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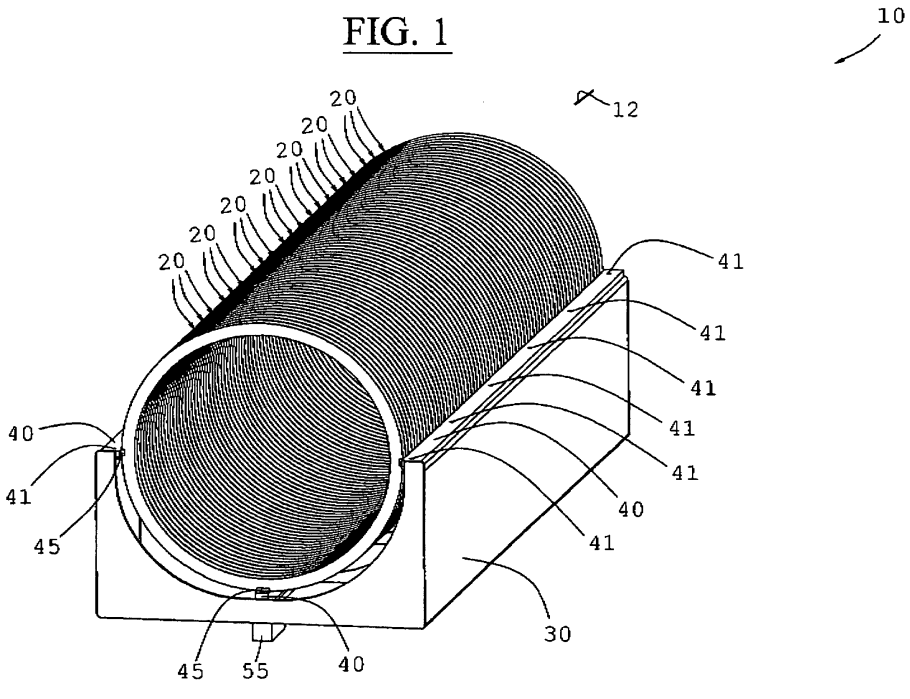
(54) A supporting, positioning and centering system for a plurality of cores for winding reels of metal bands and method thereof

(57) A supporting, positioning and centering system (10) for a plurality of annular cores (20) of the kind inserted on a spindle of a winding reel which is capable of winding a plurality of metal bands on said corresponding plurality of annular cores (20), each annular core (20) comprising a transversal width (22) and an internal radius (24), the system (10) comprising a support frame (30) for the plurality of annular cores (20) in order to easily handle the same and to approaching it to the winding reel, the support frame (30) comprising a centering axis (12) and further comprising a section orthogonal to the centering axis (12), being substantially "C" or "U" shaped.

A supporting, positioning and centering method of a plurality of annular metal cores (20) on a winding reel of a plurality of metal bands of the kind provided with a spindle, the method comprising following steps: a) inserting the plurality of metal cores (20) in a corresponding plurality of asymmetrical seats (35) of a supporting, positioning and centering system (10); b) fitting the supporting system (10) on a spindle of said winding reel; c) decoupling the supporting, centering and loading system (10) from the spindle of the winding reel.

FIG. 1



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Description

[0001] The present invention relates to a supporting, positioning and centering system for a plurality of winding reels of metal bands, in particular aluminum bands preferably for the production of aluminum radiators.

[0002] Currently the cores of winding reels of metal bands typically used by the industrial production of metal parts, are manually placed directly onto a corresponding spindle of the winding reel.

[0003] This requires much time and a very high cost due to the hourly cost for the operator performing such operation.

[0004] Furthermore, another disadvantage is that a manual operation necessarily involves errors due to the relative positioning between a core and the adjacent one, and furthermore it involves misalignments of the core with respect to the metal band which will be wound around the same, and furthermore misalignment errors of the axis of each core with respect to the winding reel.

[0005] Positioning errors of this kind comprise an incorrect winding of the metal band on the corresponding core.

[0006] Furthermore for the production of metal parts, as for example aluminum radiators by means of automated machines utilizing the wound metal bands as a starting material, it is not possible to get metal bands non correctly wound, as this would affect the production of final metal parts, and consequently the metal bands non correctly wound on the cores cannot be used and are scrapped.

[0007] Aim of the present invention is the production of a supporting, positioning and centering system for a plurality of cores of winding reels of metal bands and a relative supporting, positioning and centering method, which permit to reduce at the minimum the positioning times of the plurality of cores on the spindle of the winding reel, so reducing at the minimum the positioning errors of the same.

[0008] Further aim is to realize a supporting, positioning and centering system for a plurality of cores of winding reels of metal bands and a relative supporting, positioning and centering method which permit the fast and simple positioning of the plurality of cores on the spindle of the winding reel, so reducing at the minimum the human action and which permit to minimize the positioning errors, even when changing the diameters and the thickness of the cores.

[0009] Another aim is to have a supporting, positioning and centering system for a plurality of cores of winding reels and a relative supporting, positioning and centering method which permits a simple and fast insertion of the cores on a spindle of a winding reel for metal bands, and at the same time permit to simply position different series of cores having different diameters and different lengths.

[0010] Further aim is to have a supporting, positioning and centering system for a plurality of cores of winding reels of metal bands and a relative supporting, positioning and centering method, which are easy to realize and economically advantageous.

[0011] These aims according to the present invention are reached by realizing a supporting, positioning and centering system for a plurality of cores of winding reels of metal bands and a relative supporting, positioning and centering method, according to claims 1 and 15.

[0012] Further features of the invention are highlighted by the subsequent claims.

[0013] The features and advantages of a supporting, positioning and centering system for a plurality of cores of winding reels of metal bands and of a relative supporting, positioning and centering method or a plurality of cores of winding reels of metal bands according to the present invention, will become more apparent from the following exemplary and non limitative description, with reference to the annexed schematic drawings, in which:

figure 1 is a right side elevation perspective view from above of a preferred embodiment of a supporting, positioning and centering system for a plurality of annular cores of a spindle of a winding reel of small metal bands according to the present invention;

figure 2 is a left side elevation perspective view from below of the supporting, positioning and centering system of figure 1;

figure 3 is a front elevation view of the supporting, positioning and centering system of figure 1;

figure 4 is a sectioned right side elevation view of the supporting, positioning and centering system of figure 3, sectioned along line IV-IV;

figure 5 is a sectioned left side elevation view of a detail of the supporting system of figure 4;

figure 6 is a split left side elevation perspective view from above, showing a detail of the supporting system of figure 4;

figure 7 is a split front elevation view of a detail of figure 3.

