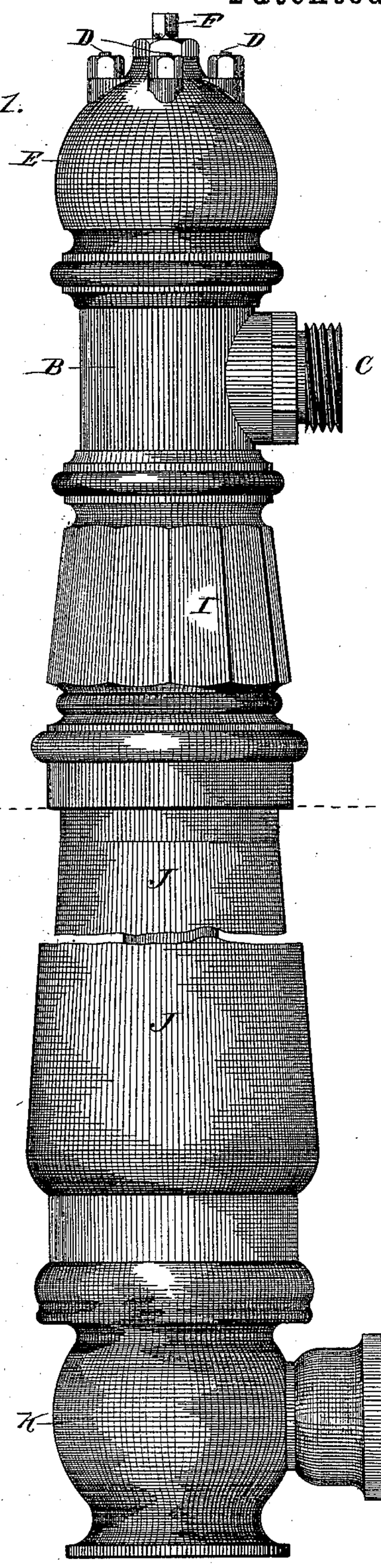
(No Model.) 3 Sheets—Sheet 1.

A. J. TYLER.

HYDRANT.

No. 402,115. Patented Apr. 23, 1889.

Fig. 1.



WITNESSES:

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Chas. A. Davis

INVENTOR

Aaron J. Tyler

BY

C. M. Alexander

ATTORNEY

(No Model.) 3 Sheets—Sheet 2.

A. J. TYLER.

HYDRANT.

No. 402,115. Patented Apr. 23, 1889.

Fig. 2.

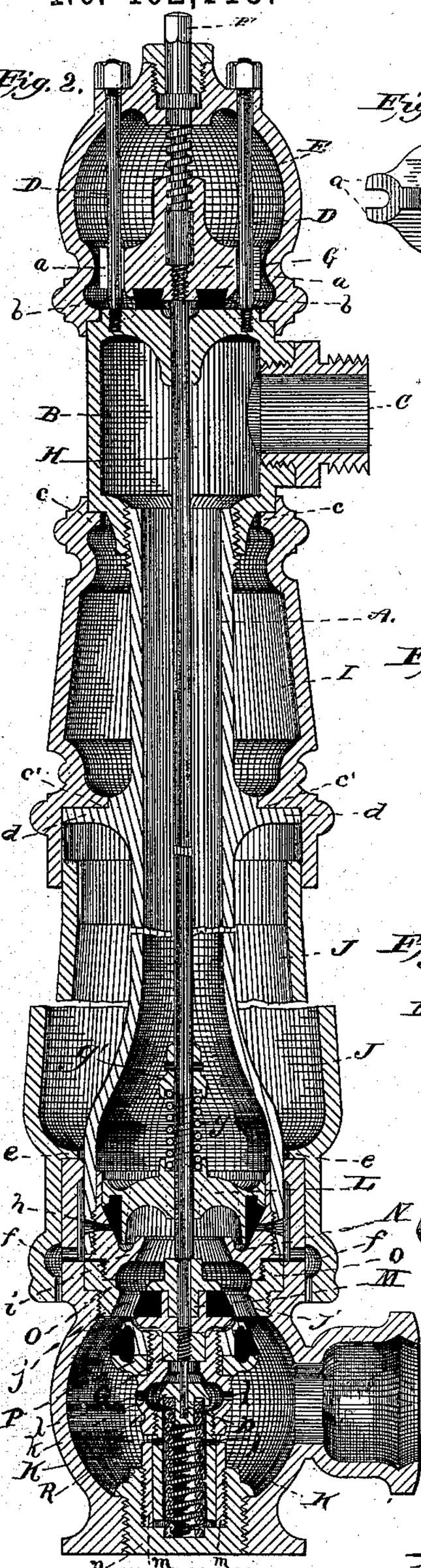


Fig. 4.

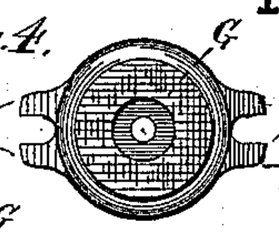


Fig. 5.

