United States Patent

Dorris

[15] **3,695,153**

[45] **Oct. 3, 1972**

[54] DRAINAGE CATCH BASINS

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[22] Filed: **Nov. 10, 1970**

[21] Appl. No.: **88,423**

[52] **U.S. Cl.** **94/31.3,** 52/21, 94/34

[51] **Int. Cl.**.....**E01c 11/22**

[58] **Field of Search** 94/34, 31.1, 31.3; 52/19, 20, 52/21

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Primary Examiner—Jacob L. Nackenoff
Attorney—Bacon & Thomas

[57] **ABSTRACT**

Drainage catch basin structures embodying dual level adjusting means, and comprising a rectangular top section containing a chamber with an elongated drainage water inlet communicating therewith and to be positioned in alignment with a street curb, said chamber having a rectangular outlet at its lower end; a base section having a generally circular interior and a water outlet; and an intermediate or transition section having a rectangular inlet conforming to the outlet of the top section and a circular outlet conforming with the upper end of the base section. The top section may have a non-skid surface cast therein and a man hole opening closed by a cover, and its marginal edges may be protected by angle iron to prevent chipping in use or in handling. The top section has four leveling bolts cast therein at its lower edge for effecting fine adjustment thereof side to side or front to rear, relative to an underlying section to conform its top surface to a desired side walk or street grade level. The transition section has sleeves cast therein to receive the lower ends of the leveling bolts. A pair of tapered adjusting rings, each of which is of greater height at one point than at a diametrically opposite point, can be interposed between the transition section and the base or other underlying section, and so positioned circumferentially relative to each other that the upper surface of the top section can be adjusted to conform to any major inclinations in road grade.

8 Claims, 16 Drawing Figures

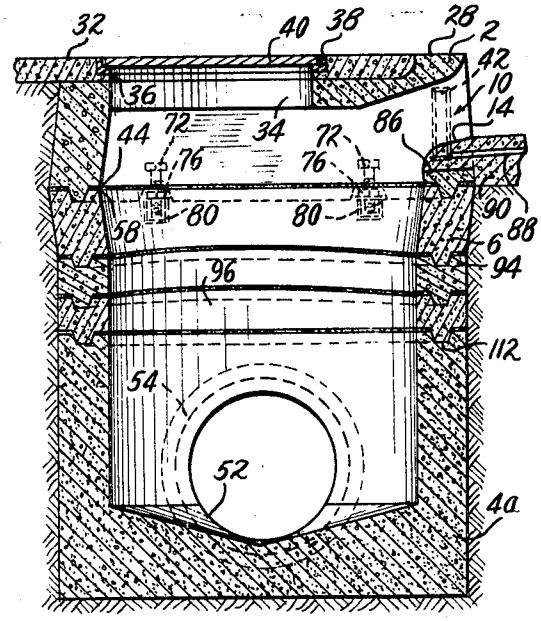
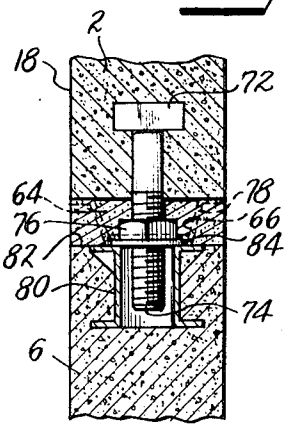


Fig. 1.



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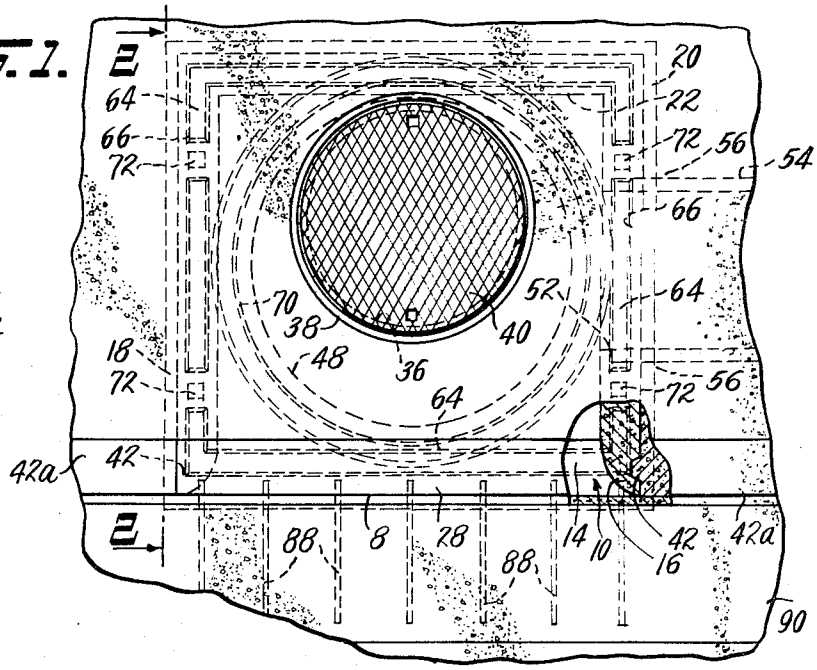

