

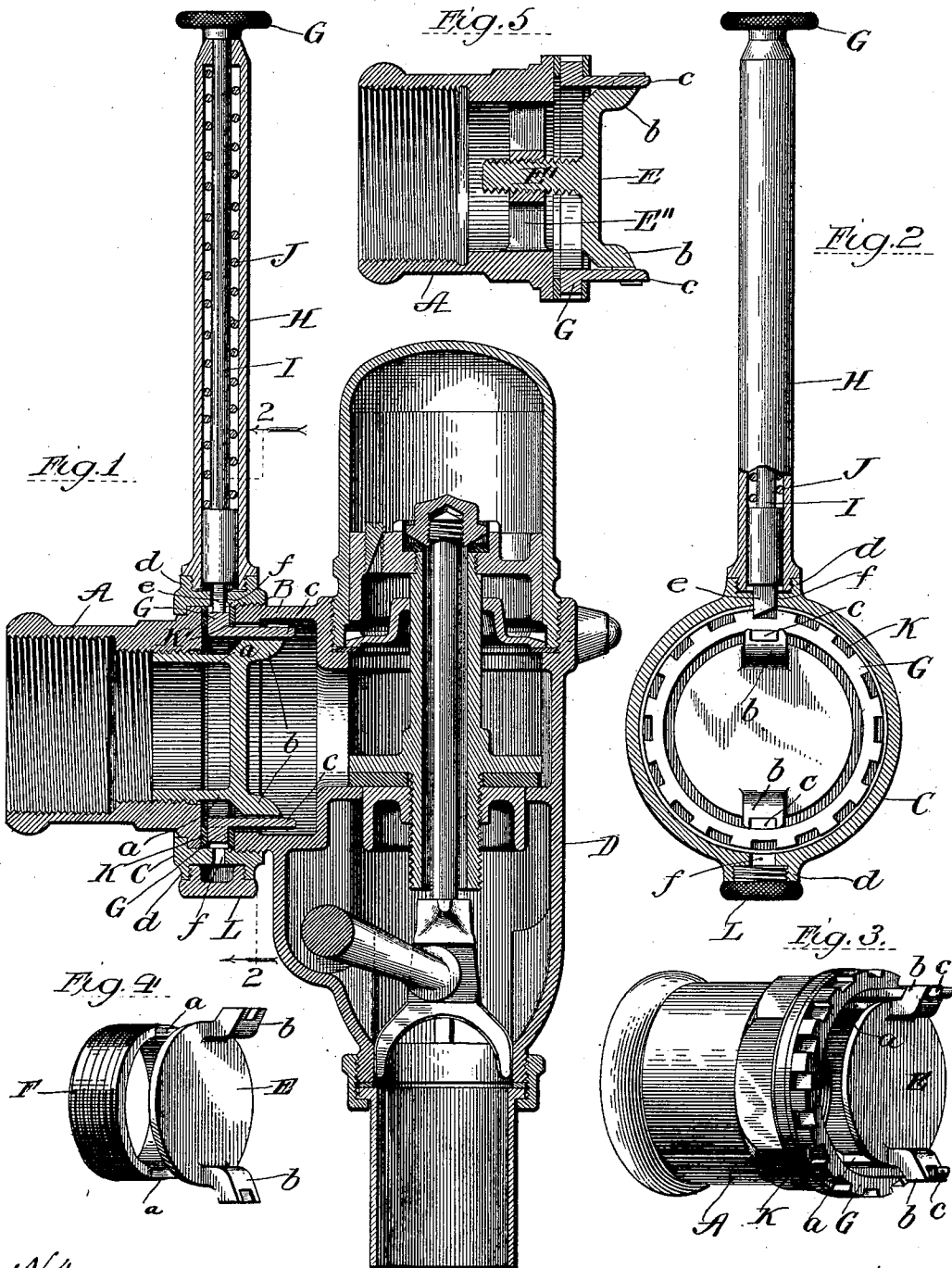
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E. G. WATROUS.
VALVE.

(Application filed Nov. 19, 1901.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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VALVE.

SPECIFICATION forming part of Letters Patent No. 710,129, dated September 30, 1902.

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To all whom it may concern:

Be it known that I, EARL G. WATROUS, a citizen of the United States, residing at Chicago, in the State of Illinois, have invented certain new and useful Improvements in Valves, of which the following is a description, reference being had to the accompanying drawings, forming part of this specification.

