(No Model.) 3 Sheets—Sheet 1.

A. J. TYLER.

HYDRANT.

No. 462,885. Patented Nov. 10, 1891.

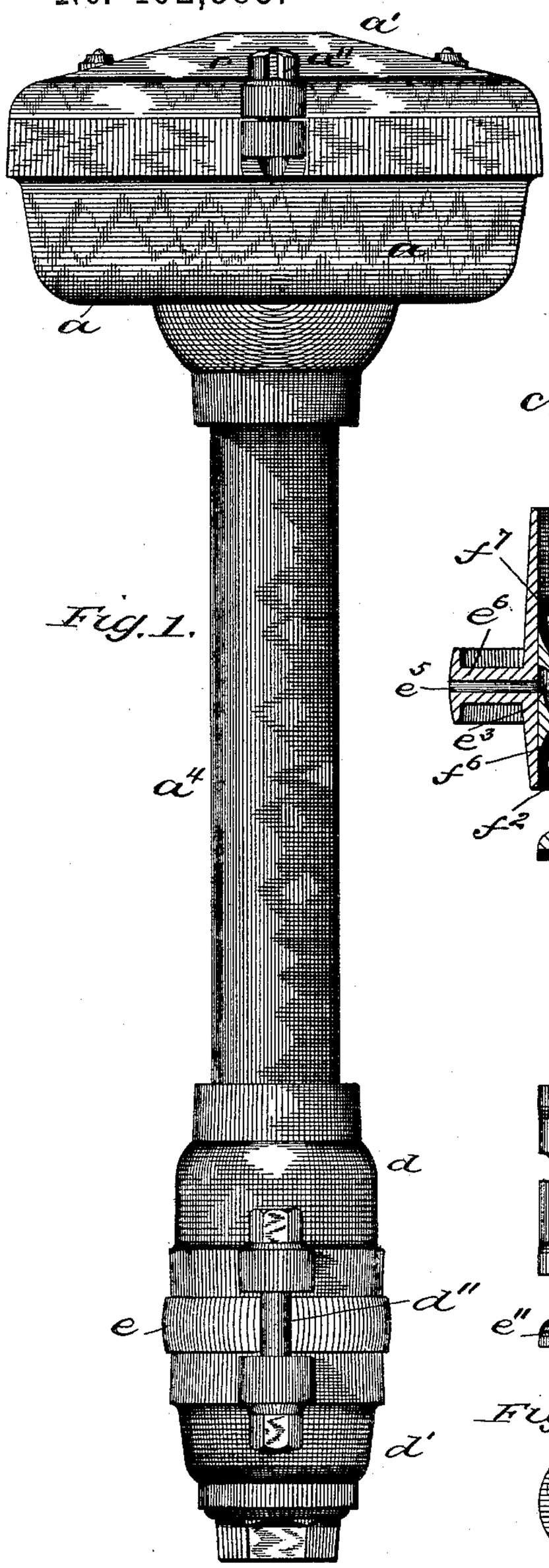

Fig. 1.

Fig. 3.

Fig. 4.

Fig. 5.

