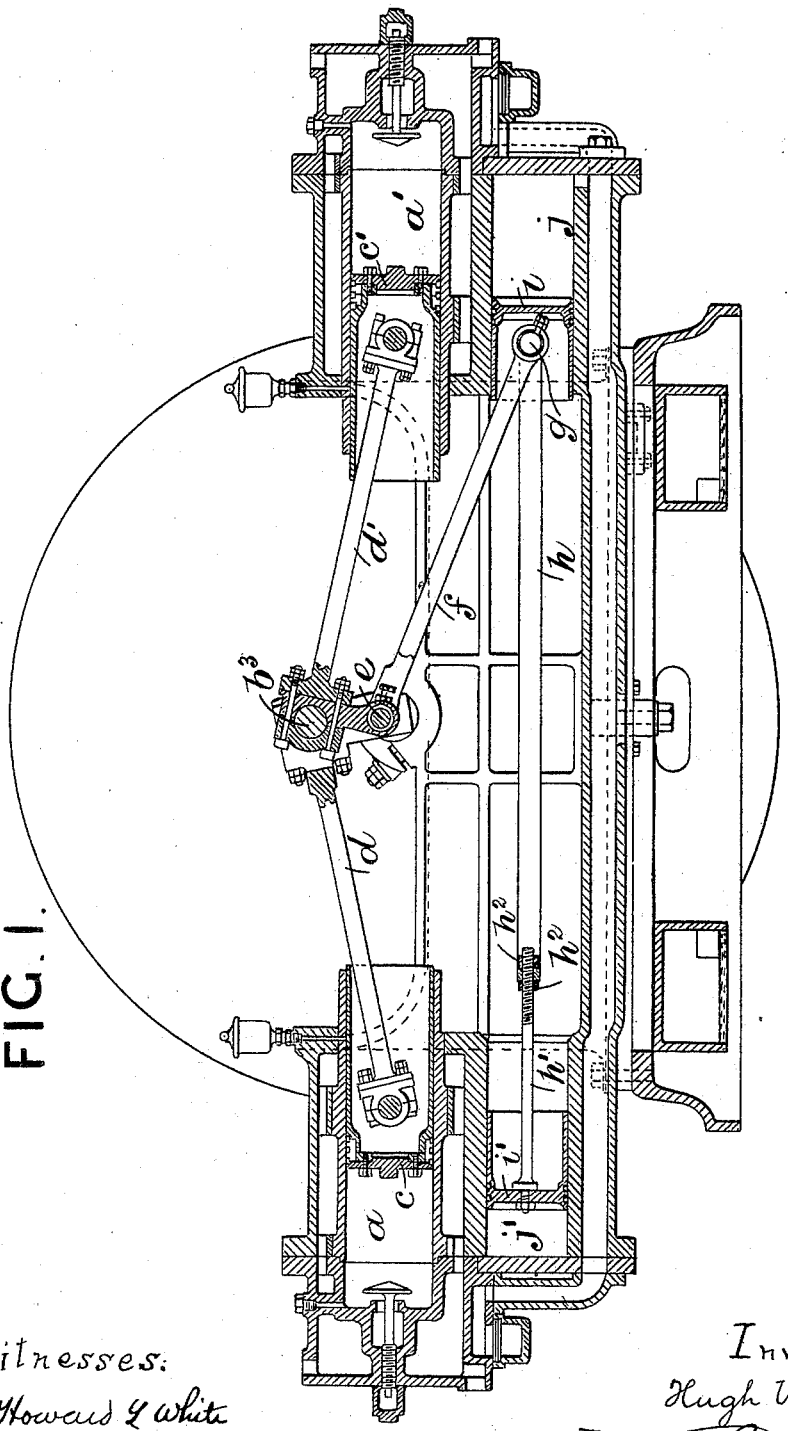

FIG. 1.

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(No Model.) 3 Sheets—Sheet 2.

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FIG. 2.

