No. 617,331. Patented Jan. 10, 1899.

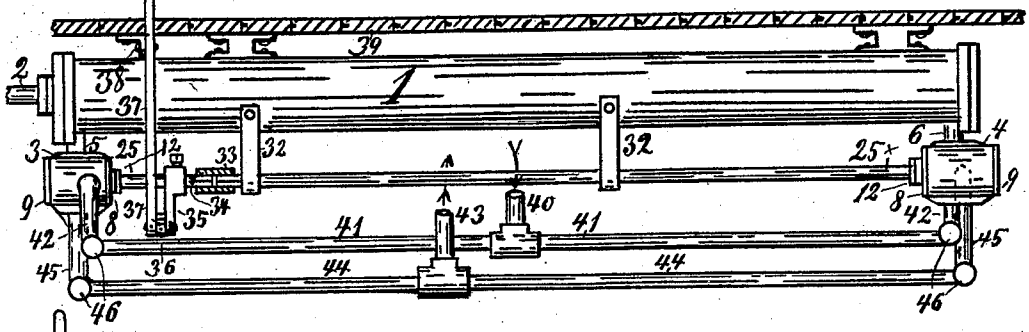
R. GILLETTE.

ROTARY STEAM VALVE.

(Application filed Feb. 8, 1898.)

(No Model.)

FIG. 1.



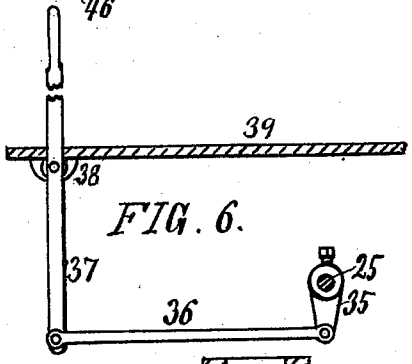


FIG. 6.

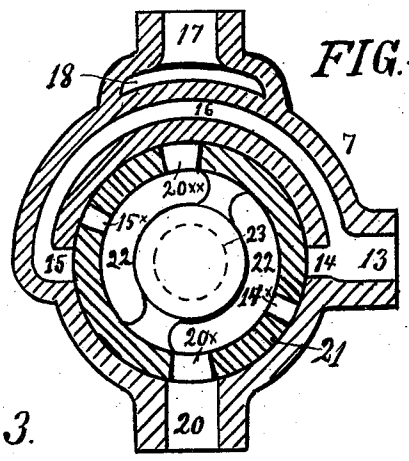


FIG. 4.

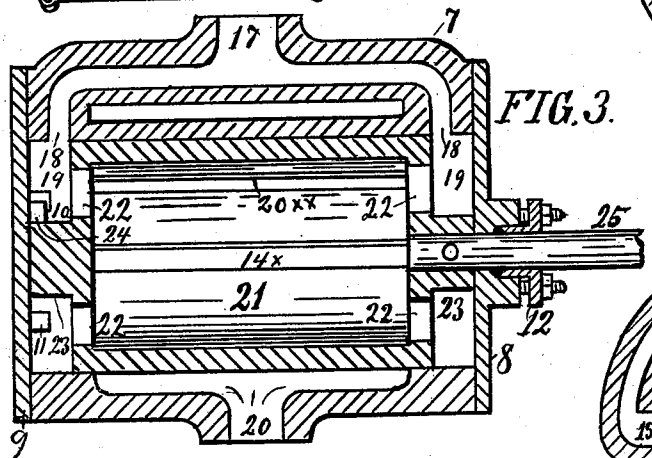


FIG. 3.

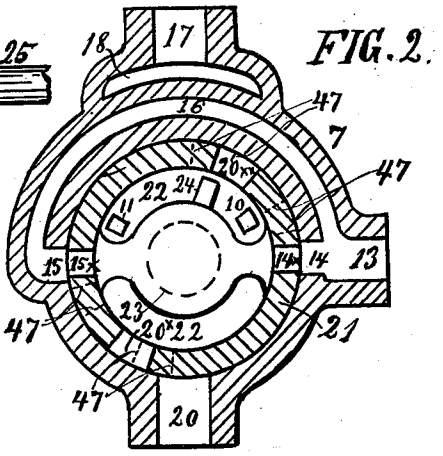


FIG. 2.

