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(54) Abstract Title: **An access cover with formations to improve grip**

(57) An access cover 2 has an integrally formed tread made of chevron shaped protrusions 3 from which further projections 4 extend. The chevrons may be arranged irregularly. There may be several projections on each chevron. The chevrons preferably have right angled corners edges around their upper surface. The projections can be circular and are ideally shorter than the chevrons. The cover can be used for a manhole cover or a stop tap box cover.

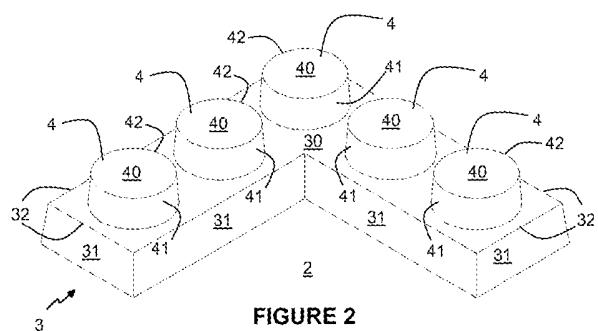


FIGURE 2

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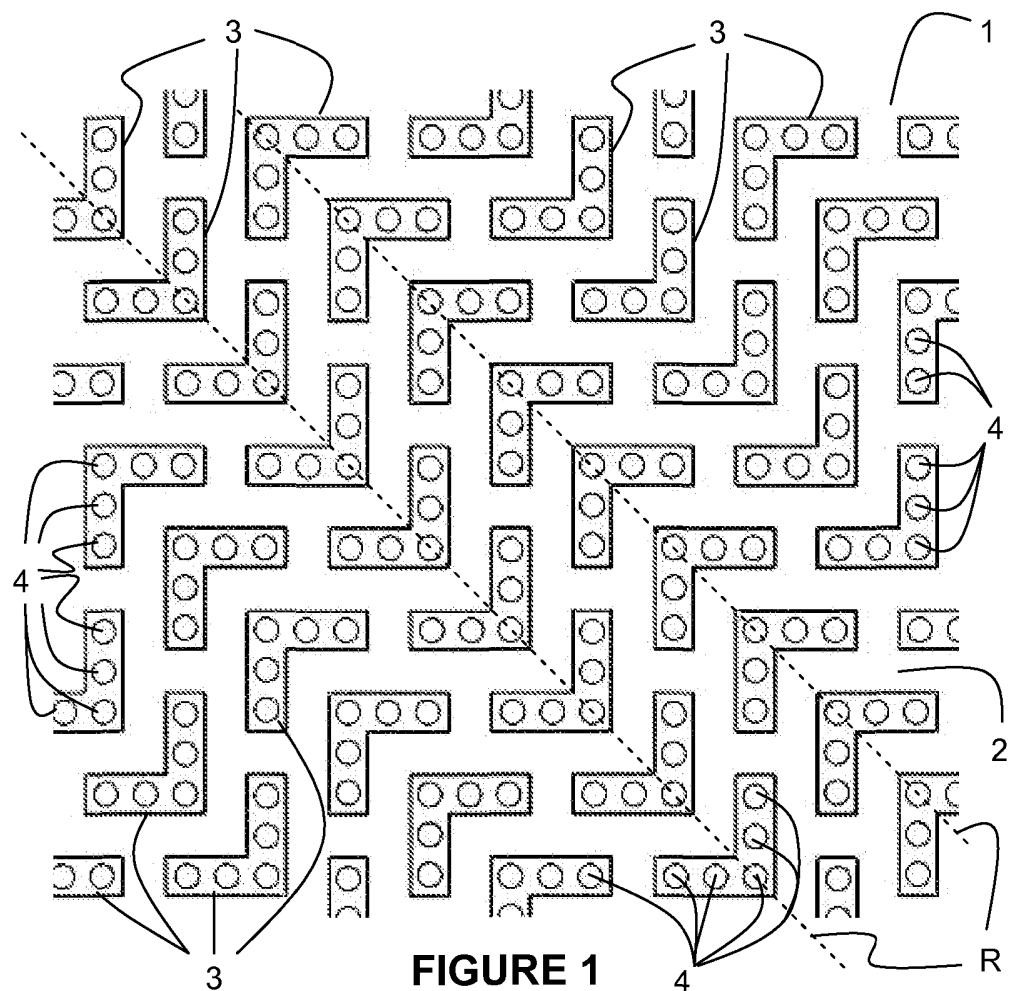


