A storm drain filter assembly includes a frame and several rows of bristles extending down from a top rail of the frame. The frame can be positioned next to a storm drain with the bristles blocking debris from entering the drain while allowing water to flow into the drain. As the frame is lowered toward the ground in front of the drain, brackets on the back of the frame slide between the storm drain surface and other brackets that have been affixed to the storm drain surface, so that when the frame rests on the ground with the bristles covering the storm drain, it is retained in place by the brackets. The frame assembly can be removed simply by lifting the frame up and away from the storm drain.
STORM DRAIN FILTER

RELATED APPLICATION


FIELD OF THE INVENTION

[0002] The present invention relates generally to storm drain filters.

BACKGROUND OF THE INVENTION

[0003] The above-referenced applications discuss the need for storm drain filters, and the inadequacies of conventional methods such as rock bags for blocking debris and unwanted substances from entering storm drains, where the debris and unwanted substances can drain into the environment. As understood here, the principles of the above-referenced applications can be used to provide an easily installable and removable storm drain filter that his effective in preventing debris and unwanted substances from entering storm drains.

SUMMARY OF THE INVENTION

[0004] A storm drain filter assembly includes a frame that is configured for extending substantially across a storm drain, and plural bristles are supported by the frame in a vertical orientation when the frame is positioned to cover a storm drain. One or more frame brackets are attached to the frame and respective drain brackets can be affixed to a storm drain surface adjacent a storm drain. With this structure, the frame with bristles can be lowered by a person toward the street next to the storm drain such that, when the drain bracket is affixed to the storm drain surface, the frame bracket engages the drain bracket to hold the frame in front of the storm drain without further connecting structure and with the bristles substantially blocking the storm drain.

[0005] In non-limiting embodiments the frame bracket is slidable between the drain brackets and the storm drain surface. Thus, the frame bracket can be disposed between the drain bracket and the storm drain surface, with the frame being configured such that a portion of the frame rests on the ground. If desired, a seal can be engaged with the frame and disposed against the storm drain surface when the frame bracket is engaged with the drain bracket.

[0006] In non-limiting implementations two drain brackets are provided and can be affixed to the storm drain surface at opposed ends of the storm drain. First and second frame brackets are engaged with opposed end portions of the frame such that the frame brackets engage respective drain brackets. One non-limiting frame bracket can be established by a parallelepiped-shaped plate that is affixed to the frame with a portion of the plate extending past the frame, while a non-limiting drain bracket can establish a space between the storm drain surface and the drain bracket, with the portion of the frame bracket plate that extends past the frame being disposed in the space.

[0007] In another aspect, a method for blocking debris from entering a storm drain while permitting water to flow into the drain includes affixing at least one drain bracket to a storm drain surface adjacent the storm drain, attaching at least one frame bracket to a frame supporting plural bristles, and lowering the frame toward the storm drain such that a bottom portion of the frame rests on the ground, the bristles cover the storm drain, and the brackets engage each other to substantially prevent lateral motion of the of frame relative to the storm drain while permitting the frame to be lifted up and away from the storm drain.

[0008] In another aspect, a frame assembly for a storm drain defined by a drain opening bounded by a storm drain surface includes one or more drain brackets affixed to the storm drain surface. A frame is sized and configured substantially like the drain opening, and the frame is associated with means for blocking the drain opening to solid matter but substantially not to prevent water from flowing into the drain opening. One or more frame brackets are coupled to the frame. Each frame bracket is engaged with a respective drain bracket to hold the frame adjacent the storm drain surface with the bristles juxtaposed with the drain opening.

