



(22) **Date de dépôt/Filing Date:** 2011/11/30
(41) **Mise à la disp. pub./Open to Public Insp.:** 2012/06/14
(45) **Date de délivrance/Issue Date:** 2019/01/08
(62) **Demande originale/Original Application:** 2 856 940
(30) **Priorité/Priority:** 2010/12/08 (US61/421,185)

(51) **Cl.Int./Int.Cl.** *E01H 5/06* (2006.01)
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(54) **Titre : DISPOSITIF LAME DE BALAYAGE REGLABLE ET ENSEMBLE LAME DE BALAYAGE**
(54) **Title: ADJUSTABLE SWEEPING BLADE DEVICE AND SWEEPING BLADE ASSEMBLY**

(57) **Abrégé/Abstract:**

The present document describes a sweeping blade assembly for attachment to a vehicle for sweeping a ground surface. The assembly comprises first and second blade supports attached parallel to and distant from each other so as to define a vertical channel which is open at the top and at the bottom. A plurality of sweeping blades are provided within the channel for sweeping the ground. Each blade comprises two bushing holes and a compressible bushing in each bushing hole for attachment to the first blade support and/or the second blade support. The bushing may be made of a resilient material and may comprise a ventilation hole for improving its compressibility. Whereby, upon contacting an obstacle on the ground, the bushings compress under pressure to cause a vertical and/or angular movement of the blade within the channel.

ABSTRACT

The present document describes a sweeping blade assembly for attachment to a vehicle for sweeping a ground surface. The assembly comprises first and second blade supports attached parallel to and distant from each other so as to define a vertical channel which is open at the top and at the bottom. A plurality of sweeping blades are provided within the channel for sweeping the ground. Each blade comprises two bushing holes and a compressible bushing in each bushing hole for attachment to the first blade support and/or the second blade support. The bushing may be made of a resilient material and may comprise a ventilation hole for improving its compressibility. Whereby, upon contacting an obstacle on the ground, the bushings compress under pressure to cause a vertical and/or angular movement of the blade within the channel.

ADJUSTABLE SWEEPING BLADE DEVICE AND SWEEPING BLADE ASSEMBLY

TECHNICAL FIELD

This description relates to an adjustable sweeping blade device and an adjustable
5 sweeping blade assembly for attachment to personal or commercial vehicles.

BACKGROUND

Removing snow from open ground, streets, sidewalks and parking lots is an age-
old problem in less temperate climates where significant snowfall is anticipated
during colder periods of the year. For instance, in many parts of Canada and in
10 many northern states in the United States, significant snowfall can be expected
during the late fall and early spring months.

Clearing freshly fallen snow from open ground, parking lots, driveways, sidewalks
and roadways, whether these surfaces are paved or not, is a task common to all
of these areas that is generally required to make these surfaces passable. If the
15 snow is allowed to accumulate over a period of weeks, the snow eventually makes
it difficult for pedestrian and vehicle travel, if not treacherous. Therefore, many
devices have been designed and manufactured to remove accumulated snow from
such surfaces.

Blade arrangements or systems for snow removal are typically mounted directly to
20 a vehicle so as to remove snow and ice from a wide variety of road surfaces.
Depending of the environmental conditions, the type of road surface and the user
ability that the snow plough blade arrangement is exposed to, the wear on the
snow plough blade can be extensive and costly as the operator is constantly
replacing the blades. Typically challenges for the blades include uneven road
25 surface resulting in uneven/premature wear, repeated impact to the blades, hitting
obstacles on the road, and operator error.

As an example, U.S. Patent No. 5,746,017 issued May 5, 1998 to Jostein discloses a ploughshare having cutting edge and securing device for attachment to a plough. The ploughshare has a number of individual metallic parts which are firmly permanently embedded in an elastomer mass. The prior art however does not
5 show the reduction of wear on snow blade systems as a result of the blades having constant metal to metal contact at different points in the attachment system.

As another example, U.S. Patent No. 4,669,205 issued on January 24, 1986 to Smathers and relates to a snow plough apparatus is described having segmented blade means comprising a plurality of bits. Each bit is independently mounted so
10 that it can be vertically displaced when it encounters a high point in the roadway or an obstruction. It will be noted that such metal to metal contact results in an increase in wear and repair due to vibration which causes costs increase to the user of such a blade for removing snow from all kinds of roads and surfaces.

Also, U.S. Patent No. 5,743,032 which issued on April 28, 1998 to Vauhkonen
15 relates to a plough blade arrangement for a snow-plough. The plough blade arrangement includes a frame consisting of a flat part removably attached to the plough, several blade plates covering the desired working width, and attachment members for the blade plates to the frame. Here, the prior art does not address the ability to accommodate uneven and different road surfaces. Moreover, the easy
20 replacement of the blades is also not adequately addressed.

The prior art does not show the reduction of wear on snow blade systems as a result of the blades having constant metal to metal contact at different points in the attachment system. It will be noted that such metal to metal contact results in an increase in wear and repair due to vibration which causes costs increase to the
25 user of such a blade for removing snow from all kinds of roads and surfaces.

Moreover, prior art does not completely address the ability to accommodate uneven and different road surfaces. Finally, the easy replacement of the blades is also not adequately addressed.

For these disadvantages established, there is therefore a need for an improved sweeping blade device.

SUMMARY

It is an object of the present disclosure to provide an improved adjustable sweeping
5 blade device and an adjustable sweeping blade assembly for attachment to
personal or commercial vehicles.

According to one aspect, there is provided a sweeping blade assembly for
attachment to a vehicle having a snow plough blade for sweeping a ground
surface. The sweeping blade assembly comprises: a first blade support adapted
10 to be attached to the snow plough blade of the vehicle; a second blade support
adapted to be attached parallel to and distant from the first blade support; a
plurality of sweeping blade devices for sweeping the ground surface, each one of
the sweeping blade devices comprising a blade portion having at least two bushing
holes extending therethrough and a compressible bushing inserted in each one of
15 the at least two bushing holes, wherein the sweeping blade devices are operably
attached to the first blade support and/or the second blade support using the
compressible bushings that allows for a vertical movement of the sweeping blade
device when the ground surface is uneven; wherein the first blade support and the
second blade support define a channel in which the plurality of sweeping blade
20 devices are inserted, the second blade support extending continuously along the
plurality of sweeping blade devices mounted in an adjacent configuration, with
each one of the sweeping blade devices being shorter in length than the first and
the second blade supports, and wherein the channel is open on top to allow for a
free movement of the sweeping blade devices across the channel when at least
25 one of the compressible bushings is compressed.

According to another embodiment, there is provided a sweeping blade device,
wherein the blade portion is made of composite material, steel, carbide, aluminum,
alloy, polymer and/or plastic. In an embodiment, the blade portion is steel-based.

In an embodiment, wherein the blade portion has a lower edge configured to contact the ground surface and each one of the sweeping blade devices further comprises an insert in the lower edge. In an embodiment, each one of the sweeping blade devices further comprises metallic bushings inserted in the compressible bushings and defining fastener apertures. Each one of the ventilation holes, if any, can be aligned with a respective one of the fastener apertures, each one of the ventilation holes being closer to the lower edge than a corresponding one of the metallic bushings. Each one of the metallic bushings can be aligned with the ventilation hole defined in the same resilient material bushing. The lower edges of the blade portions can extend downwardly past the first and second blade supports. Each one of the blade portions can comprise an upper edge and the upper edges of the blade portions can extend up to or upwardly past the second blade support.

According to another embodiment, there is provided a sweeping blade device, wherein the insert is made of carbide.

According to another embodiment, there is provided a sweeping blade device, further comprising at least one bushing opposite the lower edge of the blade portion.

According to another embodiment, there is provided a sweeping blade device, wherein the resilient material is a rubber material.

According to another embodiment, there is provided a sweeping blade device, wherein the resilient material bushing is integrally formed in the resilient material layer. In an embodiment, the resilient material layer can cover a majority of front and rear faces of the blade portion. The resilient material layer can be bonded to the blade portion. The resilient material layer can extend at most to the upper edge of the blade portion and it can cover the upper edge of the blade portion.

According to another embodiment, there is provided a sweeping blade device, wherein the resilient material bushing further comprises a metallic bushing.

According to another embodiment, there is provided a sweeping blade device, wherein the resilient material bushing further comprises a ventilation hole.

According to another embodiment, there is provided a sweeping blade kit comprising:

- 5 a) at least one blade support for removably attaching to a vehicle; and
- b) at least one sweeping device as described above for removably attaching to the support.

According to another embodiment, there is provided a sweeping blade kit, wherein the blade support is made of two parts to receive the blade therebetween.

- 10 According to another embodiment, there is provided a sweeping blade, wherein the two parts are made of a first blade support for removably attaching to a vehicle and a second blade support for removably attaching to the sweeping blade device.

According to another embodiment, there is provided a sweeping blade assembly comprising:

- 15 a) at least one blade support for removably attaching to a vehicle; and
- b) at least one sweeping blade device removably attached to the blade support.

According to another embodiment, there is provided a sweeping blade assembly, wherein the blade support is made of two parts to receive the blade therebetween.

- 20 According to another embodiment, there is provided a sweeping blade assembly, wherein the two parts are made of a first blade support for removably attaching to a vehicle and a second blade support removably attached to the sweeping blade device.

- 25 According to another embodiment, there is provided a sweeping blade assembly, wherein the sweeping blade device is removably attached with attaching means.

According to another embodiment, there is provided a sweeping blade assembly, wherein the attaching means are nuts and bolts.