FIGURE 1

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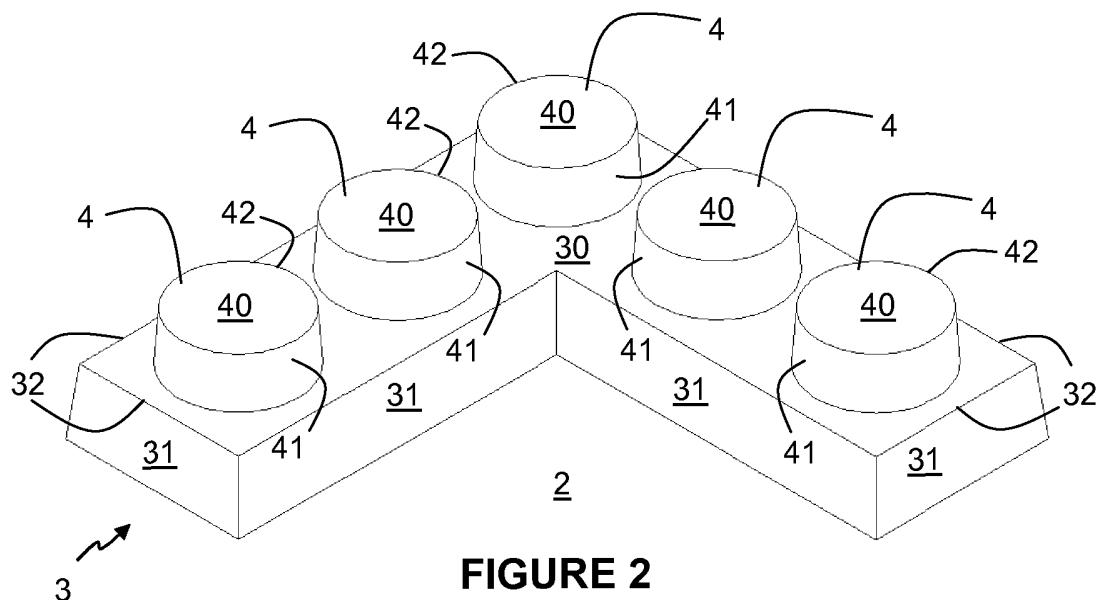


FIGURE 2

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GRIPPING MEANS

This invention relates generally to access covers and more specifically to access covers with gripping means for increasing the grip on a surface thereof, for example the upper and/or exposed surface of a stop tap box cover or a manhole cover.

It is a non-exclusive object of the invention to provide a more effective gripping means for such applications.

One aspect of the invention provides an access cover, e.g. a rigid access cover, with an integrally formed gripping means on an exposed surface thereof for increasing the friction between the surface and a body moving over the surface, the gripping means comprising a plurality of L-shaped protrusions formed integrally with the surface and having an upper protrusion surface and a corner edge about at least a portion of the periphery of the upper protrusion surface, each protrusion including a projection extending from the upper protrusion surface.

The inventors have observed that L-shaped protrusions with projections extending from their upper surface provides a surprisingly effective gripping means, particularly in the case of access covers, which are generally rigid, e.g. formed of steel.

The orientation of the protrusions is preferably different from, for example alternates with respect to, adjacent protrusions, for example such as to form an irregular or at least partially irregular array of protrusions.

Preferably, each protrusion includes two or more projections extending from the upper protrusion surface of each protrusion. Each projection may have an upper projection surface, for example with a corner edge about at least a portion of the periphery of the upper projection surface.

Preferably, each corner edge comprises an angle of between 60 and 120 degrees, for example between 70 and 110 degrees or more specifically between 80 and 100 degrees. More preferably, the edges comprise an angle of about 90 degrees, however, the angle may be varied, for example to include a draft angle, for ease of manufacture.