[0014] With reference to the figures it is shown a supporting, positioning and centering system 10 for a plurality of annular cores 20 which are inserted upon a spindle of a winding reel capable to wind a plurality of metal bands on said corresponding plurality of annular cores 20.

[0015] Each annular core 20 comprises a transversal width 22 and an internal radius 24.

[0016] According to the present invention, said system 10 comprises a supporting frame 30 for said plurality of annular cores 20, which is preferably provided with a plurality of wheels in order to easily handle the same and approaching it to said winding reel, said supporting frame 30 comprising a centering axis 12.

[0017] Preferably, said supporting frame 30 comprises a section orthogonal to said centering axis 12 and substantially "C" or "U" shaped.

[0018] Advantageously this permits an easy positioning and centering of said plurality of annular cores 20 with respect to said centering axis 12.

[0019] Furthermore, said system 10 comprises a plurality of asymmetrical seats 35 for said corresponding plurality of annular cores 20 preferably metallic, each asymmetrical seat 35 being also asymmetrical with respect to said centering axis 12 and being further perpendicular to the same, each asymmetrical seat 35 being also symmetrical with respect to a vertical plane 14 passing through said centering axis 12, each asymmetrical seat 35 also occupying a radial portion with respect to said centering axis 12, which is equal or smaller than 200°, in particular equal or smaller than 190° and still more in particular is equal or smaller than 180°.

[0020] Preferably said radial portion is defined with respect to a second plane 15 perpendicular to said first vertical plane 14.

[0021] Furthermore each asymmetrical seat 35 has a minimum radial distance 37 measured with respect to said centering axis 12, which is greater than said internal radius 24 of each corresponding annular core 20.

[0022] It is in this way advantageously possible to quickly and extremely precisely insert the plurality of annular cores 20 on said support frame 30 by keeping the same perfectly centered with respect to said centering axis 12 and also perfectly orthogonal and perfectly distributed with respect to the same, so avoiding manual positioning errors, with a consequent great saving of time, together with an increase of the productivity and the quality of said plurality of metal bands obtained by said winding reel.

[0023] In this way it is further possible to fit said support frame 30 on said spindle, by at the same time fitting said plurality of annular cores 20 on said spindle of said winding reel, and further it is possible to lower said support frame 30 in a direction perpendicular to said centering axis 12, by decoupling the same from said plurality of annular cores 20 and at the same time keeping the same perfectly centered and perfectly perpendicular to a symmetry axis of said spindle, so avoiding possible manual positioning errors, and consequently reaching an easy, quick and precise positioning of said plurality of annular cores 20 on said spindle of said winding reel.

[0024] Preferably said system 10 comprises at least two combs or racks 40, preferably at least three combs 40, which are fixed and made integral with said support frame 30, and which are parallel to said centering axis 12, and further in each comb 40 is realized a portion of each asymmetrical seat 35 of said plurality of asymmetrical seats 35.

[0025] In particular, each comb 40 is substantially "I" shaped.

[0026] In this way it is possible to greatly simplify the realization of said plurality of asymmetrical seats 35 and of said system 10, so reducing costs and assembling times.

[0027] Preferably each comb 40 comprises a plurality of grooves which are perpendicular to said centering axis 12.

[0028] In particular each groove is "U" shaped and has two side walls and a bottom portion which is orthogonal to said side walls.

[0029] Preferably each comb 40 comprises a plurality of centering through holes 41 which are realized on a base surface 48 and which are positioned along a line parallel to said centering axis 12 in order to simplify the fastening to said support frame 30 by keeping the same correctly positioned with respect to said centering axis 12.

[0030] In this way it is advantageously possible to position and fasten each comb 40 with respect to said centering axis 12, so that each groove is aligned with at least one corresponding groove of another comb 40 along one direction orthogonal to said centering axis 12.

[0031] Preferably each asymmetrical seat 35 comprises at least two radial abutments 44, and in particular at least three radial abutments 44, for each annular core 20 which comprises an external profile, when the same is inserted into a corresponding seat 35, such external profile at the same time contacting said at least two radial abutments 44 and in particular said at least three radial abutments 44.

[0032] In this way it is advantageously possible to perfectly and quickly center each annular core 20 within a corresponding asymmetrical seat 35 so avoiding any manual error, as the radial abutments 44 permit to center a symmetry axis of each annular core 20 with said centering axis 12.

[0033] In particular, each radial abutment 44 of each asymmetrical seat 35 is placed along a circumference 49 and is further tangential to the same, said circumference 49 comprising a radius which is slightly greater than said internal radius 24 of a corresponding annular core 20.

[0034] It is in this way advantageously possible to perfectly and quickly position each annular core 20 so reaching a perfect centering of said symmetry axis of each annular core 20 with said centering axis 12.

[0035] Preferably each asymmetrical seat 35 comprises a plurality of transversal abutments 45, in particular at least two transversal abutments 45 for each annular core 20 which are parallel to each other and perpendicular to said centering axis 12.

[0036] In this way it is advantageously possible to perfectly and quickly position each annular core 20 within a corresponding asymmetrical seat 35 so avoiding a manual error, as the radial abutments 44 permit to correctly position one annular core 20 with respect to the adjacent annular cores, and furthermore permit to perfectly align the symmetry axis of each annular core 20 with said centering axis 12 so avoiding misalignment errors.

[0037] In particular said at least two transversal abutments 45 have a distance between them which is slightly greater than said transversal width 22 of a corresponding annular core 20.

[0038] In this way it is advantageously possible to avoid misalignment problems of a corresponding annular core 20 with respect to said centering axis 12, then determin-

ing a better quality of the metal band wound on the same.

[0039] This is very important as the metal band must be correctly wound due to the fact that the same is used in automated machines e.g. for the production of metal radiators.

[0040] This automated machines use only metal bands perfectly wound on the corresponding annular cores 20, therefore the non correctly wound bands would be completely disposed, resulting in a considerable loss of earnings.

[0041] Preferably said plurality of transversal abutments 45 and said plurality of radial abutments 44 are integrated within said plurality of grooves of each comb 40.

[0042] Preferably said system 10 further comprises at least one axial abutment 55, in particular at least two axial abutments 55, which is fastened or preferably integrated with said support frame 30.

