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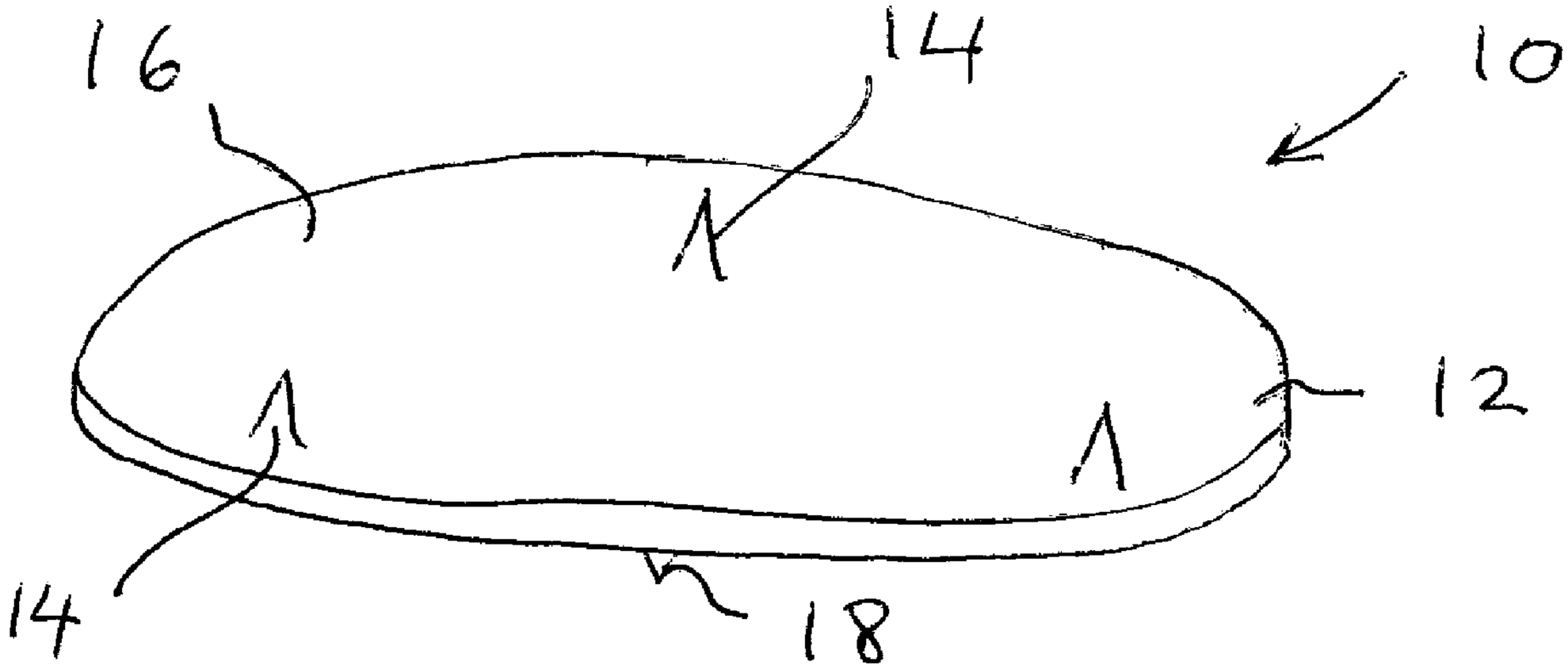
(54) Title: RETAINING WALL SYSTEMS WITH SANDBAG ATTACHMENT MEMBERS



(57) Abrégé/Abstract:
A sandbag retaining wall has interconnecting members for attaching sandbags in adjacent courses together. The sandbag interconnecting member has a generally planar body having at least three projections on its upper side and its lower side which can protrude into the sandbags. The sandbag interconnecting member is sized such that two sandbag interconnecting members can fit in spaced-apart positions on the upper or lower side of a sandbag. In another embodiment, the sandbag interconnecting member is a strip of material having an upper side and a lower side, both of which can form a detachable bond to a sandbag. The surfaces of the interconnecting member, and the sandbag wall, or a portion thereof, comprise mating parts of a hook-and-loop fastener (velcro) or similar attachment means.