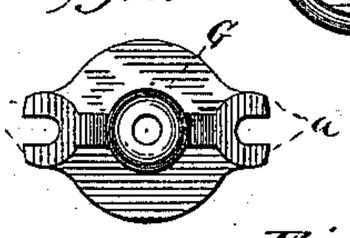


Fig. 6.

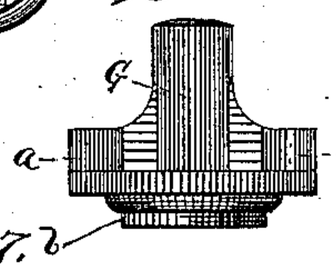


Fig. 7.

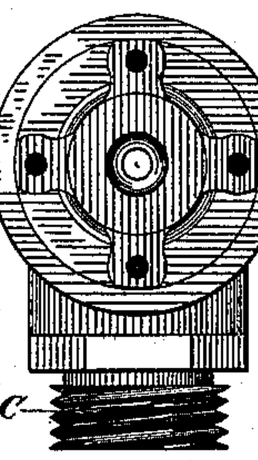


Fig. 8.

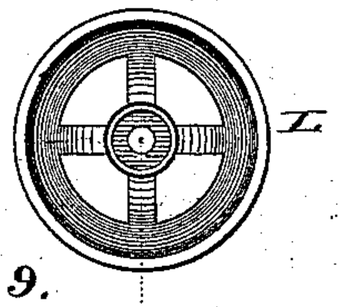


Fig. 9.

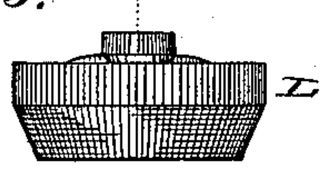


Fig. 10.

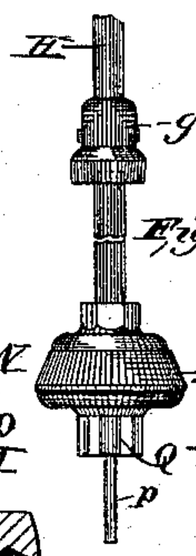


Fig. 11.

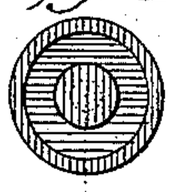


Fig. 12.

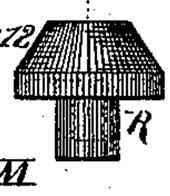


Fig. 13.

Fig. 14.

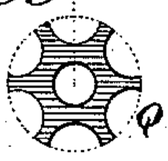


Fig. 15.

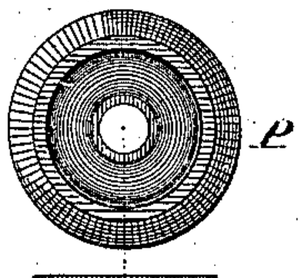


Fig. 16.

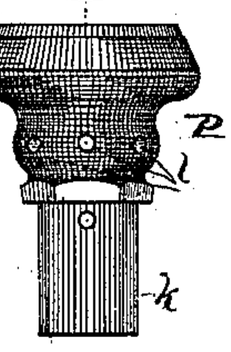
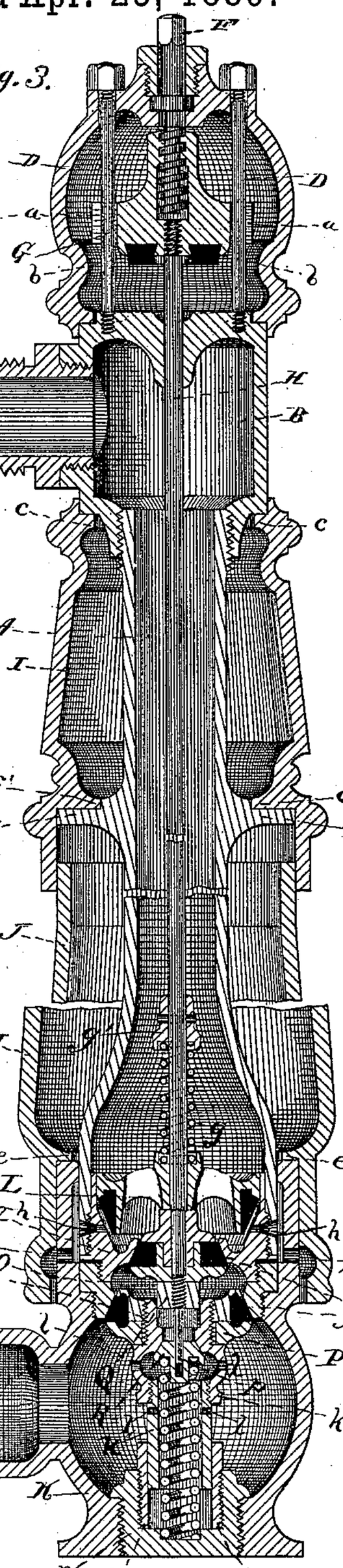


Fig. 3.



