

(12) STANDARD PATENT
(19) AUSTRALIAN PATENT OFFICE

(11) Application No. **AU 2014283775 B2**

(54) Title
Screen lining

(51) International Patent Classification(s)
B07B 1/46 (2006.01)

(21) Application No: **2014283775**

(22) Date of Filing: **2014.05.16**

(87) WIPO No: **WO14/202169**

(30) Priority Data

(31) Number
102013010051.8

(32) Date
2013.06.17

(33) Country
DE

(43) Publication Date: **2014.12.24**

(44) Accepted Journal Date: **2016.05.12**

(71) Applicant(s)
Schenck Process GmbH

(72) Inventor(s)
Schneeberger, Patrick

(74) Agent / Attorney
IP Strategies, c/o Darryl Mischlewski PO Box 1254, Suite 204, 685 Burke Road, Camberwell, VIC, 3124

(56) Related Art
WO 2006/110953 A1
AU 742 060 B2
US 3 905 897 A

(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES
PATENTWESENS (PCT) VERÖFFENTLICHTE INTERNATIONALE ANMELDUNG

(19) Weltorganisation für geistiges
Eigentum

Internationales Büro

(43) Internationales
Veröffentlichungsdatum
24. Dezember 2014 (24.12.2014)



(10) Internationale Veröffentlichungsnummer
WO 2014/202169 A1

(51) Internationale Patentklassifikation:
B07B 1/46 (2006.01)

(21) Internationales Aktenzeichen: PCT/EP2014/001329

(22) Internationales Anmeldedatum:
16. Mai 2014 (16.05.2014)

(25) Einreichungssprache: Deutsch

(26) Veröffentlichungssprache: Deutsch

(30) Angaben zur Priorität:
102013010051.8 17. Juni 2013 (17.06.2013) DE

(71) Anmelder: **SCHENCK PROCESS GMBH** [DE/DE];
Pallaswiesenstraße 100, 64293 Darmstadt (DE).

(72) Erfinder: **SCHNEEBERGER, Patrick**; Ortsstraße 24,
64756 Mossautal (DE).

(81) Bestimmungsstaaten (soweit nicht anders angegeben, für
jede verfügbare nationale Schutzrechtsart): AE, AG, AL,
AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW,
BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DK, DM,
DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,
HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR,
KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME,

MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ,
OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA,
SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM,
ZW.

(84) Bestimmungsstaaten (soweit nicht anders angegeben, für
jede verfügbare regionale Schutzrechtsart): ARIPO (BW,
GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ,
TZ, UG, ZM, ZW), eurasisches (AM, AZ, BY, KG, KZ,
RU, TJ, TM), europäisches (AL, AT, BE, BG, CH, CY,
CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT,
LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE,
SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA,
GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Erklärungen gemäß Regel 4.17:

- hinsichtlich der Berechtigung des Anmelders, ein Patent zu
beantragen und zu erhalten (Regel 4.17 Ziffer ii)
- Erfindererklärung (Regel 4.17 Ziffer iv)

Veröffentlicht:

- mit internationalem Recherchenbericht (Artikel 21 Absatz
3)

(54) Title: SCREEN LINING

(54) Bezeichnung : SIEBBELAG

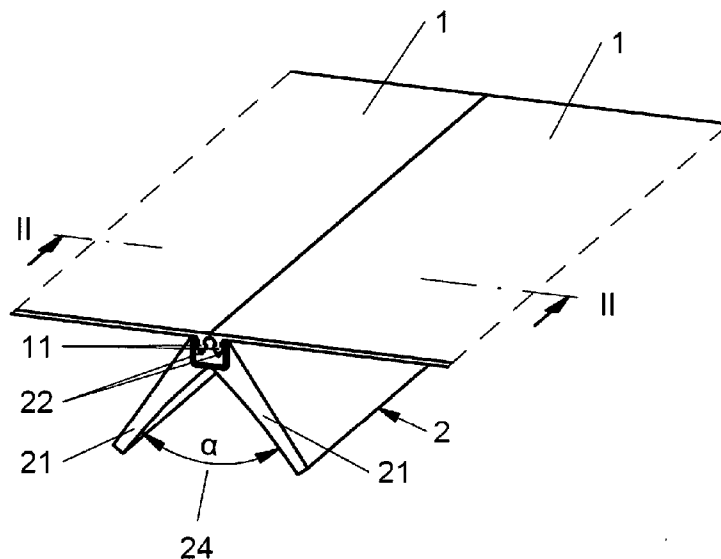


Fig. 1

Unterkonstruktion (3), bei dem die Adapterleiste (2) an ihrer den Siebmatten (1) abgewandten