According to another embodiment, there is provided a sweeping blade assembly, wherein the vehicle may be included in the group consisting of a truck, a car, a
5 four-wheeler, a tractor, a personal vehicle, a commercial vehicle, a snow plow vehicle and a van.

According to another embodiment, there is provided a sweeping blade assembly, wherein the blade support is for removably attaching, or being removably
10 securable, to a snow plough blade located at the front, side, back or underneath of the vehicle.

According to another aspect, there is provided a sweeping blade assembly for sweeping a ground surface and comprising: a blade support assembly comprising a first blade support and a second blade support defining a vertical channel therebetween for receiving a plurality of sweeping blade devices; and a plurality of
15 sweeping blade devices operably mounted within the vertical channel for sweeping a ground surface, the sweeping blade devices being configured to move vertically and angularly within the vertical channel when the ground surface is uneven; wherein the vertical channel has an open top and an open bottom for allowing vertical and angular movement of the sweeping blade devices across the vertical
20 channel. Each one of the sweeping blade devices comprises a blade portion having a bushing hole at least partially filled with a resilient material bushing and a resilient material layer coated on the blade portion to at least partially cover same, with the resilient material bushing being integral with said resilient material layer, wherein the resilient material bushing is for attachment of a corresponding of the
25 sweeping blade devices to the first blade support or the second blade support.

According to a further aspect, there is provided a sweeping blade assembly comprising: a blade support assembly comprising a first blade support and a second blade support defining a vertical channel therebetween for receiving a plurality of sweeping blade devices; and a plurality of sweeping blade devices

operably mounted within the vertical channel for sweeping a ground surface, the sweeping blade devices being configured to move vertically and angularly within the vertical channel when the ground surface is uneven; wherein the vertical channel has an open top and an open bottom for allowing vertical and angular
5 movement of the sweeping blade devices across the vertical channel.

According to another general aspect, there is provided a sweeping blade assembly for attachment to a vehicle for sweeping a ground surface. The sweeping blade assembly comprises: a first blade support adapted to be attached to the vehicle; a second blade support adapted to be attached parallel to and distant from the first
10 blade support; and a plurality of sweeping blade devices for sweeping the ground surface. Each one of the sweeping blade devices comprises a blade portion having at least two bushing holes extending therethrough and a compressible bushing inserted in each one of the at least two bushing holes. The sweeping blade devices are operably attached to the first blade support and/or the second blade support
15 using the compressible bushings that allow for a vertical movement of the sweeping blade devices when the ground surface is uneven. The first blade support and the second blade support define a channel in which the plurality of sweeping blade devices are inserted. The channel is open on top to allow for a free movement of the sweeping blade devices across the channel when at least
20 one of the compressible bushings is compressed.

According to still another general aspect, there is provided a sweeping blade assembly for sweeping a ground surface and comprising: a first blade support adapted to be attached to a snow plough blade of a vehicle, said first blade support defining a first planar surface; a second blade support defining a second planar
25 surface, the second blade support being adapted to be attached parallel to and distant from the first blade support, the first planar surface and the second planar surface defining a vertical channel inbetween; and a plurality of sweeping blade devices operably installed within the vertical channel for sweeping a ground surface with the second blade support extending continuously along the plurality
30 of sweeping blade devices mounted in an adjacent configuration, with each one of

the sweeping blade devices being shorter in length than the first and the second blade supports. The sweeping blade devices are configured to move vertically and angularly within the vertical channel when a ground surface is uneven. The vertical channel has an open top and an open bottom for allowing vertical and angular movement of the sweeping blade devices across the vertical channel.

According to a further general aspect, there is provided a sweeping blade assembly comprising: a blade support assembly comprising a first blade support and a second blade support defining a vertical channel therebetween; and a plurality of sweeping blade devices operably installed within the vertical channel for sweeping a ground surface, the sweeping blade devices being configured to move vertically and angularly within the vertical channel when a ground surface is uneven. The vertical channel has an open top and an open bottom for allowing vertical and angular movement of the sweeping blade devices across the vertical channel.

According to still another general aspect, there is provided an assembly of sweeping blade devices engageable with a blade support assembly attached to a vehicle and including a first blade support and a second blade support. The second blade support extends parallel to and spaced-apart from the first blade support, and the first and second blade supports define together a channel. At least a plurality of the sweeping blade devices comprises: a blade portion having a front face, a rear face, a lower edge for sweeping a ground surface, and an upper edge opposite of the lower edge, the blade portion having at least two bushing holes extending therethrough between the front face and the lower face and between the upper and lower edge, the blade portion being insertable into the channel defined between the first and the second blade supports and operably attachable to the first blade support and/or the second blade support through the at least two bushing holes; and bushings comprising a resilient bushing portion having a fastener aperture and a ventilation hole extending therethrough, each one of the bushings being inserted in a respective one of at least two bushing holes.

According to still another general aspect, there is provided a sweeping blade comprising: a blade portion having a front face, a rear face, a lower edge for sweeping a ground surface, and an upper edge opposite the lower edge, the blade portion having at least two bushing holes extending therethrough between the front
5 face and the lower face and between the upper and lower edge; and bushings comprising a resilient bushing portion having a fastener aperture extending therethrough and a ventilation hole defined therein, each one of the bushings being inserted in a respective one of at least two bushing holes. In an embodiment, the ventilation hole extends through the resilient bushing portion. The ventilation is
10 configured to increase the compressibility of a respective one of the bushings.

According to a further general aspect, there is provided an assembly of sweeping blade devices engageable with a blade support assembly attached to a vehicle and including a first blade support and a second blade support, the second blade support extending parallel to and spaced-apart from the first blade support, the first
15 and second blade supports defining together a channel having an open top and an open bottom. At least a plurality of the sweeping blade devices comprises: a blade portion, bushings, and a resilient material layer. The blade portion has a front face, a rear face, a lower edge for sweeping a ground surface, and an upper edge opposite the lower edge. The blade portion has at least two bushing holes
20 extending therethrough between the front face and the lower face and between the upper and lower edges. The blade portion is insertable into the channel defined between the first and the second blade supports and operably attachable to the first blade support and/or the second blade support through the at least two bushing holes. Each one of the bushings comprises a resilient bushing portion
25 having a fastener aperture extending therethrough. Each one of the bushings is inserted in a respective one of at least two bushing holes. The resilient material layer is coated on the blade portion to at least partially cover same and the resilient material bushing portions are integral with said resilient material layer. At least one of the blade portions of the sweeping blade devices is displaceable above the first
30 and the second blade supports through the open top.

According to still a further general aspect, there is provided a sweeping blade comprising: a blade portion, bushings, and a resilient material layer. The blade portion has a front face, a rear face, a lower edge for sweeping a ground surface, and an upper edge opposite the lower edge. The blade portion has at least two
5 bushing holes extending therethrough between the front face and the lower face and between the upper and lower edge. Each one of the bushings comprises a resilient bushing portion having a fastener aperture, each one of the bushings being inserted in a respective one of at least two bushing holes. The resilient material layer is coated on the blade portion to at least partially cover same. The
10 resilient material bushing portions is integral with said resilient material layer.

The expression "blade portion" is intended to mean a blade made of a material resilient or not. Examples include, without limitations, a wide range of composite material, steel, carbide as defined below, aluminum, alloy, polymer, plastic, and the like.

15 The expression "carbide" is intended to mean a compound composed of carbon and a less electronegative element. Carbides can be generally classified by chemical bonding type as follows: (i) salt-like, (ii) covalent compounds, (iii) interstitial compounds, and (iv) "intermediate" transition metal carbides. Examples include, without limitations, calcium carbide, silicon carbide, tungsten carbide
20 (often called simply carbide), and cementite.

The expression "resilient material" is intended to mean a material which absorbs energy when it is deformed elastically and then, upon unloads to have this energy recovered. Examples include, without limitations, natural rubber, polymeric material, a wide range of composite material and the like.

25 The expression "rubber material" is intended to mean a material in which bond lengths deviate from the equilibrium (minimum energy) and strain energy is stored electrostatically. Examples include, without limitations, compositions of nitrile, hydrogenated nitrile, ethylene-propylene, fluorocarbon, chloroprene, silicone,

fluorosilicone, polyacrylate, ethylene acrylic, styrene-butadiene, polyurethane, rubber material and the like.

BRIEF DESCRIPTION OF THE DRAWINGS

Further features and advantages of the present disclosure will become apparent
5 from the following detailed description, taken in combination with the appended drawings, in which:

Fig. 1 illustrates the first blade support to be installed to a sweeping blade assembly for attachment to personal or commercial vehicles.

Fig. 2 illustrates an adjustable sweeping blade assembly for attachment to
10 personal or commercial vehicles.

Fig. 3 is a cross-sectional view of an adjustable sweeping blade assembly for attachment to personal or commercial vehicles.

Fig. 4 illustrates an improved sweeping blade device to be installed to a sweeping blade assembly for attachment to personal or commercial vehicles.

15 Fig. 5 is a cross-sectional view of an improved sweeping blade device to be installed to a sweeping blade assembly for attachment to personal or commercial vehicles.

Fig. 6 is a cross-sectional view along axis A-A in Fig. 5 of an improved sweeping blade device showing the rubber blade portion to be installed to a sweeping blade
20 assembly for attachment to personal or commercial vehicles.

Fig. 7 illustrates the rubber blade portion with the bushings to be installed to a sweeping blade assembly for attachment to personal or commercial vehicles.

Fig. 8 is a cross-sectional view of an improved sweeping blade device with an insert to be installed to a sweeping blade assembly for attachment to personal or
25 commercial vehicles.