WITNESSES:

Jno. S. Finch Jr.

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(No Model.) 3 Sheets—Sheet 3.

A. J. TYLER.

HYDRANT.

No. 402,115. Patented Apr. 23, 1889.

Fig. 17.

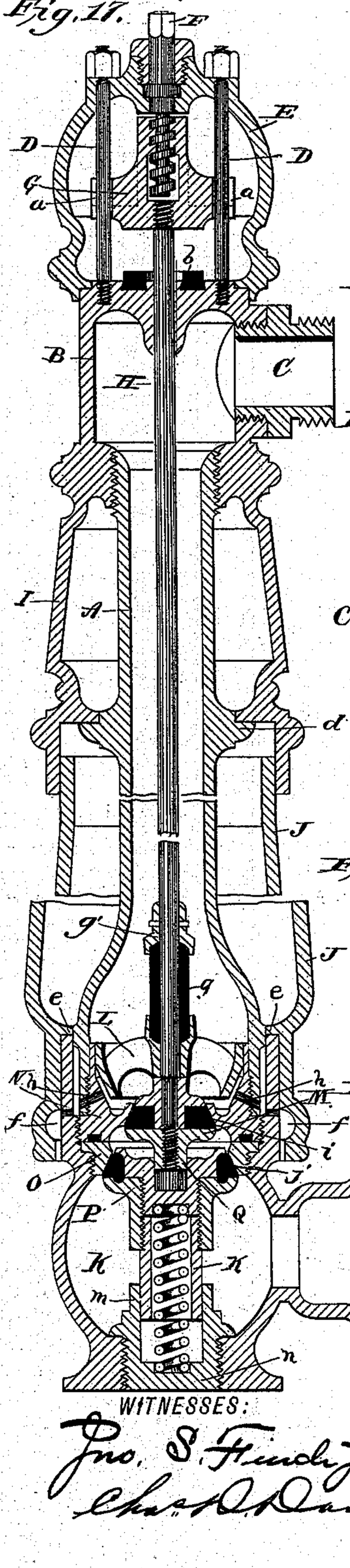


Fig. 18.

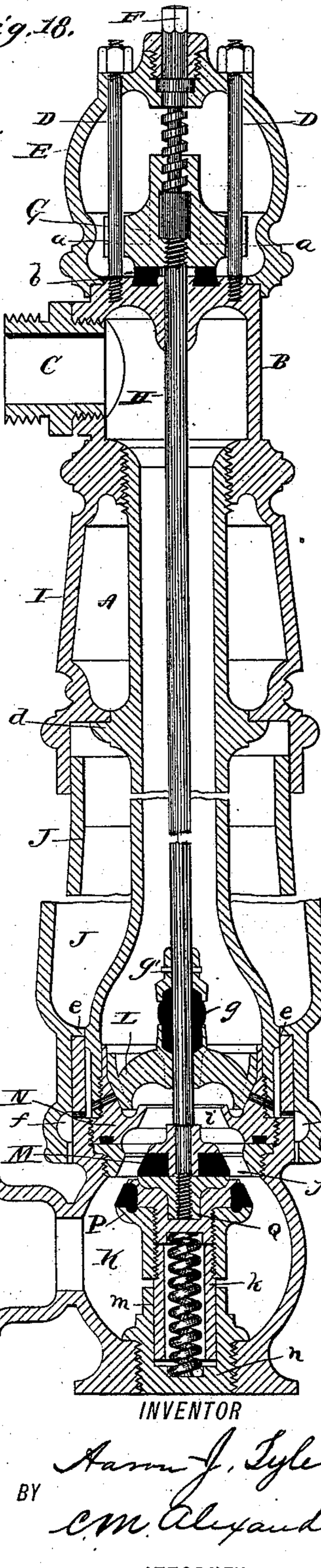


Fig. 19.

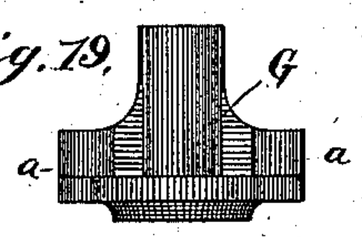


Fig. 20.

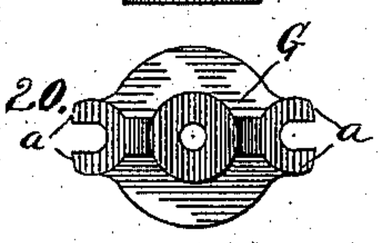


Fig. 21.

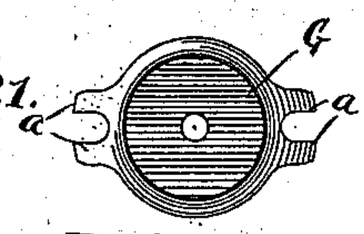


Fig. 22.

