(No Model.) 3 Sheets—Sheet 1.

D. W. CARROLL.

FIRE HYDRANT.

No. 382,951. Patented May 15, 1888.

Fig. 1.

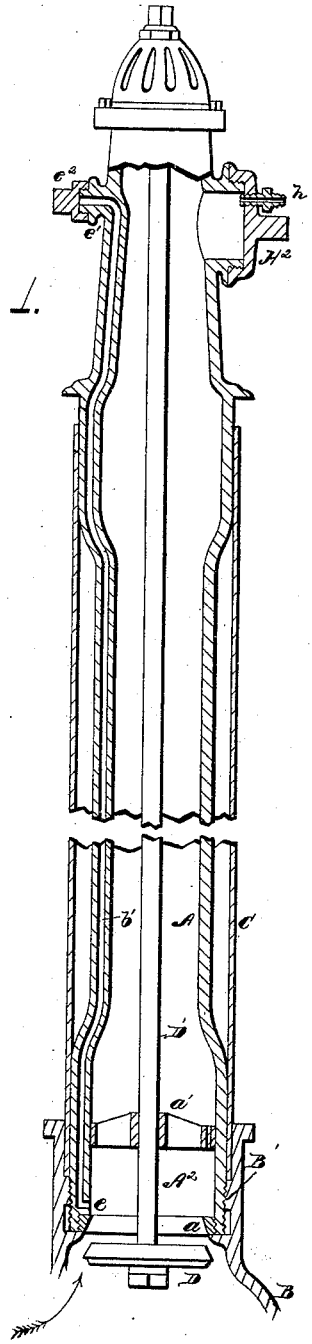
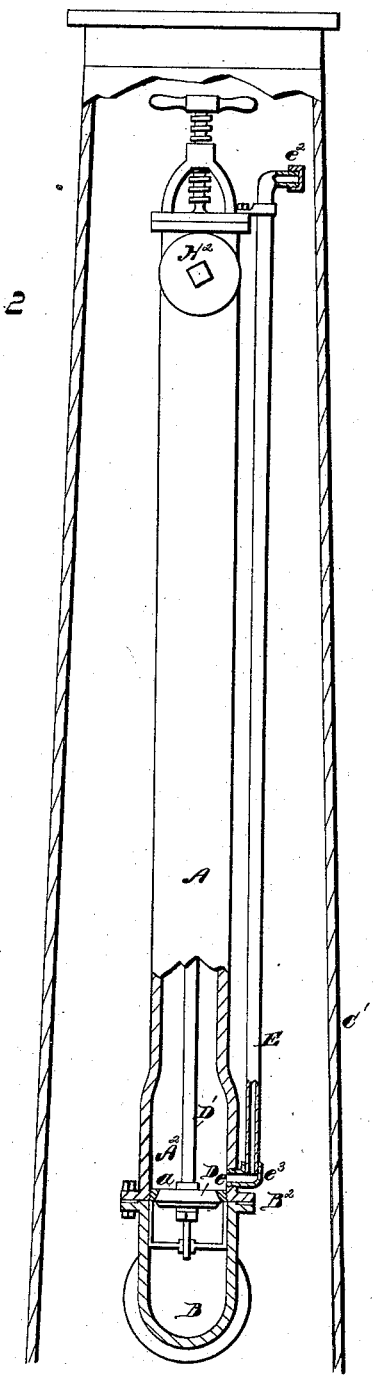


Fig. 2



WITNESSES.

Samuel E. Thomas.

N. S. Wright.

INVENTOR

Daniel W. Carroll

By W. W. Leggett.

Attorney

(No Model.) 3 Sheets—Sheet 2.

D. W. CARROLL.

FIRE HYDRANT.

No. 382,951. Patented May 15, 1888.

Fig. 3.