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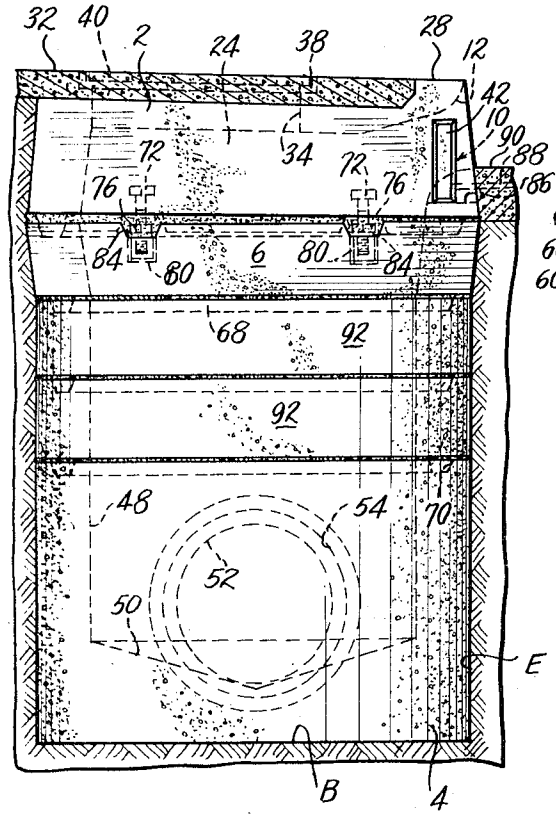

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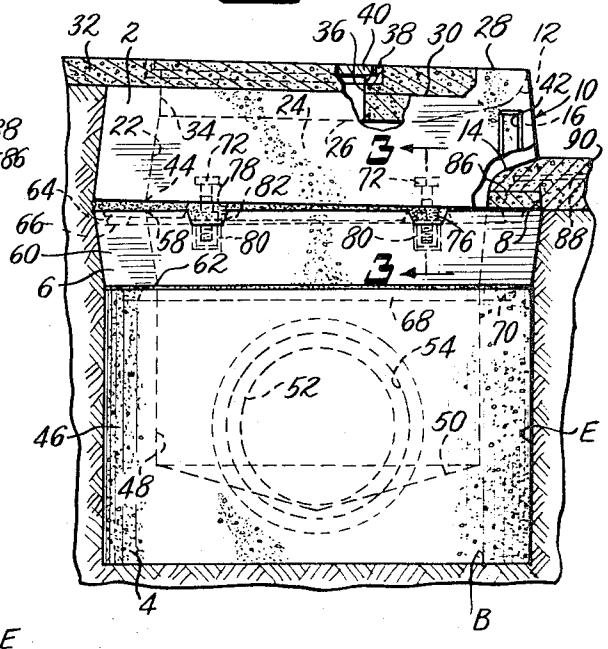

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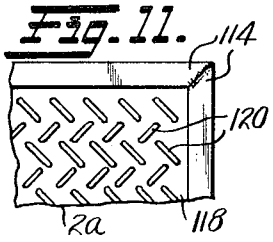
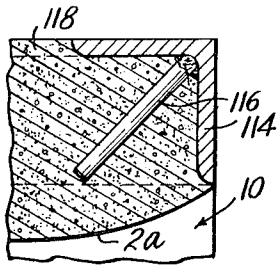
Fig. 11.





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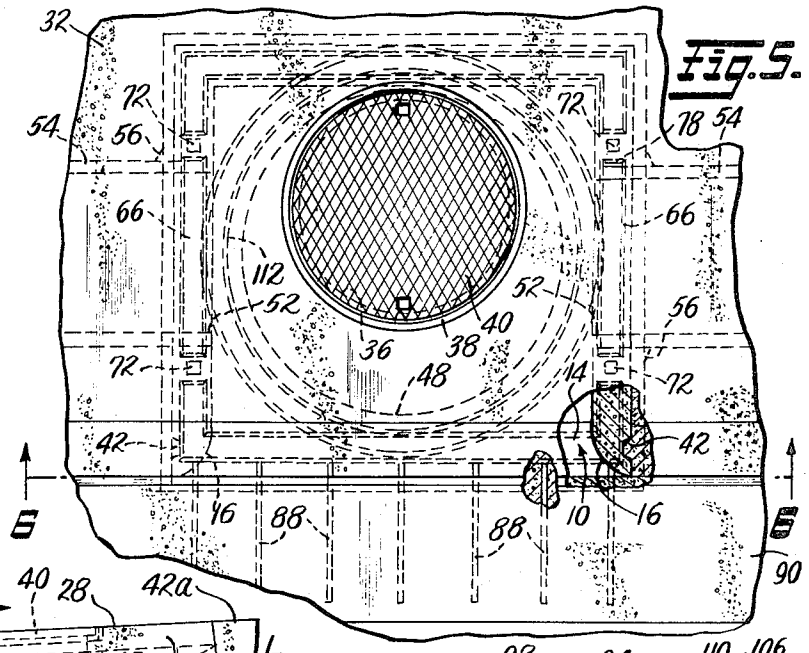