Each projection, for example the upper projection surface, may be circular, square, rectangular or polygon in shape or any other suitable shape. The projection preferably

extends from the upper protrusion surface by a lesser distance than the distance by which the protrusion extends from the substrate surface. More specifically, the height of the projection may be less than the height of the protrusion, for example two thirds, half or one third of the height of the protrusion. Alternatively, the height of the projection may be 5 more than the height of the protrusion.

In one preferred embodiment, the protrusions are arranged in an alternating pattern. In a more specific preferred embodiment, each protrusion includes five projections, for example circular projections, on its upper protrusion surface.

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The access cover is preferably formed of a metal, for example an alloy containing iron. More preferably, the access cover comprises steel and may comprise stainless steel.

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One embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 is a top view of the gripping means according to one embodiment of the invention showing an array of protrusions;

Figure 2 is a perspective view of one of the protrusions of Figure 1.

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In Figure 1, there is shown a portion 1 of an access cover having a substrate surface 2 on which is located a gripping means 10 in the form of an array of protrusions 3 with a plurality of projections 4 on each protrusion 3.

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The array of protrusions 3 is arranged in diagonal rows R, wherein the orientation of the protrusions 3 alternates between each adjacent row R. Each protrusion 3 is L-shaped and includes four equally spaced circular projections 4 thereon.

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As shown more clearly in Figure 2, each protrusion 3 includes an upper protrusion surface 30 and a side protrusion surface 31. The upper protrusion surface 30 is flat and substantially parallel to the substrate surface 2. The side protrusion surface 31 extends from the substrate surface 2 at an angle of about 90 degrees, but a draft angle of 10 degrees is included in this embodiment for ease of manufacture. The periphery of the upper protrusion surface 30 is defined by a corner edge 32 where the side protrusion surface 31 meets the upper surface 30 which is at an angle of about 100 degrees as a result of the draft angle.

Similarly, each projection 4 includes an upper projection surface 40 and a side projection surface 41. The upper projection surface 40 is flat and substantially parallel to the upper protrusion surface 30. The side projection surface 41 also preferably extends from the upper protrusion surface 30 at an angle of about 90 degrees, but a draft angle of 5 degrees is included for this surface in this embodiment for ease of manufacture. The distance by which the side projection surface 41 is less than the distance by which the protrusion 3 extends from the substrate surface 2. Thus, the effective height of each projection 4 is less than the height of the protrusion 3 from which it projects, in this case approximately two thirds. In this embodiment, the height of the protrusions 3 is 3mm and the height of the projections is 2mm.

The periphery of the upper projection surface 40 is defined by a corner edge 42 where the side projection surface 41 meets the upper projection surface 40 at an angle of about 95 degrees due to the aforementioned draft angle.

15 The rigid substrate 1 in this embodiment is part of a manhole cover (not shown) in this embodiment. The gripping means 10 is located on an upper surface 2 of the manhole cover (not shown), in use, such that the surface 2 is exposed and is substantially contiguous with the road or pavement (not shown).

20 In use, when a body, for example a car or person, moves over the surface 2, the tyre of the car or the sole of the person's shoe is in contact with the gripping means 10. The sole or tyre cooperates in particular with the corner edge 32 of the protrusion 3 and with the projection 4 to provide improved gripping means 10. It has been observed that the 25 presence of this double protrusion or ridge arrangement 3, 4 substantially increases the interference between the body and the substrate surface 2, and hence the friction therebetween, to a surprisingly advantageous extent.

Furthermore, the presence of a corner edge 42 on the projection 4 has been found to 30 increase significantly this advantageous effect. It is therefore even more advantageous to configure the projection 4 which provides a further corner edge 42.

It will be appreciated by those skilled in the art that the invention may be incorporated into any number of applications in which a rigid access cover requires an improved gripping 35 means. For example, the invention may be incorporated into a stop tap box or the like.