Abstract of the Disclosure

A sandbag retaining wall has interconnecting members for attaching sandbags in adjacent courses together. The sandbag interconnecting member has a generally planar body having at least three projections on its upper side and its lower side which can protrude into the sandbags. The sandbag interconnecting member is sized such that two sandbag interconnecting members can fit in spaced-apart positions on the upper or lower side of a sandbag. In another embodiment, the sandbag interconnecting member is a strip of material having an upper side and a lower side, both of which can form a detachable bond to a sandbag. The surfaces of the interconnecting member, and the sandbag wall, or a portion thereof, comprise mating parts of a hook-and-loop fastener (velcro) or similar attachment means.

RETAINING WALL SYSTEMS WITH SANDBAG ATTACHMENT MEMBERS

Technical Field

The invention pertains to retaining walls made of sandbags and to interconnecting members for attaching together sandbags in such walls.

Background of the Invention

Retaining walls are used in a wide variety of civil engineering and landscaping applications, for example to support slopes and embankments for highways, support noise barriers, prevent erosion along waterways, etc. Retaining walls are commonly made having a support face structure made of interconnecting blocks with soil or other fill material placed and compacted in back of the wall, and sometimes with sheets of geogrid laid in the fill at various levels, extending back from the wall and attached to it.

International Patent Publication No. WO 00/61880 (Kim), published October 19, 2000, discloses a system of building retaining walls from sandbags which uses interconnecting members to attach the sandbags in adjacent courses to each other so as to stabilize and strengthen the sandbag wall structure, permitting the construction of permanent retaining walls. Sandbag retaining walls have several advantages over prior art systems in those applications where they can be used, including lower cost, ease of construction and the ability to make vegetation-covered walls from seeds in the sandbag fill material.

It would be desirable to extend the utility and application of sandbag retaining walls by providing further means to enhance the strength, stability and use of such structures.

Summary of the Invention

The invention provides sandbag interconnecting members for connecting sandbags in a retaining wall. According to one embodiment of the invention, the sandbag interconnecting member comprises a generally planar body having at least three projections on its upper side and on its lower side, the projections being capable of protruding into sandbags, the interconnecting member being sized such that two or more interconnecting members can fit in spaced-apart positions on the upper or lower side of a sandbag in a course of sandbags in a retaining wall.

The invention further provides a sandbag interconnecting member which comprises a piece of material, for example plastic or fabric, having an upper side and a lower side, both of which can form a detachable bond to a sandbag. The surfaces of the interconnecting member, and the wall of the sandbag or a portion thereof, comprise mating parts of a hook-and-loop fastener device (as velcro) or a similar attachment means. Alternately, a plurality of loose hooks can be applied between a sandbag interconnecting member and the sandbags, or simply between the sandbags themselves. In the latter case, the mass of loose hooks acts as a sandbag interconnecting member.

The invention further provides retaining walls comprising two or more courses of sandbags in which vertically-adjacent courses are attached together by means of the sandbag interconnecting members of the invention.

Brief Description of the Drawings

Figure 1 is a top perspective view of one embodiment of a sandbag interconnecting member according to the invention.

Figure 2 is a bottom perspective view thereof.

Figure 3 is a side elevation view thereof.

Figure 4 is a top perspective view of another embodiment of the sandbag interconnecting member.

Figure 5 is a top plan view of a course of sandbags in a retaining wall with the interconnecting members in position thereon.

Figure 6 is a front sectional view of the first two courses of a retaining wall according to the invention.

Figure 7 is a top perspective view of another embodiment of the sandbag interconnecting member.

Detailed Description of the Preferred Embodiments

Exemplary embodiments are illustrated in the accompanying drawings. It is intended that the embodiments and figures disclosed herein are to be considered illustrative rather than restrictive.

In the following description and in the drawings, corresponding and like parts are referred to by the same reference characters.

Referring to Figures 1 to 3, the sandbag interconnecting member **10** comprises a body portion **12**, which is a generally planar, solid disk, having three spaced-apart projections **14** on its upper surface **16** and three spaced-apart projections **18** on its lower surface **20**. The interconnecting member is

preferably about ten to twenty centimeters in diameter. It may be made of plastics or aluminum or other non-corrodible material.

Figure 5 shows the use of the sandbag interconnecting members **10** in a retaining wall **36** that is made of sandbags **26** supporting backfill **38** and having a wall face **42**. The term "retaining wall" as used in this specification in relation to structures made of sandbags includes any array of sandbags that is suitable for the purpose of erosion control (for example along shorelines, riverbanks, etc.), flood control, retaining or stabilizing slopes or embankments, noise barriers, and for similar applications. In this specification, "fill material" means any material that is suitable for use in bags in the construction of retaining walls, including sand, soil, gravel, dry mix concrete (which hardens after wetting and curing), and mixtures thereof, including fill material with seeds for vegetation. The term "sandbag" as used in this specification means a bag containing any "fill material". For further clarity, the term is not limited to a bag in which the fill material is sand.