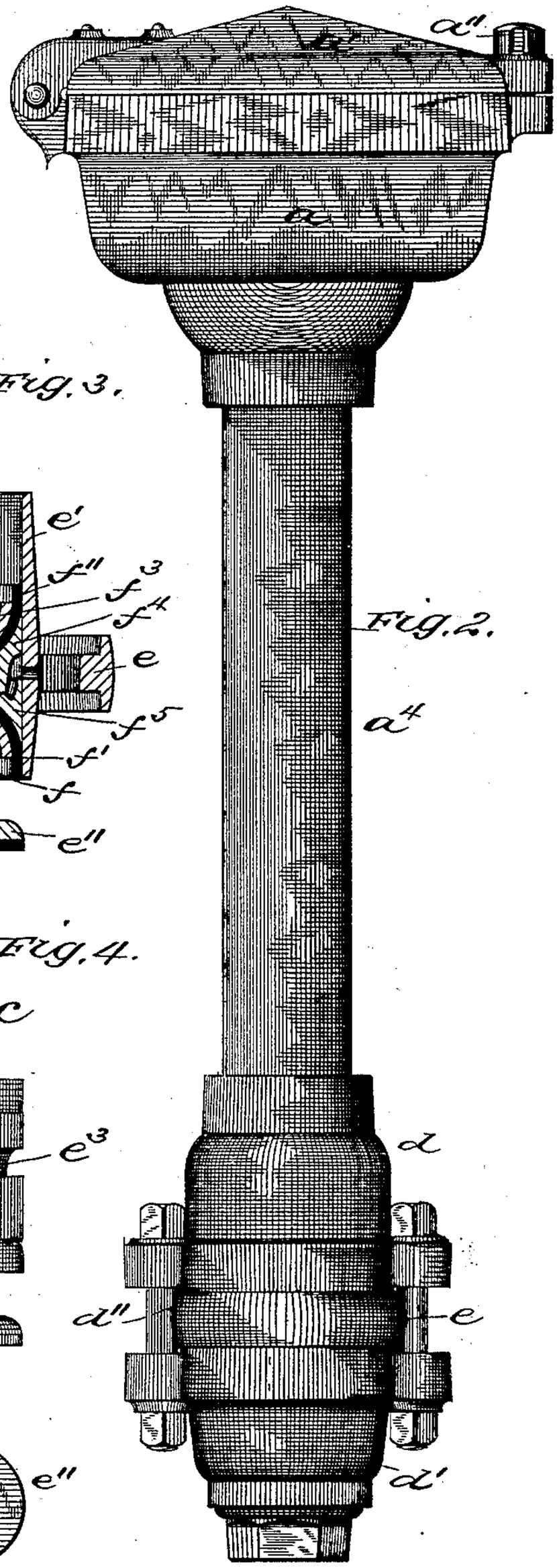

Fig. 2.

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(No Model.) 3 Sheets—Sheet 2.

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HYDRANT.

No. 462,885. Patented Nov. 10, 1891.

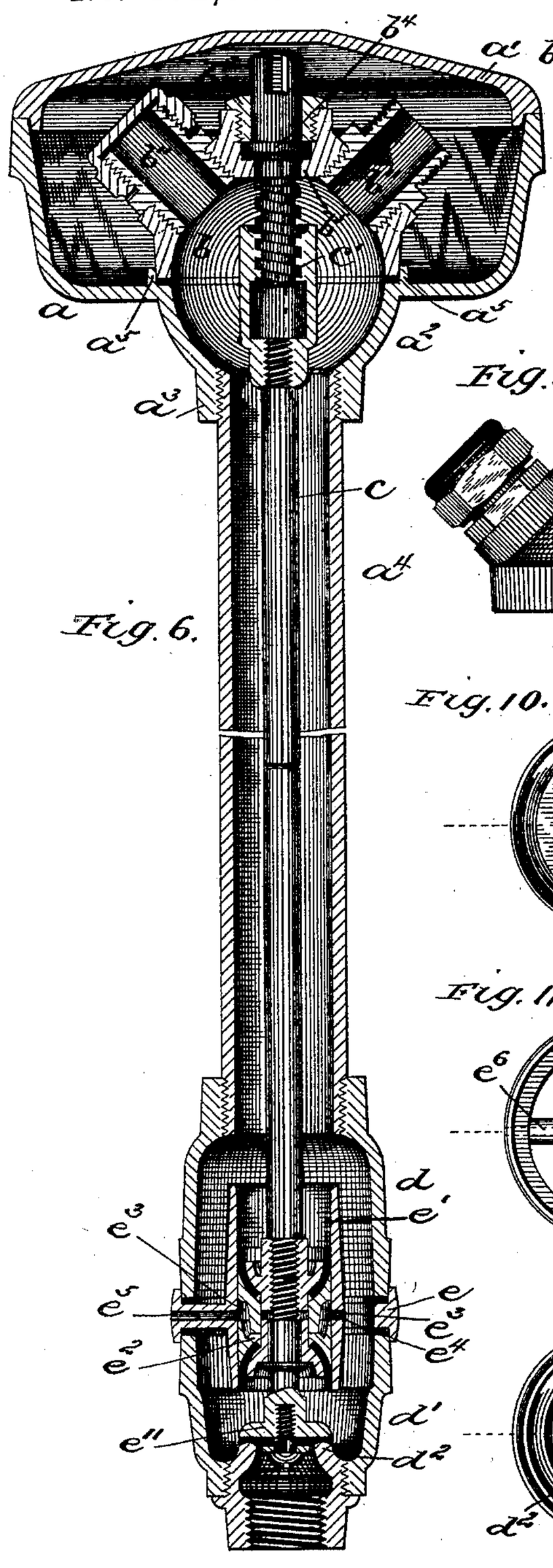

Fig. 6.

