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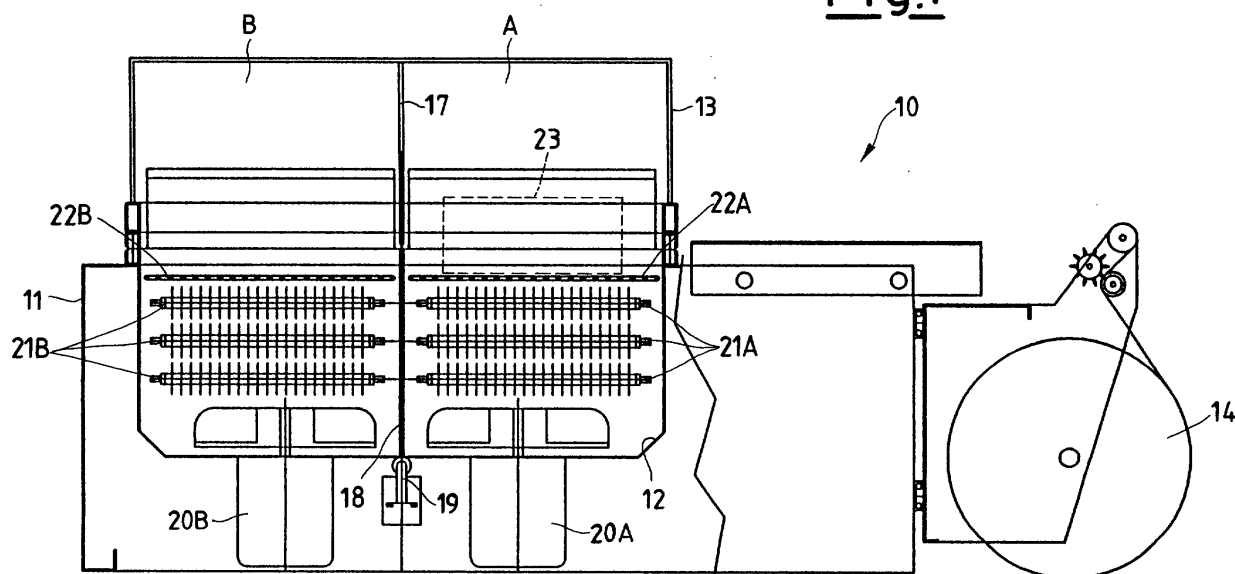
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(54) **Energy-saving machine for packaging products with heat-shrinking film**

(57) An energy-saving machine for packaging products with heat-shrinking film comprises a structure (11) consisting of a cover or dome (13), or upper part of the machine, which is arranged on a tank (12), or lower part, to define a chamber (15, A, B), said chamber being equipped with at least one heat source (21A, 21B), one fan (20, 20A, 20B) for circulating the air heated by said

heat source and one transportation and support group (22, 22A, 22B) of a product (23) to be packaged, moreover being foreseen means for cutting and heat-sealing said film. According to the invention said machine foresees a dividing wall (17, 18) arranged in said dome (13) and/or said tank (12) to define at least two separate zones (A, B) which can be used together or separately.

Fig.1



Description

[0001] The present invention refers to an energy-saving machine for packaging products with heat-shrinking film.

[0002] Up to now, packaging machines of the traditional type are sized and structured so as to be able to wrap products of varying sizes with heat-shrinking film. In such a way the investment costs are cut and with a single machine it is possible to advantageously treat the various products in their different sizes.

[0003] It is clear that these machines must be of a sufficient size and capability both for ventilation and heating so as to completely fill the size of the tank and of the dome of the machine.

[0004] It can immediately be understood that to be able to carry out such a function the aforementioned machines have respective constant volumes and energy consumption both in the case where one needs to wrap a small product and where one needs to wrap a large one with a clear waste of energy and space.

[0005] Consequently packaging times are also reasonably predetermined and long and the energy consumption is substantial, even for packaging small products.

[0006] The general purpose of the present invention is that of overcoming the aforementioned drawbacks of the prior art in an extremely simple, cost-effective and particularly functional manner.

[0007] Another purpose is that of being able to limit as desired the consumption still with the ability of the machine being unchanged according to the variation of the requirements.

[0008] Yet another purpose is that of being able to also limit the treatment times both according to the material and according to the size of the product being packaged.

[0009] In view of the aforementioned purposes, according to the present invention, it has been thought of to realise an energy-saving machine for packaging products with a heat-shrinking film, having the characteristics laid out in the attached claims.

[0010] The structural and functional characteristics of the present invention and its advantages compared to the prior art shall become clearer from an examination of the following description, referring to the attached drawings, which show various embodiments of an energy-saving machine for packaging products with a heat-shrinking film according to the inventive principles of the invention itself.

[0011] In the drawings:

- figure 1 is a side section view which longitudinally shows a first embodiment of the packaging machine of the present invention;
- figure 2 is a transversal section view rotated by 90° with respect to the previous view of figure 1;
- figure 3 is a plan view from above of the machine

of figure 1;

- figure 4 is a side section view which longitudinally shows a second embodiment of the packaging machine of the present invention;
- figure 5 is a plan view from above of the machine of figure 4;
- figure 6 is a side section view which longitudinally shows a third embodiment of the packaging machine of the present invention;
- figure 7 is a plan view from above of the machine of figure 6.