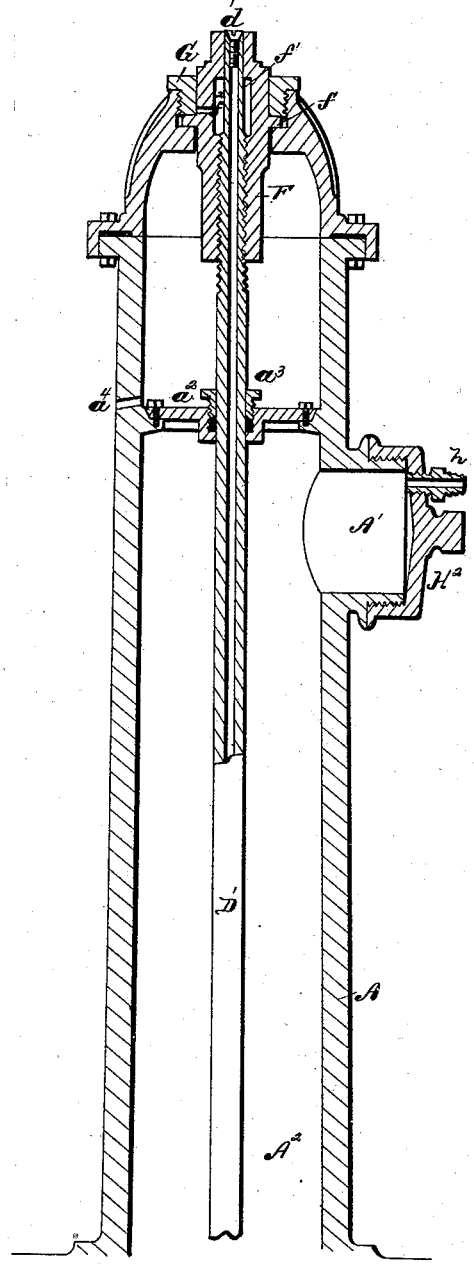
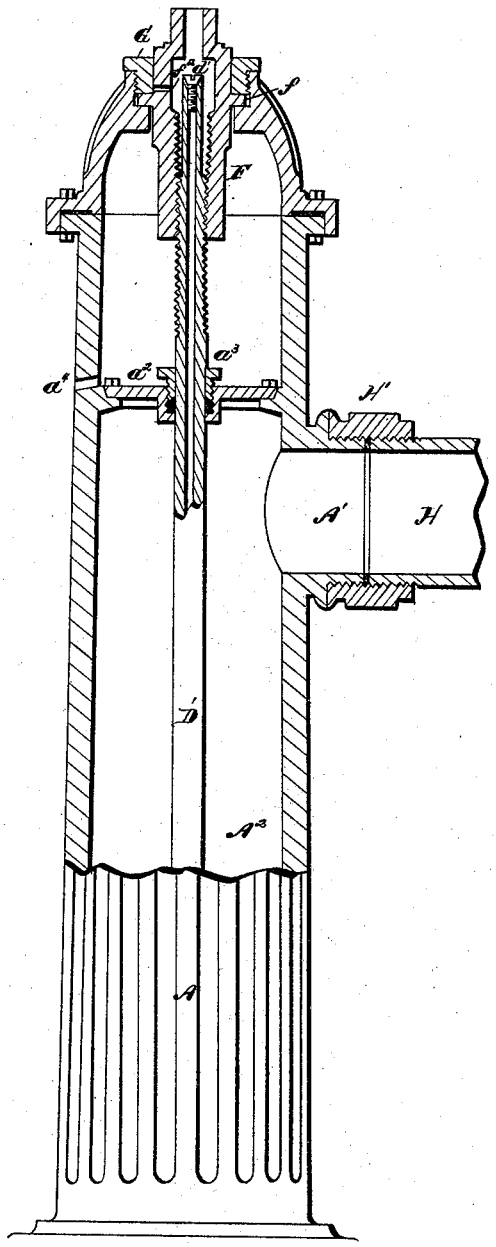


Fig. 4.



WITNESSES.

Samuel E. Thomas.

N. S. Wright.

INVENTOR.

Daniel W. Carroll.

By W. W. Leggett.

Attorney.

(No Model.) 3 Sheets—Sheet 3.

D. W. CARROLL.

FIRE HYDRANT.

No. 382,951. Patented May 15, 1888.

Fig. 7.

