

Oct. 17, 1933.

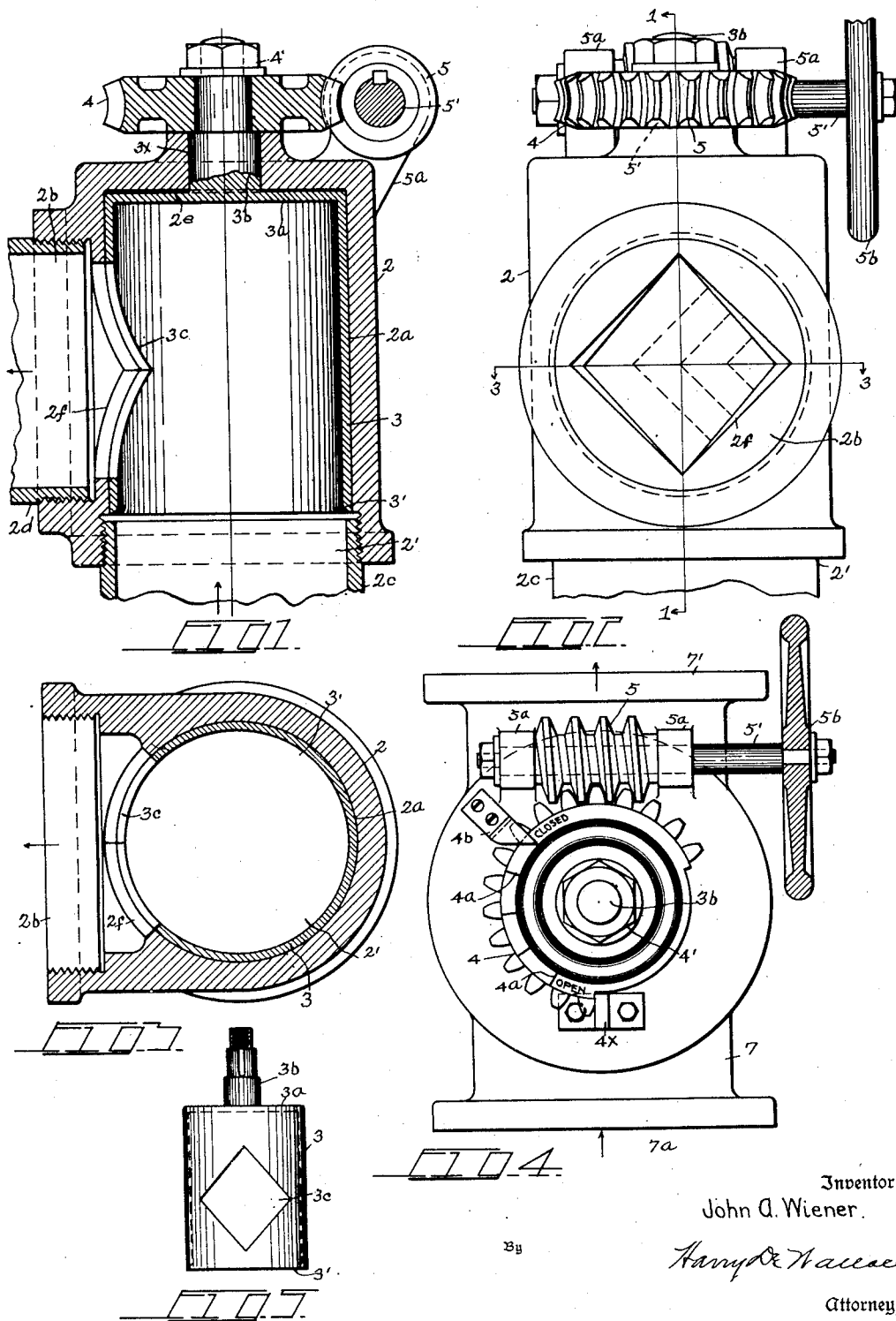
J. A. WIENER

1,931,048

VALVE

Filed May 28, 1932

2 Sheets-Sheet 1



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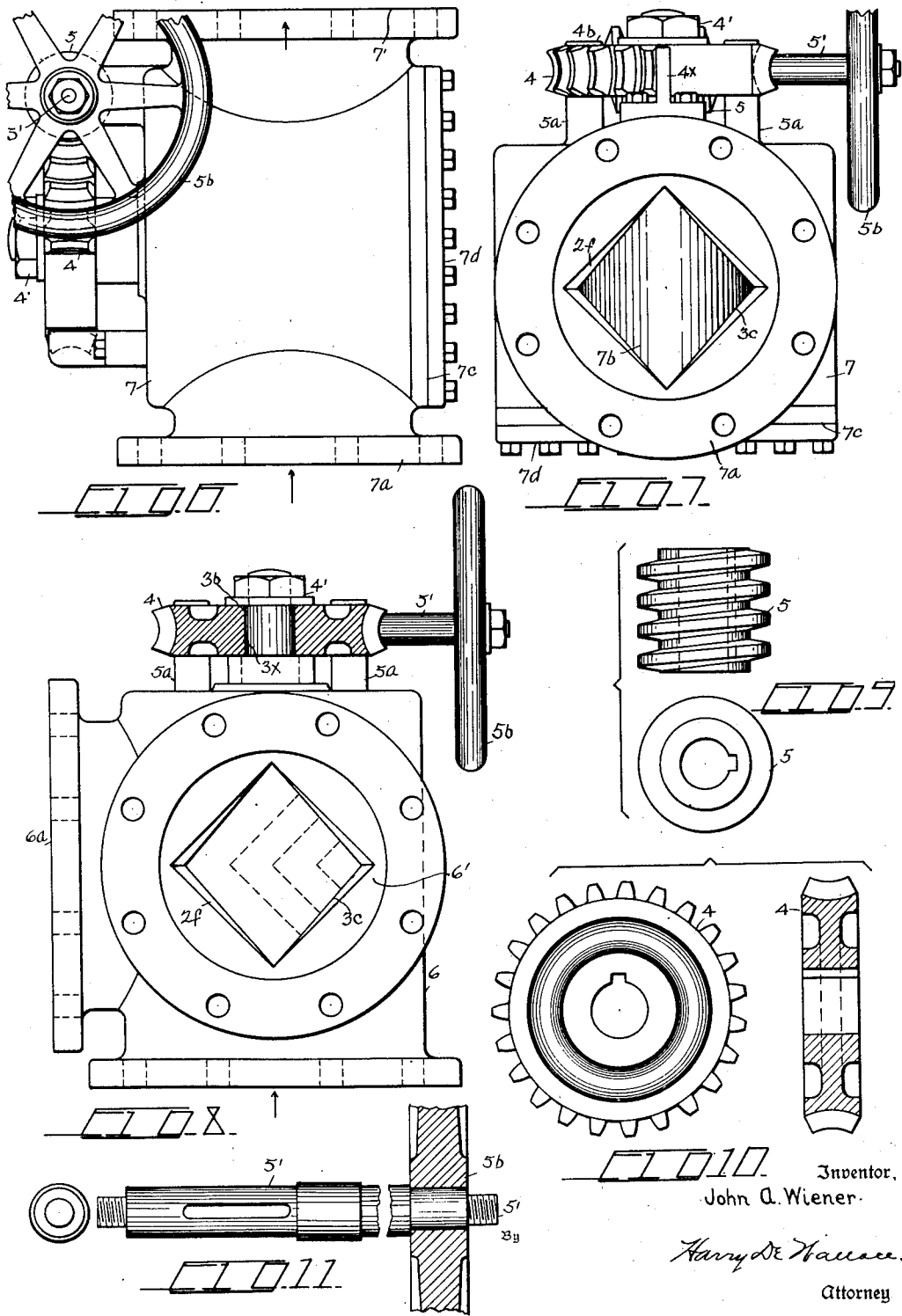
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UNITED STATES PATENT OFFICE

1,931,048

VALVE

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1 Claim. (Cl. 251—91)

