

(No Model.)

E. M. CORYELL.
STEAM ACTUATED VALVE.

No. 327,069.

Patented Sept. 29, 1885.

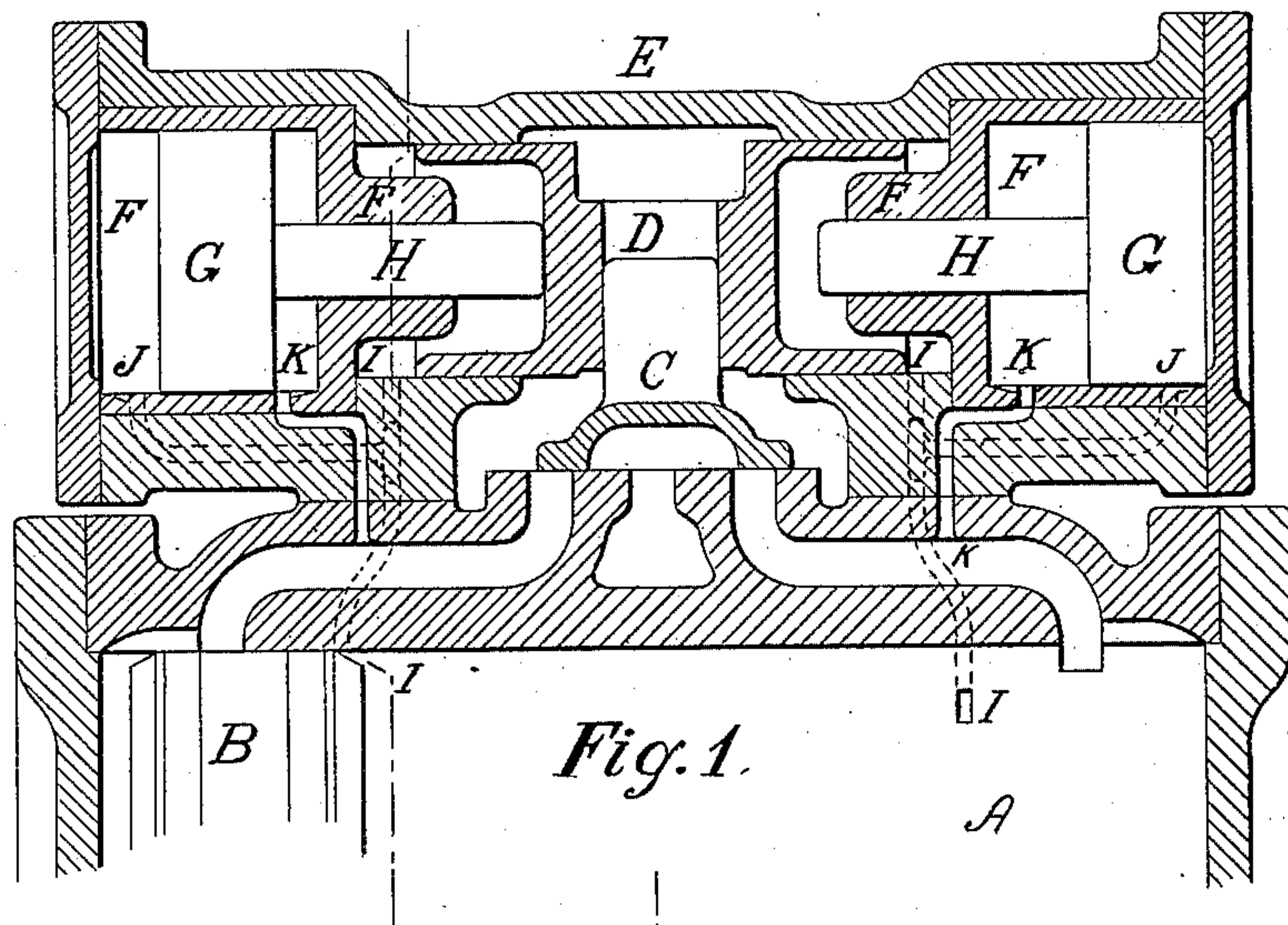


Fig. 1.

