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(54) **Bearing construction for high power liquid condensers and coolers**

Tragekonstruktion für Hochleistungsflüssigkeitskondensatoren und -kühler

Construction de revêtement pour condensateurs liquides haute puissance et refroidisseurs

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Description**BACKGROUND OF THE INVENTION**

[0001] The present invention relates to a condenser or cooler according to the preamble of claim 1. such a cooler or condenser is known from document US 5 181 395.

[0002] As is known, commercially available high power liquid condensers and coolers, usually comprising two slanted batteries and two rows of fans, are constructed starting from a bearing construction, in turn made of steel sheet panels, as is shown in figure 12.

[0003] The main function of the panel inner construction is that to properly support the batteries and air conveyers, with the related fans.

[0004] Moreover, the above mentioned panel construction, characterizing the structure of conventional liquid condensers and coolers, is necessary to provide a product resisting against mechanical stresses due to the product transport and assembling handlings and movements.

[0005] The above disclosed conventional panel construction has some advantages: for example, the separating of the air flow for each air fan may be useful for operating conditions providing an operation with a single operating battery, with the fans arranged adjoining it, or an operation with an ON-OFF adjusting system, for properly adjusting the power, and operating based on a stop of pairs of fans.

[0006] However, the prior panel construction is also affected by several drawbacks.

[0007] In particular, the making cost of the steel sheet panels, and their assembling inside the product, is a comparatively high one.

[0008] Moreover, the steel sheet panels have a very high weight and, accordingly, also the weight of the end product is very high.

[0009] Such a high end product weight makes the handling, transport and assembling operations of the product very difficult.

[0010] Moreover, an installation of such a high weight article of manufacture requires that a proper base for supporting it, with a plurality of clamping point, be used.

SUMMARY OF THE INVENTION

[0011] The present invention provides a condensers or coolers according to the preamble of claim 1.

[0012] Within the scope of the above mentioned aim, a main object of the invention is to provide such a bearing construction allowing to greatly reduce the making cost.

[0013] Another object of the invention is to provide such a bearing construction allowing to also greatly reduce the weight of the end product.

[0014] Yet another object of the present invention is to provide such a bearing construction which, owing to the reduction of the product weight, allows to greatly simplify the product handling, transport and installing operations.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] A preferred, though not exclusive, embodiment of the invention is illustrated, by way of an indicative, but not limitative, example, in the accompanying drawings, where:

Figure 1 is a perspective view of a condenser and cooler, including two slanted batteries, having two rows of fans, and a bearing construction according to the present invention;

Figure 2 is a side elevation view of the condenser and cooler, including two slanted batteries, and two rows of fans, and having a bearing construction according to the present invention;

Figure 3 is a top plan view of the condenser and cooler, including two slanted batteries, and two rows of fans, and having the bearing construction according to the invention;

Figure 4 is an elevation view showing the grid construction of a system including two slanted batteries and two rows of two fans;

Figure 5 is a further elevation view, showing the grid construction of a system including two slanted batteries and two rows of three fans;

Figure 6 is a further elevation view, showing the grid construction of a system including two slanted batteries and two rows of four fans;

Figure 7 is yet another elevation view, showing the grid construction of a system including two slanted batteries and two rows of five fans;

Figure 8 is yet another elevation view, showing the grid construction of a system including two slanted batteries and two rows of six fans;

Figure 9 is yet another elevation view, showing the grid construction of a system including two slanted batteries and two rows of seven fans;

Figure 10 is yet another elevation view, showing the grid construction of a system including two slanted batteries and two rows of height fans;

Figure 11 is yet another elevation view, showing the grid construction of a system including two slanted batteries and two rows of nine fans; and

Figure 12 shows a perspective view of a conventional type of bearing construction.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0016] With reference to the number references of the above mentioned figures, the bearing construction which has been generally indicated by the reference number 1, has been specifically designed for a high power liquid condenser and cooler, generally indicated by the reference number 100, and including two slanted batteries 101, and two rows of fans 102.

[0017] The bearing construction has, according to the main aspect of the invention, a grid like configuration,

and comprises, as main components thereof, a series of tie-rods and struts, having a suitable size and so arranged as to properly support the air conveyers and related fans 102 and batteries 101, thereby allowing to provide a very strong product which can easily resist against the mechanical stresses due to the transport and installation handlings and/or movements.

[0018] Figures 11 shows the bearing construction 1 of the condensers system 100, shown in figures 1-3, and comprising two slanted batteries and two rows of nine fans.

[0019] Figures 4 to 10 show seven examples of bearing constructions, respectively indicated by the reference numbers 201, 301, 401, 501, 601, 701 and 801, for systems including two slanted batteries and two rows of 2 - 3 - 4 - 5 - 6 - 7 - 8 fans.

[0020] It has been found that the invention fully achieves the intended aim and objects.