(57) **Abstract:** The invention relates to a screen lining, comprising an adapter strip (2) for fastening a screen mat (1) or two screen mats (1) arranged adjacent to each other to a supporting substructure (3) in such a way that the screen mat or screen mats can be replaced. The adapter strip (2) has projections (23) on the side of the adapter strip facing away from the screen mats (1), which projections are integrally formed on the adapter strip in order to be inserted into openings (31) on the substructure (3) and have a bearing region on the side of the projections facing the screen mats (1), in which bearing region at least one hollow (22) for the form-fitting fastening of the screen mats (1) is arranged. According to the invention, the adapter strip (2) has integrated deflecting blades (21), the top sides of which are angled downward with respect to a plane defined by the screen mats (1).

(57) **Zusammenfassung:** Bei einem Siebbelag mit einer Adapterleiste (2) zur auswechselbaren Befestigung einer Siebmatte (1) oder zweier nebeneinander angeordneter Siebmatten (1) an einer tragenden

[Fortsetzung auf der nächsten Seite]

WO 2014/202169 A1



Seite Vorsprünge (23) aufweist, die zum Einfügen in Öffnungen (31) an der Unterkonstruktion (3) angeformt sind und an ihrer den Siebmatten (1) zugewandten Seite einen Auflagerbereich aufweist, in welchem wenigstens eine Ausnehmung (22) zur formschlüssigen Befestigung der Siebmatten (1) angeordnet ist, ist vorgesehen, dass die Adapterleiste (2) integrierte Abweisflügel (21) aufweist, deren Oberseiten gegenüber einer durch die Siebmatten (1) definierten Ebene nach unten abgewinkelt angeordnet sind.

Screen Deck

The present invention concerns a screen deck of flexible modular screening panels.

5 Screen decks are used for applications including vibrating screens and screening machines, which can be used for classifying various materials in the form of bulk products. So that the materials can be conveyed and separated by means of the screening panels., vibrating screens or screening machines are driven by force
10 elements that consist of rectangular plastic panels that have a plurality of openings as needed for classifying the bulk product. There are many different variations with regard to shape and size of the screen lining openings in this context. Depending on the stress on the screen linings, they are reinforced, if applicable, with an insert or a mesh made of metal. In addition, screen linings comprise adapter strips or snap-lock
15 profiles that serve as a fastening element between screen mats or screening elements and the supporting substructure of the vibrating screen or screening machine.

screening panels are subject to high wear. This results primarily from loading and
20 abrasive wear caused by the material being screened. In the case of flexible screens, the flexible screen mats are additionally moved continuously and are subjected to tensile loading, so that high forces act on the adapter strips, most particularly in the support region. For this reason, it is necessary to ensure secure retention of the screen mats in the adapter strips. For replacement of the screening
25 panels, care must additionally be taken that their attachment can be accomplished quickly and economically. Moreover, the substructure of the screen lining, and thus the structural frame of the vibrating screen or of the screening machine, should not be affected, either during screen operation or during replacement of the screen linings.

30

A screen deck with rigid screening elements and a profiled member as intermediate element between the screening element and substructure is known from DE 34 25 485 C2, to which member the screening elements, which have an appropriate

thickness, are fastened in a snap-lock manner at a lower recessed region. The profiled member has a horizontal lip that covers the top of the substructure.

5 In addition, US 5,213,217 A discloses a screen deck with an adapter strip for replaceable attachment of rigid screening elements to a supporting substructure, wherein the adapter strip has, on its side facing away from the screening elements, projections that are provided for insertion into openings in the substructure. The screening elements rest on a bearing region of the adapter strip, and have a recess in which an annular collar of a securing pin seated on the adapter strip engages and
10 secures the screening elements.

The object of the present invention is to improve a screen lining with screening elements and associated adapter strips, wherein the primary aim is to ensure cost-effective installation of the screen linings and long service life of the screening
15 machine substructure.