This invention relates to a self-cleaning valve designed for controlling the flow of liquids generally, and has particular reference to valve means for regulating the flow of wood pulp and similar semi-liquid and viscous preparations employed in the manufacture of paper, fibrous wall board, and like products.

able means connected with the valve spindle for rotating the valve in opposite directions, and also means to indicate the operative movements of the valve. And a further object is to generally simplify and improve the construction, arrangement and operation of stock-regulators of the class, to the end that the dispensing valves may be self-draining and require neither packing nor lubrication when employed for dispensing pulp and similar semi-liquid stocks, and wherein the interiors of the valve, valve chamber and casing are severally so fashioned as to obviate all cavities, pockets or obstructions that may retard the flow or become clogged with sediment or accumulations of the solid constituents of the said stocks and thereby rendered inefficient and inoperable.

I attain these objects by the means set forth in the detailed description which follows, and as illustrated by the accompanying drawings, in which—

Figure 1 is a central vertical section through an angle valve, taken on line 1—1 of Fig. 2. Fig. 2 is an end elevation of the same. Fig. 3 is a horizontal section, taken on line 3—3 of Fig. 2, showing the valve open as in Figs. 1 and 2. Fig. 4 is a top plan view of a straight valve, the axis thereof being vertical instead of horizontal to avoid crowding of the figures. Fig. 5 is an elevational view of the inverted cup-shaped valve of Figs. 1, 2 and 3. Fig. 6 is a broken side elevation of the straight valve corresponding to Fig. 4. Fig. 7 is an end elevation of the same, taken in the direction of the arrow in Fig. 6. Fig. 8 is an elevational view, a modification of the angle valve of Fig. 1. Fig. 9 is respectively a side and an end elevation of the worm. Fig. 10 is respectively a plan and a central vertical cross-section of a normal worm gear, the section being taken on line 10—10 of the plan view. And Fig. 11 is a broken elevation and partial central section of the worm shaft and hand wheel.

In the drawings, referring particularly to Figs. 1, 2 and 3, 2 represents an angular valve body having its bottom formed with an intake opening 2', that coincides with a cylindrical valve chamber 2a, and through the latter connects with an angular outlet opening 2b, the said openings being fitted with pipes 2c—2d. 3 represents the cylindrical inverted cup-shaped valve, by which the flow of liquid pulp or other stock may be regulated. Valve 3 has a normally open bottom end 3' that receives the stock from the inlet 2', and a closed top end 3a which

The primary object of the invention is to provide a novel stock regulating valve preferably of the simple angular type, to take the place of the more complicated gate, plug and clapper valves, in common use in pulp and paper mills, which frequently become clogged due to the accumulations of fibers and other solid constituents of the pulp stock. A further object is to provide such a stock regulator wherein the valve proper is in the form of an inverted, self-draining cup, comprising a relatively long concavo-convex body or barrel, which is concentrically and rotatably disposed in a cylindrical chamber or socket, the corresponding ends of the chamber and valve being open and communicating freely with the receiving opening of the valve body, while the opposite ends of both the valve and chamber are closed and disposed in bearing contact with each other. The closed end of the valve is preferably formed with an integral axial spindle or stem, that journals in and projects beyond an adjacent axial opening of the cylinder; the external surfaces of the valve and the internal surfaces of the chamber being ground to effect a close, substantially liquid-tight but workable joint, that requires no packing to prevent escape of the liquid past the valve and through the spindle opening, the valve and its chamber being disposed at right angles to one or more outlet or exhaust openings that may align with or may be disposed in angular relation to each other, as well as to the intake opening of the valve casing. A further object is to provide a hollow cylindrical valve having a normally open bottom end that admits the stock to its interior and having one or more angular lateral apertures or openings located between its ends for the discharge of pulp that may be supplied to the valve under pressure of a pump; the valve chamber preferably being formed with similar angular openings with which the lateral openings of the valve may coincide when the latter is rotated, and the angular openings of the valve chamber preferably being arranged substantially concentric to the outlet openings of the casing, whereby the volume of stock passing through the valve may be regulated. A further object is to provide simple manually oper-