My improved valve is adapted for use as a substitute for the ordinary gate-valve for controlling and regulating the passage through a line of pipe; but it is particularly adapted for use as a valve for controlling and regulating the water-supply in connection with water-closet flushing-valves, and it is in association with the latter that my invention has therefore been illustrated in the accompanying drawings.

In such drawings, Figure 1 represents a middle vertical section of a flushing-valve of familiar construction with the valve constituting my present invention located in the supply-pipe to which said flushing-valve is connected; Fig. 2, a vertical cross-section through the middle of the coupling-nut approximately on the line 2-2 of Fig. 1 and showing the parts within the nut in elevation; Fig. 3, a perspective view of the parts within the coupling nut or sleeve with the latter and one of the rubber gaskets or packing-rings removed; Fig. 4, a perspective view of the valve detached, and Fig. 5 a sectional detail showing a different method of supporting the valve in the pipe-section upon which its seat is formed.

The same letters of reference are employed to indicate corresponding parts in the several views.

A and B may be taken to be two sections of pipe coupled together by a coupling-nut C, engaging a peripheral flange upon the section A and screwed upon the exteriorly-threaded end of the section B, as usual; but in the instance illustrated in the drawings the section B forms an integral part of the casing of a water-closet flushing-valve D, while the section A is a short piece of pipe interiorly threaded at its end opposite the coupling for the purpose of screwing it onto the supply-pipe through which water is supplied to the valve D to flush the closet with which the lower end of the valve is connected. It is

desirable in flushing-valves of this character to provide a regulating-valve by means of which the supply of water admitted to the flushing-valve may be regulated at will and by means of which also the supply of water may be entirely cut off from the flushing-valve when desired to permit the latter to be removed for inspection and repairs, and I have by my present invention provided a simple and efficient valve for this purpose which is located directly in the pipe connections between the flushing-valve and supply-pipe and which may be manipulated to regulate the quantity of water admitted to the flushing-valve or to entirely cut it off when necessary. For this purpose the end of the pipe-section A adjacent the section B is suitably formed to serve as a seat for a disk valve E, having a beveled seating-surface and carried in the present instance by an exteriorly-threaded sleeve F, screwed into the pipe-section A, the latter being interiorly threaded to receive it. The valve E is connected to the sleeve F by integral intermediate lugs a, which leave wide openings between the sleeve and valve for the passage of the water, Fig. 4. Upon its opposite side the valve E is provided with two diametrically opposite ears b, grooved to receive a pair of fingers c, projecting from a loose ring G, which fits between the abutting ends of the pipe-sections A B within the coupling-nut C and is free to turn independently of them. Owing to the connection of the valve E with this ring G by means of the grooved ears b and the fingers c, the valve and ring turn together, while the valve is free to move longitudinally of the pipe-sections independently of the ring, its grooved ears b sliding along the fingers c in such movements. By turning the ring G in one direction or the other, therefore, the valve E will be turned in a corresponding direction and its threaded sleeve F be screwed farther into the pipe-section A, and thereby carry the valve toward its seat, or be withdrawn therefrom to carry the valve away from its seat, according to the direction in which the ring and valve are turned. As a means for turning the ring G for this purpose I provide its periphery with a series of notches or recesses adapted to be engaged by a turning instrument inserted through an opening provided for the purpose

in the coupling-nut C. In the present instance I provide said nut at diametrically opposite points with interiorly-threaded bosses *d*, adapted to receive the threaded end of a tubular turning-handle H, which contains a longitudinally-movable rod I, projecting at both ends beyond the tube and having its end adjacent the threaded end of the tube formed into a beveled pawl-tooth *e*, adapted to pass through openings *f* in the nut C at the bottoms of the bosses *d* and engage the notches in the periphery of the ring G, Fig. 2. The opposite projecting end of the rod I at the outer end of the tubular handle H is provided with a milled thumb-piece *g*, by means of which the rod may be drawn outwardly within the handle to disengage its inner end from the ring G. A coiled spring J, surrounding the rod I within the handle H and confined between shoulders formed upon the rod and handle, respectively, serves to press the rod inwardly and yieldingly maintain its toothed inner end in engagement with the ring G whenever the handle is applied to the coupling-nut.

Rubber gaskets or packing-rings K are interposed between the pipe-section A B and the ring G upon either side of the latter for the purpose of making tight joints between the pipe-sections and ring. The coupling-nut C is screwed upon the threaded end of the section B tightly enough for this purpose, but not so tightly as to prevent it from being turned freely back and forth a limited distance by means of the handle H.