Fig. 9 shows the sweeping blade assembly for attachment to personal or commercial vehicles.

Fig. 10 is another view that shows the sweeping blade assembly for attachment to personal or commercial vehicles.

- 5 It will be noted that throughout the appended drawings, like features are identified by like reference numerals.

DETAILED DESCRIPTION

In the embodiments there are disclosed an improved adjustable sweeping blade device and an adjustable sweeping blade assembly for attachment to personal or commercial vehicles.

- 5 Referring now to the drawings, and more particularly to Figs. 1 and 2, there is shown the first blade support 12 to be installed to a sweeping blade assembly 10 for attachment to personal or commercial vehicles. It is noted that the sweeping blade device 14 of the sweeping blade assembly 10 is removably attached with attaching means 28, such as nuts and bolts.
- 10 In Fig. 2, there is shown one embodiment of a sweeping blade assembly 10 comprising at least one blade support 12 for attachment to a vehicle. The sweeping blade assembly 10 also comprises at least one sweeping blade device 14 for attachment to a first blade support 12 and to at least a second blade support 16 for being attached to the sweeping blade device 14 and blade support 12 for
- 15 sweeping a ground with resistant fixtures. Referring to the sweeping blade assembly 10, it is noted that the vehicle may be included in the group consisting of a truck, a car, a four-wheeler, a tractor, a personal vehicle, a commercial vehicle, a snow plow vehicle, a van and the like. The sweeping blade assembly 10 may be attached either to the front, back and underneath of such vehicles. This sweeping
- 20 blade assembly 10 may be used to remove snow from road surfaces or even earth in an agricultural field.

- Now referring to Fig. 3, there is shown a cross-sectional view of a sweeping blade assembly 10 for attachment to personal or commercial vehicles. The sweeping blade assembly 10 comprises at least a first blade support 12 for attachment to a
- 25 vehicle, at least one sweeping blade device 14 for attachment to a first blade support 12 and at least a second blade support 16 for being attached to the sweeping blade device 14 and blade support 12.

Now referring to Fig. 4, there is shown a sweeping blade device 14 comprising a blade portion 22 which comprises a lower edge 32 for sweeping a ground.

In Figs. 5 and 6, the blade portion 22 of the sweeping blade device 14 is coated with a layer 18 of a resilient material. As an example, the resilient material for the
5 layer 18 may be made of a rubber composition material.

It is to be noted that the sweeping blade device 14 includes at least one bushing hole 19 opposite the lower edge 32 (Fig. 4). The bushing 20 (Fig. 7) is made of a resilient material which may consist in a rubber composition material. It is to be noted that the bushing 20 and the bushing hole 19 allow a better absorption and
10 the ability to accommodate uneven and different road surfaces without damaging the vehicle and the vehicle components. It is also to be noted that a metal to metal contact (without the bushing 20 and the bushing hole 19) results in an increase in wear and repair due to vibration which causes costs increase to the user of such a blade for removing snow from all kinds of roads and surfaces.

15 The bushing hole 19 may be of different shapes and/or configurations for increasing its ability to accommodate uneven and different road surfaces without damaging the vehicle and the vehicle components. The shape of the bushing hole 19 may be, without limitations, a circular shape, an elliptic shape, and the like. In a preferred embodiment, the shape of the bushing hole 19 is an eccentric shape.

20 Now referring to Fig. 5, there is shown a cross-sectional view of the improved sweeping blade device 14 to be installed to a sweeping blade assembly 10 for attachment to personal or commercial vehicles. There is shown a slot 13 for inserting an insert 15 as shown in Fig. 8.

Now referring to Fig. 6, there is shown a cross-sectional view along axis A-A in
25 Fig. 5 of the improved sweeping blade device 14 showing the layer 18 to be installed to a sweeping blade assembly 10 for attachment to personal or commercial vehicles.

Now referring to Fig. 7, there is shown the layer 18 with the bushings 20 integrally formed thereto, for example, by molding. Metal bushing 21 is installed in resilient material bushing 20, as shown in Fig. 6. The resilient material bushing 20 allows metal bushing 21 to absorb vibration and vertical movement causing less wear and tear on the lower edge 32. The ventilation hole 23 in layer 18 shown in Fig. 7 allows for more absorption of vibration and vertical movement of the sweeping blade device 14 reducing wear and tear on lower edge 32.

Accordingly, the blade construction discussed above with reference to Figure 7 includes the provision of a bushing hole comprising a metal bushing 21 surrounded by a resilient material bushing 20, and a ventilation hole 23 in the resilient material bushing 20. Such construction increases the flexibility and the compressibility of the resilient material bushing since the air in the ventilation hole is more compressible than the resilient material that surrounds it. This results in improved movement of the blade device 14 to absorb vibration. Whereby, when one of the bushings 20 is compressed more than the other due to the presence of an obstacle of some sort on the ground surface, the differential compression of the bushings would ultimately result in an angular movement of the blade 14 as exemplified in Figure 10. Figure 10 illustrates a sweeping blade assembly in accordance with one embodiment wherein one of the bushings (the right one) is compressed more than the left one due to an obstacle 17 under the right side of the blade device 14, resulting in a higher compression of the right-side bushing than the left side bushing. This ultimately leads to an angular movement (rotation) of the blade device 14 around the metal bushing of the less compressed bushing.

Still referring to the figures and now to Fig. 8 and Fig. 9, there is shown the sweeping blade assembly 10 for attachment to personal or commercial vehicles. In this case, the improved adjustable sweeping blade device 14 and the adjustable sweeping blade assembly 10 for attachment to personal or commercial vehicles can improve the methods of high speed snow removal by improving the wear life of the product, by minimizing vibrations on the equipment and the noise due to the road's surface contact effects, by reducing the fatigue encountered by the operator

due to vibrations and noise, by improving road and highway safety due to cleaner surfaces, by reducing sand and salt consumption and by reducing highway and road marking wear.

5 While preferred embodiments have been described above and illustrated in the accompanying drawings, it will be evident to those skilled in the art that modifications may be made without departing from this disclosure. Such modifications are considered as possible variants comprised in the scope of the disclosure.

1. A sweeping blade assembly for attachment to a vehicle having a snow plough blade for sweeping a ground surface, the sweeping blade assembly comprising:

a first blade support adapted to be attached to the snow plough blade of the vehicle;

a second blade support adapted to be attached parallel to and distant from the first blade support; and

a plurality of sweeping blade devices for sweeping the ground surface, each one of the sweeping blade devices comprising a blade portion having at least two bushing holes extending therethrough and a compressible bushing inserted in each one of the at least two bushing holes, each one of the sweeping blade devices further comprises a resilient material layer coated on the blade portion with the compressible bushings being integral with said resilient material layer, wherein the sweeping blade devices are operably attached to the first blade support and/or the second blade support using the compressible bushings that allow for a vertical movement of the sweeping blade devices when the ground surface is uneven;

wherein the first blade support and the second blade support define a channel in which the plurality of sweeping blade devices are inserted, the second blade support extending continuously along the plurality of sweeping blade devices mounted in an adjacent configuration, with each one of the sweeping blade devices being shorter in length than the first and the second blade supports, and wherein the channel is open on top to allow for a free movement of the sweeping blade devices across the channel when at least one of the compressible bushings is compressed.

2. The sweeping blade assembly of claim 1, wherein the second blade support is narrower than the sweeping blade devices.

3. The sweeping blade assembly of one of claims 1 and 2, wherein the blade portion is made of composite material, steel, carbide, aluminum, alloy, polymer and/or plastic.

4. The sweeping blade assembly of anyone of claims 1 to 3, wherein the blade portion has a lower edge configured to contact the ground surface and each one of the sweeping blade devices further comprises an insert in said lower edge.

5. The sweeping blade assembly of claim 4, wherein the insert comprises carbide.

6. The sweeping blade assembly of claim 5, wherein the sweeping blade devices further comprise ventilation holes defined in the resilient material layer and the compressible bushings.

7. The sweeping blade assembly of one of claims 5 and 6, wherein the resilient material comprises a rubber material.

8. The sweeping blade assembly of any one of claims 1 to 5, wherein each one of the compressible bushings comprises a ventilation hole defined therein, the ventilation being configured to increase the compressibility of a corresponding one of the compressible bushings.

9. The sweeping blade assembly of one of claims 6 and 8, wherein the ventilation holes extend through the corresponding one of the compressible bushings.

10. The sweeping blade assembly of any one of claims 1 to 9, wherein each one of the sweeping blade devices further comprises metallic bushings inserted in the compressible bushings and defining fastener apertures.

11. The sweeping blade assembly of any one of claims 1 to 10, wherein the blade portion is steel-based.

12. The sweeping blade assembly of any one of claims 1 to 11, wherein the at least one bushing hole is elliptic in shape.

13. The sweeping blade assembly of claim 6, wherein the blade portion comprises a lower edge for sweeping the ground surface, each one of the sweeping blade devices further comprises metallic bushings inserted in the compressible bushings and defining fastener apertures, and wherein each one of the ventilation holes is aligned with a respective one of the fastener apertures, each one of the ventilation holes being closer to the lower edge than a corresponding one of the metallic bushings.

