No. 651,878. Patented June 19, 1900.

H. W. McCOMBS.

STEAM CYLINDER DRAIN VALVE.

(Application filed Nov. 16, 1899.)

(No Model.)

Fig. 1.

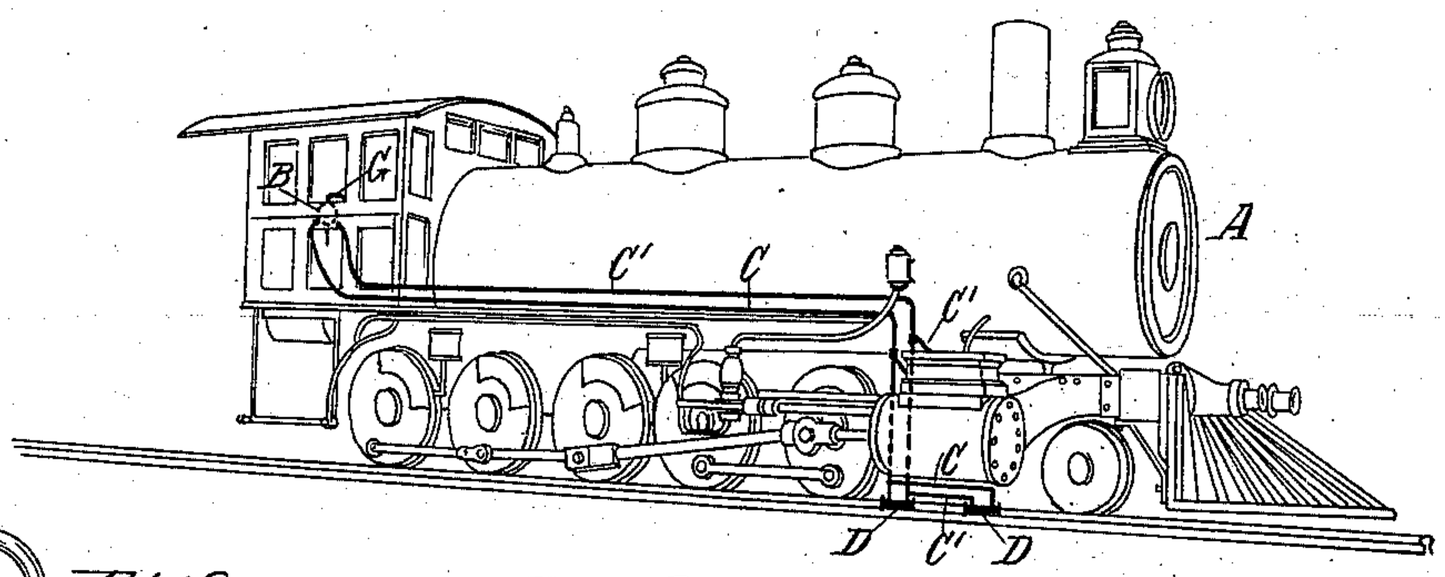

Fig. 2.

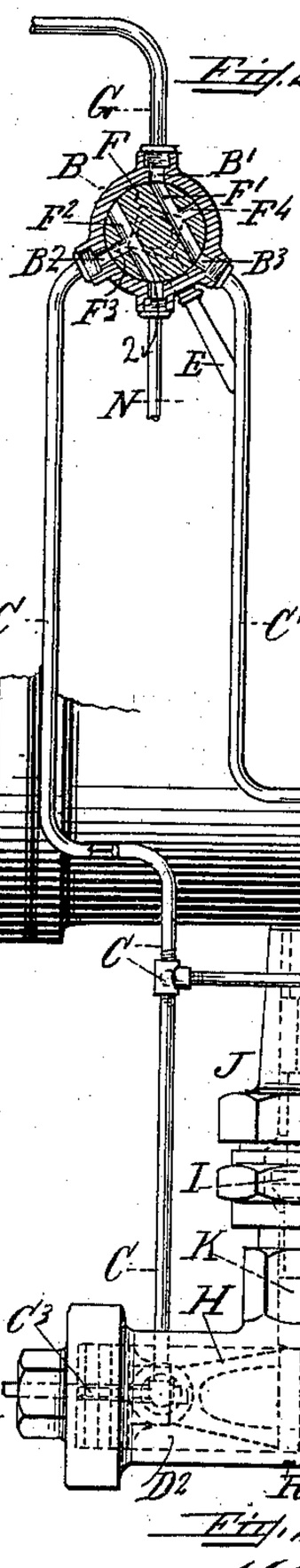

Fig. 3.

