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(54) **A conveying and artifical aging system of construction artifacts**

(57) The system (1) comprises a conveying line (5) adapted to transfer a plurality of singularized tables (4) on each of which a plurality of artifacts (2) is rested and an aging machine (7) installed along the conveying line (5) and adapted to age the artifacts (2). The main feature of the present invention consists in that the aging machine (7) comprises a track (13) adapted to accept the artifacts (2) of each table (4), first means (14) adapted to transfer the artifacts (2) of one first table (4) from the conveying line (5) to the track (13), and second means (15) adapted to convey the artifacts (2) along the track (13) from a collecting position of the artifacts (2) from the table (4) to a releasing position of the artifacts (2) onto a second table (4).

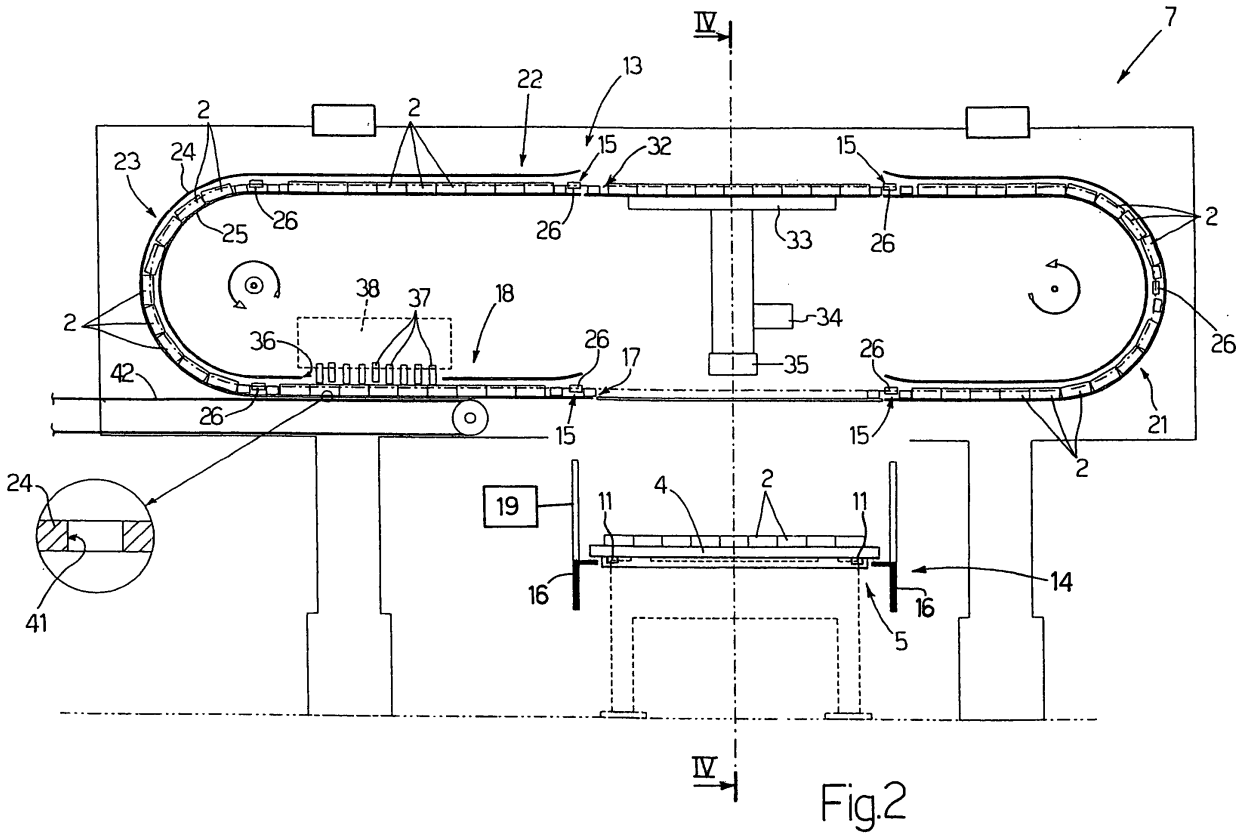

Fig.2

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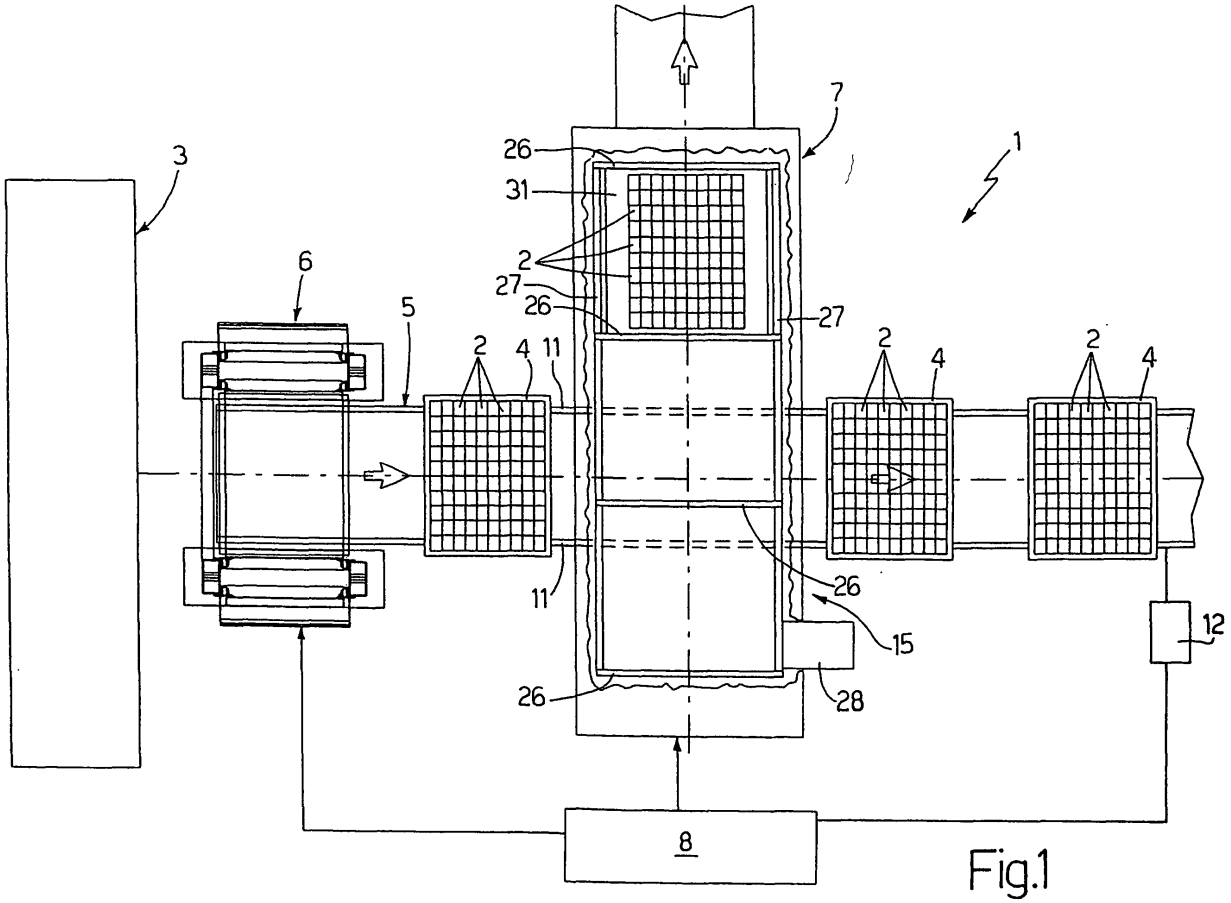

Fig.1

Description

[0001] The present invention relates to a conveying and artificial aging system of construction artifacts, such as for example concrete artifacts.

[0002] It is known that construction artifact production systems comprise a station in which a plurality of artifacts is made on a table by means of a press, a curing zone and a packing line. Increasingly more users require previously aged artifacts, i.e. artifacts provided with flaws such as rounded corners and scratches, especially for road paving. Essentially, artifacts similar to those installed for some time, i.e. worn, are required. Therefore, the deviation of a further conveying line along which an aging station is installed along the conveying line between the curing zone and the packing zone is contemplated in the current systems. A typical type of aging station contemplates extracting a table carrying a plurality of artifacts from the conveying line and passing it under a plurality of strikers or hammers which strike the visible surface of the artifacts. Such type of aging station implies the drawback that the artifacts are moved along with the machining waste caused by the strikers. Finally, the aging station contemplates a dedicated conveying line, with an increase of costs in addition to the total dimensions of the production system.

[0003] It is the object of the present invention to make a conveying and aging system of construction artifacts which is free from the above-described drawbacks and which specifically contemplates a simple, effective and rapid aging system directly along the conveying line of the artifacts from the curing station to the packing station.

[0004] According to the present invention, a conveying and artificial aging system of construction artifacts is made of the type comprising:

