(No Model.) 2 Sheets—Sheet 1.

G. S. STRONG.

VALVE FOR STEAM ENGINES.

No. 304,974. Patented Sept. 9, 1884.

FIG. 2.

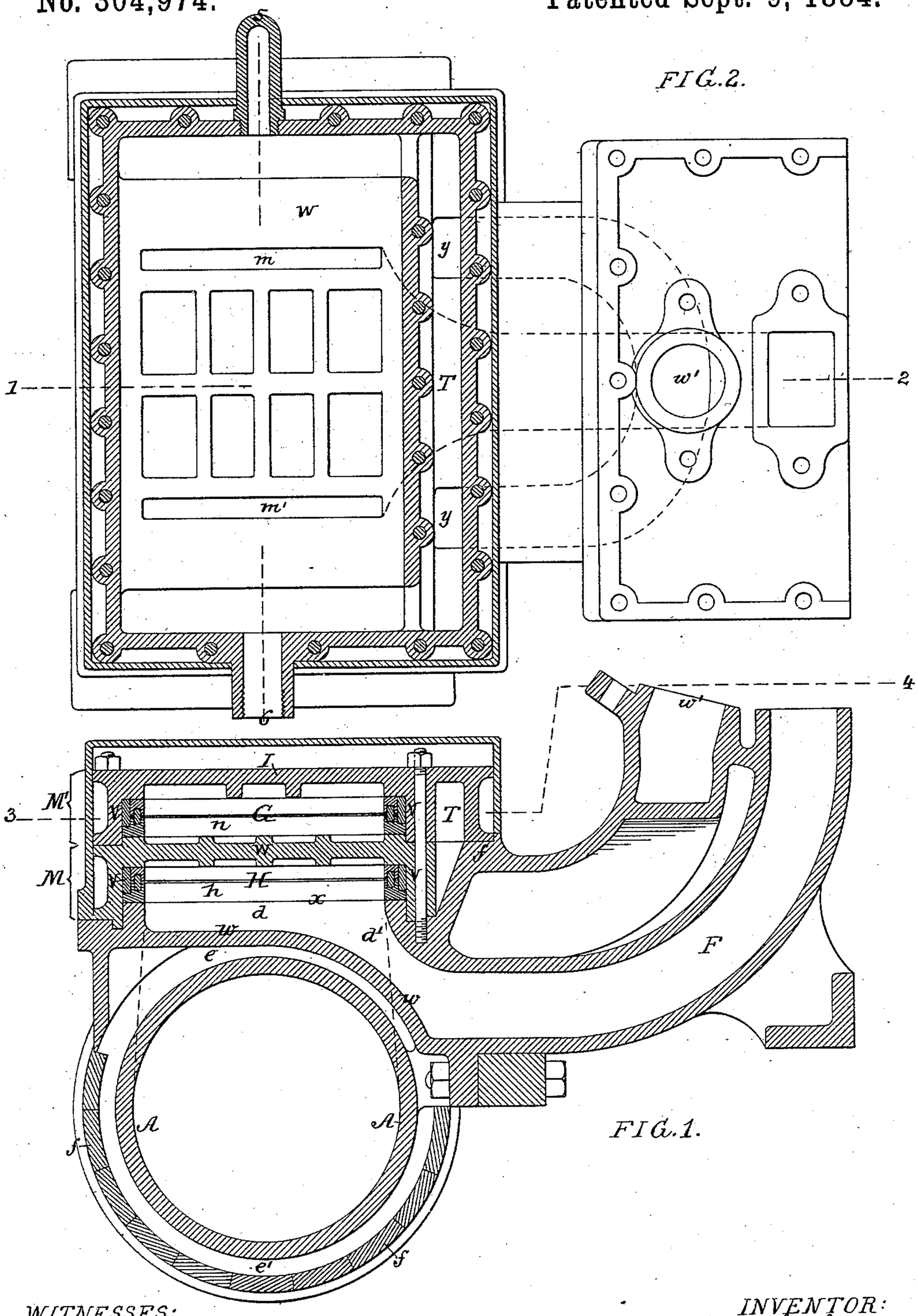


FIG. 1.

WITNESSES:

John E. Baker

James F. Johns

INVENTOR:

George S. Strong

by his attys.

