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W. T. MESSINGER.

FLUID DISCHARGING APPARATUS.

(Application filed Apr. 3, 1899.)

(No Model.)

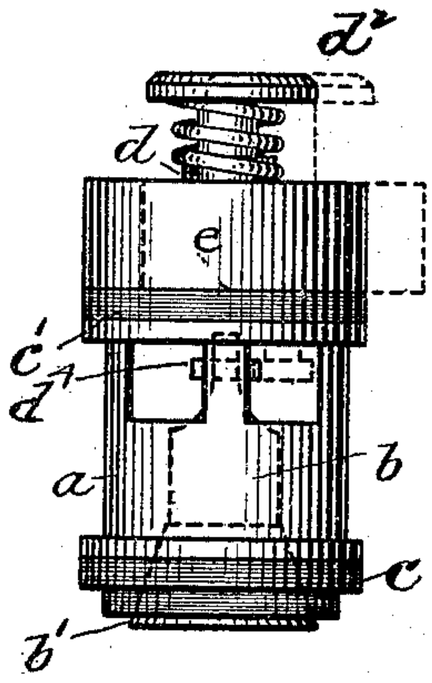

Fig. 2.

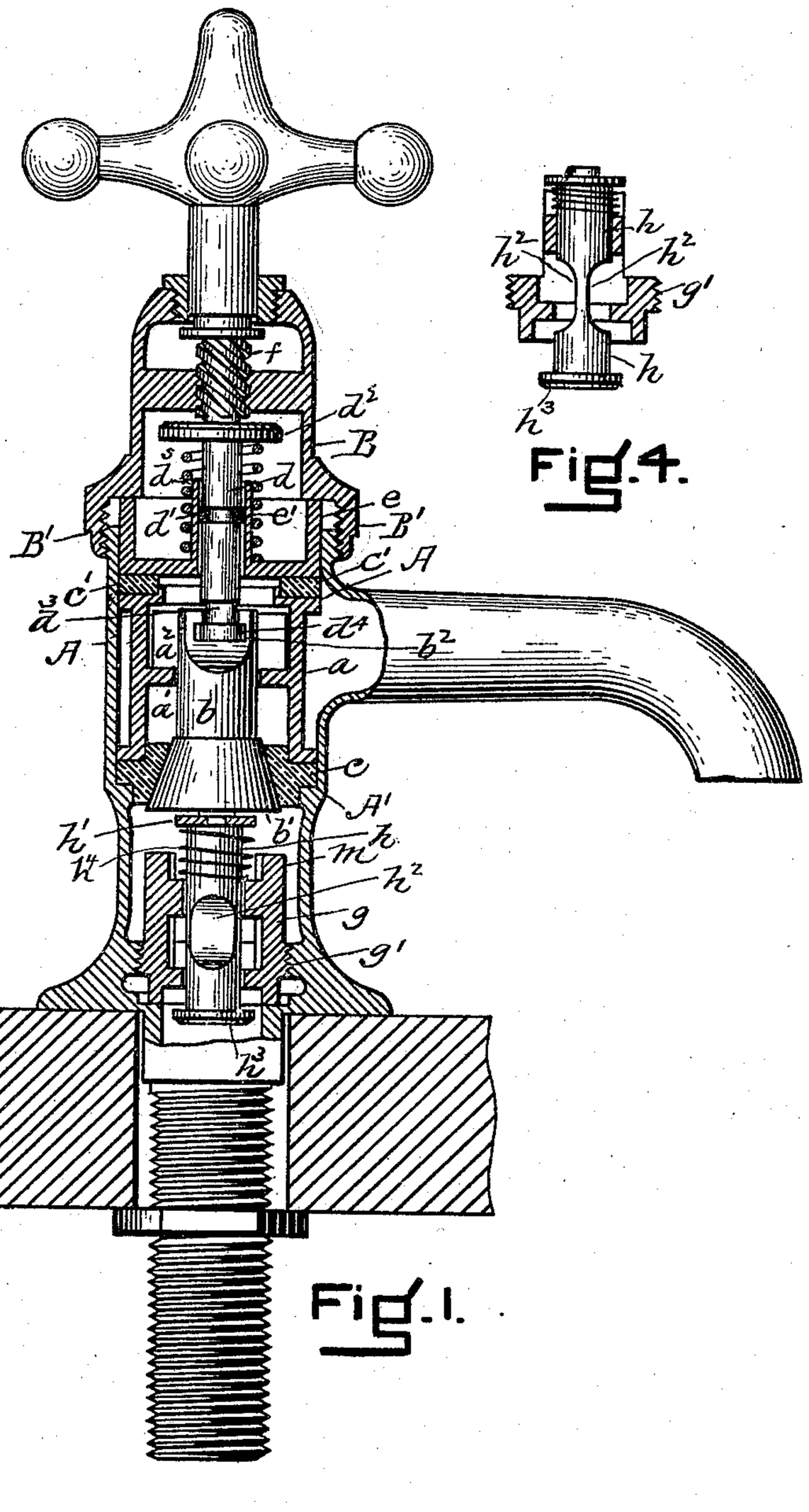

Fig. 4.

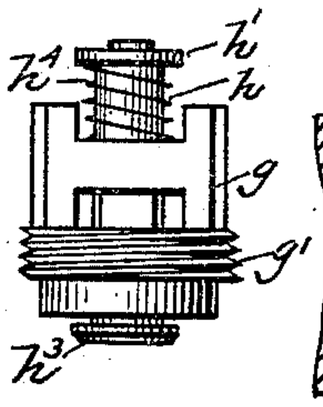

Fig. 3.

Fig. 1.

WITNESSES

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WILLIAM T. MESSINGER, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE MESSINGER-HALL MANUFACTURING COMPANY, OF SAME PLACE.

FLUID-DISCHARGING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 638,974, dated December 12, 1899.

Application filed April 3, 1899. Serial No. 711,492. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM T. MESSINGER, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Fluid-Discharging Apparatus, of which the following is a specification.

My present invention relates to certain improvements which I have made more particularly to my former patent, No. 517,550, dated April 3, 1894, but is not confined to a construction such as shown in that patent. The particular improvements which I have made and will hereinafter explain appertain to simplicity of construction, reliability of operation, and more effectually preventing what is called "water-hammer" in this class of articles. In previous attempts to overcome the pounding or "water-hammer," as it is called, various devices have been made, but as far as my information extends have not been entirely effectual for the purpose.

Referring to the drawings, like letters of reference indicating corresponding parts, Figure 1 is a sectional elevation of my present device. Fig. 2 is a side elevation of the main valve. Fig. 3 is a side elevation of the auxiliary valve. Fig. 4 represents the auxiliary valve in section.

My present device embodies a coöperative action of two separate valves, and, furthermore, the parts of each valve are so constructed as to be substantially independent of each other, thereby insuring against the wearing of the parts to interfere with the practical and continued operation desired to be obtained.