[0043] Preferably said at least one axial abutment 55 is fastened or made integral with a bottom portion of said support frame 30.

[0044] In particular said at least two axial abutments 55 which are fastened or made integral with said support frame 30 permit to perfectly position and center said centering axis 12 with said axis of said spindle of said winding reel, so advantageously avoiding possible centering and/or misalignment errors of the same.

[0045] Preferably said at least two axial abutments 55 are two rectified metal prismatic elements which permit to register the axial and transversal position of said support frame 30 with respect to said axis or spindle of said winding reel, so that each annular core 20 will be positioned with respect to a corresponding metal band to be wound on the same.

[0046] According to another aspect of the present invention a method is provided for supporting, positioning and centering a plurality of annular metal cores 20 onto one winding reel of a plurality of metal bands of the kind provided with a spindle having a centering axis 12.

[0047] According to the present invention, said method comprises the following steps:

a) inserting said plurality of annular metal cores 20 in a corresponding plurality of asymmetrical seats 35 of a supporting, positioning and centering system 10;

b) fitting said supporting system 10 on said spindle of said winding reel, hence at the same time fitting said plurality of annular cores 20 on said spindle of said winding reel;

c) decoupling said supporting, positioning and centering system 10 from said spindle of said winding reel.

[0048] In this way it is advantageously possible to avoid manual errors, as by means of the supporting, positioning and centering system 10 it is possible d) to insert each annular metal core 20 in a corresponding asymmetrical seat 35 of said plurality of asymmetrical seats 35 so obtaining a perfect positioning of the plurality of metal cores 20 one respect to the other.

[0049] Furthermore, being the seats 35 asymmetrical it is possible to decouple the support system 10 from said spindle of said winding reel so keeping in the same correct position the plurality of metal cores 20, avoiding positioning, misalignment or other manual errors.

[0050] Indeed, positioning or misalignment errors of the plurality of annular metal cores 20 with respect to the axis of the spindle are due to manual errors and usually produce waste metal bands which are non correctly wound, as the wound metal bands are subsequently used in automated machines for the production of metal radiators as an example, and these automated machines necessarily require perfectly wound bands in order to avoid production problems with consequent rejection of the final product.

[0051] Preferably such system 10 comprises a support frame 30 in which said plurality of asymmetrical seats 35 is integrated.

[0052] Furthermore said method comprises a step of e) fitting said support frame 30 on said spindle, hence at the same time fitting said plurality of annular cores 20 on said spindle of said winding reel, and further comprises one step of f) move said support frame 30 in a direction perpendicular to said centering axis 12, and one step of g) decoupling said support frame 30 from said plurality of annular cores 20 and at the same time keeping the same perfectly centered and perfectly perpendicular to a symmetry axis of said spindle, so avoiding possible manual positioning errors, and consequently reaching an easy, quick and precise positioning of said plurality of annular cores 20 on said spindle of said winding reel.

[0053] So it has been seen that a supporting, positioning and centering system for a plurality of cores of winding reels of metal bands and a relative supporting, positioning and centering method according to the present invention, realizes the aforementioned purposes.

[0054] The supporting, positioning and centering system for a plurality of cores of winding reels of metal bands and a relative supporting, positioning and centering method of the present invention so conceived, are subjected to numerous modifications and variations, all within the same inventive concept.

[0055] Furthermore, in practice the used materials, and also their dimensions and components, can be of any kind according to the technical needs.

Claims

1. A supporting, positioning and centering system (10) for a plurality of annular cores (20) of the kind inserted onto a spindle of a winding reel which is capable of winding a plurality of metal bands on said corresponding plurality of annular cores (20), each annular core (20) comprising a transversal width (22) and

an internal radius (24), said system (10) being **characterized in that** it comprises a support frame (30) for said plurality of annular cores (20) in order to easily handling the same and approaching it to said winding reel, said support frame (30) comprising a centering axis (12) and further one section orthogonal to said centering axis (12) which is substantially "C" or "U" shaped.

2. The system (10) according to claim 1, **characterized in that** it comprises a plurality of asymmetrical seats (35) for said corresponding plurality of annular cores (20) preferably metallic, each asymmetrical seat (35) being also asymmetric with respect to said centering axis (12) and further being perpendicular to the same, each asymmetrical seat (35) being further symmetrical with respect to a vertical plane (14) passing trough said centering axis (12), and further each asymmetrical seat (35) occupying a radial portion with respect to said centering axis (12) which is equal or less than 200°.

3. The system (10) according to claim 2, **characterized in that** said radial portion is defined with respect to a second plane (15) perpendicular to said first vertical plane (14).

4. The system (10) according to any of claims 1 to 3, **characterized in that** each asymmetrical seat (35) has a minimum radial distance (37) measured with respect to said centering axis (12) which is greater than said internal radius (24) of each corresponding annular core (20).

5. The system (10) according to any of claims 1 to 4, **characterized in that** it comprises at least two combs (40) which are fastened and made integral with said support frame (30), and which are parallel to said centering axis (12), in each comb (40) being further realized a portion of each asymmetrical seat (35) of said plurality of asymmetrical seats (35).

6. The system (10) according to claim 5, **characterized in that** each comb (40) is substantially "I" shaped.

7. The system (10) according to claim 5 or 6, **characterized in that** each comb (40) comprises a plurality of grooves which are perpendicular to said centering axis (12).

8. The system (10) according to claim 5, **characterized in that** each groove is "U" shaped and comprises two lateral walls and one bottom portion which is orthogonal to said lateral walls.

9. The system (10) according to any of claims 5 to 8, **characterized in that** each comb (40) comprises a plurality of through centering holes (41) which are provided on a base surface (48) and which are placed along a line parallel to said centering axis (12) in order to assist the fastening to said support frame (30) by keeping the same correctly positioned with respect to said centering axis (12).

10. The system (10) according to any of claims 2 to 9, **characterized in that** each asymmetrical seat (35) comprises at least two radial abutments (44) for each annular core (20).

11. The system (10) according to claim 10, **characterized in that** each radial abutment (44) of each asymmetrical seat (35) is placed along a circumference (49) and is also tangential to the same, said circumference (49) comprising a diameter which is greater than said internal radius (24) of a corresponding annular core (20).

