



(12) **DEMANDE DE BREVET CANADIEN
CANADIAN PATENT APPLICATION**

(13) **A1**

(86) Date de dépôt PCT/PCT Filing Date: 2017/09/13
(87) Date publication PCT/PCT Publication Date: 2018/03/22
(85) Entrée phase nationale/National Entry: 2019/03/13
(86) N° demande PCT/PCT Application No.: AT 2017/060227
(87) N° publication PCT/PCT Publication No.: 2018/049452
(30) Priorité/Priority: 2016/09/13 (AT A 50817/2016)

(51) Cl.Int./Int.Cl. *A47F 3/00* (2006.01),
A47B 31/02 (2006.01), *A47F 3/04* (2006.01),
F25B 39/02 (2006.01), *F25D 31/00* (2006.01),
F28F 1/22 (2006.01)
(71) Demandeur/Applicant:
JOSEF HOLLER GMBH, AT
(72) Inventeurs/Inventors:
HOLLER, JOSEF, AT;
HOLLER, JOACHIM, AT
(74) Agent: NORTON ROSE FULBRIGHT CANADA
LLP/S.E.N.C.R.L., S.R.L.

(54) Titre : PLAQUE DE REFRIGERATION ET DE CHAUFFE
(54) Title: COOLING AND HEATING PLATE

[Fig.]

