No. 677,362. Patented July 2, 1901.

C. E. LOETZER.

HYDRANT.

(Application filed Dec. 20, 1900.)

(No Model.)

Fig. 1.

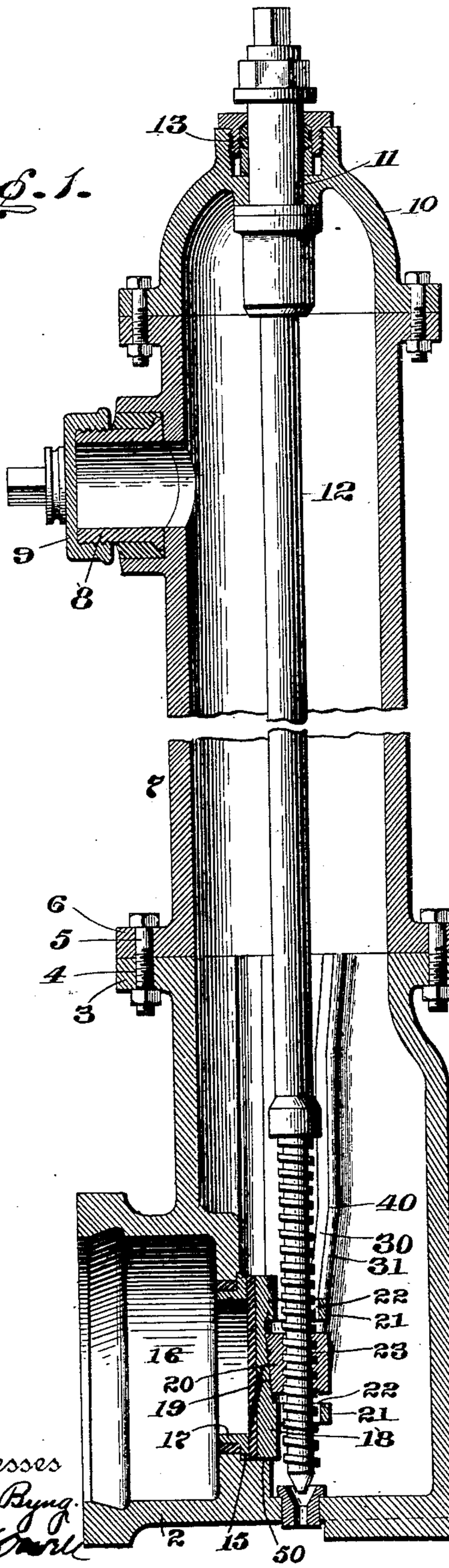


Fig. 2.

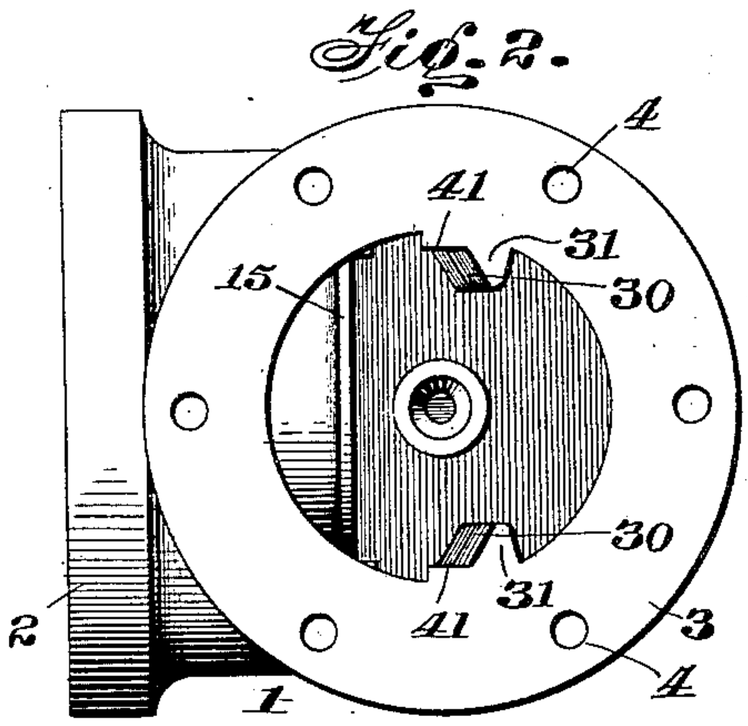


Fig. 3.