The sandbag interconnecting members are placed in spaced-apart positions on the upper side of the sandbags **26**. Two sandbag interconnecting members **10** are placed on each sandbag **26** in the lower course **30**, in spaced-apart positions, preferably between the mid-line and the ends **28** of the bag. One or two sandbag interconnecting members may also be placed under each sandbag in the lower course **30**, to better secure the wall **36** to the ground on which it is constructed. The sandbags **26** are positioned so that their ends **28** abut each other in the course **30**. As seen in Figure 6, a second course **32** of sandbags **26** is placed above the first course, with the upper sandbags in a laterally-staggered arrangement relative to the sandbags in the

lower course **30**, i.e. so that each sandbag in a course rests on two adjacent sandbags in the adjacent lower course.

When the upper course **32** of sandbags is placed on top of the lower course **30** and on the interconnecting members **10** positioned thereon, the projections **14** on the upper side of the sandbag interconnecting member protrude into the sandbags in the upper course, and the weight of such sandbags presses the interconnecting members so that the projections **18** on their lower side protrude into the sandbags of the lower course **30**. The projections **14**, **18** can be configured to penetrate the sandbags, or, preferably, to simply indent them. In either case, the projections are considered to "protrude" into the sandbags. This attaches together the sandbags in the upper course to those in the lower course. The interconnecting members **10** do not extend across the point of abutment of adjacent sandbags within a given course.

The courses of the retaining wall structure typically lie generally horizontally, though they may follow the contour of the ground as required. The courses **30**, **32** of the wall are laid one above the other, including further courses laid in the same manner to build a wall of the required height. The slope of the resulting wall face of sandbags may vary from a gradual slope to a substantially vertical one, depending on the particular application. The courses **30**, **32** of the wall face are "vertically-adjacent" in the sense that they are generally one above the other, so as to form a wall having a height, though not necessarily, or typically, forming a vertical wall, as a wall having some slope is generally preferred.

According to a further embodiment, illustrated in Figure 4, the sandbag interconnecting member **10A** is substantially the same as the interconnect-

ing member **10** of Figs. 1 to 3, but it includes an eyelet **22** on either the upper or lower surface of the body **12**. A cord **24** can be inserted through the eyelet. The cord may be made of any suitable and durable material, preferably a strong synthetic non-degradeable material. Plastics materials such as nylon or high-density polyethylene are preferred. Instead of an eyelet **22**, other cord-retaining means such as a hook can be employed. In use, the cord **24** is strung through the eyelets **22** of the sandbag interconnecting members **10A** along a given course of sandbags, and is anchored at its ends to the retaining wall, backfill or adjacent ground, for example by means of spikes. This increases the strength and stability of the retaining wall.

In a further embodiment, shown in Figure 6, the sandbag interconnecting members **40** are pieces of fabric, plastic or other material that have hook fasteners on both sides thereof. The sandbags **26** may comprise a fabric, such as geotextile, to which the hook fasteners can detachably connect (in the manner of fabric hook-and-loop fasteners such as velcro) or the sandbags may have strips of loop fasteners attached to them, to which the hook fasteners of the interconnecting members can connect. The opening of the sandbag may also be provided with velcro strips to hold the bag closed after it is filled with fill material.

The sandbags **26** are placed in adjacent courses in the retaining wall **36** so that the interconnecting members **40** attach the sandbags in adjacent courses together. The sandbag interconnecting members **40** may be in the form of strips that are oriented laterally across the face of the sandbag, i.e. perpendicular to the wall face **42**, in order to provide the greatest resistance to movement from the pressure of the backfill **38** supported by the wall.

However, different shapes, such as square or circular, or different orientations, of the sandbag interconnecting member may also be used.

Although the invention has been described in terms of various embodiments, it is not intended that the invention be limited to these embodiments. Various modifications within the scope of the invention will be apparent to those skilled in the art. The scope of the invention is defined by the claims that follows:

WHAT IS CLAIMED IS:

1. A sandbag interconnecting member for attaching to a sandbag in a retaining wall, said sandbag being configured to lie in a course of such sandbags, said sandbag having an upper side and a lower side, said retaining wall comprising a plurality of said courses, said sandbag interconnecting member comprising a generally planar body having an upper side and a lower side, at least three spaced-apart projections on said upper side of said body, at least three spaced-apart projections on said lower side of said body, said projections being capable of protruding into said sandbag, said body being sized such that two said sandbag interconnecting members can fit in spaced-apart positions on said upper side or said lower side of said sandbag.