[0012] With reference to the drawings in general, various embodiments of energy-saving machines for packaging products with heat-shrinking film according to the invention are shown.

[0013] Figures 1-3 show a first embodiment in which a machine according to the present invention is wholly indicated with 10, and in the illustrated example it comprises a structure 11 upon which a reel of heat-shrinking film 14 is lodged.

[0014] The structure of the machine for packaging products with heat-shrinking film is not described in detail here since it is in se well known; here we only refer to the functional elements which are useful for the interpretation and the actuation of the invention.

[0015] A cover or dome 13 constitutes the upper part of the machine 10 which is arranged on a tank or lower part 12 to define a chamber, wholly indicated with 15 only in figure 2. This chamber, which is equipped with a heat source and with a fan for circulating the air which is heated by the aforementioned heat source, defines a single cutting, sealing and heat-shrinking space of the film used.

[0016] Integral with the dome and with the tank, means for cutting and heat-sealing the film, such as blades, are foreseen and the chamber 15 can be closed through the dome 13 which is hinged at 16 along one side thereof.

[0017] Inside the aforementioned chamber a composite dividing wall is arranged formed from an upper portion 17, integral with the dome 13, and a lower portion 18, inserted into the tank 12.

[0018] In this way, both the dome 13 and the tank 12 define two separate zones A and B which can be used together or separately thanks to an external control (not shown).

[0019] Each zone A and B then foresees a transportation and support group 22A and 22B for a product schematised at 23.

[0020] Indeed, each zone A and B foresees an air circulation fan 20A and 20B and relative heat sources, such as two groups of resistors 21A and 21B.

[0021] Both the fans 20A, 20B and the groups of resistors 21A, 21B can be selectively activated so that it is possible to only make those of zone A (fan 20A and resistors 21A) function in the presence of small products 23, supplied one after the other only in that zone.

[0022] The possible activation of both of the fans 20A, 20B and of both of the groups of resistors 21A, 21B is allowed by the permission given by a sensor 19, present on the base of the tank 12 which indicates the presence of the lower portion 18 of the dividing wall.

[0023] If the upper portion 17 and lower portion 18 of the dividing wall are removable, a single chamber can be defined for the treatment of large products, not shown. In such a case there will be the activation of the two fans 20A and 20B and of the two groups of resistors 21A and 21B since the sensor 19 indicates the absence of the lower portion 18 of the dividing wall.

[0024] Figures 4 and 5 show a second embodiment wherein the dome 13 and the tank 12 are equipped with mobile portions of the dividing wall.

[0025] However, it can be hypothesised that in a first possible embodiment only the upper portion 17 of the dividing wall be mobile. The use of an upper portion or mobile partition 17 transversally divides the dome. This upper portion or mobile partition 17 can be guided by a group of two guides 24 (only one of which is shown) inside which they are capable of sliding with or without spherical pins 25 bound to the upper portion 17 of the dividing wall. There can be a handle or another means which allows the operator to regulate its position with respect to the tank 12. In this way the dome 13 is partialised, but in the tank 12 there must be at least one fan 20 and relative resistor groups 21A and 21B.

[0026] In figures 4 and 5, in the use of mobile partitions as described above, it should be noted how this can also transversally divide the tank 12 of the machine. This dividing wall 17, 18 constituting a partition can in this case form a single body with a lower plate 26 carrying the motor of the fan 20, capable of sliding on a base portion 12a of the tank 12. Such a lower plate 26 is, for example, guided by suitable guides, with or without balls, arranged in the lower part of the body of the machine, in such a way that, moving the dividing wall 17, 18, the fan with the relative motor 20 also moves so that they are always arranged in the closest position to the centre of the area created by the dividing wall and by the rest of the tank 12 and of the dome 13.

[0027] Moreover, to collaborate with the mobile lower portion 18 of the dividing wall sensors or microswitches 19A and 19B are foreseen which selectively activate the two groups of resistors 21A and 21B arranged in the tank 12.

[0028] Alternatively, with simply the lower portion 18 mobile, two distinct groups of fans 20A and 20B can be used connected to two relative groups of resistors 21A and 21B. In this case, with suitable electrical connections controlled through a microswitch and/or proximity sensor, the second fan 20B shall only be activated when the area of use shall be such as to have to use the air vortex created by this to obtain a better yield.

[0029] As stated previously, the lower portion 18 supports and/or can support a support grill or transportation and support group 22 of a product schematised at 23,

which also adapts to the varying useful size of the operating zone inside the machine. Regarding which, from the opposite side such a grill 22 enters into a suitable slit 27 behind which is arranged a support system, such as a roller 28, which also eases its ability to slide when the lower portion 18 of the dividing wall is moved.

