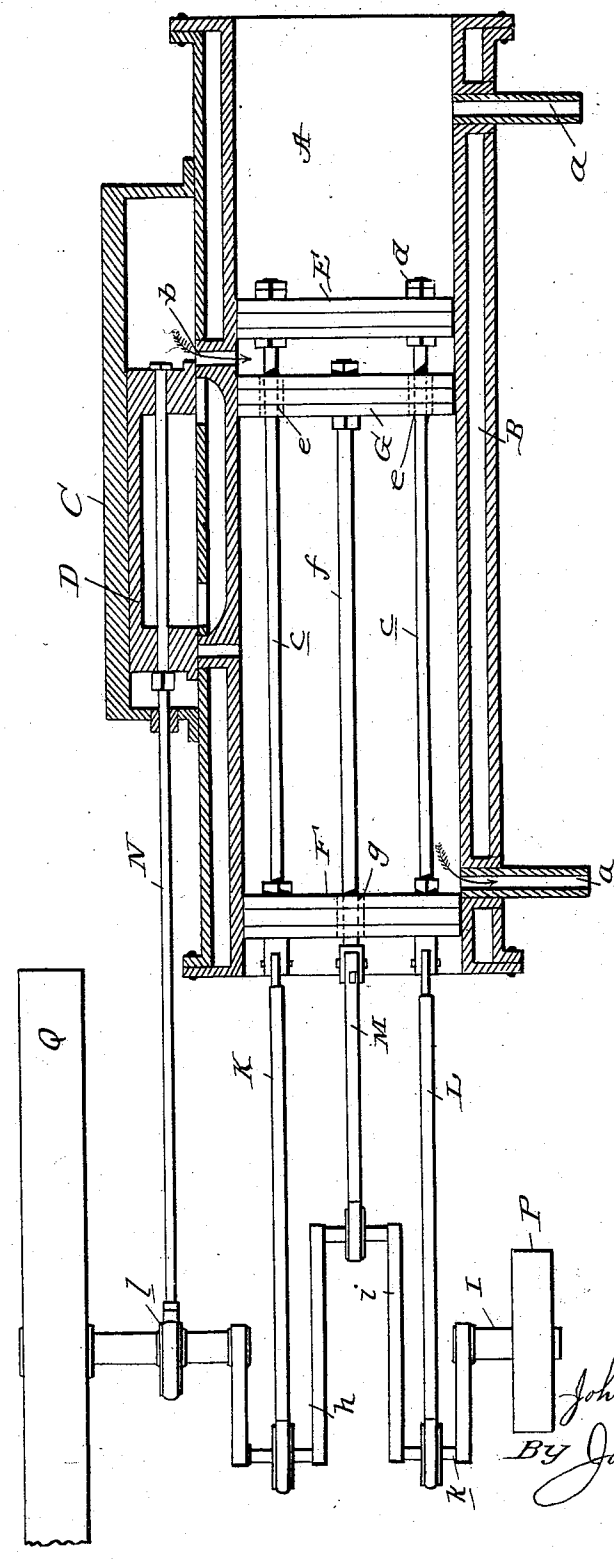
(No Model.)

J. S. SHERMAN.

STEAM ENGINE.

No. 507,173. Patented Oct. 24, 1893.



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JOHN S. SHERMAN, OF GALENA, KANSAS.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 507,173, dated October 24, 1893.

Application filed February 14, 1893. Serial No. 462,350. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. SHERMAN, a citizen of the United States, residing at Galena, in the county of Cherokee and State of Kansas, have invented certain new and useful Improvements in Steam-Engines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention has relation to an improvement in multiple piston engines, and it has for its object to improve the efficiency of such engines, and to lessen the cost of manufacture by simplifying the construction.

Other objects and advantages will be fully understood from the following description and claim when taken in connection with the annexed drawing; in which the figure is a view partly in longitudinal section and partly in plan, of my improved engine.

Referring by letter to said drawing:—A, indicates the piston cylinder which is open at both ends, as shown. This cylinder is provided with a jacket B, entirely surrounding the same, and is furthermore provided on one side near opposite ends with exhaust ports *a*, and on its opposite side at equal distance from its opposite ends, with induction ports *b*.

C, indicates the valve chest, which is arranged on one side of the piston as shown, and D, is a slide valve arranged in said chest.

E, indicates an outer piston head, and F, indicates a similar piston head. These two heads which are arranged within the cylinder A, are connected together by two rods *c*, and nuts *d*, or other suitable fastening devices, so that said heads will move simultaneously and in the same direction, within the cylinder.

G, indicates a piston head, which is arranged within the cylinder between the heads E, and F. This intermediate head has an independent movement from the heads E, and F, and is provided with holes *e*, for the passage of the rods *c*. The intermediate head G, is provided with a single rod *f*, which is secured centrally thereto and passes out through a hole *g*, in the center of the head F.

I, indicates a drive shaft. This shaft is designed to be supported in suitable bearings, and is provided with three cranks *h*, *i*, and *k*, disposed alternately in opposite directions. The crank *h*, is connected with the adjacent end of one of the rods *c*, by means of a pitman K. The crank *k*, is connected with the adjacent end of the other rod *c*, by means of a pitman L, and the crank *i*, is connected to the adjacent end of the rod *f*, by means of a pitman M, so it will be seen that the intermediate crank of the drive shaft, is connected with the intermediate piston head, while the two outer cranks are connected with the two outer piston heads, and it will be observed that I omit the use of cross heads on the pistons or pitmen.

N, indicates the valve rod. This valve rod is also connected with the drive shaft by means of an eccentric *l*, so that as the said shaft is driven, the valve rod and its valve will be given a reciprocatory motion.

P, indicates a drive wheel which may be of the character usually employed, and Q, indicates a balance or fly wheel.

In operation, the parts being in the position illustrated, steam is admitted through the port *b*, containing the arrow, and between the heads E, and G, so as to force the head E, beyond the adjacent exhaust port *a*, thereby allowing the steam after expansion to be discharged through said port, and simultaneously with this movement of the head E, the head G, will be forced in an opposite direction within the cylinder, and to a position with the other port *b*, similar to that which it previously assumed with respect to the other induction port, while the head E, drawing up the head F, within the cylinder, will bring this latter head adjacent to the induction port, so that the heads F, and G, will then assume a position with respect to the adjacent port *b*, similar to that which the heads G, and E, now assume in the figure. During this action, the slide valve will be reciprocated so as to close the induction port bearing the arrow, and open the other one, when the heads will be moved to the position now shown, and the exhaust steam discharged through the port *a*, bearing the arrow.

From the construction described, it will be seen that there is nothing about the engine to got out of order, and it may be manufac-

tured and operated at a comparatively small expense.

I am well aware that the several elements of my improved engine are not new when separately considered and I therefore make no claim to the same; but

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

The improved multiple, piston engine herein described, consisting essentially of the following instrumentalities in combination: the cylinder A, open at opposite ends, and having the two exhaust ports *a*, and the two induction ports *b*, the two outer piston heads arranged within the cylinder, the rods *c*, connecting said heads, the intermediate head arranged between the outer heads, the piston rod *f*, secured to said intermediate head and passing out through the head F, the drive shaft, having the three cranks disposed alternately in opposite directions, the pitman connecting the intermediate crank with the outer end of the intermediate piston rod, and the two outer cranks connected with the piston rods *c*, *c*, without the employment of cross heads, the valve chest, the reciprocatory valve arranged therein, and the valve rod connecting said valve with an eccentric on the drive shaft, all adapted to operate, substantially as and for the purposes specified.

JOHN S. SHERMAN.

Witnesses:
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