2. A sandbag interconnecting member according to claim 1 wherein said body is a solid disk.

3. A sandbag interconnecting member according to claim 1 or 2 wherein there are exactly three said projections on said lower side of said body.

4. A sandbag interconnecting member according to any preceding claim wherein there are exactly three said projections on said upper side of said body.

5. A sandbag interconnecting member according to claim 3 or 4 wherein said exactly said three said projections are equidistantly spaced apart.

6. A sandbag interconnecting member according to any preceding claim further comprising a cord-retaining means on said upper side or said lower side of said body configured to retain a cord.

7. A sandbag interconnecting member according to claim 6 wherein said cord-retaining means is an eyelet.

8. A sandbag interconnecting member for attaching to a sandbag in a retaining wall, said sandbag being configured to lie in a course of such sandbags, said sandbag having an upper side and a lower side, said retaining wall comprising a plurality of said courses, said sandbag interconnecting member comprising a piece of material having an upper surface and a lower surface, both said surfaces being adapted to form a detachable bond to said sandbag, and said sandbag comprising a fabric adapted to form said detachable bond to said surfaces of said sandbag interconnecting member.

9. A sandbag interconnecting member according to claim 8 wherein one or both of said surfaces of said sandbag interconnecting member comprises hook fasteners.

10. A sandbag interconnecting member according to claim 8 wherein one or both of said surfaces of said sandbag interconnecting member comprises loop fasteners and said sandbag fabric comprises hook fasteners.

11. A sandbag interconnecting member according to claim 8 wherein said piece of material is an elongated strip.

12. A sandbag interconnecting member according to claim 8 wherein said piece of material is a disk.

13. A sandbag interconnecting member according to any one of claims 8 to 12 wherein said material is one of fabric or plastic.

14. A retaining wall comprising:

(a) a plurality of sandbag interconnecting members according to any preceding claim;

(b) a first plurality of said sandbags positioned end-to-end forming a lower course;

(c) a second plurality of said sandbags positioned end-to-end forming an upper course above said first course;

(d) said sandbags of said upper course being in staggered position relative to said sandbags of said lower course such that each said sandbag in said upper course rests on two adjacent sandbags in said lower course; and

(e) said sandbag interconnecting members positioned between said lower course and said upper course such that two said sandbag interconnecting members are in spaced-apart positions on each said sandbag of said lower course to attach said lower sandbag to two adjacent sandbags of said upper course.

15. A retaining wall according to claim 14 further comprising an interconnecting member positioned under each said sandbag in said lower course.

16. A retaining wall comprising:

(a) a plurality of sandbag interconnecting members according to claim 8;

(b) a first plurality of said sandbags forming a lower course;

(c) a second plurality of said sandbags forming an upper course above said first course;

(d) said sandbag interconnecting members positioned between said lower course and said upper course such that two said sandbag interconnecting members are in spaced-apart positions on each said sandbag of said lower course to attach said lower sandbag to two adjacent sandbags of said upper course.

17. A retaining wall according to claim 16 wherein said elongated strip is positioned to extend generally perpendicular to a face of said retaining wall.

18. A retaining wall comprising:

(a) a plurality of sandbag interconnecting members according to claim 6;

(b) a first plurality of said sandbags positioned end-to-end forming a lower course;

(c) a second plurality of said sandbags forming an upper course above said first course;

(d) said sandbags of said upper course being in staggered position relative to said sandbags of said lower course such that each said sandbag in said upper course rests on two adjacent sandbags in said lower course;

(e) said sandbag interconnecting members positioned between said lower course and said upper course such that two said sandbag interconnecting members are in spaced-apart positions on each said sandbag of said lower

course to attach said lower sandbag to two adjacent sandbags of said upper course; and

(f) a cord attached to said cord-retaining means of said interconnecting members along at least one said course of said sandbags.

19. Two sandbag interconnecting members according to any one of claims 1 to 12 in combination with a sandbag, said sandbag being configured to lie in a course of such sandbags, said sandbag having an upper side and a lower side, said two interconnecting members being attached to said upper side or to said lower side of said sandbag.

