No. 712,164. Patented Oct. 28, 1902.

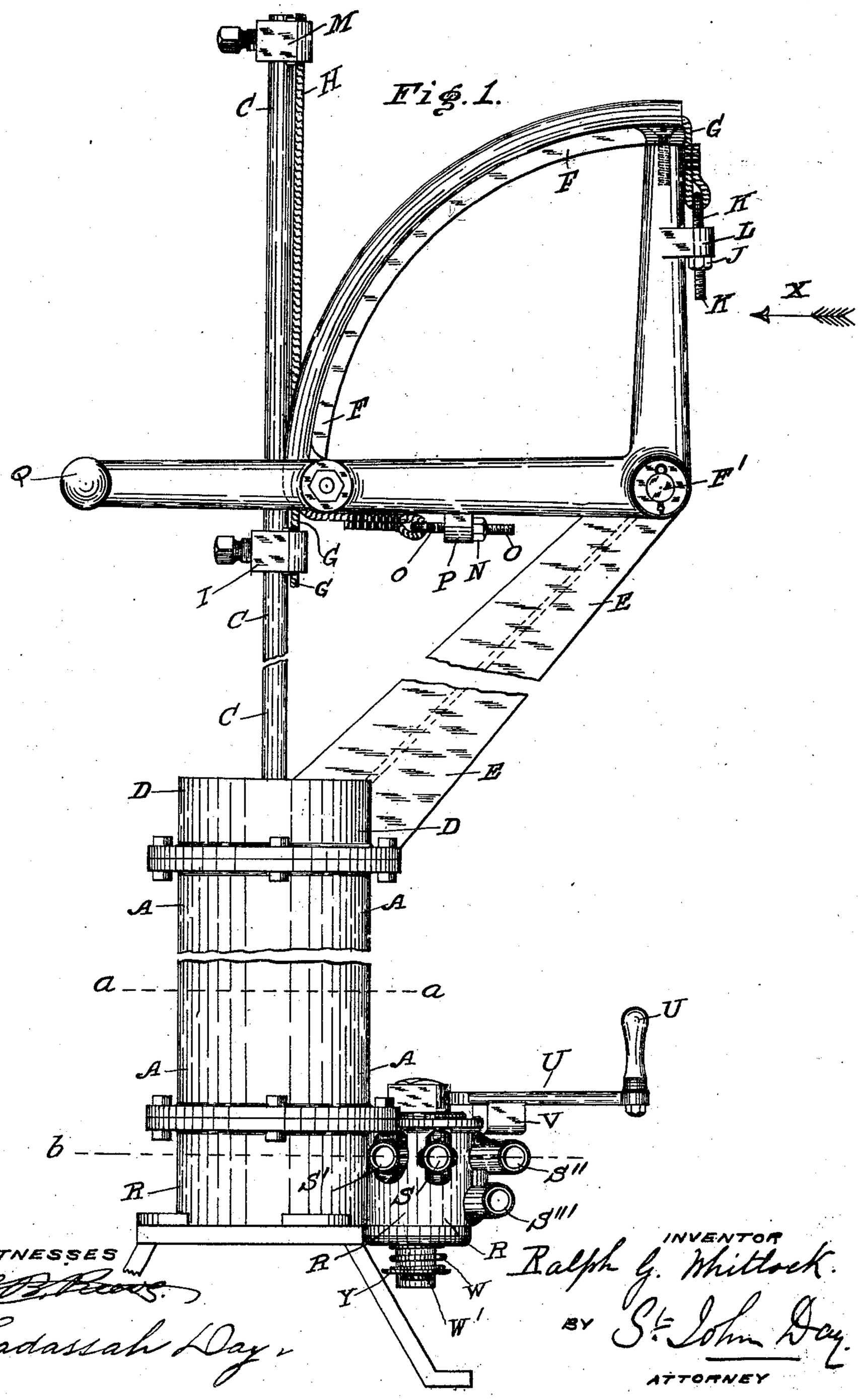
R. G. WHITLOCK.

PUMP FOR MEASURING, MIXING, BLENDING, OR DILUTING LIQUIDS.

(Application filed Jan. 24, 1902.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



WITNESSES

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3 Sheets—Sheet 2.

Fig. 2.

