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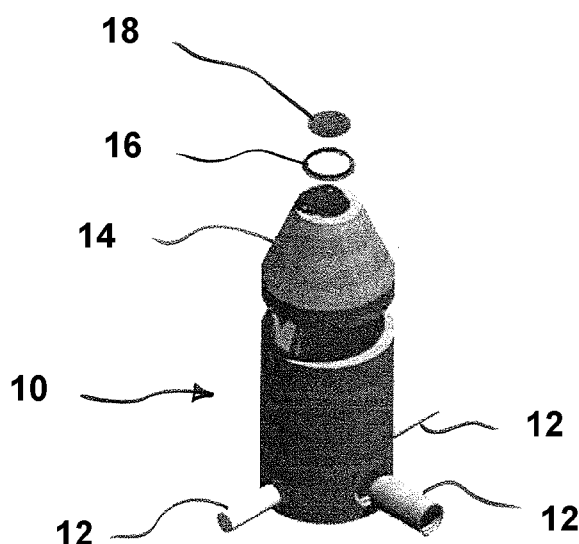


Fig.1

(57) Abstract: An adjustable frame configured to receive a standard grate includes a plurality of threaded openings that may be threadably engaged with bolts to adjust an elevation of the frame. The threaded openings may be configured to have a desired thread pitch, which in turn dictates how much the frame may be lowered or raised with one full turn of the bolt. Optionally, threaded bushings may be installed into the frame to engage with the bolts.

ADJUSTABLE GRATE FRAMES

FIELD OF THE INVENTION

[0001] This invention relates generally to adjustable frames for grates or covers, which may take the form of manhole covers for sewer, water, storm, electrical, *etc.*, and also generally relates to methods of installing the frames.

BACKGROUND OF THE INVENTION

[0002] For underground sewer, water, storm and electrical infrastructure, a grate or manhole is provided in the road surface through which a worker can have access to an underground structure or tunnel to do repairs or other work. FIGURE 1 shows a concrete structure 10 built below street level. Different types of conduit 12 are accessible within the structure 10. The structure 10 includes a cone-shaped upper portion 14. An upper surface of the upper portion 14 is configured to seat a frame 16, which in turn provides a support surface for a grate or manhole cover 18. One drawback of this system is that the frame 16 is not particularly adjustable, but may be adjusted using shims, wood chips, pebbles and other material that may be found or made easily available at the site. Over time, the frame 16 and/or the grate 18 may not remain flush with the road surface. In some cases, reinforcing concrete must be added to re-level the frame 16 and the grate 18. In other cases, concrete from the cone-shaped upper portion 14 must be removed. Nevertheless, as a consequence of the frame 16 being relatively not adjustable it is difficult to accurately level the grate 18 with the road surface. While the shims, wood chips, pebbles and other material may be useful in adjusting the frame 16 such that the grate 18 is flush with the road surface, it has been found that these shimming materials may become compressed, crushed, pushed out or otherwise rendered less efficient resulting in a change in the alignment of the grate 18.

SUMMARY

[0003] The present invention provides an underground access port that includes an entry area having a shoulder, a conduit access area coupled to the entry area and one or more conduits, a portal device received by a structure. The portal device includes a removable section and an adjustable frame configured to receive the removable section. The adjustable frame includes a plurality of adjustment devices configured to allow adjustment of height of the frame relative to the shoulder.

[0004] In one aspect of the invention, the removable section includes a grate or a manhole cover.

[0005] In another aspect of the invention, the underground access port is mounted within at least one of a road or a sidewalk.

[0006] In still another aspect of the invention, the adjustment devices includes a plurality of threaded cavities located around the threads that are configured to engage with threads in the threaded cavity and a plurality of bolts configured to be received within the threaded cavities.

