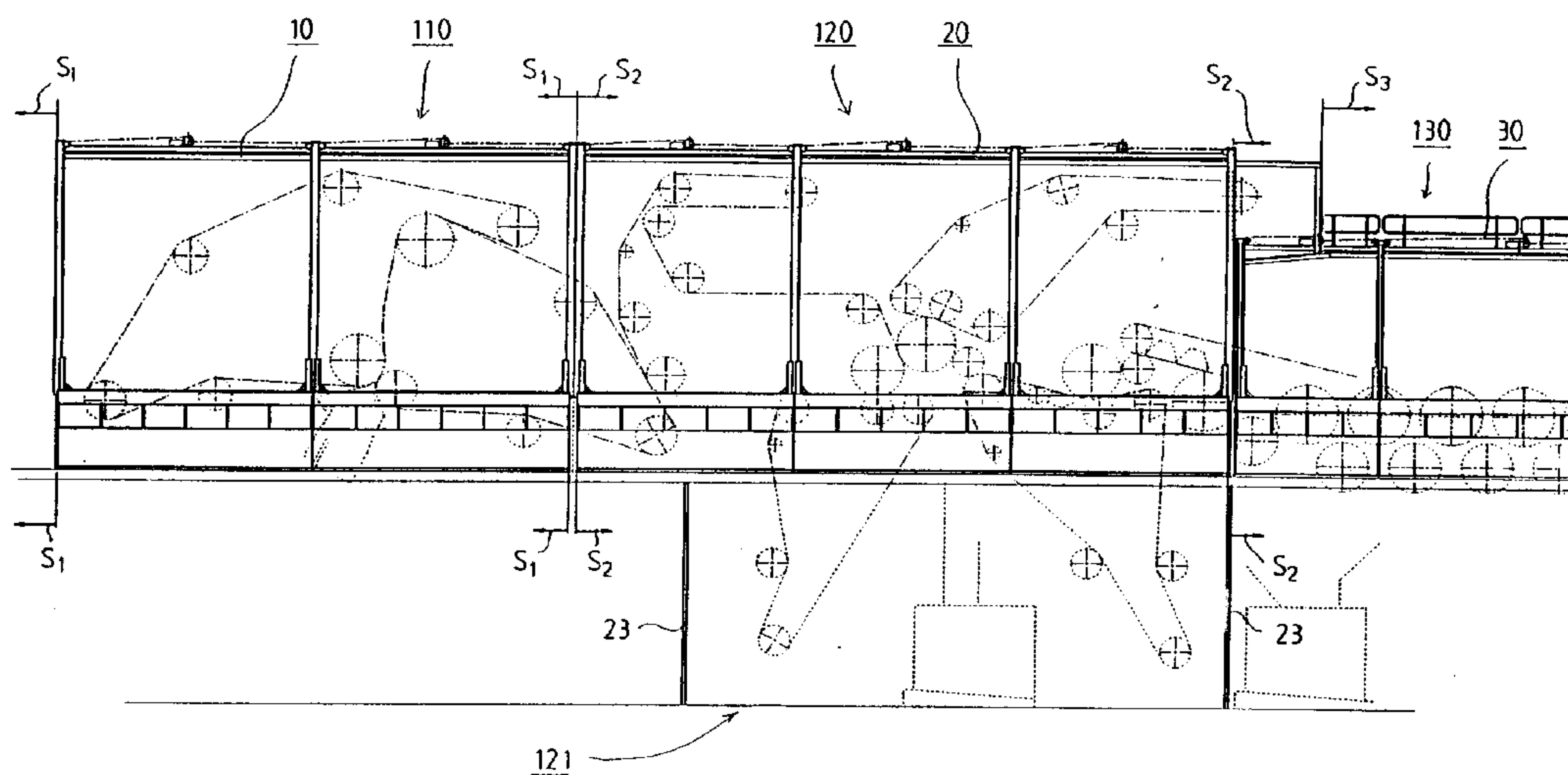




(11) (21) (C) **2,193,701**  
(86) 1996/04/17  
(87) 1996/10/31  
(45) 2000/01/04

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(51) Int.Cl.<sup>6</sup> D21F 1/00, D21F 5/00, D21F 3/00  
(30) 1995/04/27 (952017) FI  
(54) **CAPOT POUR SECTION CABLAGE ET UNE SECTION PRESSE**  
(54) **HOOD FOR A WIRE PART AND FOR A PRESS SECTION**