Under the above-described construction and arrangement of the parts the operation is as follows: Assuming that it be desired to change the existing adjustment of the valve E, so as to permit more or less water to pass to the flushing-valve or to cut it off entirely, the handle H is screwed into one of the bosses *d* of the coupling-nut C and the pawl-tooth *e* upon the inner end of the spring-pressed rod I permitted to pass through the opening *f* in the nut C and engage the periphery of the ring G, as in Fig. 2. By now oscillating the nut C back and forth through a limited distance, using the handle H as a lever for that purpose, the toothed inner end of the spring-pressed rod I will engage successive notches in the periphery of the ring G and carry it forward continuously in one direction or the other, the beveled end of the tooth permitting it to slip backward over the ring in one direction without turning it, the latter being yieldingly held from movement by its frictional engagement with the gaskets K on either side of it. Inasmuch as the valve E turns with the ring G, as before explained, and is supported by its threaded sleeve F in the pipe-section A, it will be carried toward or from its seat by such oscillation of the nut C, depending upon the direction in which the ring G is turned thereby. This direction will depend upon the position of the beveled lower end of the rod I relatively to the ring. This

rod is free to turn within the tubular handle H when the latter is detached from the nut C or when after being attached the rod I is drawn outward against the resistance of the spring J (by means of the thumb-piece *g* at the outer end of the rod) far enough to withdraw the toothed inner end of the rod from the hole in the nut C, through which it passes to engage the ring G. The shape of this hole and toothed end of the rod are such (being rectangular in the present instance) that the rod cannot be turned within the handle without withdrawing it in the manner explained, so that when it is set to turn the ring G and valve E in the desired direction it is locked in that position during the oscillation of the nut by means of the handle H. The thumb-piece upon the outer end of the rod I is preferably provided upon its face with an arrow, as indicated in Fig. 2, to indicate the position of the tooth at its lower end and the consequent direction in which the valve will be turned by oscillation of the nut C, and the nut C may itself be suitably marked upon its periphery to indicate in which direction the valve should be turned to close it and in which direction to open it.

It will be understood that the handle H will be applied to the coupling-nut only when it is desired to adjust the valve, said handle constituting simply a key or tool to be kept on hand for adjusting all of the valves in use at any given place. Cap-nuts L, screwed into the bosses *d* of the nut C, may be provided, as in the case of the lower boss in Figs. 1 and 2, to form a neat finish.

Instead of providing the valve E with the threaded sleeve F for adjustably supporting it within the pipe-section A it may be, as shown in Fig. 5, provided with a threaded stem *E'*, passing through a diametrical supporting-bridge *E''* in the section A.

Having thus fully described my invention, I claim—

1. A pair of pipe-sections, and a coupling-nut for connecting them, in combination with a valve located within said nut, and means for opening and closing said valve by oscillation of said nut; substantially as described.
2. A pair of pipe-sections, and a coupling-nut connecting them, in combination with a valve having a threaded support in one of said sections whereby it will be moved toward or from its seat by turning it in one direction or the other, and means for turning said valve continuously in one direction by oscillation of the coupling-nut; substantially as described.
3. A pair of pipe-sections, in combination with a ring rotatable between said sections, and a valve having a threaded support in one of said sections and rotatable with the ring, whereby the valve may be moved toward and from its seat by turning the ring in one direction or the other; substantially as described.
4. A pair of pipe-sections, and a coupling-nut connecting them, in combination with a ring rotatable within said nut, and a valve

within said nut movable toward and from its seat by rotation of said ring; substantially as described.

5. A pair of pipe-sections, and a coupling-nut connecting them, in combination with a ring rotatable between said pipe-sections within said nut, means for turning said ring continuously in one direction by oscillation of said nut, and a valve within said nut movable toward and from its seat by the rotation of said ring; substantially as described.

6. A pair of pipe-sections, and a coupling-nut connecting them, in combination with a ring rotatable between said sections within said nut, means for turning said ring continuously in one direction by oscillation of said nut, a valve having a threaded support in one of said sections, and a connection between the valve and ring for causing the valve to turn with the ring while leaving it free to move toward and from its seat independently of the ring; substantially as described.

7. The pipe-sections A B, and coupling-nut C connecting them, in combination with the valve E having a threaded support in the section A and provided upon its opposite side with the ears *b*, and the rotatable ring G provided with the fingers *c* engaging said ears; substantially as described.

