

No. 699,176.

Patented May 6, 1902.

W. J. HOUGH.
CATCH BASIN FOR SEWERS.

(Application filed Sept. 4, 1900.)

(No Model.)

3 Sheets—Sheet 1.

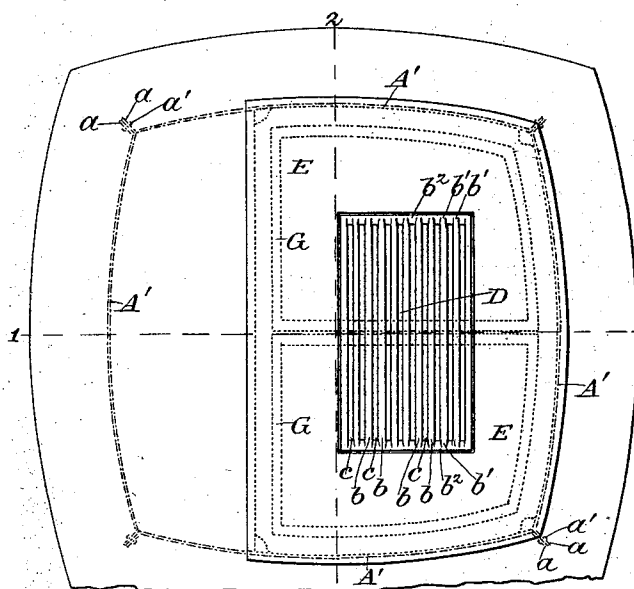


Fig. 1.

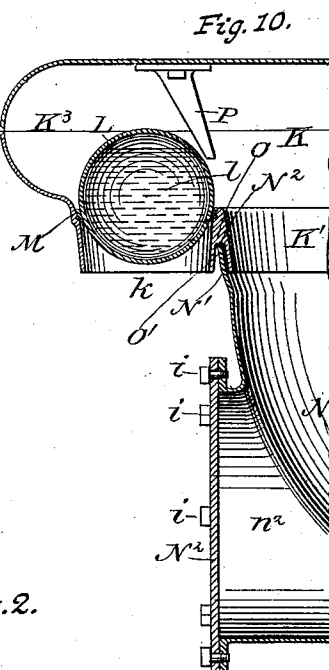


Fig. 10.

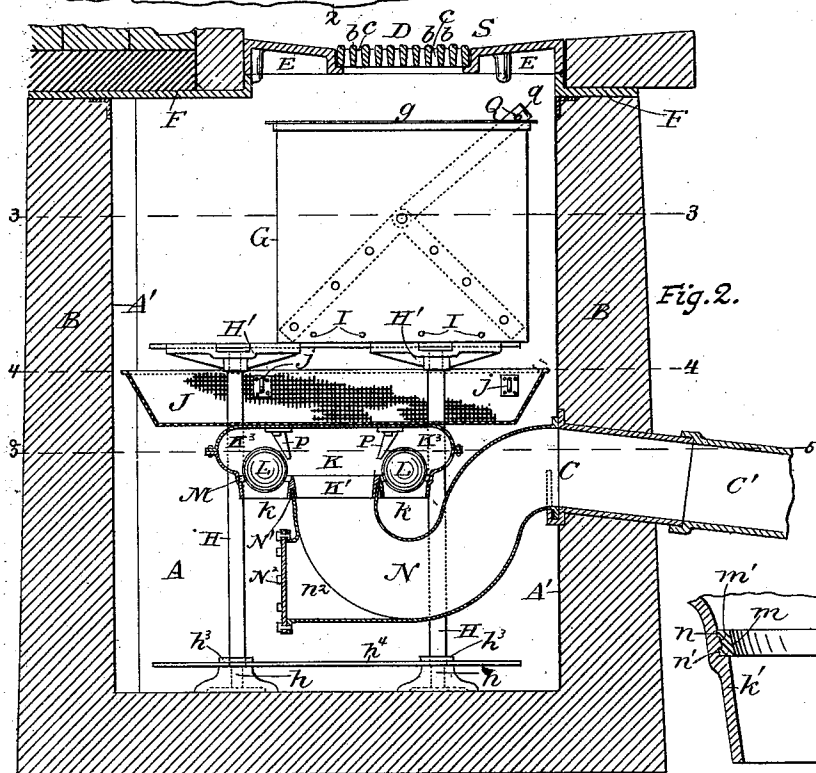


Fig. 2.