12. The system (10) according to any of claims 2 to 11, **characterized in that** each asymmetrical seat (35) comprises a plurality of transversal abutments (45) for each corresponding annular core (20), which are parallel one another and perpendicular to said centering axis (12).

13. The system (10) according to claim 10, **characterized in that** each asymmetrical seat (35) comprises at least two transversal abutments (45) which have a distance between them which is slightly greater than said transversal width (22) of a corresponding annular core (20).

14. The system (10) according to claim 12 or 13, characterize in that said plurality of transversal abutments (45) and said plurality of radial abutments (44) are integrated in said plurality of grooves of each comb (40).

15. A supporting, positioning and centering method of a plurality of metal annular cores (20) on a winding reel of a plurality of metal bands of the kind provided with a spindle, said method being **characterized in that** it comprises following steps:

a) inserting said plurality of metal cores (20) in a corresponding plurality of asymmetrical seats (35) of a supporting, centering and loading system (10);
b) fitting said supporting system (10) on said spindle of said winding reel;
c) decoupling said supporting, centering and loading system (10) from said spindle of said winding reel.

16. The method according to claim 15, **characterized in that** it comprises one step of d) inserting each metal core (20) in a corresponding asymmetrical

seat (35) of said plurality of asymmetrical seats (35) so obtaining a perfect positioning of the plurality of metal cores (20) one respect to another.

17. The method according to claim 15 or 16, **characterized in that** said system (10) comprises a support frame (30) in which said plurality of asymmetrical seats (35) is integrated, and that it comprises one step of e) fitting said support frame (30) on said spindle, at the same time fitting said plurality of annular cores (20) on said spindle of said winding reel, and further comprising one step of f) move said support frame (30) in a direction perpendicular to said centering axis (12), and one step of g) decoupling said support frame (30) from said plurality of annular cores (20) and at the same time keeping the same perfectly centered and perfectly perpendicular to a symmetry axis of said spindle.