> a conveying line adapted to transfer a plurality of singularized tables on each of which a plurality of said artifacts is rested; and
> an aging machine installed along said conveying line and adapted to age said artifacts;
> characterized in that said aging station comprises:
> a track adapted to accept said artifacts of each of said tables;
> first means adapted to transfer said artifacts of one said table from said conveying line to said track; and
> second means adapted to convey said artifacts along said track from a collecting position of said artifacts from said table to a releasing position of said artifacts onto said second table.

[0005] The present invention will now be described with reference to the accompanying drawings illustrating a preferred embodiment, in which:

- figure 1 is a diagrammatic plan view of a system made according to the dictates of the present invention;
- figure 2 is a side, partial section, diagrammatic view of a detail of a station in the system in figure 1;
- figure 3 is a side, partial section, diagrammatic view of the station in figure 2 in a different operative position;
- figure 4 is a section taken along line IV-IV in figure 2;
- figure 5 is a section taken along line V-V in figure 3; and
- figure 6 is a plan view of a component of the station in figure 2.

[0006] With reference to figure 1, numeral 1 indicates as a whole a conveying and artificial aging system of construction artifacts 2; artifacts 2 generally formed by concrete.

[0007] System 1 comprises:

> a curing zone 3, of known type and thus diagrammatically shown, and in which artifacts 2, once shaped and laid according to a plurality of rows and columns on a table 4, are cured for a given time;
> a conveying line 5 adapted to transfer singularized tables 4 to a packing station (of known type and thus not shown);
> a device 6 (commonly called descender, of known type and thus diagrammatically shown) adapted to receive tables 4 from curing zone 3 and to lay them one by one on a conveying line 5;
> an aging machine 7 installed along conveying line 5 and adapted to age artifacts 2 before the aforesaid packing station (not shown); and
> an electronic control unit 8 adapted to manage device 6, conveying line 5 and aging machine 7.

[0008] Conveying line 5 is of known type and thus diagrammatically described and illustrated. Such conveying line 5 comprises, as shown in the accompanying drawings, two annular chains 11 (or belts) which support table 4 along the peripheral edges of the latter and an electric motor 12 managed by control unit 8 and which moves chains 11. Table 4 presents a rectangular peripheral profile with two opposite sides of shorter length than the other opposite sides.