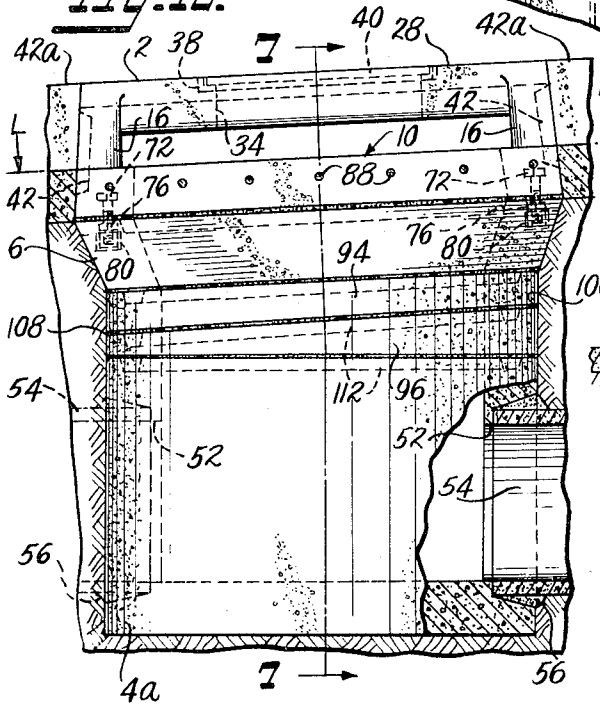

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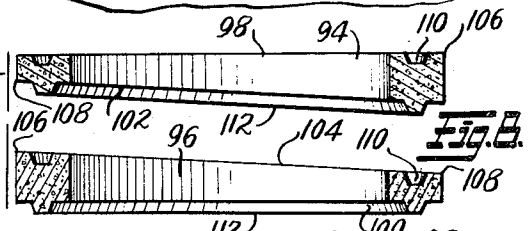

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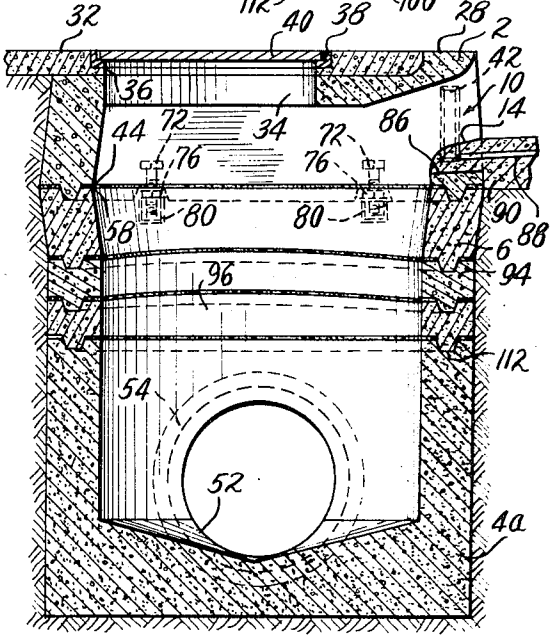

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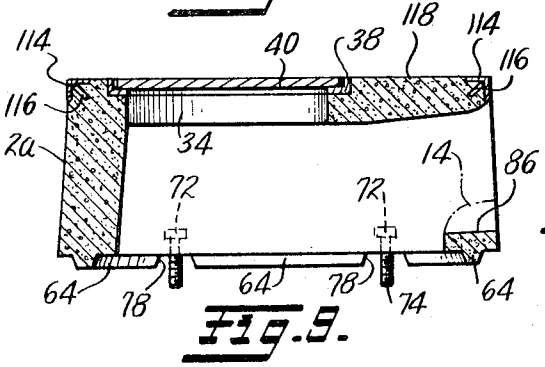

Fig. 9.

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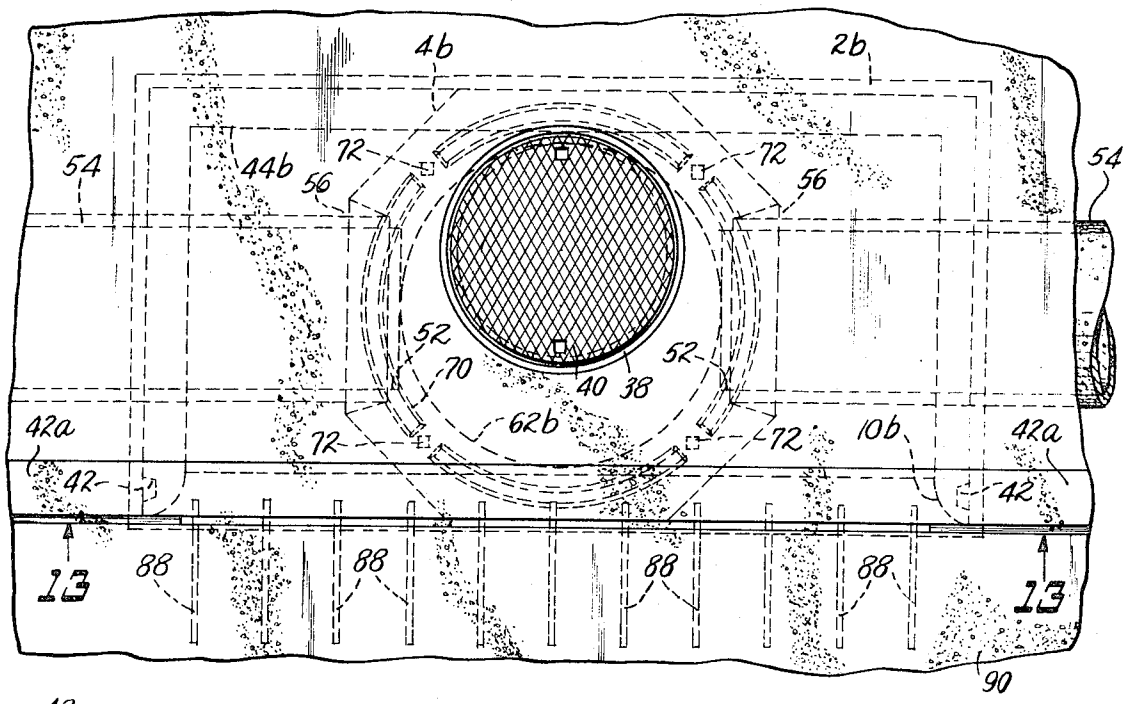
Fig. 12.