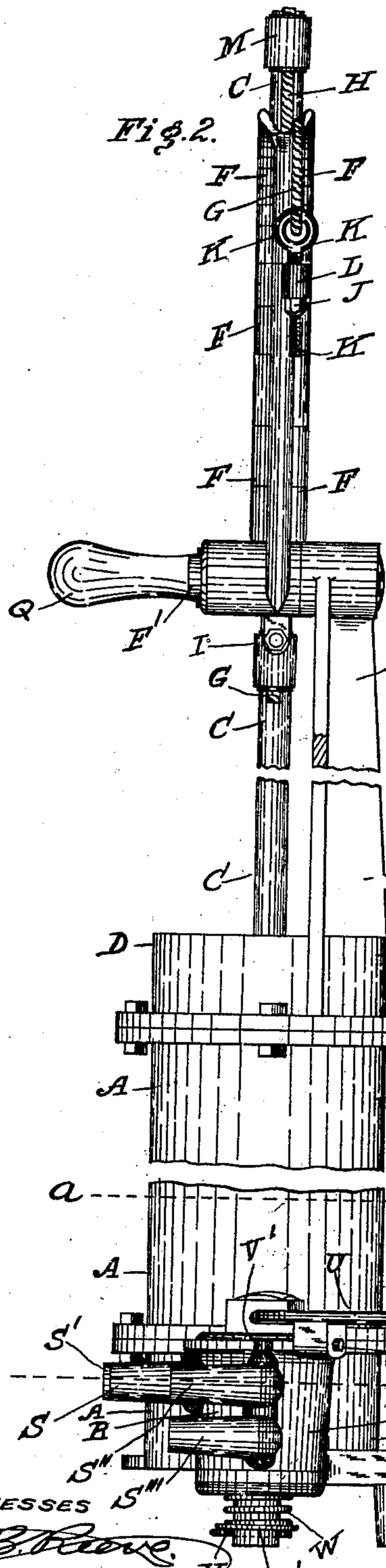


Fig. 4.

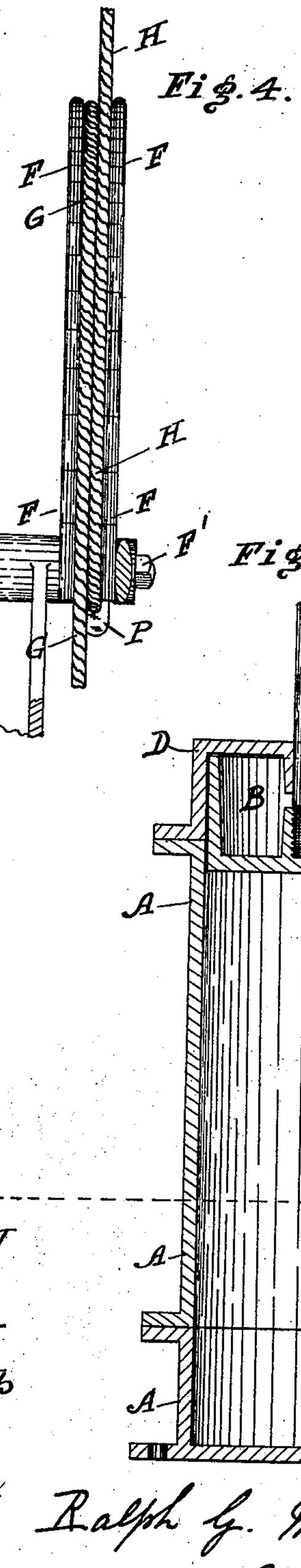
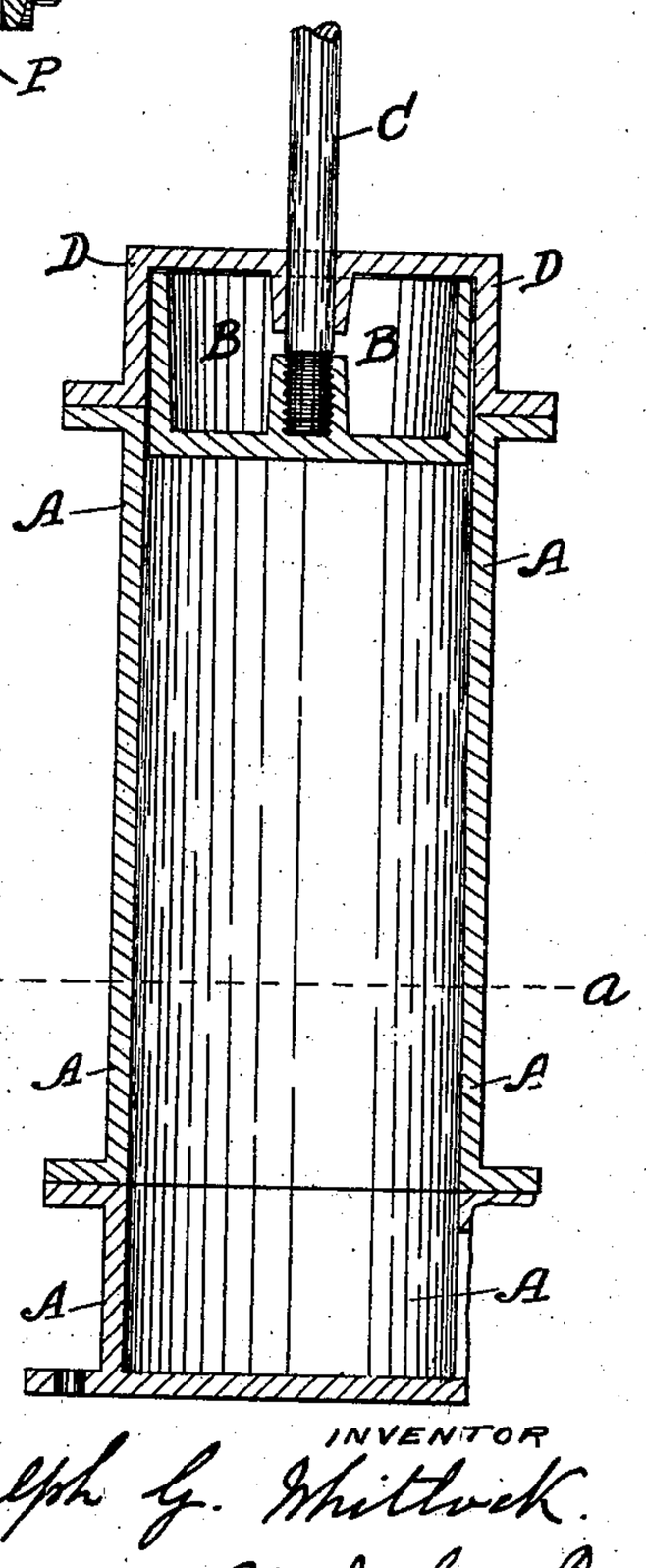


