

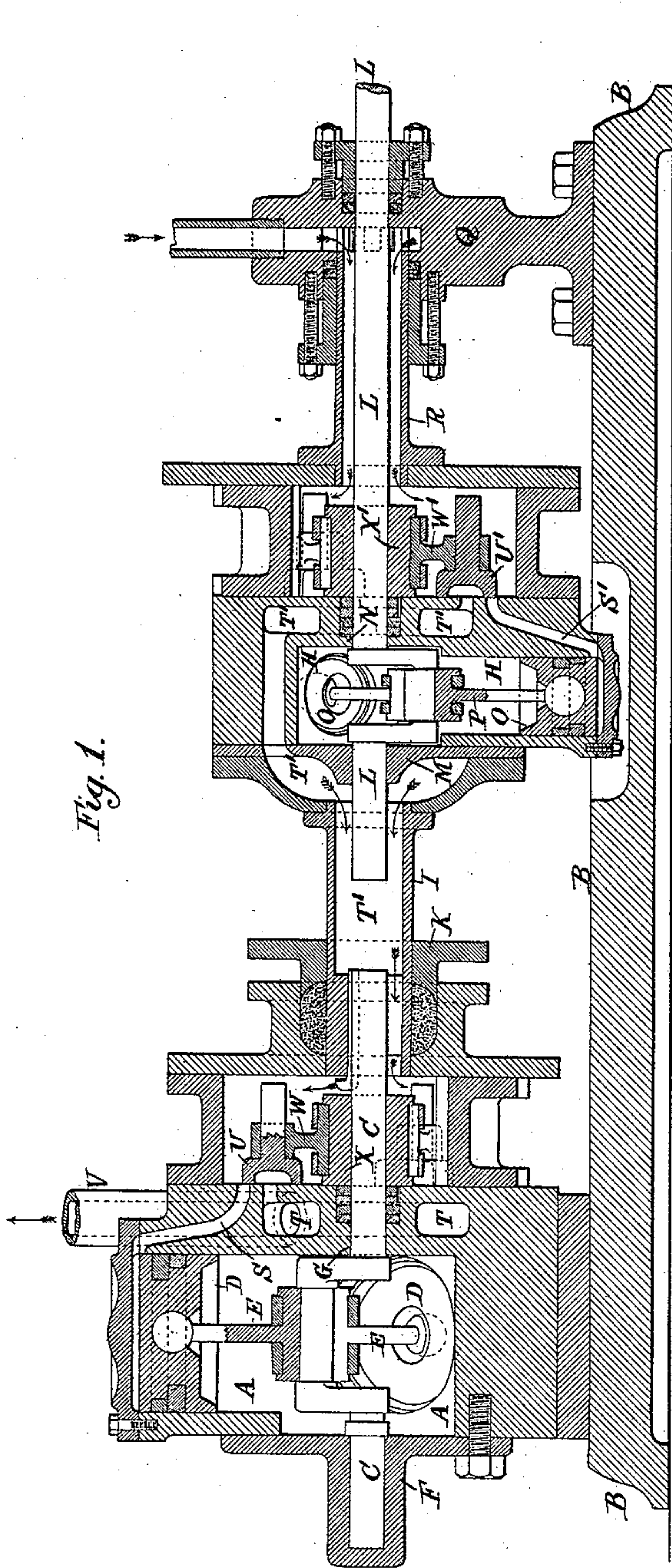
(No Model.)

2 Sheets—Sheet 1.

J. F. SLEAT.  
HIGH SPEED ENGINE.

No. 442,708.

Patented Dec. 16, 1890.



Witnesses:  
E. De Puy  
C.A. Reed.