In the drawings, A represents the shell or body of the faucet; B, the upper section of the shell, which is secured to the main body A by the thread B'. The main valve is represented by b' and its stem by b. This valve is supported by the annular frame a, which by a cross-section furnishes a support to the said valve-stem. This frame a rests upon the shoulder A', which is formed upon the interior of the shell. Beneath the frame a or upon its lower end is placed the packing-ring c. This forms a water-tight cushion for the frame a and also secures a valve-seat for the main valve b'. Upon the upper end of frame a is placed another packing-ring c'. On the top of this is placed the annular piece e, the bottom resting upon the top of the packing c'. This piece is formed to exactly fit the interior of the shell, and it is also formed cup-shaped—that is, with the interior projection e', through which passes the short piston or stem d, which is connected at its lower end d^4 with the top of the main-valve stem, as shown in Figs. 1 and 2. This projection e' of the piece e supports the said piston d and also the spiral spring d^5, which is placed around it and under the cap of said piston d and which is indicated by d^2. Above this part already described is placed the usual screw or threaded stem f for operating the valve mechanism, as will hereinafter be more particularly described. Any of the well-known means for operating a valve-faucet from the top, as by screw or cam or levers, may be employed in this construction. The auxiliary valve is placed near the bottom within the shell A, as shown in Fig. 1, h^3 being the valve proper and h representing the stem. h' represents the cap upon the top of the stem. This valve and stem are supported by the frame g, which is screwed into the lower part of the shell, as shown at g'. This valve is also provided with the spring h^4, which rests upon the upper part of the frame g and beneath the cap-piece h'. Fig. 4 represents the method of forming the valve-stem h, it having the sides h^2 hollowed out for the purpose of admitting the fluid to the chamber above. It will thus be seen that in this device we have simply the main shell A, with its top B; that the lower valve and its frame are secured within the bottom of the shell; that above this, supported and properly packed, is the main valve; above the frame supporting the main valve is placed the operative parts for moving the valve mechanism; the interior of the shell is plain, inexpensive to make, and cannot easily get out of repair.

Having now explained the general parts of the invention, I will describe its mode of operation.

When the threaded screw f is turned down upon the head or cap d^2 of the piston d, it is of course depressed, and the valve b' is open downward. The bottom of this valve rests

upon the top of the cap h' of the valve-stem h of the secondary valve. The downward movement of the main valve consequently depresses the secondary valve h^3, and part h^2, which is cut out of the body of the stem h, is forced downward, so that the fluid from beneath can pass up and enter the chamber above. This will be understood by reference to Fig. 4. The fluid passing upward will enter the chamber formed in the frame a and will be discharged through the lateral openings a^2 in said frame to the spout or delivery. It will be observed that the fluid surrounding the main-valve stem b within the chamber and within the shell cannot flow upward on account of the packing-ring c', which exactly fits the interior surface of the annular shell. In order to prevent any fluid passing upward by the side of the piston d, I form midway of its length a depression for the packing of the stem, which is represented in Fig. 1 by d'. It will be observed also that in the movement of this piston d the packing-ring d' will always be within the raised projection e' of the cup part e. When the threaded screw f is released, it will be thrown upward by the pressure of the spring d^5 and the main valve b' will be forced into position, the pressure of the water upon the bottom of the valve b' also aiding its closing. As the upper valve is closed, the auxiliary valve h^3, with its stem h, ascends, but does not entirely close. Thus the pressure is equalized throughout the shell, and the fluid serves as a cushion to the operation of the two valves in connection with each other. As there is no jar or shock when the main valve is closed, there is no noise or pounding or water-hammer, and the wearing of the parts is thereby prevented.

In case it is necessary to take the main valve from the shell at any time it can readily be done without turning off the water from the pipe or in any manner lessening the pressure, for it is obvious that when the top of the shell B is removed from the main shell A the frame a and all the contiguous parts can be readily removed through the top. When this is done, the auxiliary valve will be released and will be thrown upward by the force of the water as well as by the spiral spring h^4, which is usually used in connection with it, and the flow of fluid will be at once stopped. When the main valve and parts are replaced, the original condition and relation of the two valves to each other and to the operation of the whole device will be at once resumed.