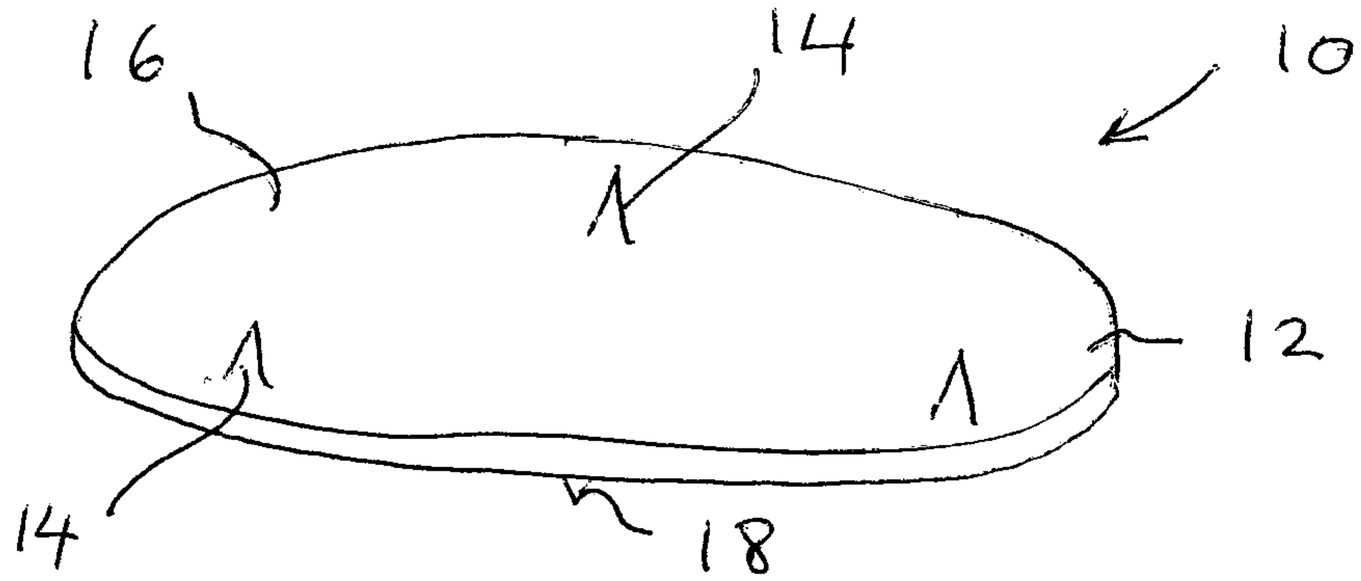


Fig. 1

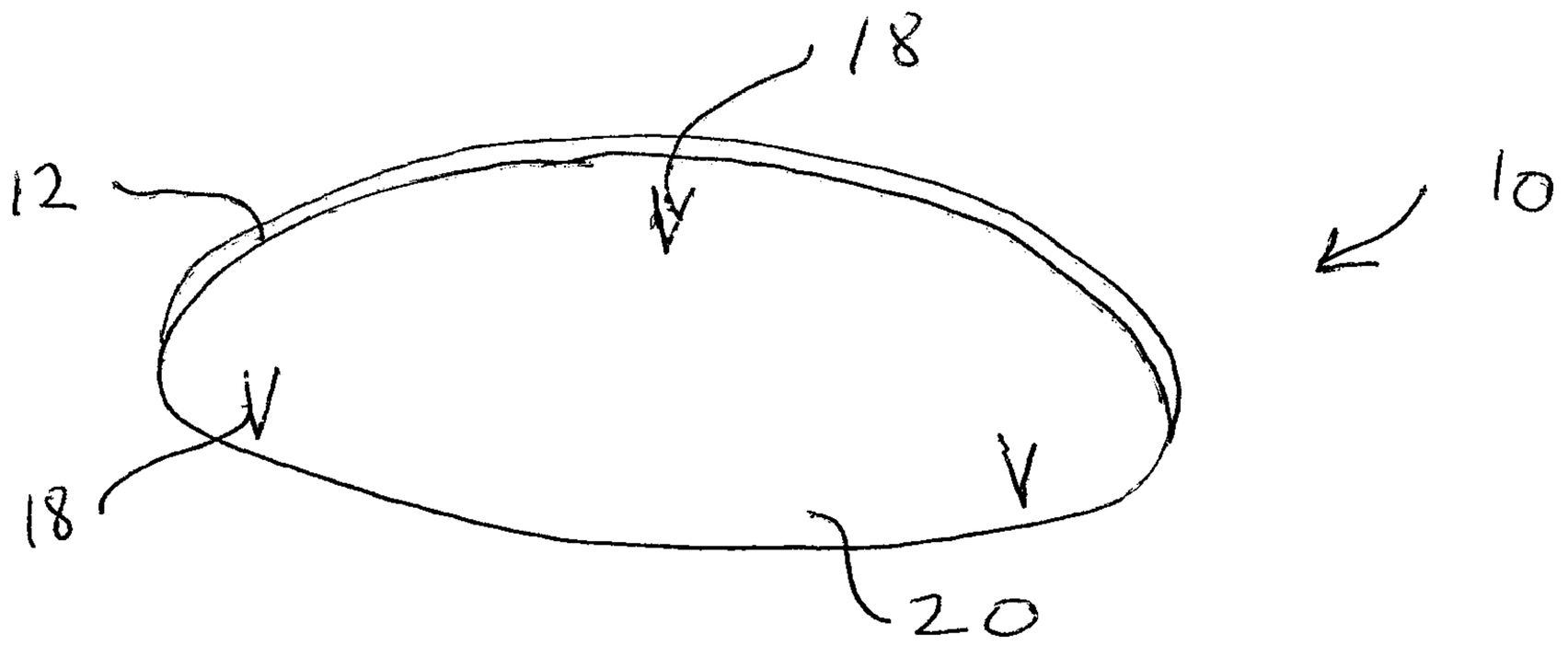


Fig. 2