[0009] With reference to figures from 2 to 5, aging system 7 comprises:

> a track 13 adapted to accept artifacts 2 from one table 4 at a time;
> means 14 adapted to transfer artifacts 2 of a table 4 from conveying line 5 to track 13; and
> means 15 adapted to move artifacts 2 along track 13.

[0010] Means 14 comprise two arms 16 arranged by the side of line 5 and, under the bias of an electric motor 19, mobile parallelly to themselves from a lower position in which they are essentially on the same level as chains 11 to an upper position in which artifacts 2 are on the level of a mouth 17 defined on track 13. At mouth 17,

artifacts 2 are taken by means 15 which make artifacts 2 travel along the entire track 13 and return such artifacts 2 to mouth 17 where a different table 4 takes back the aforesaid, newly aged artifacts 2.

[0011] Track 13 is annular and comprises a first rectilinear, horizontal segment 18 at which mouth 17 is made, a second curved union segment 21 between a first longitudinal end of first segment 18 and a first longitudinal end of a third rectilinear, horizontal segment 22 which on a higher level than that of first segment 18, and a fourth curved union segment 23 between a second longitudinal end of third segment 22 and a second longitudinal end of first segment 18. Track 13 is defined between an external sheet 24 and an internal sheet 25 which reciprocally form the aforesaid segments 18, 21, 22 and 23.

[0012] Means 15 comprise a plurality of horizontal bars 26 carried on their longitudinal ends by two annular chains 27 moved by an electric motor 28. Bars 26 are inside track 13 and are orthogonal to the direction of movement of artifacts 2. The length of track 13 is designed so that several equidistanced bars 26 are arranged along the span of track 13; between each pair of adjacent bars 26 there being artifacts 2 taken from a corresponding table 4. The width of track 13 is essentially equal to the distance between two adjacent pairs of bars 26 so as to define a square peripheral development space between adjacent bars 26. In such space, a frame 31 (figure 6) with square external peripheral development and rectangular internal peripheral development is positioned to envelop within artifacts 2 of a table 4, which as shown present a rectangular peripheral development as a whole. Frame 31 is formed by flexible material so as to travel along curved segments 21 and 23 of track 13.

[0013] With reference to figures from 2 to 5, a through window 32 is made along segment 22 in both sheets 24 and 25. A platform 33 is installed at such windows 32, the platform being mobile parallelly to itself and under the bias of electric motor 34 from a lower position in which its surface is coplanar with segment 22 and essentially with internal sheet 25 and an upper position. In use, while traveling along segment 22, artifacts 2 are laid on platform 33 when this is in its lower position. It is now possible by means of motor 34, to take platform 33 to its upper position and by means of a further electric motor 35 to turn platform 33 itself by 90°. Following such rotation, platform 33 is taken from its lower position so that artifacts 2 may, by means of bars 26, travel along the rest of track 13. The peripheral development of platform 33 is smaller than the space defined between two adjacent bars 26 but larger than the peripheral development of frame 31, so that it also takes frame 31, which contains artifacts 2, during its movement between the lower and the upper position.

[0014] Along segment 18 upstream of mouth 17, a through window 36 is made in internal sheet 25, at which window a plurality of strikers 37, carried by an assembly 38 of known type and controlled by control unit 8, is installed. The function of the strikers 37 consists in entering in track 13 from the top to strike the upper surface of artifacts 2 which pass along segment 18 and thus age such upper surface. Holes 41 are further made in external sheet 24 along track 13, through which the machining waste exits from track 13, so as to deliver artifacts 2 aged but free from machining waste. At such holes 41, a conveyor belt 42 is installed on which the aforesaid waste drops and is then transferred to an unloading station (not shown). It is further possible to make such holes 41 in other zones of track 13 and to contemplate under the latter a further evacuation belt 42, as shown in figure 2, or a simple container.

[0015] Firstly, in use, tables 4, each of which supports a plurality of reciprocally sorted artifacts 2, are taken one by one from device 6 so as to present a rectangular peripheral development as a whole on table 4. Table 4 is then laid along conveying line 5 which transfers it to aging machine 7 on arms 16 which are at mouth 17. Arms 16 are raised up to mouth 17 where artifacts 2 penetrate inside frame 31. Means 15 are then operated so that bar 26 immediately preceding such frame 31 presses on such frame 31 and transfers the same frame and artifacts 2 inserted therein along track 13. Table 4 which was at mouth 17 is now engaged in a further complex of artifacts 2 inserted in a frame 31 preceding the one described above. Table 4 then descends and is laid on chains 11 which transfer it to the packing station (not shown). It is now possible to operate two plates 40 which close mouth 17 and define a sliding surface which connects the two zones of segment 18. Artifacts 2 entered in track 13 cover a first zone of segment 18, segment 21 and a first zone of segment 22. Segment 21 is curved, and thus the edges of the first two opposite sides of artifacts 2 knock into the corresponding edges of adjacent artifacts 2 so as to age such edges.

[0016] At window 32, artifacts 2 with corresponding frame 31 come to rest on platform 33. This is raised to clear track 13, is turned by 90° and finally descends to window 32. Now, the advancement of frame 31 and corresponding artifacts 2 may continue along track 13 traveling along a second zone of segment 22, segment 23 and a second zone of segment 18 to mouth 17. While traveling along segment 23, which is curved, the edges of the second opposite sides of artifacts 2 knock into the corresponding edges of adjacent artifacts 2 so as to age such edges. Furthermore, while covering the second zone of segment 18, by means of strikers 37, the upper surface of artifacts 2 is also aged. The machining waste is then evacuated from track 13 through holes 41. Sometimes, according also to the composition of the material, it may be convenient to make artifacts 2 turn on track 13 several times, hence the usefulness of plates 40.