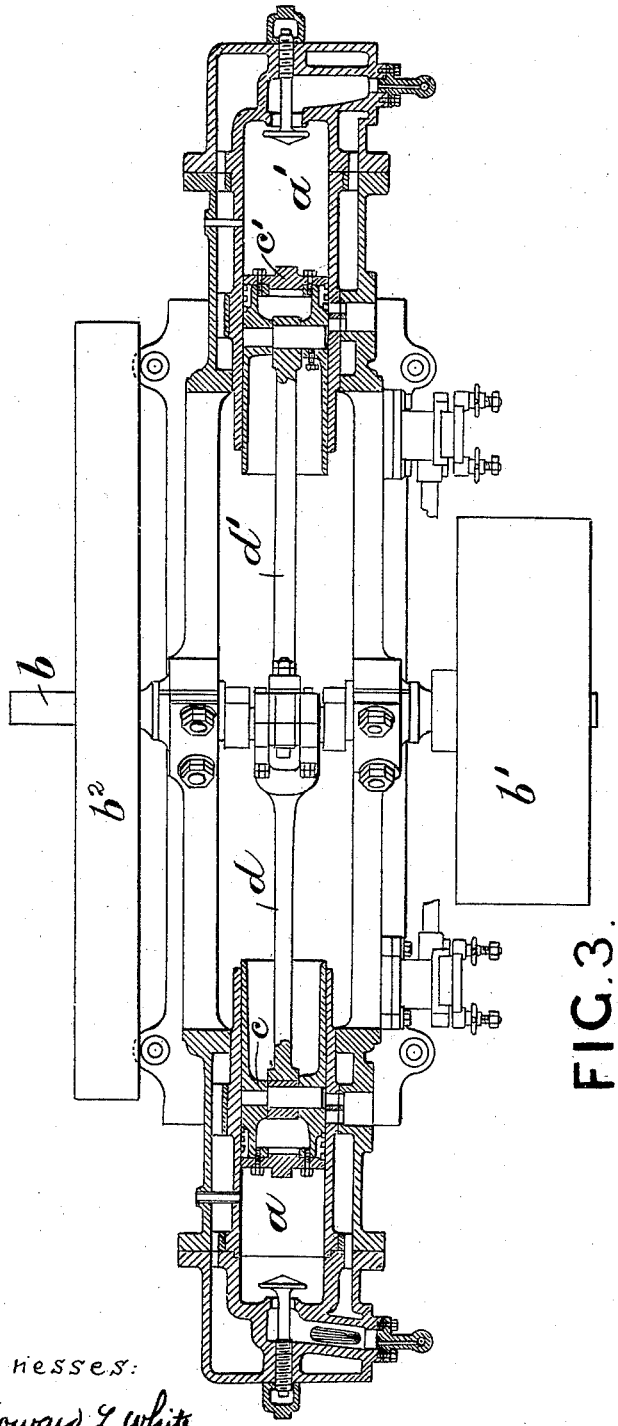
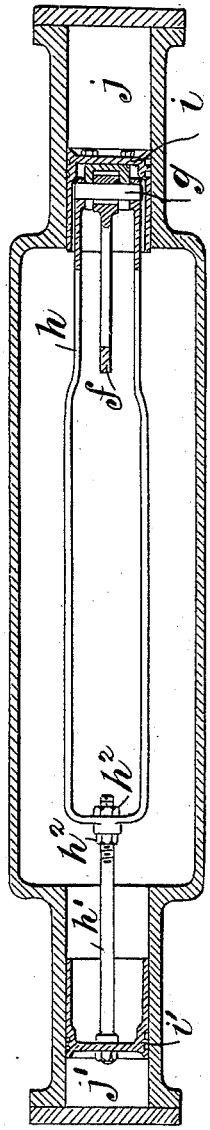


FIG. 3.



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(No Model.) 3 Sheets—Sheet 3.

H. WILLIAMS.

GAS MOTOR ENGINE.

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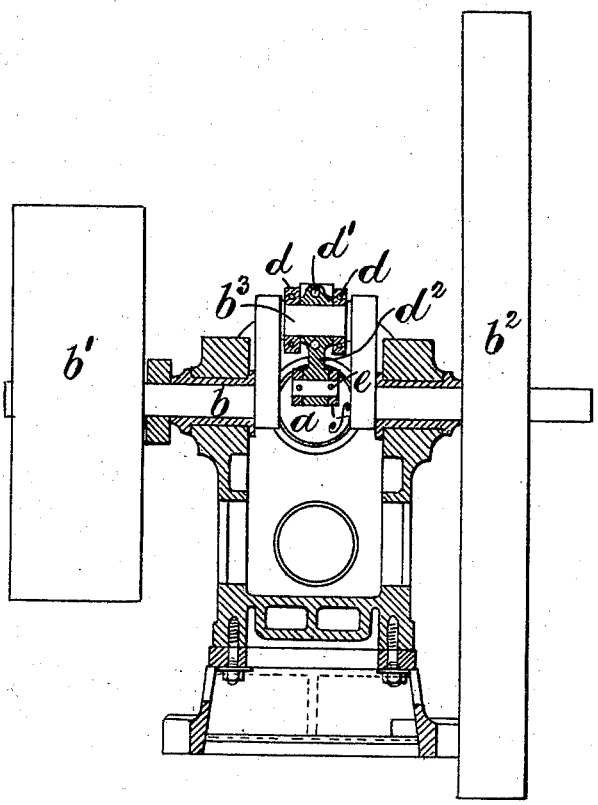
FIG. 4.