For convenience the piston d is formed at its lower end as shown in Figs. 1 and 2, and the upper end of the main-valve stem b is also formed as represented in said figures. The lower part of the piston, as represented by d^4, slides in and is hooked or locked to the top of stem b. When the frame a and the contiguous parts are removed from the shell, the lower end of the piston d can be readily unhooked and taken out through the cup-ring e. The opening through the upper end of the frame a is made considerably larger than the diameter of the piston d. Consequently when it is desired to attach the parts together the piston d is placed in the cup part e and is hooked upon the top of the valve-stem b, sufficient lateral movement of the cup part e being allowed by the opening in the top of frame a. After being connected together the cup part e is brought directly in line with the outside of the frame a and its packing c' and is held firmly in place within the shell. The upper part of the shell B by its shoulder presses upon the cup part e and forces it tightly against the packing c', which is placed upon the top of the annular frame a. Thus all of the parts are firmly held in place and a perfect fluid-tight separation is made between the frame a and the upper part of the interior of the shell. The method of attaching these parts together is represented in Fig. 2, the dotted line on the right representing the movement of the cup part e upon the packing c' in the act of hooking or securing the lower end of the stem d to the top of the main-valve stem b. Of course the valve-stem b and the piston d might be made of one piece of metal. If this were done, it would be necessary to provide some means for removing the cap d^2 in order to take the valve and stem out of its frame. For convenience of use I prefer the form represented in the drawings. It is also preferable because by this means all the parts are securely locked together and held without the aid of screws or screw-threads of any kind, and consequently the parts are positive in their action and cannot become loose by use or wear.

As heretofore suggested, in this construction the lower valve operates to partially cut off the supply of water to the upper or main valve, so that in the closing of the same the direct pressure is greatly decreased by the operation of the lower valve. The construction of the main valve also aids in its coming to its seat gradually instead of with a shock, as in the usual constructions for this purpose. The combination, with the main-valve chamber, of the packing-disk d' is so constructed as to afford a guide for the motive stem or piston d and no water or fluid can pass above the main-valve chamber, thereby avoiding the escape of any fluid into the passages above the valve-chamber and obviating the necessity of any stuffing-box or packing around the actuating-stem of the apparatus. This is an important part of my present invention. In the construction shown in the drawings the lower or auxiliary valve consists of a plug or frame g, provided with threads and adapted to screw into a partition in the bottom of the shell or chamber from which the fluid is to be discharged, as already stated, and said plug or frame is further provided with a passage through its center to admit the introduction of a valve-stem having the valve h^3 at its lower end,

the said valve-stem being so constructed as to allow the water to pass freely through the said plug or frame *g*. When the stem is pushed to its lower point, it will partially cut off the supply of water through said plug by its vertical upward movement, and will, further, totally cut off said supply through the plug when it has had its fullest movement. The valve-plug *g* thus performs two separate functions, the first being to relieve the pressure of fluid from the upper valve while it is in operation and the second to enable the upper valve to be removed from the shell absolutely for purposes of repair or cleaning, the lower valve then holding or retaining the passage of the fluid into the shell. The valve-stem is operated by the movement of the upper or main valve, which moves in the valve-seat of the principal-valve chamber, as already explained. The upper or main valve chamber, provided with the annulus *c*, adapted to engage the seat in the shell, is also constructed to form a conical valve-seat to engage with the conical valve *b'*, provided with its stem *b*, which passes upward through the center of said valve-chamber, the said valve-stem being provided with the lock or lug adapted to engage with a coöperating lock or lug in the end of the motive stem. The said valve-chamber is constructed with a partition, as shown in Fig. 1, the said partition dividing or separating the lower part of the valve-chamber *a'* from the upper a^2, through which the valve-stem operates, by which means the passing fluid is checked in its passage below said partition at the moment of the final closing of said valve, and the upper portion of said valve-chamber is provided with lateral ports a^2, by means of which free egress is afforded for the fluid passing from said valve-chamber. The upper portion of said valve chamber or frame *a* is furnished with a seat to receive suitable packing *c'*, adapted to prevent the passage of the fluid above said point outside the valve-chamber, and upon said packing rests the cup-shaped packing-disk *e*, adapted to be engaged by a coupling-nut formed by the union of shells A and B, between which coupling-nut and the seat in the shell the main-valve chamber is securely clamped. The said packing-disk *e* is further so constructed as to provide a passage for the actuating-stem, as shown, having a cylindrical passage through its center, in which said actuating-stem operates, said actuating stem or piston being maintained in its position by the spring interposed between the shoulder or cap at its top and the bottom of the cup-shaped packing-disk. It is obvious that when the stem of the conical valve is interlocked with the terminal of said actuating-stem the device is held firmly in said position and the movement downward of the actuating device will operate to open the valve from the main-valve chamber. The upper portion of the main-valve chamber affords sufficient space for the passage of the lock of the actuating-stem into said opening by lateral movement to engage with the lock in the valve-stem; but when returned to position thus locked the introduction of the combined devices into the cylinder of the shell renders impossible any lateral movement and consequently any unlocking of parts, as previously described.

