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Department for Supplying the City with Water.

REPORT

UPON THE

FIRE PLUGS

OF THE

CITY OF PHILADELPHIA.

Presented to the Committee on Water February 21st, 1865.

BY HENRY P. M. BIRKINBINE,

CHIEF ENGINEER.

PHILADELPHIA:

WILLIAM F. GEDDES, PRINTER, No. 320 CHESTNUT STREET.

1865.

Resolution passed by the Committee on Water, February 21st, 1865, in reply to the Resolution from Councils, of February 9th, 1865, relating to the condition of the Fire Plugs.

To the Select and Common Councils
of the City of Philadelphia.

GENTLEMEN :—Your Committee on Water, in reply to the annexed Resolution, passed by the Select and Common Councils of the City of Philadelphia, February 9th, 1865, would respectfully state that they have carefully considered the Report of the Chief Engineer on the condition of the Fire Plugs during the past inclement season, and are not only satisfied that there has been no neglect by the employees of the Department, but are gratified to learn the comparatively small number of fire plugs frozen during the unusually severe weather we have experienced—having been less than one per cent. of the whole number. And that only four of the fire plugs were frozen in the neighborhood where fires have occurred.

The valuable information contained in the Report in regard to the construction and preservation of the Fire Plugs, has induced us to order two hundred and fifty copies printed, for distribution to members of Councils, and others interested in preserving the efficiency of our Fire Plugs.

A. H. O'BRIEN, *Sec'ry.*

REPORT.

HENRY W. GRAY, ESQ.,

Chairman of the Committee on Water Works :

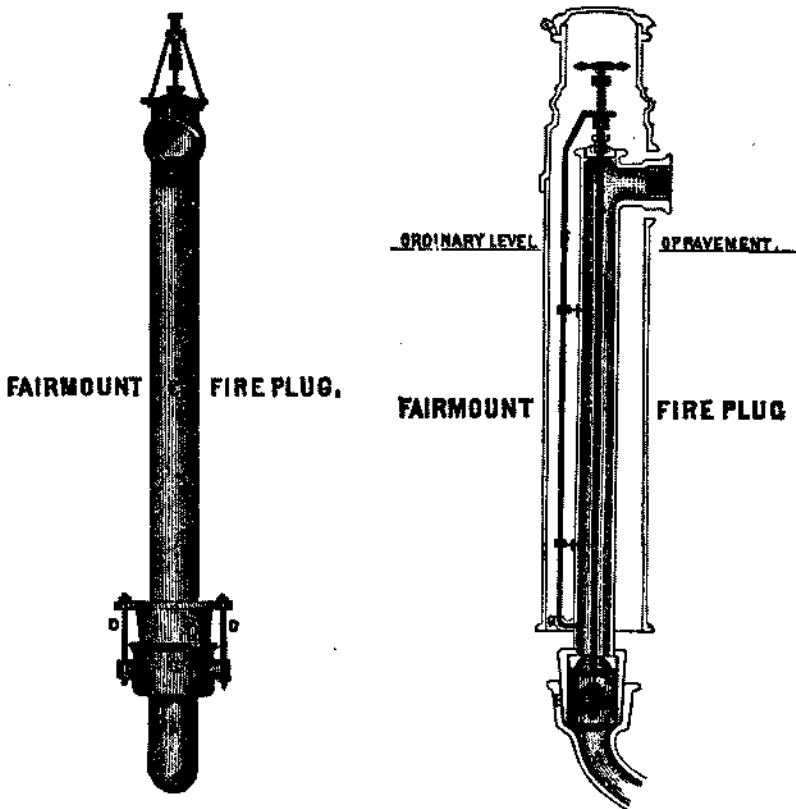
DEAR SIR :—The following statements are submitted in answer to the accompanying resolution referred to me by the Committee on Water :

Resolved, By the Select and Common Councils of the City of Philadelphia, That the Committee on Water Works be and they are hereby instructed to inquire into the present state of the Fire Plugs of the City, with a view of promoting the efficiency of the same during the severity of inclement seasons.

DESCRIPTION OF FIRE PLUGS OR HYDRANTS.