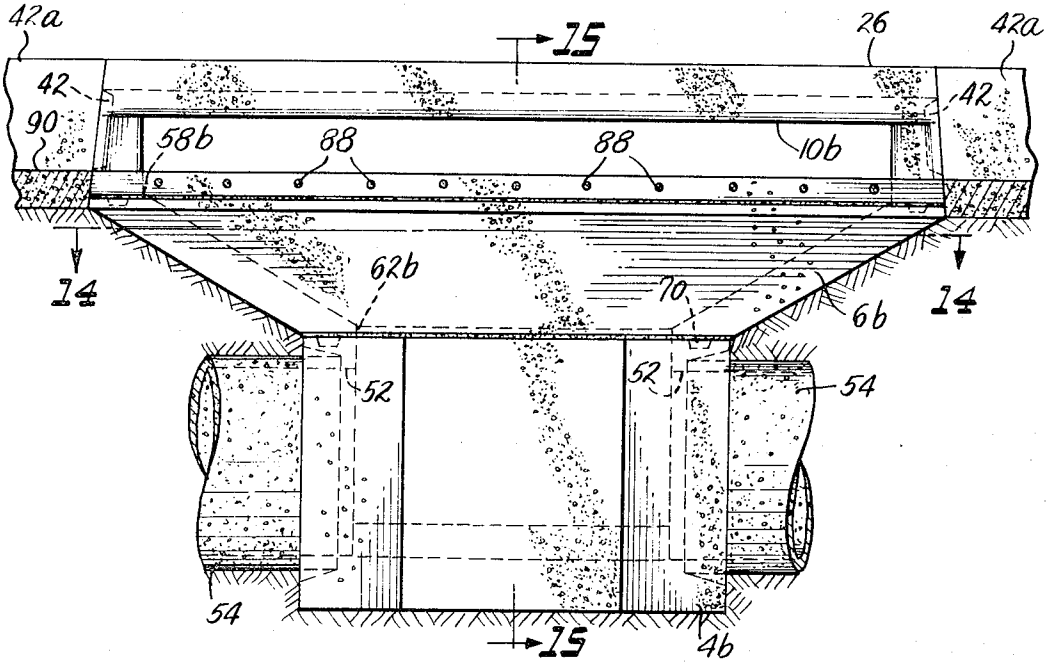


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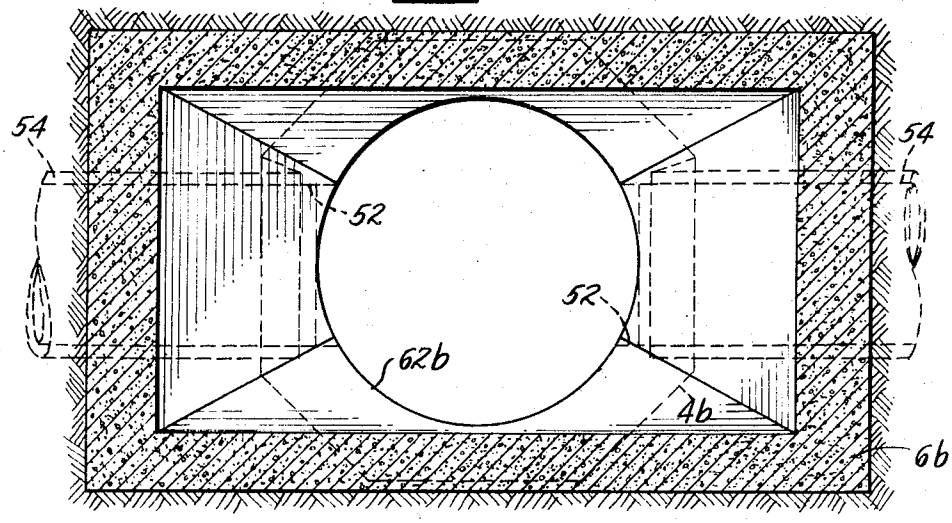
Fig. 14