14. The sweeping blade assembly of claim 4, wherein the lower edges of the blade portions extend downwardly past the first and the second blade supports.
15. The sweeping blade assembly of any one of claims 1 to 14, wherein each one of the blade portions comprises an upper edge and the upper edges of the blade portions extend up to or upwardly past the second blade support.
16. The sweeping blade assembly of any one of claims 1 to 15, wherein the resilient material layer covers a majority of front and rear faces of the blade portion.
17. The sweeping blade assembly of any one of claims 1 to 16, wherein the resilient material layer is bonded to the blade portion.
18. The sweeping blade assembly of any one of claims 1 to 17, wherein the blade portion comprises an upper edge and the resilient material layer extends at most to the upper edge of the blade portion.
19. The sweeping blade assembly of claim 18, wherein the resilient material layer covers the upper edge of the blade portion.
20. A sweeping blade assembly for sweeping a ground surface comprising:
- a first blade support adapted to be attached to a snow plough blade of a vehicle, said first blade support defining a first planar surface;
 - a second blade support defining a second planar surface, the second blade support being adapted to be attached parallel to and distant from the first blade support, the first planar surface and the second planar surface defining a vertical channel inbetween; and
 - a plurality of sweeping blade devices operably installed within the vertical channel with the second blade support extending continuously along the plurality of sweeping blade devices mounted in an adjacent configuration with each one of the sweeping blade devices being shorter in length than the first and the second blade supports, the sweeping blade devices being configured for sweeping a ground surface, each one of the sweeping blade devices comprises a blade portion

with two bushing holes defined therein and a resilient material bushing inserted in each one of the two bushing holes, wherein each one of the sweeping blade devices further comprises a resilient material layer coated on the blade portion with the resilient material bushings being integral with said resilient material layer, the sweeping blade devices being attached to the first blade support or the second blade support through the resilient material bushings, the sweeping blade devices being configured to move vertically and angularly within the vertical channel when the ground surface is uneven;

wherein the vertical channel has an open top and an open bottom for allowing vertical and angular movement of the sweeping blade devices across the vertical channel.

21. The sweeping blade assembly of claim 20, wherein the resilient material bushings comprise a ventilation hole defined therein, the at least one of the sweeping blade devices being attached to the first blade support or the second blade support through the resilient material bushings.

22. The sweeping blade assembly of one of claims 20 and 21, wherein the second blade support is narrower than the sweeping blade devices.

23. The sweeping blade assembly of any one of claims 20 to 22, wherein the first blade support is removably securable to a snow plough blade located at a front, side, back or underneath of a vehicle.

24. The sweeping blade assembly of claim 21, wherein the at least one of the sweeping blade devices further comprises a metallic bushing inserted in the resilient material bushing and defining a fastener aperture, the metallic bushing being aligned with the ventilation hole defined in the same one of the resilient material bushings.

25. The sweeping blade assembly of any one of claims 20 to 24, wherein the blade portion is steel-based and the resilient material is rubber-based.

26. The sweeping blade assembly of any one of claims 20 to 25, wherein the two bushing holes are elliptic in shape.

27. The sweeping blade assembly of claim 24, wherein the blade portion comprises a lower edge for sweeping the ground surface and the ventilation hole is closer to the lower edge than the metallic bushing.

28. The sweeping blade assembly of any one of claims 20 to 27, wherein the blade portion comprises a lower edge for sweeping the ground surface and the lower edge of the blade portion extends downwardly past the first and the second blade supports.

29. The sweeping blade assembly of any one of claims 20 to 28, wherein the blade portion comprises an upper edge and the upper edge of the blade portion extends up to or upwardly past the second blade support.

30. The sweeping blade assembly of claim 21, wherein the ventilation hole extends through a respective one of the resilient material bushings.

31. The sweeping blade assembly of any one of claims 20 to 30, wherein the resilient material layer covers a majority of front and rear faces of the blade portion.

32. The sweeping blade assembly of any one of claims 20 to 31, wherein the resilient material layer is bonded to the blade portion.

33. The sweeping blade assembly of any one of claims 20 to 32, wherein the blade portion comprises an upper edge and the resilient material layer extends at most to the upper edge of the blade portion.

34. The sweeping blade assembly of claim 33, wherein the resilient material layer covers the upper edge of the blade portion.

35. A sweeping blade assembly for sweeping a ground surface comprising:

a blade support assembly comprising a first blade support and a second blade support defining a vertical channel therebetween; and

a plurality of sweeping blade devices operably mounted within the vertical channel for sweeping a ground surface, the sweeping blade devices being configured to move vertically and angularly within the vertical channel when the ground surface is uneven, wherein each one of the sweeping blade devices comprises a blade portion having at least one bushing hole at least partially filled

with a resilient material bushing and a resilient material layer coated on the blade portion to at least partially cover same and the resilient material bushing being integral with said resilient material layer, wherein the resilient material bushing is for attachment of a corresponding one of the sweeping blade devices to the first blade support or the second blade support;

wherein the vertical channel has an open bottom for allowing vertical and angular movement of the sweeping blade devices across the vertical channel.

36. The sweeping blade assembly of claim 35, wherein the resilient material bushing comprises a ventilation hole defined therein configured to increase the compressibility of a respective one of the resilient material bushings.

37. The sweeping blade assembly of one of claims 35 and 36, wherein the first blade support assembly is removably securable to a snow plough blade located at a front, side, back or underneath of a vehicle.

38. The sweeping blade assembly of claim 36, wherein the ventilation hole extends throughout the resilient material layer and the resilient material bushing.

39. The sweeping blade assembly of claim 36, wherein each one of the sweeping blade devices further comprises a metallic bushing inserted in the resilient material bushing and defining a fastener aperture, the metallic bushing being aligned with the ventilation hole defined in the same resilient material bushing.

40. The sweeping blade assembly of any one of claims 35 to 39, wherein the blade portion is steel-based and the resilient material is rubber-based.

41. The sweeping blade assembly of any one of claims 35 to 40, wherein the at least one bushing hole is elliptic in shape.

42. The sweeping blade assembly of claim 39, wherein the blade portion comprises a lower edge for sweeping the ground surface and the ventilation hole is closer to the lower edge than the metallic bushing.

43. The sweeping blade assembly of any one of claims 35 to 42, wherein the blade portion comprises a lower edge for sweeping the ground surface and the lower edge of the blade portion extends downwardly past the first and the second blade supports.

44. The sweeping blade assembly of any one of claims 35 to 43, wherein the blade portion comprises an upper edge, the first blade support is securable to a snow plough blade of a vehicle, the second blade support is mountable in parallel to and distant from the first blade support, and the upper edge of the blade portion extends up to or upwardly past the second blade support.

45. The sweeping blade assembly of any one of claims 35 to 44, wherein each one of the sweeping blade devices is shorter in length than the first and the second blade supports.

46. The sweeping blade assembly of any one of claims 35 to 45, wherein the resilient material layer covers a majority of the front and rear faces of the blade portion.

47. The sweeping blade assembly of any one of claims 35 to 46, wherein the resilient material layer is bonded to the blade portion.

48. The sweeping blade assembly of any one of claims 35 to 47, wherein the blade portion comprises an upper edge and the resilient material layer extends at most to the upper edge of the blade portion.

49. The sweeping blade assembly of claim 48, wherein the resilient material layer covers the upper edge of the blade portion.

50. An assembly of sweeping blade devices engageable with a blade support assembly attached to a vehicle and including a first blade support and a second blade support, the second blade support extending parallel to and spaced-apart from the first blade support, the first and second blade supports defining together a channel having an open bottom, at least a plurality of the sweeping blade devices comprising:

a blade portion having a front face, a rear face, a lower edge for sweeping a ground surface, and an upper edge opposite the lower edge, the blade portion having at least two bushing holes extending therethrough between the front face and the lower face and between the upper and lower edges, the blade portion being

insertable into the channel defined between the first and the second blade supports and operably attachable to the first blade support and/or the second blade support through the at least two bushing holes;

bushings, each one of the bushings comprising a resilient bushing portion having a fastener aperture extending therethrough and each one of the bushings being inserted in a respective one of at least two bushing holes; and

a resilient material layer coated on the blade portion to at least partially cover same and the resilient material bushing portions being integral with said resilient material layer;

wherein at least one of the blade portions of the sweeping blade devices is displaceable above the first and the second blade supports through the open top.

51. The assembly as claimed in claim 50, wherein each one of the resilient bushing portions further comprises a ventilation hole defined therein and configured to increase the compressibility of a respective one of the bushings, the ventilation hole being aligned with a corresponding one of the fastener apertures.

52. The assembly as claimed in claim 51, wherein the ventilation hole extends through the resilient material layer and the resilient bushing portion.

53. The assembly as claimed in any one of claims 50 to 52, wherein the resilient material layer covers a majority of the front and rear faces of the blade portion, the resilient material layer extending at most to the upper edge of the blade portion and being bonded to the blade portion.

54. The assembly of claim 52, wherein the resilient material layer covers the upper edge of the blade portion.

55. The assembly as claimed in any one of claims 50 to 54, wherein each one of the bushings further comprises a metallic bushing inserted in the fastener aperture, the metallic bushing being externally surrounded by a respective one of the resilient bushing portions.

56. The assembly as claimed in any one of claims 50 to 55, wherein the second blade support is narrower than the sweeping blade devices.

57. The assembly as claimed in any one of claims 50 to 56, wherein the blade portion is made of composite material, steel, carbide, aluminum, alloy, polymer and/or plastic.

58. The assembly as claimed in any one of claims 50 to 57, wherein the blade portion further comprises a carbide insert inserted into the lower edge.

59. The assembly of any one of claims 50 to 58, wherein the blade portion is steel-based and the resilient bushing portion is rubber-based.

60. The assembly of any one of claims 50 to 59, wherein the at least two bushing holes are elliptic in shape.

61. The assembly of claim 51, wherein each one of the bushings further comprises a metallic bushing inserted in the fastener aperture with the ventilation hole being closer to the lower edge than the metallic bushing.