[0021] In fact, the invention is provide with a bearing construction, specifically designed for high power liquid condensers and coolers, adapted to properly support the air conveyers and related fans and batteries, thereby allowing to make a very strong product, adapted to resist against the mechanical stresses due to the transport and installation movements or handlings.

[0022] The bearing construction provides a plurality of advantages, with respect to conventional like bearing constructions, even from an operating standpoint.

[0023] For example, the inventive grid construction allows to greatly reduce any power losses of the product, for example due to a fan failure, owing to a full exploiting of the operating battery underlying the fan.

[0024] Another advantage is that a possible covering of the grid of the failed motor allows to prevent air from recirculating through the operating motors, which would further reduce the power loss of the device.

[0025] Moreover, the grid construction allows to eliminate the noise caused by possible sound resonances, as those generated by conventional panels as fan air passes therethrough.

[0026] Yet a further advantage is the great reduction of the number of the fixing or clamping elements for clamping to the ground the device, thereby consequently reducing the installation cost.

[0027] Yet a further advantage is that the installation supporting base is greatly simplified and of a much less cost.

[0028] Actually, under particular operating conditions, providing an operation of only a battery and fans adjoining thereto, or an operation with a power ON-OFF adjusting system, to be achieved by stopping pairs of fans, it is possible, with a little increase of the making cost, to easily assemble on the grid construction dedicated plastics material panels for separating the fan air flows.

[0029] With reference to figure 12, it should be apparent that the grid construction used in the present invention allows moreover to eliminate the outer sheet metal reinforcement elements which, on the contrary, are neces-

sary in conventional like constructions.

[0030] Furthermore, the grid construction used in the the present invention allows to reduce the number of the supporting cross members and, as aforesaid, the number of the clamping elements to clamp the construction to the ground.

[0031] By way of an example, the inner cross-members of the grid construction according to the present invention are reduced to only 1 - 2, with respect to the 4 - 8 of a conventional bearing construction.

[0032] Moreover, it is possible to greatly reduce the length of the outer longitudinal cross-members.

[0033] Yet another advantage of the grid construction used in the present invention is that the elimination of the outer reinforcement elements and the reduction of the length of the longitudinal outer cross-members, allows to greatly improve the air distribution through the operating batteries.

[0034] In practicing the invention, the used materials, as well as the contingent size and shapes, can be any, according on requirements.

Claims

1. Condenser or cooler comprising two slanted batteries in a V-configuration and two rows of fans, **characterized in that** it further comprises a grid bearing construction, which comprises a plurality of tie-rods and struts forming the grid, so sized and arranged as to support the fans and batteries, and forming an upper and lower longitudinal side; the grid bearing construction being vertically placed symmetrically between the two slanted batteries; the grid bearing construction bearing the fans on the upper longitudinal side thereof and the slanted batteries on the lower longitudinal side thereof.
2. Condenser or cooler according to claim 1, **characterized in that** each grid portion is adapted to be covered by a covering element to prevent air of a failed motor from recirculating through the other operating fan motors thereby reducing the power losses to a minimum.
3. Condenser or cooler according to claim 1, **characterized in that** each fan motor grid portion is adapted for assembling thereon plastics material panels to separate individual air flows from one another.

Patentansprüche

1. Kondensator oder Kühler, welcher zwei schräge Batterien in einer V-Konfiguration und zwei Gebläseriesihen umfasst, **dadurch gekennzeichnet, dass** er ferner eine Gitter-Trägerkonstruktion umfasst, welche mehrere Spannanker und Streben umfasst, wel-

che das Gitter bilden und eine solche Größe aufweisen und so angeordnet sind, dass sie die Gebläse und Batterien tragen, und eine obere und untere Längsseite bilden; wobei die Gitter-Trägerkonstruktion vertikal symmetrisch zwischen den beiden schrägen Batterien angeordnet ist; wobei die Gitter-Trägerkonstruktion die Gebläse auf ihrer oberen Längsseite und die schrägen Batterien auf ihrer unteren Längsseite trägt.

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2. Kondensator oder Kühler nach Anspruch 1, **dadurch gekennzeichnet, dass** jeder Gitterabschnitt dafür geeignet ist, von einem Deckelement bedeckt zu werden, um zu verhindern, dass Luft eines fehlerhaften Motors durch die anderen arbeitenden Gebläsemotoren zurück zirkuliert, wodurch die Leistungsverluste auf ein Mindestmaß verringert werden.
3. Kondensator oder Kühler nach Anspruch 1, **dadurch gekennzeichnet, dass** jeder Gebläsemotor-Gitterabschnitt dafür geeignet ist, darauf Kunststoffmaterialplatten zu montieren, um einzelne Luftströme voneinander zu trennen.