8. The pipe-sections A B, and coupling-nut C connecting them, in combination with the valve E provided with the ears *b*, the exteriorly-threaded sleeve F screwed into the section A and connected to the valve E by the lugs *a* leaving water-passages between the sleeve and valve, and the rotatable ring G provided with the fingers *c* engaging the ears *b* on the valve E; substantially as described.

9. The pipe-sections A B, in combination with the ring G rotatable between them, the packing-rings K between the ring G and the ends of the pipe-sections, and the valve E located within the ring G and movable toward and from its seat by rotation of said ring; substantially as described.

10. The pipe-sections A B, in combination with the ring G rotatable between them and provided with the fingers *c*, the packing-rings K between the ring G and ends of the pipe-sections, and the valve E having a threaded support in the section A and provided with the ears *b* engaging the fingers *c*; substantially as described.

11. The pipe-sections A B, and coupling-nut C connecting them, in combination with the valve E having a threaded support in the section A and provided upon its opposite side with the ears *b*, the rotatable ring G provided with the fingers *c* engaging said ears, and the packing-rings K between the ring G and ends of the pipe-sections; substantially as described.

12. A pair of pipe-sections, and a coupling-nut connecting them, in combination with a ring within said nut, a valve movable toward and from its seat by rotation of said ring, an

operating-handle applicable to said nut for oscillating the same, and means intermediate said handle and the rotatable ring within the nut for turning said ring continuously in one direction by oscillating the nut; substantially as described.

13. A pair of pipe-sections, and a coupling-nut connecting them, in combination with a ring within said nut, a valve movable toward and from its seat by rotation of said ring, an operating-handle applicable to said nut for oscillating the same, and means intermediate said handle and the rotatable ring within the nut for turning said ring at will in either direction by oscillating the nut; substantially as described.

14. A pair of pipe-sections, and a coupling-nut connecting them, in combination with a rotatable ring located within said nut and having a notched periphery, a valve within said nut movable toward and from its seat by the rotation of said ring, an operating-handle applicable to said nut for oscillating the same, and a pawl-tooth carried by said handle and adapted to engage the periphery of the rotatable ring, to rotate the same continuously in one direction by oscillating said nut; substantially as described.

15. A pair of pipe-sections, and a coupling-nut connecting them, in combination with a rotatable ring located within said nut and having a notched periphery, a valve within said nut movable toward and from its seat by the rotation of said ring, an operating-handle applicable to said nut for oscillating the same, and a reversible pawl-tooth carried by said handle and adapted to engage the notched periphery of the rotatable ring, whereby said ring may be turned at will in either direction by oscillating said nut; substantially as described.

16. A pair of pipe-sections, and a coupling-nut connecting them, in combination with a rotatable ring located within said nut, a valve movable toward and from its seat by rotation of said nut, a tubular operating-handle applicable to said nut for oscillating the same, and a spring-pressed rod located within said handle and projecting at one end beyond the same and formed into a tooth adapted to engage the periphery of the notched ring within the coupling-nut; substantially as and for the purpose described.

17. A pair of pipe-sections and a coupling-nut connecting them, in combination with a rotatable ring located within said nut, a valve movable toward and from its seat by rotation of said nut, a tubular operating-handle applicable to said nut for oscillating the same, and a spring-pressed rod located within said handle and projecting at one end beyond the same and formed into a tooth adapted to engage the periphery of the notched ring within the coupling-nut, said spring-pressed rod being free to turn within the handle when disengaged from the coupling-nut and ring,

to reverse the position of the toothed inner end; substantially as and for the purpose described.

18. A coupling-nut C provided with an opening *f* surrounded by the threaded boss *d*, in combination with the tubular handle H having the threaded end adapted to engage said boss, the rod I located within the handle H and having its end projecting beyond the threaded end of the handle H formed into a pawl-tooth *e* adapted to pass through the opening *f* in the nut C, the thumb-piece *g* secured to the opposite projecting end of said rod, and the coiled spring J surrounding the rod

within the handle; substantially as and for the purpose described.

19. The combination of the tubular handle H, the rod I rotatable therein and projecting beyond the opposite ends thereof, formed into a pawl-tooth at one end and having the thumb-piece *g* secured to its opposite end, and the coiled spring J surrounding said rod within the handle H; substantially as and for the purpose described.

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