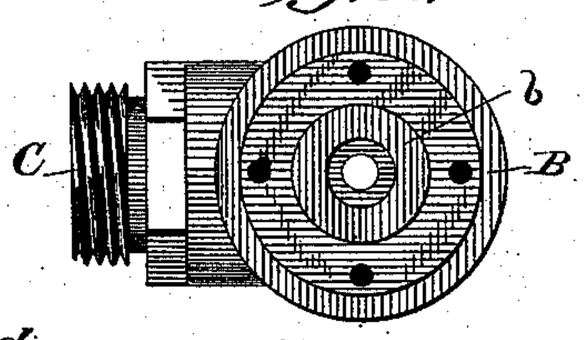


Fig. 23.

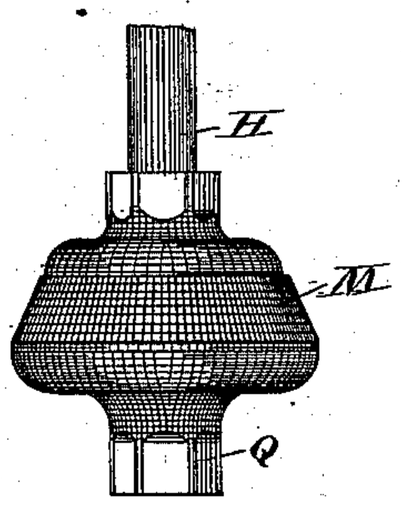


Fig. 24.

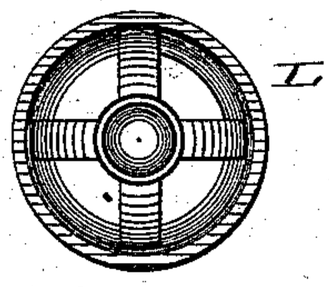


Fig. 25.

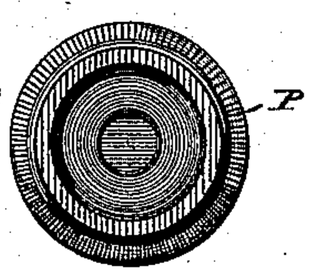
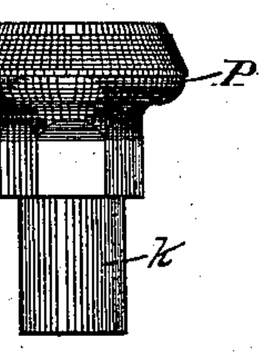


Fig. 26.



WITNESSES:

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Chas. A. Dann

INVENTOR

BY Aaron J. Tyler

C. M. Alexander

ATTORNEY

UNITED STATES PATENT OFFICE.

AARON J. TYLER, OF ALBION, NEW YORK.

HYDRANT.

SPECIFICATION forming part of Letters Patent No. 402,115, dated April 23, 1889.

Application filed May 1, 1888. Serial No. 272,478. (No model.)

To all whom it may concern:

Be it known that I, AARON J. TYLER, a citizen of the United States, residing at Albion, in the county of Orleans and State of New York, have invented certain new and useful Improvements in Hydrants, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention generally has relation to certain new and valuable improvements on that class of hydrants known as "fire-hydrants" or "fire-plugs;" and it is particularly designed as an improvement upon that particular class of hydrants wherein, in addition to the main valve, an independent supplementary valve is employed for the purpose of automatically cutting off the supply of water from the water-main whenever the hydrant is withdrawn for repairs or otherwise, the said supplemental valve serving also as an additional security against leakage, being so arranged that the pressure of the water in the main is utilized for the purpose of holding it closely to its seat while the main valve remains closed, thus to a great extent relieving the main valve, as will be more fully hereinafter set forth.

The object and great advantages derived from the employment of this independent "supplemental" valve are perfectly well known to the trade, and I will not therefore enlarge upon them in the specification.

The main and essential objects of this invention are to provide the hydrant with an efficient and improved system of valves and improve and simplify its general construction in a variety of ways, whereby all trembling and pounding of the valves when they are opened and closed, and the dangerous consequences arising therefrom, are completely obviated, and at the same time the opening of the supplemental valve against the pressure in the main is greatly facilitated and rendered more easy, whereby a full and adequate supply of water is obtained, the valves being so arranged with relation to each other that the flow through the hydrant is not in the least impeded by them, thus enabling me to obtain a volume of water at the outlet of the hydrant equal to that which can flow into it from the main without sacrificing the efficiency of the valve or without decreasing the pressure of water at the outlet, whereby the danger from freezing is more effectually provided against, and whereby the stand-pipe of the hydrant and the valves may all be withdrawn from the ground for repairs or renewal without removing the frost-jacket or making an excavation around the hydrant for that purpose, as will more fully hereinafter appear.