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Revendications

1. Condenseur ou refroidisseur comprenant deux batteries inclinées en une configuration en V et deux rangées de ventilateurs, **caractérisé en ce qu'il** comprend en outre une construction de revêtement de grille, qui comprend une pluralité de tirants et de traverses formant la grille, ayant une taille telle, et étant agencée de telle manière qu'elle supporte les ventilateurs et les batteries, et formant un côté longitudinal supérieur et inférieur ; la construction de revêtement de grille étant placée verticalement de manière symétrique entre les deux batteries inclinées ; la construction de revêtement de grille portant les ventilateurs sur le côté longitudinal supérieur de celle-ci et les batteries inclinées sur le côté longitudinal inférieur de celle-ci.
2. Condenseur ou refroidisseur selon la revendication 1, **caractérisé en ce que** chaque portion de grille est conçue pour être recouverte d'un élément de couverture afin d'empêcher l'air d'un moteur en panne de recirculer à travers les autres moteurs de ventilateur en fonctionnement, ce qui réduit ainsi les pertes de puissance à un minimum.
3. Condenseur ou refroidisseur selon la revendication 1, **caractérisé en ce que** chaque portion de grille de moteur de ventilateur est conçue pour assembler sur celle-ci des panneaux de matière plastique pour séparer des flux d'air individuels l'un de l'autre.

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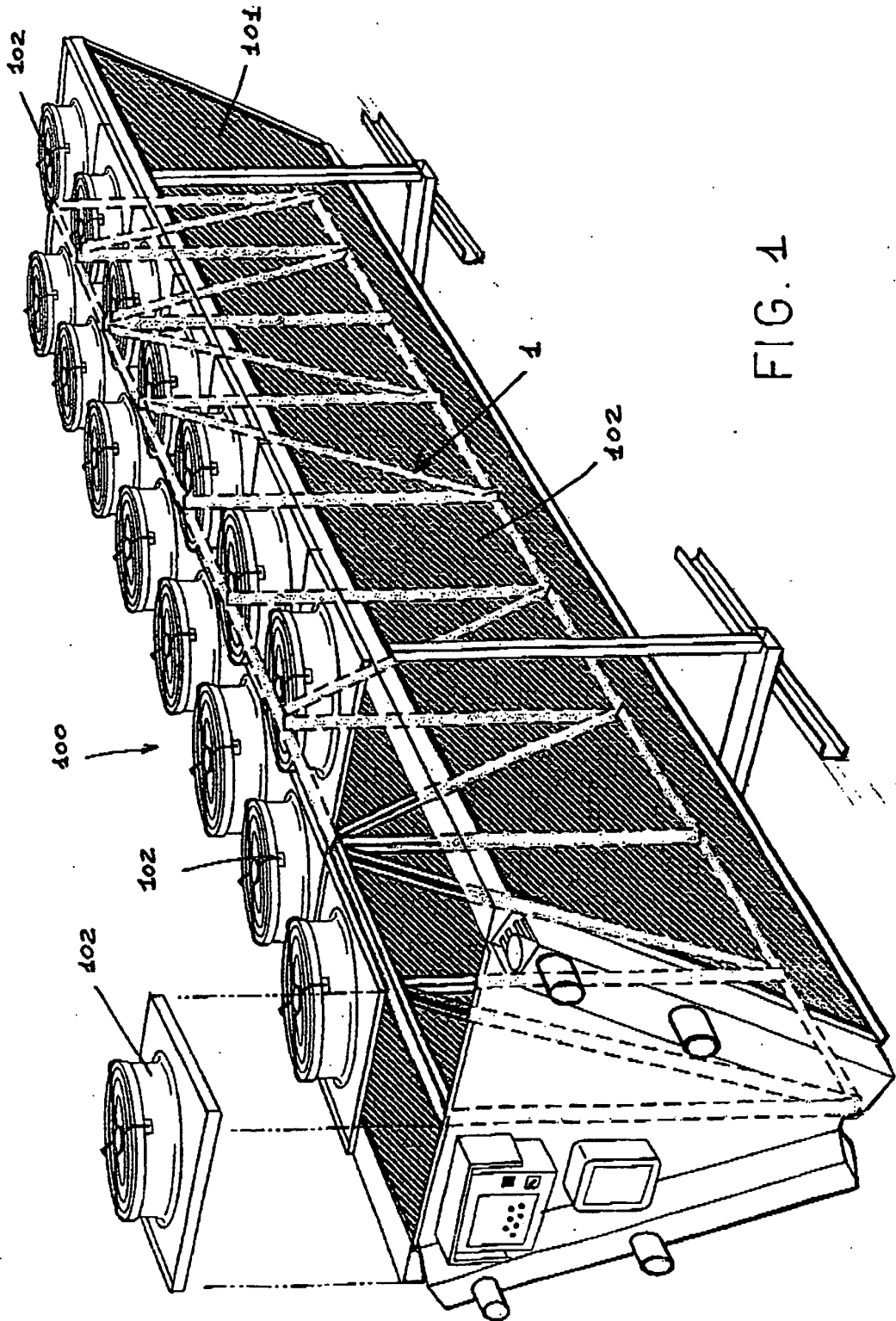