[0007] In yet another aspect of the invention, the bolts have a length greater than a thickness of the adjustable frame, and wherein the threaded cavities pass through the adjustable frame.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] Preferred and alternative embodiments of the present invention are described in detail below with reference to the following drawings:

[0009] FIGURE 1 is a perspective view of an underground structure having a grate in accordance with the prior art;

[0010] FIGURE 2 is a perspective view of an underground structure having an adjustable grate and frame assembly in accordance with an embodiment of the present invention;

[0011] FIGURE 3 is a perspective view of the grate and frame assembly of FIGURE 2 in accordance with an embodiment of the present invention;

[0012] FIGURE 4 is a cross-sectional view of a grate and frame assembly in which the frame includes threaded openings to receive a plurality of bolts in accordance with an embodiment of the present invention; and

[0013] FIGURE 5 is a schematic close-up view of a portion of the frame moveable upwards or downwards in conjunction with a pitch of the bolt in accordance with an embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0014] As will be described in further detail below, at least one embodiment of the invention includes a standard grate received by an adjustable frame that may be configured to be flush with a road surface. The frame includes threaded openings that receive bolts, which when torqued provide a selected upward or downward movement of the frame.

[0015] FIGURE 2 shows a concrete structure 100 built below road or street level. Different types of conduit 102 are accessible within the structure 100. In the illustrated embodiment, the structure 100 includes a cone-shaped upper portion 104. An upper surface of the upper portion 104 is configured to seat an adjustable frame 106, which in turn is configured to receive a standard grate or manhole cover (hereinafter grate) 108.

[0016] FIGURE 3 shows the adjustable frame 106 with the standard grate 108 received into a recessed portion of the frame 106. The frame 106 includes a plurality of threaded openings 110 and optionally includes a plurality of structural support gussets 112. The threaded openings 110 have a predefined thread pitch, which in turn dictates how much the frame 106 may be lowered or raised with one full turn of a bolt (not shown) received in the threaded openings 110.

[0017] FIGURE 4 shows a schematic view of slanted road surface 200 and an access structure 202 with a shoulder 204 onto which an adjustable frame 206 may be placed. The structure 202 was mounted perpendicular to a horizontal plane. In this example, the horizontal plane is not parallel to the slanted road surface 200. For purposes of brevity and clarity, a grate, such as the grate 108 in FIGURE 3, is not shown as being received into the frame 206. Bolts 214 are threaded into

openings 210 of the frame 206. As a free end 216 of the bolt 214 contacts the shoulder 204, the frame 106 rises with each rotation of the bolt 214 in accordance with its thread pitch. Thus, the bolt 214 at a higher end of the road surface 200 is threaded further into the respective opening 110 than the bolt 214 at a lower end of the road surface 200. This allows the frame 206 to be flush with the road surface 200 because the frame 206 at the higher end is positioned higher on the bolt 214 than at the bolt 214 at the lower end.

[0018] FIGURE 5 is a close-up view of the bolt 214 received in the opening 210 of the adjustable frame 206. In this embodiment, a threaded bushing 218 is provided in the opening 210. Therefore, maintenance or repair of the frame 206 would not necessarily require replacement of the entire frame 206, but instead just replacement of the bolts 214 and the bushings 218. In addition, different bolts and corresponding bushing may be used for different portions of the frame, where some bolts may have a finer thread pitch and others have a courser thread pitch.

[0019] While the preferred embodiment of the invention has been illustrated and described, as noted above, many changes can be made without departing from the spirit and scope of the invention. Accordingly, the scope of the invention is not limited by the disclosure of the preferred embodiment. Instead, the invention should be determined by reference to the claims that follow.