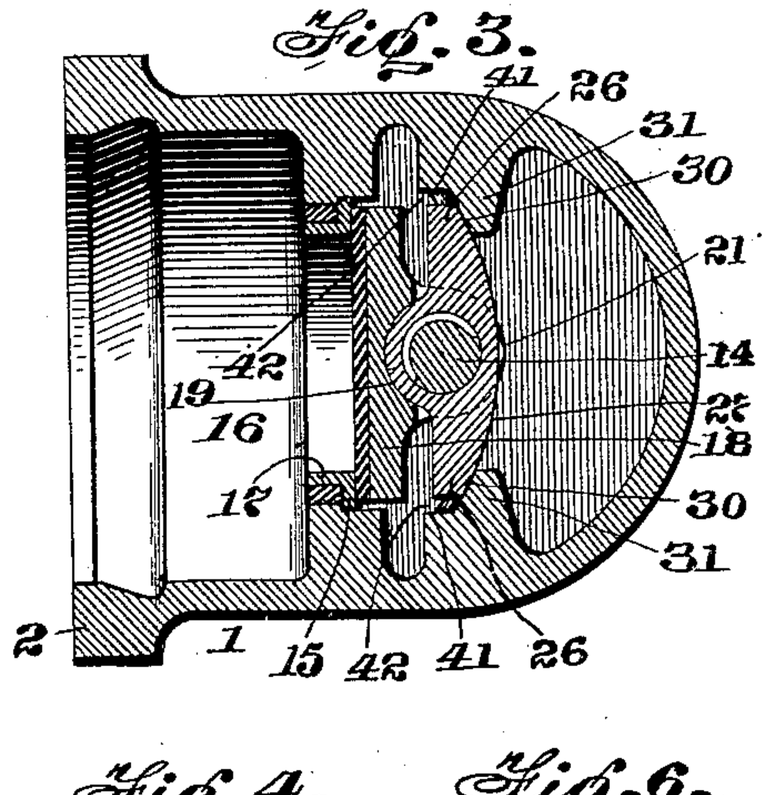


Fig. 4.

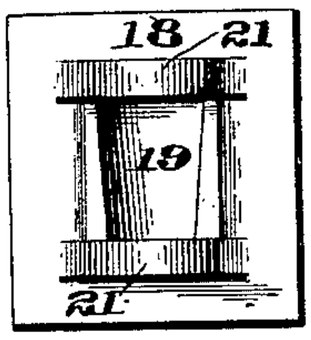


Fig. 6.

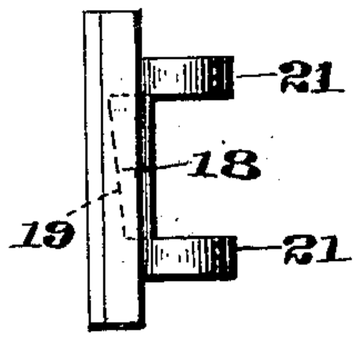


Fig. 5.

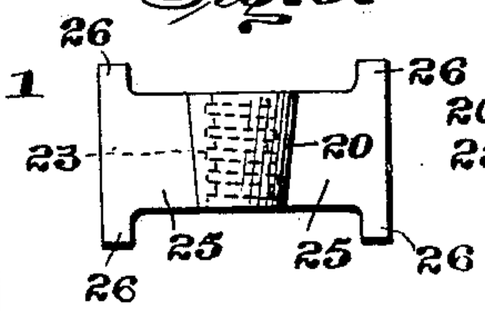
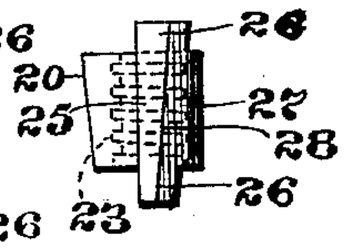


Fig. 7.



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UNITED STATES PATENT OFFICE.

CHRISTIAN E. LOETZER, OF SAYRE, PENNSYLVANIA, ASSIGNOR TO THE CAYUTA WHEEL & FOUNDRY COMPANY, OF SAME PLACE.