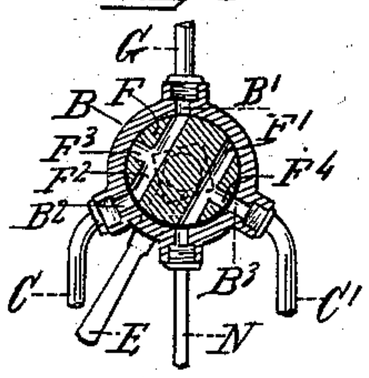

Fig. 4.

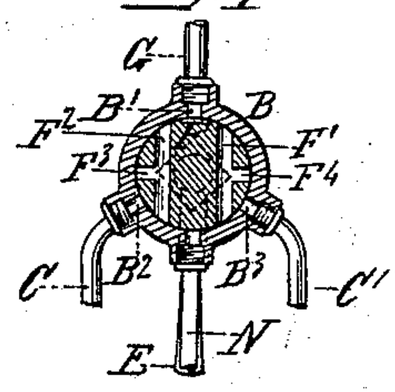

Fig. 5.

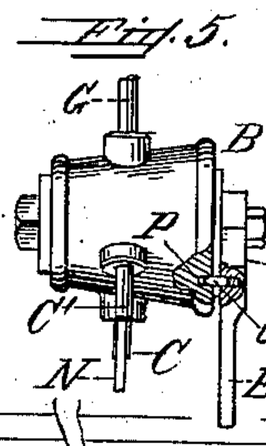

Fig. 6.

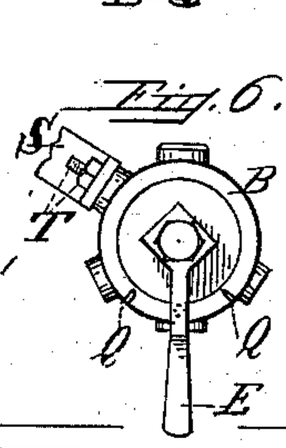

Fig. 2a.

Fig. 2c.

Witnesses:
Samuel. F. Tuckerman
Frank. H. McCombs

Inventor:
Henry W. McCombs.
per H. E. Remick
his atty.

UNITED STATES PATENT OFFICE.

HENRY W. McCOMBS, OF BOSTON, MASSACHUSETTS.

STEAM-CYLINDER DRAIN-VALVE.

SPECIFICATION forming part of Letters Patent No. 651,878, dated June 19, 1900.

Application filed November 16, 1899. Serial No. 737,209. (No model.)

To all whom it may concern:

Be it known that I, HENRY W. McCOMBS, a citizen of the United States of America, and a resident of Boston, in the county of Suffolk and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Steam-Cylinder Drain-Valves, of which the following is a specification.

My invention relates to improvements in apparatus used in draining the cylinders of locomotives, stationary and marine engines, and in other allied uses where it becomes necessary to liberate the moisture from the cylinders.

The objects of my invention are to effectually and quickly empty the cylinders of the condensed steam through the employment of improved drain-valves actuated by steam or compressed air through pipes communicating therewith and whose action is governed by a supply-cock located in the cab or engine-room, where it can be manually operated by the engineer. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 represents in perspective a locomotive equipped with my improved apparatus. Fig. 2 designates the supply-cock in transverse central section governing the supply of steam or air to the cylinder-valves in a position to open the steam-cylinder cocks, Fig. 3 being a similar view, but with the steam or air ducts in reversed position to close said cylinder-cocks. Fig. 4 is also a like view with the ducts in normal position and the ports closed. Fig. 5 is a side elevation of the four-way supply-cock and its connections. Fig. 6 illustrates a front elevation of the same to exhibit the method of prescribing the movements of the operating-lever, Fig. 2^A being a side elevation or external view of one of the cylinder-valves and Fig. 2^C a similar position of a like valve in longitudinal section, with the ordinary cylinder-cocks in vertical central section supporting said cylinder-valves, each of the latter views being supplementary and forming a part of Fig. 2.