FIG. 1

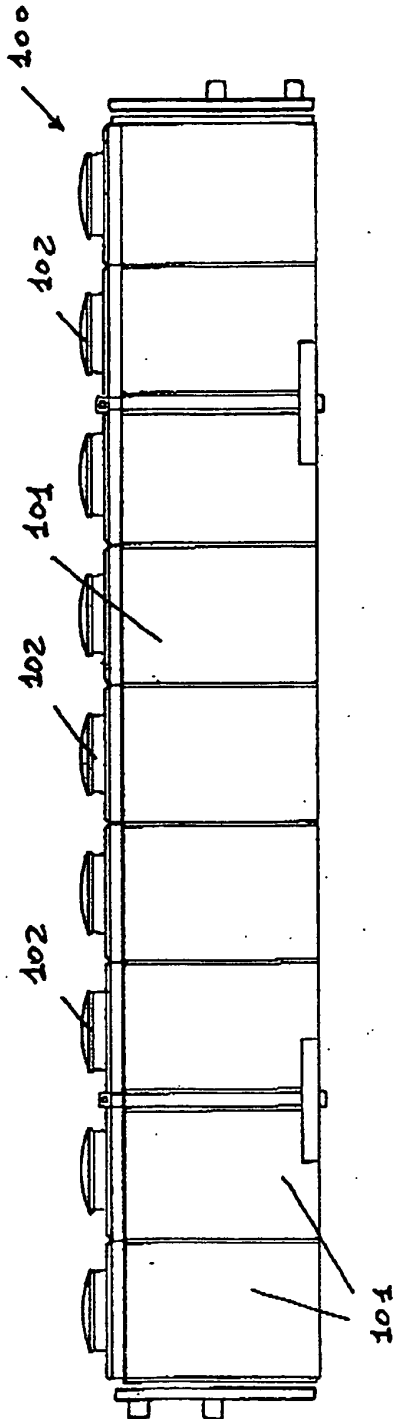


FIG 2

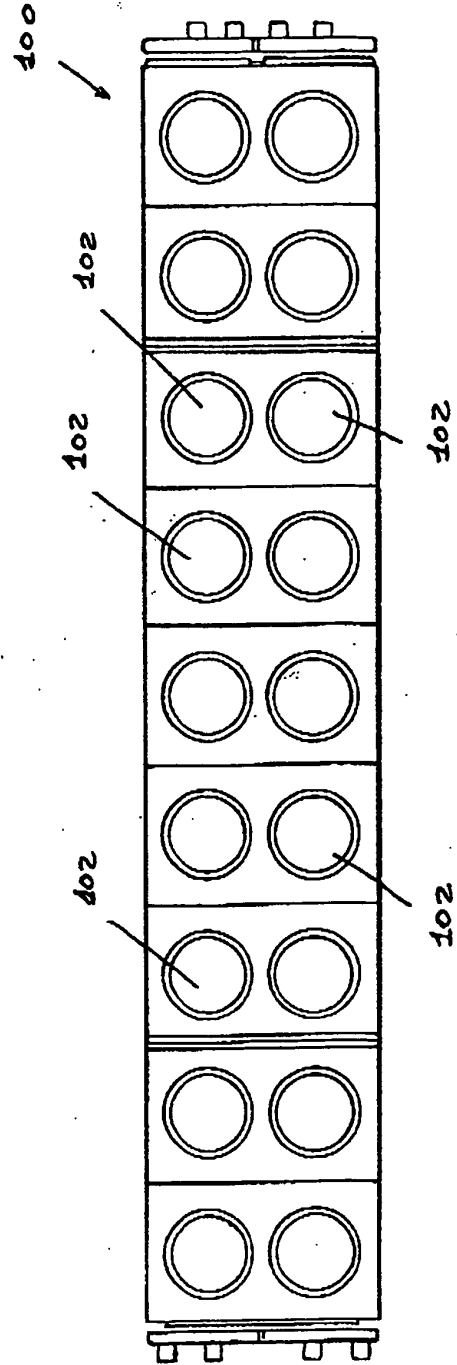


FIG 3

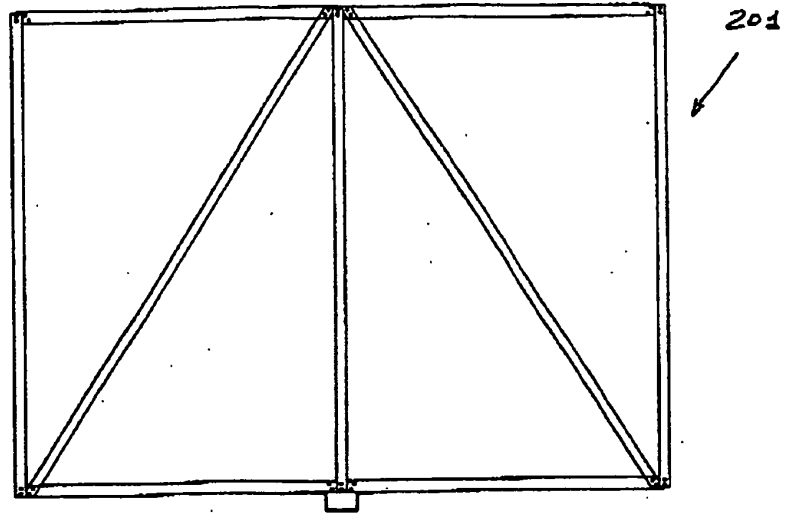


