

Dyson & Smith.

Steam Valve Gear.

N^o 97,064.

Patented Nov. 23, 1869.

Fig: 1.

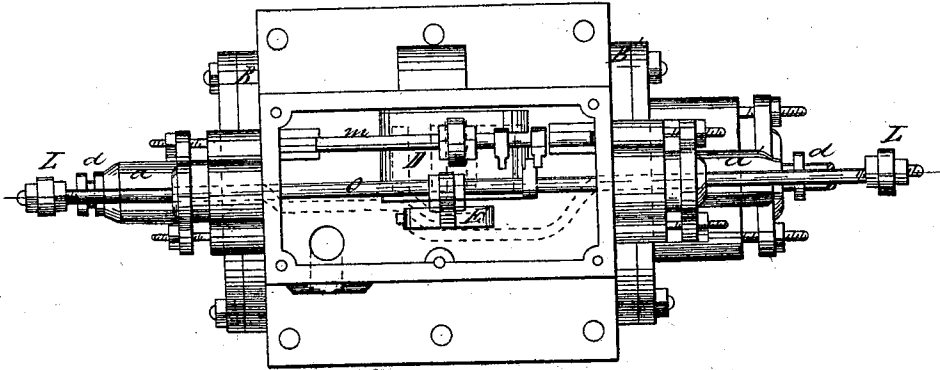


Fig: 2.

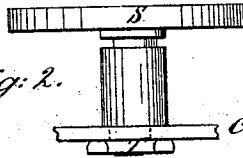
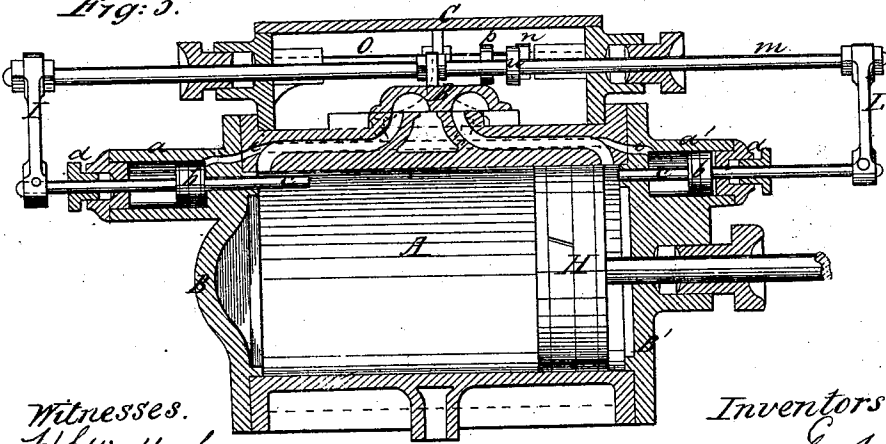


Fig: 3.



Witnesses.
H. Wallenberg
G. M. Johnson

Inventors
J. Dyson & S. Smith
per J. M. Johnson
attys

United States Patent Office.

THOMAS DYSON AND GEORGE SMITH, OF NEW YORK, N. Y.

Letters Patent No. 97,064, dated November 23, 1869; antedated November 19, 1869.

IMPROVEMENT IN STEAM-ENGINE VALVE-GEAR.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern :

Be it known that we, THOMAS DYSON and GEORGE SMITH, of the city, county, and State of New York, have invented a new and improved Adjustable Valve-Gear for Steam-Engines; and that the following description, taken in connection with the accompanying drawings, hereinafter referred to, forms a full and exact specification of the same, wherein we have set forth the nature and principles of our said improvement, by which our invention may be distinguished from all others of a similar class, together with such parts as we claim, and desire to have secured to us by Letters Patent.

The object of this invention is to so construct the valves of steam-engines, more particularly engines wherein the piston is compelled to travel at great speed, and with short stroke, such as pumping and blowing-engines, &c., that, for engines of this class, the ordinary way of opening and closing valves, by means of an eccentric, is unsatisfactory, and productive of loss of power, inasmuch as the eccentric, by its operation, begins to open the valves before the piston has reached the end of its stroke, and, in many instances, actually prevents the piston from completing its stroke, while in others the steam admitted before the completion of the stroke offers serious opposition and work upon the engine to overcome the unnecessary labor thus forced upon it. Our invention, therefore, is designed to overcome and remedy this evil, and, as will be clearly shown hereinafter, the object is successfully attained, together with other useful and improved appliances in the same connection.