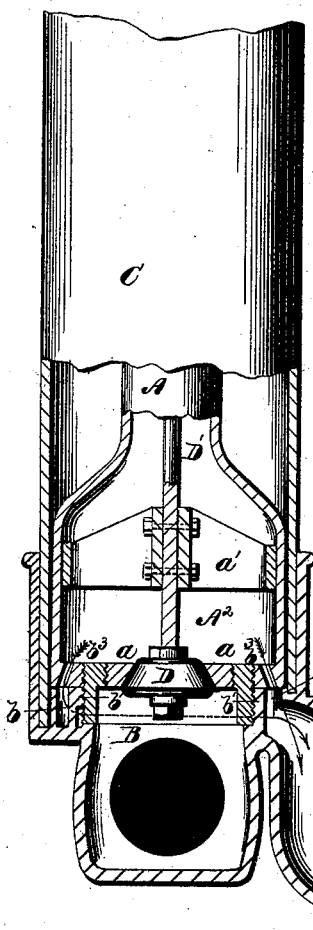


Fig. 5.

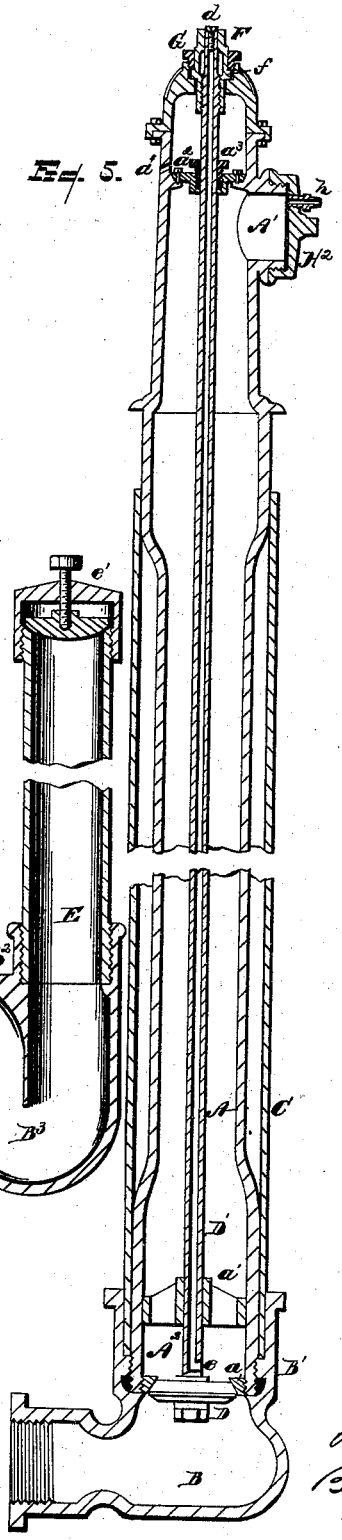
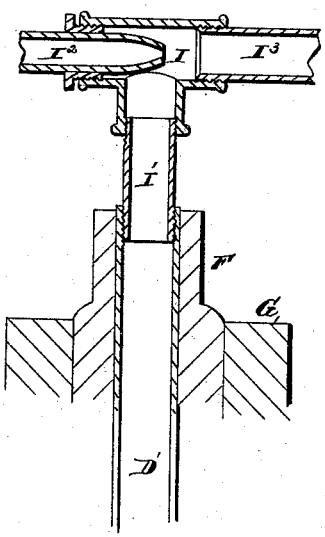


Fig. 6.



WITNESSES

Samuel E. Thomas.

R. S. Wright.

INVENTOR

Daniel W. Carroll

By W. W. Seggs & Co.

Attorney.

UNITED STATES PATENT OFFICE.

DANIEL W. CARROLL, OF DETROIT, MICHIGAN, ASSIGNOR OF ONE-HALF TO EDMUND A. CHAPOTON, OF SAME PLACE.

FIRE-HYDRANT.

SPECIFICATION forming part of Letters Patent No. 382,951, dated May 15, 1888.

Application filed March 31, 1887. Serial No. 233,149. (No model.)