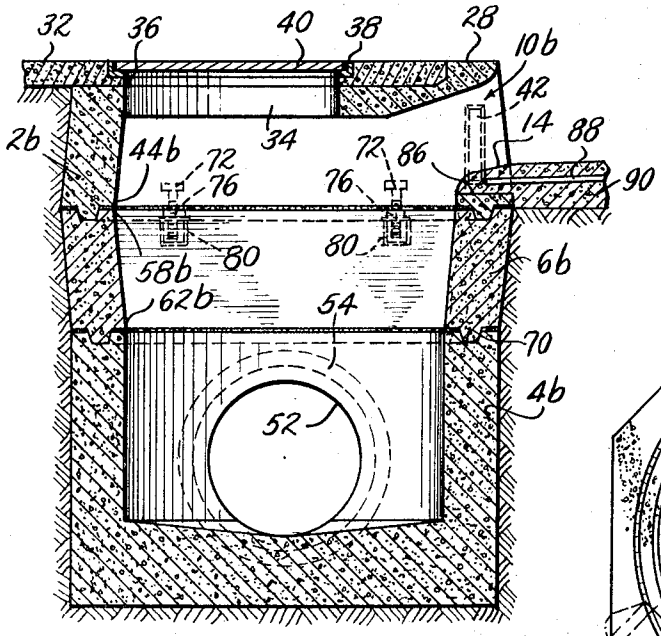
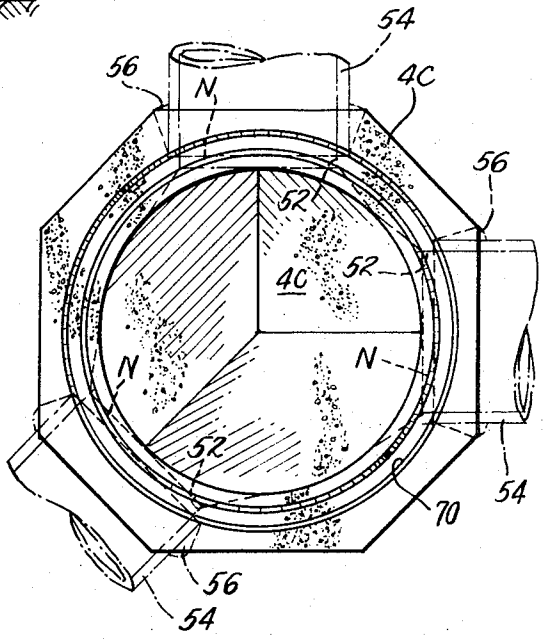


Fig. 15.

Fig. 16.



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DRAINAGE CATCH BASINS

FIELD OF THE INVENTION

The present invention relates to drainage catch basins of the type to be installed along a street curb line.

DESCRIPTION OF THE PRIOR ART

Drainage catch basins have been heretofore constructed by digging a hole in the ground at the location where the catch basin is to be installed, and erecting a wooden form in the hole and pouring concrete into the form to mold the catch basin. This type of construction is slow and costly. Other drainage catch basins have been made in pre-cast sections and assembled in an excavation, but these sections are heavy and difficulty has been encountered in initially positioning the base section so that the top surface of the top section, which is added later, closely follows a desired road grade as well as the slope of the adjacent side walk. In addition, most of such sections have all been formed with a cavity of the same size, from top to bottom, resulting, in the larger sizes, in unnecessary expense and labor in excavation, and unnecessary expense in the cost of the materials employed in making such catch basins.

SUMMARY OF THE INVENTION

The present invention overcomes the foregoing objections by providing catch basin structures that are pre-cast, require a minimum of excavation, and can be readily put in place and levelled. Thus, even though the top section of the catch basin may be of considerable length to provide an adequate drainage opening, nevertheless, the base section may be of much smaller size. This is made possible through the inter positioning of a transition section between the top and base or other underlying section. Thus, the top section can be readily cast in a rectangular mold, so that the opening at its lower side is of rectangular configuration. The base section can be cast in a circular or polygonal-shaped mold having a circular interior, with one or more side wall openings to which a drain pipe can be connected. An intermediate, or transition section, is cast with an inlet opening at its upper end conforming to the size and shape of the rectangular opening of the top section, and an outlet opening at its lower end conforming to the size and shape of the interior of the base section. This makes it possible to use the same base section with top sections of various sizes, with the interposition of a suitable transition section.

The top section preferably has four leveling bolts cast therein and the transition section has four sleeves cast therein to receive the bolt shanks. Each bolt has a nut adjustable along the threads thereof so that the top section can be inclined with respect to the transition section to conform to minor variations in street grade or sidewalk level. The range of adjustment provided by the leveling bolts is necessarily limited, and where a greater degree of inclination is required, a pair of circular leveling rings, each of greater height at one side than at the diametrically opposite side can be interposed between the transition section and the base, or other underlying section. These tapered rings are rotated relative to each other to the extent necessary to provide as nearly as possible the desired slope or

inclination to the surface of the top section, before the transition and top sections are permanently put in place. In situations where the drain pipe is to lie at a substantial depth below the top section, one or more plain circular ring sections can first be mounted upon the base.

The top section also has notches at its opposite ends for interlocking the same to adjacent concrete curbing.

Accordingly, the principal object of the invention is to provide a drainage catch basin that can be prefabricated in sections, and readily installed with the top section thereof either horizontally disposed, or inclined to meet any road grade condition and side walk inclination.

Another object is to provide a drainage catch basin wherein the top section may vary considerably in length and width, but which can be fitted to a standardized base section through the intermediary of a transition section.

Another object is to provide a top section for a drainage catch basin having an elongated inlet opening, the lower edge of which can be readily finished and conformed to the level and grade of a street or roadway.

Another object is to provide a drainage catch basin that can be interlocked with a street curbing.

A further object is to provide a sectional drainage catch basin assembly, the top section of which can be set with either minor or major adjustments, or both.

Still another object is to provide a catch basin wherein the top section embodies means for adjusting the level thereof lengthwise and/or crosswise.