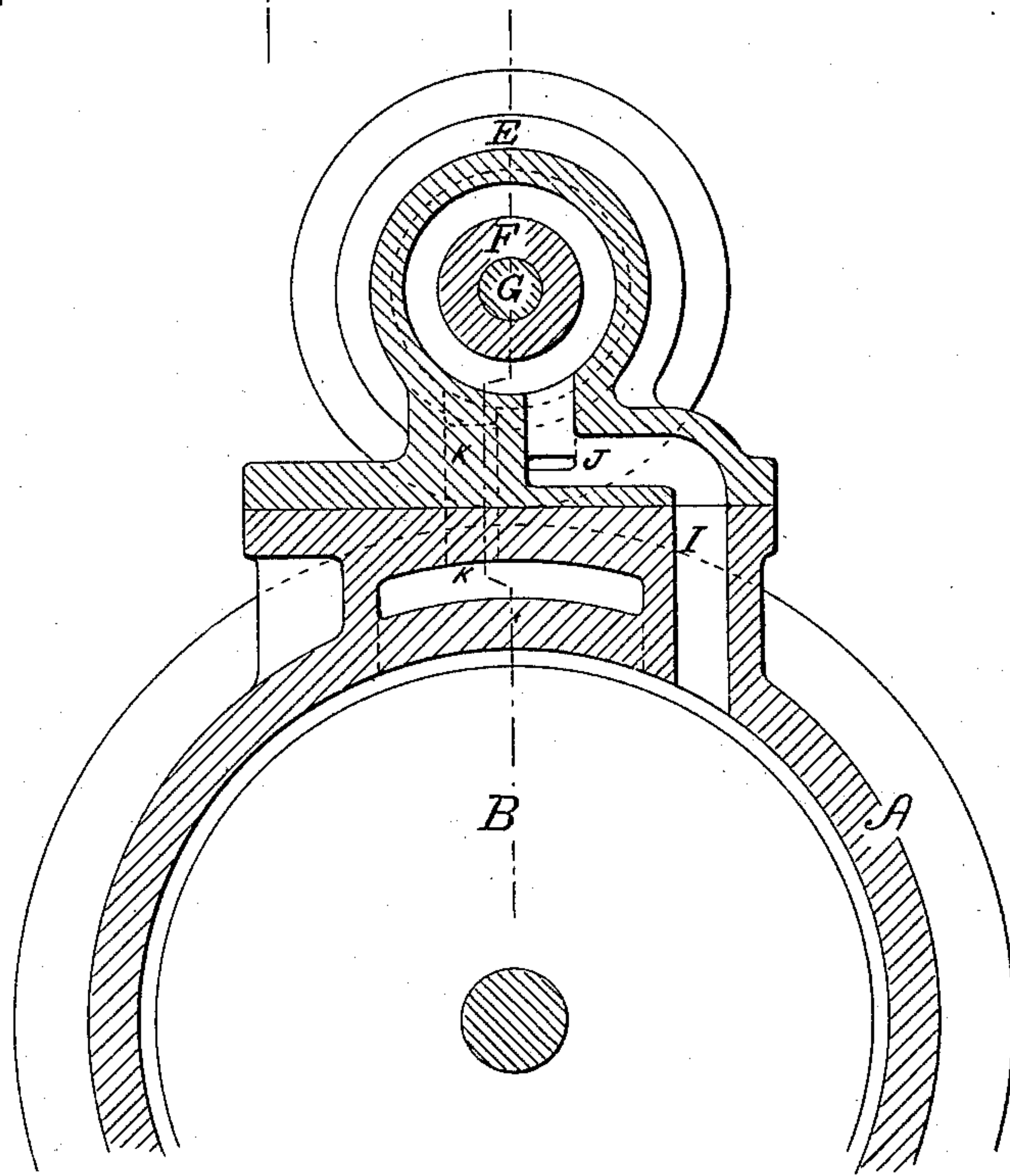


Fig. 2.

Witnesses.

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EDWIN M. CORYELL, OF BROOKLYN, NEW YORK.

STEAM-ACTUATED VALVE.

SPECIFICATION forming part of Letters Patent No. 327,069, dated September 29, 1885.

Application filed December 5, 1884. (No model.)

To all whom it may concern:

Be it known that I, EDWIN M. CORYELL, a citizen of the United States, and a resident of Brooklyn, E. D., in the county of Kings and State of New York, have invented new and useful Improvements in Steam-Actuated Valves, of which the following is a specification.

My invention relates to improvements in valve-gear of direct-acting steam-engines, in which a supplemental piston carries or moves a valve to open or close the steam and exhaust ports of the engine, and is particularly applicable to steam-pumps.