HYDRANT.

SPECIFICATION forming part of Letters Patent No. 677,362, dated July 2, 1901.

Application filed December 20, 1900. Serial No. 40,565. (No model.)

To all whom it may concern:

Be it known that I, CHRISTIAN E. LOETZER, a citizen of the United States, residing at Sayre, in the county of Bradford and State of Pennsylvania, have invented certain new and useful Improvements in Hydrants; and I do hereby 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 appertains to make and use the same.

This invention relates to fire hydrants or plugs; and it consists, substantially, in the improvements hereinafter more particularly described, and pointed out in the claims.

The invention has reference more particularly to that class of fire hydrants or plugs in which a sliding-gate valve is operated, by means of a wedge or other device, to open and close the inlet-passage leading to the hydrant or plug from the water-main. In the construction or manufacture of this class of fire hydrants or plugs it frequently happens that the seat for the valve is found not to be perfectly true or even between the sides thereof, and consequently when the valve is applied or placed in position a leakage is found to exist, which can only be remedied with great difficulty, as by removing the valve and regrinding the face thereof or else by removing the entire plug or hydrant and dressing or regrinding both the said valve and its seat. A further difficulty has been that even though the valve may fit against its seat evenly at first yet in a short time the same will begin to wear and leakage will also result, as in the instance before mentioned. This wear of the valve is due principally to the fact that the same portions thereof are always made to bear against the valve-seat, and even though the most reliable means may be employed to prevent rubbing of the valve it cannot be entirely obviated in some instances. The valve having its movements in direct lines generally and having no independent movement to conform to the inequalities produced by such wear usually has to be removed and subjected to regrinding or else replaced by another or entirely new valve, and which of course is inconvenient and laborious, besides being very expensive and time-consuming. A still further difficulty experienced with some former constructions of fire plugs or hydrants is that by reason of the form and peculiar disposition of the guides for the operating device or wedge for the valve the column of water ascending the interior of the hydrant is so broken up or divided as to result in considerable jerking and spurting of the water at the outlet, and consequently the discharge or delivery of the stream is irregular and uncertain, besides endangering the security of the hose or other connections at the said outlet. It has been proposed heretofore to provide a sliding-gate valve operated by a wedge having a downward or closing movement in excess of the valve, by which the latter is forced hard against its seat, and also having an initial movement independently of the valve, so as to cause the valve to be forced from its seat prior to being raised or opened. This construction, while having its advantages, does not entirely prevent wear of either the valve or its seat. In other former instances a substantially similarly operated valve has been located within a housing of special construction to hold and guide the same in its movements, the said housing, however, necessitating the use or employment of independent guides for centralizing the same within the hydrant, by which to insure the proper working of the valve and its operating devices. This construction, while also having certain advantages in particular adaptations thereof, is still somewhat expensive and unduly complicated. Now it may be also stated that in some former constructions of this class of inventions it has been proposed to construct the valve in a way to permit the same to have an independent movement to conform to inequalities of surface of either the said valve or its seat; but it will be found that in nearly all such cases the guides for the operating-wedge or similar device are so constructed and disposed within the base of the hydrant as to bring the same within the category thirdly referred to above.

One object of the present invention is to overcome all the above-mentioned disadvantages and to provide a fire hydrant or plug having means whereby the valve is rendered self-conforming to inequalities of surface of either the said valve or its seat and also whereby a tight fit of the valve is maintained when in its closed position.

A further object is to so construct and dis-

pose the guides for the valve that the column of water entering the hydrant is held practically intact or unbroken throughout the full extent of the waterway, thus insuring the delivery of a substantially solid stream at the outlet or discharge without jerking or undue spurting of the water.

The invention also has for its object to dispense with some of the features or elements hitherto employed in the construction of the valve and its operating devices, as well as to simplify the general arrangement and reduce to a minimum the cost of manufacture and repair.