The invention also has for its objects to provide for a more compact and practical arrangement of the valves, and also to provide improved means for obviating the use of a stuffing-box at the top of the hydrant around the valve-rod, the disadvantage arising from the use of a stuffing-box being, as is well known, that it soon becomes too worn to subserve its intended purpose of preventing leakage.

The invention has for its further object the simplication of the construction of the hydrant, whereby the various parts are rendered more easy of manufacture and are comparatively easy to assemble, as will presently appear.

This invention also has other minor objects in view, which will be pointed out in the course of the following description.

These objects I accomplish by the means illustrated in the accompanying drawings, in which—

Figure 1 represents a side elevation of my improved hydrant complete; Fig. 2, a vertical longitudinal sectional view of the same, the main and supplemental valves being open and the waste-valve closed; Fig. 3, a similar view showing the main and supplemental valves closed and the waste-valve open; Figs. 4, 5, and 6 represent, respectively, a bottom view, plan view, and a side elevation of the valve attached to the upper end of the valve-rod for the purpose of preventing leakage around the same when the water is flowing through the hydrant; Fig. 7, a plan view of the water-chamber attached to the upper end of the stand-pipe of the hydrant; Figs. 8 and 9, views of the waste-valve; Fig. 10, a side elevation of the lower portion of the valve-rod with the main valve attached thereto; Figs. 11 and 12, respectively, a bottom and side view of the small auxiliary valve in the supplementary valve; Figs. 13 and 14, respectively, a side and plan view of the spider or guide attached to lower side

of main valve; Figs. 15 and 16, respectively, a plan and side elevation of the supplemental valve; Fig. 17, a vertical sectional view of my hydrant, showing a somewhat modified form, the valves being closed; Fig. 18, a similar view showing the valves open; Figs. 19, 20, and 21, respectively, a side, plan, and bottom view of the valve upon the upper end of the valve-rod as used in this modified form of hydrant; Fig. 22, a plan view of the water-chamber attached to upper end of stand-pipe as used in this modified form of hydrant; Fig. 23, a side elevation of the main valve as used in modified form of hydrant; Fig. 24, a plan of the waste-valve; and Figs. 25 and 26, respectively, a plan and side elevation of the supplemental valve as constructed in the modified form of hydrant.

Referring to the annexed drawings by letter, A designates the stand-pipe, which is provided with male screw-threads upon its upper end, whereby a water-chamber, B, which is provided with similar female screw-threads, may be screwed to it, this water-chamber being provided with one or more supply-nozzles, C, for the attachment of fire-hose. Bolted securely to the top of the chamber B, by means of two vertical bolts, D, is the cap E, centrally in the top of which is journaled, in the usual manner, the male screw-threaded spindle F, provided with a squared upper end for the application of an operating-wrench or other tool. The lower screw-threaded end of this spindle F works in a similar female thread in the valve G, which is guided in its vertical movements by means of ears *a a*, which embrace the vertical bolts D, and is provided on its under side with a packing-ring, *b*. Screwed centrally into the under side of this valve G is the upper end of the valve-rod H, which passes centrally through the head of the chamber B. By this arrangement it will be perceived that by operating the spindle F the valve-rod may be either raised to close the valves of the hydrant or lowered to open them, and that when the valves are open, so as to let the water flow through the hydrant, the valve G will be forced down upon the head of the chamber B, its packing-ring pressing closely against the head around the valve-rod, thereby preventing leakage of water around the valve-rod into the cap. In the hydrants now in use a stuffing-box is employed around the valve-rod for this purpose; but this stuffing-box soon becomes worn and lets water into the cap, where it congeals and renders the spindle inoperative.

Surrounding the stand-pipe A, from the level of the ground, as shown by dotted lines, to the lower end of the chamber B, is a jacket or casing, I, which forms a dead-air space around that portion of the stand-pipe exposed above ground, thereby preventing frost from reaching the stand-pipe and creeping down the interior of the same to the valves of the hydrant, as is quite frequently the case with the hydrants now in use, especially in northern latitudes. The preferred manner of securing this jacket to the hydrant is that shown in Figs. 2 and 3, wherein the jacket is cast separate and secured in place by the mere act of screwing the stand-pipe to the water-chamber B, the stand-pipe being provided with an external flange, *d*, and the jacket with two internal flanges, *c c*, for this purpose. It will be observed that the upper internal flange of the jacket abuts against the lower edge of the chamber B, and that the external flange, *d*, on the stand-pipe abuts against the lower internal flange of the jacket.