This object is attained by a screen lining with the features of claim 1. Advantageous enhancements are the subject matter of the dependent claims and are included in the description.
20

With the invention, a screening panel is provided for a flexible screen having an adapter strip for replaceable attachment to a supporting substructure of one or two screen mats arranged side by side. To this end, the adapter strip has, on its side facing away from the screen mats, projections intended for insertion into openings in
25 the substructure. A steel beam or a hollow steel profile, which is arranged in a frame of the screening machine as a cross member or cross piece, is customarily provided as the substructure for the adapter strips. The substructure accordingly has bores or openings in which the projections of the adapter strip engage and where they are secured by means of snap-lock or screwed connections. The adapter strips
30 additionally have, on their side facing the screen mats, a bearing region in which is located at least one recess for interlocking attachment of the screen mats. Accordingly, the screen mats also have, on their underside, projections that correspond to the recesses in the adapter strips. A snap-lock connection is

customarily provided between the screening element and adapter strip, so that the screening elements can be secured to the adapter strips without additional fastening means. According to the present invention, the adapter strip has integrated deflecting flaps, the top sides of which are angled downward with respect to a plane defined by the screen mats. Owing to the design of the adapter strips, a wear protection of the substructure is therefore achieved, since the adapter strip conducts the material being screened downward, away from the substructure, by means of the deflecting flaps. After the material being screened has passed through the screen mats, the slanted shape of the deflecting flaps thus prevents it from coming into contact with the substructure and causing damage there. Furthermore, the slanted shape of the deflecting flaps reduces the bearing region for the screen mats to a minimum area so that the screening area can be optimally utilized. Moreover, an accumulation of screened material between the screen mat and adapter strip is avoided.

The shape of the adapter strip and of the deflecting flaps can also be made to correspond to the outer contours of the substructure. This means that the underside of the adapter strip is matched to the substructure, and the deflecting flaps are formed with a length such that they cover the substructure in a shielding manner.

When rectangular or square hollow profiles are used as the substructure, they can also be fitted into the frame of the screening machine such that they point up and down with one edge, and their lateral faces are angled at 45° with respect to the plane of the screen. Accordingly, in one embodiment of the invention the adapter strip can have a V-shape that is attached to the substructure with the opening downward. Advantageously, the undersides of the deflecting flaps of the adapter strip enclose an included angle of 60° to 90°.

Advantageously, the included angle of the deflecting flaps is provided such that the deflecting flaps are spread apart when the adapter strip is applied to the substructure, and subsequently bear against the substructure under tension or under friction.

Another embodiment makes provision that a free space is provided between the adapter strip and screen panels, outside the bearing region of the screen panels, as a space for the passage of the material being screened. This means that the bearing region for the screen panels is kept to a minimum, and only comprises a groove or similar recess. The screen openings of the screen panels can thus extend up to the bearing region, since the material being screened can be diverted in the region of the substructure as well.

Customarily the screen decks consisting of adapter strip and /or screen panels are made of synthetic plastic. As a result of this design, a great variety of interlocking connections or a combination of interlocking and frictional connections is possible with regard to the attachment of the adapter strips to the substructure and the attachment of the screen mats to the adapter strip.

The projections located on the side of the adapter strips facing away from the screen mats can be provided as cylinders, slotted cylinders, or expanding anchors, for example. In the case of slotted cylinders or expanding anchors, the adapter strips are first placed on the substructure such that the projections engage in openings provided for this purpose in the substructure. Then screws are screwed from above into the cylinders or expanding anchors, deforming or spreading apart their jaws, thus securing the position of the adapter strip on the substructure.

Another embodiment of the invention makes provision that the connection between the screen mat and adapter strip is a snap-lock connection. To this end, the recess on the adapter strip and/or a corresponding projection on the screen panels has a triangular shape with rounded corners. As a result of this shape, the screen panel easily slides by means of the inclined surfaces into the recess when pressed against the adapter strip, and in its final position is prevented by the top edges from moving in the reverse direction.

An enhancement of the invention provides that the adapter strip is reinforced in the bearing region by a troughlike reinforcement or strengthening structure. Because of the greater stability, it prevents the screen panel from coming loose and popping

out. Consequently, the high forces from the screen panel motion are accommodated, and the adapter strip is prevented from rupturing in the region of the recess or the support region.