The above and additional objects I attain by the means substantially as illustrated in the accompanying drawings, wherein—

Figure 1 is a vertical sectional elevation of a fire hydrant or plug constructed and arranged in accordance with my invention. Fig. 2 is a detail top plan view of the hydrant-base, the stand-pipe or upper section of the hydrant or plug being detached or removed. Fig. 3 is a detail cross-sectional view taken through the hydrant-base, the valve and its seat, and the operating wedge or device for the said valve. Fig. 4 is a detail inner front view of the valve, and Fig. 5 is a similar view of the operating-wedge therefor as when viewed from the left in Fig. 1. Figs. 6 and 7 are end elevations of the valve and its operating wedge or device, respectively.

In carrying my invention into effect I preferably construct the hydrant or plug in three sections—namely, a base, a central portion or stand-pipe fitted to said base, and a dome or cap-piece fitting upon and closing the upper end of the said central section or stand-pipe—and at or near the upper end of the stand-pipe I provide a suitable outlet or discharge nozzle for the water, which is closed by a removable cap or cover. The said base is provided at one side with a branch for connection with the ordinary main pipe, and at the point of junction of said branch with the base an interior annular valve-seat is provided, surrounding the passage that is controlled by the valve. Said valve-seat is preferably provided with a suitable annulus or wear-ring, and the valve is so located within the base as to lie snugly and evenly against said seat when in its closed position. If desired, the face of the valve may be simply ground off smooth, or the valve may also be fitted with a wear plate or disk, as in the case of the valve-seat; but these are immaterial features of construction and are entirely optional in practice. The valve is otherwise of peculiar construction, as is the operating device or wedge therefor, by which the valve is rendered self-conforming to inequalities in the valve-seat, and said operating device or wedge works against inclined guides or bearings therefor constructed at opposite sides of the interior of the hydrant-base. By thus disposing said inclined guides I dispense with the use of similar guides either above or directly opposite the valve, and in this way the waterway in the base of the hydrant is rendered practically free of protruding elements and the water permitted to ascend in practically an undivided column. The said wedge is operated in the usual way by means of a stem passing down into the hydrant and manipulated from above, and said stem serves also to open and close the usual vent in the bottom of the hydrant-base for permitting discharge of any water remaining in the hydrant after the valve is closed. The said operating-stem is provided with a left-hand thread at its lower portion, which threaded portion passes loosely through projections on the valve and engages similar threads in a central vertical opening in the operating-wedge. The said operating-wedge has a downward movement in excess of the downward movement of the valve, so as to force the valve hard against its seat, and it also has initial independent upward movement, so as to permit the valve to be forced clear of its seat prior to the opening or raising of the valve, which is effected by the continued upward movement of said wedge. The valve being closed and the vent being open and it being desired to open the valve and close the vent, the operating-stem is turned in the left-hand direction, whereupon said stem moves downward to an extent equal to the play or movement which the wedge has independently of the valve, whereupon the vent in the bottom of the hydrant-base is closed by the entry of the lower end of said stem therein, and at the same time the wedge has imparted thereto an initial upward movement independently of the valve and also about equal in extent to the downward movement of the stem. Immediately the wedge starts to move upwardly the pressure of water against the face of the valve forces the valve outwardly from its seat, so that no rubbing action of the latter takes place, and then by the continued upward movement of said wedge the valve and wedge begin to move together, and thus is the valve opened. To close the valve, the operating-stem is turned in the opposite direction, (to the right,) and then the valve and wedge move together downwardly, the vent also being opened by the removal of the end of the stem therefrom. As soon as the valve is carried to its full-closed position before the valve-seat the further downward movement of the valve is arrested by a stop in the bottom of the hydrant; but by still turning the stem the movement of the wedge is further continued downwardly, and by the wedging action produced upon the valve the latter is forced tightly against its seat.

Specific reference being had to the accompanying drawings, 1 represents the hydrant-base, having at one side the branch or elbow 2 for connection with the usual street water-main and being of suitable height and provided at its upper end with an annular flange

3, having suitable holes 4 for the passage of bolts or pins 5, passing also through similar holes formed in a corresponding flange 6 at the lower end of the stand-pipe or intermediate section 7 of the hydrant or plug. In its side, near the upper end thereof, the said stand-pipe or intermediate section is provided with a discharge or outlet nozzle 8 for the water, and which nozzle is closed by means of a suitable cap or cover 9. The upper end of said stand-pipe is closed by means of a dome or cap-piece 10, which is provided with a central opening 11 for the passage of the stem 12, which operates the valve and its wedge, and surrounding said opening is a suitable stuffing-box or any preferred packing device 13 for maintaining a water-tight bearing around said stem. The upper end of the stem 12 may be provided with any suitable crank or handle or may be squared to receive a wrench for operating the stem, while the lower portion of said stem is provided for a suitable distance with a left-hand-screw-threaded portion 14.