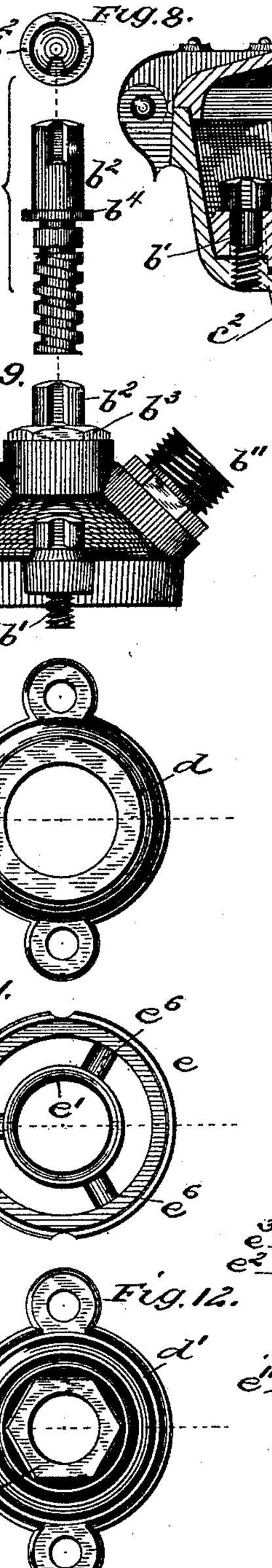

Fig. 9.

Fig. 11.

Fig. 12.

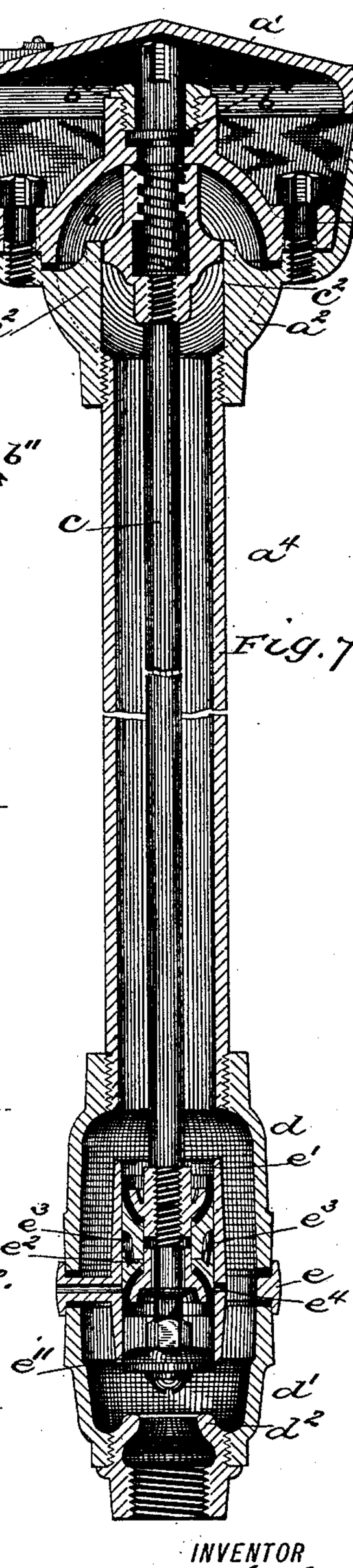

Fig. 7.

Fig. 8.

Fig. 10.

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3 Sheets—Sheet 3.