- 5 Advantageously, space is provided at the recess on the adapter strip for impurities or dirt particles captured from the material being screened. This means that the recess on the adapter strip is made large enough that the projections of the screen mat can be inserted into the recess despite possible contaminants, and the snap-in connection between the screen mat and adapter strip nevertheless takes effect.

10

The invention is described in detail below on the basis of an exemplary embodiment. Elements that have the same function are labeled with the same reference numbers in the figures here. Specifically, the figures show:

- 15 Fig. 1 a perspective view of a detail of a screen deck according to the invention, consisting of adapter strip and screen mats

Fig. 2 a cross-section along line II-II through the screen deck from Fig. 1

- 20 Fig. 3 an enlarged view of the detail "Z" from Fig. 2

Fig. 4 a cross-section along line IV-IV through the screen deck from Fig. 1

- Fig. 1 shows a screen deck according to the invention, which is intended for a flexible screen, in a perspective view. Screen panels 1 for flexible screens have high flexibility and consequently only very low strength. Since the moving substructure (not shown) likewise sets the screen panels 1 in motion, and the panels are subjected to a continuous extension and compression process, the secure attachment of the screen mats 1 to the substructure is critical for the service life of the screen deck. For the purpose of attaching the screen deck to the substructure or structural frame of the screening machine (not shown), an adapter strip 2 is provided, which has groove-like recesses 22 on its side facing the screen mats 1.
- 25
- 30

Projections 11, which are formed on the underside of the screen mats 1, are inserted into these recesses 22.

The adapter strip 2 is matched to the shape and arrangement of the substructure 3, and has two deflecting flaps 21, the underside of which conforms to the outside of the substructure 3, as shown in Fig. 2. Chosen as the substructure 3 is a hollow profile, which is attached to the frame of the screening machine (not shown) at an angle of 45° with respect to the horizontal. The included angle 24 of the deflecting flaps 21 is somewhat smaller here than the right angle of the hollow profile so that when the deflecting flaps 21 are applied to the substructure 3 they are spread apart and bear against the outside of the hollow profile under tension. It is evident from Fig. 4 that the adapter strip 2 has projections 23 at regular intervals on its side facing the substructure 3, and that the projections are inserted into openings 31 provided in the substructure 3 for this purpose. The projections 23 are provided with two slotted jaws in the nature of expanding anchors. Accordingly, the projections 23 have a through opening for a mounting screw 4, which is screwed from above into the projections 23 of the adapter strip 2 prior to installation of the screen mats 1, and the slotted jaws of the projections 23 are spread apart so that the adapter strip 2 is secured on the substructure 3.

After attachment of the adapter strip 2, the screen panels 1 can be secured by driving or pressing the projections 11 into the recesses 22 of the adapter strip 2. Fig. 3 shows the connection between screen panels 1 and adapter strip 2 from Fig. 2 (detail Z) in an enlarged representation. The projections 11 of the screen panels 1 were given a special shape during manufacture or during the process of molding the screen panels 1. The projections 11 have a triangular or arrowhead shape with rounded corners. By means of the lateral inclined surfaces, the screen panels 1 can easily slide into the recesses 22 of the adapter strip 2, and lock into place in the recess 22 which is suitably designed with a complementary negative shape. After locking into place, the screen mats 1 are secured in their final position by the protruding rear edges of their projections 11. A troughlike reinforcement 25 in the adapter strip 2 additionally ensures adequate stability in the bearing region. The troughlike reinforcement 25 surrounds the recesses 22 so that pull-out or

deformation of the adapter strip 2 in the bearing region of the screen panels 1 is prevented.

5 It is clear from Fig. 2 that the adapter strip 2 completely covers the substructure 3 so that the screened material falling across the deflecting flaps 21 cannot come into contact with the substructure 3. Due to the arrangement of the hollow profile and the matching of the adapter strip 2 to its shape, it is possible to make the bearing region of the screen mats 1 on the adapter strip 2 just as narrow as possible. Since, moreover, the deflecting flaps 21 are angled downward, a free space is produced
10 between the screen mat 1 and adapter strip 2 or substructure 3, and the material being screened can be carried away through this space. Accordingly, the screen openings in the screen panels 1 can be provided up to close proximity to the bearing region. This allows optimal utilization of the screening area.