[0017] It is apparent that frames 31 are not necessary if the peripheral development of the whole of artifacts 2 carried by a table is square because it would be sufficient for such peripheral development to be essentially equal to the internal peripheral development defined between two adjacent bars 26.

[0018] The advantages obtained by implementing the present invention are apparent and numerous.

[0019] Specifically, a system for performing the aging of artifacts 2 indeed along the conveying line of the same towards the packing station without needing to install a derived conveying line with consequent increase of the system dimensions. Furthermore, the system comprises an aging machine 7 which ages all the side edges of artifacts 2 and the upper surface of the same. In addition to effective, precise aging, artifacts 2 are still sorted to facilitate subsequent packing at the outlet of machine 7. Finally, machine 7 is of simple construction with consequently low manufacturing costs.

Claims

1. A conveying and artificial aging systems of construction artifacts (2) of the type comprising:

   a conveying line (5) adapted to transfer a plurality of singularized tables (4) on each of which a plurality of said artifacts (2) are rested; and
   an aging machine (7) installed along said conveying line (5) and adapted to age said artifacts (2);
   characterized in that said aging machine (7) comprises:
   a track (13) adapted to accept said artifacts (2) of each of said tables (4);
   first means (14) adapted to transfer said artifacts (2) of one said table (4) from said conveying line (5) to said track (13); and
   second means (15) adapted to convey said artifacts (2) along said track (13) from a collecting position of said artifacts (2) from said table to a releasing position of said artifacts (2) onto said second table (4).

2. A system according to claim 1 **characterized in that** said track (13) is annular and comprises a first rectilinear, horizontal segment (18) at which an inlet mouth (17) is made, a second curved union segment (21) between a first longitudinal end of said first segment (18) and a first longitudinal end of a third rectilinear, horizontal segment (22) which is on a higher level that said first segment (18), and a fourth curved union segment (23) between a second longitudinal end of said third segment (22) and a second longitudinal end of said first segment (18); during the span defined by said track (13) said artifacts (2) being adapted to knock into the adjacent artifacts (2) to age them.

3. A system according to claim 2, **characterized in that** said track (13) is defined between an external sheet (24) and an internal sheet (25).

4. A system according to claim 2 and/or 3 **characterized in that** said first means (14) comprise two arms (16) mobile parallelly to themselves from a lower position in which they are essentially on the same level as said conveying line (5) to a higher position in which said artifacts (2) are on the level of said mouth (17) defined in said track (13), and vice versa.

5. A system according to at least one of the claims from 2 to 4, **characterized in that** said second means (15) comprise a plurality of horizontal bars (26) carried by their longitudinal ends by two annular chains (27) moved by an electric motor (28); said bars (26) are within said track (13) and orthogonal to the direction of movement of said artifacts (2) along said track (13).

6. A system according to at least one of the claims from 2 to 5, **characterized in that** it comprises:

   a through window (32) made along said third segment (22);
   third means (33, 34 and 35) adapted to carry said artifacts (2) when these are at said window (32) from a lower position in which said artifacts (2) are coplanar with said third segment (22) to an upper position where said again third means (33, 34 and 35) turn said artifacts (2) by 90°;
   said third means (33, 34 and 35) adapted to then return said artifacts (2) to said window (32) so that said second means (15) may continue to transfer said artifacts (2) along the remaining part of said track (13).

7. A system according to at least one of the claims from 2 to 6, **characterized in that** it comprises at least one striker (37) installed along the span defined by said track (13) and adapted to knock on the upper surface of said artifacts (2) for aging such upper surface.

8. A system according to at least one of the preceding claims, **characterized in that** machining waste evacuation holes (41) which are created within said track (13) are made along said track (13).

9. A system according to claim 8, **characterized in that** it comprises a conveyor belt (42) arranged underneath said holes (41) for collecting and then transferring the machining waste to an unloading station.

10. A system according to at least one of the preceding claims, **characterized in that** along said track (13) said artifacts (2) are inside a frame (31).

11. A system according to claim 10, **characterized in that** said frame (31) is formed by elastically deformable material.

12. A system according to at least one of the preceding claims **characterized in that** said track (13) comprises an inlet mouth (17) of said artifacts (2); said mouth (17) being adapted to be closed by at least one plate (40).