Howson and Sons

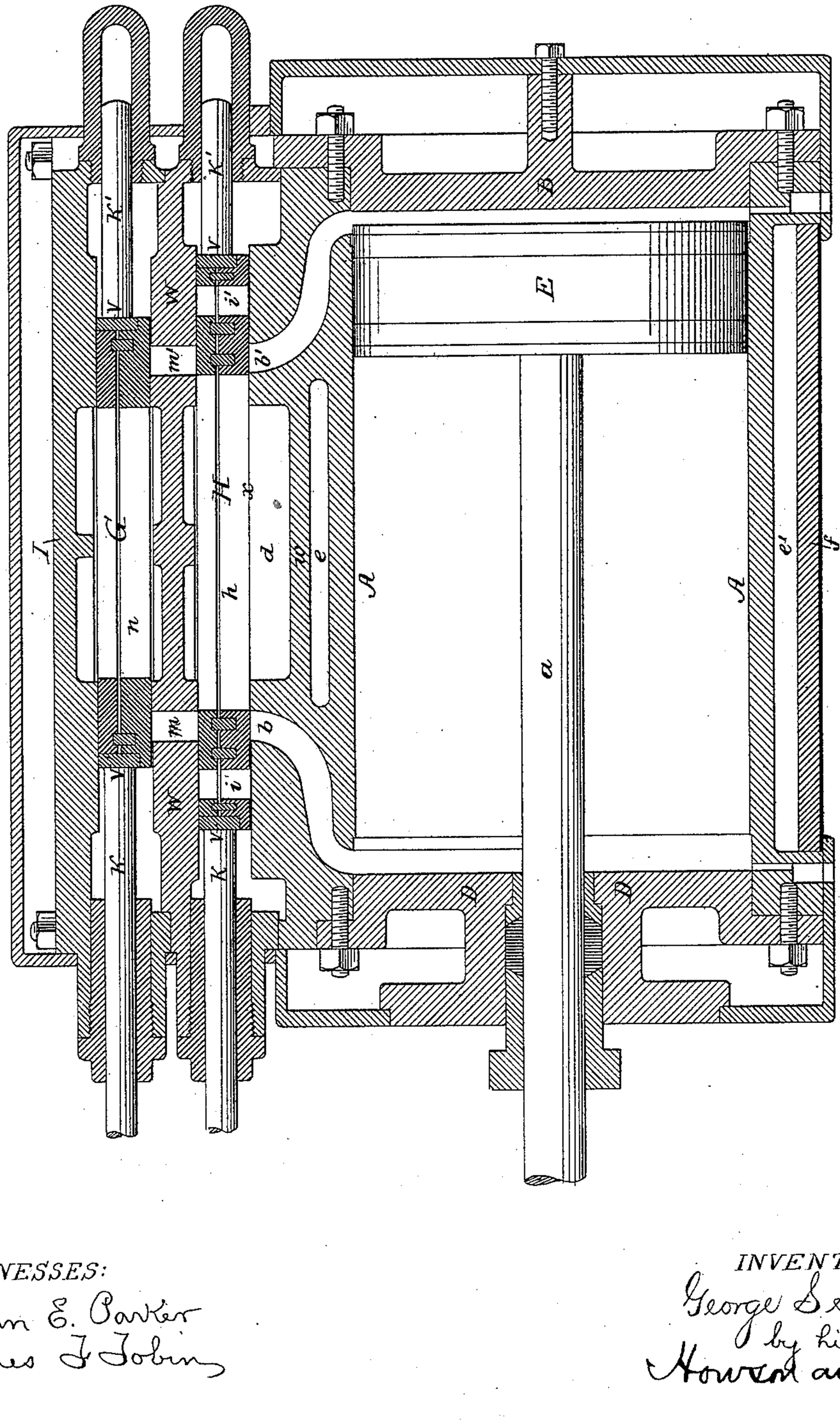
(No Model.) 2 Sheets—Sheet 2.

G. S. STRONG.

VALVE FOR STEAM ENGINES.

No. 304,974. Patented Sept. 9, 1884.

FIG. 3.



WITNESSES:

John E. Parker

James J. Jobin

INVENTOR:

George S. Strong

by his Attys

Howson and Sons

UNITED STATES PATENT OFFICE.

GEORGE S. STRONG, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO JOHN T. MORRIS, TRUSTEE, OF SAME PLACE.

VALVE FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 304,974, dated September 9, 1884.

Application filed February 4, 1884. (No model.)

