No. 751,281. PATENTED FEB. 2, 1904.

R. GILLETTE.

ROTARY VALVE.

APPLICATION FILED OCT. 29, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

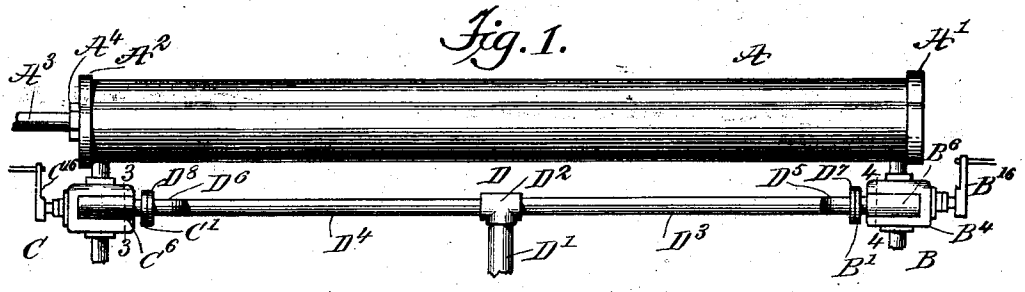


Fig. 2.

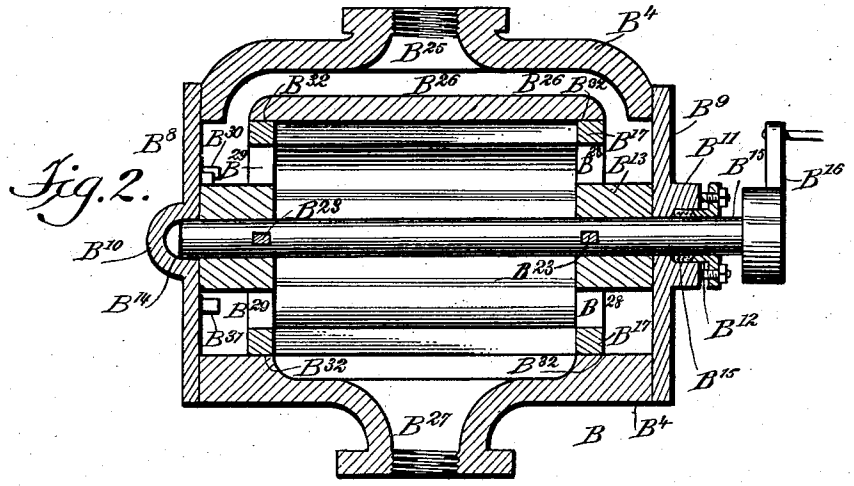


Fig. 3.

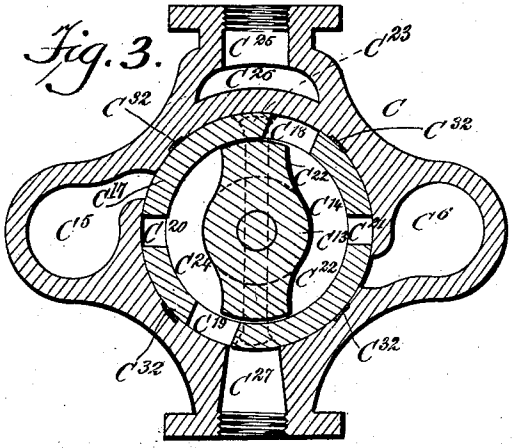
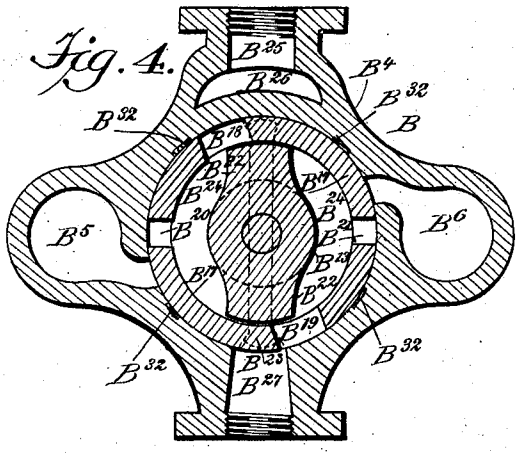


Fig. 4.



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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 5.