Fig. 3.



WITNESSES

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(Application filed Jan. 24, 1902.)

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3 Sheets—Sheet 3.

Fig. 6.

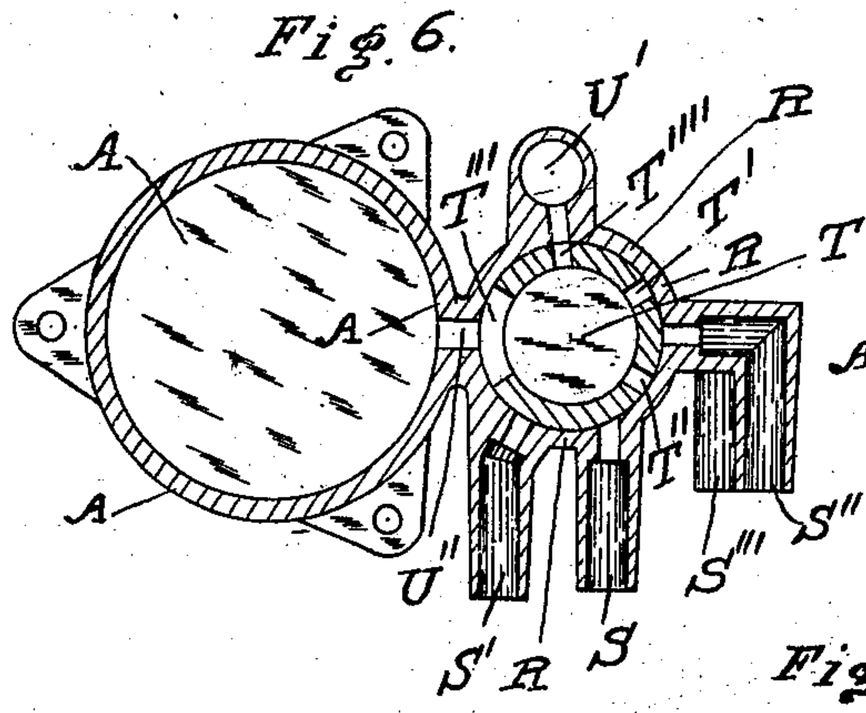


Fig. 5.