Inventor  
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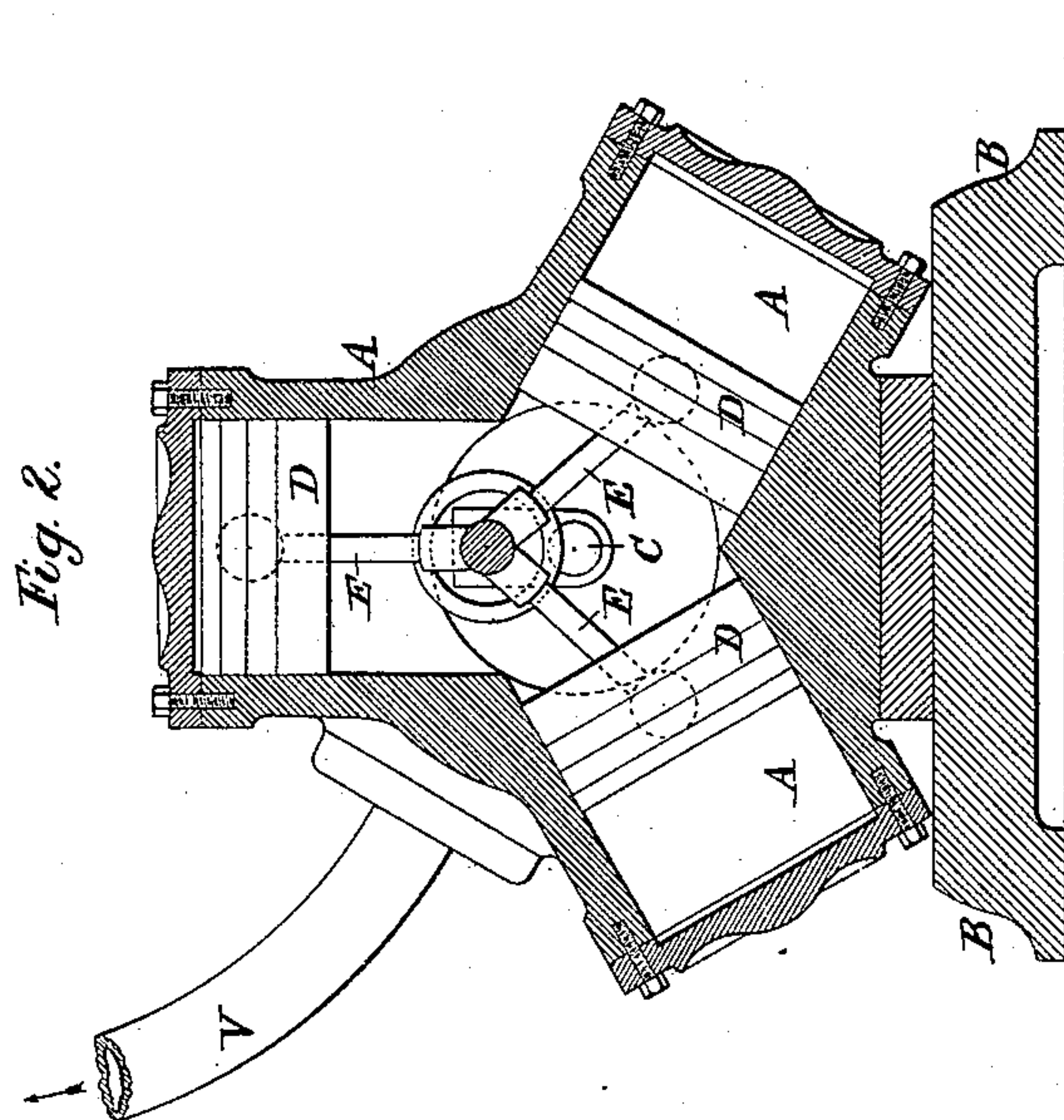
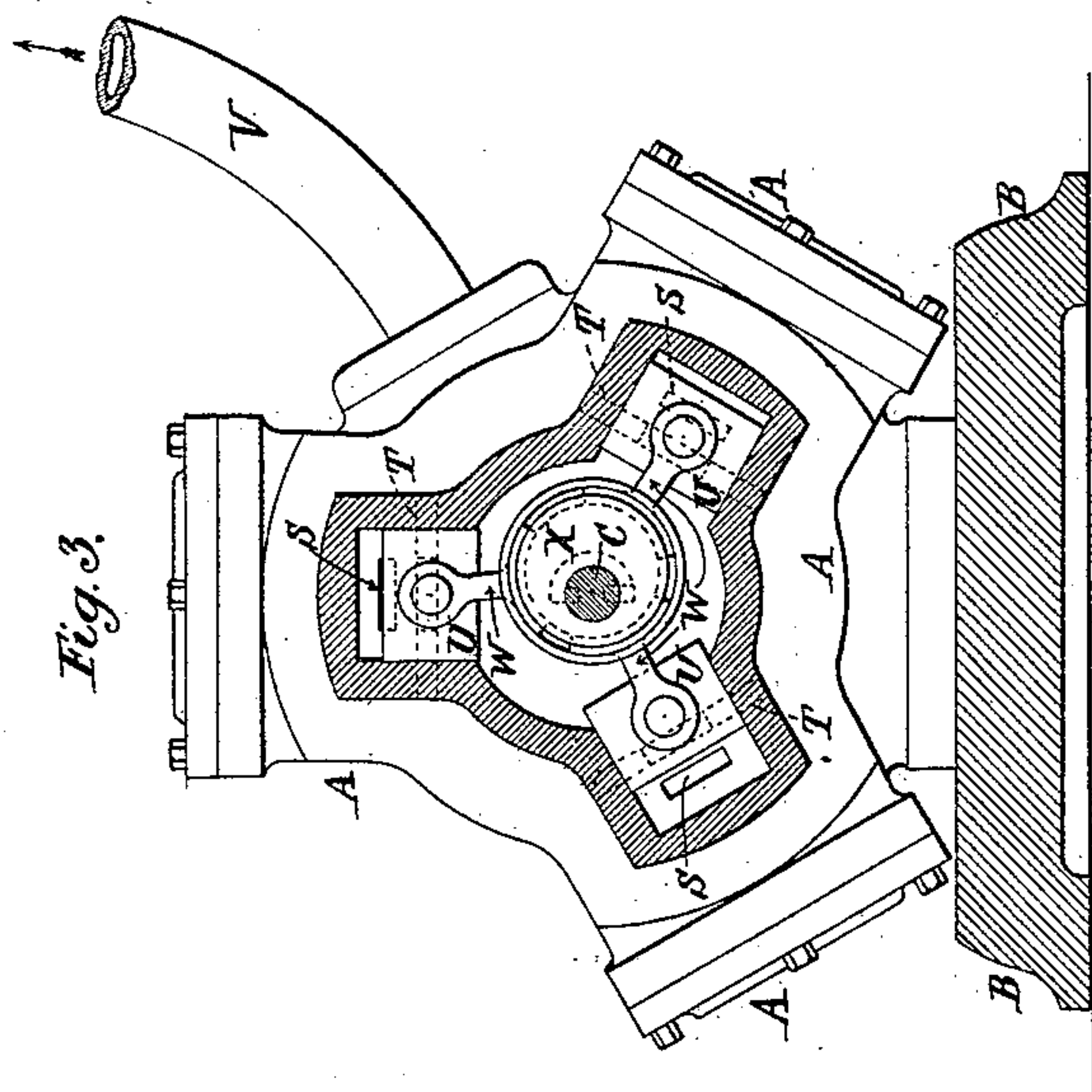
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2 Sheets—Sheet 2.