62. The assembly of any one of claims 50 to 61, wherein the lower edge of the blade portion extends downwardly past the first and the second blade supports.

63. The assembly of any one of claims 50 to 62, wherein the first blade support is attachable to a snow plough blade of the vehicle and the upper edge of the blade portion extends up to or upwardly past the second blade support.

64. The assembly of any one of claims 50 to 63, wherein each one of the sweeping blade devices is shorter in length than the first and the second blade supports.

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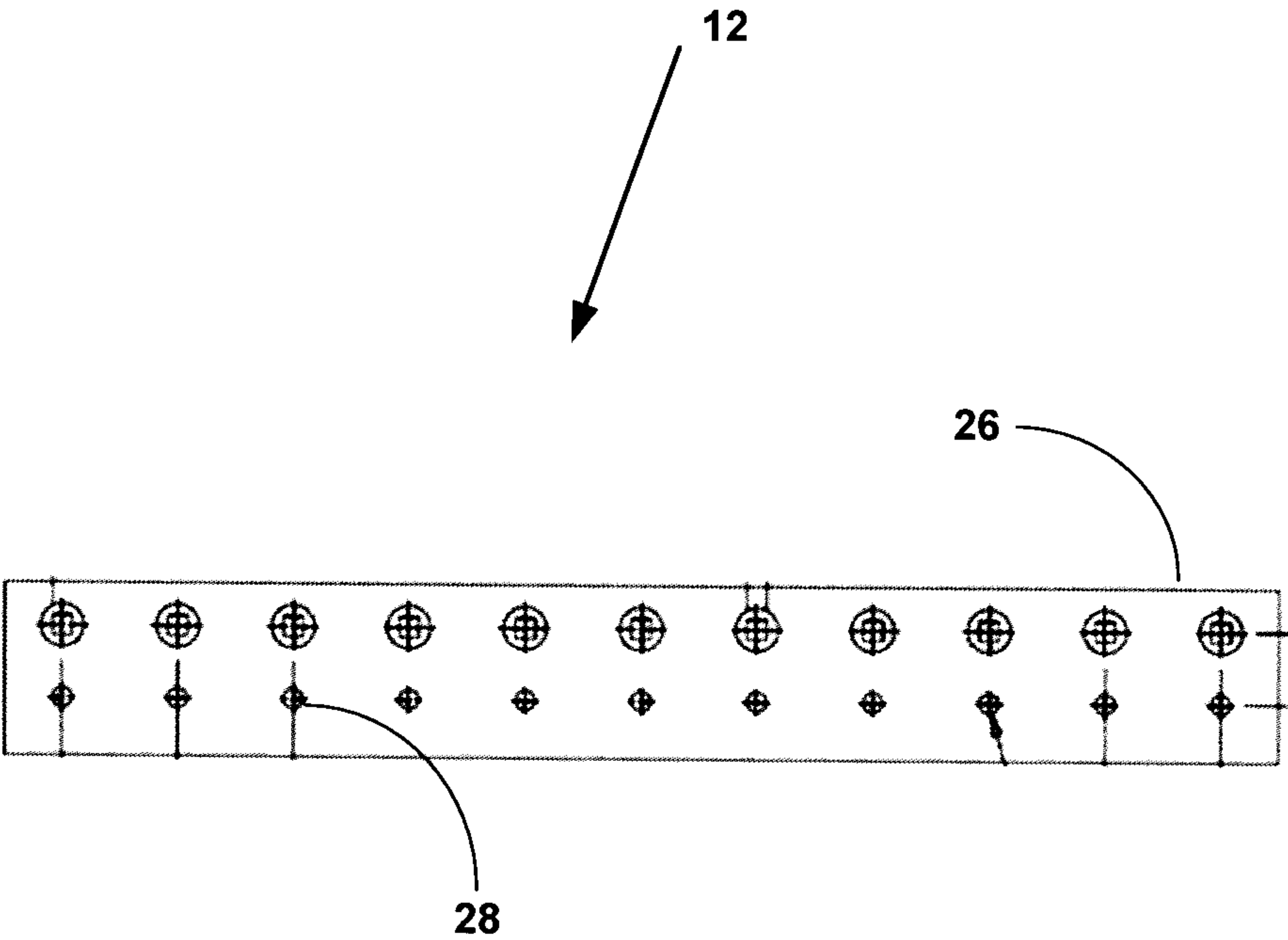


Fig. 1

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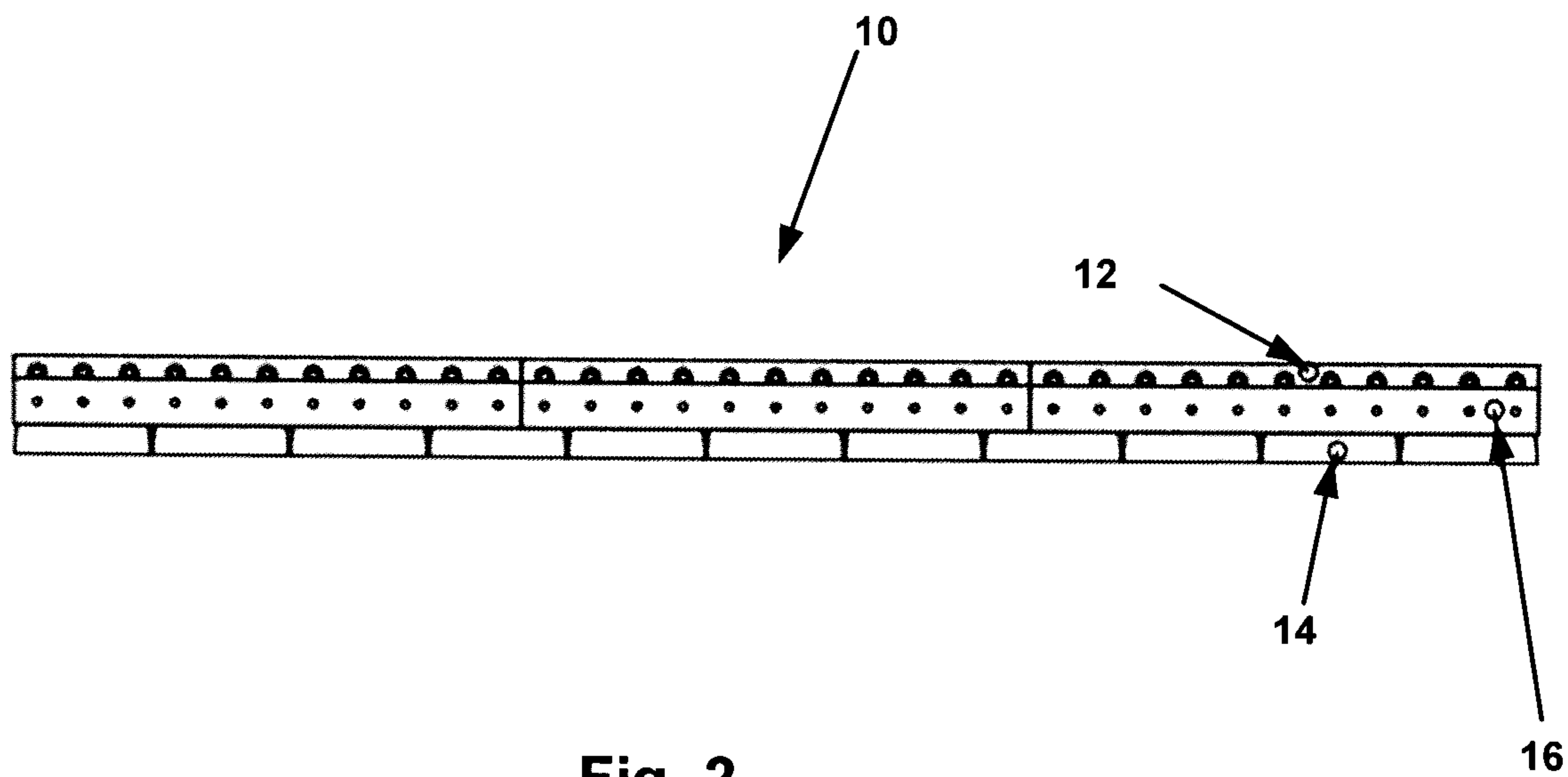