Fig. 7

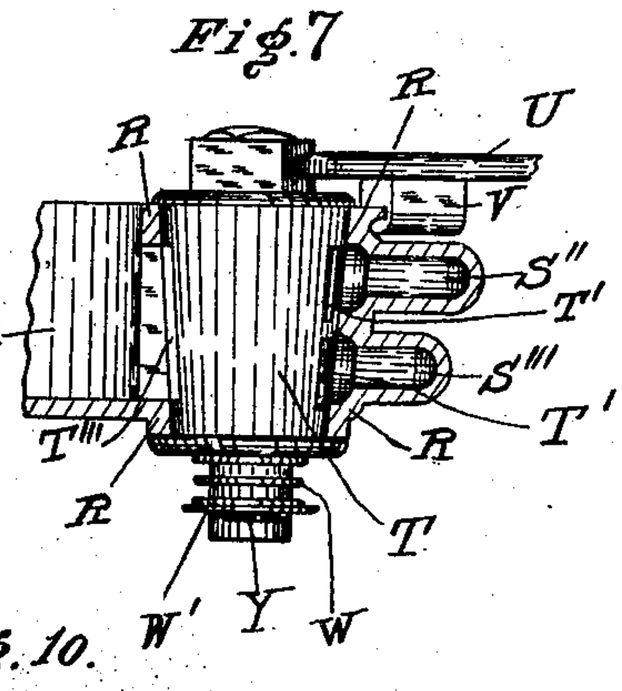
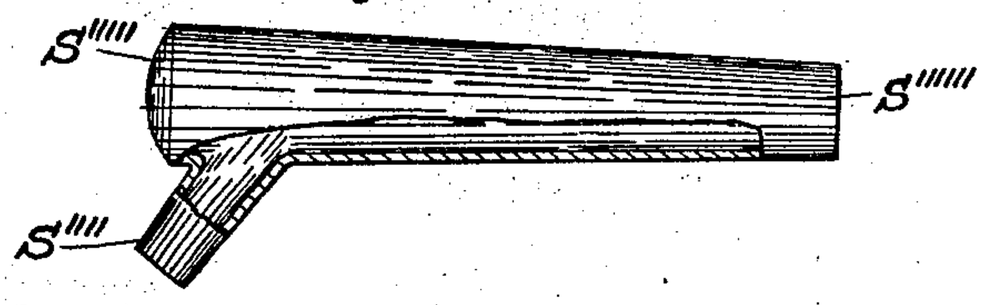


Fig. 10.



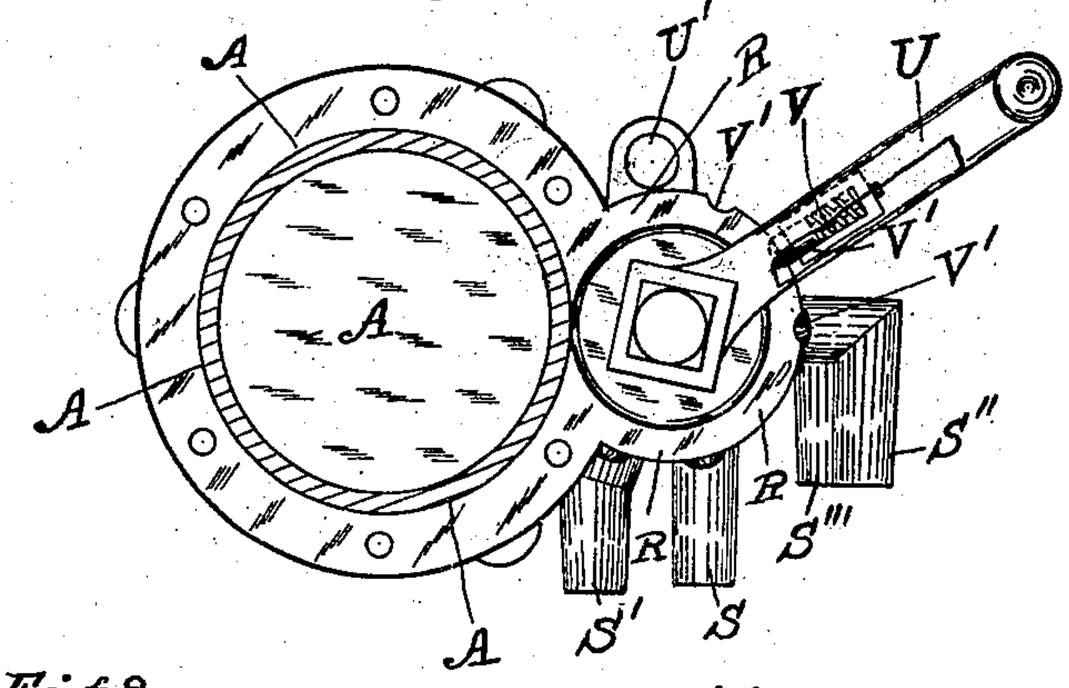


Fig. 9.