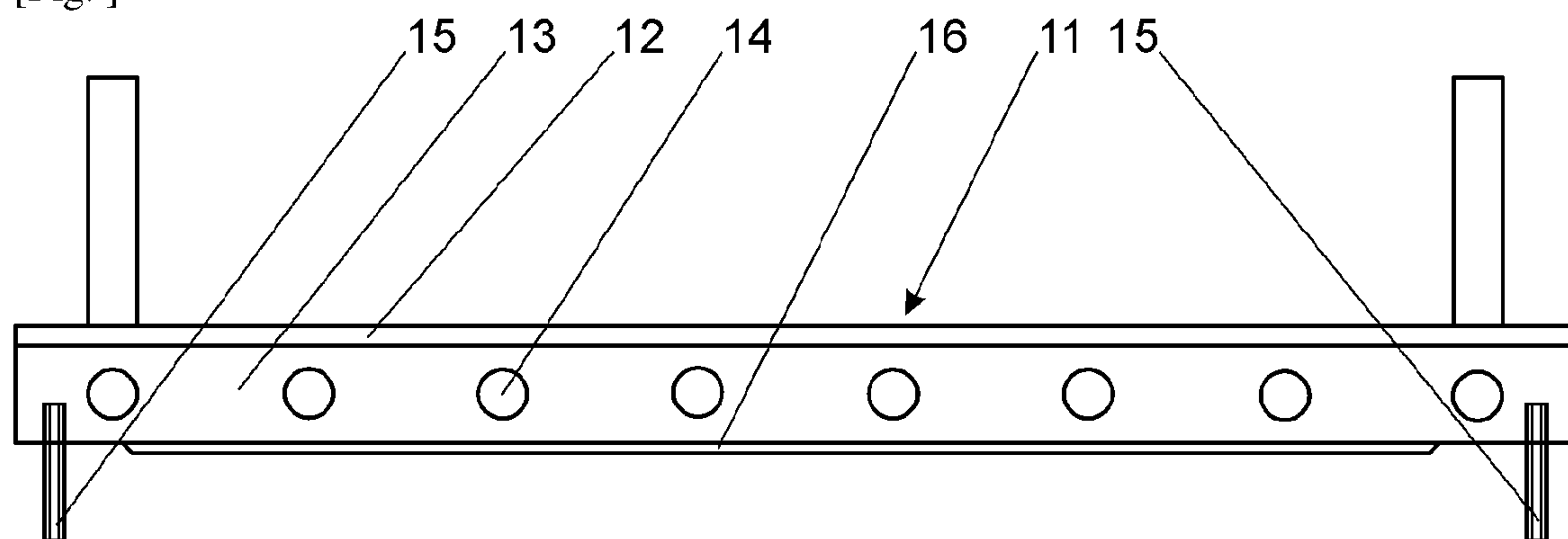


Fig. 1

(57) **Abrégé/Abstract:**

A cooling and heating plate, in particular for serving food and beverages, is connected to a cooling unit and an electrical heating device, preferably a silicone panel heater (16), is also provided on the under side of the plate. The plate is a multilayered plate (11) comprising an upper plate (12), preferably consisting of chrome nickel steel, and an aluminium plate (13) situated thereunder. According to the invention, at least one steel pipe (14), which is preferably seamless with serpentine curves, having a compressive strength of at least 50 bar is integrally cast in the aluminium plate (13). As a result, carbon dioxide can also be used as a coolant. Fastening elements (15) can also be integrally cast in the aluminium plate (13).

(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
22. März 2018 (22.03.2018)(10) Internationale Veröffentlichungsnummer
WO 2018/049452 A1

(51) Internationale Patentklassifikation:

A47F 3/00 (2006.01) F25D 31/00 (2006.01)
A47F 3/04 (2006.01) F25B 39/02 (2006.01)
A47B 31/02 (2006.01) F28F 1/22 (2006.01)

(21) Internationales Aktenzeichen: PCT/AT2017/060227

(22) Internationales Anmeldedatum:
13. September 2017 (13.09.2017)

(25) Einreichungssprache: Deutsch

(26) Veröffentlichungssprache: Deutsch

(30) Angaben zur Priorität:
A 50817/2016 13. September 2016 (13.09.2016) AT(71) Anmelder: JOSEF HÖLLER GMBH [AT/AT]; Peter
Mitterhoferstr. 4, 3300 Amstetten (AT).(72) Erfinder: HÖLLER, Josef; Vorgartenstraße 4, 3363 Neu-
furth (AT). HÖLLER, Joachim; Mozartstraße 17, 3311
Zeillern (AT).(74) Anwalt: MÜLLNER, Martin et al.; 169, Weihburggasse
9, 1010 Wien (AT).(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, DE, DJ, DK, DM,
DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,
HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN,
KP, KR, KW, KZ, LA, LC, LK, LR, LS, 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, ST,
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).

(54) Title: COOLING AND HEATING PLATE

(54) Bezeichnung: KÜHL- UND WÄRMEPLATTE

[Fig.]