Surrounding all that portion of the stand-pipe extending below the surface of the ground is an upwardly-tapering frost-jacket, J, which is removably secured in place by the act of securing the stand-pipe to the elbow K, the upper end of this frost-jacket extending a short distance into the lower end of the upper jacket, I, which assists in holding it in place. This frost-jacket, near its lower end, is provided with an internal shoulder, *e*, which rests upon the upper end of the vertical arm of the elbow K, that portion of the jacket extending below this shoulder and embracing the vertical arm of the elbow, as shown, being provided with an internal annular groove, *f*, to facilitate the discharge of the waste water from the hydrant. The object in making this frost-jacket with an upward taper to it is to prevent, to a great extent, the jacket being lifted by the upheaval of the earth in frosty weather, it being evident that the upward movement of the earth, by reason of this formation of jacket, will be independent of the jacket; but if it happens, for any reason, that the jacket should be lifted by the earth the space between the upper end of the jacket and the flange *d* on the stand-pipe will be sufficient to permit it to move freely without dislocating or loosening any of the joints of the hydrant or main. By extending the lower end of the frost-jacket over the waste-apertures the same will be in no danger of being clogged or stopped up.

The lower end of the stand-pipe projects into the vertical arm of the elbow, and is enlarged for the purpose of receiving the waste-valve L, which is mounted loosely upon the valve-rod, and is preferably kept pressed normally downward by means of a spiral spring, *g*, surrounding the valve-rod, this spring being held in place by a collar, *g'*. When the main valve M, attached to the lower end of valve-rod, is closed, the waste-valve rests upon the upper side of the main valve, and is thereby held off its beveled seat on the ring N, which latter is screwed into the lower end of the stand-pipe. When the main valve M is open, the waste-valve closes automatically, and shuts off communication with the lateral drip-openings *h* formed through the said seat N and through the stand-pipe. The object of this waste-valve is, as will be perceived, to

permit all the water that remains in the stand-pipe after the main valve is closed to run off into the surrounding earth through the drip-apertures, and to automatically close these openings when the water is passing through the hydrant.. By thus mounting the waste-valve loosely upon the valve-rod, (whereby the said valve will automatically seat itself,) whether a spring is used or not, it is evident that I am enabled to make the drip or waste apertures *h* much nearer to the main valve than the hydrants now in use, thereby enabling me to drain off practically all of the waste water from the stand-pipe.

The main valve M works against the seat *i* formed on the interior of the waste-valve seat N, as shown, this seat *i* being about or very near on a level with the drip-apertures *h*, whereby when the main valve is closed all or very near all the water above this valve will be allowed to run off, thus obviating the danger of freezing and the sticking of the valves to their seats. Connecting the valve-seat N with the elbow K is an internally and externally screw-threaded shouldered ring, O, which forms the seat *j* for the supplemental valve P, which is directly below and in close relation to the main valve M when these valves are closed, there being preferably a small space between them, as shown. This supplemental valve has formed through it a central opening, into which projects a radially-winged guide or spider, Q, screwed to the lower end of the valve-rod below the main valve, this spider serving as a nut to hold the main valve on the valve-rod. This spider assists to guide the two valves and at the same time permits the free passage of the water up through the opening in the supplemental valve. The supplemental valve has a downwardly-projecting tubular stem, *k*, perforated at *l* for the passage of the water. This tubular stem *k* is guided vertically by means of a short tube, *m*, inserted in or formed on a plug, *n*, screwed into the bottom of the elbow K, as clearly shown. Working in this tubular stem *k* is a small auxiliary valve, R, which is held normally to its seat over the central opening in the supplemental valve by means of a suitable coil-spring below it. Projecting into a vertical axial recess in this auxiliary valve is a pin, *p*, formed on or secured to the extreme lower end of the valve-rod.

The operation of the hydrant is as follows, the valves being closed, as in Fig. 3: When the valve-rod is forced down in the manner hereinbefore described, the first valve to open will be the main valve M. At the same time the waste-valve L closes, shutting off communication with the waste-outlets *h* before any water is let into the hydrant. As the valve-rod is forced down, the pin *p* forces the small auxiliary valve R away from its seat in the supplemental valve P and permits the water from the main to rush in above the supplemental valve, thereby practically equalizing the pressure above and below the same. As the valve-rod is forced still farther down, the supplemental valve will also be opened, the opening of this valve being rendered easy by the letting in of the water above it, as described, thus giving the water a free passage through the hydrant. When the valve-rod is elevated, the valves will close in the reverse order—that is, the supplemental valve will first reach its seat and be held there by the pressure of the water, the small auxiliary valve next closing against its seat in the supplemental valve, and the main valve M finally closing against its seat, the waste-valve having begun to open the instant or after the auxiliary valve R closes against its seat.

When it is desired to remove the hydrant for repairs, all that is necessary to do is to turn the stand-pipe by any suitable means, this action serving to unscrew the seat N from the ring O, after which the stand-pipe, valve-rod, waste-valve, and main valve may all be lifted out of the frost-case J, the supplemental valve and its seat remaining in the elbow to prevent the outward flow of the water. Should it be desired to remove the supplemental and auxiliary valves, this may be done by first unscrewing the ring O by inserting a suitable wrench, the water from the main being of course first cut off from the hydrant. The hydrants of this character now on the market do not provide for thus removing the supplemental valve; hence every time this valve needs repairing in the hydrants now in use it is necessary to make an excavation around the hydrant and take the same to pieces. This feature, then, it will be observed, is of paramount importance and essential to a practical hydrant.