[0030] The activation of these upper 17 and/or lower 18 partition portions therefore determines the activation of the heating resistors 21A and 21B which are of a number and power such as to correspond with the volume requirement of the dome 13 and of the tank 12 determined by the position of the portions of dividing wall 17 and 18.

[0031] Such resistors which constitute the heating group (heat lung), instead of being in a single body like in traditional machines, is divided into two parts separated longitudinally each containing two, three or more resistors of an appropriate power which in total, however, does not differ much from the maximum used on traditional "dome" machines of an equal maximum format.

[0032] The group of resistors 21A arranged towards the right shall always be heating up (when the machine is set up for shrinking) whereas the group arranged on the left shall be activated two resistors 21B at a time, when the portions 17, 18 of dividing wall divide the total volume of the machine by about 2/3. On the other hand, when this ratio is exceeded the third resistor 21B is also made to heat up to have an optimal shrinking.

[0033] Figures 6 and 7 show yet another embodiment of the invention wherein the machine for packaging products with heat-shrinking film foresees an even greater saving of energy.

[0034] Indeed, this machine realises both a regulation of the chamber and the operating elements connected to it and a regulation of the support grill or of the transportation and support group of the product or products to be packaged.

[0035] Indeed, a dividing wall 17, 18 is foreseen which can be moved according to predetermined discrete positions in the machine in correspondence with arrangements indicated with X, Y, Z, etc. The wall 17, 18, moving in correspondence with the aforementioned arrangements X, Y, Z etc., defines a chamber of a greater size which can adapt to the size of the product to be packaged. Should the height or thickness of such a product be large, it is, moreover, also possible to vary the arrangement of the support grill 22 according to variable height arrangements S, T, V, W, etc.

[0036] Obviously, like for the previous embodiment, at least one fan 20 and relative resistor groups 21A and 21B are foreseen, capable of being activated through sensors or microswitches 19A, 19B which selectively control the two groups of resistors 21A and 21B arranged in the tank 12.

[0037] It is clear that in this way the so-called "dome" machine becomes modular both regarding the adaptation of the working volume of the machine itself to the actual size of the product and regarding the amount of

energy used. These special characteristics give various advantages and especially: a reduction in the cycle time and a reduction in energy consumption.

[0038] From that which has been described above with reference to the figures, it can clearly be seen how an energy-saving machine for packaging products with a heat-shrinking film according to the invention is particularly useful and advantageous.

[0039] The purpose mentioned in the preamble of the description is thus achieved.

[0040] Of course, the shape of the machine of the invention can be different from that shown as a non-limiting example in the drawings, just as the materials can also be different.

[0041] The scope of protection of the present invention is therefore defined by the attached claims.

Claims

1. Energy-saving machine for packaging products with heat-shrinking film comprising a structure (11) consisting of a cover or dome (13), or upper part of the machine, which is arranged on a tank (12), or lower part, to define a chamber (15, A, B), said chamber being equipped with at least one heat source (21A, 21B), one fan (20, 20A, 20B) for circulating the air heated by said heat source and one transportation and support group (22, 22A, 22B) of a product (23) to be packaged, moreover being foreseen means for cutting and heat-sealing said film, **characterised in that** it foresees a dividing wall (17, 18) arranged in said dome (13) and/or said tank (12) to define at least two separate zones (A, B) which can be used together or separately.
2. Packaging machine according to claim 1, **characterised in that** said dividing wall (17) is arranged fixed in said dome (13).
3. Packaging machine according to claim 1 or 2, **characterised in that** said dividing wall (18) is arranged fixed in said tank (12).
4. Packaging machine according to claim 1, **characterised in that** said dividing wall (17, 18) is arranged capable of moving in said chamber (15, A, B) on sliding guides (24, 25; 26, 12a).
5. Packaging machine according to claim 4, **characterised in that** integral with said dividing wall (17, 18) there is a plate (26) carrying said fan (20), being foreseen sensors or microswitches (19A, 19B), capable of being activated through the displacement of said dividing wall (17, 18), which selectively activate at least two groups of resistors (21A, 21B) arranged in said tank (12).
6. Packaging machine according to claim 4, **characterised in that** said transportation and support group (22) can be moved horizontally inside said chamber (15, A, B).
7. Packaging machine according to claim 1, **characterised in that** it foresees at least one pair of groups of resistors (21A, 21B) to constitute said heat source.
8. Packaging machine according to claim 7, **characterised in that** a first of said groups of resistors (21A), arranged in correspondence with an inlet opening of said machine, always heats up with the machine carrying out shrinking operations, whereas a second group (21B) is activated two resistors (21B) at a time, when said dividing wall (17, 18) divides the total volume of said chamber (15) by about 2/3 and also said third resistor (21B) is activated when said 2/3 ratio is exceeded.
9. Packaging machine according to claim 1, **characterised in that** said transportation and support group (22, 22A, 22B) can be moved vertically (at S, T, V, W) in said chamber (15, A, B).
10. Packaging machine according to claim 1, **characterised in that** an upper portion (17) of said dividing wall separates said dome (13) into two separate zones (A, B) which can be used together or separately thanks to an external control.