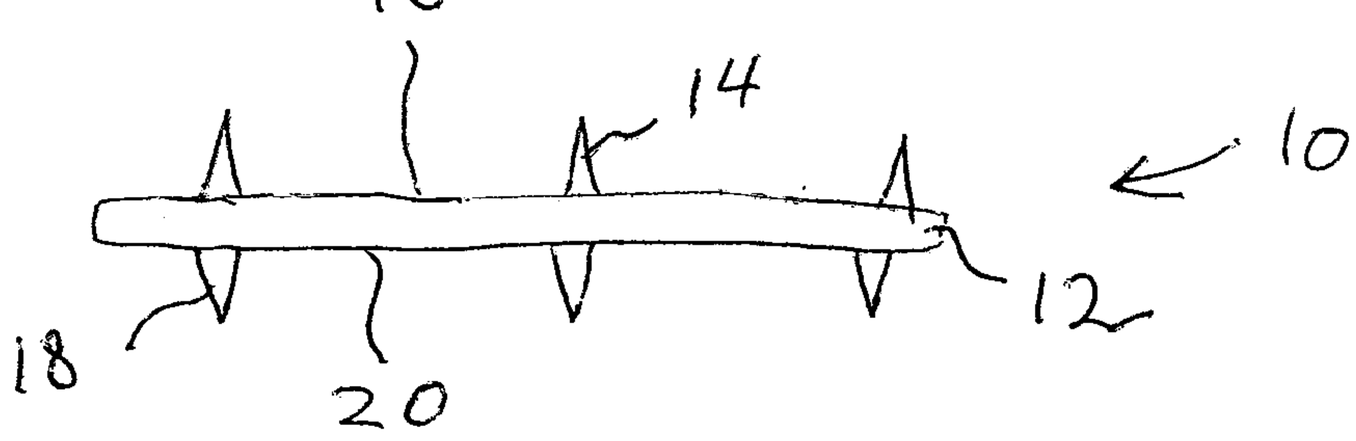


Fig. 3

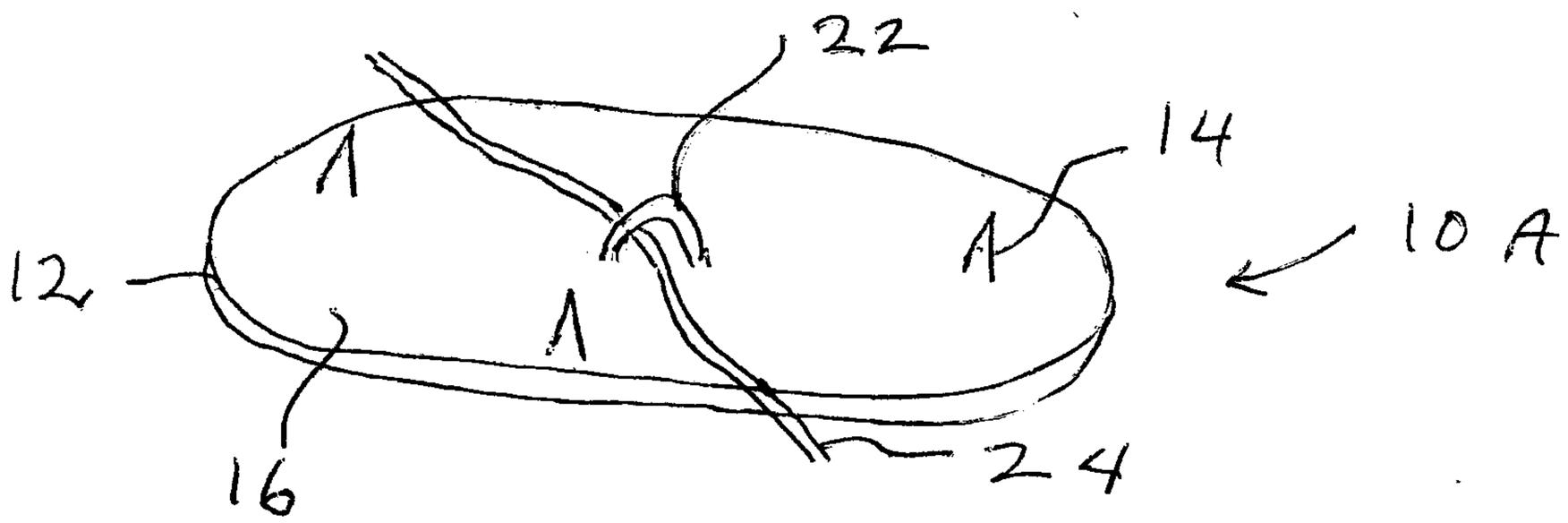


Fig. 4