(57) L'invention concerne un capot pour une section câblage et/ou une section presse dans une machine à papier/carton, qui comprend des parois et un plafond (10, 20), l'ensemble formant un capot qui enferme la partie câblage et/ou la partie presse avec système de climatisation. Les parois (10, 20) ont une partie extérieure et une partie intérieure entre lesquelles se trouve une amenée d'air permettant de faire circuler de l'air frais à l'intérieur du capot vers une zone sensiblement médiane de la machine à papier, par l'intermédiaire de l'ouverture pratiquée dans la partie intérieure des parois. La circulation d'air frais a pour but

(57) The invention concerns a hood for a wire part and/or for a press section in a paper/board machine, comprising walls and a ceiling (10, 20), which form a closed hood around the wire part and/or the press section, air-conditioning being arranged in connection with the hood. The hood walls (10, 20) are composed of outer and inner walls, so that between them there is an air duct for passing a replacement air flow into the interior of the hood towards a substantial middle area of the paper machine through openings that have been made into the inner wall, the replacement air keeping the interior of the hood substantially dry and clean. The walls (10, 20) of





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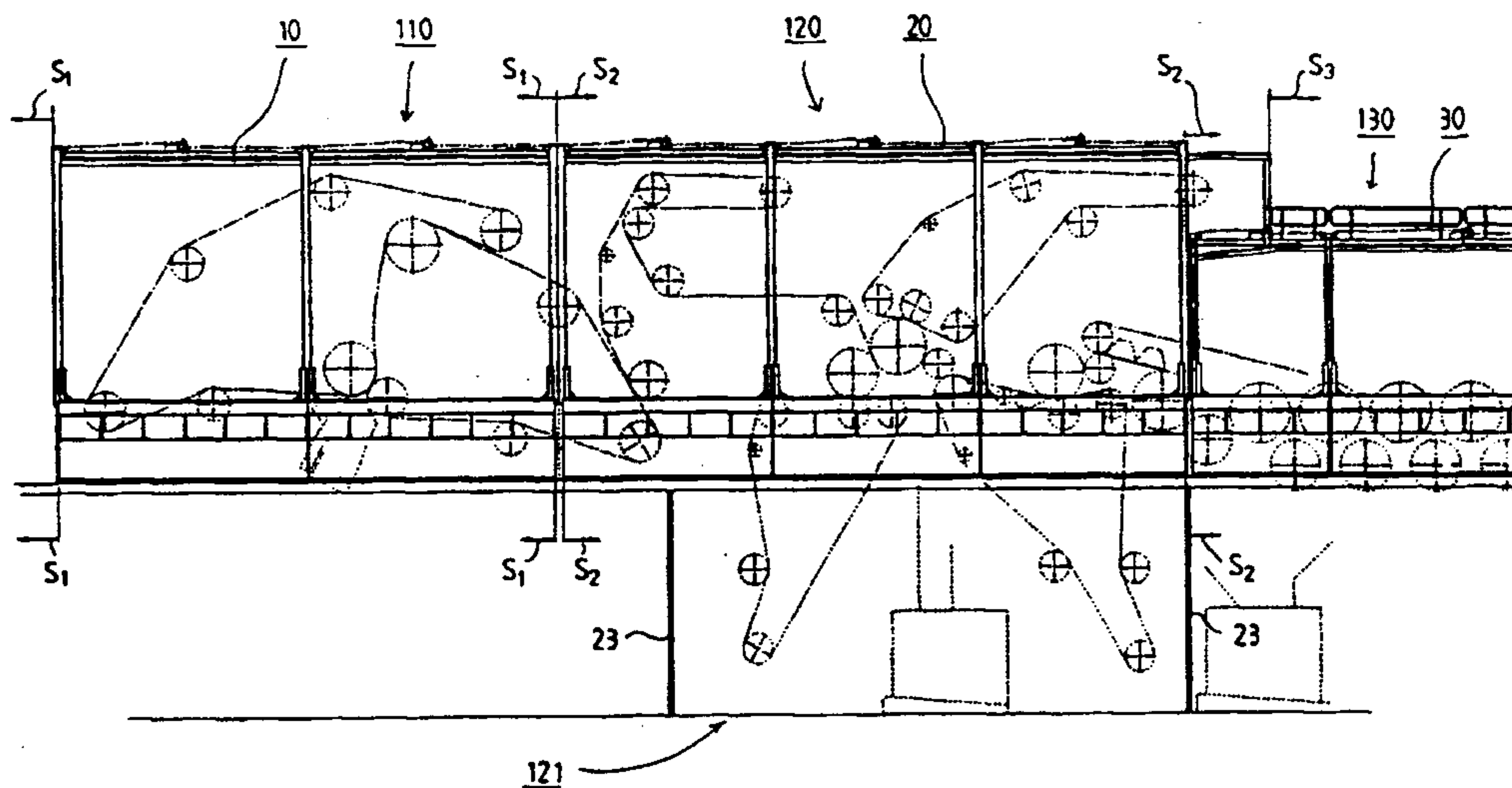
de maintenir l'intérieur du capot sensiblement sec et propre. Les parois (10, 20) comportent une partie verticale du côté entraînement, de préférence fixe à une partie verticale avec plafond du côté commande, en une seule paroi, de préférence en forme de L et mobile. La paroi mobile (10, 20) du côté commande comprend deux parties, une partie (10) pour abriter la section câblage (110) et une autre pour abriter la section presse (120): on peut déplacer ces parties en sens inverse pour les éloigner de la section câblage et de la section presse.