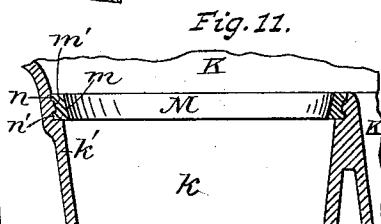


Fig. 11.

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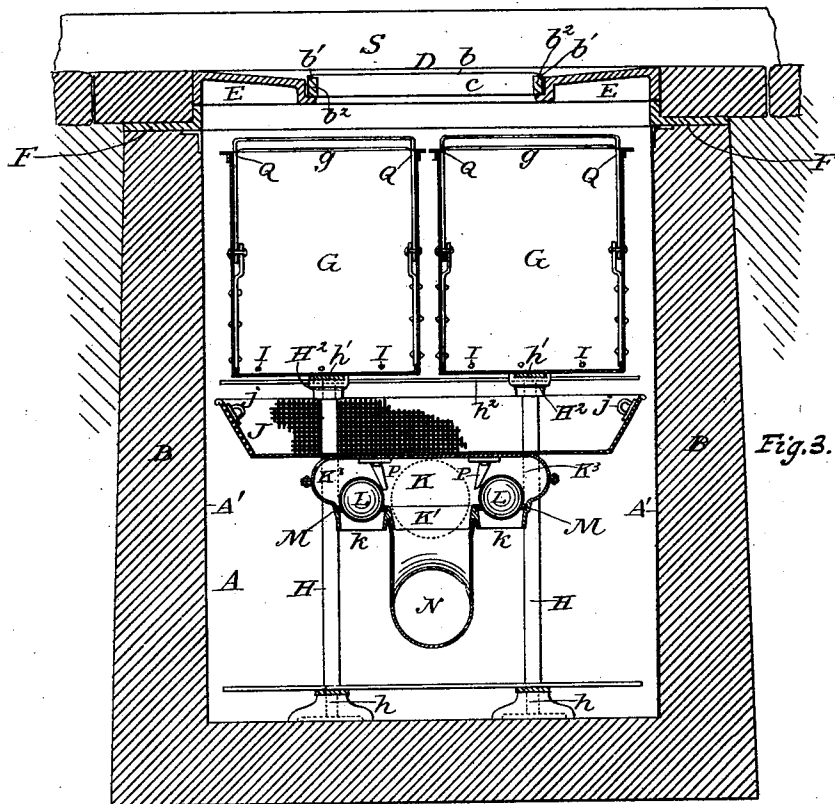


Fig. 3.

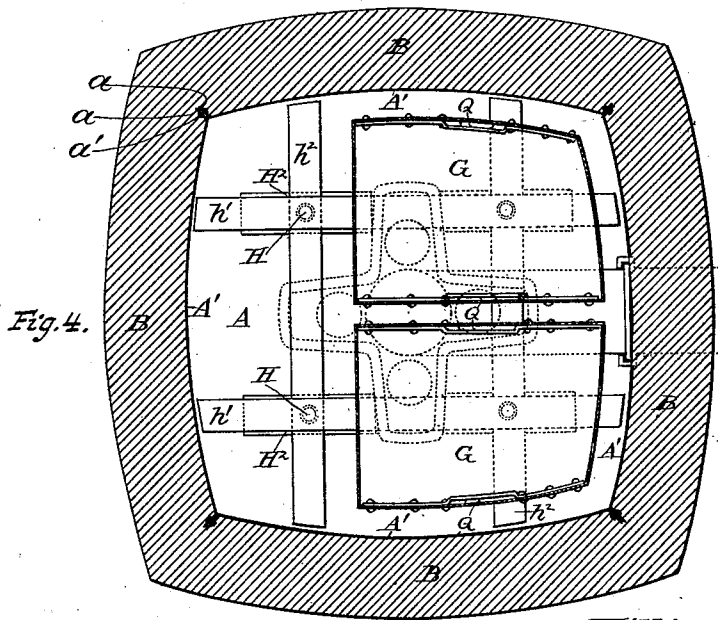


Fig. 4.