Corresponding letters of reference designate like features throughout the several views, referring to which—

A represents a locomotive, in the cab of which is located the engineer's supply-cock, placed in any convenient position, as at B. Steam or air pipes C C′ connect said supply-cock with the cylinder-valves D D, situated at the lower line of each of the steam-cylinders. The functions of the several pipes, valves, and cocks with their construction will appear in the further description, commencing with Fig. 2 herein. The situation of the lever E indicates the open position of the valve I in the cylinder-cocks J, the plug F being semirotated from its normal position, Fig. 4, so that the lower end of its transverse duct F′ communicates with the pipes C′ and its upper end with the port B′ communicating with the pipe G, leading from the steam or air supply accessibly situated in the locomotive-cab or in the engine-room, and which is conveyed to the cylinder-valves D D through said pipe C′ and duct C^2, entering the cylinder-valve-chamber ends D′ D′ simultaneously, actuating longitudinally the sliding taper plugs H H in a direction to open the valves I of the cylinder-cocks J J in the position shown in Fig. 2^C. Obviously any series of cylinder-valves connected with the several steam-cylinders are in like manner actuated; but for the purpose of this description I confine myself to the duplicate valves illustrated.

Should the operating- (hand) lever E of the supply-cock B be reversed to the position shown in Fig. 3, then its transverse duct F^2 is rotated to a position establishing communication from the steam or air supply through the pipe G, port B′, to port B^2, to pipes C, duct C^3, and cylinder-valve-chamber ends D^2, D^2, such action simultaneously reversing the former position of the sliding taper plugs H H, and thus closes the valves I I of the cylinder-cocks J. The open position of said valves is well observed in Fig. 2^c. Here the valve-stem K is raised by the plug H, lifting the valve I from its seat L and opening the cylinder-cock port J, permitting the condensation to escape from the steam-cylinders through the drain-vents M M. Drip-vents R R serve to keep the cylinder-valve free from any excess of moisture that may pass through the vents M M.

Reverting again to Fig. 2, the position of the radial duct F^3 opens into the port B^2 and into the pipes C C in such position that the

surplus of the steam or air which actuated the taper sliding plug H H, if any, remains in the cylinder-valve chambers D^2, returns by the pipes C C, and escapes through the transverse duct B^2 in the direction of the arrow 2 and through the exhaust-pipe N to the outer air. The reversed position of said plug F, as in Fig. 3, obviously exhausts any latent steam or air from the opposite ends of the cylinder-valve chambers D', in a like manner returning through the pipes C', port B^3, radial duct F^4, and transverse duct F' to the exhaust N and out again.

A bracket S, attached to any convenient part of the boiler inside the cab, supports the supply-cock B through the medium of the stud and nut T, as in Fig. 6.

To change the position of the plugs H H independently of steam or air pressure, they may be manually actuated by the hand-rods U U, properly packed through the ends of the cylinders D D, the ends of said rods being secured to the ends of the several plugs.

To secure the lever E from accidental displacement, a spring-actuated pin O, Figs. 5 and 6, is inserted in the inner side of the lever-shank O', which falls into a recess P in the face of the supply-cock B, (when in its normal position,) while the spurs or ribs Q Q prescribe the swing of the lever E within the radius of its proper action.

The normal position of the supply-cock B when the train is in motion is as exhibited in Fig. 4, the aforesaid manipulation of the same being only necessary when it is desired to empty or drain the steam-cylinders of the condensed steam.

My improved device accomplishes the purpose for which it is designed expeditiously and efficiently and insures greater economy and convenience when repairs are necessary than in similar devices at present in use, and while I have illustrated the preferred method of constructing my invention I desire not to be confined to the strict interpretation thereof as herein set forth, but may employ such equivalents therefor as would come within the fair scope and spirit of my invention.

Having described my invention, I desire to secure by Letters Patent of the United States and claim—

1. The supply-cock provided with a revoluble taper plug having two transverse ducts and two radial communicating ducts, the transverse ducts adapted to admit air or steam alternately to each end of the cylinder-valve chambers, to reciprocate the cylinder-valve plugs to open or close the cylinder-cocks; the said cylinder-valve chambers, the cylinder-valve plugs reciprocating therein, the cylinder-cocks in conjunction therewith, and the radial ducts adapted and arranged to receive air or steam from the chamber of the cylinder-valve as and for the purpose set forth.

2. In combination with a supply-cock plug provided with transverse and radial ducts adapted to simultaneously transmit air to one end of the cylinder-valve chamber and to receive it from the other end, the supply-cock body B provided with spurs to limit the semi-rotation of the operating-lever E, means to temporarily secure said lever to a central or normal position, the cylinder-valve chambers, the cylinder-valve plugs operating in said chambers, and the cylinder-cocks adapted when the said cylinder-valve plugs are actuated simultaneously to liberate the condensation in the steam-cylinders or to prevent the steam from escaping therefrom substantially as specified.

Signed by me at Boston, Massachusetts, this 14th day of November, 1899.

HENRY W. McCOMBS.

Witnesses:
SAMUEL F. TUCKERMAN,
FRANK H. McCOMBS.