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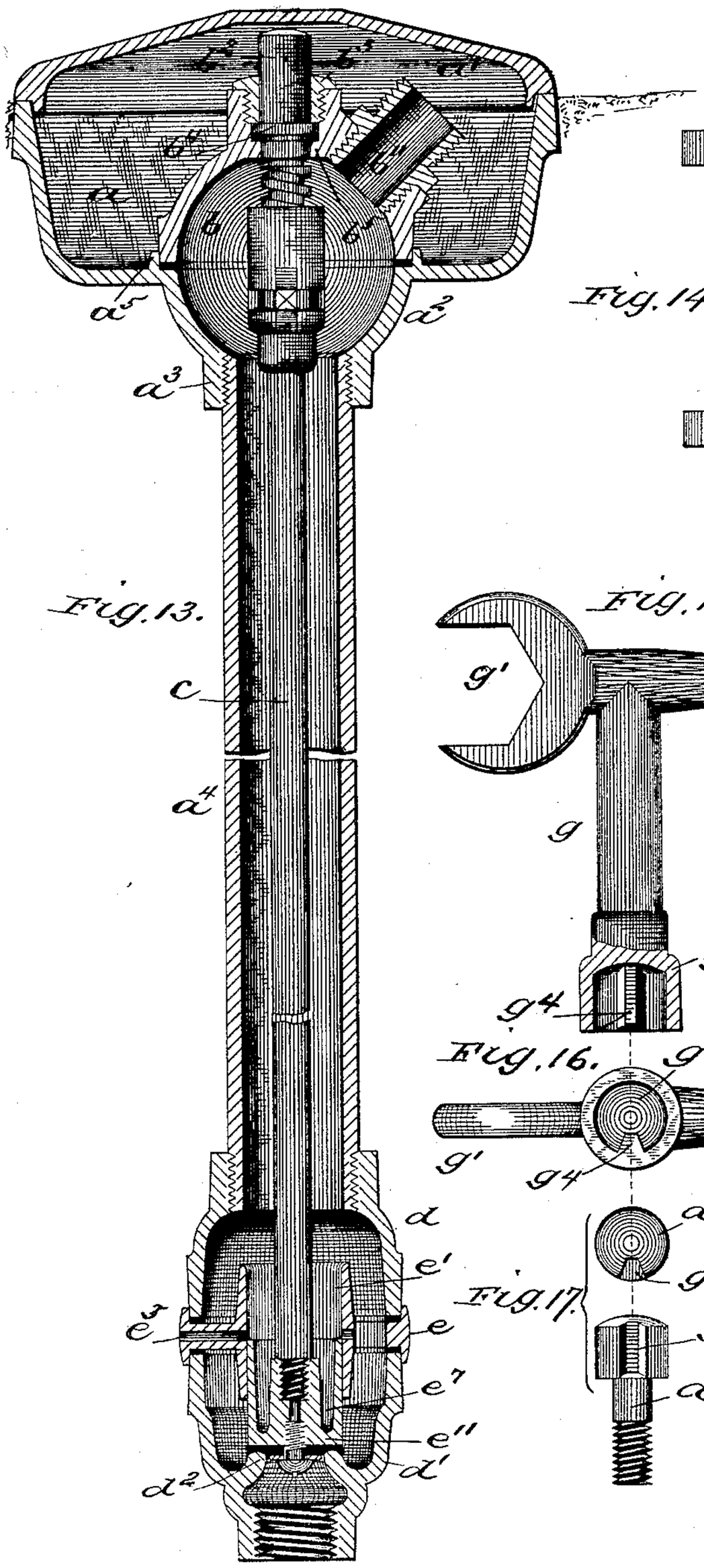

Fig. 13.