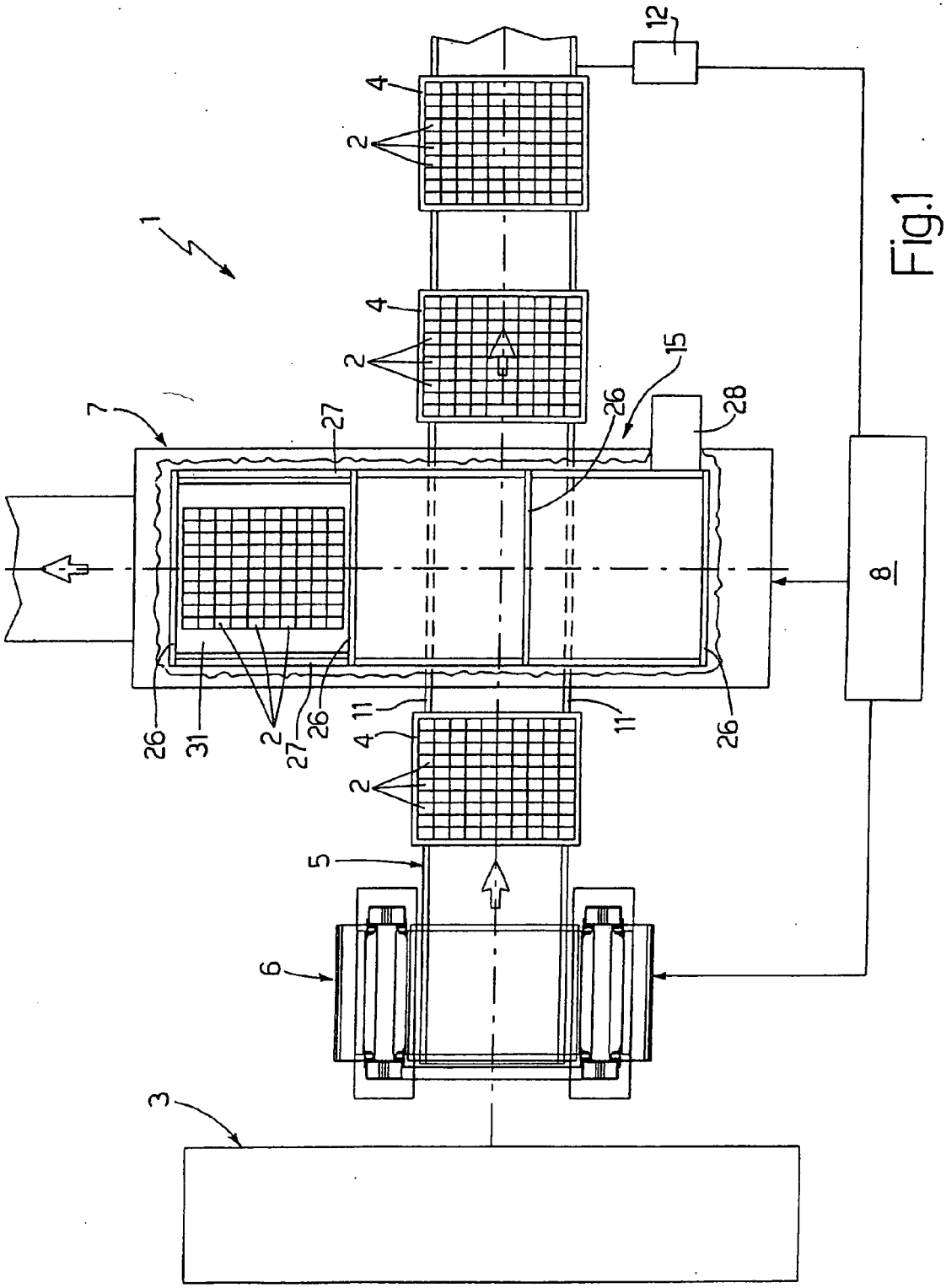

Fig.1

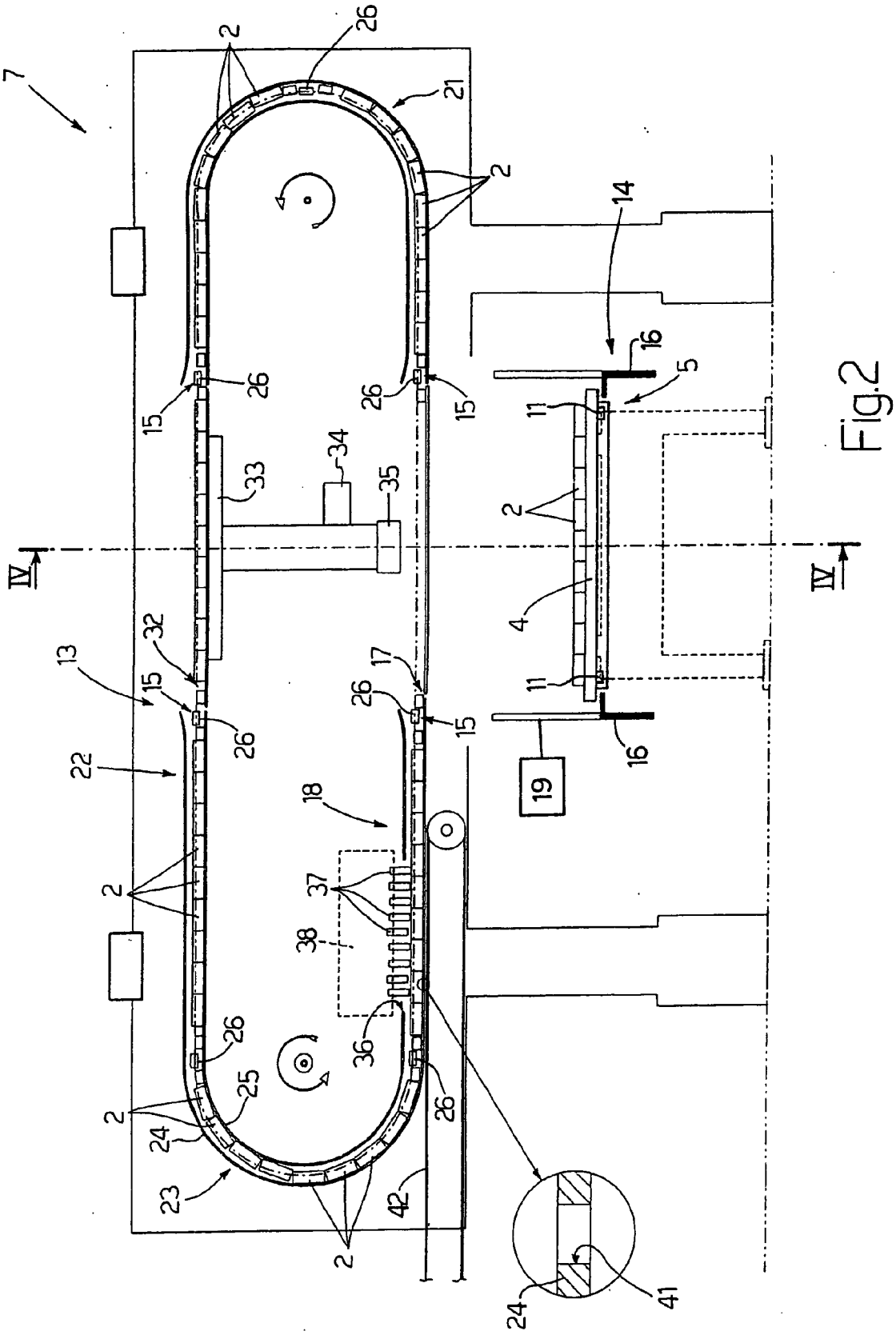
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Fig.2