A still further object is to provide a sectional drainage catch basin with a pair of adjustable rings designed so that they can be shifted circumferentially with respect to each other to vary to a major extent the inclination of an overlying section.

A still further object is to provide a sectional catch basin wherein the base section can have one or more drain pipes angularly connected thereto, and which can be set at any angle and mate through a circular tongue and groove joint with an overlying section.

Still another object is to provide a sectional drainage catch basin wherein the top section has its edges protected against chipping during handling and while in use.

Still another object is to provide a top section for a catch basin which has a pre-formed curb simulating ridge along its front edge, and an adjacent recess to receive material for forming a sidewalk.

A still further object is to provide a top section for a catch basin that can be interlocked with adjacent concrete curbing.

A still further object is to provide a top section for a catch basin having a curb line water inlet opening, the lower edge of which opening can be finished to conform with the gutter level and to be interlocked with the gutter forming material.

Other objects, advantages, and features of the invention will be apparent from the following description taken in conjunction with the accompanying drawings.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary plan view of a sectional drainage catch basin embodying the principles of the

present invention, shown installed at the edge of a street curbing.

FIG. 2 is a left side elevational view of the catch basin of FIG. 1, partly in section, as viewed on the Line 2—2 of FIG. 1, with the top section shown slightly inclined upwardly from the curb line.

FIG. 3 is an enlarged fragmentary vertical sectional view through one of the adjusting members cast in the top section, taken on the Line 3—3 of FIG. 2.

FIG. 4 is a view similar to FIG. 2, but showing two plain ring sections mounted between the base and the transition section to increase the depth of the catch basin.

FIG. 5 is a fragmentary plan view of a modified catch basin having two drain pipes connected thereto.

FIG. 6 is a front elevational view, partly in cross-section of the catch basin shown in FIG. 5, as viewed along the curb indicated by the Line 6—6 of FIG. 5, and particularly showing a pair of leveling rings between the base and transition section.

FIG. 7 is a vertical sectional view, taken on the Line 7—7 of FIG. 6.

FIG. 8 is a vertical sectional view through the tapered adjusting rings, with the rings shown spaced apart.

FIG. 9 is a vertical sectional view through the top section of the catch basin having an angle iron protecting member at its edges.

FIG. 10 is an enlarged fragmentary sectional view illustrating the manner in which the angle iron protecting the edges of the top section is anchored in the concrete.

FIG. 11 is a fragmentary plan view of a corner of the top section shown in FIG. 9, and showing the angle iron edge reinforcing and a non-skid top surface.

FIG. 12 is a fragmentary plan view of a large capacity catch basin wherein a much longer inlet opening is provided in the top section than is shown in FIGS. 1 and 6.

FIG. 13 is a front elevational view of the large capacity catch basin, as viewed along the curb, indicated by the Line 13—13 of FIG. 12.

FIG. 14 is a horizontal sectional view, taken through the transition section on the Line 14—14 of FIG. 13.

FIG. 15 is a vertical sectional view, taken on the Line 15—15 of FIG. 13.

FIG. 16 is a plan view of a modified form of base section provided with three openings having knockouts to which one to three drain pipes can be connected.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the drawings, all embodiments of the drainage catch basin disclosed comprise pre-cast concrete sections. As shown in FIGS. 1 and 2, one embodiment comprises a top section 2, a base section 4, and an intermediate or transition section 6. The top section 2 is generally rectangular in plan and has a front wall 8 provided with an elongated inlet drainage opening 10, the upper, lower, and vertical side edges of which are curved as indicated at 12, 14 and 16, respectively, to facilitate free flow of water into the catch basin. The lower edge of the opening is made curved after installation, as will be explained later.

The section 2 has side walls 18 and 20 and a rear wall 22, which cooperate with the front wall 8 to provide a rectangular chamber 24 within the section 2. A top wall 26 interconnects the front, rear and side walls and has a ridge 28 comprising an extension of the front wall 8 and simulating the top of a curb. Inwardly of the ridge is a depression or cavity 30 to receive cement forming a portion of a side walk 32. The top wall 26 has a man hole opening 34 formed therein, and a corresponding opening 36 is formed in the side walk portion 32 and lined with a ring 38 that is L-shaped in cross-section for receiving and supporting a man hole cover 40. Each of the side walls 18 and 20 has a vertical notch 42 molded therein on its exterior in the region of the front wall 8. The purpose of the notches 42 is to receive the concrete of adjacent curbing 42a to form an interlock therewith to thus anchor the section 2 in place. The front wall 8, the side walls 18 and 20, and the rear wall 22, all flair downwardly and outwardly to provide at their lower edges, a generally rectangular outlet 44 that communicates with the transition section 6.

The base section 4 has a side wall 46 that is circular on its interior to provide a round chamber 48 and is polygonal (rectangular) on its exterior, as is best shown in FIG. 1. The base 4 has a bottom wall 50 that slopes from the side wall toward an outlet opening 52 to which a drain pipe 54 is connected, the joint between the base section 4 and the drain pipe 54 being sealed by grouting, mortar, or other sealing material 56.

The transition section 6 is rectangular exteriorly and has an upper end defining a rectangular inlet 58 conforming to the shape of the outlet 44 of the top section 2. The side wall 60 of the transition section is shaped on the interior thereof so that the lower inner edges thereof provide a circular outlet 62 conforming to the circular chamber 48 of the base section 4. Thus, the interior shape of the transition section 6 is varied from the rectangular inlet 58 to a circular outlet 62 for smooth flow of water from the top section 2 into the base section 4.