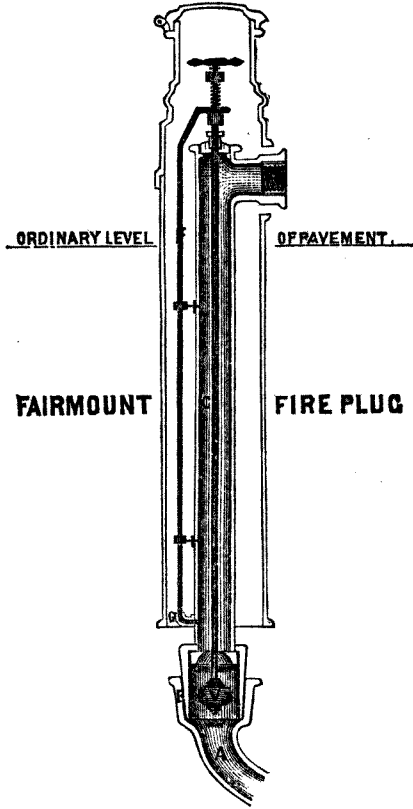
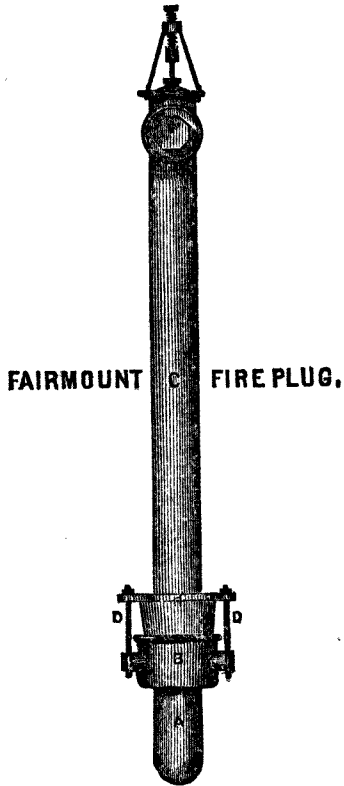
The fire plugs now used in this city are principally made from what is known as the old Fairmount pattern; they are placed upon the sidewalk, against the curb-stone. Fig. 1 will illustrate the manner in which they are constructed.

FIG. 1.



The connections to the street mains are generally made by a four-inch branch, and a four-inch pipe laid to the side of the street where a hydrant bend *A* is attached; this is a pipe curved up, with a tapering bell *B*, enlarged, so as to receive the fire plug or stand-pipe *C*; this bend has lugs cast on it to receive the stirrups *D D*, by which the plug is kept in its place. The plug or stand pipe is a pipe enlarged at the bottom to allow room for the valve

FIG. 1.



V, and the passage of the water around it. The valve is conical, and made of leather; it is operated by a rod *E* passing up through a stuffing box on the top of the stand: the valve is opened and closed by a screw worked by a handle.

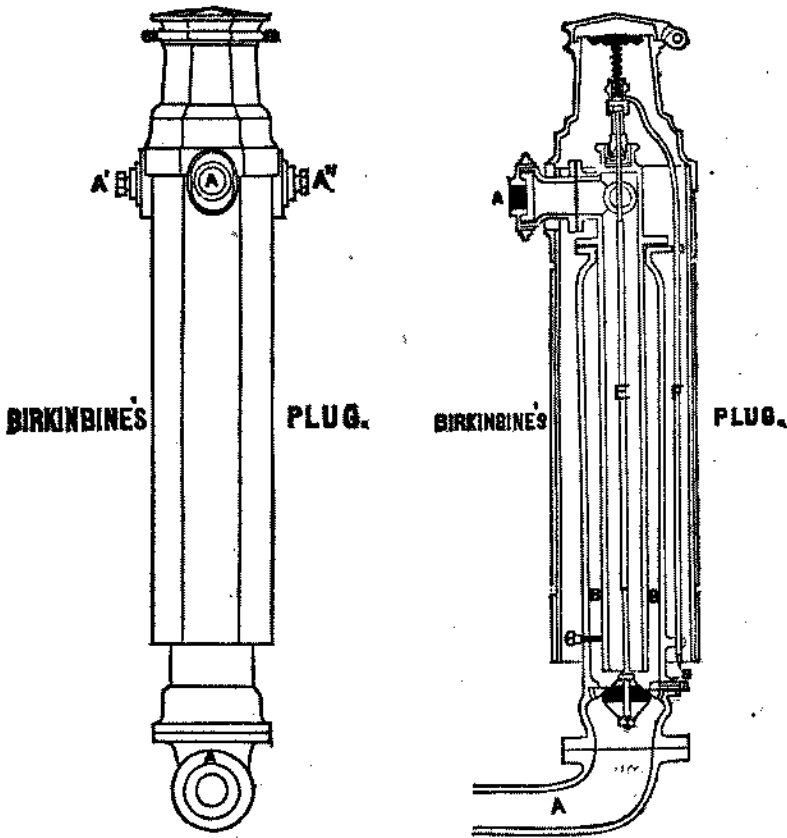
The valve seat is brass, secured to its place by a lead packing. The water passes out by a short branch near the top; this has a brass nut secured in it by lead packing; the nut is cast so as to fit the screws upon ordinary sized hose couplings, used by all the fire companies. At the back of the plug is a rod *F*, which is lifted by the screw operating the valve. When the plug is closed this rod is lifted, thus opening the waste or frost stop *G* at the bottom of the plug, allowing the water in the plug to flow out. When the plug is opened the rod drops into its place and closes the frost valve, so as to prevent waste while the plug is in use. The plug is held in place by a yoke *H* and the two stirrup bolts. The case is made of iron, in three pieces; so that it can be readily taken apart to facilitate repairs.