Besides the above drawback, there is another serious defect with this class of hydrants as heretofore constructed. It lies in the fact that between the main and supplemental valves there is comparatively a large space left which always stands full of dead water. Now, in extremely cold weather, this solid body of water being perfectly still, very frequently freezes solid, thus absolutely precluding the possibility of opening the valves, making it necessary to dig up the hydrant and thaw it out before it can be used again. This liability to freeze up renders it very precarious in case of fire, inasmuch as the supply of water would be thereby entirely cut off. My arrangement of valves is designed to and does overcome this defect existing in the hydrants now in use.

It will be obvious that in my hydrant there is but a small space between the valves to hold still water, which, being protected from the cold by the surrounding valve-seats, elbow, and the frost-jacket, will not be liable to freeze. Should it freeze, however, the valves may be opened without difficulty, as the cake of ice between them will not be of such a shape as to prevent its being forced down with the valves. The instant the ice is dislodged the impetus of outflowing water will

crush and carry it out of the hydrant. This desirable object can only be accomplished, as will be perceived, by bringing the valves close together and making the main valve smaller in diameter than the supplemental valve.

By providing the small auxiliary valve and opening it before the supplemental valve, so as to let in the water above this valve, and thereby equalizing the pressure, all trembling and pounding of the valves are obviated, thus lessening the danger of loosening the joints of the main, as is evident.

In the modification shown on Sheet 3 of the annexed drawings I have inserted the packing-ring *b* in the head of the chamber B instead of in the valve G, as shown in the preferred form of hydrant. I also show in these drawings the casing I as formed integral with the chamber B instead of independent of it. In lieu of the spiral spring *g*, I may use a rubber spring, as shown in the modification, without departing from the spirit of my invention. In this modification I also show that I may form the spider Q integral with the main valve; also, that I may do away entirely with the small auxiliary valve R without impairing the efficiency of the rest of the hydrant; also, that the short tube *m* may be done away with and the plug *n* serve as a guide for the stem of the supplemental valve, and also that I may screw the seat N into the elbow and employ a packing-ring between the seat and ring O, instead of screwing the seat into the latter.

It is obvious that I do not desire to confine myself to the exact construction of parts shown and described, as modifications besides those I have shown may be designed without departing from the spirit of the invention.

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

1. In a hydrant, the combination of a stand-pipe and valves, a water-chamber, B, and a valve-rod with a vertically-guided valve, G, attached to the upper end of this valve-rod, so as to move with the same, a packing-ring, *b*, between the valve and head of said water-chamber and surrounding the valve-rod, a cap, E, bolted to the head of the water-chamber, and means for operating the valve-rod and valve, substantially as described.

2. In a hydrant, the combination, with a stand-pipe, water-chamber, valve-rod, cap, and vertical bolts D D for securing this cap to the head of the water-chamber, of a valve, G, attached to the upper end of the valve-rod and provided with lugs *a a*, adapted to embrace the vertical bolts D D, a packing-ring, *b*, and means for raising and lowering the said valve and rod, substantially as described.

3. In a hydrant, the combination of the stand-pipe having cast integral with it an external flange, *d*, a water-chamber screwed upon the upper end of the stand-pipe, and a jacket, I, provided with internal shoulders, *c c'*, formed integral with it, the said jacket forming a dead-air chamber around the stand-pipe above the ground-line and being clamped removably in place by simply screwing the said water-chamber to the stand-pipe, substantially as herein set forth.

4. The combination of the stand-pipe having screwed to its upper end a water-chamber and provided with an integral flange, *d*, a jacket, I, surrounding the stand-pipe above the ground-line and provided with an internal integral flange, *c'*, adapted to abut against the aforesaid flange *d*, the lower end of this jacket extending below the said flange *d* on the stand-pipe, an elbow detachably attached to the lower end of the stand-pipe, the lower end of the stand-pipe setting in the vertical arm of the said elbow, and an upwardly-tapering frost-case, J, provided with an internal shoulder, *e*, adapted to rest upon the upper end of the vertical arm of the elbow, the upper end of the said frost-case being inserted in the lower end of the said jacket I, all arranged as and for the purposes herein set forth.

5. The combination of the stand-pipe enlarged at its lower end, a ring, N, screwed into the lower enlarged end of the stand-pipe, the said ring being provided with a beveled seat for the waste-valve, and a beveled seat, *i*, for the main valve, this seat *i* being smaller than the waste-valve seat and formed on the interior of the said ring N, a valve-rod, a main valve, M, and a beveled waste-valve, L, mounted loosely upon the valve-rod and adapted to automatically close upon its seat when the main valve opens, waste-apertures *h* being formed through the stand-pipe and ring, substantially as herein described.