FIG 4

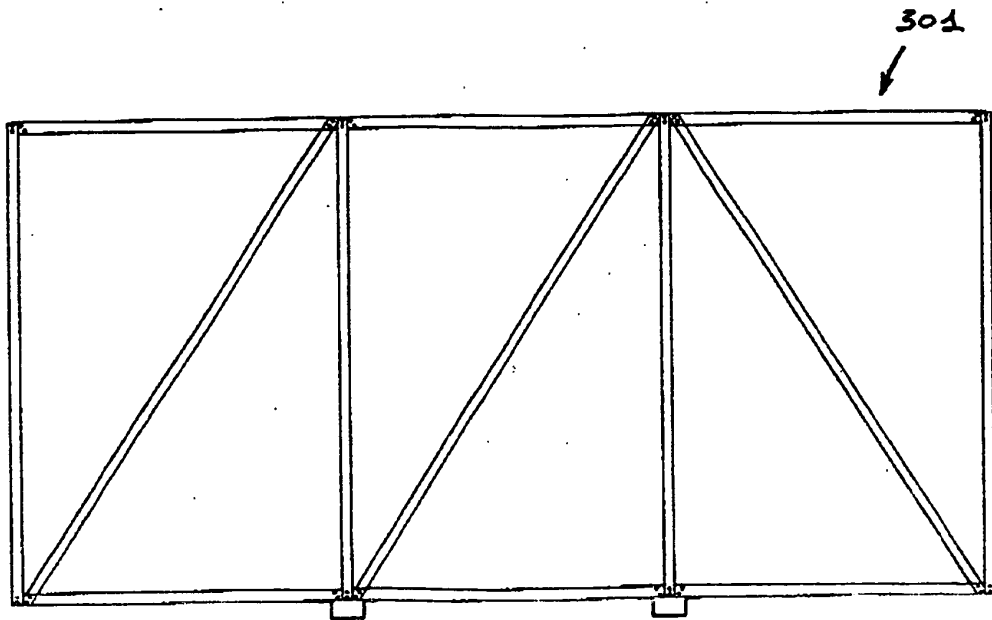


FIG 5

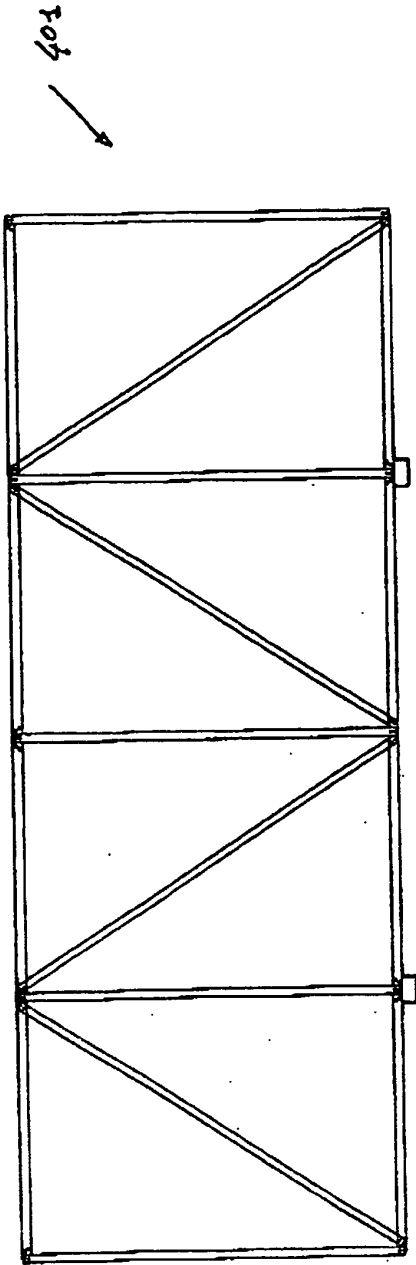


FIG. 6