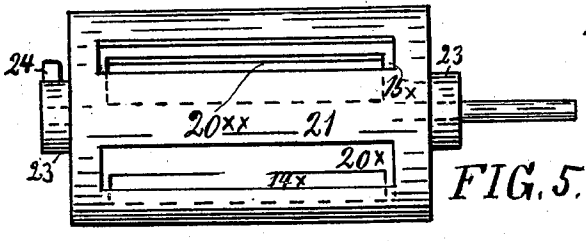


FIG. 5.

WITNESSES.

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RANDOLPH GILLETTE, OF LITTLE FALLS, MINNESOTA.

ROTARY STEAM-VALVE.

SPECIFICATION forming part of Letters Patent No. 617,331, dated January 10, 1899.

Application filed February 8, 1898. Serial No. 669,476. (No model.)

To all whom it may concern:

Be it known that I, RANDOLPH GILLETTE, a citizen of the United States, residing at Little Falls, in the county of Morrison and State of Minnesota, have invented certain new and useful Improvements in Rotary Steam-Feed Valves; 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, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in rotary valves of the class used for directing the steam alternately into opposite ends of the cylinder of a steam-engine, and more particularly so for the class of engine known as the "steam-feed" for sawmill-carriages.

It will be observed that in all the steam-feeds heretofore used in sawmills, whether the feeding-cylinder is of the direct-acting type having a length of about fifty feet and the carriage secured to the piston-rod or the cylinder is shorter and the piston rod or rods connected to the carriage by a speed-increasing mechanism, the steam is always fed into either end of the cylinder by a valve operated by a hand-lever, about like 37 in Figures 1 and 6 of my drawings, and a connecting-rod, as 36, extending from the valve handle or arm 35 on the valve-stem 25 to said hand-lever 37, which for obvious purposes is located near the saw. This hand-lever 37 is frequently thrown into one of its two operative positions and retained there by lumber thrown or forced against it by the saw-carriage and various other machinery or by moving trucks, &c., and in all such cases the saw-carriage runs away and does some damage to the machinery and often also injures or kills some of the employees before the obstructed lever can be cleared and moved back, so as to stop or reverse the motion of the carriage. To reach and turn off the throttle-valve in such instances is much too slow a process.

Therefore the objects of my invention are, first, to provide a steam-valve of such construction that if its operating-lever is accidentally thrown to its limit in either of its two directions the valve will shut off the steam from the cylinder; second, to provide a valve of such construction that if its operating-lever be obstructed, so that it cannot be swung to its proper shutting-off position, it can be swung away from the obstruction, and thereby shut off the steam; third, to provide a steam-feed valve in which the steam-pressure is entirely equalized upon the valve-plug, so that the latter will turn easily, and I do this without employing the usual idle counterbalancing steam-spaces in the shell or casing of the valve; fourth, to provide a steam-feed valve with the above-described merits and still of an utterly simple and cheap construction; fifth, to provide between two such valves, when secured one to each end of a steam-feed cylinder, piping and operating mechanism which are self-adjustable, so as to follow the longitudinal expansion and contraction of the long cylinder.

With these and other objects in view my invention consists in the novel construction and arrangement of parts illustrated in the accompanying drawings, in which—

Fig. 1 is a side elevation of a long steam-cylinder, such as is used for feeding sawmill-carriages, with my improved valve applied to it, one at each end, and connected with pipes and operating mechanism. Fig. 2 is an enlarged cross-section of the valve-casing with the plug in it and turned so as to let steam into the cylinder. Fig. 3 is an enlarged central longitudinal vertical section of the valve. Fig. 4 is the same as Fig. 2, only that the valve-plug is turned in a different position, so as to exhaust the steam. Fig. 5 is a side view of the valve-plug only. Fig. 6 is a detail view of the operating mechanism shown in Fig. 1, looking in longitudinal direction of the feed-cylinder.