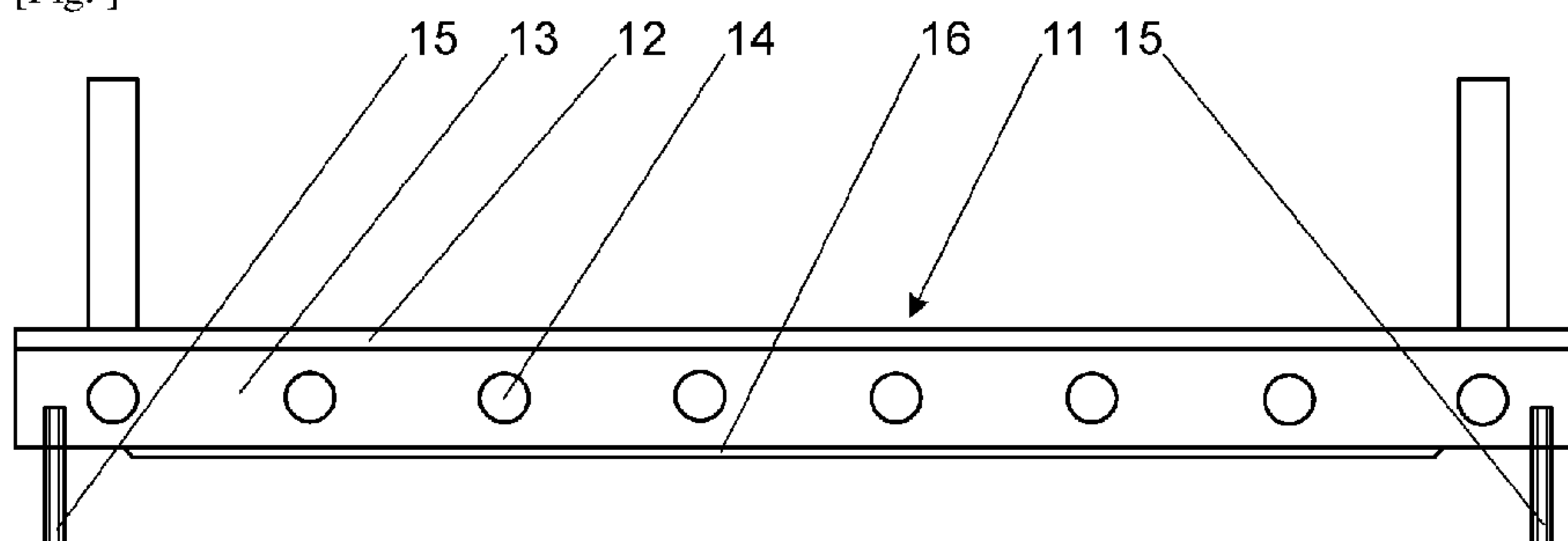


Fig. 1

(57) **Abstract:** A cooling and heating plate, in particular for serving food and beverages, is connected to a cooling unit and an electrical heating device, preferably a silicone panel heater (16), is also provided on the under side of the plate. The plate is a multilayered plate (11) comprising an upper plate (12), preferably consisting of chrome nickel steel, and an aluminium plate (13) situated thereunder. According to the invention, at least one steel pipe (14), which is preferably seamless with serpentine curves, having a compressive strength of at least 50 bar is integrally cast in the aluminium plate (13). As a result, carbon dioxide can also be used as a coolant. Fastening elements (15) can also be integrally cast in the aluminium plate (13).

(57) **Zusammenfassung:** Eine Kühl- und Wärmeplatte, insbesondere für die Präsentation von Speisen und Getränken, ist einerseits mit einem Kühlaggregat verbunden, andererseits ist an ihrer Unterseite eine elektrische Heizeinrichtung, vorzugsweise eine Silicon-Flächenheizung (16), vorgesehen. Sie ist als Mehrschichtplatte (11) mit einer Oberplatte (12) vorzugsweise aus Chromnickelstahl und einer darunter liegenden Aluminiumplatte (13) ausgebildet. Erfindungsgemäß ist in der Aluminiumplatte (13) zumindest ein – vorzugsweise nahtloses und mäanderförmig gebogenes - Stahlrohr (14) mit einer Druckfestigkeit von zumindest 50 bar eingegossen. Dadurch kann auch Kohlendioxid als Kältemittel verwendet werden. In die Aluminiumplatte (13) können auch Befestigungselemente (15) eingegossen sein.

[Fortsetzung auf der nächsten Seite]

WO 2018/049452 A1

Veröffentlicht:

- *mit internationalem Recherchenbericht (Artikel 21 Absatz 3)*

Description

Title of the invention: COOLING AND HEATING PLATE

Technical field

- [0001] The present invention relates to a cooling and heating plate, in particular for the presentation of food and beverages, in which the plate is connected to a cooling unit and has an electrical heating device on its lower side, wherein the plate is designed as a multilayered plate having an upper plate, preferably consisting of chromium-nickel steel, and, situated therebelow, an aluminum plate having coolant ducts.

Prior art

- [0002] Such a cooling and heating plate is known from patcit0001:WO WO 2015/161332 --. According to this document, the cooling and heating plate consists of three layers: an upper plate consisting of chromium steel having a thickness of about 1.5 mm, a central plate consisting of aluminum having a thickness of about 5 mm, and a lower plate likewise consisting of chromium steel having a thickness of about 1.5 mm. Coolant ducts are incorporated into the central plate. The connection between the central plate and the upper and the lower plate is achieved according to this document by rolling.
- [0003] Arranged on the lower side of the lower plate is a heating mat which is covered by a thermal and electrical insulation and tightly closed by a covering shell.
- [0004] Two things are disadvantageous with this plate: firstly, the coolant ducts withstand only relatively low pressures, and secondly, by virtue of the high pressure upon rolling, the coolant ducts have the effect that the upper plate is not completely planar, with the result that the coolant ducts are noticeable upon corresponding light incidence.
- [0005] The most future-oriented refrigerant is currently carbon dioxide since it has no influence on the ozone layer and, compared with other refrigerants, has barely any influence on the greenhouse effect. However, carbon dioxide requires high pressures, even on the low-pressure side (that is to say downstream of the evaporator). The known cooling and heating plate cannot cope with these pressures.