Fig. 2

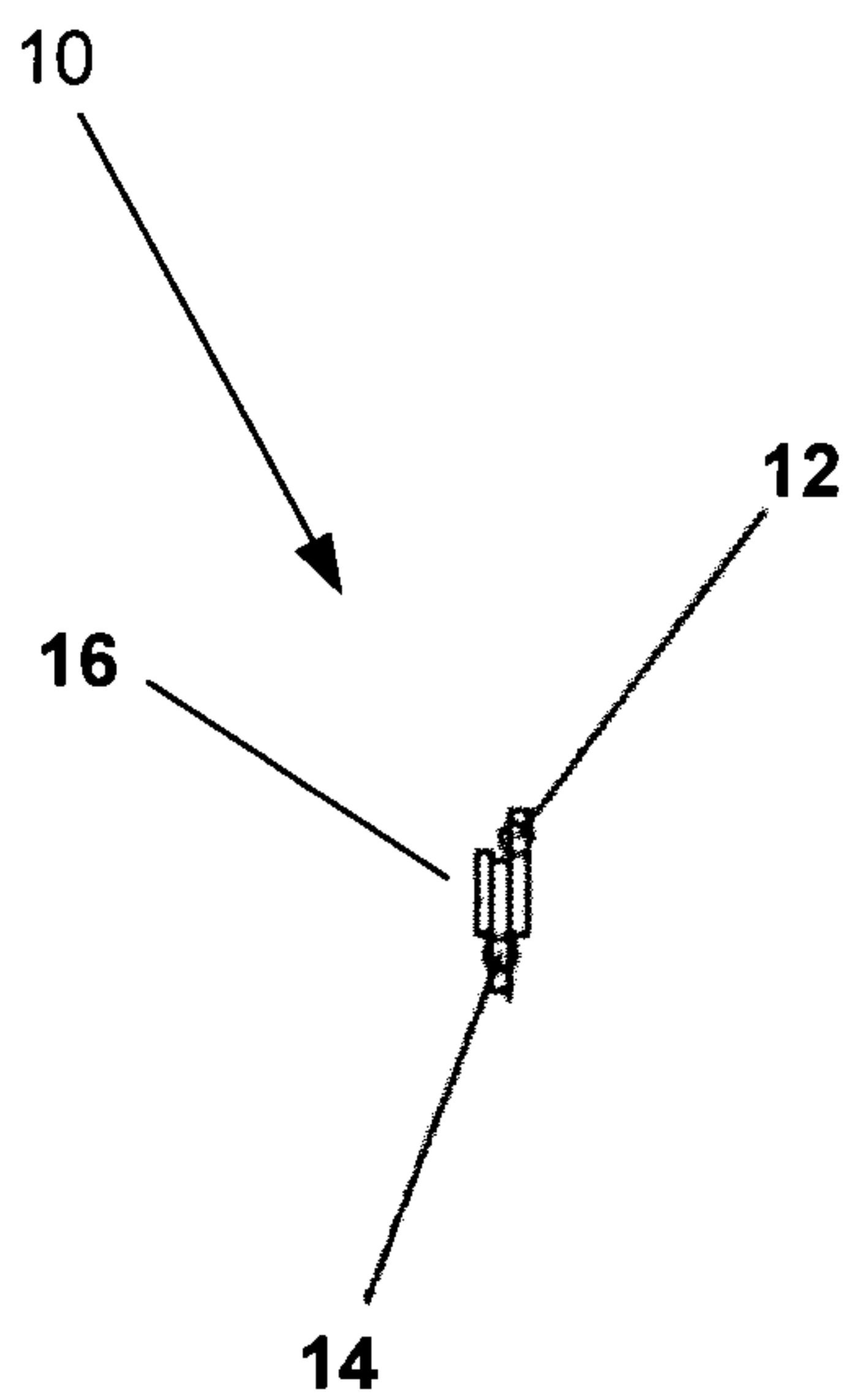


Fig. 3

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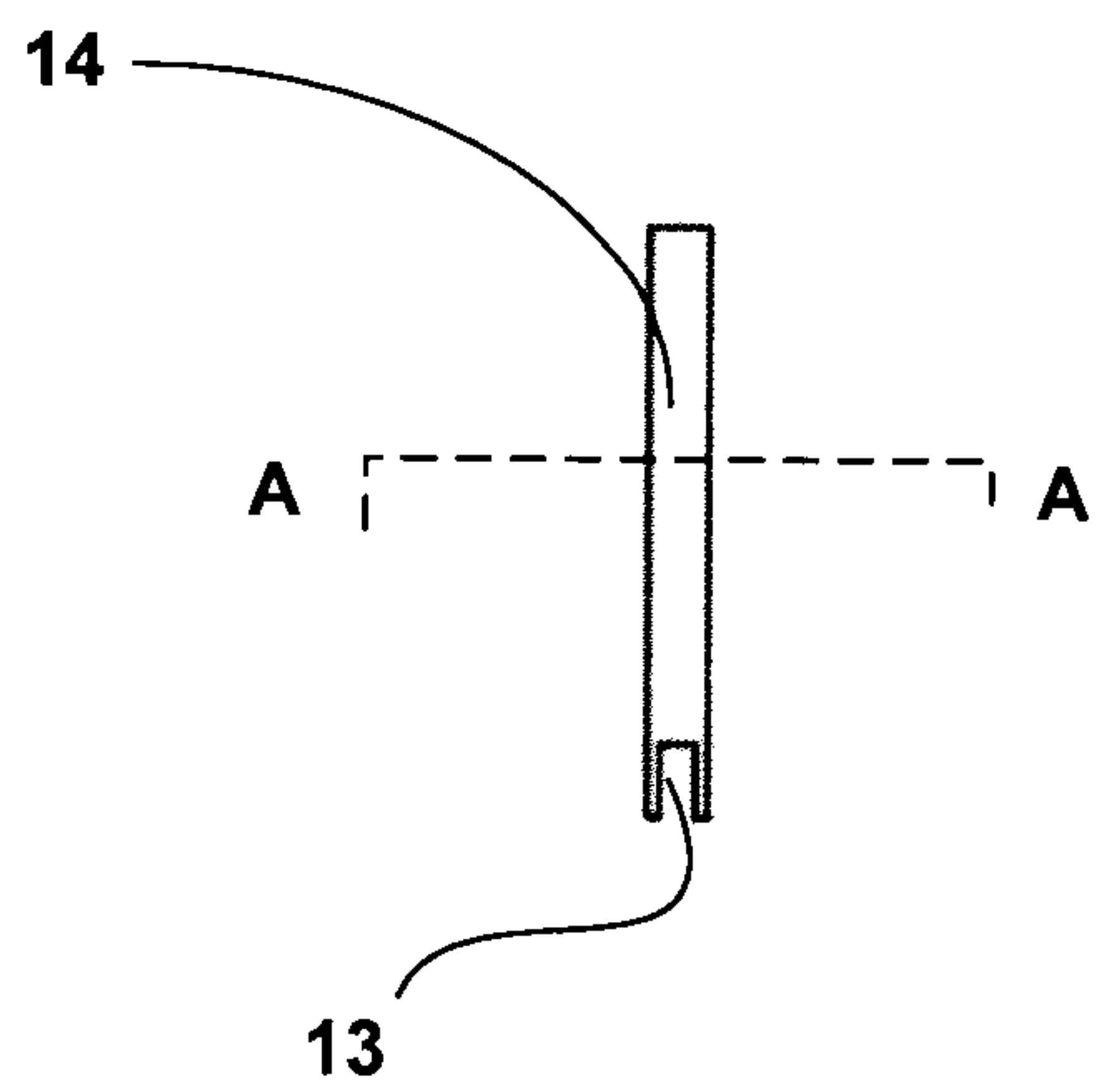
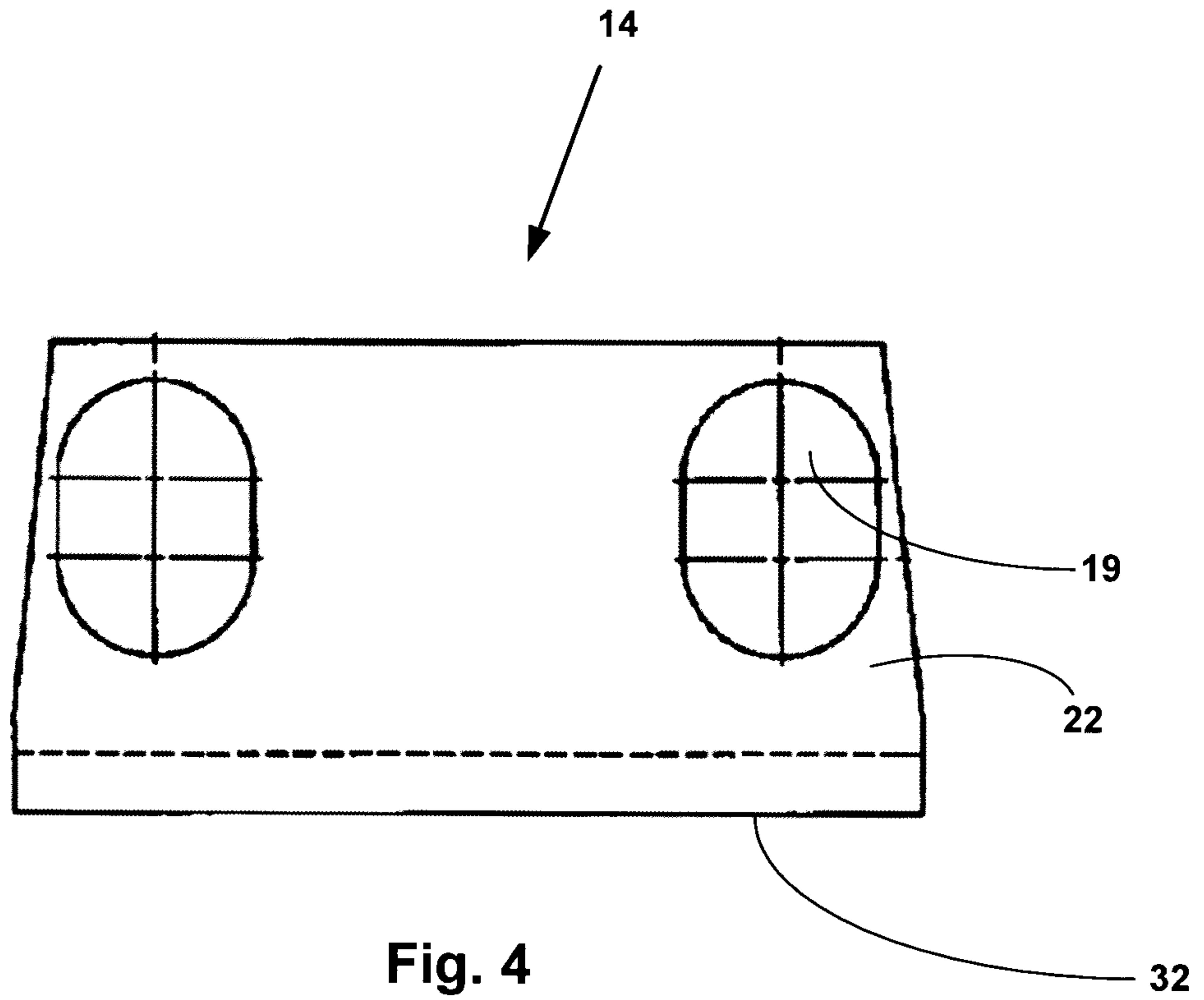