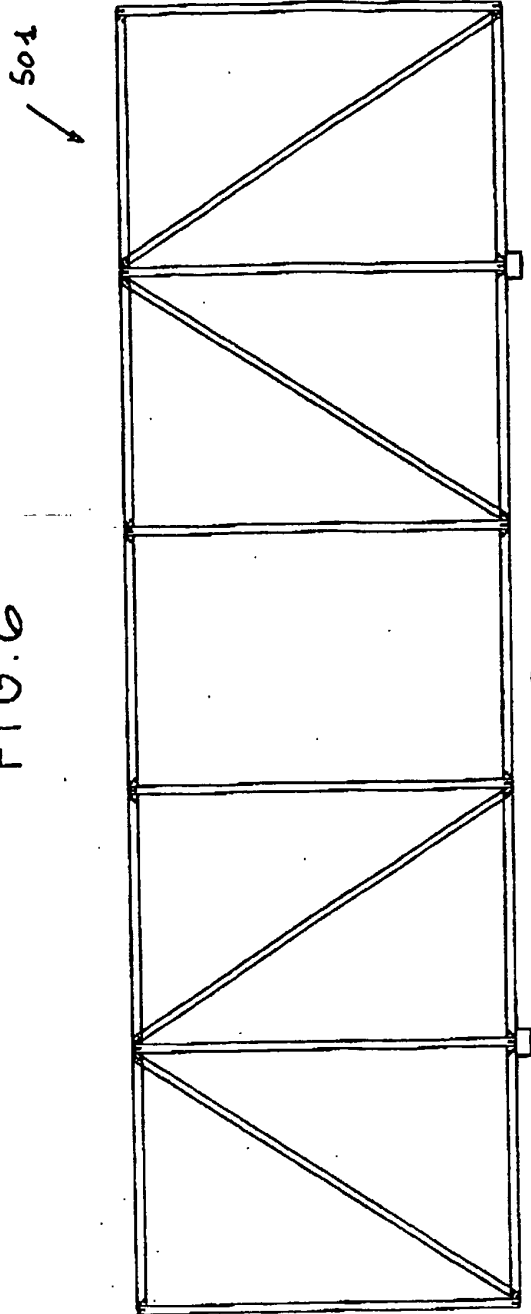


FIG. 7

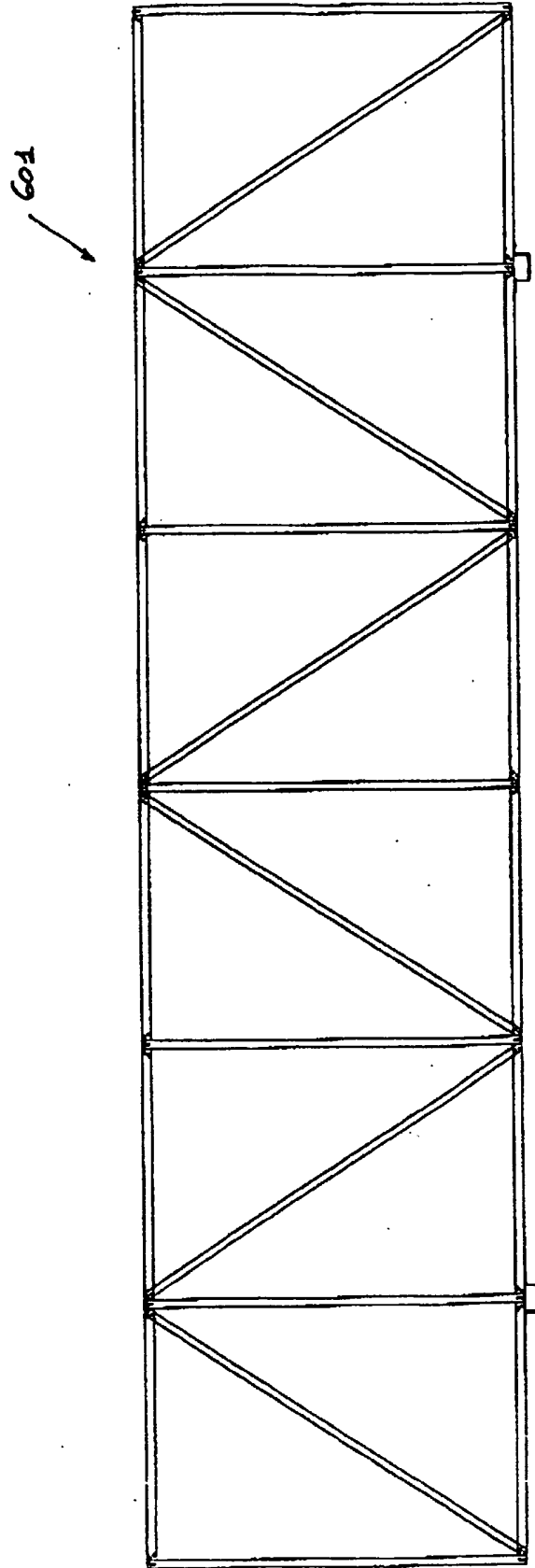


FIG. 8

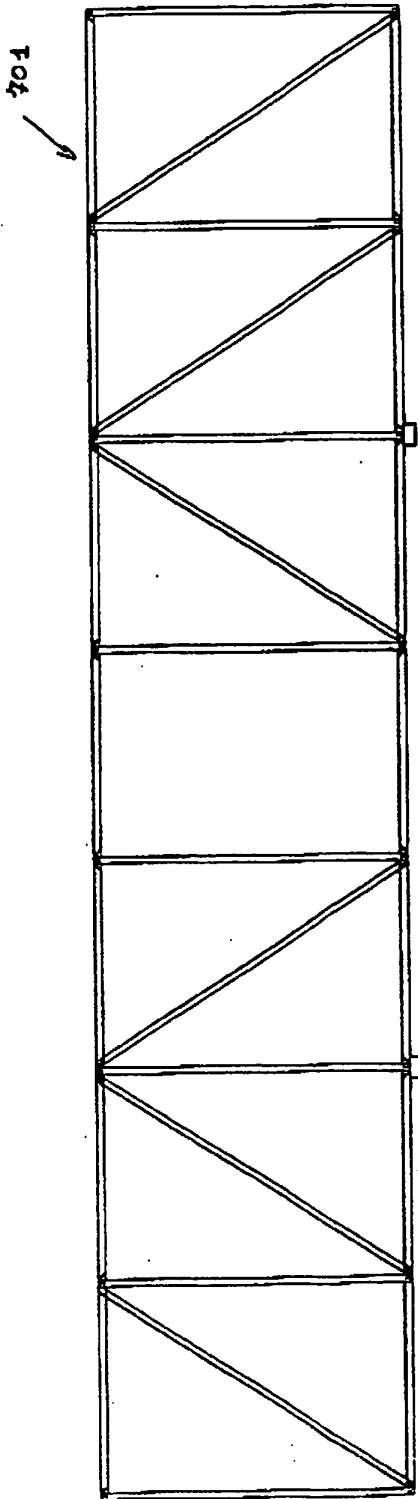