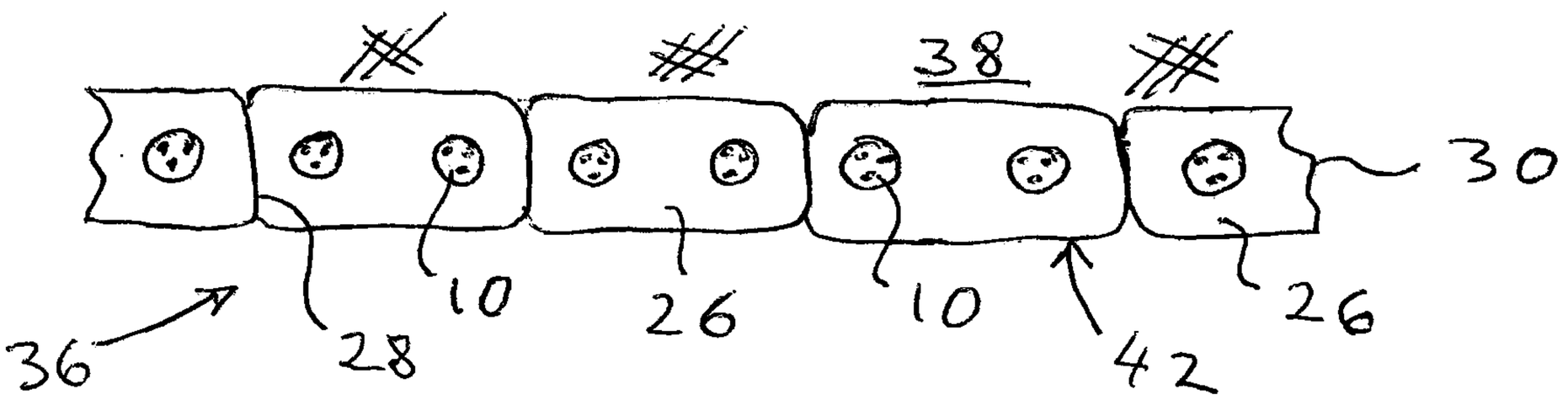


Fig. 5

Fig. 6

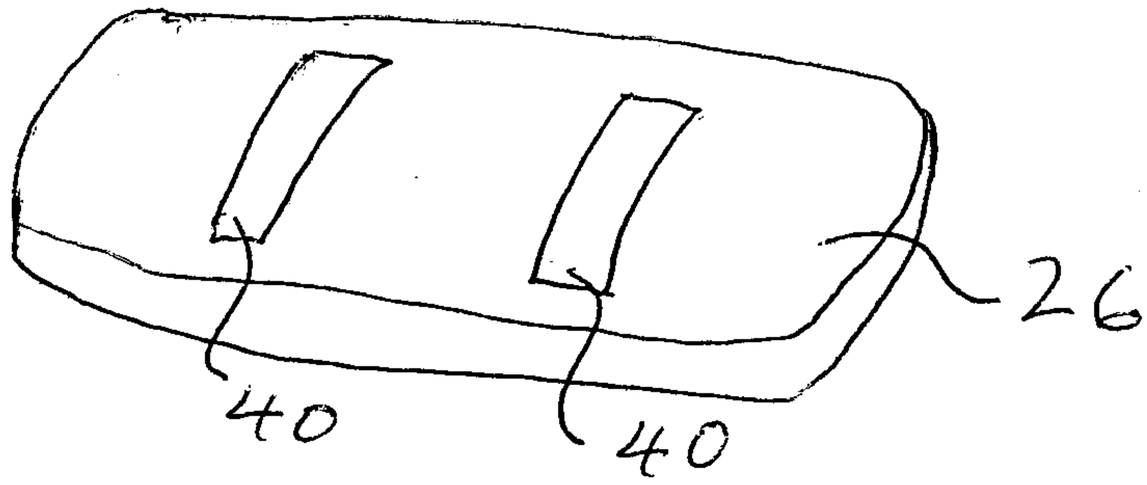