Referring to the various parts in the drawings by reference-numerals, 1 designates the steam-feed cylinder of a mill-carriage.

2 is the piston-rod by which the carriage (not shown) is moved.

3 and 4 are the two valves connected by the steam-pipes 5 and 6, one to each end of the cylinder. Each of said valves consists of the internally-cylindrical shell or casing 7, the ends of which are closed by the covers 8 and 9, one of which is provided with two pegs or stops 10 and 11 upon its inner side and the

other with the stuffing-box 12. The casing 7 is provided upon one side with the steam-inlet 13, from which extend into the valve-chamber at diametrically opposite points the longitudinally-elongated ports 14 and 15, the latter of which is reached by the arched steam-duct 16, extending about half-way around the casing.

17 is the port communicating with the steam-cylinder. This port branches off, as at 18, toward both ends of the casing and there enters the permanent steam-spaces 19, provided between the ends of the valve-plug and the covers of the casing. Finally, the casing is provided with an exhaust-port 20, which, like the ports 14 and 15, has its inner opening enlarged longitudinally to almost the same length as the valve-plug and in width equals the two ports 14 and 15 put together. In said casing rotates or rocks the valve-plug 21, which consists of a tubular body having large apertures 22 in both of its ends or bottoms. At both ends of the plug are formed the concentric projections 23, which hold the plug proper the desired distance from the covers of the casing, so as to form the stem-spaces 19. One of these projections 23 is provided with an arm 24, plying between the stops 10 and 11. In the other projection 23 is secured the valve-stem 25, which extends out of the stuffing-box and is operated by means presently to be more fully described. Through the sides of the tube-like plug 21 I cut or provide two opposite elongated apertures $14^{\times}$ and $15^{\times}$, which register simultaneously with the ports 14 and 15 in the casing. The plug is further provided with two larger oppositely-located apertures $20^{\times}$ and $20^{\times\times}$, of which the latter is merely a counterbalancing-space to the former, so that the steam inside the plug cannot find more surface to press upon in one side of the plug than in the other. The function of the aperture $20^{\times}$ is to exhaust the steam at the port 20, as will be further described in the operation of the valve.

When two of my valves are applied to a cylinder, as in Fig. 1, I prefer turning them with their front ends toward each other and connect them together by an extension-rod or rock-shaft $25^{\times}$, which is supported in the hangers 32 and on its end is provided with an internally-four-cornered socket 33, in which slides snugly the four-cornered end 34 of the opposite valve-stem, and thus forms a self-extensible joint or coupling between the two valves, which allows the cylinder to expand from the heat of the steam. Upon one of the valve-stems I secure a rocker-arm 35, which is operated by the connecting-rod 36 and hand-lever 37 shown in Figs. 1 and 6 as fulcrumed to a bracket 38, secured underneath the floor 39, which is the usual position of the parts relatively to the floor. The two valves are further connected by the live-steam piping 40 41 42 and the exhaust-piping 43 44 45. Both of said pipe-lines are provided with the necessary swivel-joints 46 (of which some are shown) to allow the cylinder to expand and contract without resistance or strain on the pipes.

In operation when the operating hand-lever 37 stands about plumb the valve-plugs stand as indicated by the dotted line 47 in Fig. 2, shutting off the live steam from both ends of the cylinder. If the lever 37 be thrown partly to either side of its plumb position, the one valve-plug will stand as in Fig. 2 and the other as in Fig. 4. In Fig. 2 the live steam then enters at 13, passes into the valve-plug through the ports 14 16 15 and apertures $14^{\times}$ and $15^{\times}$ in the sides of the plug, then out of the end apertures 22, through the spaces 19, and up through the ports 18, joining at 17, and enters the cylinder, while the valve at the opposite end of the cylinder, having the position shown in Fig. 4, returns the used steam from the cylinder through the ports 17 18, spaces 19, and apertures 22 into the valve-plug, and thence out through the lower side aperture $20^{\times}$ and exhaust-port 20, and if the lever be thrown in the opposite direction the valve-plugs will exchange positions, and thus cause the piston to travel in the opposite direction. When both valves have their ports 14 and 15 covered by the plugs, as indicated in dotted lines in Fig. 2, the aperture $20^{\times}$ registers partly with the exhaust-port 20, so as to empty the cylinder of steam and water when not in use. (See dotted lines 47 near bottom of Fig. 2.)