FIG. 9

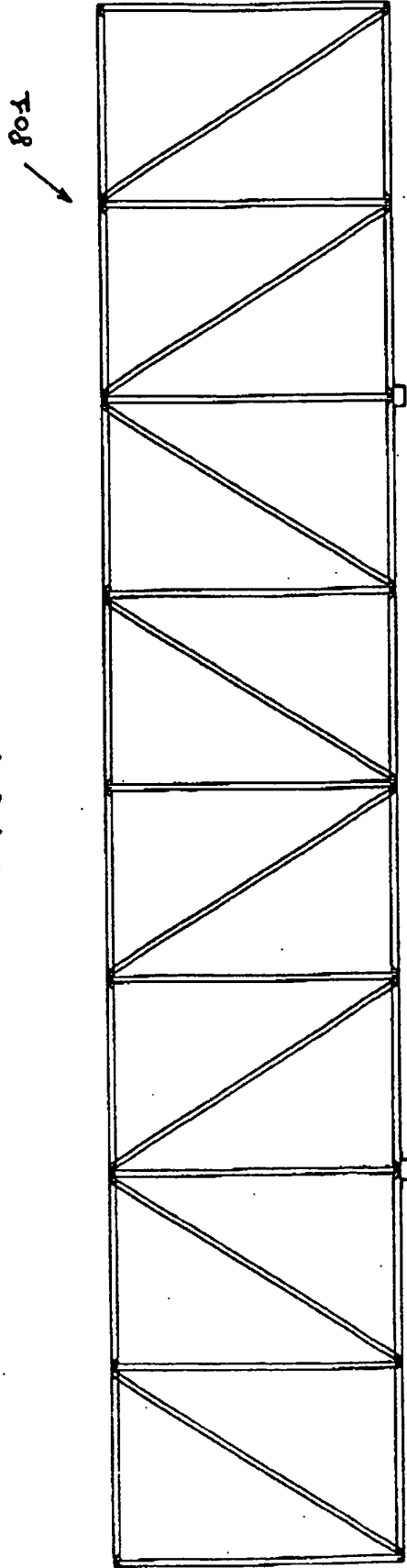


FIG. 10

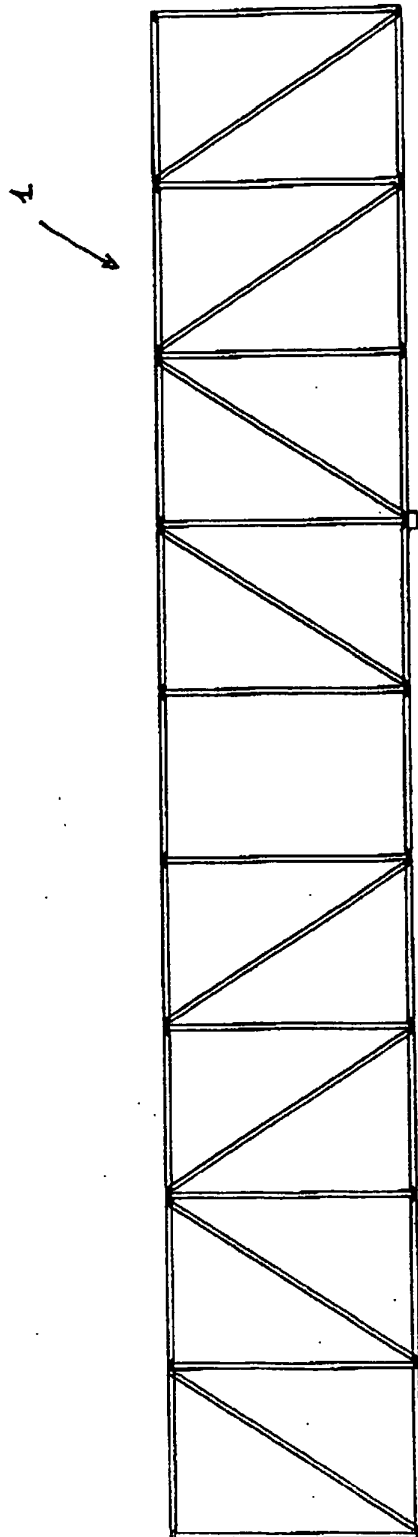


FIG. 11