[0009] The details of the present invention, both as to its structure and operation, can best be understood in reference to the accompanying drawings, in which like reference numerals refer to like parts, and in which:

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] FIG. 1 is a perspective view of the drain brackets affixed to the storm drain surface;
[0011] FIG. 2 is a perspective view of a storm drain cover showing fastening rivets in an exploded relationship to the frame;
[0012] FIG. 3 is a perspective view of an alternate storm drain cover in which the frame brackets are shown twice for clarity, once as they appear when attached to the frame and also in an enlarged exploded view to better illustrate their structure; and
[0013] FIG. 4 is a perspective view showing details of the bristle mounting structure for the drain cover in FIG. 3, with portions cut away and with the bristles with base in an exploded relationship with the frame.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0014] Referring initially to FIG. 1, a storm drain 10 includes a storm drain surface 12, typically the vertical face of a street curb, that bounds a drain opening 14 through which water can flow to a sewer. The filter of the present invention is intended to cover the opening 14 in a way that permits water to flow into the sewer but substantially prevents debris and other undesirable matter from entering the sewer.

[0015] To mount the present filter in front of the drain opening 14, one or more mounting members can be affixed to the drain surface 12 more or less on opposite sides of the drain opening 14 as shown. In the embodiment shown, two brackets 16 are affixed to the drain surface 12 using an adhesive such as “Gorilla” glue, it being understood that other means for mounting the brackets 16 such as fasteners can be used. Adhesion is preferred to permit relatively easy removable of the brackets 16 if desired.

[0016] The non-limiting brackets shown each include two parallelepiped-shaped front and rear elements 18, 20 made of metal, ceramic, or hard plastic. The elements 18, 20 may be sized and shaped identically to each other, and are held flush together in the overlapping configuration shown by any suitable means such as glue or more preferably rivets 22 or fasteners. Accordingly, it may be appreciated that the entire...
rear surface of the rear element 20 may be positioned flush against the drain surface 12 and adhered or otherwise affixed thereto, with a portion 24 of the front element 18 extending past the rear element 20 to establish a space 26 between the portion 24 and drain surface 12.

[0017] While FIG. 1 shows two brackets 16 advantageously mounted on the drain surface 12 above the drain opening 14, it is to be understood that greater or fewer brackets can be used and mounted on other locations of the drain surface 12 if desired, even, less optimally, on the top of the drain surface (i.e., the sidewalk).

[0018] Attention is now directed to FIG. 2, which shows a filter, generally designated 30, that includes plural bristles 32 supported on a frame 34. In one non-limiting embodiment, the frame 34 may include opposed vertical struts 36 that can be hollow parallelepiped-shaped metal or hard plastic structures (e.g., without limitation, fiberglass-reinforced resin) the bottoms ends of which can be connected together by a bottom beam 38. A rubber or plastic gasket 40 or other sealing element can be glued or otherwise adhered to the bottom beam 38 and/or to the struts 36.

[0019] The above-referenced patent applications describe various configurations of the bristles 32, e.g., that they can be arranged in dense rows and made of polypropylene, and methods for engaging the bristles 32 with the frame 30, e.g., by first supporting the bristles 32 at their lower and/or upper ends by a panel beam 42 and then engaging the panel beam with a frame. All of these methods and structures disclosed in the above-referenced patent applications are incorporated herein.

[0020] Of particular relevance to the present invention is that the frame is provided with structure for engaging with curb-mounted structure (e.g., drain brackets 16) to hold the frame in front of the storm drain without further frame-to-curb connecting structure and with the bristles 32 substantially blocking the storm drain, i.e., extending from one side of the drain to the other and extending from the top of the drain opening to near or at the bottom (street). In the exemplary non-limiting embodiment shown, first and second frame brackets 44 are engaged with opposed end portions of the frame 30 as shown, preferably on opposed struts 36 adjacent the top beam 42. As further shown, each frame bracket 44 is established by a parallelepiped-shaped plate that is affixed to the frame (e.g., by rivets 46 or glue or other fasteners), with a portion 48 of the plate extending outward and laterally past the frame 30.