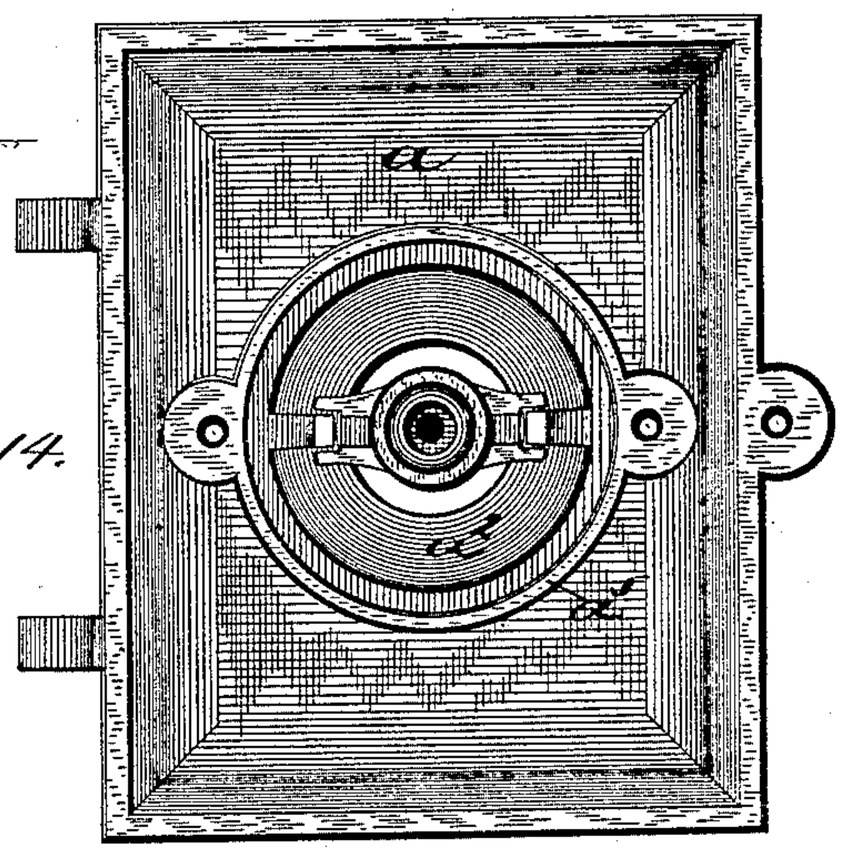

Fig. 14.

Fig. 15.

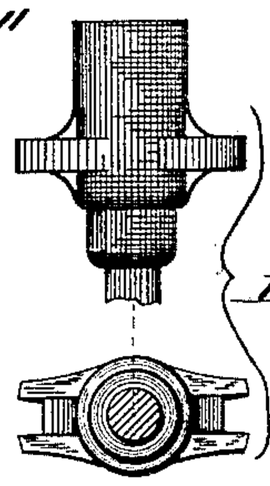

Fig. 18.

Fig. 16.

Fig. 17.

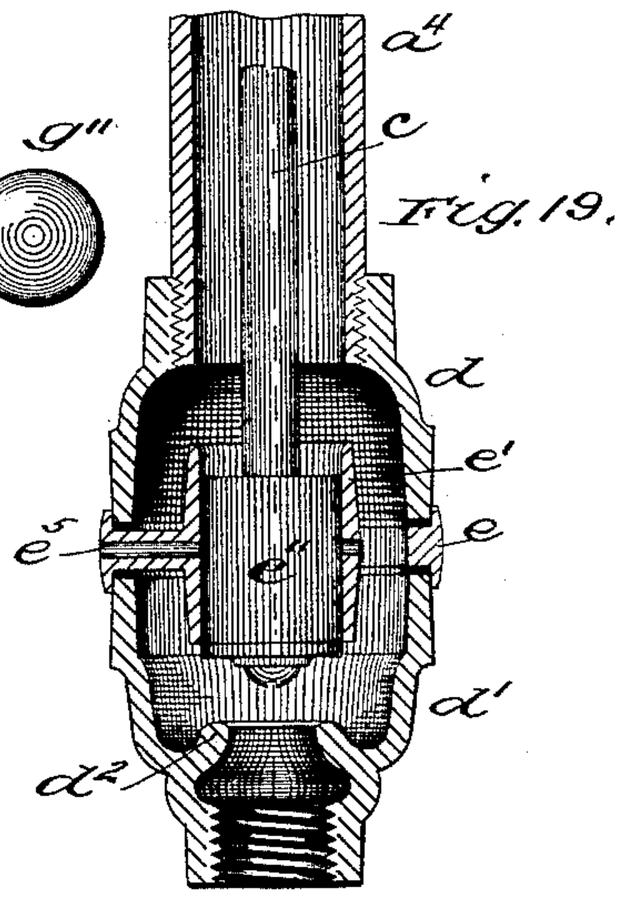

Fig. 19.

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UNITED STATES PATENT OFFICE.

AARON J. TYLER, OF PASSAIC, NEW JERSEY.

HYDRANT.

SPECIFICATION forming part of Letters Patent No. 462,885, dated November 10, 1891.

Application filed July 18, 1891. Serial No. 399,950. (No model.)

To all whom it may concern:

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

Figures 1 and 2 represent side elevations of my improved hydrant, showing different sides thereof; Fig. 3, a vertical sectional view of the piston and the suspended tube in which it works; Figs. 4 and 5, respectively, side and bottom views of the piston; Fig. 6, a vertical sectional view of the hydrant, showing it closed; Fig. 7, a similar view showing it open; Fig. 8, detail views of the operating-screw; Fig. 9, a detail side elevation of the nozzle-holding cap; Figs. 10, 11, and 12, detail plans of parts that will be hereinafter described; Fig. 13, a vertical sectional view showing a modified form of piston used in small hydrants and also showing only one hose-nozzle in the cap; Fig. 14, a plan view of the interior of the surface box, the cover thereof and the nozzle-holding cap being removed; Figs. 15 and 16, detail views of the tool employed; Fig. 17, a detail view of one of the connecting-bolts; Fig. 18, detail views of the guide for the upper end of the valve-rod; Fig. 19, a vertical sectional view of the lower part of the hydrant, showing the valve and piston raised.