Claims

1. Screen deck of flexible screen panels which includes an adapter strip (2) for replaceable attachment of one screen panel (1) or two screen panels (1) arranged side by side to a supporting substructure (3), wherein the adapter strip (2)
 - has, on its side facing away from the screen panels (1), projections (23) intended for insertion into openings (31) in the substructure (3),
 - and has, on its side facing towards the screen panels (1), a bearing region in which is located at least one recess (22) for interlocking attachment of the screen panels (1), characterized in that
 - projections (11) for insertion into the recesses (22) are formed on the underside of the screen panels (1), and
 - in that the adapter strip (2) has integrated deflecting flaps (21), the top sides of which are angled downward with respect to a plane defined by the screen panels (1).
2. Screen lining according to claim 1, characterized in that the shape of the adapter strip (2) and of the deflecting flaps (21) is made to correspond to the outer contours of the substructure (3).
3. Screen lining according to claim 1 or 2, characterized in that the adapter strip (2) is provided with a V-shape.
4. Screen lining according to claim 1, characterized in that the undersides of the deflecting flaps (21) of the adapter strip (2) enclose an included angle (24) of 60° to 90°.
5. Screen lining according to one of the preceding claims, characterized in that the deflecting flaps (21) bear against the substructure (3) under tension due to spreading.

6. Screen lining according to one of the preceding claims, characterized in that a free space is provided between the adapter strip (2) and screen mats (1), outside the bearing region, as a space for the passage of the material being screened.
7. Screen lining according to one of the preceding claims, characterized in that the projections (23) provided on the adapter strip (2) are provided as slotted cylinders with spreadable jaws or as expanding anchors.
8. Screen lining according to one of the preceding claims, characterized in that the recess (22) on the adapter strip (2) and/or a corresponding projection (11) on the screen mats (1) has a triangular shape with rounded corners.
9. Screen lining according to one of the preceding claims, characterized in that the adapter strip (2) and /or screen panels (1) are made of plastic.
10. Screen lining according to one of the preceding claims, characterized in that the adapter strip (2) is reinforced in the bearing region by a troughlike reinforcement (25) or strengthening structure.
11. Screen lining according to one of the preceding claims, characterized in that the recess (22) on the adapter strip (2) provides space for captured dirt particles.