The objects of my improvements are, first, to admit steam to and exhaust it from alternate ends of the steam-cylinder by the movement of the valve without the intervention of rods or tappets coming in contact with any part of the piston or rod or any attachment thereto; second, to provide for the movement of the valve without permitting metal to strike metal with sufficient violence to produce a noise; and, third, to provide for the retardation of the steam-piston at the beginning of its stroke, and for wide-open ports during the remaining portion of the stroke. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of the upper portion of a direct-acting steam-engine with its cylinder, cylinder-heads, and steam-piston, steam-chest or supplementary steam-cylinder, supplementary piston, and valve, with my improvements at each end of the chest, and in the small ports near the ends of the cylinder. Fig. 2 is a vertical section of the upper part of the engine through the cylinder, one of the small ports before referred to, and steam-chest. The broken lines show where the sections are taken.

Similar letters refer to similar parts in both views.

A is the steam-cylinder, B the steam-piston, C the valve, D the supplemental piston, and E the supplemental cylinder, of a direct-acting steam-engine.

E is an auxiliary supplemental steam-cylinder. G is its piston, and H its rod.

I is a port leading from the steam-cylinder A to the end of the supplemental piston D, and having a branch, J, leading to the end of

the auxiliary supplemental cylinder F which is farthest from the supplemental piston D.

K is a port leading from the steam-cylinder A or its main port to the rod end of the auxiliary supplemental cylinder F.

When piston B, having nearly completed its stroke from the opposite end of the cylinder A, has passed port I, the live steam will issue from that port behind auxiliary supplemental piston G, and also behind supplemental piston D. The latter will then be balanced, having live steam at both ends; but auxiliary supplemental piston G, being open to the exhaust through port K, which connects with the (for the time being) exhaust end of the cylinder A, will be forced over, and the end of its rod being in contact with supplemental piston D will cause it to move in the same direction until the valve C has passed the steam-port of that end and partially opened the exhaust of the other end of cylinder A, when live steam issuing from port I, and communication being made to the exhaust through port K, will force auxiliary supplemental piston G back to its original position, and the steam-piston B will begin its return-stroke, its motion being retarded by reason of the throttling of the steam by the partially-opened valve C until the piston has repassed port I, when, being opened to the exhaust at the opposite end, and being urged by live steam through the port just opened by the passage of the steam-piston, the supplemental piston will complete its stroke and open fully valve C, which will so remain until its reversal takes place by reason of the steam-piston B passing port I at the opposite end of the cylinder.

When the supplemental piston is forced to the end of its stroke, it may pass over port I, completely closing it, and thus prevent any leakage of steam. This is practicable, because the space being filled with exhaust-steam the supplemental piston by its momentum will contract it, compressing the steam to a pressure equal to or greater than the initial steam-pressure, and its subsequent reversal of motion being effected by a separate piston the complete covering of the port does not prevent its movement, as would be the case were it dependent upon the action of steam to be admitted through port I.

The slow movement of the steam-piston at

the commencement of the stroke, before referred to, is a decided advantage in the application of this engine to steam-pumps, as it gives the water-valves time to close gradually, and thus avoid shock or jar and noise. The only occasion for noise (caused by hard substances striking together) in this engine (methods now in use being adopted for the cushioning of the pistons) is when the auxiliary supplemental-piston rod H strikes the supplemental piston in starting the latter; but, as is apparent, they are in very close proximity to or actually touching each other at that time, and little or no noise will be made by their coming together.

I do not claim the supplemental piston which carries or moves the valve, nor broadly claim an arrangement of ports by means of which the supplemental piston is actuated by steam (from the cylinder or other source) being permitted to enter behind one end or exhausting from the other end, nor the opening and closing of either or both ends of its cylinder by the supplemental piston acting as its own valve, nor the admission or exhausting of steam from the ends of a supplemental cylinder by the passage of the main piston over ports leading thereto.

I do not claim independent steam-pistons in combination with and acting upon a steam-valve; but

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

1. The combination, with a supplemental piston, D, not itself the main valve of the engine, of auxiliary supplemental steam-pistons G G, having rods or stems projecting into a supplemental steam-cylinder, E, having no direct steam communication with the steam-chest, substantially as shown. 35

2. The combination of auxiliary supplemental steam-cylinders F F, ports I J K, and auxiliary supplemental steam-pistons G G, having rods or stems H H, with a supplemental steam-piston, D, not itself the main valve of the engine, whereby said supplemental steam-piston is moved a portion of its throw, substantially as set forth. 40 45

3. The combination, with steam-cylinder A and piston B, of supplemental steam-cylinder E, supplemental steam-piston D, and port J, whereby the supplemental steam-piston D is alternately balanced and made to complete its stroke, as hereinbefore set forth. 50

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 2d day of December, 1884. 55

EDWIN M. CORYELL.

Witnesses:

WM. SECOR,
JAS. D. BILLARD, Jr.