This invention has a number of important objects in view, which will fully appear in the course of this description.

In the drawings annexed, a designates the surface or street box, which is rectangular in shape and adapted to be set down into the earth a sufficient distance to bring its upper edge approximately flush with the surrounding surface. A strong flanged cover a' is suitably hinged to the box and secured in a closed position by means of a screw-bolt a'', passed down through a lug on the cover and tapped into a corresponding lug on the box. Formed integrally with the bottom of the box is a depending semi-spherical depression or chamber a^2, terminating in a tubular portion a^3, into which latter the stand-pipe a^4 is screwed. Formed around the edge of the depression a^2 on the bottom of the box is a circular flange a^5, inside of which sets the lower circular edge of a semi-spherical cap b, this cap being bolted down securely in place by bolts b', passed down through ears on the cap and tapped into the bottom of the box, a suitable packing-ring being interposed between the cap and bottom to make the joint water-tight. This cap, together with the depression in the bottom of the box, forms a spherical water-chamber. Tapped into suitable threaded openings in the cap are one or more nozzles b'' for the attachment of the hose, these nozzles setting at about a forty-five-degree angle to the stand-pipe and being arranged radially with respect thereto, whereby when the hose is attached to them there will be no sharp bends to break the force of the outgoing water or injure the hose. In larger hydrants two or more of these nozzles are used, as shown in Figs. 6 and 9, and in small hydrants used for lawn and street sprinkling a single nozzle, as shown in Fig. 13, may be used.

Passing down through an opening in the top of the cap is the operating-screw b^2, whose lower end is threaded and works in a vertically-movable nut c', attached to the upper end of the valve-rod c, said nut being guided vertically by vertical ways c^2, formed on the interior of the part a^2 and working between bifurcated ears on the nut. A gland b^3 is tapped in around the upper cylindrical end of the screw b^2 and bears upon a flange b^4, formed on the same, a packing-ring being interposed between the flange b^4 and an internal shoulder b^5, formed on the cap, an annular groove being formed in the bolt to hold said packing-ring.

Screwed on the lower end of the stand pipe is a water-chamber composed of two open-ended tubular sections d d', secured removably together end to end by connecting-bolts d'', passing through lugs or ears formed on the outside of the sections. Screwed in the lower end of the lower section is a tubular valve-seat d^2, which projects up slightly into the chamber. Between the two tubular sections of the chamber is removably clamped a flanged ring e, suitable packing-rings being interposed between the respective ends of the sections and the ring to make the joints water-tight. A vertical open-ended cylinder e' is suspended centrally within the chamber by

means of three or more radial arms e^6, formed integral with the ring, the cylinder being preferably formed integral with the arms and ring. The arms e^6 are small in diameter, so as not to materially obstruct the free passage of water, the spaces between these arms being amply sufficient to permit the necessary quantity of water to pass. A drip-opening e^5 extends through the ring and one of the radial arms e^6 and communicates with the interior of the suspended cylinder, and another opening e^4 is formed through the wall of the cylinder at a diametrically-opposite point from said opening e^5, this latter opening communicating directly with the interior of the chamber.

A piston e^2 is carried by the valve-rod and works in the suspended cylinder, and below this piston a valve e'' is secured, this valve being adapted to close down on the valve-seat d^2 to control the supply of water from the main. The piston is constructed, preferably, as shown most clearly in Fig. 3—that is, as follows: Screwed on the lower end of the valve-rod c is an internally-threaded tube f^3, the end of the rod passing down about halfway through said tube, this tube having formed on it a curved or convexed annular flange f^7. Slipped on the lower end of the tube f^3 is a short tube or ring f^4, which fits the cylinder e' and has the upper part of its interior hollowed out and formed concave to correspond to the curvature of the flange f'', the lower end of this tube projecting below the lower end of the threaded tube f^3. Screwed into the lower end of the tube f^3 is the upper end of the section f of the valve-rod, which is provided with an annular flange f^2 about midway its length and carries the valve e'' at its lower end. Upon this rod f, resting on the shoulder f^2, is a short sleeve provided with a curved flange f^6, (similar to the flange f^7,) and projecting up into the lower end of the tube f^4 and between this curved flange and the lower end of said tube f^4 is clamped a ring f^5, fitted to the cylinder e' and hollowed out to correspond with the curvature of the flange f^6. Between the curved surfaces of the flanges f^6 f^7 and tubes f^4 f^5 flexible packings are clamped so as to fit the cylinder e' tightly. Between the parts f^4 and f^5 an annular space or groove e^3 is formed for the passage of the drip-water around the piston, as will more fully hereinafter appear.