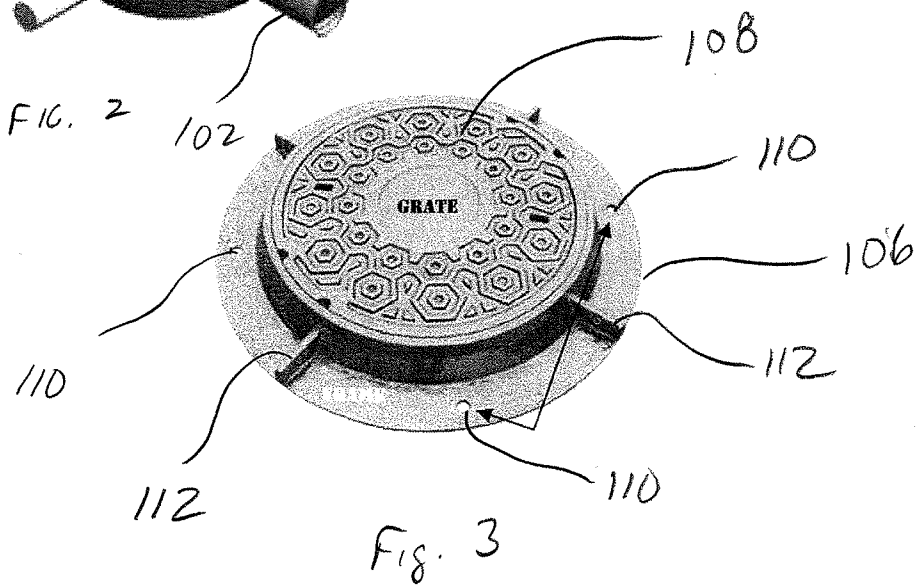
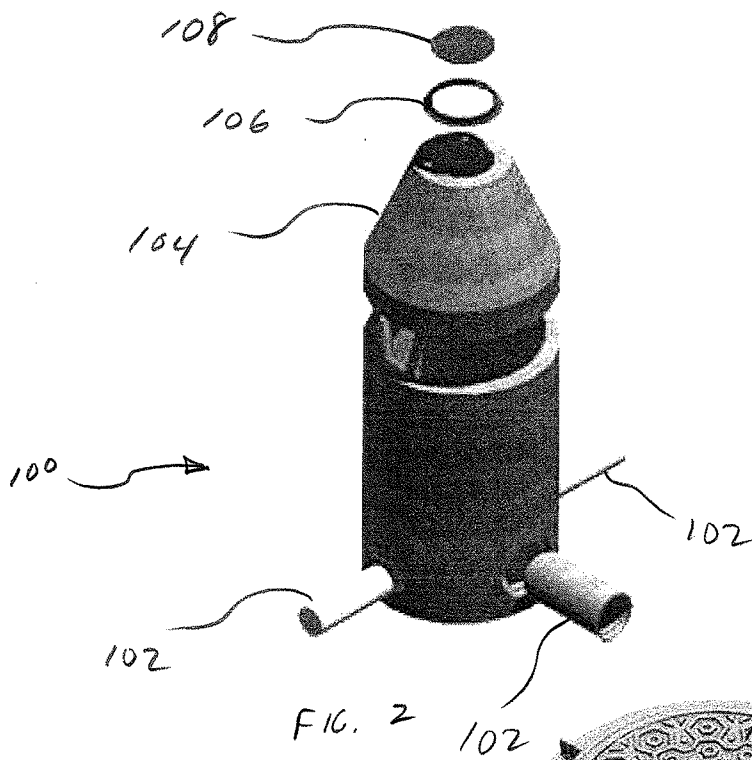
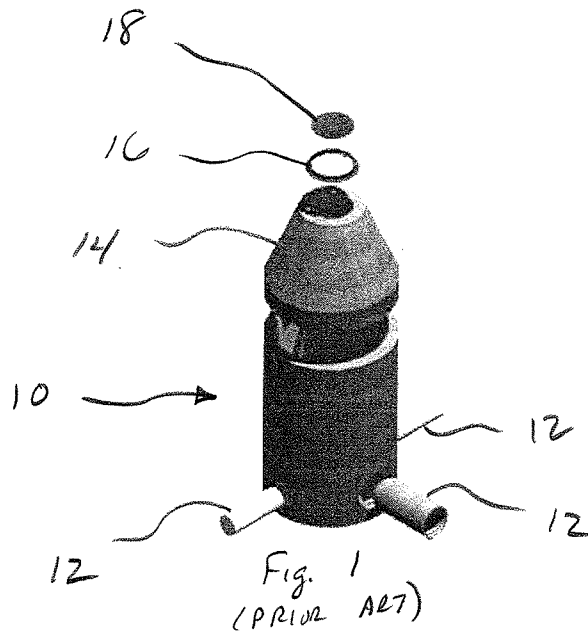
[0020] The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A utility access portal device received by a structure, the device comprising:
a removable section; and
an adjustable frame configured to receive the removable section, the adjustable frame comprising:
a plurality of adjustment devices configured to allow adjustment of height of the frame relative to the structure.
2. The device of Claim 1, wherein the removable section comprises a grate.
3. The device of Claim 1, wherein the removable section comprises a manhole cover.
4. The device of Claim 1, wherein the structure is at least one of a road or sidewalk.
5. The device of Claim 1, wherein the adjustment devices comprise:
a plurality of threaded cavities located around the threads that are configured to engage with threads in the threaded cavity; and
a plurality of bolts configured to be received within the threaded cavities.
6. The device of Claim 1, wherein the bolts have a length greater than a thickness of the adjustable frame, and wherein the threaded cavities pass through the adjustable frame.
7. An underground access port comprising:
an entry area having a shoulder;
a conduit access area coupled to the entry area and one or more conduits;
a portal device received by a structure, the portal device comprising:
a removable section; and