Fig.1

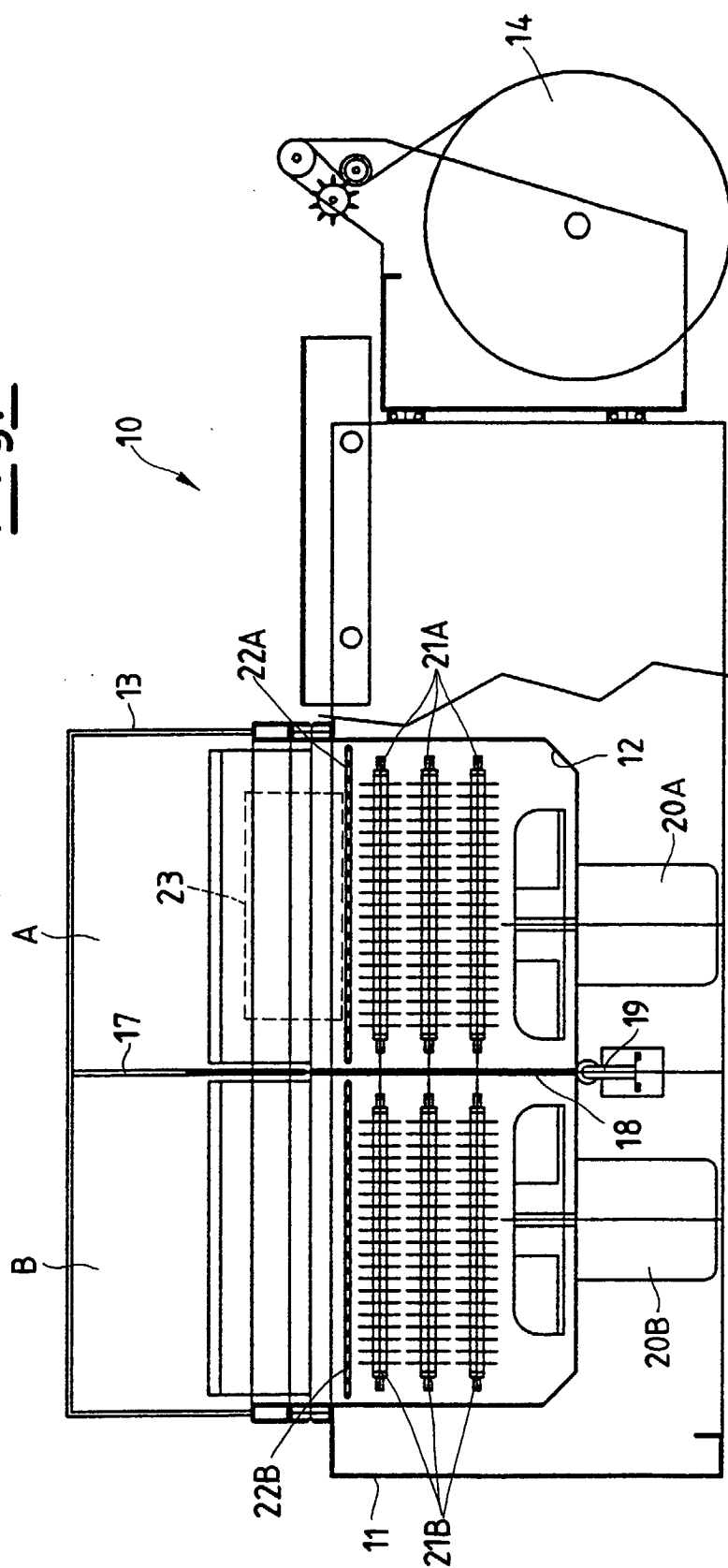


Fig.2