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3 Sheets—Sheet 3.

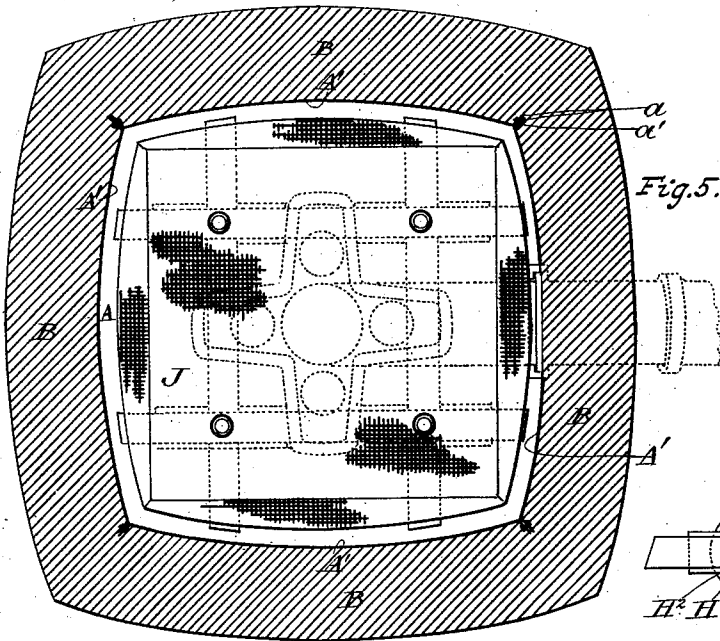


Fig. 5.

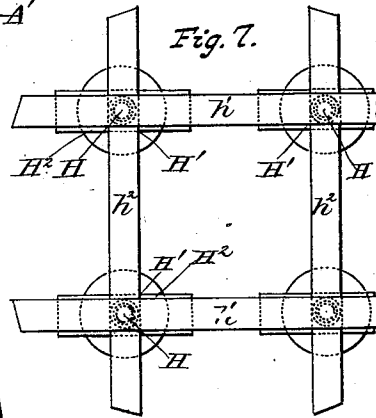


Fig. 7.

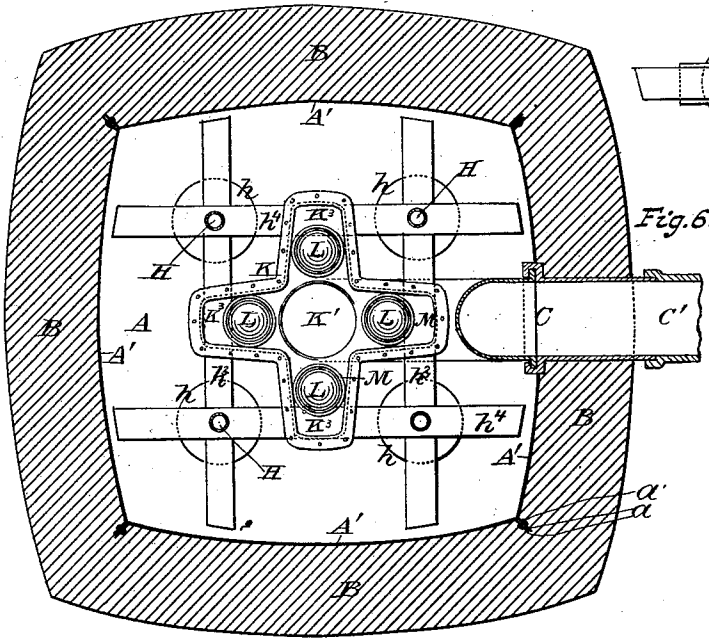


Fig. 6.