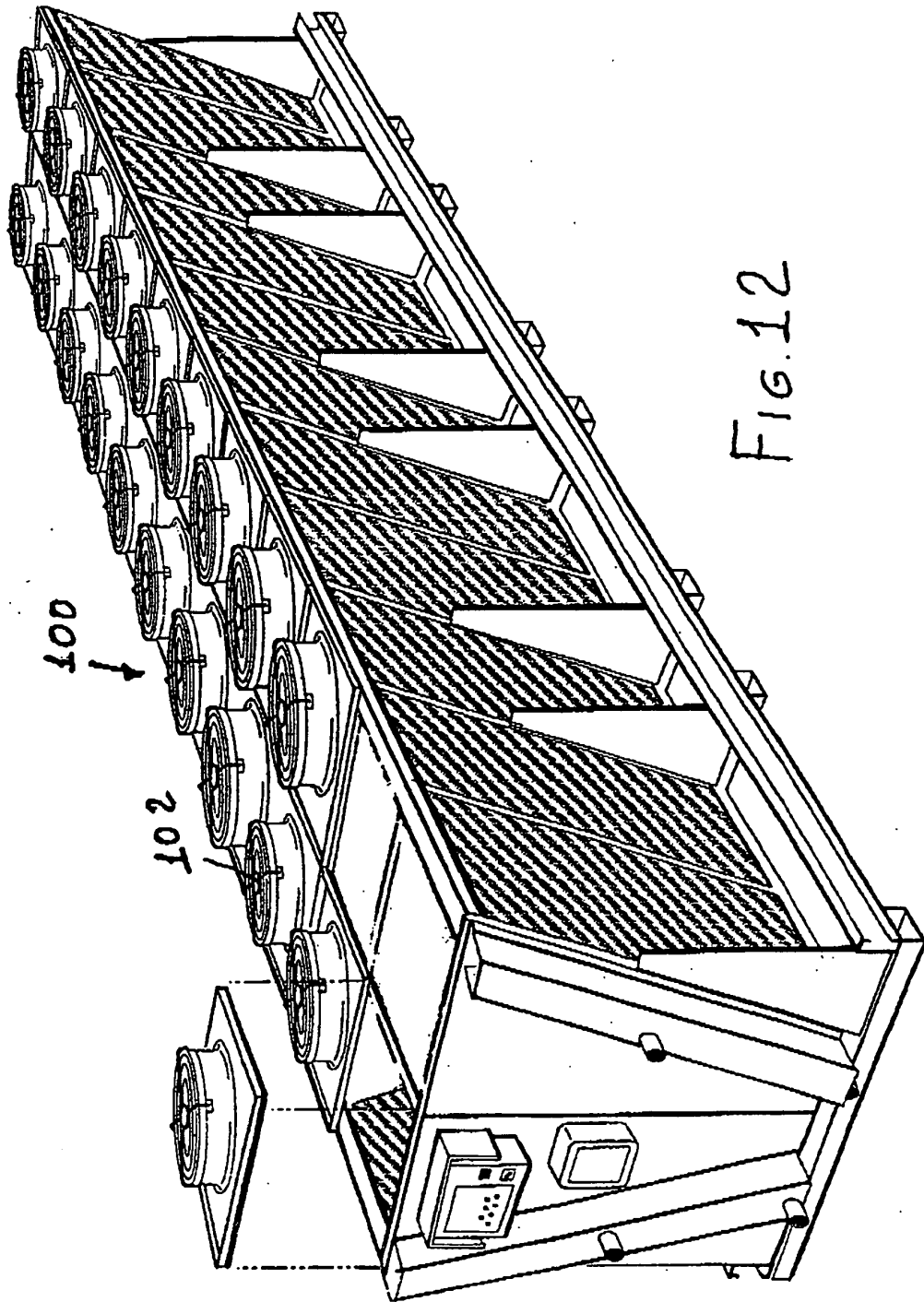


FIG.12

REFERENCES CITED IN THE DESCRIPTION

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