Summary of the invention

- [0006] It is an object of the present invention to overcome these disadvantages and to provide a cooling and heating plate whose coolant ducts also withstand high pressures and in which the upper plate is planar.

- [0007] This object is achieved according to the invention by a cooling and heating plate of the type stated at the outset in that at least one steel pipe having a compressive strength of at least 50 bar is integrally cast in the aluminum plate to form the coolant ducts.
- [0008] According to the invention, the coolant ducts are thus not produced by milling out the aluminum plate, but by a steel pipe which is integrally cast during the production of the aluminum plate. As a result, the heat transfer between the steel pipe and the aluminum is optimal, and the compressive strength is provided by virtue of the steel pipe. Overall, the heat transfer from the refrigerant to the aluminum plate is not substantially poorer than in the known solution described at the outset.
- [0009] If the steel pipe is bent in a meandering shape, it is also possible to manage with a single steel pipe in the case of large cooling and heating plates.
- [0010] Since, according to the invention, each aluminum plate is produced by casting, the possibility arises of also integrally casting fastening elements in the aluminum plate, with the result that no additional machining operations are necessary for mounting the fastening elements (for example screw bolts).
- [0011] In order for the steel pipe to withstand high pressures and for pipe breakages to be improbable, it is preferable for the steel pipe to be seamless.
- [0012] For reasons of the manufacturing outlay and of the weight of the cooling and heating plate, the aluminum plate should be thin, but, on the other hand, it should be ensured that the steel pipe, even in the case of slight deviations from the planned central position, is sufficiently covered. According to a further preferred feature, there is therefore provision that the aluminum plate has a thickness which is approximately twice as large as the outside diameter of the steel pipe.
- [0013] The electrical heating device is preferably a silicone panel heater which is fitted on the lower side of the aluminum plate. Such silicone panel heaters are flat, emit uniform heat and can generate high temperatures. They are therefore well suited for the cooling and heating plates according to the invention.

Brief description of the drawings

- [0014] The present invention will be explained in more detail with reference to the appended drawing, in which fig. 1 shows a vertical section through a

cooling and heating plate according to the invention; and fig. 2 shows a horizontal section through the same cooling and heating plate.

Best way of implementing the invention

- [0015] The cooling and heating plate is a multilayered plate 11 consisting of an aluminum plate 13 and an upper plate 12. The upper plate 12 bears the beverages to be heated or to be cooled and must therefore, on the one hand, consist of a food-safe material and, on the other hand, must have a sound appearance over years. A preferred material for the upper plate 12 is chromium-nickel steel.
- [0016] A steel pipe 14 bent in a meandering shape is integrally cast in the aluminum plate 13. This steel pipe 14 has a compressive strength of at least 50 bar and can therefore also withstand the pressures which are necessary for refrigerating machines having carbon dioxide as refrigerant. Since the steel pipe 14 is integrally cast in the aluminum, the heat transfer resistance between the steel pipe 14 and the aluminum plate 13 is low. Between the refrigerant (e.g. carbon dioxide) and the aluminum plate 13 there is, of course, additionally the heat resistance of the steel pipe 14, which should therefore be as thin as possible. If use is made of a seamless steel pipe 14, it is possible to manage with wall thicknesses of at most 1 mm without compromising the necessary compressive strength.
- [0017] Fastening elements 15 are also integrally cast in the aluminum plate 13. An electrical silicone panel heater 16 is mounted on the lower side of the aluminum plate 13. For heating, this silicone panel heater is switched on, in which case the cooling unit is, of course, switched off. The coolant can remain in the steel pipe 14. Although carbon dioxide then exceeds the critical temperature, the steel pipe 14 withstands the resultant pressures.
- [0018] For temperature measurement (both during heating and during cooling), a Pt100 temperature sensor can be provided in a conventional manner, and a suitable controller is, for example, the controller ST121-KD1TA.03FS from STÖRK-TRONIC.
- [0019] This cooling and heating plate makes it possible, during cooling, to achieve an optimum temperature transfer down to -30°C. The temperature of -30°C serves for the production of ice cream, directly before the eyes of the consumer. During heating, a temperature of up to 140°C can be achieved, with the result that food can be kept sufficiently warm. The bottom of the cooling and heating plate is insulated to suit the requirements