the hood comprise a vertical side wall at the driving side, which wall is preferably fixed, and a tending-side vertical side wall and a ceiling, which have been formed as a single wall, which is preferably L-shaped and displaceable. The displaceable hood wall (10, 20) at the tending side is composed of two parts, so that the first hood wall (10) is placed on the wire section (110) and the second hood wall on the press section (120), which wall parts can be displaced apart from the wire part and the press section in opposite directions.

## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>6</sup> : D21F 1/00, 3/00, 5/00	A1	(11) International Publication Number: <b>WO 96/34145</b> (43) International Publication Date: 31 October 1996 (31.10.96)
<p>(21) International Application Number: PCT/FI96/00205</p> <p>(22) International Filing Date: 17 April 1996 (17.04.96)</p> <p>(30) Priority Data: 952017 27 April 1995 (27.04.95) FI</p> <p>(71) Applicant: VALMET CORPORATION [FI/FI]; Panuntie 6, FIN-00620 HELSINKI (FI).</p> <p>(72) Inventors: LEINONEN, Antti; Kielokummuntie 7 D 5, FIN-41340 Laukaa (FI). KIVIMAA, Juha; Paavalinvuorentie 2, FIN-40950 Muurame (FI). PETTERSSON, Henrik; Kuusitie 14, FIN-23100 Mynämäki (FI). HEIKKILÄ, Pertti; Nummenpääkatu 5 B 18, FIN-21260 Raisio (FI). SALMINEN, Risto; Isomestarinkatu 1, FIN-20780 Kaarina (FI). LENTO, Tapio; Polusmäentie 53 B 11, FIN-21260 Raisio (FI). NIEMIKKO, Hannu; Välipolku 1, FIN-21270 Nousiainen (FI). KIILAVUORI, Erkki; Auvilankuja 6 B 33, FIN-40740 Jyväskylä (FI).</p> <p>(74) Agent: FORSSÉN &amp; SALOMAA OY; Yrjönkatu 30, FIN-00100 Helsinki (FI).</p>	<p>(81) Designated States: CA, JP, KR, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p> <p>Published With international search report.</p> <p style="text-align: center; font-size: 2em;"><b>2193701</b></p>	

(54) Title: HOOD FOR A WIRE PART AND FOR A PRESS SECTION



## (57) Abstract

The invention concerns a hood for a wire part and/or for a press section in a paper/board machine, comprising walls and a ceiling (10, 20), which form a closed hood around the wire part and/or the press section, air-conditioning being arranged in connection with the hood. The hood walls (10, 20) are composed of outer and inner walls, so that between them there is an air duct for passing a replacement air flow into the interior of the hood towards a substantial middle area of the paper machine through openings that have been made into the inner wall, the replacement air keeping the interior of the hood substantially dry and clean. The walls (10, 20) of the hood comprise a vertical side wall at the driving side, which wall is preferably fixed, and a tending-side vertical side wall and a ceiling, which have been formed as a single wall, which is preferably L-shaped and displaceable. The displaceable hood wall (10, 20) at the tending side is composed of two parts, so that the first hood wall (10) is placed on the wire section (110) and the second hood wall on the press section (120), which wall parts can be displaced apart from the wire part and the press section in opposite directions.

Hood for a wire part and for a press section

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The invention concerns a hood for a wire part and/or for a press section in a paper/board machine, comprising walls and a ceiling, which form a closed hood around the wire part and/or the press section, air-conditioning being arranged in connection with the hood.