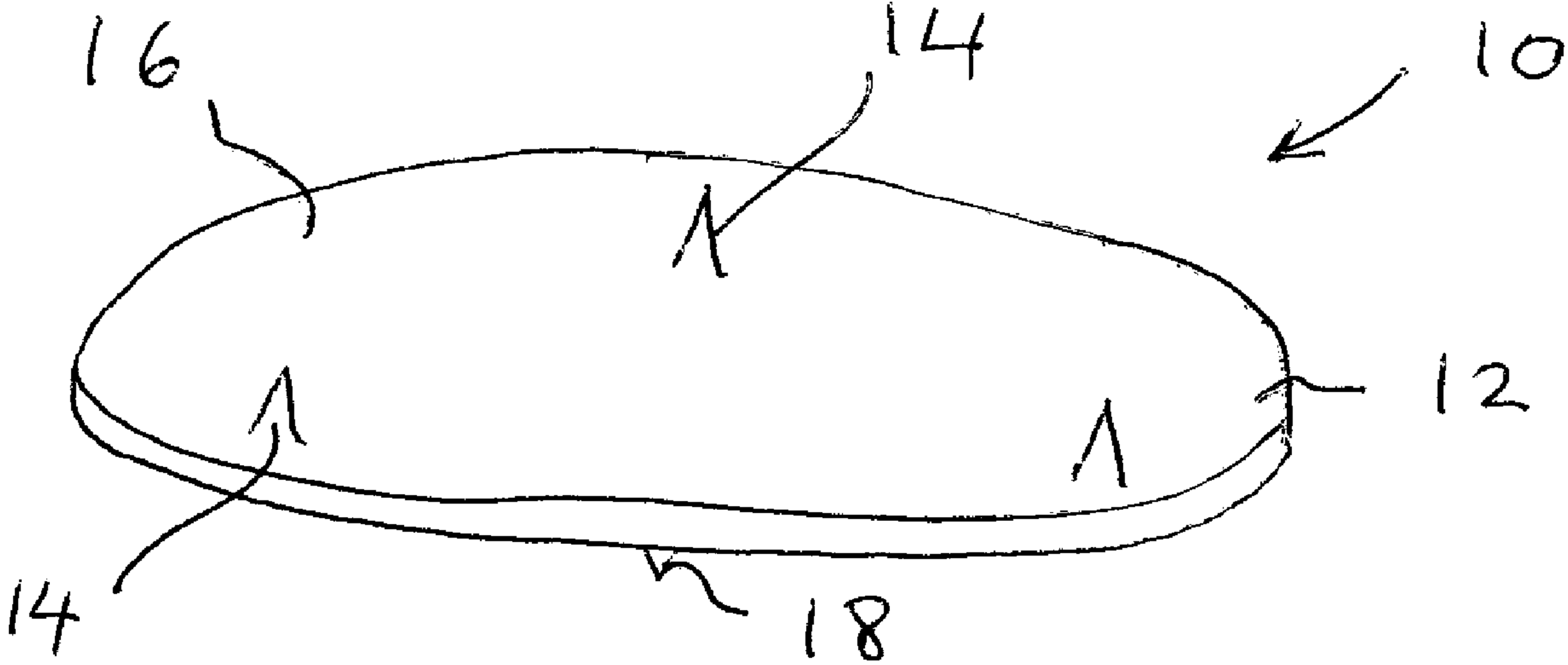


Fig. 7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