Fig. 5

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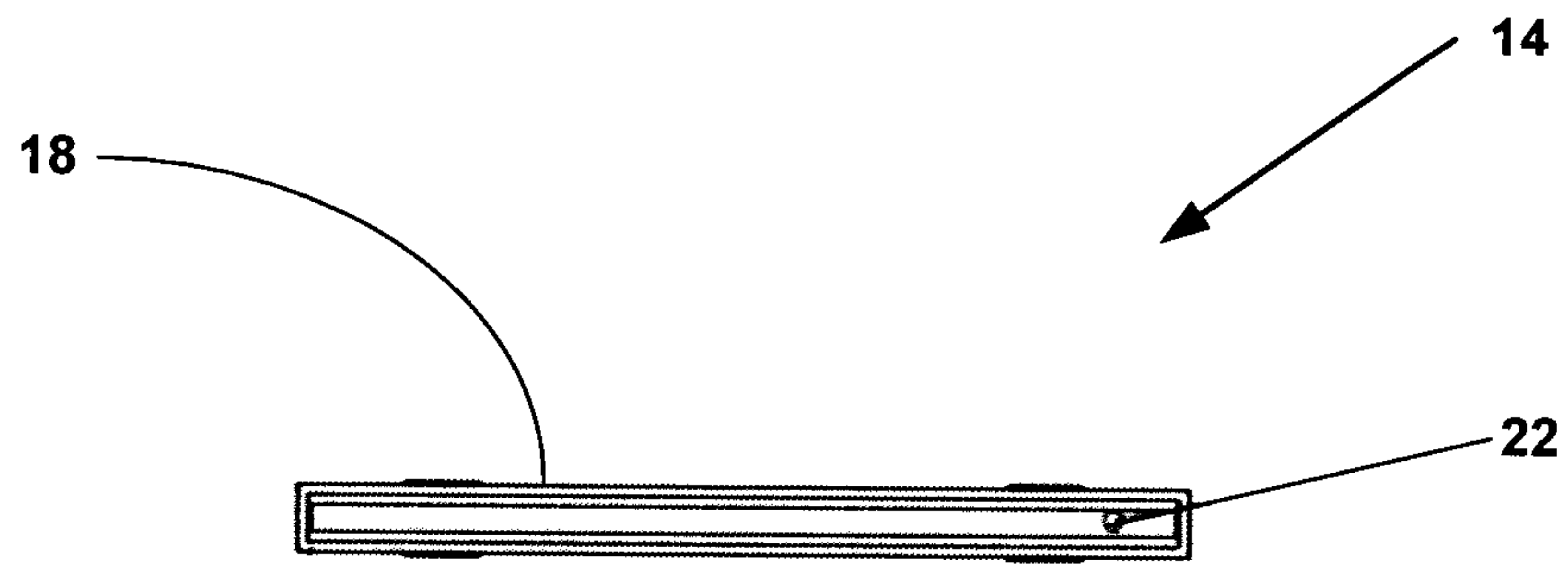


Fig. 6

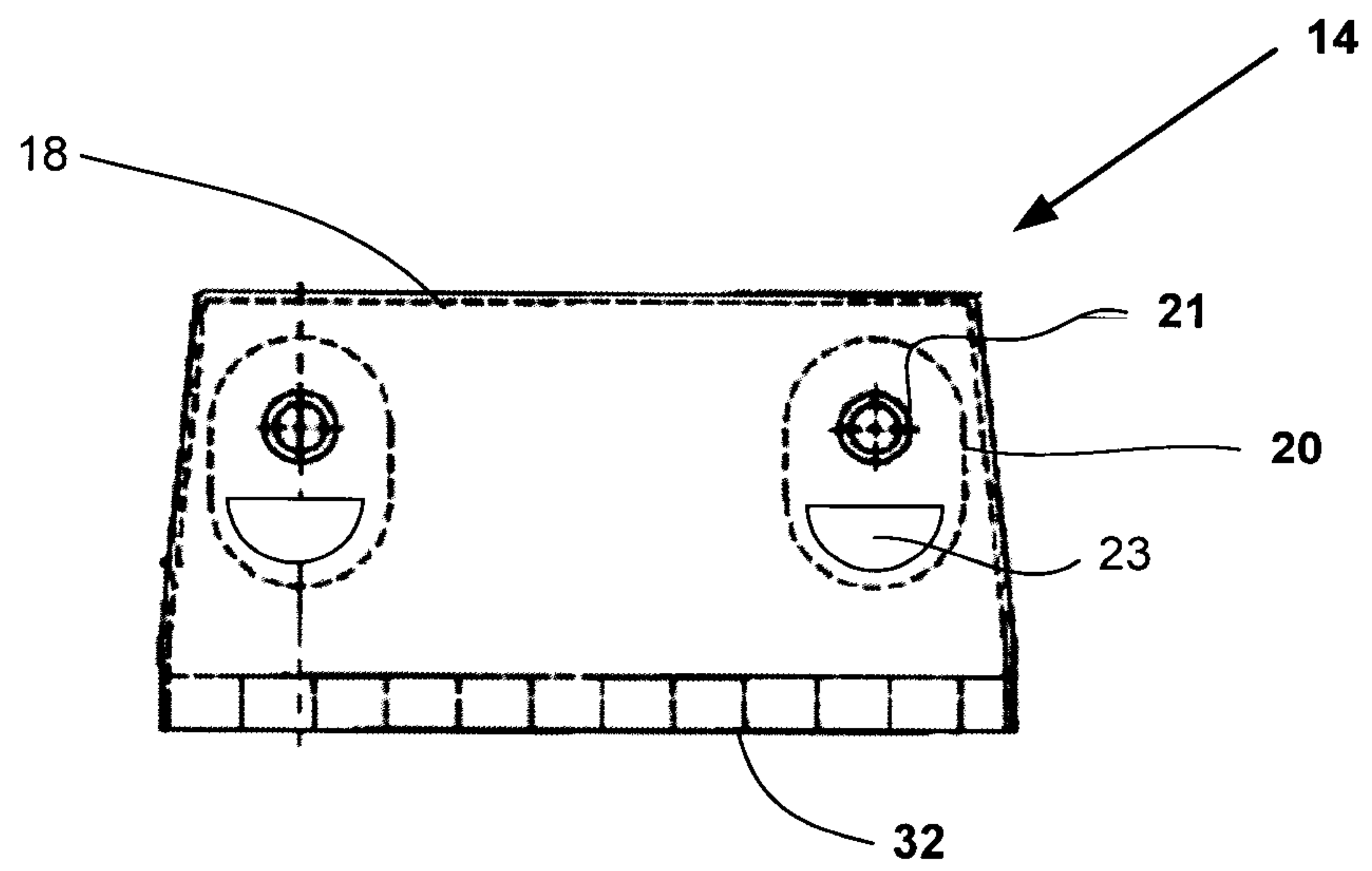


Fig. 7

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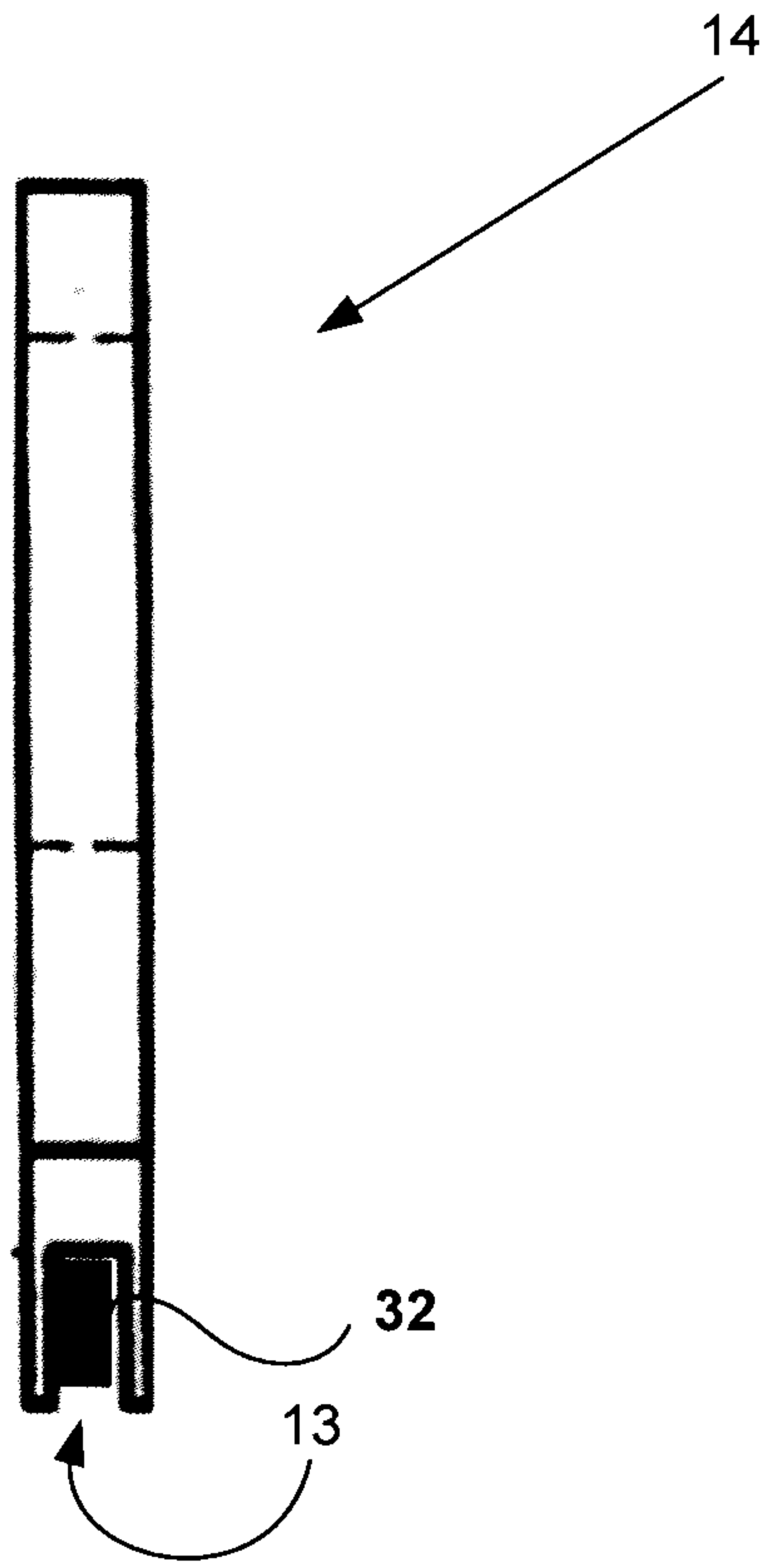