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It is known from the prior art to place the wire part, the press section, and/or the dryer section of a paper machine inside a hood. The aim of said hood in respect of the wire part has been in particular to prevent spreading of drops into the machine hall. In the area of the press section, in view of energy economy, there has been an attempt to obtain economies as the pressing of the paper web is accomplished more efficiently, because the web and the felts that are used are warmer. It has been a further object of the hood to operate as a noise insulation and to separate the wire part and the press section from the rest of the machine hall, in which case the hood prevents spreading of moisture into the machine hall. In the dryer section, by means of a hood, attempts are made in particular to reduce the consumption of energy and to prevent spreading of heat, moisture and noise into the machine hall.

With respect to the prior art related to the dryer section, reference is made, for example, to the paper *Wochenblatt für Papierfabrikation* 23/24 1992, F. Sodec: *Neues Haubenkonzept für energiesparende Papiertrocknung*, in which paper an exemplifying embodiment is described of a concept in which, in the dryer section, a hood and an air-conditioning arrangement are employed.

With respect to the prior art related to the dryer section, reference is also made to the *FI Patent* 63,980, in which a method is suggested for enhancing the air-conditioning in dryer sections provided with a closed hood in paper machines. In this cited

paper, particular emphasis is placed on arranging the air-conditioning of the hood so that problems arising from condensation can be prevented.

With respect to hood arrangement related to the press section of a paper machine, reference is made to the FI Patent 83,551, in which a press section of a paper machine is described, in particular a press section in which suction rolls are used. According to the cited paper, the press section is covered with a hood, whose construction is such that it both raises the temperature of operation of the press section and reduces the noise level in the environment outside the press section to a substantial extent. In the arrangement in accordance with said cited paper, the hood consists of displaceable wall and ceiling elements at the tending side and of displaceable or fixed wall elements at the driving side. Said elements of the hood have been made of a sound-insulating material, which is transparent at the tending side. What is described in said cited paper constitutes the prior art most closely related to the present invention.

The present invention is directed towards the further developments of the arrangement described in said cited paper while also applying said arrangement to the wire part and while, in particular, paying attention to problems related to the arrangements of supply of air as well as the construction of the hood elements proper.

It is a further important component factor to arrange the hood so that it does not produce problems of cleaning.

The present invention further is directed towards development of the solution described in said cited paper so that, when necessary, the shifting of the wall constructions can be accomplished easily and simply.

The present invention additionally is directed towards preventing condensation in the start-up stage and in the initial stages of production.

The present invention is further directed towards an arrangement by whose means the hood in the area of the wire and in the area of the press can be sealed so that the area inside the hood and the area outside the hood, respectively, constitute air-conditioning units of their own.

The arrangement in accordance with the invention is mainly characterized in that the hood walls are composed of outer and inner walls, so that between them there is an air duct for passing a replacement air flow into the interior of the hood towards a substantial middle area of the paper machine through openings that have been made  
5 into the inner wall, the replacement air keeping the interior of the hood substantially dry and clean.

Accordingly, in one aspect of the present invention, there is provided a hood for a wire part, a press section or a press and wire section in a paper/board machine, comprising enclosure means arranged around the wire part, a press section or a press  
10 and wire section for defining a closed interior of the hood, the enclosure means comprising at least one component having an outer wall and an opposed inner wall facing the interior of the hood, the outer wall being spaced from the inner wall to form an air duct therebetween, the inner wall having openings extending between the air duct and the interior of the hood; and a first ventilation means extending into the  
15 interior of the hood through the enclosure means for ventilating the interior of the hood, and a second ventilation means for directing a replacement air flow into and through the air duct formed between the outer and inner walls such that the replacement air flows into the interior of the hood through the openings in the inner wall.

20 According to the invention, the replacement air is supplied into the hood of the wire part and of the press section from the wall and ceiling elements, the elements being heatable while the air flows in the frame space in the space between the two walls of the wall element. The dry replacement air is discharged, for example, through slots all over the area of the wall and ceiling faces into the interior of the  
25 hood. Then, the walls and the ceiling remain clean and dry as the elements are warm, in which case there is no risk of condensation. In the arrangement in accordance with the invention, the necessary replacement air is, thus, brought to the wire part and to the press section through slots or a perforated face provided on the wall elements.