In the accompanying drawings, forming part of this specification—

Figure 1 represents a plan or top view of our invention;

Figure 2, a longitudinal section of the same, taken in the plane of the line *x x*; and

Figure 3, a detached view of starting-apparatus.

Similar letters of reference indicate corresponding parts in the several drawings.

To enable others skilled in the art to make and use our invention, we will proceed to describe it fully and particularly.

A represents a cylinder, of cast-iron, which may be of any size desired.

B B' are the cylinder-heads, upon the upper side of which, and in line with the central axis of the cylinder, are cast supplementary cylinders *a a'*, into which are properly fitted, with packing, the pistons *b b'*.

On to these pistons are attached the piston-rods *c c'*, one end of which passes through the cylinder-head B, and projects into the cylinder A, at or near its upper inner surface, and the other ends of which project through the stuffing-boxes *d d'*.

C represents the steam-chest, cast or fitted on to the cylinder A in the ordinary way.

Into this steam-chest are fitted the slide or double valve D and the supplementary slide-valve E.

When the piston H has nearly reached the end of its stroke, (and before steam for the return-stroke has been admitted,) it comes in contact with the projecting end of the piston-rod *e*, driving it back, and opening the steam-channel *i*, and admitting steam into the supplementary cylinder *a*. The steam thus admitted forces the supplementary piston *b* to the end of the cylinder *a*, the piston *b* forcing with it, in its backward movement, the outward part of the piston-rod *c*.

To the outer end of the piston-rod *c* is fastened the rigid connection L, by means of which the piston-rod *c* and valve-rod *m* are connected securely together, so that, when the piston *b*, by its operation, moves the piston-rod *c*, it must necessarily move, at the same time, the valve-rod *m*, which, in turn, by its sliding or reciprocating movement, moves the valve D from right to left at each stroke; and, at the same time, by bringing the toes *n n'* alternately in contact with the toe *p* on the supplementary valve-rod *o*, the supplementary valve E is moved so as to admit or exhaust steam from the channels *i i'*.

The supplementary valve E is so arranged and connected as that, when steam is flowing into one supplementary cylinder, it is, at the same time, being exhausted from the other.

The slide-valve D and supplementary valve E may be adjusted to admit or exhaust steam to and from the cylinder A, or the supplementary cylinders *a a'*, at any part of the stroke that may be desired, the same as in the ordinary cut-offs, by simply shifting the toes *n* and *p* on their respective valve-rods. This is done by securing the toes with set-screws, which admit of being tightened or loosened, at pleasure.

Hitherto, engines of the blower or pumping class have been started by merely turning on the steam, and much difficulty has been experienced, for, if the engine, at the moment of starting, happened to be at its dead-point, or, as is commonly termed, "on its centre," it became necessary to move the valve by turning the fly-wheel; or, if the engine were not on its centre, it might have a reverse motion, instead of a forward one, just as the valve happened to be placed for admitting steam on one side of the piston or the other. To obviate this difficulty, we have invented and attached to our engine a starting-apparatus, consisting of the wheel S and fork T. The wheel S turns in a collar and stuffing-box properly secured to the top of the steam-chest C, the fork T being secured to the lower end of the spindle, which passes through the collar; and immediately under the top of the steam-chest, between the fork T, and attached to the centre

of the valve-rod *m*, is a projection, so that, when the wheel is moved to the right or left, the fork presses on the right or left side of the projection, and thus forces the valve in the desired direction, whether for going ahead or reversing.

We are aware that valve-gears similar to our invention have before been invented, particularly that of A. S. Cameron, patented October 3, 1865; but, while we disclaim anything contained in his invention, we desire to show that ours is not only dissimilar, but far more useful and effectual. In Cameron's invention, the valves are kept in place by the operation of springs; and, besides, he uses no supplementary valve; and, again, his supplementary piston has got to move a distance equal to its width before the full volume of steam is admitted, Cameron's supplementary valves acting as puppet-valves only, and ours acting more in the nature

of piston-valves, so that the advantages claimed by Cameron are not fully attained, while our gear does all and more than we have asked for. These differences are so apparent that no further remark in this connection is necessary.

Having thus described our invention,

What we claim as new, and desire to secure by Letters Patent, is—

The supplementary valve *E* and pistons *b b'*, in combination with the rigid connection *L*, adjustable toes *n*, *n'*, and *p*, and starting-fork *T*, constructed and arranged as set forth and described.

THOMAS DYSON.
GEORGE SMITH.

Witnesses:

FRANK HUDNER,
GEO. E. TUTHILL.