Referring to FIG. 2, the top section 2 has a tongue 64 projecting downwardly from its front, rear and side walls and positioned midway of the inner and outer peripheral surfaces of said walls. The tongue 64 extends completely around the lower face of the section 2, as is shown in FIG. 1, and is received in a complementary groove 66 formed in the top face of the transition section 6. The transition section 6 has a cylindrical or annular depending tongue 68 received in a circular groove 70 in the upper face of the side wall 46 of the base 4. This enables the base section to be set in any position to suit job requirements and still mate with the transition section.

In order to install the drainage catch basin, an excavation E must, of course, be first made at the site. The bottom B of the excavation is leveled and the base section 4 is set in place in a desired angular position. Grout may then be poured into the groove 70 in the top face of the base section 4, and the transition section 6 placed in position. The top section 2 may then be similarly mounted upon the transition section B. Usually, minor final adjustments are required to conform the upper surface of the top section 2 to road grade, if any, or side walk slope. This is effected by precasting bolts 72 in the section 2 so that the threaded shank portion 74 thereof extends beyond the tongue 64 at the lower face of the top section. A nut 76 is

threaded on the bolt 72 and a notch 78 is formed in the tongue 64 in the region of the bolts 72 to provide access to the nut 76. Correspondingly, the transition section 6 has sleeves 88 embedded therein at locations to receive the bolt shanks 74. A notch 82 intersects the groove 66 at each sleeve to provide access to the nut 76, as is best shown in FIG. 4. A washer 84 is placed over the upper end of each sleeve 80 prior to positioning the top section 2 on the transition section 6.

It will be seen that by rotating the nuts 76 to move then along the shanks 74, the top section 2 can be inclined lengthwise (from side to side), and transversely (from front to rear), as may be necessary. After the leveling adjustments have been made, the notches 78 and 82 and any spaces in the tongue and groove joint between the sections 2 and 6 can be filled with grout, mortar, or any other sealing material. After all joints have been sealed, earth is shoveled into the excavation E and compacted around the sections 4, 6 and 2.

The drainage catch basin is set in place at such depth that a flat top surface 86 extending across the lower side of the inlet opening 10 is of less than the full height required and is disposed below the intended paving or gutter level, as shown in FIG. 2. In order to tie the top section 2 of the catch basin into the gutter or street paving 90, a series of reinforcing bars 88 is set in place perpendicular to the inlet opening 10 so that one end thereof extends into said opening at a level above the original inlet surface 86. The reinforcing bars 88 are equally spaced and extend across the full width of the inlet opening 10. After the street paving 90 has been poured, additional cement mix is placed over the ends of the reinforcing bars 70 and the surface is finished off into the smooth curve 14, as indicated in FIG. 2.

In instances where the drainage catch basin is to be connected with a drain pipe that is a substantial depth below the side walk level, one or more plain cylindrical rings 92 are installed between the base 4 and the transition section 6, as is shown in FIG. 4. The plain ring sections 92 are provided with tongue and groove joints similar to those described above and are similarly sealed against leakage.

Referring to FIGS. 5 to 8, wherein parts described above are identified by like reference numerals, in installations where the top 2 of the drainage catch basin is required to conform to a substantial inclined grade level, indicated by the line L—L in FIG. 6, the problem can be met by installing a pair of tapered leveling rings 94 and 96 between the transition section 6, and an underlying base section 4a as is illustrated in FIGS. 6 and 7, or an underlying ring such as the ring 92 (not shown). Each of the leveling rings 94 and 96 has one face 98 and 100, respectively, that is perpendicular to its axis or outer periphery, and another face 102 and 104, respectively, that is inclined to the axis, so that each ring has a maximum height at a point 106 on its periphery, and a minimum weight at the diametrically opposite point 108 on its periphery, as indicated in FIG. 8. The top surface of each ring is provided with a groove 110 and the lower face of each ring is provided with a tongue 112 similar to the tongue and groove arrangement on the transition section 6 and base section 4a.

In use, the lower ring 96 is mounted upon an underlying section and the upper ring 94 is mounted upon the lower ring 96, so that the inclined faces 102 and 104 are in contact. It will be seen that by circumferentially rotating one ring section relative to the other ring section, the face 98 of the upper ring 94 can be disposed at various angles of inclination to the horizontal. After the desired inclination has been attained, the transition section 6 and the top section 2 are mounted in place in the same manner as described above. Any minor adjustments required for the top section to conform it to road level or side walk slope can be made by adjusting the nuts 76 on the shanks 74 of leveling bolts 72, as described above.

The side walk 32 may then be poured to fill the recess 30 inwardly of the ridge 28, and a man hole support ring and cover mounted as described above in connection with FIGS. 1 and 2. It will be noted that the base 4a has two outlets 52 and two drain pipes 54 extending therefrom, as is shown in FIGS. 5 and 6. By way of example, but not limitation, the leveling rings 94 and 96 may have an inside diameter of 36 inches and be 6 inches in height at the maximum point 106 thereof and 3 inches in height at the minimum portion 108 thereof.