[0021] Accordingly, with the above-described combination of structure, the frame 30 can be lowered by, e.g., a person toward the storm drain so that the bottom beam 38 of the frame 30 rests on the ground, the bristles 32 cover the storm drain opening, and each frame bracket 44 engages a respective drain bracket 16 to substantially prevent lateral motion of the frame 30 relative to the storm drain while permitting the frame 30 to be lifted up and away from the storm drain when desired. In greater detail, as the frame is lowered in front of the storm drain, the portion 48 of each frame bracket 44 slides down into the space 26 that is between the drain surface 12 and the overlap portion 24 of the front element 18 of the respective drain bracket 16. With the frame 30 in place as intended herein, the frame 30 extends substantially across the storm drain and the bristles 32 are in a vertical orientation. Preferably, the height above the ground of the frame brackets 44 when the filter is positioned as described equals the height above the ground of the drain brackets 16, so that the overlap portion 48 of each frame bracket 44 rests in its space 26 more or less flush against the overlap portion 24 of the respective drain bracket 16. The gasket 40 faces and preferably abuts the storm drain surface 12.

[0022] FIG. 3 shows a storm drain cover 100 that is in all essential respects identical to the cover 30 shown in FIG. 2, except that instead of two single-plane frame brackets 44, the cover 100 shown in FIG. 3 has two right-angle frame brackets 102 (each one being shown twice for illustration, once as attached to the frame and once in an enlarged exploded relationship with the frame). A fastening side 104 of each L-shaped frame bracket 102 is attached to a frame 106 and more particularly in a non-limiting embodiment to a respective vertical strut of the frame by, e.g., rivets 108, while an engagement side 110 of each frame bracket 102 extends laterally inward beyond the respective frame strut and is distanced from other drain 100 structure as shown such that the engagement sides 110 can slide down into the space 26 that is between the drain surface 12 and the overlap portion 24 of the front element 18 of the respective drain bracket 16 as described previously.

[0023] If desired, the drain cover 100 can have a hollow bottom rail 120 and bristles 122 can be free at their top ends and can be supported by the bottom rail 120 as shown in FIG. 4. Specifically, the bristles 122 can be heat fused into a solid polypropylene base 124 that preferably is of the same cross-section as the channel in the hollow bottom rail 120. Accordingly, the base 124 can be slid into the bottom rail 120 of the frame. U.S. Pat. No. 5,819,357, incorporated herein by reference, discloses polypropylene bristles that can be used as the bristles shown herein.

[0024] While the particular STORM DRAIN FILTER is herein shown and described in detail, it is to be understood that the subject matter which is encompassed by the present invention is limited only by the claims.

What is claimed is:
1. A storm drain filter assembly, comprising:
a frame configured for extending substantially across a storm drain;
plural bristles supported by the frame in a vertical orientation when the frame is positioned to cover a storm drain;
at least one frame bracket attached to the frame; and
at least one drain bracket affixable to a storm drain surface adjacent a storm drain, wherein the frame with bristles can be lowered by a person toward a street next to a storm drain such that when the drain bracket is affixed to the storm drain surface the frame bracket engages the drain bracket to hold the frame in front of the storm drain without further connecting structure and with the bristles substantially blocking the storm drain.
2. The filter assembly of claim 1, wherein when the drain bracket is affixed to the storm drain surface the frame bracket is slidable between the drain bracket and the storm drain surface.
3. The filter assembly of claim 2, wherein when the frame bracket is disposed between the drain bracket and the storm drain surface, the frame is configured such that a portion of the frame rests on the ground.
4. The filter assembly of claim 1, comprising a seal engaged with at least a portion of the frame and disposed against the storm drain surface when the frame bracket is engaged with the drain bracket.
5. The filter assembly of claim 1, wherein the drain bracket is a first drain bracket and the frame bracket is a first frame bracket, and the filter assembly comprises a second drain bracket and a second frame bracket, the first and second drain brackets being affixable to the storm drain surface at opposed ends of the storm drain, the first and second frame brackets being engaged with opposed end portions of the frame, the first and second frame brackets respectively engaging the first and second drain brackets.