FIG. 1

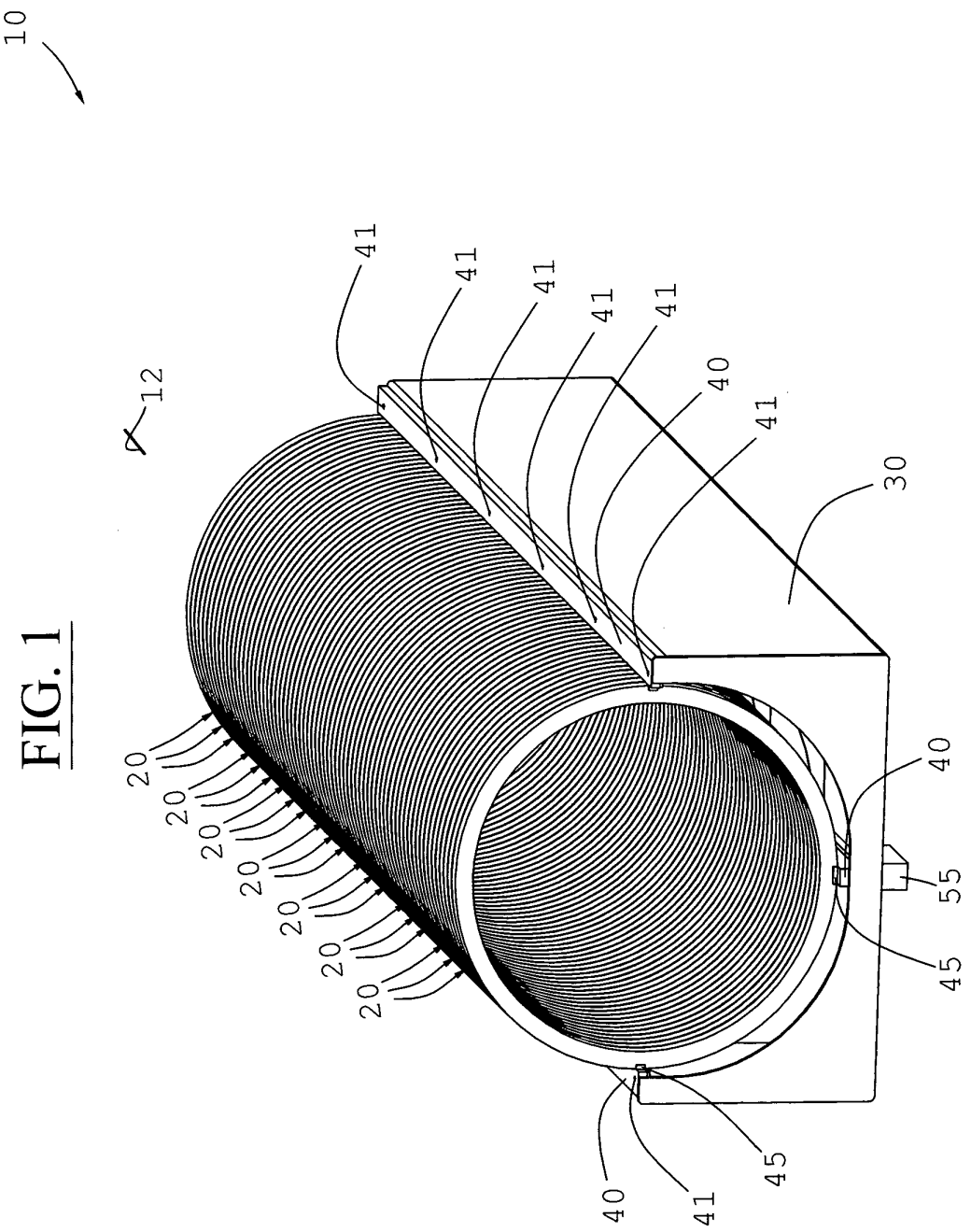


FIG. 2

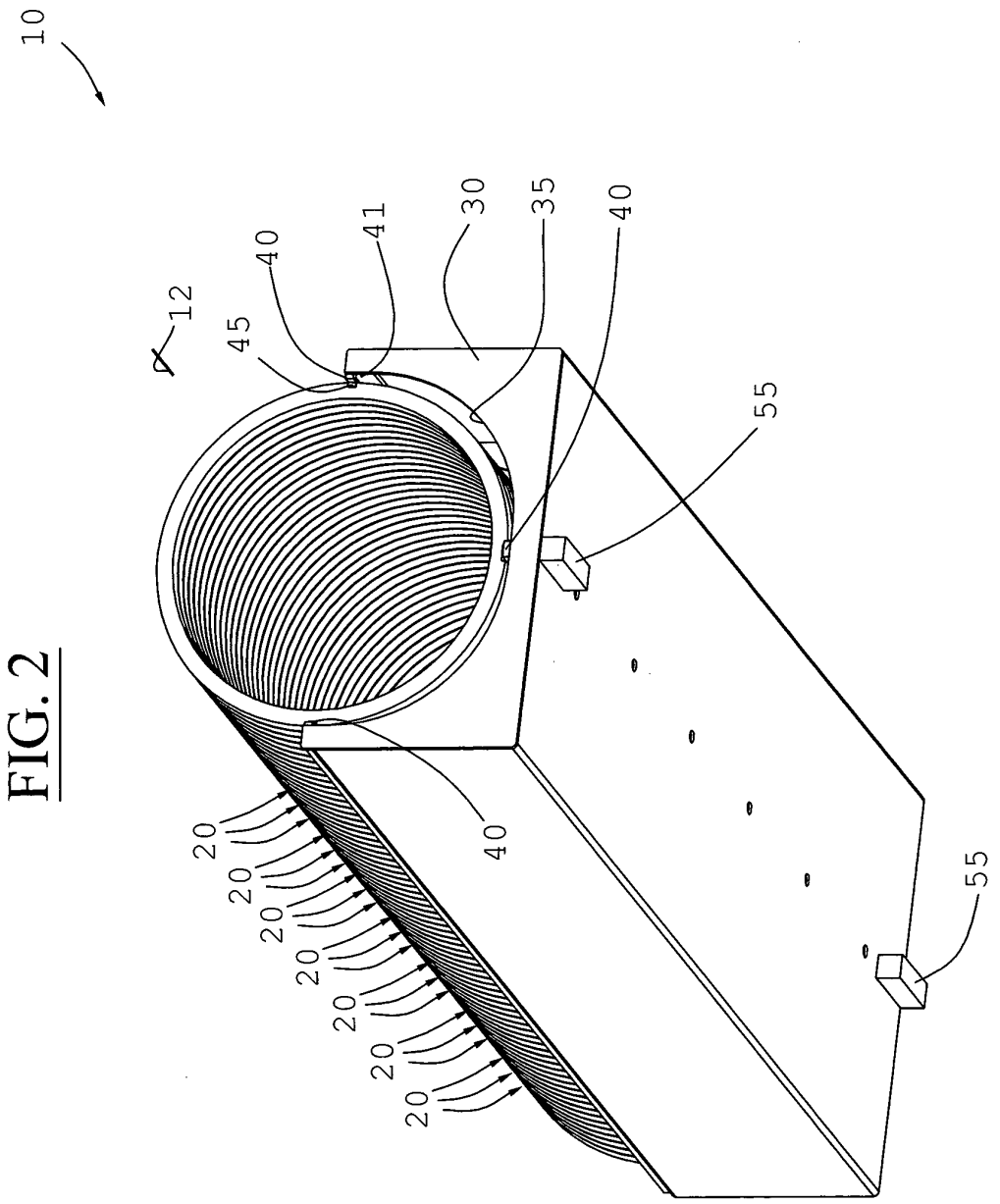


FIG. 3