- [0020] The cooling and heating plate can be operated with carbon dioxide, with the result that the otherwise customary greenhouse gases can be avoided. Of course, however, it can also be operated with all conventional refrigerants, thus also being suitable as a replacement part for existing systems. Isobutane as refrigerant is best suited for a cooling unit which is mounted directly in the cooling and heating plate and which has to be correspondingly compact.
- [0021] The upper plate 12 and the aluminum plate 13 are preferably adhesively bonded to one another with an adhesive having good heat conductivity. If they are connected to one another by rolling, there is the risk that the steel pipe 14 is deformed in the process, resulting in cross-sectional narrowings.

Claims

- [Claim 0001] A cooling and heating plate, in particular for the presentation of food and beverages, in which the plate is connected to a cooling unit and has an electrical heating device on its lower side, wherein the plate is designed as a multilayered plate (11) having an upper plate (12), preferably consisting of chromium-nickel steel, and, situated therebelow, an aluminum plate (13) having coolant ducts, **characterized in that** at least one steel pipe (14) having a compressive strength of at least 50 bar is integrally cast in the aluminum plate (13) to form the coolant ducts.
- [Claim 0002] The cooling and heating plate as claimed in claim 1, **characterized in that** the steel pipe (14) is bent in a meandering shape.
- [Claim 0003] The cooling and heating plate as claimed in claim 1 or 2, **characterized in that** fastening elements (15) are also integrally cast in the aluminum plate (13).
- [Claim 0004] The cooling and heating plate as claimed in one of claims 1 to 3, **characterized in that** the steel pipe (14) is seamless.
- [Claim 0005] The cooling and heating plate as claimed in one of claims 1 to 4, **characterized in that** the aluminum plate (13) has a thickness which is approximately twice as large as the outside diameter of the steel pipe (14).
- [Claim 0006] The cooling and heating plate as claimed in one of claims 1 to 5, **characterized in that** the electrical heating device is a silicone panel heater (16) which is fitted on the lower side of the aluminum plate (13).

[Fig.]