There are over three thousand plugs of this kind in the city, and most of the Water Works in the country use substantially the same plug.

In 1859, the introduction of steam fire engines made a larger supply of water necessary than could be procured from the ordinary plugs. This led to the construction of a plug designed by myself, (fig. 2,) for the purpose of furnishing a larger amount of water and preventing the destructive effect that the *ram* of the water had upon the ordinary plug; the connections and even the street mains were sometimes burst by the earlier steam engines. Improvements have, however, been made in the steam engines, which make them much less destructive. This plug is similar to the others in its operation, differing in being larger, furnishing the full flow of a four-inch pipe, and having the means provided for

making three connections, one for the suction pipe of steamers, and two for ordinary hose connections, *A A A*. Another peculiarity of this plug is the air chamber, formed by the annular space *B B*, between the pipe outside and the stand-pipe of the plug; this receives the *ram* of the water when a steamer is attached, and prevents injury to the plug, pipe or mains.

FIG. 2.



CONDITION OF THE PLUGS.

Immediately before the cold weather set in, all the fire plugs under the charge of this Department, were examined and placed in perfect order. They were not packed with hay or straw, as was the custom some years back, experience having proved that such packing was no protection against frost. Where the plugs can be drained so as to allow the escape of the waste water none of them

freeze; and where the well or space inside the case is filled by the overflowing of gutters or other means, the wet straw is no protection. For this reason the packing has been omitted, and it is believed that fewer plugs have been frozen since it has been dispensed with.

When plugs leak, or are carelessly or partially closed, they are liable to freeze. Most of the plugs are frozen by the overflowing of the gutters, obstructed by ice and snow.

Where the side walks are excavated and vaults constructed, the plugs are liable to freeze, indeed they are a constant source of annoyance to the Department and the occupants of the vaults. Where permission to excavate the side walks is granted, it should be stipulated that a wall be built of brick in cement, at least nine inches thick, inclosing the plug; with a drain to carry off the waste water, so as to prevent the plug from freezing and protect the occupants of the vaults from damage by water.

NUMBERS OF PLUGS FROZEN.

During the late severely cold weather the plugs were carefully watched, and when any one was found frozen, salt was introduced, which generally opened it; less than one per cent of the plugs were in this condition. After careful inquiry it has been ascertained that but four were found frozen, when needed at any of the numerous fires which occurred during that time. These occasioned but little inconvenience, as any where within the built up portion of the city, the flow of from fifteen to twenty plugs can be concentrated on a fire at one time.

IMPROVEMENTS.

From the comparatively satisfactory condition of the plugs during the late cold weather, and the small amount of trouble they occasion at any time, it is difficult to suggest improvements.

In Liverpool and Manchester, England, the plugs are much more numerous than here, and are placed on the mains; their construction is very simple and cheap; but being in the middle of the streets, it is sometimes difficult to find them when the ground is covered with snow, notwithstanding the marks placed upon adjacent houses indicating the location, distance and direction of the plug from the mark. Another difficulty is, that the stand or plug is detached, and one or more must be carried by each fire apparatus, and sometimes obstructions are found in the way of readily attaching them, and the street is always obstructed when they are in use; another objection is the trouble of flushing the gutters by them.