At the point of juncture of the branch 2 with the base 1 of the hydrant is formed an interior annular valve-seat 15, which surrounds the water-passage 16, leading to the hydrant, and which valve-seat is preferably, though not essentially, provided with an annular wear or packing ring 17, of any suitable material. The valve itself is designated at 18 and is preferably a rectangular plate smooth on its outer or working face and formed or provided on its opposite or inner face with a concavity 19, which in shape conforms substantially to that of a divided inverted frustum of a cone and which constitutes a wedge or inclined surface on said valve designed to coöperate with a similar surface on the operating-wedge 20 therefor. Projecting from the inner face of the valve above and below the said concavity is a lug or offset 21, each having an opening 22 therein for the free passage of the operating-stem, said openings being large enough to permit of the proper working and operation of said valve, as described. The said operating-wedge 20 is practically a nut, the shape of the operating-surface 21 of which is substantially that of a divided frustum of a cone and which surface is thus inclined reversely to the surface of the concavity 19 and constitutes also a wedge coöperating with the like surface on the valve as produced by the shape of the said concavity. It is obvious that the valve and wedge can be reversely constructed in some instances and operate with equal effect. Said wedge is formed with a vertical threaded opening 23, in which the threaded portion 14 of the operating-stem 12 works, and it is evident that as the stem is turned in one direction or the other the wedge and valve will be operated accordingly. The wedge is somewhat less in height than the space or distance between the lugs or offsets 21, so as to permit of the same having the desired movements independently of the valve, and said wedge is provided with lateral wings 25, which are preferably spread or widened vertically at the ends, as shown at 26, by which to obtain increased strength and bearing-surface therefor in the manner about to be described. The inner surfaces of said wings are straight, while the outer surface of the entire wedge, between its side extremities, is made curved or rounded at 27, so as to consume or take up as little as possible of the space in the waterway of the hydrant. The ends or widened extremities 26 of the said wings 25 are beveled or inclined inwardly and downwardly at 28, and these surfaces of said wings coöperate with similar reversely-inclined surfaces 30, formed on the adjacent faces of the vertically-disposed guides 31, arranged at opposite sides of the interior of the base 1 of the hydrant. From this construction it will be seen that the valve is arrested in its downward movement by means of a stop 50 in the hydrant-base, and even after the wedge has performed its full wedging effect upon the valve an additional wedging effect is produced on both said valve and wedge on the downward movement thereof by means of the said inclined guides 31. The said guides 31 at their lower ends extend only a short distance below the upper edge of the wedge when the latter is in its lowermost position, and for all the purposes of a full and perfect operation of the valve and wedge the said guides 31 need not extend any farther upward than the point 40. Preferably, however, the said guides 31 extend to the upper end of base 1 for convenience in guiding or directing the valve and wedge to their proper positions when inserting the same into the hydrant or in removing them for any desired purpose. It will be noted that the ends of the lateral wings 25 of the wedge do not quite reach to the outer sides 41 of the guides 31, thus leaving a space 42 at each side to allow for any slight lateral play which may be imparted to the wedge in operation. This construction also obviates any wear at the ends of said wings and permits the wedge to move up and down more freely than would be the case if the ends of the wings were in contact with any surface.

From the foregoing description it will be seen that in addition to its other movements the valve has an independent movement about the vertical axis of its operating-stem by which to conform to any wear or inequalities between the same and its seat, and in any of such movements thereof it will be seen also that the corresponding wedging-surfaces between the valve and wedge are always in parallelism, so that the parts will be equally responsive in operation whatever may be the position of the valve relative to its seat and the wedge.

It will of course be understood that I am not limited to the precise details of construction and arrangement of the parts herein shown and described.