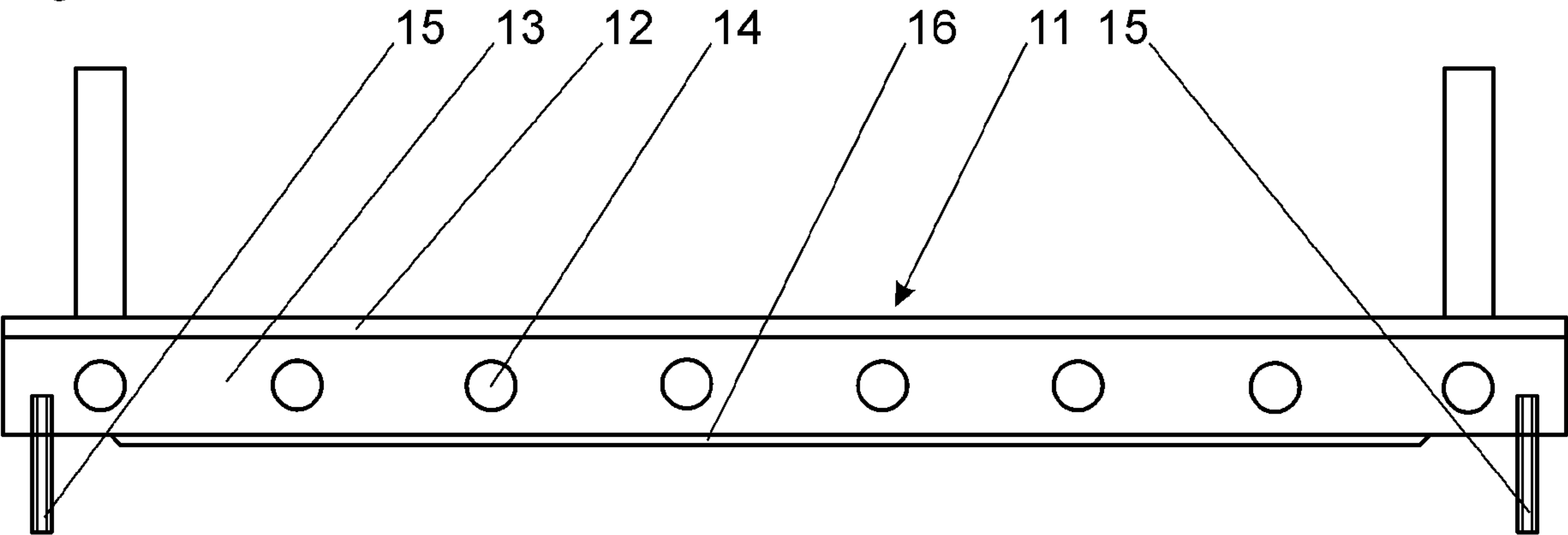


Fig. 1

[Fig.]