The plugs used in Boston, have some advantage, like those in our city, they are placed upon the sidewalk, but do not project above the level of the pavement, and are covered with a heavy iron lid. The objections to these, are the difficulty in finding them, particularly when covered with snow or ice and the fact that it would be necessary to attach a hose to flush the gutters.

In locating the plugs in this city, particular attention is paid to their use in cleansing gutters, &c., they are placed on the summit of streets, opposite alleys, or where they will afford the best opportunity of using them for this most essential purpose.

The adoption of a plug such as those in use in Boston, would effect a large saving of water, they would cost less, and would not be so readily accessible, and as a consequence not so frequently opened.

After a careful examination of the subject, the Department is not prepared to recommend any essential change in the plugs now used, but would suggest that the use of the same plug and case be continued with some alterations in fitting them up, and also, enlarging their capacity to full four-inch diameter, so as to furnish an adequate supply to steamers.

The plug for steamers designed by myself as described above, would be recommended were it not for the cost of constructing them, now fully as much as three of the ordinary plugs. Several large plugs were made two years ago, and one of them was placed at the corner of Eighth and Market Streets; this will readily supply three first class steamers.

It is no doubt better policy to have a larger number of small plugs, for should an accident happen to one of such large dimensions, the damage to surrounding property and to the street by water would be great. From these considerations and the fact that the capacity of the mains are readily exhausted in the vicinity of a fire, by the ordinary size plugs; the erection of these larger ones is not recommended.

A four-inch attachment will supply any of the steamers now in the use of the Fire Department with an abundance of water. This size is therefore thought to be sufficiently large, as nothing can be gained by concentrating a number of engines at one plug.

The plug and case, as the Department propose to make them in future, do not differ from those now in use, except in size.

If the City Shop was furnished with proper tools, they could be fitted up differently and better, at a less cost than they now are.

ABUSE OF PLUGS.

There are four men detailed from this Department, whose special duty is to see that the plugs are always kept in good order. It is their duty to be present at every fire that occurs in their respective districts; to see that all the plugs are closed, and if any require repairs to have it done immediately. This has been found particularly necessary since the introduction of steam fire engines, as they scarcely ever use one of the old plugs without loosening or injuring it in some way.

The plugs frequently receive rougher usage from the Fire Department than is necessary; the cases are sometimes broken by sledges without the least reason for such action; (more than twenty have been thus broken in the lower part of the City during the last two months,) and frequently no care is taken to close them. The assistance the Fire Department can render in keeping them in order would be of great value to the city, as the necessary repairs amount to a large sum of money annually. During the past year it was found necessary to repair 1208 plugs. This is not because they are carelessly or imperfectly made, but principally owing to recklessness in using them.

Many citizens open the plugs, supposing they have a right to do so, particularly if a gutter should appear to require flushing; and often they open them for their private benefit, to procure water for building and other purposes. All this is illegal and improper; it frequently subjects the Department to great inconvenience, particularly in the seasons when the greatest demand is made upon the Works.

In warm weather the men in charge of the plugs go to the police stations in their respective districts, and any complaints or requests sent there, or to the different Purveyors offices, receive immediate attention. By this means the plugs are opened, so as not to interfere with the regular supply for private uses, and the waste of water prevented. The amount of water drawn from the reservoirs and wasted in warm weather, is frequently one fourth of the whole amount necessary to supply the city.

When fire occurs there are frequently more steamers attached than the mains will supply; this makes the partial vacuum produced by them very trying to the plugs, mains and fixtures in the vicinity. There are very few locations in the city, where the mains are of sufficient capacity to furnish an ample supply to more than

ten steamers, working at the same time. When a greater number are attached, they rob and interfere with the supply of each other, and frequently those most advantageously situated, have the amount of water they can procure so much reduced by those situated more remote from the fire, that they are rendered useless. The plugs in the immediate vicinity of the fire, which should be the most efficient, have to be abandoned and others taken at a greater distance.

When the uses to which plugs are put in this city are taken into consideration, the necessity for carefully using them will be apparent. They are not only used for fire purposes, but for flushing gutters and sprinkling streets. It is so important to maintain the plugs in good repair, that care will be necessary by the Fire and Street Cleaning Departments in using them, and vigilance on the part of the police, as well as the employees of this Department.

H. P. M. BIRKINBINE,
Chief Engineer.

February 21st, 1865.