To all whom it may concern:

Be it known that I, GEORGE S. STRONG, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Valves for Steam-Engines, of which the following is a specification.

My invention consists of the combination, substantially as described and claimed hereinafter, of the cylinder and ports of a steam-engine, a steam and exhaust valve, and a fixed partition-plate between the two, with passages by which live steam is directed to the opposite ends only of the said steam-valve.

In the accompanying drawings, Figure 1, Sheet 1, is a transverse vertical section on the line 1 2, Fig. 2, of one of the cylinders of a locomotive-engine illustrating my improvements; Fig. 2, a sectional plan on the line 3 4, Fig. 1; and Fig. 3, Sheet 2, a longitudinal section on the line 5 6, Fig. 2.

A is the cylinder, provided at the rear end with the cover B, and at the front end with a cover, D, having the usual stuffing-box for the rod *a* of the piston E.

There are two slide-valves, G and H, of the character described hereinafter; but it should be stated here that so far as the construction of the valves, viewed apart from their special arrangement in respect to the other parts of the device is concerned, it is not of my invention. The cylinder has steam-ports *b b'* and exhaust-port *d*, the latter communicating, through a passage, *d'*, with the curved pipe F, which communicates with the usual draft-pipe of the locomotive. It will be observed on referring to Fig. 1 that the exhaust-passage *d'* is not bounded at any points by the steam-cylinder, but is isolated therefrom by a partition, *w*, forming a continuation of the lower portion of the exhaust-pipe F, between which partition and the cylinder A is a space, *e*, communicating with the space *e'* between the usual lagging, *f*, and the said cylinder, an arrangement by which the latter is isolated from the exhaust-passage, and is consequently uninfluenced by the temperature of the exhaust-steam. The lower face of the valve H is adapted to the face *x*, formed on the cylinder, and has an extended central opening, *h*, and two ports, *i i'*, the upper surface of this valve being arranged to bear against the under side of a partition-plate, W, on the upper side of which is the seat for the valve G, the said partition-plate having two ports, *m m'*. The valve G has an extended central opening, *n*, and its upper face is arranged to bear against the under side of the cover-plate I.

There are two chests, M M', the lower chest, M, of which the partition-plate W in the present instance forms a part, having its bearings on an extension of the valve-face *x*, and the upper chest, M', having its bearings on the lower chest, and both chests being secured to the cylinder. The chest M is extended laterally, so as to have an additional bearing at *f*, and so as to form a passage, T, which communicates at two points, *y y*, Fig. 2, with curved passages, (indicated by dotted lines,) which passages terminate at the steam-inlet *w'*, the said passage T communicating with the interior of the chest M at opposite ends of the valve G, which, when the engine is in operation, are always exposed to the pressure of live steam. Each valve is composed of two plates, with strips let into both plates, and preventing the steam from entering between them, suitable springs intervening between the said plates, so as to maintain both in contact with their seats. This construction of valve forms no part of my invention, as it has been heretofore used.

To each valve is fitted a yoke, *v*, forming part of the spindles K K'.

The valves are combined with any of the well-known mechanisms by which an invariable full stroke is imparted to the valve H and a variable stroke to the valve G, or in some cases where an unchangeable cut-off is required, the valve G may have an unvarying movement. It will be seen that both valves are balanced—that there is no pressure of steam on the top of the valve—that the valve G is in no way influenced as regards its movements by the steam, as the pressure of the same on both ends is alike—and that the valve H cannot be influenced by the live steam, as the opening *h* extends entirely through it.

It will be unnecessary to introduce a minute description of the movements of the two valves, as they will be readily understood by those familiar with inventions of this class. It will

suffice to remark that the valve H is practically an exhaust-valve solely, the valve G being a steam cut-off valve, which performs the duty of admitting steam to the two ports *b b'* of the cylinder, the valve G and the ports *m m'* determining this introduction of steam, and the ports *i i'* being always in such a position that, no matter which of the two ports *m m'* be opened by the valve G, there will be a free passage for the steam through a port, *i*, of the lower valve to a cylinder-port.

I claim as my invention—

The combination of the cylinder and its ports, the exhaust-valve H, fixed partition-plate W, and steam-valve G, with passages by which live steam is directed to the opposite ends only of the said steam-valve, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEO. S. STRONG.

Witnesses:

JOHN E. PARKER,

HARRY SMITH.