I do not confine myself to the exact form of parts shown, as these may be modified without departing from the spirit of my invention.

Having now fully explained my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. The within-described discharging apparatus, consisting of the main shell A, the auxiliary shell B, the frame *a*, the main valve and stem *b*, *b'*, supported and moving in said frame *a*, and said frame also provided with the annulus-valve and packing attachment *c*, and the annulus at its upper end *c'*, the cup-shaped packing and supporting disk *e*, having the projecting part *e'*, the piston or actuating-stem *d*, provided with the packing-disk *d'*, midway of the length of the projection *e'* of the disk *e*, and having the cap-piece d^2 and the spring d^5; suitable means for actuating the said piston or stem *d*, vertically, and through it the valve *b'*; the auxiliary valve h^3, provided with its stem *h*, and having the depressions h^2, h^2; the frame *g*, secured to the lower end of the shell A, and supporting the valve h^3 and its stem *h*, the spring h^4; the said auxiliary valve adapted to be operated by the movements of the main valve, and all arranged and combined substantially as and for the purposes set forth.

2. In a device for discharging fluids, the combination with the shell, of the frame *a*, the annulus *c*, and *c'*, and the disk *e*, substantially as and for the purposes set forth.

3. In a device for discharging fluids, the combination of the cup-disk *e*, provided with the projecting part *e'*, and the actuating stem or piston *d*, provided with the packing-disk *d'*, substantially as and for the purposes set forth.

4. In a device for discharging fluids, the combination of the frame *a*, provided with the annulus and valve-packing *c*, and the annulus-packing *c'*, the valve *b'*, supported and seated in the said frame *a*, the cup-shaped packing and supporting disk *e*, the actuating-piston *d*, provided with the packing-disk *d'*, the said piston *d*, removably secured to the valve-stem *b*, all substantially as and for the purposes set forth.

5. In a device for discharging fluids, the combination with the shell, of a frame *a*, the annulus *c'*, the cup-disk *e*, the actuating-piston *d*, the packing-disk *d'*, arranged and adapted to prevent the flow of the fluid into the upper part of the shell, all substantially as and for the purposes set forth.

6. In a device for discharging fluids, the combination with the shell, of the frame *g*, the valve h^3, provided with the valve-stem *h*,

the said stem formed with the depressions h^2, h^2, and adapted to move and be supported by the said frame g, and having the cap h', and the spring h^4, all substantially as and for the purposes set forth.

7. In a device for discharging fluids, the combination of a main valve consisting of the valve parts b', the stem b, and the frame a, provided with the packing devices c, and c', the said valve adapted to be actuated by the piston d, having a suitable packing-disk d', and moving in and supported by the cup-disk e; with the auxiliary valve h^3, having the stem h, and the supporting-frame g, and arranged in connection with the said main valve so that when in position the auxiliary valve will be slightly opened, but will automatically close when the main valve and its connecting parts are removed from the shell, all substantially as and for the purposes set forth.

In testimony whereof I have affixed my signature, in presence of two witnesses, this 24th day of March, A. D. 1899.

WILLIAM T. MESSINGER.

Witnesses:
HAYES LONGEE,
H. M. HOLBROOK.