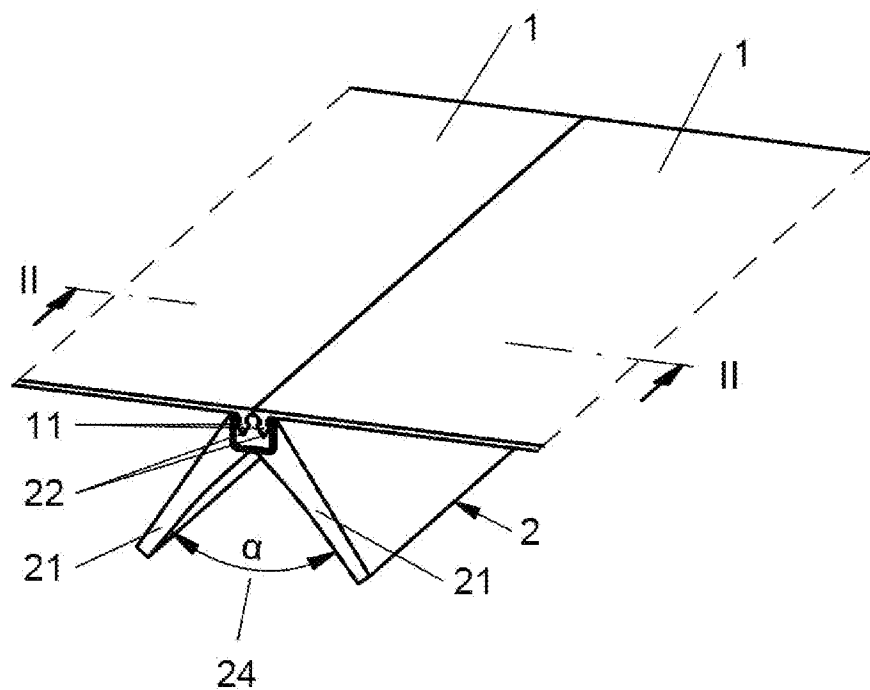


Fig. 1

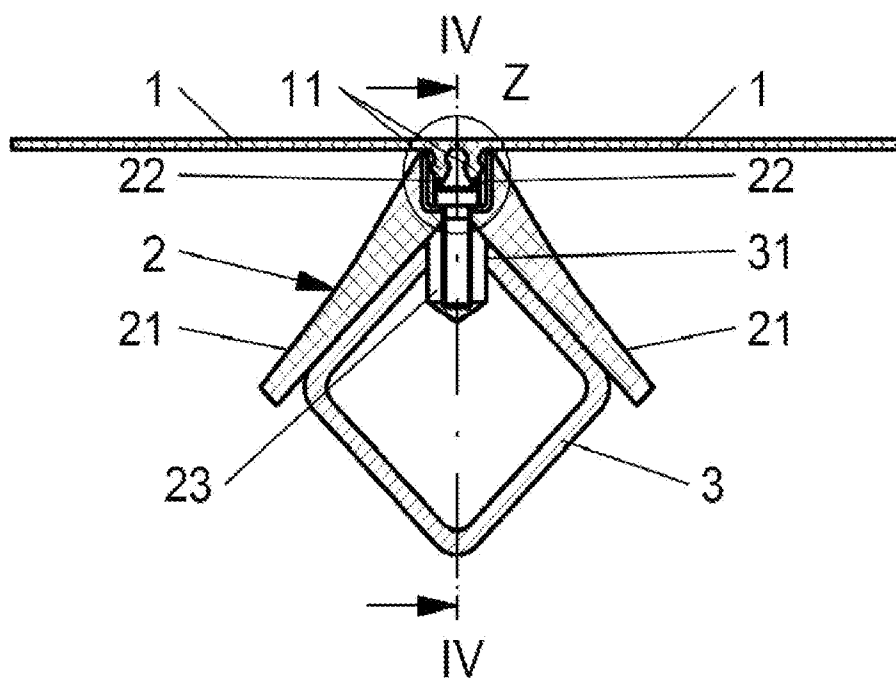


Fig. 2

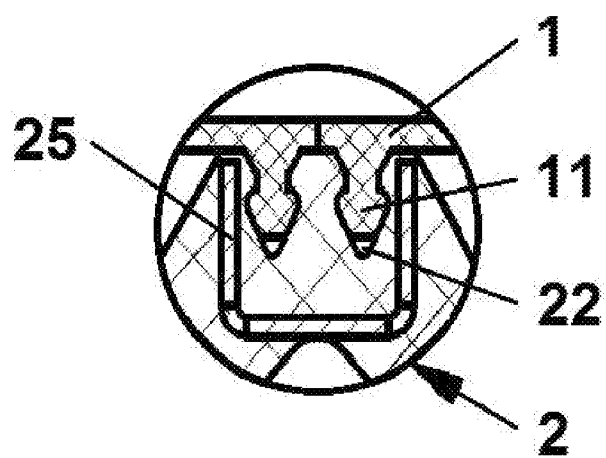


Fig. 3

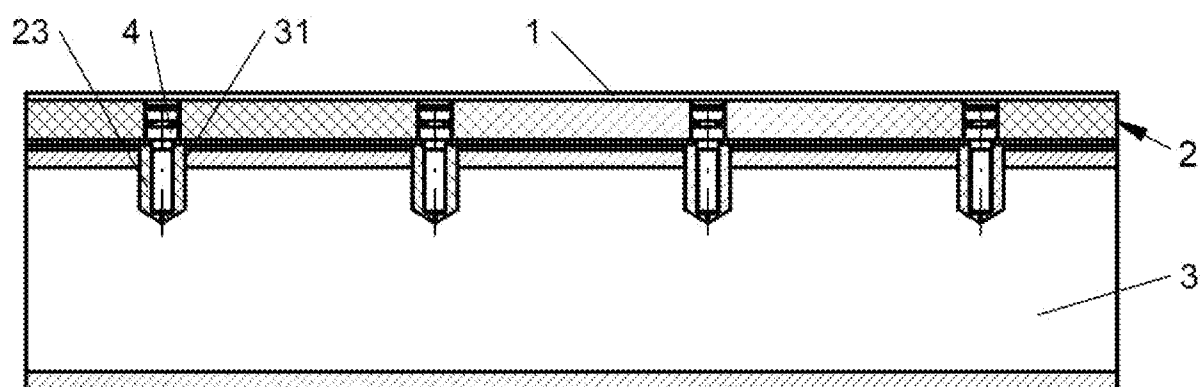


Fig. 4