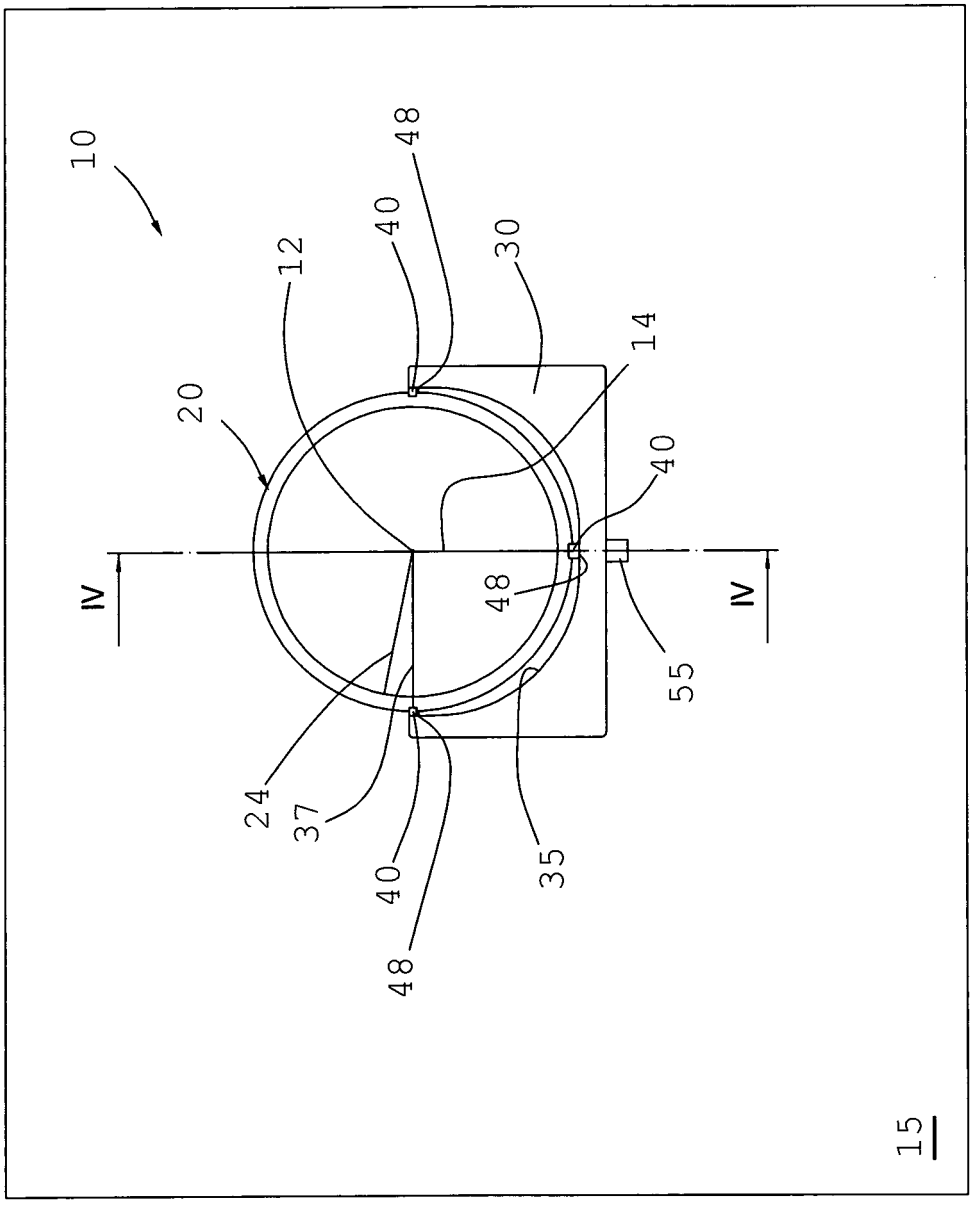


FIG. 4

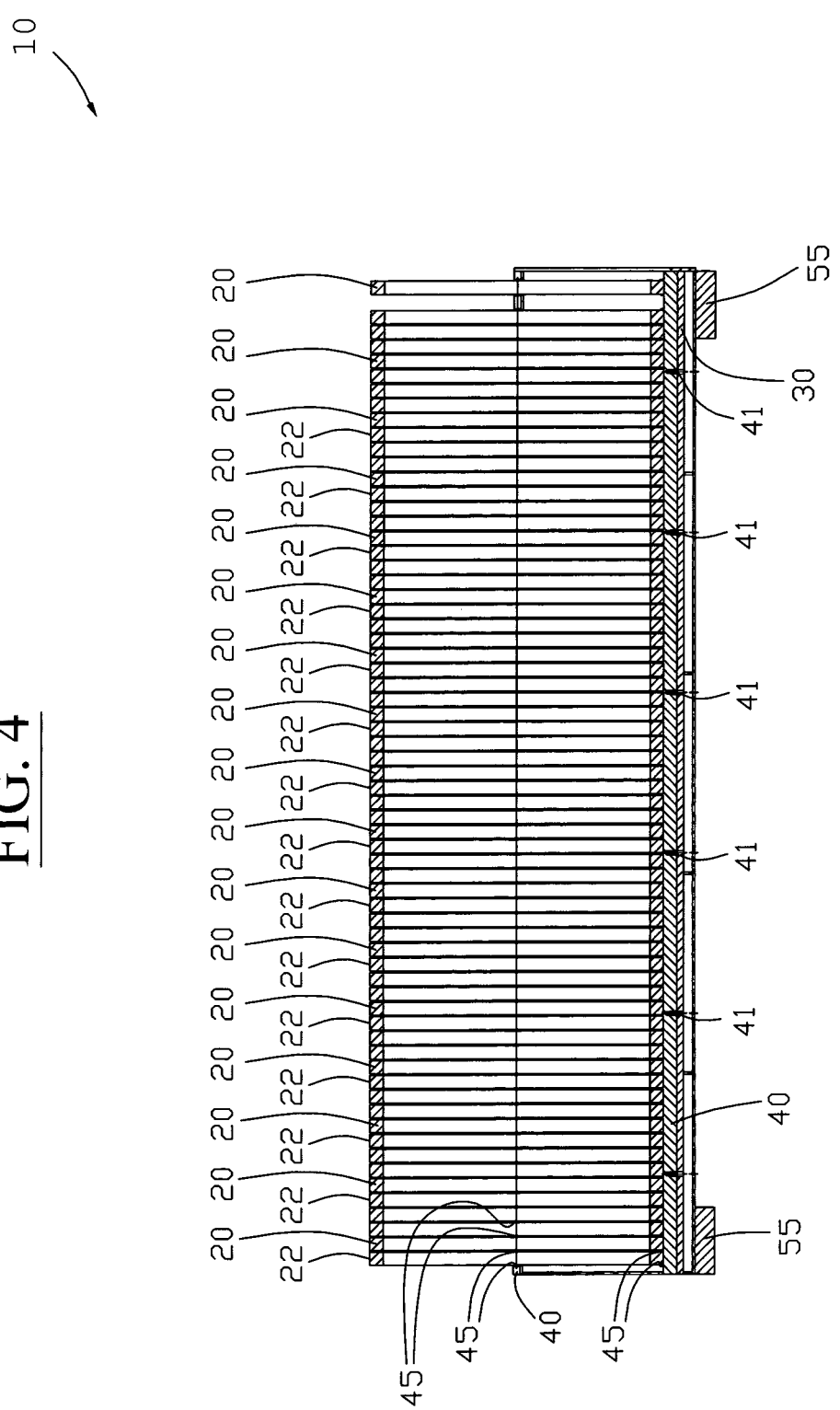


FIG. 5