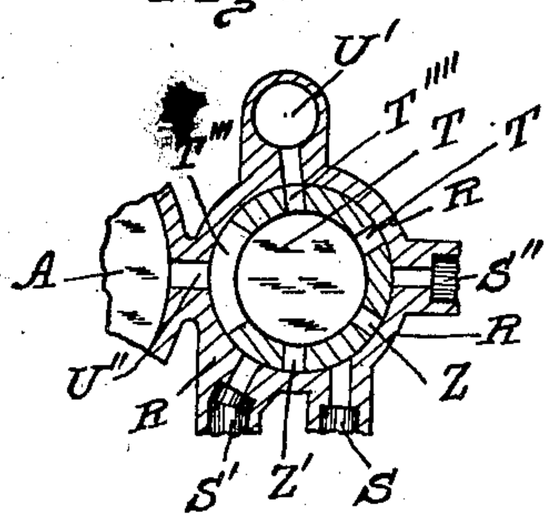
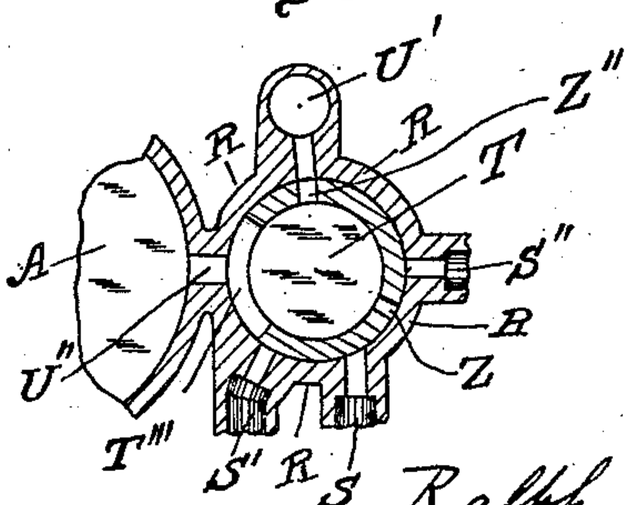


Fig. 8



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UNITED STATES PATENT OFFICE.

RALPH G. WHITLOCK, OF LOS ANGELES, CALIFORNIA.

PUMP FOR MEASURING, MIXING, BLENDING, OR DILUTING LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 712,164, dated October 28, 1902.

Application filed January 24, 1902. Serial No. 91,076. (No model.)

To all whom it may concern:

Be it known that I, RALPH G. WHITLOCK, of the city of Los Angeles, in the county of Los Angeles and State of California, have invented a certain new or Improved Pump for Measuring, Mixing, Blending, or Diluting Liquids, which may be used for other pumping operations, of which the following is a full, clear, and exact description or specification, reference being had to the annexed sheets of drawings and to the letters marked thereon.

My said invention, which relates to pumps especially applicable for measuring, mixing, blending, or diluting liquors, may also be used for pumping liquors from any container or vessel into any other container or vessel.

The essential feature of my said invention consists in the arrangement of the ports in a plug or valve casing forming part of my pumping mechanism and in the ports in the interchangeable rotatable hollow plugs or valves contained and operated within said plug or valve casing, whereby it results that that opening in any of the plugs or valves whereby liquid passes into or out of the pump barrel or cylinder is always open, so that there is free and unobstructed passage at all times between the pump barrel or cylinder and the interior hollow space of the plugs or valves, and this irrespective of whether the other ports in the plugs or valves are open to either one or more of the ports in the plug or valve casing through which liquid is drawn into the pump or whether these ports are shut to the ports in the plug or valve casing and open to the discharge-port therein. The ports in the casing are or may be of such number as is necessary to admit into a pump the maximum number of liquids which are to be measured, mixed, blended, or diluted, and the number of ports in a plug or valve is such as to admit either such maximum number of liquids or any desired less number of liquids (than the number of ports in the plug or valve casing) to be measured, mixed, blended, or diluted in order to produce any definite proportion of measuring, mixing, blending, or diluting of said liquids, so that while the plug or valve casing is adapted for its ports being connected by means of flexible pipes, such as rubber hose-pipes, or by pipes of any other suitable kind, with any desired number of casks or other vessels containing liquids which are to be measured, mixed, blended, or diluted, yet the plugs or valves which operate in this plug or valve casing are constructed with ports which are so placed in the plugs or valves that these ports in the plugs or valves may be of such number that they may open to the maximum number of ports in the plug-casing or to any less number than the maximum number of ports in the plug-casing. Thus it follows that when my new or improved pump is used for measuring, mixing, blending, or diluting a very varied number of liquors—that is to say, in different numbers of the liquors to be measured, mixed, blended, or diluted—then it is necessary for the pumping apparatus to be provided with a sufficient number of such plugs or valves each having the number of ports corresponding to the number of liquids to be mixed or blended; but the port in every plug or valve which opens to the pump-port is large enough to maintain free or unobstructed connection between the pump and the interior hollow or space of the plug or valve whereinto all the ports in the plug or valve open, so that liquid passing through the several ports in the plug or valve from the casks or barrels through which such liquids are drawn can flow freely into the pump barrel or cylinder during the pumping stroke of the piston or plunger therein, and the moment that a valve-plug is turned or moved in the casing, so as to close the ports leading to the casks or barrels and to open the discharge-port, then this port in the hollow of any of the plugs or valves as freely and unobstructedly connects the interior of the pump barrel or cylinder with the discharge-port of the pump.