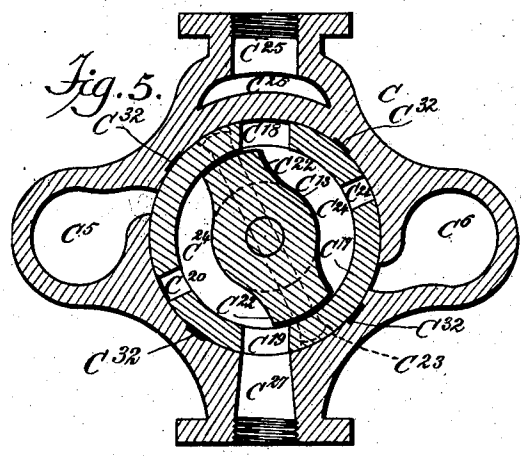


Fig. 6.

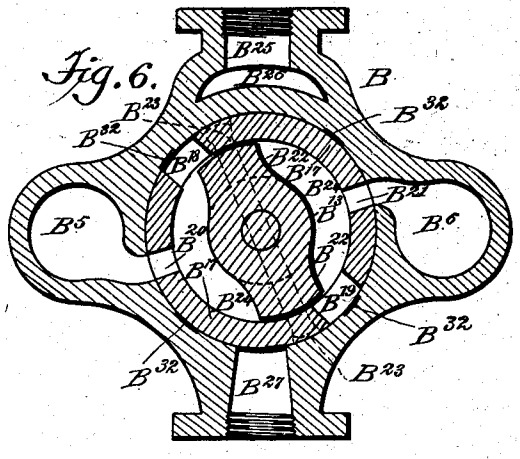


Fig. 7.

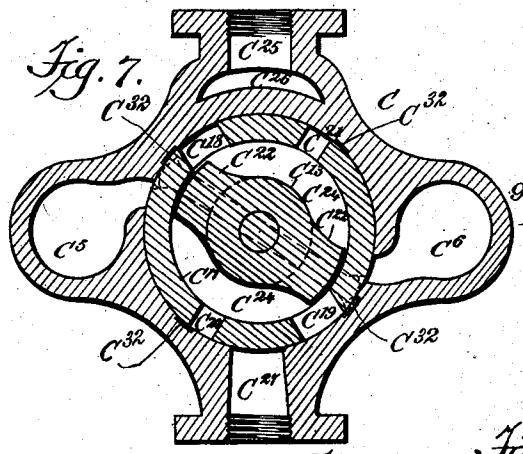


Fig. 8.

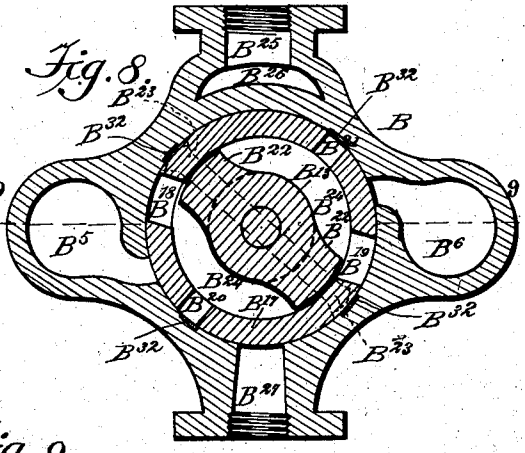
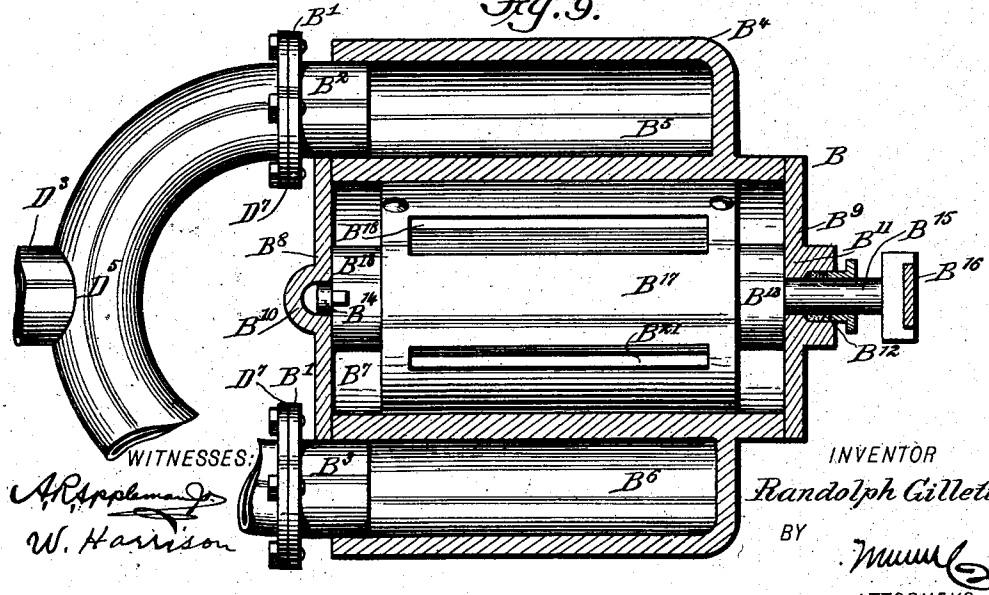


Fig. 9.