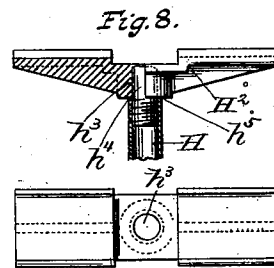


Fig. 8.

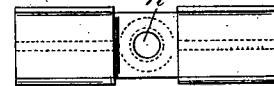


Fig. 9. H^2

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UNITED STATES PATENT OFFICE.

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CATCH-BASIN FOR SEWERS.

SPECIFICATION forming part of Letters Patent No. 699,176, dated May 6, 1902.

Application filed September 4, 1900. Serial No. 28,887. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. HOUGH, a citizen of the United States, residing at Albany, in the county of Albany and State of New York, have invented new and useful Improvements in Catch-Basins for Sewers, of which the following is a specification.

My invention relates to catch-basins for sewers; and it consists in the novel devices and novel combinations of parts and devices herein shown and described, and more particularly pointed out in the claims.

The objects of my invention are to provide with a catch-basin which is interposed between the street-surface and a sewer means and devices by which a separation of the larger pieces of both floatable and sinkable substances washed toward the catch-basin by the street surface water may be separated from the smaller pieces of those substances and the smaller pieces and particles of floatable and sinkable substances be readily separated from each other and the latter be in part run into the sewer to be floated off through the sewer to a discharge therefrom, while the former may be deposited into suitable removable sedimentary vessels and the sewer-gases be prevented from escaping from the sewer by the way of the catch-basin to the street, as heretofore.

Other objects and advantages of the invention will be fully understood from the following description and claims when taken in connection with the annexed drawings, in three sheets, in which—

Figure 1 is a view in plan of my improved catch-basin at its street-intake. Fig. 2 is a longitudinal section of the same at line 1 in Fig. 1. Fig. 3 is a transverse section at line 2 in Fig. 1. Fig. 4 is a horizontal section at line 3 in Fig. 2. Fig. 5 is a horizontal section at line 4 in Fig. 2. Fig. 6 is a horizontal section at line 5 in Fig. 2. Fig. 7 is a plan view of preferred form of device for supporting the sedimentary vessels. Fig. 8 is a view, part in section, of the coupling device between standards and seating-bars of said supporting device and also the upper end of a standard. Fig. 9 is a view of the upper side of the said coupling device. Fig. 10 is a section, on enlarged scale, showing preferred forms of construction of certain parts; and Fig. 11

is a section, on enlarged scale, of the valve-seat and wall of an intake-section of the trap, between the chamber of the basin and its discharge-opening.

Similar letters of reference refer to similar parts throughout the several views.

In the drawings, A is the catch-basin, which may be made of any suitable material and of size and proportion adapted to give it the capacity for receiving the several devices to be assembled and combined within its chamber for operations, as hereinafter described. My preferred form of construction shown in the drawings consists of a metal vessel formed of sheet-metal walls A', made slightly concavo-convex in a horizontal direction and on straight lines in a vertical direction and provided with coupling-flanges *a a*, preferably integral with the plates of said walls and secured together by suitable rivets *a'*. This vessel is made with a vertical length of from six to eight feet. The several walls of this catch-basin and their adjuncts are coated with a suitable material adapted to prevent air and water having contact with the surfaces of the metal of said basin, so that oxidation of the same may be prevented. This catch-basin may be backed all around with sand or brick, yet in some cases, as when the metal of walls A' is thin, I prefer to reinforce said walls by walls B of concrete, formed of Portland or natural hydraulic cement combined with sand and broken stone or gravel, mixed and applied and rammed in accordance with the best methods of concrete construction, and in this concrete may be embedded suitable cast-iron pieces (not shown) set on the top of the concrete walls to prevent wear by attrition or be set elsewhere for strengthening the walls against pressure by frost. These concrete walls B are tapering and may be stepped as they run upward as may be preferred, so that frost may be prevented from heaving the same. The bottom of the basin is preferably formed of similar hydraulic cement.

C is the discharge-opening from the chamber of the catch-basin, which opening communicates to the sewer (not shown) through the medium of the conduit C', leading from the said basin to said sewer.