It is to be understood that the sizes of the ports in the plug connecting with the casks or barrels from which liquids to be measured, mixed, blended, or diluted are such as may be required to allow any desired proportion of each liquid to be drawn into the pump.

In using the pump constituting my invention for measuring, mixing, blending, or diluting corrosive liquids the pump barrel or cylinder, the piston or plunger, and the plug-

casing, with the several ports forming part thereof, are by preference made of aluminium, as being a non-corrosive or but very slightly corrosive metal and in order that the plug or valve may operate easily and without cutting the receptacle in the plug-casing wherein it operates.

On the annexed sheets of drawings, Figure 1 is a side elevation of my new or improved pump for measuring, mixing, blending, or diluting liquors. Fig. 2 is an end elevation of my said pump looked at in the direction of the arrow marked X on the right-hand side of Fig. 1. Fig. 3 is a section of the pump barrel or cylinder with the piston and piston-rod therein. Fig. 4 is an edge elevation of the cable-quadrant for operating the piston or plunger of the pump, as hereinafter described. Fig. 5 is a horizontal section of the pump-barrel on the line *a a*, Figs. 1, 2, and 3, and showing the plug or valve casing, a tapered plug or valve, and the nozzles connecting with the ports in the tapered plug. Fig. 6 is a horizontal section through the cylinder and through the tapered plug or valve casing, through the tapered plug or valve itself, and through three of the nozzles for connecting barrels, casks, or other receptacles containing liquid with the pump, the tapered plug or valve in this case having its ports arranged for connecting with three of the ports in the casing, to which the nozzles thereof are connected by flexible rubber hose or equivalent pipes. Fig. 7 is a vertical section through the casing, showing the connection of the ports in the tapered plug or valve with two inlet ports and nozzles, also the port connecting the whole interior of the tapered plug with the bottom of the pump barrel or cylinder and the discharge-port. Fig. 8 is a horizontal section of part of the pump-barrel and having the tapered plug or valve constructed with but one port therein for the purpose of drawing or pumping one liquid at a time from any barrel or receptacle and for discharging it measured into any other barrel or receptacle. Fig. 9 is a similar horizontal section to Fig. 8, but shown as containing a tapered plug or valve with ports therein for connecting with three of the ports in the casing for measuring and mixing three liquids at a time. Fig. 10 is an elevation, partly in section, for connecting the pump with the casks or receptacles from which liquids are pumped for being measured, blended, or diluted.

As shown by Figs. 1, 2, and 3 more especially, my new or improved pump consists of a cylinder marked A, whereinto is fitted a piston B, more especially shown in section at Fig. 3. This piston B is screwed onto the lower end of the piston-rod C in the manner also shown at Fig. 3—that is to say, the piston-rod C does not project through the piston B, but instead thereof the lower end and the entire piston-rod C are maintained always out of contact with the liquid or liquids passing through the pump barrel or cylinder A in order to prevent any corrosive liquid or liquids which may be passed through the pump-barrel A from coming into contact with any part of the piston-rod C. The pump barrel or cylinder A and the piston or plunger B, besides all the other parts with which the liquid or liquids passed through the pump come into contact, are constructed of aluminium or other non-corrosive metal or material, so that no chemical action whatever can take place between the material of which the interior parts of the pump are constructed and the liquid or liquids passed through the pump, from which arrangement it follows that the liquid or liquids is or are discharged from the pump either measured in their normal condition—that is to say, when not mixed, blended, or diluted—or in their chemically-pure condition when measured, mixed, blended, or diluted. The piston B of the pump is so operated that its action completely fills and completely discharges the whole of the liquid taken into the pump-barrel A at every stroke thereof, and as the pump-barrel A is of such dimension as to contain an exact measured quantity of liquid—say, for example, a gallon or less or more than a gallon—it follows that my new or improved pump is also a measuring device for the quantity of liquid passed through it, which is always ascertained by counting the number of strokes of the pump in one direction only. For example, if the upward stroke of my new or improved pump causes one gallon of liquid to be taken into the pump barrel or cylinder A, then any number of such strokes will cause that number of gallons to be passed into the pump barrel or cylinder and discharged by the opposite strokes of the piston into any receptacle whereinto the same may be delivered.

The upper part or cover D of the pump-barrel or cylinder A may be constructed of cast iron or other sufficiently strong material, and from one side thereof there projects the inclined arm E, upon the upper outer end of which there is pivotally carried the cable-quadrant F F, movable upon the pivot F′. As shown at Figs. 1, 2, and 4, two short lengths of cable or rope (marked G and H, respectively) connect this cable-quadrant F F with the piston-rod C in the manner now to be described.