To all whom it may concern:

Be it known that I, DANIEL W. CARROLL, of Detroit, county of Wayne, State of Michigan, have invented a new and useful Improvement in Fire-Hydrants; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to new and useful improvements in fire-hydrants, and has for its object to relieve such a hydrant from waste water, which may remain therein upon closing the valve controlling the admission of water thereto from the main, or which may accumulate therein should the valve fail to seat closely, the purpose of such relief being to prevent the freezing of the hydrant in cold weather. Heretofore in hydrants of this description, when located in proximity to sewers, it has been the practice to lead a waste-pipe from the base of the hydrant above the shut-off valve to the sewer in order to drain off the water from the interior of the hydrant when not in use; and so desirable has such drainage been that the waste-pipe has often been conducted a very considerable distance to communicate with the sewer, involving a very large expense for digging and for piping. So, also, in order to secure proper drainage, and thereby prevent the freezing of the hydrant, it has frequently been located to disadvantage in other respects. Where, however, sewers do not exist, as in the outskirts of cities, and in smaller towns, or where it is impracticable to lead a waste-pipe to a sewer, no means of relief has heretofore been employed to free the hydrant of waste water and prevent freezing, except to leave an open waste-orifice at the base of the hydrant to permit the water to leak away into the surrounding soil. This has answered to some extent when the hydrant is located upon high and porous ground, but has been found thoroughly impracticable where the hydrant has been located upon a low, hard, or wet soil. In such a case it is evident that such an open orifice only permits the surface-water from the soil to run back into the hydrant instead of giving any relief. In consequence of such constructions it has not infrequently been found necessary on occasion of a fire to first thaw out the hydrant after the fire-engine has reached the locality, or where—as in towns which do not use fire-engines, but direct pressure is employed in the main—it is found necessary in winter to provide some device whereby water may be heated and pumped into the hydrant to thaw it out when frozen, involving great delay in a time of emergency, resulting in the fire increasing its headway and the destruction of property.

To meet difficulties of this class and prevent the freezing of hydrants where communication with a sewer is difficult or impracticable is the purpose of this invention, which I accomplish by affording means of relieving the hydrant of water above the shut-off valve, notwithstanding the absence of communication with a sewer or the setting of the hydrant in damp soil.

My invention therefore consists in the combinations of devices and appliances, hereinafter specified, and more particularly pointed out in the claims.

In the accompanying drawings, which constitute a part of this application, Figure 1 is a vertical section of a device embodying my invention, showing a relief-pipe made integral with the hydrant-case or stand-pipe and leading upward within the same. Fig. 2 is a view in elevation and section illustrating my invention as applied to another ordinary or "wooden-box hydrant," the relief-pipe leading upward outside the stand-pipe or hydrant-case and communicating with the interior hydrant-chamber at its base. Fig. 3 is an enlarged view in vertical section of features of my invention located at the upper end of the hydrant, showing their position when the shut-off valve is closed. Fig. 4 is a similar view illustrating said features and their positions when the shut-off valve is open. Fig. 5 is a vertical section showing the relief-pipe as constituting a feature of the valve rod or stem and made coincident therewith. Fig. 6 is a separate view, in section, of a modification designed to effect a discharge of the waste water through the relief-pipe. Fig. 7 is a vertical section of a modification.

I carry out my invention, as follows: A rep-

resents the stand pipe or case of a hydrant. B is the elbow or hub with which the hydrant is connected, the engagement of the hydrant with the hub preferably being by a screw-connection, as shown at B′, so that the hydrant can be readily disconnected, if desired; but the connection may be made otherwise, as shown in Fig. 2 at B^2, the mode of connection of the hydrant with the main or hub forming no part of my invention, which I contemplate applying to hydrants of any ordinary construction. C represents a frost-jacket of any usual construction and arrangement. D is the shut-off valve; D′, the valve rod or stem leading usually to the top of the hydrant. *a* represents the valve-seat; *a′*, a guide for the rod D′, located toward the base of the hydrant, and a^2 an additional guide located above the hydrant-outlet A′ and preferably made tight and provided with a stuffing-box, a^3, through which the valve-rod passes, any water which may gain entrance into the chamber above the guide a^2 finding escape through an orifice, a^4, in the case. These various features may be constructed in the ordinary manner, unless it be preferred to modify the construction of the valve-rod, as hereinafter mentioned.