D is the intake-opening, which communi-

cates from the street-gutter S to the chamber of the basin A. This intake-opening D is of grate form and consists of parallel bars *b b* and openings *c c* alternating, the bars being
 5 of metal and of sufficient size to give them strength to resist strains which may tend to break or bend them, while the openings *c c* are narrow—say about three-eighths of an
 10 inch wide—so as to adapt this intake to separate the larger pieces of both floatable and sinkable substances from the smaller pieces of the same substances, respectively, by the
 15 former being carried past this grate-form intake by riding on said parallel bars *b b*, and the latter being carried through the slot-form openings *c c* by the water from the street-gutter G into the said basin. The parallel bars
 20 *b b* and slot-form openings *c c* are made to run in direction parallel with the line of direction of the flow of the water in street-gutter G, in which this intake-opening D is placed, and not transverse to said direction of flow of the
 25 said water. By this parallel arrangement of the said bars and the alternating slot-form openings of the intake-opening D in relation to the line of direction of the flow of the street-water in gutter G, as indicated by arrow 1 in Fig. 1, both the floatable and sinkable substances
 30 of larger size than the width of the openings *c c*—such as pieces of wood, large leaves, and pieces of brick, stone, cans, &c.—may freely pass forward over the bars *b b* and be clearly discharged from off the same at their terminals *b'*, which terminals have their
 35 upper sides relatively above the plane of the upper side of the frame members *b² b²* of the said grate-form intake-opening D, as shown in Figs. 1 and 3, while the smaller pieces or parts of said floatable and sinkable substances
 40 will readily pass down through the slot-form openings *c c* into the receptacle below with the water taken in by the said intake-opening. It should be understood that the aggregated areas of the slot-form openings *c c* of
 45 this intake-opening D should be but a little larger than the area of the discharge-opening C, leading from the chamber of the catch-basin to the conduit C', communicating to the sewer, which is not shown. As it is evident
 50 that an intake-opening of any form employed and much greater than the discharge-opening C may take in such a volume of water as to quickly fill the chamber of the catch-basin to overflowing, in which case other devices and parts of this invention would be
 55 rendered more or less ineffectual for obtaining all the beneficial results designed to be secured. This intake-opening D is removable at will from its frame or setting E, which
 60 latter is also removable at will from the fixed supporting-frame F, which latter is shown to have its support on the upper end of the walls of the catch-basin in its reinforcing concrete outer walls B, Figs. 2 and 3.
 65 The removable frame E, serving as a setting-frame for the removable intake grate-form opening D, may be of any suitable form

of construction adapted to support the said intake-opening at a suitable distance above the plane of the upper end of the catch-basin, 70 as shown in Figs. 2 and 3, and give it strength and stiffness for supporting wheels of vehicles, animals, &c., without liability of breaking down.

G G are removable sedimentary vessels 75 suitably arranged and supported beneath the intake-opening D and within the upper portion of the chamber of the catch-basin A with their upper ends at a few inches from the lower side of the bars *b* of the said intake- 80 opening. Although but a single removable sedimentary vessel may be employed, yet I prefer to employ at least two, although three or more may be used when the conditions of the streets contributing to the catch-basin 85 necessitate an increased number. These sedimentary vessels have their aggregated areas of upper open ends of their chambers considerably larger than that of the removable intake-opening D above and are so arranged in 90 relation to the latter that said opening D will be relatively central to the aggregate areas of both open ends *g*, so that all the discharges from said intake-opening D may be relatively central with the aggregate chambers. When 95 but a single sedimentary vessel is employed, said intake-opening D will also be larger in area than the area of the open end of the chamber of said vessel, so that similar central discharges may be had from the former into the 100 latter.