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No. 751,281. Patented February 2, 1904.

UNITED STATES PATENT OFFICE.

RANDOLPH GILLETTE, OF LITTLEFALLS, MINNESOTA, ASSIGNOR OF ONE-HALF TO SPIRIT J. VASALY, OF LITTLEFALLS, MINNESOTA.

ROTARY VALVE.

SPECIFICATION forming part of Letters Patent No. 751,281, dated February 2, 1904.

Application filed October 29, 1902. Serial No. 129,235. (No model.)

To all whom it may concern:

Be it known that I, RANDOLPH GILLETTE, a citizen of the United States, and a resident of Littlefalls, in the county of Morrison and State of Minnesota, have invented a new and Improved Rotary Valve for Steam-Feeds, of which the following is a full, clear, and exact description.

My invention relates to rotary valves used more particularly for the steam-feeds of sawmills and analogous devices.

I will describe a rotary valve for steam-feeds embodying my invention and then point out the novel features in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a fragmentary elevation of a steam-cylinder to which my invention is applied. Fig. 2 is a vertical longitudinal section through the rotary valve and its accompanying parts. Fig. 3 is a vertical cross-section of the same upon the line 3 3 of Fig. 1. Fig. 4 is a somewhat similar section upon the line 4 4 of Fig. 1. Figs. 5 and 7 are sections in all respects similar to Fig. 3, but showing the revoluble valve-plug in slightly different positions. Figs. 6 and 8 are sections similar to Fig. 4, and also showing the revoluble valve-plug in slightly different positions. Fig. 9 is a horizontal section upon the line 9 9 of Fig. 8 and showing certain details in plan.

The steam-feed cylinder A is provided with heads A' A^2 and with a piston-rod A^3, which passes through a stuffing-box A^4 to a piston inside of said cylinder, these parts being of the usual construction. The cylinder is provided at its respective ends with the revoluble valves B C, which are connected together and are supplied with steam by means of the steam-fixtures D. The live-steam pipe D' is provided with a T D^2, this T being fitted with pipes D^3 D^4, provided, respectively, with bifurcated pipes D^5 D^6 of substantially horseshoe form and terminating in flanged ends D^7 D^8. Connected with the flanged ends D^7 are the flanged ends B' of the nipples B^2 and B^3 of the rotary valve B. (See Fig. 9.) The casing of the valve B is shown at B^4 and is provided with live-steam ports B^5 B^6 and with a central cylindrical opening B^7. The valve-casing is provided with heads B^8 B^9, provided with bearings B^{10} B^{11}. The bearing B^{11} has a stuffing-box B^{12}, as shown more particularly in Fig. 9.

Revolubly mounted within the cylindrical aperture B^7 are two hubs B^{13}, mounted upon a shaft B^{14}, which is mounted in bearings B^{15} and provided with a crank B^{16}. Disposed within the casing is a revoluble plug-cylinder B^{17}, provided with exhaust-ports B^{18} B^{19} and with live-steam ports B^{20} B^{21}.

Integrally mounted upon the hubs B^{13} are webs B^{22}, and to these webs the plug-cylinder B^{17} is rigidly secured by means of pins B^{23}, which are slightly sunken therein and headed down. The webs B^{22} have substantially the same length as the diameter of the plug-cylinder B^{17}.

Owing to the shape of the hubs B^{13} and the webs B^{22}, the plug is provided with apertures B^{24}, which serve as steam-passages when the plug occupies certain positions. My purpose in giving the revoluble plug a composite form is to prevent unequal expansion and contraction of the plug when the same is subjected to extremes of heat or when one part of the plug is heated more than the other part. I have found that the composite form of plug is less liable to bind because of the expansion and contraction peculiar to various degrees of heat. Preferably I make the cylinder B^{17} fit a little loosely upon the webs B^{22} and then by means of the pins B^{23} secure the two members rigidly together. This construction permits of slight relative movements due to expansion and contraction and does not necessitate as much distortion of the plug as would be the case if all of the movable parts were made integral.