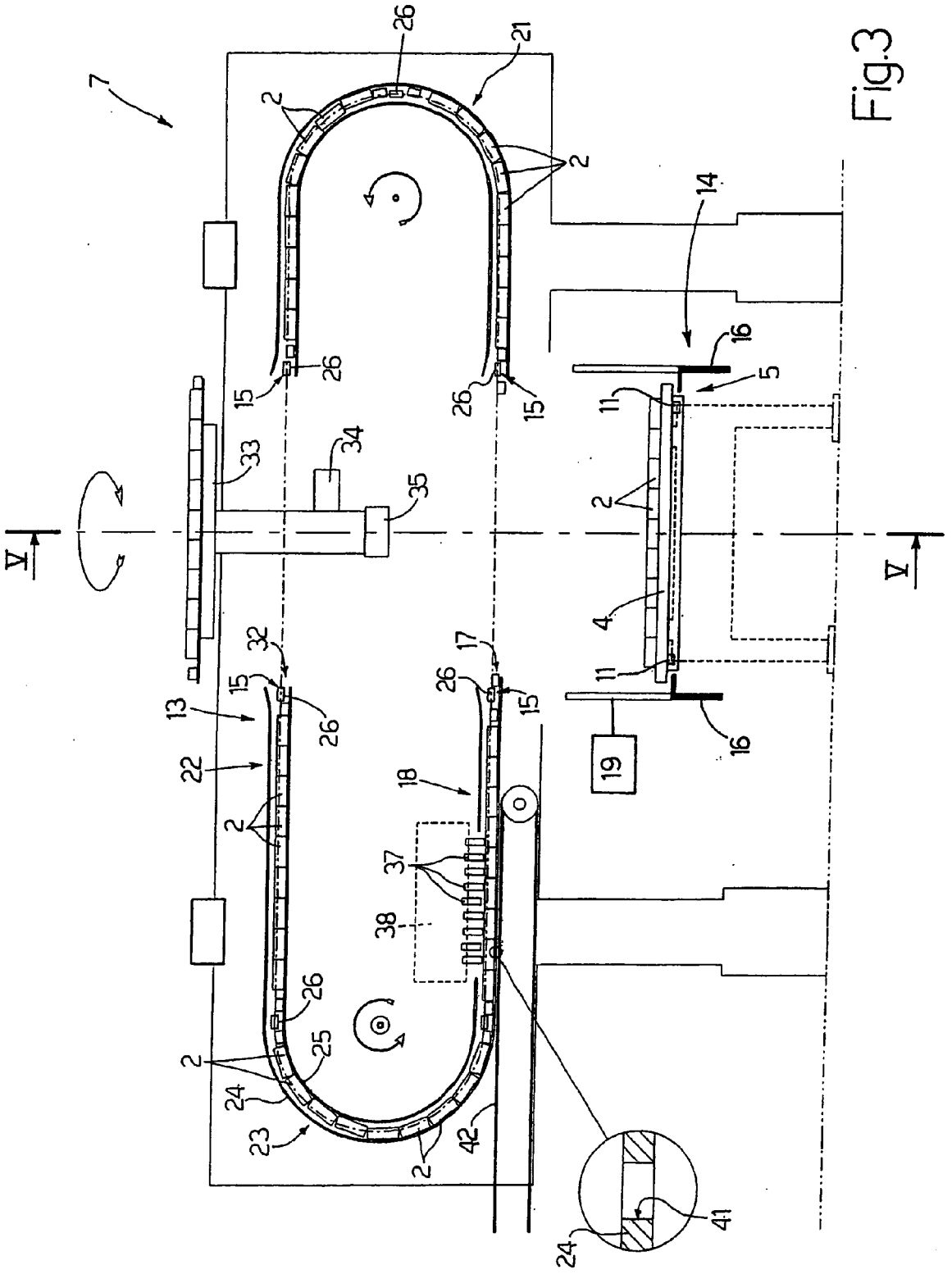
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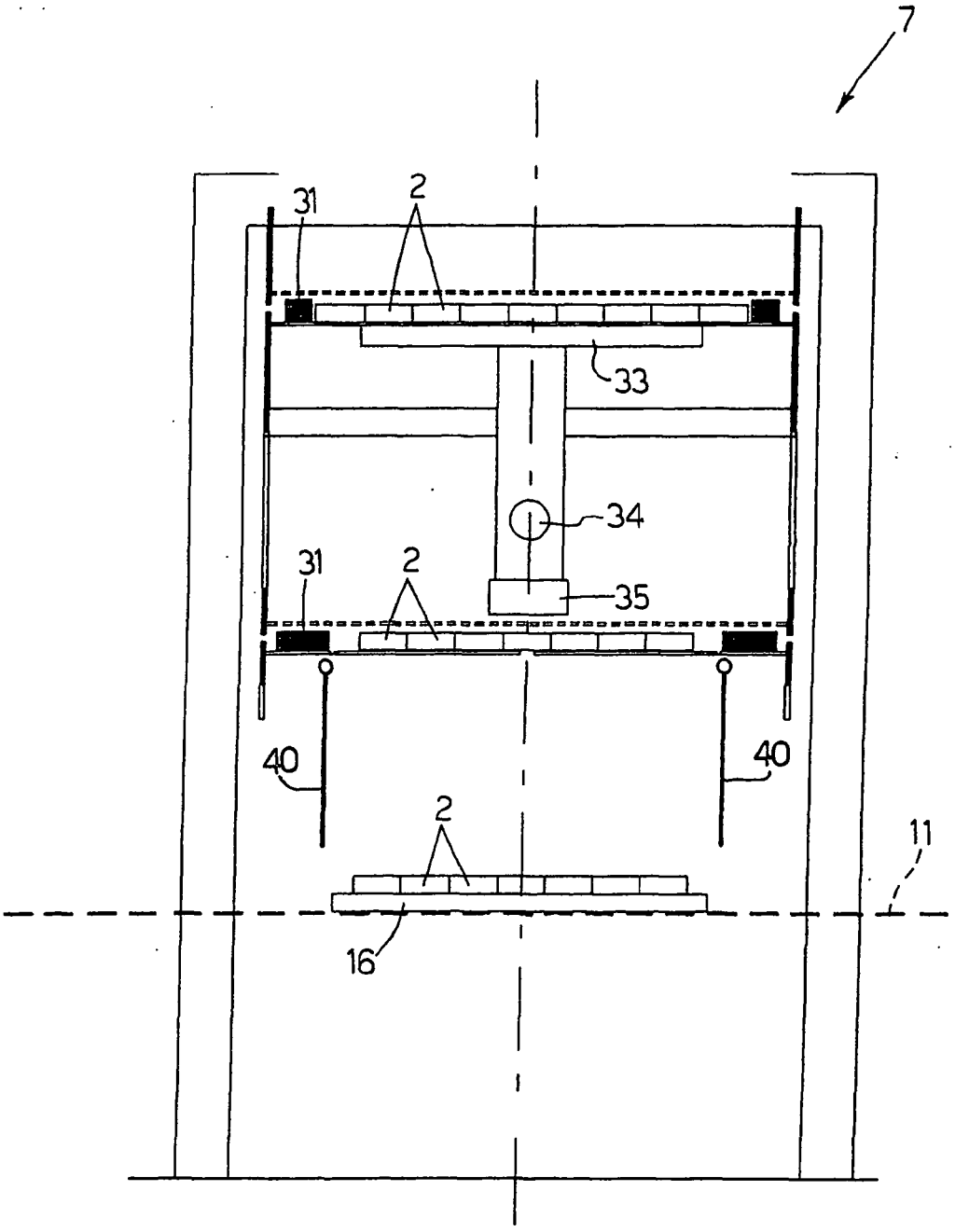
Fig.3