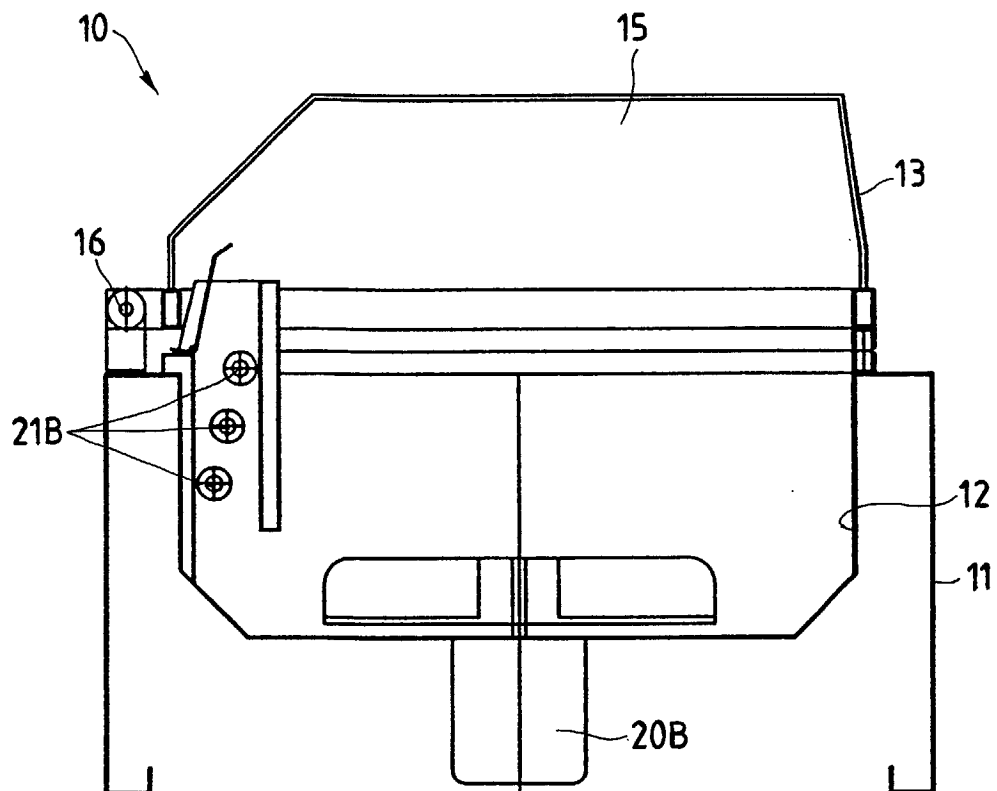


Fig. 3