Fig. 8

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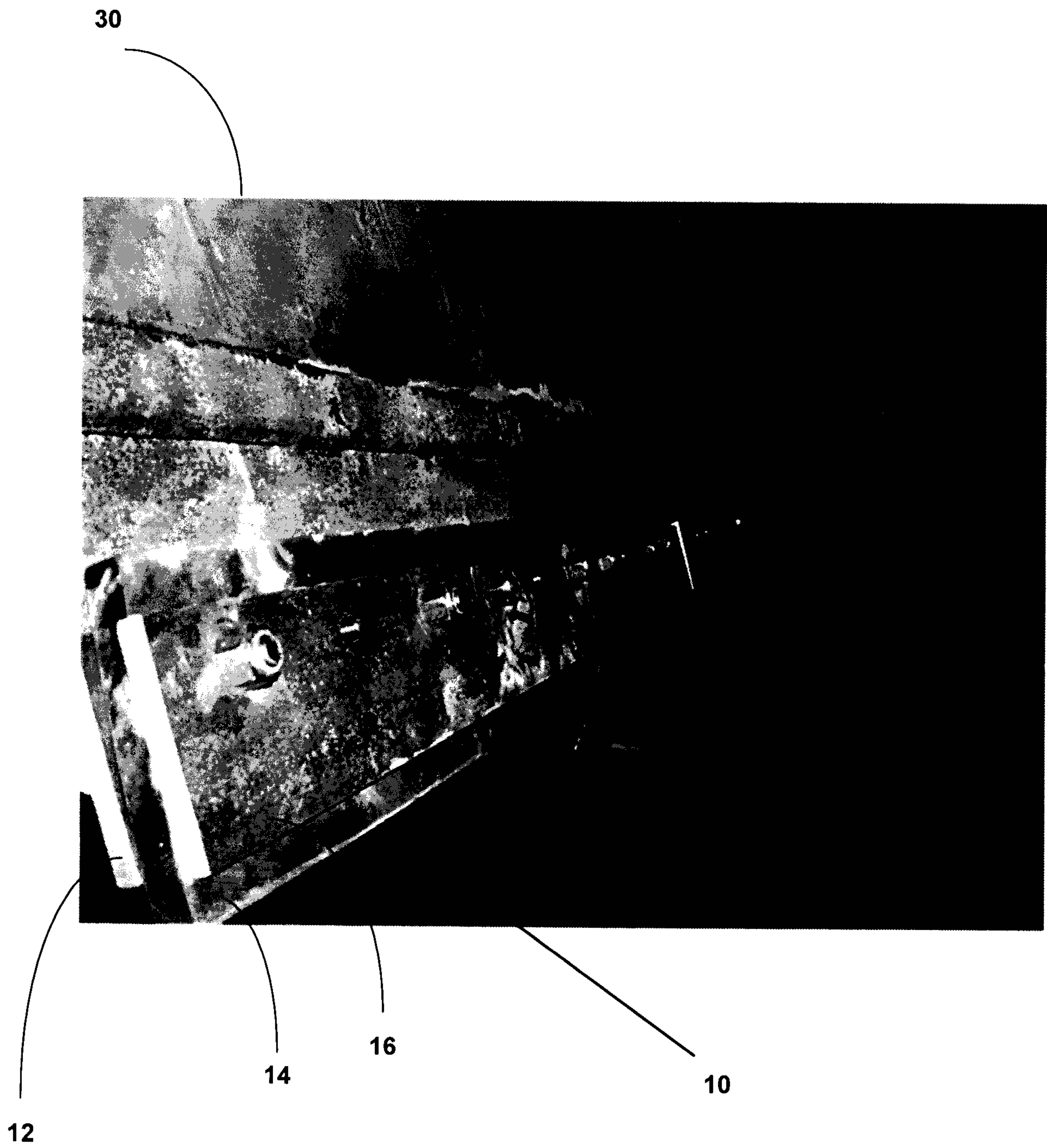


Fig. 9

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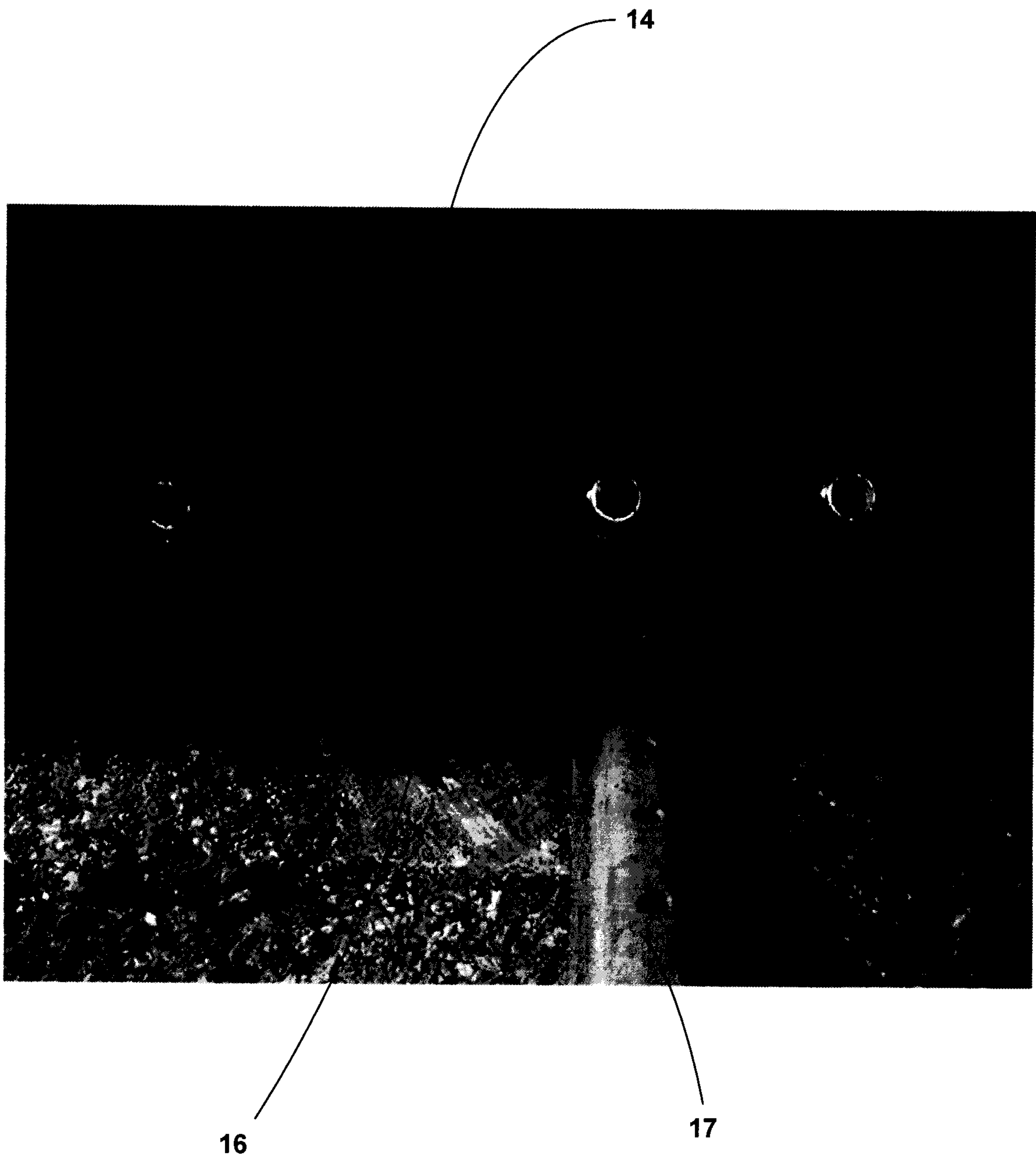


Fig. 10