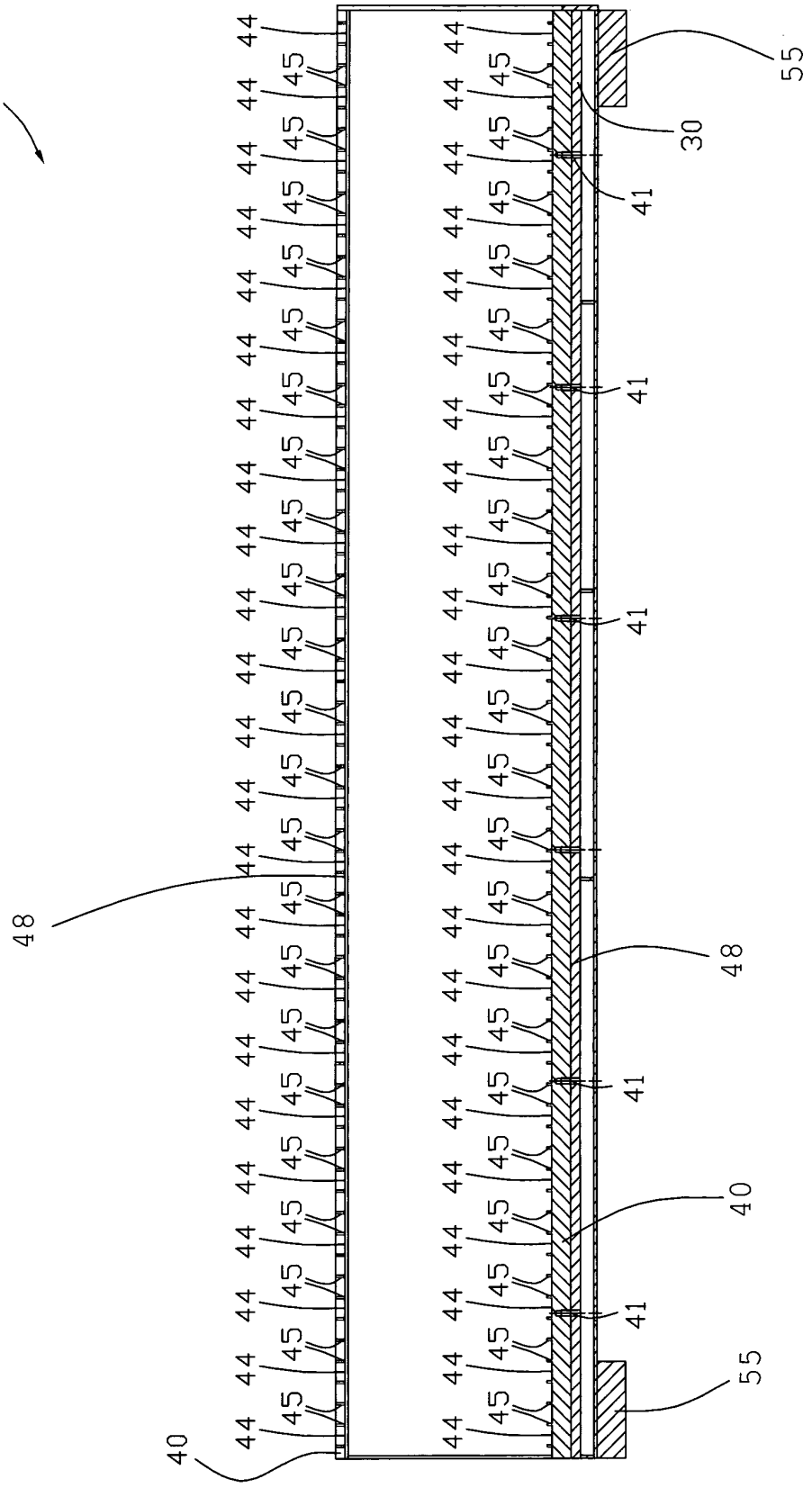


FIG. 6

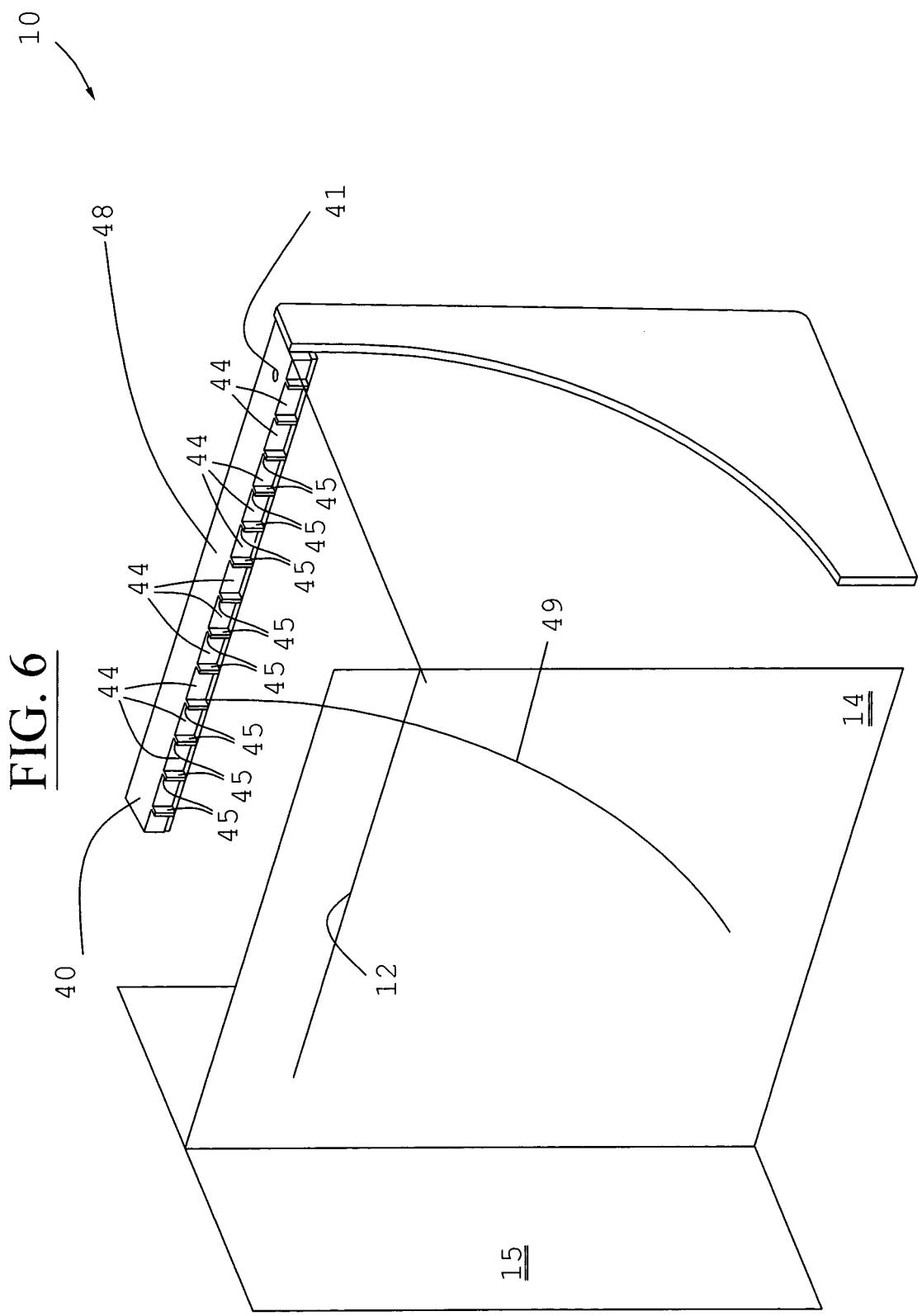
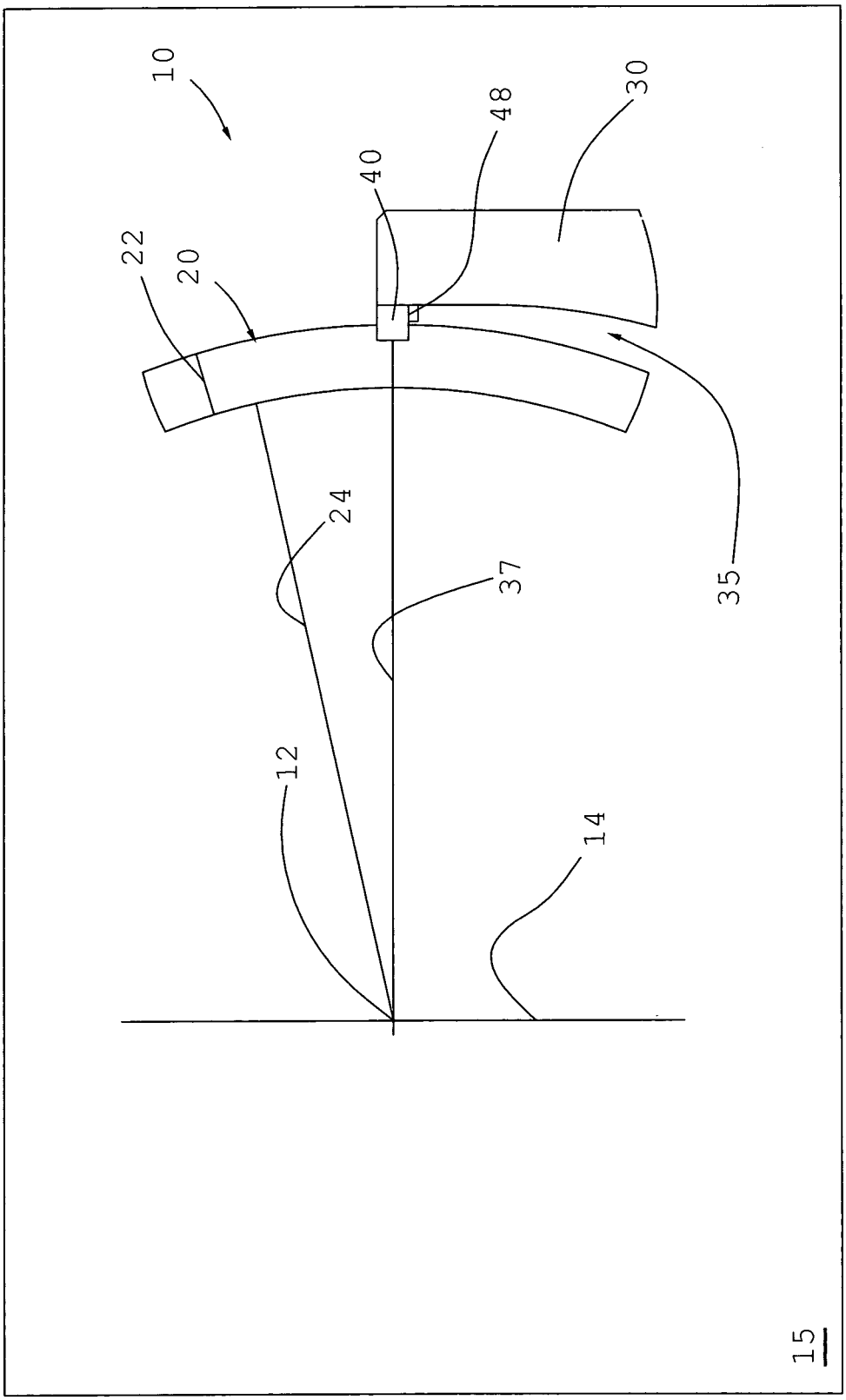