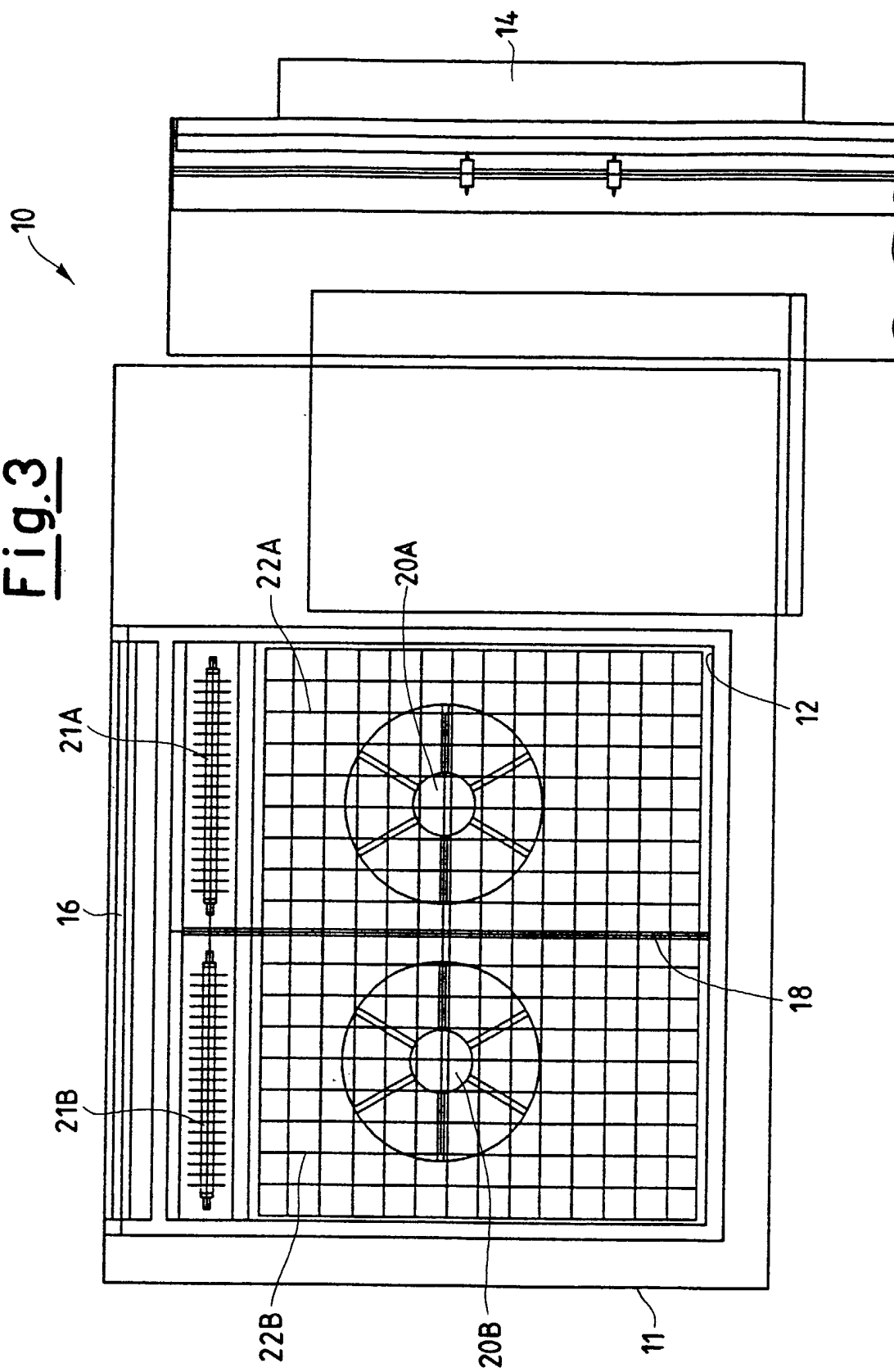
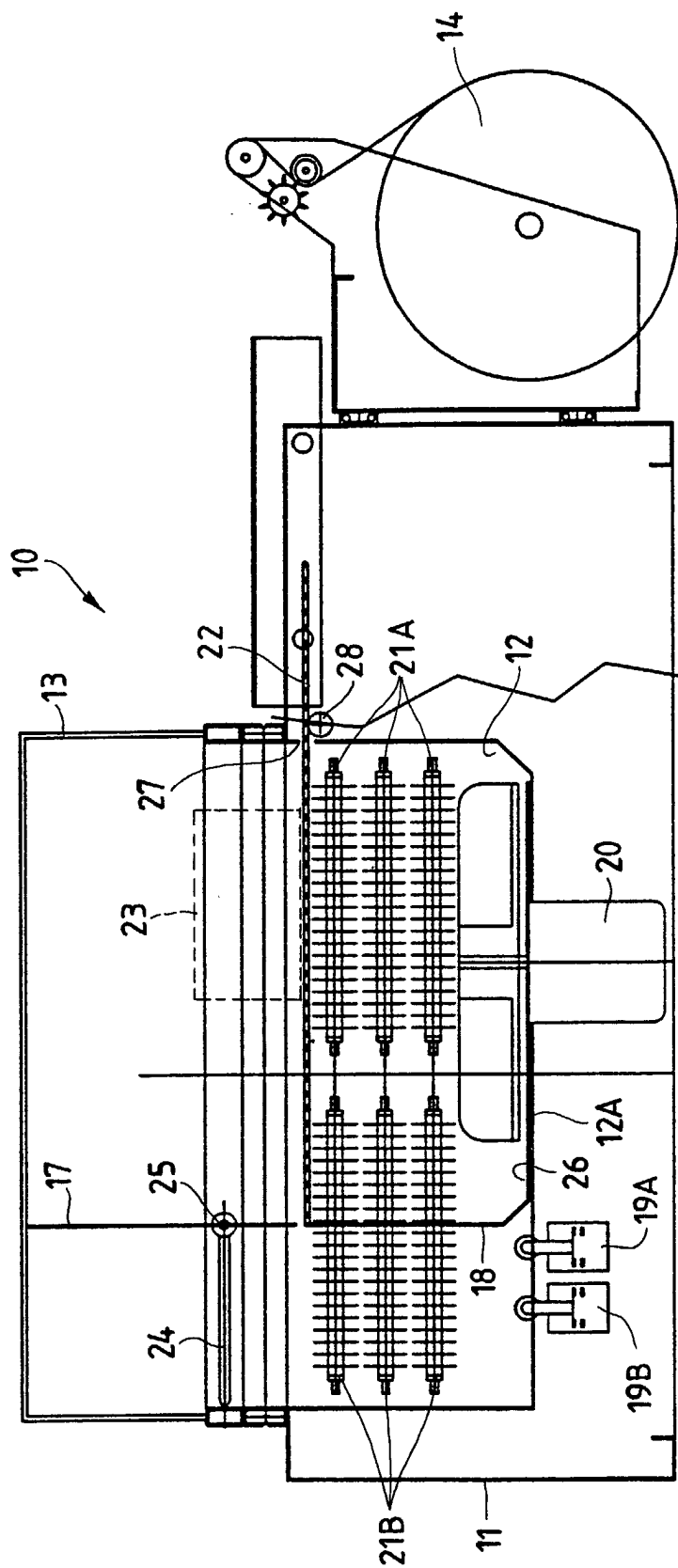