6. In a hydrant, the combination, with the stand-pipe and elbow, of the vertical valve-rod, an automatically-closing waste-valve mounted upon this valve-rod, a ring screwed into the lower end of the stand-pipe and provided with a seat, *i*, for the main valve, the main valve M, attached to lower end of valve-rod below the waste-valve, and the spider Q, attached to lower end of valve-rod below the main valve, of the supplemental valve immediately below and larger than the said main valve, the said supplemental valve being provided with a central opening or recess for the reception of the said spider Q and the supplemental valve-seat, substantially as described.

7. In a hydrant, the combination, with the stand-pipe, elbow, and vertical valve-rod, of the automatically-closing waste-valve mounted loosely upon the valve-rod, ring N, screwed into the lower end of the stand-pipe and forming a seat for the waste-valve and main valve, the main valve attached to valve-rod, a spider, Q, attached to valve-rod below the main valve, a removable externally screw-threaded ring, O, screwed into the elbow and forming a seat for the supplemental valve, and the spring-actuated supplemental valve immediately below the main valve and provided with a central opening or recess for the reception of the spider Q, substantially as described.

8. The combination of the stand-pipe, a ring, N, screwed into the lower end of the stand-pipe, this ring being externally screw-threaded and provided internally with two beveled seats, one for the waste-valve and the other for the main valve, a valve-rod, beveled waste and main valves on this rod and adapted to close on their respective seats, elbow K, a removable externally-screw-threaded ring, O, screwed into the said elbow, this ring forming a seat for the supplemental valve, and a spring-actuated supplemental valve adapted to close on the seat in the ring O, this supplemental valve being larger than the main valve and located in close proximity to it, substantially as and for the purposes herein set forth.

9. In a hydrant, the combination, with a stand-pipe, elbow, vertical valve-rod provided with a pin, *p*, waste-valve, main valve, seats for these valves, a supplemental valve, P, having a perforated tubular stem and a central opening through it, and a spring-actuated auxiliary valve, R, adapted to automatically close the said central opening in the supplemental valve and be forced open by the said pin *p*, substantially as described.

10. In a hydrant, the combination, with the stand-pipe enlarged at its lower end, of a ring screwed into the lower enlarged end of this stand-pipe, this ring being beveled on its interior to form a waste-valve seat and provided with lateral waste-apertures *h*, a valve-rod provided with a main valve, a seat for this main valve, and an open beveled waste-valve mounted loosely upon the said valve-rod and adapted to automatically seat itself on the said beveled valve-seat formed on the interior of the ring N and close the said waste-apertures, substantially as and for the purpose herein set forth.

11. In a hydrant, the combination, with the stand-pipe provided with a flange, *d*, and a water-chamber screwed to the upper end thereof, of the jacket I, provided with a flange, *c'*, said jacket surrounding the stand-pipe between the said water-chamber and the surface of the ground, substantially as described.

12. In a hydrant, the combination, with the stand-pipe and the jacket I, surrounding the upper portion of the same, of the upwardly-tapering frost-case J, having its upper end inserted in the lower end of the jacket I, and the elbow K, attached to the lower end of the stand-pipe and having its vertical arm inserted in the lower end of the frost-case, substantially as described.

13. In a hydrant, the combination, with the stand-pipe and jacket I, of the elbow K, screwed to the lower end of the said stand-pipe, and the upwardly-tapering frost-case J, having its upper end inserted in the lower end of the said jacket I and its lower end surrounding the vertical arm of the elbow K, the said jacket being provided with an internal shoulder, *e*, which rests upon the upper end of the said vertical arm of the elbow, substantially as described.

14. In a hydrant, the combination, with the stand-pipe, valve-rod, a waste-valve, L, upon the valve-rod, and a main valve attached to the lower end of the said valve-rod, of the ring N, screwed into the lower end of the said stand-pipe and provided with seats for the main and waste valves, waste-apertures *h* being formed through the said seat N, between the two valves, substantially as described.

15. The combination of a stand-pipe, a valve-rod, a main valve upon this valve-rod, a supplemental valve located below the main valve and provided with a central opening, seats for these valves, an auxiliary valve, R, seated over the opening in the said supplemental valve, and a pin for opening the auxiliary valve, substantially as described.

16. The combination of a stand-pipe, a valve-rod, main and supplemental valves, the former being attached to the valve-rod, the said supplemental valve being located immediately below the main valve and provided with a central recess in its upper side, seats for these valves, and a spider or guide, Q, upon the valve-rod below the main valve, this spider being adapted to enter the recess in the upper side of the supplemental valve, as and for the purpose herein set forth.

In testimony whereof I affix my signature in presence of two witnesses.

AARON J. TYLER.

Witnesses:

JNO. S. FINCH, Jr.,

CHAS. D. DAVIS.