The lower end of the cable G is fastened into the clench I, Figs. 1 and 2, and the upper end of the cable G is fastened to the vertical rear part by the clench adjustable nut and eyebolt J and K, Fig. 1, the eyebolt K passing through the hole in the lug L, as shown in this figure. The cable H is fastened to the clench M at the upper part of the piston-rod C C, as shown at Figs. 1 and 2, and to the lower part of the cable-quadrant F F by means of a nut and eyebolt N and O, respectively, the eyebolt O passing through the lug P, as shown. By means of this arrangement and connections of the cable-quadrant F, the cables G and H, and the piston-rod C as the

cable-quadrant F F is moved pivotally upon its pivot F′ by the operator either pressing downward or lifting upward the handle Q, so the piston-rod C and its piston B B are reciprocated completely within the pump barrel or cylinder A A through each upward or downward stroke of the piston-rod C and its piston D.

At one side of the lower part of the pump barrel or cylinder A the plug or valve casing R projects, as shown at Figs. 1 and 2, and this casing R is by preference cast in one piece with the lower part of the pump barrel or cylinder A. The construction of this casing is obvious from the drawings, wherein four nozzles S S′ S″ S‴ are shown projecting from the outer part of the casing R in the positions indicated on the drawings, and each of these nozzles S S′ S″ S‴ is tapered from its rear toward the outer end thereof in order to admit of a piece of rubber hose or equivalent flexible pipe to be pushed tight on the nozzles S S′ S″ S‴, respectively, while the other or outer end of such india-rubber hose or flexible pipe is connected to the nozzle S⁗ of the tapered connector S⁗′, which is driven into a hole in each barrel, cask, or other receptacle from which liquid is to be drawn into the pump. The barrels or other receptacles from which liquid is pumped when using my invention must always be placed upon such a level relatively with the pump that the pipes connecting the nozzles S S′ S″ S‴ thereto never have any air in them, which condition is insured by placing the pump on a lower level than the barrels or receptacles, so that a column of liquid always presses down into the pump apparatus. The tapered plug or valve (marked T in the drawings) is formed with a square projection at its upper end, upon which the operating-handle U, Figs. 1, 2, 5, and 6, fits. This operating-handle is provided at its under side with a strong yielding catch device, (marked V,) the inner end of which engages with either of the holes V′ V′ V′, cut into the periphery of the upper part of the casing R of the taper plug, as more particularly shown at Fig. 5, and the plug or valve T is maintained in its operative condition in the casing R by means of the pulling action of the spiral spring W, Figs. 1, 2, and 7, which, acting downward upon the washer W′, held on the bottom of the tapered plug T by the split pin Y, always maintains the tapered plug or valve T held downward into its operative position within the casing R.

According to the numbers expressing any part of admixture, blending, or dilution of a liquid, so the ports for admitting said liquids from pipes connected to the nozzles S S′ S″ S‴ are varied in their number and positions in the tapered plug or valve T, and in order to illustrate such variations I have shown in Figs. 6 and 7 the arrangements of the ports in the tapered plug or valve T to enable any two liquids to be admixed in the proportion of one part of one liquid to two parts of another liquid. For convenience I will assume for this part of my present specification that the liquid to be admixed or blended or diluted is vinegar and that it is mixed or blended with or diluted by water in the proportion of two parts of water to one part of vinegar. The nozzles S″ and S‴ are connected to a water-tank or other vessel containing the water to be used for measuring, mixing, blending, or diluting vinegar, and the nozzle S is that through which the vinegar is admitted into the apparatus constituting my invention in the position of the tapered plug or valve T. (Shown at Figs. 6 and 7.) The ports T′ therein, which connect with the water-nozzles S″ and S‴, and the port T″, which connects with the vinegar-port S, are both shown as shut off from the nozzles S″, S‴, and S, respectively, which position of the tapered plug or valve T and its ports T′ and T″ correspond with the pump, being in the condition of having the pump barrel or cylinder filled with water and vinegar measured, mixed, blended, or diluted in the proportions now last described, and when the tapered plug or valve T is in the position shown at Figs. 6 and 7 then the liquid in the pump barrel or cylinder A is in direct or unobstructed communication with the discharge orifice or nozzle U′. By reason of the plug or valve T being in the position when its large port (marked T‴) is open to the interior of the pump barrel or cylinder A, through the permanent opening therein, (marked U″,) and in which position the port T⁗ in the tapered plug T is also open to the discharge-nozzle U′, it follows that on making the downward stroke of the piston-rod C and piston B B all the liquid contained within the pump barrel or cylinder A is discharged through the port U″, through the port T‴, through the port T⁗, and into the discharge-nozzle U′, and when the discharge has thus been completed then the tapered plug or valve T is turned around by the handle U through an eighth of a circle, which brings the ports T′ in connection with the nozzles S″ and S‴ and the port T″ in connection with the nozzle S, at the same time closing the discharge-port T⁗, while because of the port T‴ being sufficiently long horizontally it still remains open to the port U″ in the pump barrel or cylinder A, in which position of the tapered plug U and its several ports in relation to the nozzles S, S′, S″, and S‴ the pump is in readiness for being again filled with the liquids being measured, mixed, blended, or diluted by making another upward stroke of the piston or plunger B in the manner hereinbefore described.