Any suitable form of means may be employed for supporting the sedimentary vessel or vessels in proper position with the upper end of the catch-basin, yet I prefer to employ 105 a suitable number of standards H, supported by their base ends *h* from the bottom or floor of the catch-basin and projected vertically upward to a suitable distance and provided with suitable horizontal seats H', on 110 which the bottom ends of the sedimentary vessel or vessels G may be readily seated, as shown. These seats H' may be of any preferred form, yet I at present prefer to make them of broad flat bars *h'* and *h²*, the latter 115 arranged transverse to the former and with such length as to extend to near the side walls of the catch-basin, so as to be little short of touching the same. These bars are suitably coupled together by means of coupling-pieces 120 H², loosely mounted on the upper ends of standards H by means of central socket *h³*, provided in the lower side of said coupling-piece H², and the tenon *h⁴*, extended upward from shoulder *h⁵*, preferably formed by the 125 terminal end edge of the said standards, as shown in Fig. 8. These seats H' being readily removable from the upper ends of said standards H may be readily removed therefrom piece by piece as may be required and be as 130 readily replaced.

When street surface water from the street-gutter is being poured into the sedimentary vessel or vessels G G from the intake D above

the floatable and sinkable substances, mixed with the street-water and discharged into said vessels, will at first fill the same, and the in-pour of this mixture being continued the water, with the floatable substances, will then flow outwardly in all possible directions and run in cascade form over the edge margins of said vessels G, and thereby float out from said vessels the floatable substances, while the sinkable substances—such as sand, broken bits of stone and brick, and other substances heavier than water—will settle downward and eventually be precipitated within the chamber of said vessel or vessels, there to remain until the vessel or vessels are removed from the catch-basin and dumped therefrom.

I I are small areas of openings provided in the lower end of each sedimentary vessel, at or near the bottom of the same, through which the water remaining in said vessel and mixed with the heavy sediment therein may percolate and gradually drain the water off from the same, and thereby reduce the weight of the contents of said vessel, so that the latter when filled or nearly filled may be conveniently removed at will by any suitable means and the contents be dumped therefrom in condition of a moist mass of granular substances.

J is a grated or open-work vessel, preferably made of woven wire, with meshes about one-half of an inch square. This vessel is the water-screening vessel designed to retain the larger pieces of the floatable substances which passes out from the sedimentary vessels into the catch-basin and allow the water and finer particles to pass below, and it is arranged between the bottom of the sedimentary vessel and the discharge-opening from the catch-basin. This vessel may be supported by any suitable means and at any preferred distance below the bottom of the sedimentary vessel and may be made sectional or consist of duplicate vessels or consist of a single vessel, as may be preferred or may be found to be advantageous by reason of the conditions which may attend its use. When made sectional or comprising two or more smaller or duplicate vessels, they may be wholly removed, with contents therein, from the basin A and dumped, or when consisting of a single vessel it may be hoisted up to the upper end of the catch-basin and be there held until the contents are removed. Such removal or hoisting of said vessels J may readily be effected when the seating-bars h' h^2 and their coupling-pieces H^3 have been removed away from standards H to outside said catch-basin.

Located with the catch-basin and between the sedimentary vessels G and discharge-opening C to the conduit C', leading to the sewer, is a suitable trap K of capacity corresponding to that of the discharge-opening C, which trap is adapted to prevent the escape of gases generated within the sewer from passing into the catch-basin and thence outside to the

atmosphere of the street. Although a trap of any suitable construction may be employed, yet I prefer to use a trap embodying the features of construction shown and described in Letters Patent No. 648,207 and granted to William J. Hough April 24, 1900. With the said Hough trap I have combined downwardly-projected intake-openings k k , which in their aggregate capacity shall equal or nearly equal the capacity of the discharge-opening K' of the trap. Ball-form valves L are employed for closing the intake-openings k by seating on suitable ring-form seats M. These seats M are of a metal or alloy which will not rust, and may be of aluminium, brass, bronze, or other suitable material and may be fixed in place in the upper end of the walls of the respective openings k by any suitable means. My preferred form of construction of this seat-piece M and manner of securing it in place in the upper end of wall k' of the intake-opening k are shown in Fig. 11, which construction and manner of securing said seat in place are briefly described as follows: The seat M is made of suitable material, as above described, and has its internal ball-seating surface made in whole or part with a concave form of curve m , which is in correspondence with the curvature of the surface of the ball-valve L, and in its external side are provided the annular groove m' and upper and lower end edge margins n n' , which are made on suitable tapering lines as they run downwardly from the upper end edge to lower end edge of the said seat-piece M and are coated with tin. When the lower half-section of the trap-patterns is being molded in the sand, the said seat-piece M will be placed in the suitable internal tapering annular recess provided, respectively, in the upper ends of the walls of the intake-walls with which the pattern is made, and when the mold has been properly completed and taken apart the seat-pieces M will be left in their places in the mold, and when the molten metal is poured the latter will fill in the matrix of the mold adjoining the said seat-pieces and also the cavity resulting from the annular grooves m' in said seat-pieces and fuse with the surface metal of said seat, when said seat will be held securely in place and have its joint with the metal of the wall of the said intake-opening K water-tight.