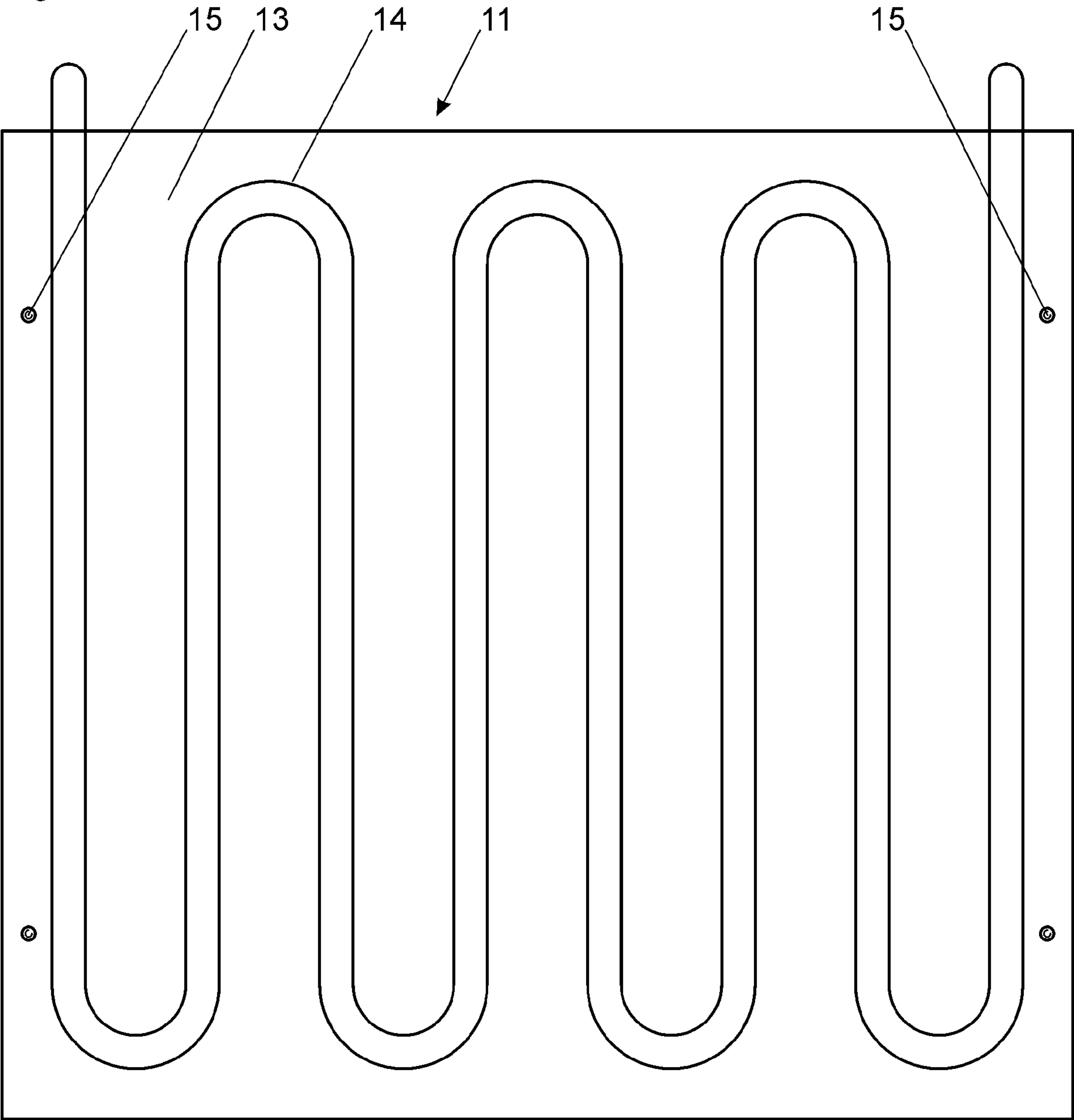


Fig. 2

[Fig.]

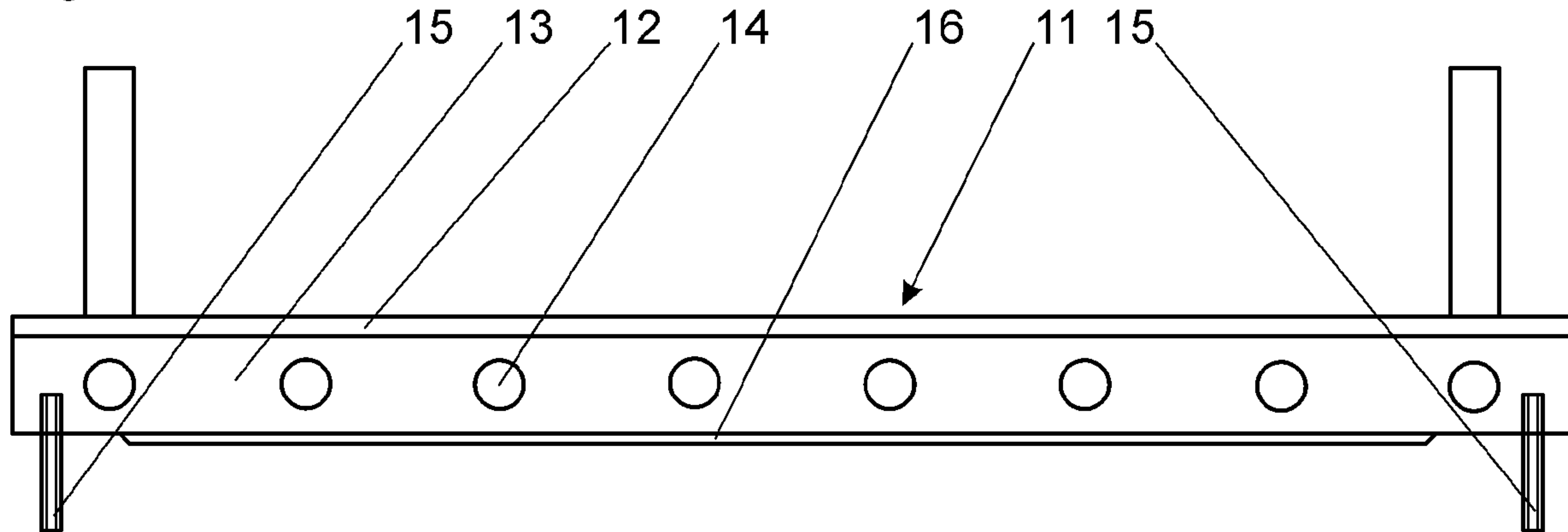


Fig. 1