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UNITED STATES PATENT OFFICE.

HUGH WILLIAMS, OF STOCKPORT, ENGLAND.

GAS-MOTOR ENGINE.

SPECIFICATION forming part of Letters Patent No. 457,020, dated August 4, 1891.

Application filed August 1, 1889. Serial No. 319,458. (No model.) Patented in England March 5, 1889, No. 3,820.

To all whom it may concern:

Be it known that I, HUGH WILLIAMS, a subject of the Queen of Great Britain, and a resident of Stockport, in the county of Chester, England, have invented certain new and useful Improvements in Gas-Motor Engines, (for which I have obtained a patent in Great Britain, No. 3,820, bearing date March 5, 1889,) of which the following is a specification.

My invention relates to improvements in gas-motor engines, and is particularly applicable to the type of engines known as the "Stockport" gas-engines, for which Letters Patent of the United States No. 301,078, bearing date July 1, 1884, were granted to Charles Henry Andrew, and in which the cylinders are arranged tandem at opposite sides of the crank-shaft, the chief object of my improvements being to insure the delivery of full charges of explosive fluid mixture from the compression or charging cylinders into the power-cylinders. I attain this object by the arrangement and combination of parts illustrated by the accompanying three sheets of drawings, in which—

Figure 1 is a longitudinal vertical section of a double-acting Stockport gas-engine fitted with my improvement. Fig. 2 is a plan of the same, partly in section. Fig. 3 is a sectional plan of the compression-cylinders and their pistons. Fig. 4 is a transverse vertical section taken through the middle of the engine.

Similar letters refer to similar parts throughout the several views.

The two power-cylinders $a\ a'$ are placed on opposite sides of the crank-shaft b, on which is mounted the driving-pulley b' and the fly-wheel b^2. The two power-pistons $c\ c'$ have the ends of their respective piston-rods $d\ d'$ fitted together to form a cross-head, through which the crank-pin b^3 passes.

Now according to my present improvements I cast with the end of the piston-rod d', or otherwise form on the aforesaid cross-head, a projection d^2, which carries a stud e, which constitutes a crank-pin for a connecting-rod f, the other end of which is secured by a pin g to the piston-rod h of the piston i of the compression or charging cylinder j. The piston-rod h' of the piston i' of the other compression-cylinder j' is screwed into the end of the piston-rod h and secured by nuts h^2. This mode of connection permits the adjustment of the relative positions of the two pistons $i\ i'$ and also insures their simultaneous movement.

The engine is provided with the usual ports, passages, valves, and igniting arrangements, which may be of any of the ordinary well-known constructions. The great advantage obtained by driving the piston i of the compression-cylinder j from the separate and independent crank-pin e, as above described, is that a longer or later stroke is given to it and also to the piston i' of the other compression-cylinder j' than that of their corresponding power-pistons $d\ d'$. Consequently after each power-piston has completed its instroke the compression-piston below it will still continue to move inward for a short distance, and the effect of this continued movement is to drive a full charge of explosive fluid mixture into the opposite power-cylinder. During the time this compression-piston—say, for example, the piston i—is forcing its charge from the cylinder j into the power-cylinder a the opposite compression-cylinder j' will be drawing in a new charge of explosive fluid mixture, as is well understood.

I declare that what I claim, and desire to secure by Letters Patent of the United States, is—

The combination, with the power-cylinders $a\ a'$, their pistons $c\ c'$, piston-rods $d\ d'$, and the crank-shaft b, of the projection d^2, crank-pin e, carried by said projection, rod f, connecting said crank-pin e to the piston-rod h of the compression-piston i, said piston-rod h being coupled adjustably to the piston-rod h' of the compression-piston i', all substantially as herein shown and described, for the purpose specified.

In witness whereof I have hereunto set my hand in presence of two witnesses.

HUGH WILLIAMS.

Witnesses:
ALF. R. BELLAMY,
ROBERT I. SMITH.