My invention consists, essentially, in leading a relief-pipe from at or near the base of the chamber A^2 of the hydrant above the shut-off valve and adapted to carry the waste water to the surface of the ground upon the application of pressure or suction, the hydrant being provided with such other features as may be necessary or desirable to readily permit the application of pressure or suction to force the water from the hydrant through the relief-pipe when the shut-off valve is closed, and so leave the chamber of the hydrant dry and thereby prevent any liability of its freezing. To this end, E represents a relief-pipe communicating with the chamber of the hydrant at its base above the shut-off valve, as shown at *e*, Figs. 1, 2, and 5. This relief-pipe in hydrants newly constructed may be located, if desired, in the case of the hydrant, as shown in Fig. 1, and be made integral therewith, the outlet of said pipe terminating toward the top of the case or stand-pipe, or at any suitable point above ground, as shown at *e′*, Fig. 1, the same being provided with a cap, e^2, removably engaged thereupon. The relief-pipe may also lead from the base of the chamber of the hydrant outside the casing, if preferred, as shown in Fig. 2, to a point above ground, and be provided with a cap, e^2. In hydrants of certain forms of construction this relief-pipe may lead upward between the case and the wooden box C′, as shown in said Fig. 2. This will be a very convenient way of arranging the relief-pipe upon hydrants already in use of this construction.

In other cases the relief-pipe may be made coincident with the valve-rod, as shown in Figs. 3, 4, and 5, said rod being made of suitable metallic tubing, opening at its base into the hydrant-chamber, as shown in Fig. 5. Where this latter form of arrangement is employed the upper end of the hollow valve-rod may have a screw-threaded engagement with a plug, F, rotatably engaged upon the upper end of the hydrant-case, said plug being held in place by a collar, G, resting upon a flange, *f*, of said plug, as shown, when in place. By rotating said plug it is evident that the valve-rod will be operated to open the valve or to close it, as the case may be, the relative positions of the said rod in said plug being shown in Figs. 3 and 4.

The upper end of the tubular valve-rod is closed by a screw, *d*, the end of said rod being reamed out to receive the head of the screw, as shown, and permit the rod being drawn through the upper end of the plug, as shown in Fig. 4, the screw *d* closing the tubular rod when the hydrant is in use. When the water is to be relieved from the hydrant, the said screw is removed, and when the operation has been completed it may again be engaged in place.

To permit the ready oiling of the bearings of the plug upon the hydrant and collar, I prefer to cut away the upper end of the tubular rod, and also the adjacent portion of the plug, to form a chamber, *f′*, into which oil may be admitted when the shut-off valve is open, as shown in Fig. 4, the oil finding its way to the parts to be lubricated through an orifice, f^2, in the plug. When the hydrant is in operation, the suction-hose H is engaged upon the outlet or nozzle A′ by a suitable pipe-union, H′.

H^2 represents the cap by which the nozzle is closed.

I will now proceed to describe the operation of relieving the hydrant of waste water, which may be accomplished in different ways, as may be desired.

When the shut-off valve is closed, the screw *d* is removed in case the tubular valve rod is employed, or the cap e^2 in case the relief-pipe is led upward independently therefrom. One convenient method of forcing the water from the hydrant when the operation is to be performed while the engine is present is to admit steam-pressure into the hydrant upon the water therein. Fire engines are accustomed to carry a small steam-hose for various purposes. For the use of such a steam-hose the hydrant—as, for instance, the cap H^2—may be provided with a nipple, *h*, upon which said steam-hose may be secured. When such engagement is made and steam is admitted into the upper end of the hydrant in this or any other suitable manner, it is evident that the water standing in the hydrant will all be forced out through the relief-pipe. So, also, such engines are accustomed to carry "reducers" for attaching hose of smaller diameter upon the hydrant-nozzle. Instead of employing a nipple, *h*, such a reducer may be engaged upon the nozzle A′ of the hydrant and the steam-hose be engaged therewith. Another convenient method of accomplishing the same end is to detach the suction-hose from the engine and

hydrant and connect a section of the delivery-hose (connected with the pumps of the engine, through which water is discharged upon the fire) upon the nozzle of the hydrant. In this case the engine will suck air and force it through the delivery-hose and into the hydrant upon the water, forcing the water out through the waste-pipe. Fire-engines, hose-carts, or supply-wagons may carry a small pump. This may be attached to the outer end of the relief-pipe, the cap H^2 being removed and the water sucked out; or an air-pump may be attached to the nipple *h* and sufficient pressure be applied thereby to drive out the water; or the air-pump might be connected to the nozzle A′ by means of a reducer.