The upper portion of the valve-casing is provided with steam-passages B^{25} B^{26} of the shape shown, and the lower portion of said casing is provided with an exhaust-passage B^{27}. The ends of the passages B^{24} terminate in openings B^{28} B^{29}, thus freely connecting the steam-passages B^{25} and B^{26} of the casing with

the passages B^{24} of the plug. Stops B^{30} B^{31} are provided for limiting the movements of the plug C^{13}, and consequently the other parts of the plug.

Lubricant-grooves B^{32} are provided within the casing B^4 at this point, as indicated more particularly in Figs. 2, 4, 6, and 8. The arrangement of these grooves is such that the pressure of the steam and the normal working of the revoluble plug tends to work the lubricant out into the points where it is needed, thereby insuring easy movement of the plug.

The structure of the valve C is substantially the same as that of the valve B, just described. The flanged heads C′ of the valve C are connected with the flanged heads D^8 of the bifurcated pipe D^6. The live-steam port C^5 (shown at the left of Figs. 3, 5, and 7) is analogous to the port B^6, already described. So, also, the live-steam port C^6 is analogous to the live-steam port B^5. The hubs C^{13} are provided with webs C^{22}, secured by pins C^{23} to the plug-cylinder C^{17}, this cylinder being provided with exhaust-ports C^{18}, C^{19}, C^{20}, and C^{21}, as above described, with reference to the valve B, and the steam-passages C^{25} C^{26} C^{27} and the lubricant-grooves C^{32} have the same construction as the corresponding parts already described with reference to the valve B. The valve C is also provided with bearings, a stuffing-box, and with a crank C^{16}.

The operation of my device is as follows: Steam being turned on through the pipe D′, the cranks B^{16} C^{16} are simultaneously moved forward or backward, as desired, this being done by means of any well-known mechanical expedient. By the movement of the cranks the revoluble plugs are rotated backward and forward within certain limits. Figs. 3 and 4 represent the valves in such position that steam can leave, but cannot enter the cylinder A. The valves being moved slightly, as indicated in Figs. 5 and 6, steam enters simultaneously through the ports B^5 B^6 of the casing and passes through the ports B^{20} B^{21} to the interior of the plug-cylinder B^{17}, from whence it escapes at the open ends B^{28} B^{29} and also passes through the steam-passages B^{26} B^{25} to the cylinder, forcing the piston thereof toward the left in Fig. 1. The exhaust-steam passes downward through the passages C^{25} C^{26} and passage C^{24} to the exhaust-passage C^{27}, thus making its escape. The valves being moved still farther, they assume the position indicated in Figs. 7 and 8, so that steam can neither enter nor leave the cylinder A.

The object of the excessive movements indicated in Figs. 7 and 8 is to enable the steam-feed to be stopped in case any obstruction should prevent the forward or backward movement of the cranks B^{16} C^{16} or any mechanism connected therewith for actuating them. In other words, if the workman finds that he cannot stop the steam-feed by causing the cranks to pass backward he drives them forward in the same direction, and thus stops the feed, or if the carriage is moving backward and he cannot cause the cranks to move forward he can drive them backward in the same direction and stop the feed.

An important feature of my invention is the fact that the live steam when fed through the ports B^5 B^6 C^5 C^6 is made to enter the revoluble plug by distinct and independent routes. Where ports are in communication with each other by a saddle-shaped channel, as is sometimes the case, the walls of the casing are liable to spring and bind upon the plug, owing to the excessive pressure of the steam.

I have found that valves for the purpose above indicated cannot be properly balanced except by feeding the steam through distinct and independent passages to different sides of the plug.

It will be further noted that all of my several improvements above mentioned conspire to form a valve in which all of the parts are worked freely relatively to each other.

The important part that passages B^{18} and C^{18} play in the proper working of the valve is that each of these passages are made in the plug-cylinder, so as to balance the steam-pressure when steam is within said plug-cylinder, also to equalize the expansion of the plug-cylinder under different degrees of heat.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a steam-feed rotary valve, the combination of a casing provided with ports, a plug revolubly mounted within said casing and likewise provided with ports, said plug consisting of a revoluble central member provided with webs, a plug-cylinder mounted upon said central member and engaging the edges of said webs, and a plurality of pins extending entirely through said webs and said central member, the ends of said pins engag- said plug-cylinder.

2. In a steam-feed rotary valve, the combination of a casing provided with ports, a plug revolubly mounted within said casing and likewise provided with ports, said plug consisting of a revoluble central member provided with webs integral therewith, a hollow cylinder encircling said revoluble member and loosely engaging said webs, said cylinder and said webs being provided with holes registering with each other, and pins passing diametrically through said webs and said central member, and engaging said hollow cylinder.

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

RANDOLPH GILLETTE.

Witnesses:
WILLIAM KRAUSE,
STEPHEN C. VASALY.