Fig.4



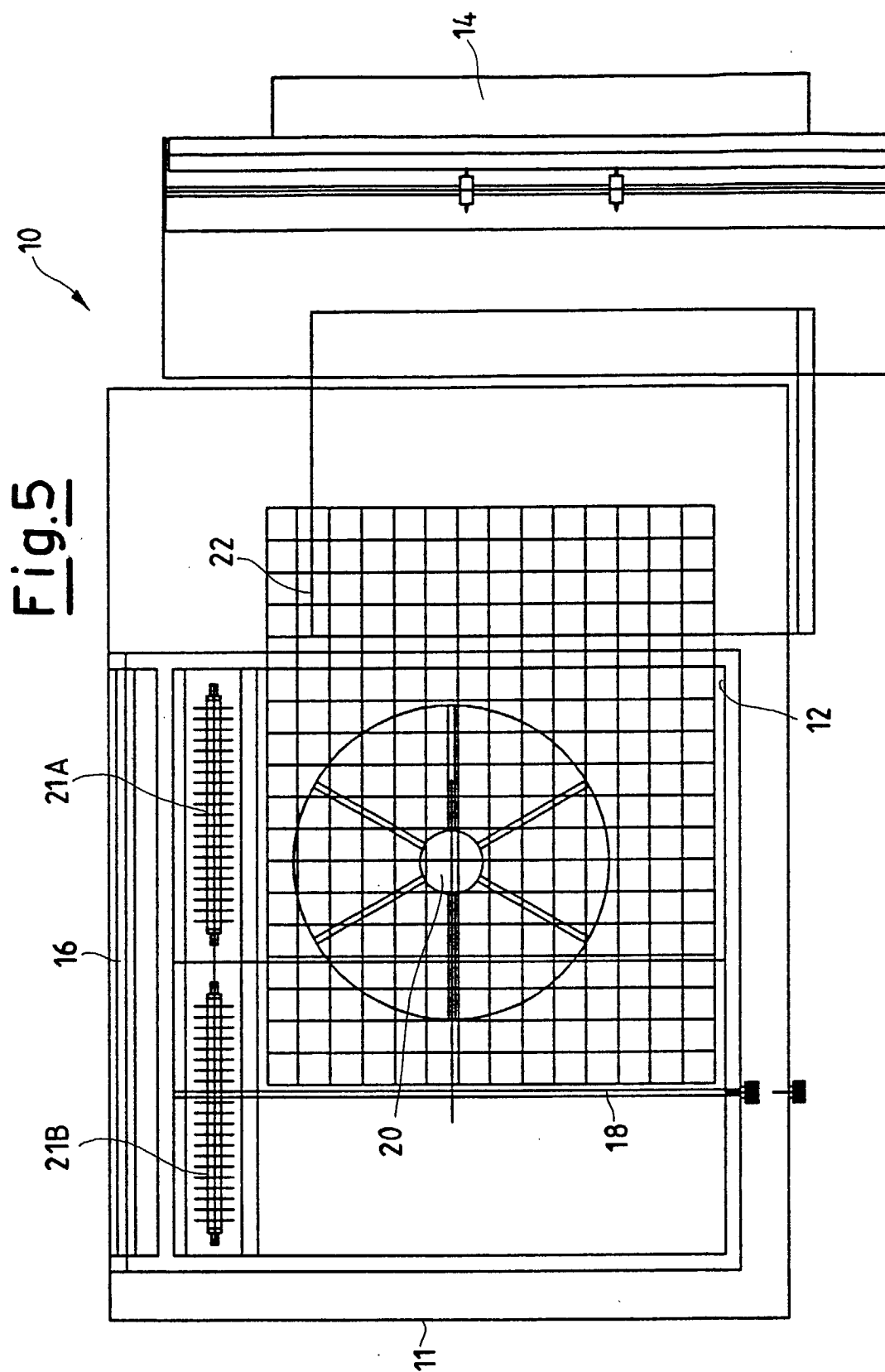


Fig. 6

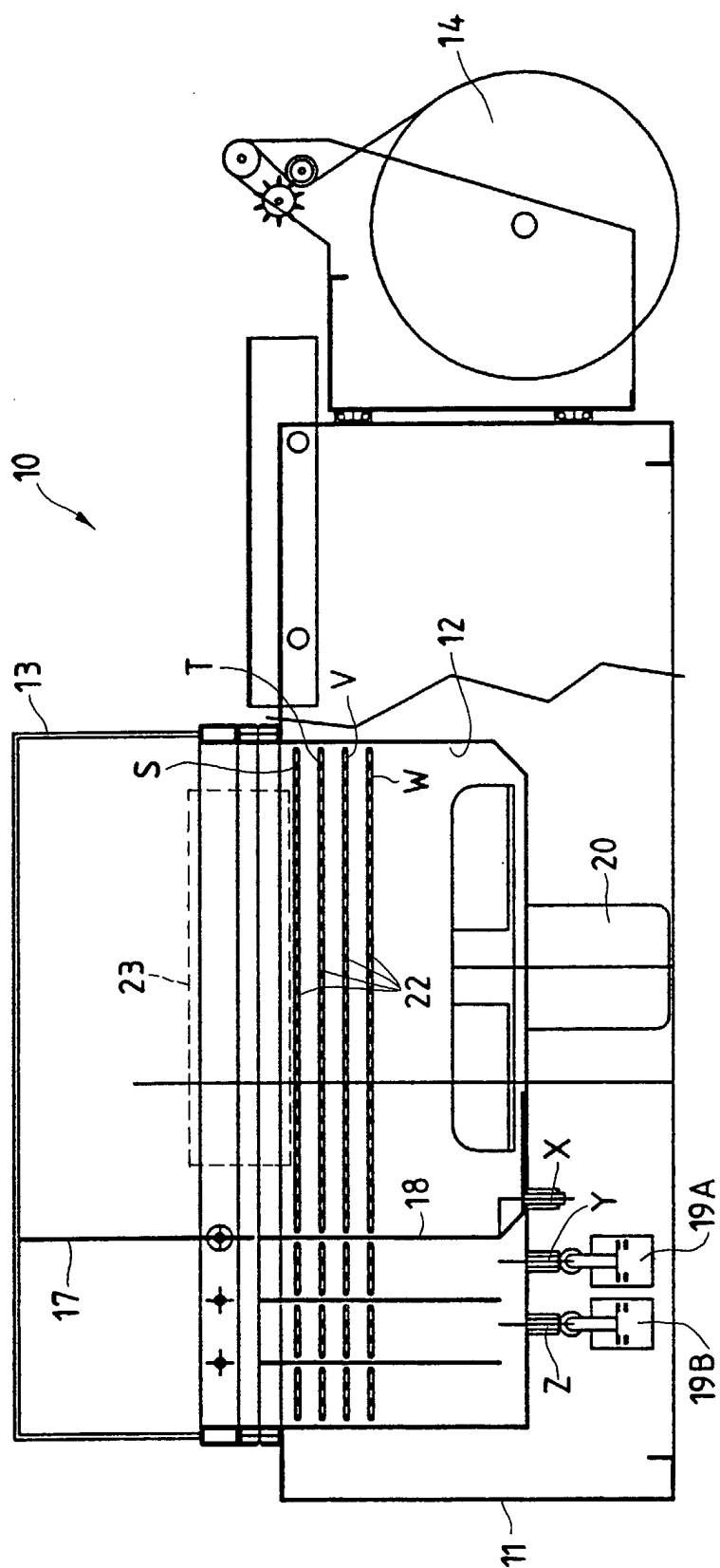
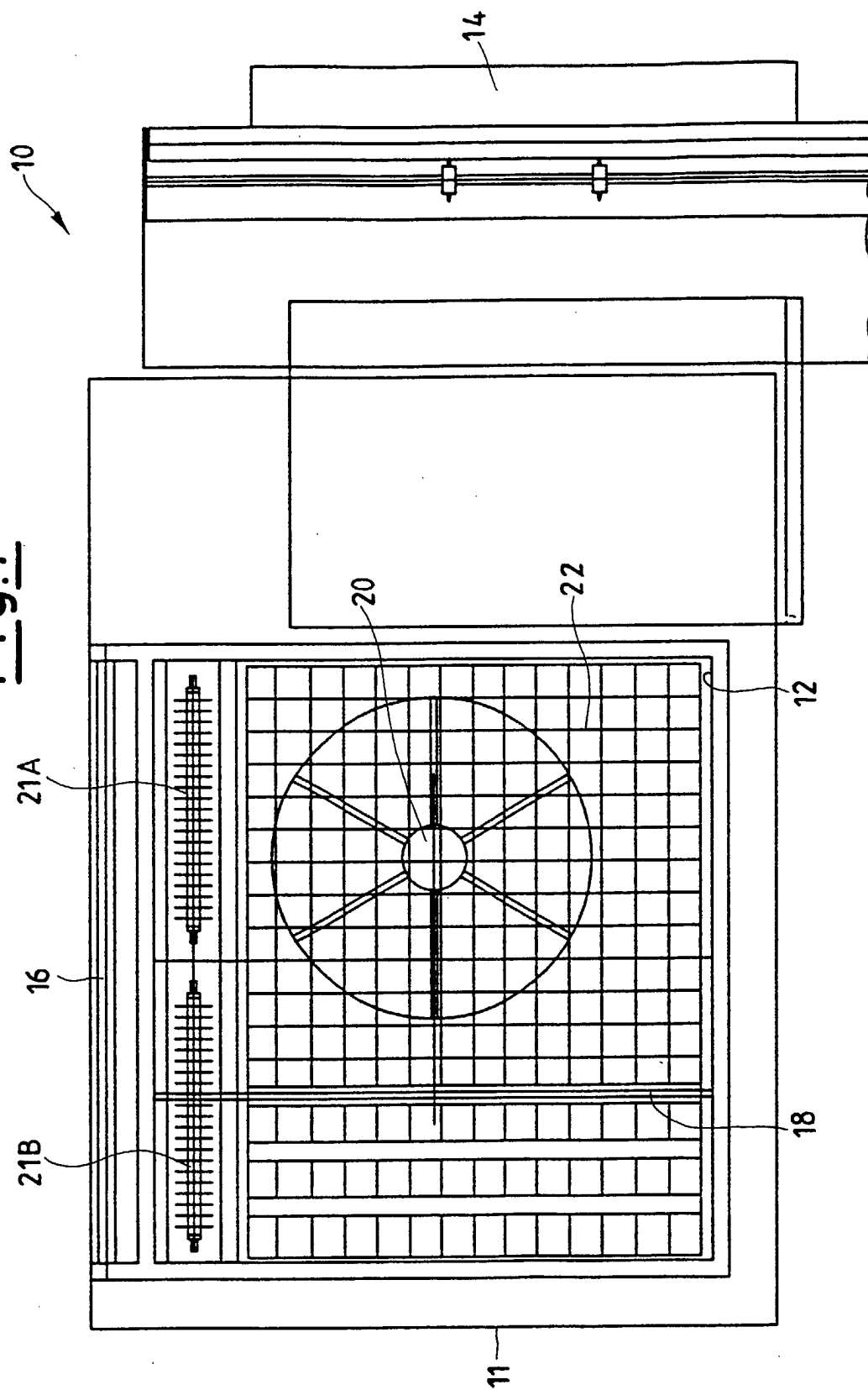


Fig.7





European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 02 07 5532

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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