J. F. SLEAT.  
HIGH SPEED ENGINE.

No. 442,708.

Patented Dec. 16, 1890.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

JOHN FRANCIS SLEAT, OF NEWINGTON, ENGLAND.

## HIGH-SPEED ENGINE.

SPECIFICATION forming part of Letters Patent No. 442,708, dated December 16, 1890.

Application filed March 11, 1890. Serial No. 343,471. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN FRANCIS SLEAT, engineer, a subject of the Queen of Great Britain, residing at 26 Penton Place, Kennington Park Road, Newington, in the county of Surrey, England, have invented a new and useful High-Speed Engine, of which the following is a specification.

This invention relates to an engine in which the motor-shaft is driven at a high speed with a comparatively slow piston-speed, the principal object being to diminish the wear and tear which must occur with high-speed engines as hitherto constructed in which the piston-speed is very high.

It consists, broadly, in the employment of two, three, or more cylinders or sets of cylinders, one only of which is stationary, and the piston, or preferably pistons, in which causes or cause the second cylinder or set of cylinders to rotate, the piston, or preferably pistons, in the latter in its or their turn causes or cause the third cylinder or set of cylinders to rotate, so that such third cylinder or set of cylinders revolves with the increased speed due to the speed with which the second cylinder or set of cylinders is rotated by the first, added to the speed with which it is itself driven by the second cylinder or set of cylinders. The last cylinder or set of cylinders actuates the motor-shaft from which power is to be transmitted. The motive fluid can either act expansively in all or any number of the cylinders or sets of cylinders in succession, or the whole of the cylinders or sets of cylinders may be high-pressure cylinders.

The following is a description of a suitable method of carrying out the invention as applied to a compound engine having two sets of cylinders.