It is evident that by screwing up the rod f' the parts of the piston may be drawn closely together and any desired pressure exerted upon the packings, and that by unscrewing said rod the parts of the piston may be removed for repair and renewal. The upper end of the sleeve f^6, projecting up through the ring f^5 and into the tube f^4, serves to not only "break" the joints between these parts and keep them in alignment with each other, but also to assist in making the piston rigid and strong and prevent any loosening of the parts, as is evident.

For small lawn and street hydrants the piston just described is unnecessary, and the solid piston e^7 (shown in Figs. 13 and 19) may be employed. In this form the piston is made integral with the valve and is of such length that its upper end terminates immediately below the drip-openings when the valve is seated.

In Figs. 13 and 19 it will be observed that the valve-seat d^2 is formed integral with the lower section of the water-chamber instead of being screwed therein, as shown in the other views.

In Figs. 15 and 16 the tool g, employed to turn the screw b^2 and the connecting-bolts, is shown. This tool is substantially T-shaped, an ordinary wrench g' being formed on one end of the cross-bar at the top, a knob g'' for hammering purposes at the other end of the cross-bar, and a socket-wrench g^3 at the lower end of the vertical bar. The wrench g' is employed principally in removing the caps from the nozzles b'' and turning the hose-couplings, (not herein shown,) and the socket-wrench is employed to turn the operating-screw b^2 and bolts a'' b'. It will be observed that the heads of the bolts a'' b' and screw b^2 are cylindrical in shape, so as to fit the cylindrical socket of the wrench, the interior of the wrench being provided with a longitudinal rib g^4, adapted to fit snugly V-grooves g^5, formed longitudinally in the exterior of the bolt-heads. In this way the socket-wrench is made to positively engage the bolts and all slipping is prevented.

The operation of this hydrant is evident from the foregoing. To open the hydrant it is simply necessary to raise the valve and connected piston, by means of the tool and operating-rod, to the position shown in Figs. 7 and 19, whereupon the water from the main is free to pass up through the hydrant to the connected hose, the water of course passing up around the outside of the suspended tube e'. When the piston is thus raised, it instantly shuts the drip-openings, so that all leakage is prevented. When the valve is forced down to its seat to shut off the supply of water, the annular groove in the piston, as shown in Fig. 6, comes opposite to and connects the drip-openings, thereby permitting the water in the stand-pipe to run out freely through the drip e^5 and escape into the surrounding earth.

This invention has a number of important advantages, among which may be mentioned the following: The nut c', working on the threaded end of the screw, bears against the under side of the cap b around the opening therein, when it is drawn up to open the valve, and is thereby made to firmly clamp the shoulder b^5 and the packing above the same. This clamping the shoulder and packing-ring makes a tight joint around the screw and effectually prevents all leakage at that point while water is passing through the hydrant. It will be observed that the

packing projects into an annular groove in the bolt, so that it is thereby made to extend across the joint between the bolt and the shoulder b^5, which is of great importance in preventing leakage at that point. It will also be observed that the water has a free passage through the hydrant, there being no abrupt bends or obstructions in its path to create undue friction, whereby the full pressure of the main may be utilized. The spherical water-chamber at the upper end of the stand-pipe and the nozzles projecting upwardly therefrom at an angle are advantageous in that respect. The nozzles are not only arranged so as to facilitate the passage of the water, but they also prevent the hose from being abruptly bent when attached to them. It will also be observed that the parts of this hydrant may be cheaply cast and tapped and put together, the parts being few and simple. The parts may all be cast without cores, except the form of valve-seat d^2 shown.

Besides the advantages already described, a further advantage of forming the opening e^4 in the opposite side of the cylinder from the opening e^5 lies in the fact that should the piston work a little loose in the cylinder the water from the main when the valve and piston are raised will run in through said opening e^4 and serve to press the piston tightly over the inner end of the drip-opening e^5, thereby preventing leakage through the same when the hydrant is in use.