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 fire-hydrant, the combination with the valve-seat, of a valve, and an operating-wedge therefor having a vertical screw-threaded opening, and a threaded operating-stem working in said opening, said valve and wedge having reversely-arranged coöperating surfaces each constructed of substantially a divided frustum of a cone, and said valve having independent movement about the vertical axis of said stem, as described.

2. In a fire-hydrant, the combination with the valve-seat, of a valve, and an operating-wedge therefor, said valve having in its inner surface a concavity shaped substantially as an inverted divided frustum of a cone, and provided with a lug above and below said concavity, said lugs having each an opening, and said wedge having on its opposite surface a projection fitting said concavity and shaped substantially as a divided frustum of a cone, the wedge also having a threaded opening, and a threaded operating-stem working in said opening of the wedge and passing loosely through the openings in said lugs, substantially as described.

3. In a fire-hydrant, the combination with the valve-seat, of a valve having independent movement about a vertical axis, and an operating-wedge for the valve, said wedge being provided with lateral wings having inclined surfaces, and inclined guides for said wings arranged interiorly of the base of the hydrant at the sides of the waterway, substantially as described.

4. In a fire-hydrant, the combination with the valve-seat, of the valve, and an operating-wedge therefor, said wedge provided with lateral wings having widened extremities formed with inclined surfaces, and inclined guides for said wings arranged interiorly of the base of the hydrant at the sides of the waterway therein.

5. In a fire-hydrant, the combination with the valve-seat, of the valve, and an operating-wedge therefor having a closing movement in excess of the valve, said wedge provided with lateral wings having widened extremities formed with inclined surfaces, and inclined guides for said wings located interiorly of the base of the hydrant at the sides of the waterway therein.

6. In a fire-hydrant, the combination with the valve-seat, of a valve, and an operating-wedge therefor, said valve and wedge having reversely-arranged coöperating wedging-surfaces each constructed substantially of a divided frustum of a cone, said wedge also provided with lateral wings having inclined surfaces, and inclined guides for said wings arranged interiorly of the base of the hydrant at opposite sides of the waterway therein.

7. In a fire-hydrant, the combination with the valve-seat, of a valve, and an operating-wedge therefor, said valve and wedge having reversely-arranged coöperating wedging-surfaces each constructed substantially of a divided frustum of a cone, said wedge also provided with lateral wings having widened extremities formed with inclined surfaces, and inclined guides for said wings located interiorly of the hydrant-base at the sides of the waterway therein.

8. In a fire-hydrant, the combination with the valve-seat, of the valve having independent movement about a vertical axis, and an operating device therefor constructed to permit such movement, said device having lateral wings, and guides for said wings arranged interiorly of the base of the hydrant at the sides of the waterway, substantially as described.

9. In a fire-hydrant, the combination with the valve-seat, of the valve having independent movement about a vertical axis, and an operating device therefor constructed to permit such movement, said device provided with lateral wings having inclined surfaces at the ends, and inclined guides for said wings arranged interiorly of the base of the hydrant at the sides of the waterway, substantially as described.

10. In a fire-hydrant, the combination with the valve-seat, of the valve having independent movement about a vertical axis, and an operating device therefor constructed to permit such movement, said device provided with lateral wings having widened or elongated extremities formed with inclined surfaces, and inclined guides for said extremities arranged interiorly of the base of the hydrant at the sides of the waterway, substantially as described.

11. In a fire-hydrant, the combination with the valve-seat, of the valve having independent movement about a vertical axis, and an operating device therefor constructed to permit such movement, said device having an opening-and-closing movement in excess of the valve and provided with lateral wings having widened or elongated extremities formed with inclined surfaces, and inclined guides for said extremities arranged interiorly of the base of the hydrant at the sides of the waterway, substantially as described.

12. In a fire-hydrant, the combination with the valve-seat, of the valve, and an operating device therefor, said device provided with lateral wings having widened or elongated extremities formed with inclined surfaces, and the outer surface of said device being rounded between the vertical edges thereof, and inclined guides for said extremities arranged interiorly of the base of the hydrant at the sides of the waterway therein, substantially as described.

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

CHRISTIAN E. LOETZER.

Witnesses:
LEWIS KINSMAN,
CLAYTON BERGHAUS.