In the accompanying drawings, Figure 1 is a longitudinal section of the improved engine; Fig. 2, a transverse section through the set of low-pressure cylinders, and Fig. 3 a transverse section through the valve-chest of the set of low-pressure cylinders.

Each set of cylinders is shown as composed of three cylinders, all three being formed in the same casting or suitably connected together. The set of low-pressure cylinders A is fixed to a suitable base or bed B, and through the center of the casting passes a crank-shaft C.

In each cylinder A is a piston D, which is connected to the crank of shaft C by rods E, so as to cause such crank-shaft to rotate in the bearings F G in the casting. The inner end of crank-shaft C is keyed to the casing of the set of high-pressure cylinders H, a projection or sleeve I on which works in the packed gland or stuffing-box K, formed on the casing of the set of low-pressure cylinders A. The sleeve I is preferably hollow and forms the passage for the motive fluid from the set of high-pressure to the set of low-pressure cylinders, as shown by the arrows. The set of high-pressure cylinders H will thus be caused to rotate with the low-pressure crank-shaft C when same is actuated by the pistons D. A second crank-shaft L passes through the center of the casting of the high-pressure cylinders H and can rotate in the bearings M N, formed in the casting.

In each cylinder H is a piston O, connected by rods P to the crank-shaft L, so as to cause same to rotate in its bearings. The crank-shaft L will therefore be driven at a speed equal to that at which the set of high-pressure cylinders H is caused to rotate by the crank-shaft C of the set of low-pressure cylinders A plus the speed at which such crank-shaft L is itself driven by the high-pressure pistons O.

The power may be taken in any suitable manner from the crank-shaft L; or, if the motor is provided with three or more separate cylinders or sets of cylinders, such crank-shaft L will in its turn be connected to the casing of the next cylinder or set of cylinders in succession, so as to cause same to rotate, and so on, the whole of the cylinders or sets of cylinders being provided with crank-shafts actuated by a piston or pistons in their respective cylinders or sets of cylinders, and the power will be taken from the crank-shaft of the last cylinder or set of cylinders. By this means the speed of the last crank-shaft or motor-shaft of the series can be increased indefinitely by increasing the number of cylinders or sets of cylinders employed, while the piston-speed of the different cylinders or sets of cylinders can be kept as low as desired.

The revolving cylinders will be suitably supported in bearings, and the casing of the last or high-pressure cylinder or set of cylinders H will preferably be provided with a pro-



jecting sleeve R, containing the passage for the motive fluid, while the bearing Q, in which such sleeve R works, will be made hollow and its space communicate with such passage, so as to convey the motive fluid inside the casing of the high-pressure cylinders H, as shown by the arrows.

Each cylinder or set of cylinders is provided with a suitable supply-port and passage S S' and exhaust-port and passage T T' and with suitable valves U U' (either of slide or piston form) to control same for insuring the proper distribution of the motive fluid and its exhaust from one cylinder to another in succession and finally at V to the atmosphere or condenser. The valves U U' may be actuated in any suitable manner, a convenient method being to connect same by rods W W' to eccentrics X X', mounted upon the respective crank-shafts C L of the different cylinders or sets of cylinders. If the cylinders or sets of cylinders are all high-pressure cylinders, each of them will of course have to be provided with suitable means for admitting the motive fluid directly thereto, when the valves U U' will insure its proper distribution and exhaust.

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

1. The improved high-speed engine consisting of two or more cylinders or sets of cylinders, one of which is fixed and actuates a

crank-shaft to which the casing of the next cylinder or set of cylinders is connected, so that the latter is caused to rotate therewith, and such second cylinder or set of cylinders and all the following cylinders or sets of cylinders (when more are employed) actuating separate crank-shafts, connected, respectively, to the casing of the next cylinder or set of cylinders in succession, substantially as and for the purpose specified.

2. The improved high-speed engine consisting of two or more cylinders or sets of cylinders, one of which is fixed and causes the second set to rotate, while the other or others actuate separate crank-shafts which are respectively connected to the casing of the following cylinder or set of cylinders in succession, in combination with passages connecting any two or more of such cylinders or sets of cylinders, so as to allow the motive fluid to pass from one to the other, substantially as and for the purpose specified.

3. The combination of two piston steam-engines and two crank-shafts operated thereby, the casing of one of said steam-engines being connected to and rotating with the crank-shaft driven by the other steam-engine, substantially as described.

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Witnesses:

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