SEZ. IV-IV

Fig.4

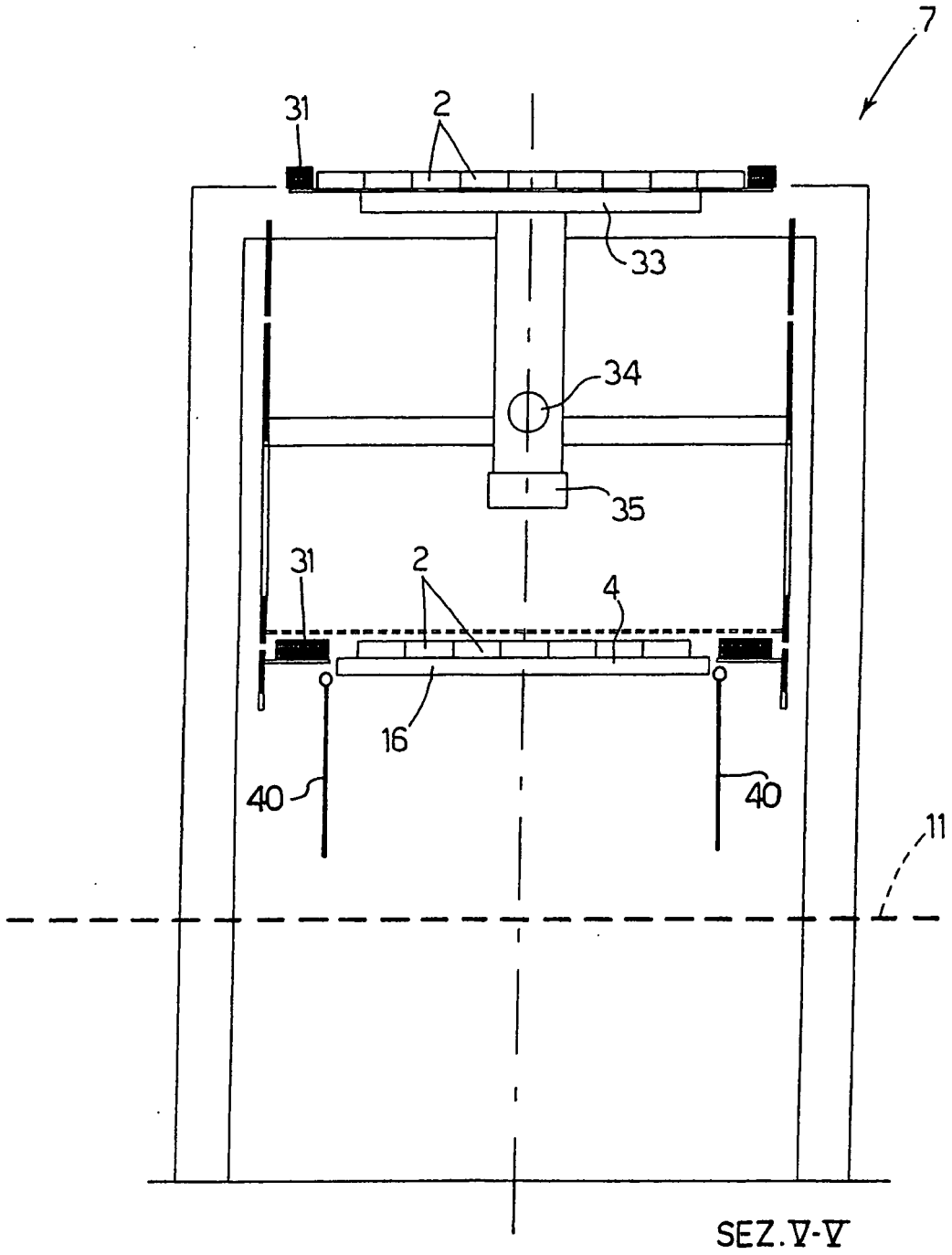


Fig.5

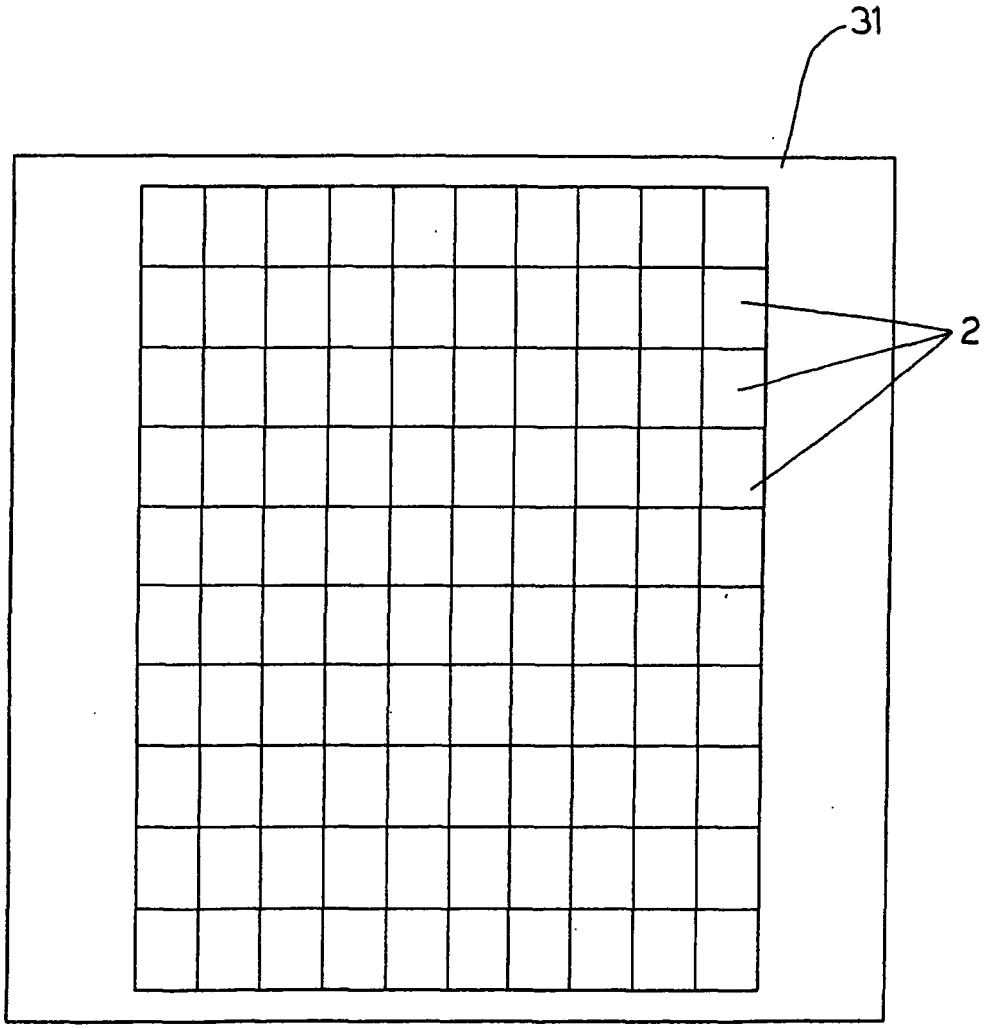


Fig.6

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EUROPEAN SEARCH REPORT

Application Number
EP 07 42 5240

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2003/214069 A1 (SUTO ANTAL Z [US] ET AL) 20 November 2003 (2003-11-20) * paragraphs [0050] - [0052]; figures *	1	INV. B28B11/08
A	BE 470 826 A (M. HORICA) 28 August 1948 (1948-08-28) * pages 4,5; figures *	1,2	

TECHNICAL FIELDS SEARCHED (IPC)

B28B
B28D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	8 November 2007	Labre, Arnaud

CATEGORY OF CITED DOCUMENTS

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08-11-2007

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