an adjustable frame configured to receive the removable section, the adjustable frame comprising:

a plurality of adjustment devices configured to allow adjustment of height of the frame relative to the shoulder.

8. The port of Claim 7, wherein the removable section comprises a grate.
9. The port of Claim 7, wherein the removable section comprises a manhole cover.
10. The port of Claim 7, wherein the underground access port is mounted within at least one of a road or a sidewalk.
11. The port of Claim 7, wherein the adjustment devices comprise:
 - a plurality of threaded cavities located around the threads that are configured to engage with threads in the threaded cavity; and
 - a plurality of bolts configured to be received within the threaded cavities.
12. The port of Claim 7, wherein the bolts have a length greater than a thickness of the adjustable frame, and wherein the threaded cavities pass through the adjustable frame.



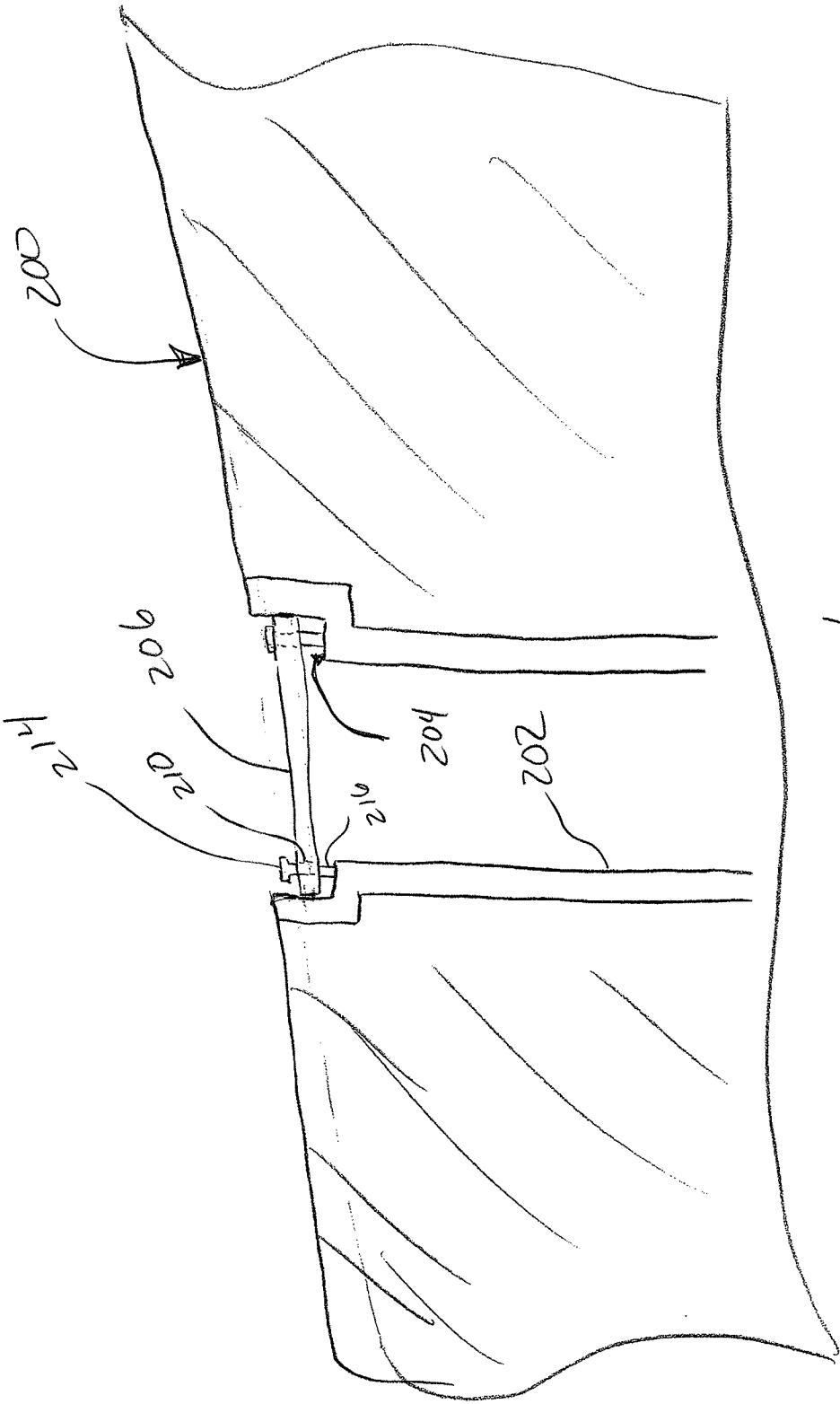


Fig 4

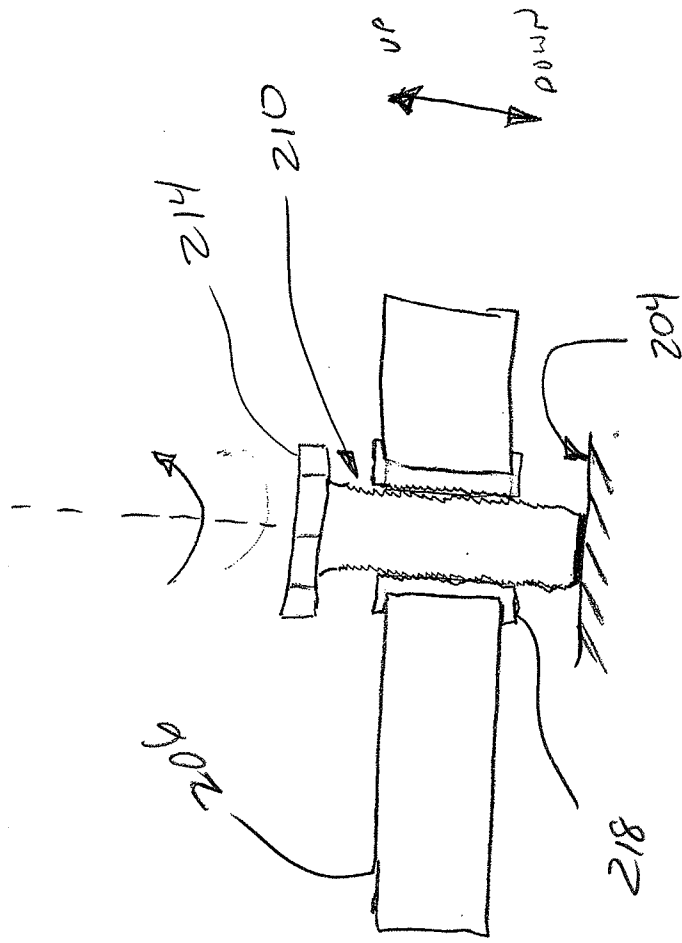


Fig. 5