is formed with an integral axial spindle or stem 3b, that journals in an opening 2e of the casing that coincides with the axis of the chamber 2a. The stem 3b extends beyond the casing, and its top end is reduced and threaded to receive a mutilated worm gear 4 and a retaining nut 4'. The gear 4 is preferably rotated by a worm 5, which is keyed on a shaft 5' that is supported by integral perforated lugs 5a, which rise from the casing 2, the said shaft being fitted with a hand-wheel 5b. The top face of the gear 4 is formed with a segmental scale 4a, which is traversed by a pointer 4b, by which predetermined opening and closing movements of the valve 3 may be indicated (see dotted lines in Figs. 2 and 8). The rotary movements of gear 4 may be limited to the extent of the scale 4a by a stop 4x, shown in Figs. 4 and 7. The valve 3 is preferably formed with a medial diamond-shaped opening 3c for the discharge of the pulp or other stock towards the outlet passage 2b whose inner end comprises a portion of the wall of chamber 2a, and is formed with a corresponding diamond-shaped opening, as 2f (see Figs. 1, 2, 3, 7 and 8). In practice, the vertical, and horizontal or top surface of chamber 2a, and also the corresponding surfaces of valve 3, are preferably ground so as to effect a substantially close, liquid-tight joint between the parts, whose clearance does not exceed one or two thousandths of an inch. The spindle 3b and its bearing 3x are also ground so as to prevent wobbling or vibrations of the valve and leakage of the said joint. When the said parts are properly ground, the joints between the valve and its stem and the casing 2 are practically air-and-liquid-tight, and the valve therefore, needs no packing. Owing to the relatively close fitting of the valve 3 and its stem 3', none of the water or other thinning liquid of the pulp can reach or enter the normal space between the top of the valve and the top of the chamber 2a, due to the presence of atmospheric pressure in this dead-end of said chamber. Further more, such danger is greatly lessened by reason of the pulp being delivered to the valve 3 under considerable pressure, which thrusts and holds the closed top-end of the valve tightly against the top of the chamber 2a and prevents escape of any of the stock as long as the said pressure is maintained by the stock pumps.

Fig. 8 illustrates an angular valve 6, having

two outlets, as 6'—6a, which may be served with the pulp stock alternately by a simple valve, as 3, having a single discharge opening, as 3c. In case it is desired to simultaneously dispense the pulp towards both of the outlets 6'—6a, the valve may be provided with two of the angular openings 3c, as may be understood by consulting Figs. 1 and 5.

The straight valve 7 of Figs. 4, 6 and 7 may receive the stock at either of its ends, 7'—7a, and the valve proper, as 7b, shown in Fig. 7, may be provided with a single opening (not shown) and so adjusted as to control the flow of the stock in the same manner as in the angle valve 2. The straight valve-body 7 has a bottom opening 7c merely for the purpose of facilitating the insertion of the valve 7b, after which said opening is preferably sealed by a cap or plug 7d. Fig. 7 shows the valve 7b closed.

In practice, the operating mechanisms for the simple angle valve 2, and the modifications of Figs. 6, 7 and 8, may be identical as shown in the drawings. The cup-shaped valve 3, shown in Figs. 1, 2, 3 and 5, possesses certain of the characteristics of the well-known plug valve in common use, but so far as I am aware, none of these older plugs have been successfully applied to angular valves, as herein shown.

Having thus described my invention, what I claim, is—

A valve for use with pulp stock including a body formed with a cylindrical valve chamber having a closed and an open end and having an outlet at one side thereof communicating with the chamber, said closed end having a bearing which terminates beyond the closed end, a valve in the chamber having a spindle extending through the bearing, a mutilated worm gear secured to the spindle and seated against the outer end of the bearing, a worm carried by the casing and in mesh with the worm gear, a stop member secured to the outer face of the closed end and projecting outwardly therebeyond and formed to engage the ends of the mutilated gear to restrict movement thereof in both directions, said worm gear having indicia "open" at one end thereof and having indicia "closed" adjacent the opposite end of the worm gear, and a pointer secured to the closed end of the casing and disposed in overlying relation to the worm gear to indicate the open and closed position of the valve.

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