When it is desired to measure, mix, blend, or dilute any two liquids in the proportion of half of each, then a plug with ports therein arranged in the manner shown in horizontal section at Fig. 9 is used. In this Fig. 9, the tapered plug T is shown in the position of

its larger port T''' open to the port U'' of the pump barrel or cylinder A and its port T'''' open to the discharge port or nozzle U', or, in other words, in the position which the ports in the plug T occupy with relation to the port U'' in the pump barrel or cylinder A and the discharge-nozzle U' when the pump barrel or cylinder A is filled with mixed, blended, or diluted liquid and ready to be discharged. By turning the tapered plug T until its ports T' become open to the water-nozzles S'' and S''' then the ports Z Z' in the tapered plug T (shown at Fig. 9) simultaneously become open to the ports S S', through which the vinegar, spirit, or other liquor to be diluted with water is drawn simultaneously with the water through the ports T', which open to both the nozzles S'' S''' until the pump barrel or cylinder A is filled with liquid mixed, blended, or diluted in the proportions of half and half, and from which such liquid is discharged by turning the plug T back into the position shown at Fig. 9.

When it is desired to use the pump not as a mixing, blending, or diluting apparatus, then the plug T is formed with but one port Z therein, as shown at Fig. 8, when liquid passes into the port through either of the nozzles S or S', as may be desired, and is discharged through the discharge orifice or nozzle U' by moving the plug T circularly or upon its vertical axis until its port Z becomes shut to the nozzle S and its other port Z'' becomes open to the discharge-port U'.

It is to be understood that although I have on the annexed drawings shown and in the preceding part of this specification have described my new or improved mixing, blending, or diluting pump as having but four nozzles S S' S'' S''' my improved pump may be provided with a greater or less number of such nozzles than four and that the ports or openings in the plug or valve T are in all cases made to correspond with the number of proportions wherein the liquids to be mixed, blended, or diluted, and that my present invention consists within such modifications of what I have shown and described as is consistent with the claims hereinafter set forth.

Having now described the nature of my said invention and the best system, mode, or manner I am at present acquainted with for carrying the same into practical effect, I desire to observe in conclusion that what I consider novel and original is—

1. In a pump for measuring or mixing liquids, a pump-barrel provided with a seat for interchangeable plugs or valves, admission-ports in said plugs or valves, nozzles on the valve-seat, one of the ports in each of the interchangeable plugs or valves being always open to the pump-barrel, the other ports in the interchangeable plugs or valves being open or closed to the desired number of nozzles of the plug or valve seat or casing, and which plugs or valves are moved by hand to close the discharge-port when the drawing stroke of the piston is being made, and to open the discharge-port while closing the admission-ports when the discharge-stroke of the piston is being made, all substantially as hereinbefore described.

2. The combination constituting my new or improved measuring, mixing, blending or diluting pump consisting of the barrel or cylinder, the cylinder-head carrying an arm, the cable-quadrant pivoted to said arm, the cables connecting the quadrant with the piston-rod, the piston-rod and piston or plunger, the permanently-open port in the barrel or cylinder, the interchangeable plugs or valves with ports for opening and closing the liquid-passages to and from the casks or other receptacles containing the liquids to be measured, mixed, blended, or diluted and for opening or closing the discharge-port, the discharge-port, the port in the valve or plug always open to the pump barrel or cylinder and the handles for actuating the pumping apparatus or mechanism, all operating together in the manner and for the purposes substantially as hereinbefore described.

3. The plug or valve casing or seat, wherein there are nozzles for coupling to pipes which lead into vessels containing liquids to be measured either unmixed or mixed, wherein also there is one of a series of interchangeable plugs or valves, each such plug or valve having one port always open to the pump-barrel, each such plug having also other ports open into one or more of the nozzles to which the coupling-pipes are attached, and having also a port for opening or closing the discharge-passage of the plug or valve casing, the pump-barrel to which said casing is attached in order that by operating the pump any required measuring of one liquid, or measuring of two or more liquids may be effected substantially as hereinbefore described.

In testimony whereof I have hereunto set my hand and seal, this 16th day of January, A. D. 1902, in the presence of two subscribing witnesses.

RALPH G. WHITLOCK. [L. S.]

Witnesses:

ST. JOHN DAY,

HADASSAH DAY.