6. The filter assembly of claim 1, wherein the frame bracket is established by one of: a parallelepiped-shaped plate affixed to the frame with a portion of the plate extending laterally outward past the frame; an L-shaped bracket with an engagement side extending laterally inward beyond a vertical strut of the frame.

7. The filter assembly of claim 6, wherein the drain bracket establishes a space between the storm drain surface and the drain bracket when the drain bracket is affixed to the storm drain surface, the portion of the frame bracket plate that extends past the frame being disposed in the space when the frame is positioned to cover the storm drain.

8. The filter assembly of claim 6, wherein the drain bracket is a first drain bracket and the frame bracket is a first frame bracket, and the filter assembly comprises a second drain bracket and a second frame bracket, the first and second drain brackets being affixable to the storm drain surface at opposed ends of the storm drain, the first and second frame brackets being engaged with opposed end portions of the frame, the first and second frame brackets respectively engaging the first and second drain brackets.

9. A method for blocking debris from entering a storm drain while permitting water to flow into the drain, comprising:
affixing at least one drain bracket to a storm drain surface adjacent the storm drain;
attaching at least one frame bracket to a frame supporting plural bristles;
lowering the frame toward the storm drain such that a bottom portion of the frame rests on the ground, the bristles cover the storm drain, and the brackets engage each other to substantially prevent lateral motion of the frame relative to the storm drain while permitting the frame to be lifted up and away from the storm drain.

10. The method of claim 9, wherein the step of lowering the frame includes causing the frame bracket to slide between the drain bracket and storm drain surface.

11. The method of claim 10, wherein the frame bracket is established by one of: a parallelepiped-shaped plate affixed to the frame with a portion of the plate extending laterally outward past the frame; an L-shaped bracket with an engagement side extending laterally inward beyond a vertical strut of the frame.

12. The method of claim 11, wherein the drain bracket establishes a space between the storm drain surface and the drain bracket, the portion of the frame bracket plate that extends past the frame being disposed in the space when the frame is positioned to cover the storm drain.

13. The method of claim 12, wherein the drain bracket is a first drain bracket and the frame bracket is a first frame bracket, and a second drain bracket is affixed to the storm drain surface and a second frame bracket is connected to the frame, the first and second drain brackets being affixed to the storm drain surface at opposed ends of the storm drain, the first and second frame brackets being engaged with opposed end portions of the frame, the first and second frame brackets respectively engaging the first and second drain brackets.

14. A frame assembly for a storm drain defined by a drain opening bounded by a storm drain surface, comprising:
one or more drain brackets affixed to the storm drain surface;
a frame sized and configured substantially like the drain opening, the frame being associated with means for blocking the drain opening at least to solid matter but substantially not to prevent water from flowing into the drain opening; and
one or more frame brackets coupled to the frame, each frame bracket being engaged with a respective drain bracket to hold the frame adjacent the storm drain surface with the bristles juxtaposed with the drain opening.

15. The filter assembly of claim 14, wherein the frame bracket is disposed between the drain bracket and the storm drain surface.

16. The filter assembly of claim 15, wherein the frame is configured such that a portion of the frame rests on the ground when the brackets are engaged with each other.

17. The filter assembly of claim 14, wherein the drain bracket is a first drain bracket and the frame bracket is a first frame bracket, and the filter assembly comprises a second drain bracket and a second frame bracket, the first and second drain brackets being affixed to the storm drain surface at opposed ends of the storm drain, the first and second frame brackets being engaged with opposed end portions of the frame, the first and second frame brackets respectively engaging the first and second drain brackets.

18. The filter assembly of claim 14, wherein the frame bracket is established by one of: a parallelepiped-shaped plate affixed to the frame with a portion of the plate extending laterally outward past the frame; an L-shaped bracket with an engagement side extending laterally inward beyond a vertical strut of the frame.

19. The filter assembly of claim 18, wherein the drain bracket establishes a space between the storm drain surface and the drain bracket, the portion of the frame bracket plate that extends past the frame being disposed in the space.

20. The filter assembly of claim 14, wherein the means for blocking includes plural bristles.