In Fig. 6 still another means of relieving the hydrant of the water is shown, the same being essentially a steam-siphon, I, connected with the relief-pipe by a joint, I′. Said joint may take the place of the screw *d* when engaged, and steam be admitted into the siphon through the nozzle I^2. In this case the water will be sucked through the relief-pipe and discharged through the pipe I^3.

I would have it understood that I do not confine myself to any particular method of forcing out the waste water from the hydrant through the relief-pipe.

Where an ordinary wooden-box hydrant is employed—such as is shown in Fig. 2—the relief-pipe may conveniently be connected with a union, e^3, at the base of the hydrant-case; but where the frost-jacket C is engaged between the base of the hydrant and the adjacent hub, and the hydrant has a screw-threaded engagement upon said hub, it may be convenient to lead the relief-pipe from the lower end of said hub, communication being made with the base of the hydrant-chamber above the shut-off valve. Such a construction is shown in Fig. 7. In this case the upper end of the hub may be provided with a suitable connecting joint or shoulder, B^3, preferably U-shaped, communicating with the interior of the hydrant-case.

In Fig. 7 I have shown the upper end of the hub constructed with an annular channel, *b*, surrounding the shoulder *b′* and communicating with both the interior of the hydrant and the joint B^3, as shown, respectively, at b^2 and b^3. In a device of this construction the relief-pipe may be of larger dimensions, when the waste water will be effectually sucked out of the hydrant by simply continuing the operation of the engine through the suction-hose, the cap upon the relief-pipe being removed, thereby sucking the water from the hydrant.

It is understood that when the valve-rod is made tubular or hollow its lower end is closed, as shown in the drawings, so as to prevent the passage of any water through said rod from beneath the valve. In hydrants already constructed with an orifice to communicate by a connecting-pipe with a sewer said orifice may be readily closed when the relief-pipe is led upward within the hydrant case.

It is customary on the part of the fire-department to examine the hydrants just before the setting in of cold weather to see that the valves are in good working order, the hydrants closed, and properly drained when drainage is practicable, and my invention is designed for use mainly or largely at such times. The examiners may be provided with a suitable pump and the water be effectually expelled from the hydrant thereby.

Where the device shown in Fig. 7 is employed, should a small quantity of water remain after the suction through the hose H had ceased, it would drip into the base of joint B^3, and might be sucked out by a pump having its hose inserted into the pipe E.

What I claim is—

1. The combination, with a fire-hydrant and its case, of a valve provided with a hollow valve-stem extending to or near the top, said hollow space communicating at a point just above the valve with the interior of the case, and an attachment upon the case adapted to receive the discharge end of a steam-hose or air-pump, the construction being such that steam or air admitted into the case through the said attachment will expel the water from the case up through the hollow valve stem, substantially as described.

2. The combination, with a fire-hydrant, of a hollow valve stem communicating at its base above the valve with the chamber of the hydrant, said hollow orifice in the stem closed at the top of the stem by a removable plug or stopper, the construction being such that by the removal of the stopper the water in the case may be forced out through the passage in the valve-stem, substantially as described.

3. The combination, with a fire-hydrant having a hollow valve-stem communicating at its base above the valve with the interior of the hydrant-case, of a nipple, *h*, in the plug-cap h^2, adapted to receive the discharge end of the steam-hose or air-pump, substantially as and for the purposes described.

In testimony whereof I have signed this specification in the presence of two witnesses.

DANIEL W. CARROLL.

Witnesses:

N. S. WRIGHT,

M. B. O'DOGHERTY.