In ordinary use the valve-plugs are never turned so far that the lug or arm 24 touches the stops 10 and 11. Should, however, the operating-lever accidentally be thrown too far in either direction and obstructed, the plugs will turn, or the operator may turn it by the lever until it stops against one of the stops 10 or 11, in which position it covers the ports 14, 15, and 20 as well as it would if the hand-lever stood in its upright position, or even more so, by covering also the port 20 entirely, thus guarding against damage by motion of the carriage should the lever accidentally become obstructed or thrown beyond its regular limit of motion.

Having thus described my invention, what I claim, and wish to secure by Letters Patent, is—

1. A rotary steam-feed valve comprising a casing having a cylindrical plug-chamber with covered ends and a cylindrical rotary plug fitted therein with steam-spaces between the ends of it, and the covers of the casing, said casing having at one side a steam-inlet port, which branches off through the walls of the casing and enters the plug-chamber at two substantially opposite points; in another side a steam-port adapted to connect with a steam-cylinder and branching off through the walls of the casing into the steam-spaces at both ends of the plug, and on still another side an exhaust-port extending from the valve-chamber to the exhaust-pipe; the said plug being

of a tubular or cylinder-like construction with steam-passages in both ends and with two opposite side apertures registering simultaneously with the two branches of the steam-inlet, and having two opposite and larger side apertures, one of which is adapted to meet the exhaust-port, and the other to relieve the plug from pressure opposite to the first-named aperture, and a stem extending from said valve-plug and suitable means for rotating or rocking the plug by the stem, substantially as and for the purpose set forth.

2. A rotary steam-feed valve comprising a casing having a cylindrical plug-chamber with covered ends and a cylindrical rotary plug fitted therein with steam-spaces between the ends of it, and the covers of the casing, said casing having at one side a steam-inlet port, which branches off through the walls of the casing and enters the plug-chamber at two substantially opposite points; in another side a steam-port adapted to connect with a steam-cylinder and branching off through the walls of the casing into the steam-spaces at both ends of the plug, and on still another side an exhaust-port extending from the valve-chamber to the exhaust-pipe; the said plug being of a tubular or cylinder-like construction with steam-passages in both ends and with two opposite side apertures registering simultaneously with the two branches of the steam-inlet, and having two opposite and larger side apertures, one of which is adapted to meet the exhaust-port, and the other to relieve the plug from pressure opposite to the first-named aperture, and a stem extending from said valve-plug and suitable means for rotating or rocking the plug by the stem, the various ports being so arranged relatively to each other that when the plug is in its ordinary shut-off position, or idle, the exhaust will be slightly open, substantially as and for the purpose set forth.

3. The combination with a steam-feed cylinder of two rotary feed-valves communicating one with each end thereof, each of the valves comprising a casing having end covers, one of which is provided with two stops and a rotating or rocking plug having an arm plying between the stops on the cover, said plug and casing being provided with suitable ports and ducts arranged to conduct the steam into a cylinder when the plug is turned in one direction and to conduct it from the cylinder when turned in the other direction, and to shut off all live steam through the valve when the plug is set at half-stroke, and also to shut off both live steam and exhaust-steam when turned in either direction beyond its active points, to certain safety shut-off points, which are reached when the arm of the plug stops against either one of the stops, the stems of said valves being suitably connected with a hand-lever turning the two valve-plugs simultaneously, and having no other means of absolutely limiting its motion than the said stops and arms on the covers and plugs of the valves, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

RANDOLPH GILLETTE.

Witnesses:
A. P. BLANCHARD,
ELLEN LA FORCE.