The ball-valves L may be of any suitable material and construction; yet I prefer to construct them of thin elastic rubber in the form of a true sphere and hollow and having its wall of thickness of about one-twelfth of an inch or more or less, accordingly as the size of the ball-valve may require. This ball-valve is nearly filled with a suitable fluid l , preferably water, so as to leave a sufficient portion of its spherical-form chamber unoccupied, so as to allow the fluid ample room in which to expand without changing the contour or size of the said ball-valve.

To better adapt my improved trap for use

in catch-basins and prevent floatable substances incidentally in street surface water from fouling the ball-valves, I provide within the trap relatively back from the intake-openings k and above the valve-seats M the outwardly-extended bay-chambers K^3 , so situated as to allow the ball-valves L to both rise and move in direction from the discharge-opening, so as to allow the said ball-valves to rise from their seats to such a distance as to permit the full volume of water to readily enter the trap by the way of the respective intake-opening and deliver a full volume from each of the same to the discharge-opening K' , while the ball-valves themselves will each receive the impact of the rapidly-inflowing water on the portions of the ball over and relatively forward toward the discharge-opening, and thereby be revolved with great rapidity in one direction while the water is washing away the floatable substances in direction toward the said discharge-opening. Fingers P, properly secured in place and in situation back from discharge-opening K' , prevent the ball-valve from being carried to said opening.

The trap K is suitably supported within the catch-basin and communicates by the way of its discharge-opening K' to the discharge-opening C of the catch-basin by means of a suitable pipe or bend N. This pipe or bend I preferably make with a double bend or S form, as shown, so as to produce between the conduit C' , communicating from the catch-basin to the sewer, (not shown,) a water seal, which is designed to relieve the ball-valve from excessive pressure from gases which may be generated within the sewer. This trap K is swiveled in the annular sleeve portion N' of the pipe or bend N and seats on a suitable gasket or packing-ring N^2 , provided between seating-surface o , adjoining the wall of the discharge-opening K' , and seating-surface o' , formed by the upper end edge of the sleeve portion N' , as shown in Figs. 10 and 11, and it may be readily removed from the pipe or bend N by lifting the body of the trap vertically to any desired suitable distance. Access may be had to the body of the trap by removal of the binding-bolts i , shown to be employed for holding the flanges k^2 k^3 of the respective sections of the trap securely clamped together. By removal of the closing-plate N^2 from the hand-hole n^2 , provided at the receiving end of the bend or pipe N, access may be had to the chamber of the latter.

The standards H, supporting the horizontal seats H' , on which the sedimentary vessels are supported, are prevented from shifting horizontally in any direction by the co-action of the lower horizontal bars h^3 h^4 with the horizontal bars h h' and the side walls of the catch-basin.

Links Q, provided in their free ends with hook-receiving eyes q and pivoted on opposite side walls of the sedimentary vessels, respectively—each at a point a little above the cen-

ter of gravity—serve as a means by which hooks of a suitable sling or other suitable adjunct (not shown) of a hoisting device may be readily connected with the said sedimentary vessels for raising them up out from the catch-basins for dumping their contents into a suitable receptacle or place of disposal. Suitable hook-receiving eyes j j are provided in the grated vessel J for service for connecting with the said vessel J the hooks of the same or a similar hoisting device which may be used for hoisting the sedimentary vessels.