Several variations to the embodiment described are also envisaged without departing from the scope of the invention. For example, the shape and/or layout of the protrusions and/or projections may be varied, i.e. the projections need not be circular in shape and/or the array of protrusions or projections need not be symmetrical. Whilst it is preferred that the projections also include corner edges, the improved gripping means is also effective where the shape of the projections is, for example, hemispherical. Although it is preferred to configure each protrusion with a plurality of projections, a single projection is also envisaged.

Moreover, the upper surfaces 30, 40 need not be flat or parallel to the substrate surface 2. It is envisaged that they may be irregular and/or taper. It is further envisaged that for some applications it may be advantageous to have one or both of the upper surfaces 30, 40 taper downwardly and inwardly from their peripheries to provide a sharper corner edge for improved gripping.

It will be appreciated that, whilst it is preferred to have sharper corner edges, gripping means incorporating angles of between 60 and 120 degrees, for example between 70 and 110 degrees or more specifically between 80 and 100 degrees, would all provide advantages over the prior art.

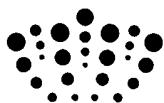
Each protrusion 3 and/or each projection 4, for example the upper protrusion or projection surface 30, 40, may be circular, square, rectangular or polygon in shape or any other suitable shape. The protrusions and/or projections need not be of the same or a similar shape to one another. The orientation of the protrusions and/or projections may be the same and/or symmetrical throughout the array.

It will be appreciated by those skilled in the art that any number of combinations of the aforementioned features and/or those shown in the appended drawings provide clear advantages over the prior art and are therefore within the scope of the invention described herein.

CLAIMS

1. A rigid access cover with an integrally formed gripping means on an exposed surface thereof for increasing the friction between the surface and a body moving over the surface, the gripping means comprising a plurality of L-shaped protrusions formed integrally with the surface and having an upper protrusion surface and a corner edge about at least a portion of the periphery of the upper protrusion surface, each protrusion including a projection extending from the upper protrusion surface.
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10. 2. Cover according to claim 1, wherein the orientation of the protrusions is alternates with respect to adjacent protrusions so as to form an irregular or at least partially irregular array of protrusions.
15. 3. Cover according to claim 1 or claim 2, wherein each protrusion includes two or more projections extending from the upper protrusion surface of each protrusion.
20. 4. Cover according to claim 3, wherein each protrusion includes three or more projections which are substantially equally spaced from one another about the upper protrusion surface.
25. 5. Cover according to any preceding claim, wherein each projection has an upper projection surface with a corner edge about at least a portion of the periphery of the upper projection surface.
30. 6. Cover according to any preceding claim, wherein each corner edge comprises an angle of between 80 and 100 degrees.
7. Cover according to claim 5, wherein each corner edge comprise an angle of about 90 degrees.
35. 8. Cover according to any preceding claim, wherein the height of the projection is less than the height of the protrusion.
9. Cover according to any preceding claim, wherein the projections are circular.
10. A rigid access cover substantially as described herein with reference to the accompanying drawings.

11. A stop tab box cover according to any preceding claim.
12. A manhole cover according to any one of claims 1 to 10.
- 5 13. A stop tap box cover substantially as described herein with reference to the accompanying drawings.
14. A manhole cover substantially as described herein with reference to the accompanying drawings.



Application No: GB0908557.2

Examiner: Mr Joe Cornfield

Claims searched: 1-12

Date of search: 10 June 2009

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
Y	1-9, 11, 12	GB2434170 A SAINT GOBAIN PIPELINES fig 1
Y	1 at least	GB2421754 A SAINT GOBAIN PIPELINES fig 1
Y	1 at least	FR2850404 A1 COMMUNEAU ROGER fig 2
Y	1-9, 11, 12	JP58042252 U 1983 figs 2 and 4
Y	1 at least	US6000878 A TAKADA abstract; figs 1 and 2
Y	1 at least	JP11131517 A NAGASHIMA abstract, figs

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X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
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Field of Search:

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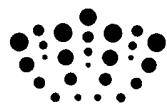
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The following online and other databases have been used in the preparation of this search report

Online: EPODOC; WPI

International Classification:



Subclass	Subgroup	Valid From
E02D	0029/14	01/01/2006
E01C	0011/24	01/01/2006