The peculiar form of the socket, wrench, or key g^3 and the bolt-heads is essentially advantageous. It will be observed that all the bolt-heads are made alike, so that the owner of the hydrant may with the single key not only unlock the cover of the box and operate the screw connected to the valve-rod, but is also enabled to remove the cap-plate and the working parts for the purposes of repair and cleaning. Forming the locking-bolt a'' and the screw b^2 as described is not only advantageous for the above reasons, but it also prevents mischievous or evil-disposed persons from opening and meddling with the hydrant, which is itself a great advantage.

A great source of annoyance with hydrants in exposed places has been that mischievous persons are prone to meddle with them, frequently breaking off the covers and turning on the water; but this difficulty is overcome by my arrangement, as access can only be gained with the peculiar form of key shown.

The advantage of making the ring e and connected cylinder separately from the chamber and clamping them in place is that they may be more readily cast separately, because it is necessary that they be made of brass or other non-corrosive metal, and it would be impractical to cast the whole chamber of that metal. If the cylinder and ring were made of iron, they would soon rust sufficiently to become almost useless.

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

1. In a hydrant, the combination of a surface box, a depression formed in its bottom, a stand-pipe depending from said depression and connected to a water-chamber, a valve in this chamber, a cap bolted over the said depression and provided with a radial nozzle or nozzles, and a valve-rod, substantially as described.

2. In a hydrant, the combination of a surface box, a stand-pipe connected to the bottom thereof, a semi-spherical cap bolted to the bottom of the box over the upper end of the stand-pipe, forming an enlarged water-chamber, and a radially and upwardly inclined nozzle or nozzles screwed into the said cap, substantially as described.

3. The combination of a stand-pipe and water-chamber attached thereto, a chamber connected to the upper end of the stand-pipe, a screw b^2, journaled centrally in a flanged opening in the cap of said chamber and extending therein, this screw being provided with a flange b^4 and an annular groove below the same, a packing-ring inserted in said annular groove and clamped between the flange in the opening and the flange b^4, a nut c', working on the threaded part of the screw and adapted to be pressed upwardly against the under side of the cap when drawn up, and a valve-rod and valve connected to said nut, substantially as described.

4. In a piston, the combination of a rod, an internally-threaded tube f^3, screwed thereon and provided with a flange, a tube f^4, slipped over the lower end of said tube f^3, a shouldered rod f, screwed into the lower end of tube f^3, a flanged sleeve f^6 on the rod f and having its upper end extending into the tube f^4, a ring f^5, slipped on the upper end of the sleeve f^6 and abutting against the lower end of tube f^4, and packing-rings clamped between the flanges and the parts $f^3 f^6$ and the adjacent tubes, substantially as and for the purpose described.

5. In a piston, the combination of a rod, two tubes $f^3 f^6$ thereon and means for drawing these tubes together, said tubes being provided with annular flanges, tubes $f^4 f^5$, slipped on the adjacent ends of said tubes $f^3 f^6$, and flexible packings clamped between the tubes $f^4 f^5$ and the flanges on the tubes $f^3 f^6$, as and for the purposes described.

6. The combination of a stand-pipe, a water-chamber secured to the lower end thereof, this chamber being constructed of two detachably-connected sections $d\,d'$, the lower section being provided with a valve-seat extending up into the chamber, a ring e, clamped between the adjacent ends of the sections $d\,d'$, this ring having formed integrally with it one or more inwardly-extending arms suspending a vertical cylinder e', this cylinder being entirely inclosed within the chamber and having its ends unconnected with any portion thereof, its internal diameter being uniform

throughout its length, a piston working in said cylinder, and a valve and valve-rod connected to the piston, substantially as described.

7. The combination of a stand-pipe, a water-chamber screwed to the lower end thereof, said water-chamber being constructed of two sections detachably secured together end to end and the lower one being provided with a valve-seat, a ring clamped between the ends of the sections and having inwardly-extending arms supporting an open-ended cylinder, this cylinder being entirely inclosed in the water-chamber and unconnected to it at its ends, a space being left between its ends and the ends of the chamber, a drip-opening e^3, extending from the exterior of the ring in through one of the arms and communicating with the interior of the suspended cylinder, and an opening e^4, formed in the cylinder opposite the opening e^3, this opening connecting the interior of the cylinder with the interior of the chamber, substantially as described.

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

AARON J. TYLER.

Witnesses:
C. D. DAVIS,
S. BRASHEARS.