It is evident that should the aggregated openings through the removable intake D be much larger than the area of discharge-opening C from the catch-basin the latter would soon be filled to overflowing in cases of heavy rains, and under this condition the floatable and sinkable substances delivered with the water into the catch-basin as designed could not be separated and would run direct into the sewer, the floatable portions to float down and out from the sewer and the latter to settle in the sewer. Therefore I would make the aggregation of the openings in the intake D to be about equal to the opening of the discharge-opening C, leading to the sewer.

By my above-described improvements catch-basins may be provided with efficient and simple means which are adapted to prevent large stones and large pieces of wood or other substances, cans, and other articles from entering the catch-basin and choking the conduit leading therefrom to the sewer, and also providing a simple and effective means for separating the small floatable pieces of foreign substances and the particles of those substances held in suspension in water from the sinkable substances, the former for passage into and through the sewer and the latter for sedimentation within a removable vessel located between the street-gutter and the sewer and adapted to be hoisted out from the catch-basin and emptied into a suitable receptacle in a cleanly manner for disposal, as may be preferred. Further, the floatable substances received within the catch-basin in their largest pieces may readily be separated from the smaller pieces, the former to be readily removed at pleasure from the chamber of the catch-basin, while the latter, too small to clog the trap, may readily pass with the water into the sewer, to be floated out from the same, and, further, the gases generated within the sewer will be prevented by both a tight valve seal and a water seal from escaping to the street.

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

1. A catch-basin for sewers having its walls concavo-convex in section and of greater radius than the diameter of the basin, flanges projecting from the vertical edges of said walls, means for securing the adjacent flanges of the adjoining walls together, and a tapering concrete reinforce for said walls.

2. A catch-basin for sewers having its walls concavo-convex in section and of greater radius than the diameter of the basin, flanges projecting from the vertical edges of said walls, means for securing the adjacent flanges of the adjoining walls together, a tapering concrete reinforce for said walls, said basin being formed with an intake-opening, and a grated cover for said opening supported by said walls and concrete reinforce.

3. A catch-basin for sewers having a surface intake-opening, a plurality of sedimentary vessels, each of a size to readily pass through said opening and having an aggregated sectional area greater than that of the opening, said vessels being arranged in juxtaposition below said opening to receive the flow therefrom and retain sinkable articles, a screening vessel below and of greater sectional area than the combined area of the sedimentary vessels, and a valved outlet from said basin.

4. A catch-basin for sewers having a surface intake-opening, a sedimentary vessel below said opening and supported from the bottom of the basin, a screening vessel below the sedimentary vessel, and a valved trap below the screening vessel, said trap supporting the screening vessel.

5. A catch-basin for sewers having a surface intake-opening, a valved trap-outlet, a screening vessel above the trap and extending beyond the same on all sides, and a sedimentary vessel between the screening vessel and the intake-opening, said sedimentary vessel being of less sectional area than the screening

vessel and supported from the bottom of the basin.

6. A catch-basin for sewers having a surface intake-opening, a valved trap-outlet centrally disposed near the bottom of the basin, a screening vessel supported by the trap and projecting beyond the same in all directions, and a sedimentary vessel of less sectional area than the screening vessel, said sedimentary vessel being removably supported by the bottom of the basin and arranged to receive all the flow from said intake-opening.

7. A catch-basin for sewers having a surface intake-opening, a valved trap-outlet, a sedimentary vessel below said intake-opening, posts rising from the bottom of the basin and supporting said sedimentary vessel, and a screening vessel intermediate the trap and sedimentary vessel and supported by the trap.

8. A catch-basin for sewers having a surface intake-opening comprising a grate, the bars of which are arranged in the direction of flow of water in the street-gutter and having their surface planes above the surface of the transverse end members of the grate, a valved trap-outlet from the basin, a sedimentary vessel below said intake-opening, posts rising from the bottom of the basin and provided with horizontal seats to support said sedimentary vessel, and a screening vessel between the sedimentary vessel and trap.

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