FIG. 9 illustrates a modified top section 2*a* having its upper edges protected against chipping by embedding strips of angle iron 114 therein around its entire periphery. It is to be understood that the angle iron 114 is positioned in a mold prior to pouring of the concrete. Anchoring of the angle iron pieces 114 in the concrete is assured by welding a series of pins 116 to the angle iron so that they extend at about 45° to the legs of the angle iron, as is best shown in FIG. 10. It will also be noted from FIG. 9, that the top section 2*a* has an upper surface 118 that is formed flat and flush with the angle iron strips 114, so that no additional concrete is required to be poured after the top section 2*a* has been mounted in place at the site. In other words, the recess 30 shown in FIGS. 2 and 5 has been omitted. This construction has the further advantage that the ring 38 for the man hole cover 40 can be cast in place at the time that the top section 2*a* is molded. In addition, non-skid formations 120, FIG. 11, can be formed in the top surface 118 during the molding operation.

FIGS. 12 to 15 illustrate a further embodiment of the invention, wherein the top section 2*b* is about twice as long as the top section 2, with a correspondingly longer elongated drainage inlet opening 10*b*. This provides for greater drainage capacity. The top section 2*b* rests upon a transition section 6*b* embodying the same principles as the transition section 6, in that the upper end of the transition section 6*b* defines a rectangular opening 58*b* conforming in size and shape to the outlet 44*b* of the top section 2*b*, and the lower end of the transition sections 6*b* defines a circular opening 62*b* conforming to the shape of the inlet at the upper end of the base section 4*b*. It will be noted from FIGS. 13 and 14 that the side walls of the transition section 6*b* slope inwardly and downwardly and merge with the circular outlet 62*b*. The base section 4b is illustrated as having a generally polygonal-shaped (octagonal) exterior, and as having two outlets 52 and two drain pipes 54 connected thereto to provide for increased drainage capacity.

FIG. 16 illustrates an octagonal base section 4c similar to the base section 4*b*, except that provision is made for the connection of three drain pipes 54 to

three sides thereof at different angles. The bottom of the base section 4c is sloped toward each drain pipe **54** so that water can readily flow out of the base section without accumulating therein. The openings **52** for the drain pipes **54** can be initially closed by knock-outs N, as shown.

It is to be understood that the various sections and rings comprising the drainage catch basin illustrated and described herein are suitably reinforced with metallic reinforcing bars and/or metallic mesh, which has been omitted from the drawings in the interest of simplicity of illustration.

It will also be understood that various changes may be made in the shape and proportions of the various sections comprising the catch basins disclosed herein without departing from the principles of the invention or the scope of the annexed claims.

I claim:

1. A concrete drainage catch basin comprising: a rectangular top section having a horizontal top wall, an upright rear wall, an upright front wall and upright side walls interconnecting said rear and front walls, said front wall having an elongated drain opening extending therethrough for water drainage and including a wall portion extending across the lower side of said drain opening, said top section containing a chamber communicating with said drain opening and having a generally rectangular outlet opening at the lower edge thereof defined by the inner surface of said upright rear and side walls and said front wall portion; a second section containing a chamber having a generally circular inlet opening at its upper end and having an upper edge defining said circular inlet opening; and an intermediate transition section between said top section and said second section having a rectangular inlet opening at its upper end conforming in shape to the rectangular outlet opening at the lower edge of said top section, said intermediate section having a circular outlet opening at its lower end and having a lower edge defining said circular outlet opening and conforming in shape to said circular inlet opening of said second section, said upper edge of said intermediate transition section confronting the lower edge of said top section, and said lower edge of said transition section confronting the upper edge of said second section, said upper, intermediate and second sections having substantially continuous tongue and groove joints between the contiguous edges thereof interlocking the sections together.

2. A drainage catch basin as defined in claim **1**, wherein the second section is a base section having side walls and a bottom wall forming said circular chamber therein, said second section having at least one water outlet opening communicating with the chamber therein.

3. A drainage catch basin as defined in claim **2**, wherein the exterior of the base section is polygonal, and wherein water outlet openings are formed in at least two of the sides thereof.

4. A drainage catch basin as defined in claim **1**, wherein the second section is a plain circular ring, and including in addition, a base section disposed below said ring having at least one outlet opening.

5. A drainage catch basin as defined in claim **1**, wherein adjusting means is disposed between the top section and the transition section for adjusting the level of the top surface of the top section to conform to a desired grade inclination, said adjusting means comprising bolts having their heads imbedded in the lower edge of the top section and their shanks projecting below said top section, each bolt having an adjusting nut thereon, said transition section having sleeves to receive the shank of said bolts, and wherein the tongue and groove between said top and intermediate sections are both notched in the region of said adjusting nuts and sleeves to provide access to said adjusting nuts.

6. A drainage catch basin as defined in Claim **1**, wherein a pair of tapered adjusting rings is interposed between the transition section and the second section, each of said rings being of different height at diametrically opposite points thereof, said pair of rings having a tongue and groove joint therebetween, the upper ring having a tongue and groove connection with said transition section and the lower ring having a tongue and groove connection with said second section.

7. A drainage catch basin as defined in Claim **1**, wherein the front wall of the top section has an upward extension forming a ridge simulating a curb, and wherein the top surface of said section is depressed inwardly of said ridge to receive paving material to cover the top section to the level of the top of said ridge.

8. A drainage catch basin as defined in claim **1**, wherein each of the side walls has a notch formed in its exterior in the region of the front wall for interlocking the top section with an adjacent concrete curb.

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