FIG. 7



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EUROPEAN SEARCH REPORT

Application Number
EP 12 00 6374

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 A	GB 2 028 772 A (DUSENBERG CO INC J) 12 March 1980 (1980-03-12) * page 2, line 99 - line 112; figures 5-12 * -----	1-8, 11-17 9,10	INV. B65H19/30
X A	US 5 810 966 A (SEMBA YOSHIKIMI [JP]) 22 September 1998 (1998-09-22) * column 9, lines 15-67; figures 15-17 * -----	1-8, 11-17 9,10	
X A	DE 24 27 095 A1 (GERHART JAMES P) 9 January 1975 (1975-01-09) * page 4, line 25 - page 5, line 8; figures 1,2,8 * -----	1-8, 11-17 9,10	
X A	EP 1 295 832 A2 (HOLMDALE PREC LTD [GB] GRAPHIC INTERNAT LTD AB [GB]) 26 March 2003 (2003-03-26) * the whole document * -----	1 2-17	
A	US 3 424 398 A (BELLEVUE JEAN PIERRE GABRIEL E) 28 January 1969 (1969-01-28) * the whole document * -----	1-17	TECHNICAL FIELDS SEARCHED (IPC) B65H
A	US 2 840 320 A (FRANK CSUTOR) 24 June 1958 (1958-06-24) * the whole document * -----	1-17	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	9 July 2013	Haaken, Willy

CATEGORY OF CITED DOCUMENTS

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09-07-2013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2028772 A	12-03-1980	AU 521657 B2	22-04-1982
		AU 4108478 A	01-05-1980
		DE 2847556 A1	14-02-1980
		FR 2432985 A1	07-03-1980
		GB 2028772 A	12-03-1980
		IT 1106249 B	11-11-1985
		JP S5526180 A	25-02-1980
		JP S6215455 B2	07-04-1987
		US 4208019 A	17-06-1980
US 5810966 A	22-09-1998	US 5810966 A	22-09-1998
		US 6269859 B1	07-08-2001
		US 2001027837 A1	11-10-2001
		US 2003207100 A1	06-11-2003
DE 2427095 A1	09-01-1975	DE 2427095 A1	09-01-1975
		GB 1468431 A	23-03-1977
		US 3869046 A	04-03-1975
EP 1295832 A2	26-03-2003	AT 350323 T	15-01-2007
		DE 60217244 T2	31-05-2007
		EP 1295832 A2	26-03-2003
		US 2003057314 A1	27-03-2003
US 3424398 A	28-01-1969	AT 281583 B	25-05-1970
		BE 689135 A	31-03-1967
		CH 493404 A	15-07-1970
		DE 1604659 A1	23-12-1970
		FR 1505340 A	15-12-1967
		GB 1120087 A	17-07-1968
		NL 6617718 A	19-06-1967
		SE 309903 B	08-04-1969
		US 3424398 A	28-01-1969
US 2840320 A	24-06-1958	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82