In the arrangement in accordance with the invention, the replacement air is  
30 preferably brought to both sides of the paper/board machine, to the tending side

## 3A

and to the driving side as well as to the top side and to the tending platform, and the removal of the air is carried out through the exhaust arrangements provided in the process, in which case, in the interior of the hood, the air flows out of the space of the tending platforms and from elsewhere in the environment of the machine to the  
5 middle of the machine, and then the air in the working area remains dryer and the inner faces fo the hood remain clean. Instead, the warm and humid circulation air is brought to the area of the wire and the web, for the circulation air must be as humid as possible in order that the temperatures of the web and the wire should not become lower by the effect of evaporation. In the arrangement, preferably a suffi-

ciently warm circulation air is employed, and at the same time evaporation as well as lowering of the temperatures of the web and the wires are prevented. If necessary, the temperature in the space inside the hood can be raised. The circulation air constitutes a part of the exhaust air of the hood, or it consists of exhaust air from other processes of the paper machine.

The arrangement in accordance with the invention is suitable for use in different paper machines and also in tissue and TAD machines. (In TAD machines, there is no press section proper, for which reason intensified draining in the wire part, of course, provides a remarkably increased rate of production.)

In the arrangement, preferably displaceable hood elements are used. In accordance with an exemplifying embodiment of the invention, the displaceable parts of the hood move preferably in two opposite directions: the displaceable hood element of the wire part towards the wet end of the paper machine and the displaceable hood element of the press section towards the dry end of the paper machine, for example, onto the hood of the dryer section. In the paper machine, at the driving side, preferably a stationary hood walls is used, because the drive gear placed at the driving side requires an abundance of lead-in holes from the interior of the hood to the machine hall. For example, on the wall at the driving side and on the floor of the machine plane at the tending side, for example, rails have been provided, along which the hood is displaced. The hood element is provided with necessary gates etc. doors and windows; for example, in the hood element of the press section, there is a gate for replacement of the wire and/or felt, which gate is, in the open position, placed in the same location as in the hood of the dryer section.

In the arrangement in accordance with the invention, replacement air is brought through the walls, and the flow is guided towards the paper machine. The frame beams in the wet end of the paper machine can be used for the supply of circulation air. According to a preferred feature of the invention, the hood has been arranged as sealed in relation to the rest of the machine hall, in which case the wire part and the press section as well as the machine hall have separate air spaces, as a result of

which the requirement of air-conditioning in the hall is reduced, because the heat and moisture load in the machine hall becomes lower. The hood also lowers the noise level in the machine hall at the wet end of the paper machine, because, according to the invention, the elements have been constructed so that the air space between the walls in the element, together with the walls, forms an efficient sound insulation. By means of the hood arrangement in accordance with the invention, considerable economies of energy are obtained. The economies of energy can be enhanced further by means of recovery of heat connected with the hood arrangement, which recovery becomes possible because of the increased humidity and raised temperature of the exhaust air.

According to the invention, the supply of air has been arranged so that the hood construction can be kept sealed. Moreover, in the hood construction, consideration has been given to carious operations of servicing, drive and tending and, thus, to accessibility of the wire part and of the press section.

In the following description, the invention will be described in more detail with reference to the accompanying drawing, the invention being, however, not supposed to be strictly confined to the details of said illustrations. In the drawings, Figure I is a schematic side view of the wire part and the press section fo a paper machine viewed from the tending side;

Figure 2 is a schematic illustration of the wire part and the press section of the paper machine viewed from the driving side;

Figure 3 is a schematic sectional view of the wet end of the paper machine; and Figures 4A and 4B are schematic illustrations in part of the construction of an element.

2193701

6

Fig. 1 is a schematic illustration of the wire part 110 and the press section 120 of a paper machine viewed from the tending side. The wire part 110 is provided with a tending-side hood wall 10, which can be shifted in the direction indicated by the arrows  $S_1$ . The press section 120 is also provided with a hood wall 20, which can  
5 be shifted in the direction indicated by the arrows  $S_2$ . The hood construction 10,20 is preferably L-shaped and can be shifted along rails fitted, for example, on the wall at the driving side and on the floor at the tending side. Thus, the hood construction 10,20 forms the ceiling and the vertical wall at the tending side as well as the necessary end walls. The portions of the press section 120 placed in the basement  
10 121 are placed inside the hood walls 23. The hood wall 20 of the press section 120 is shifted in the direction of the arrow  $S_2$ , for example, onto the hood 30 of the dryer section 130. The hood walls 10,20 at the tending side can be provided with transparent portions so as to maintain a sight connection with the paper machine, and with portions that can be opened and closed for servicing, such as lift gates, slide  
15 doors, or equivalent.

Fig. 2 is a schematic illustration of the hood construction on the wire part and on the press section of the paper machine viewed from the driving side. At the driving side, the hood wall 45 is continuous and preferably mounted stationarily in its position. At  
20 the driving side, the hood wall 45 is provided with openable doors 47. Through the hood wall 45, lead-in openings are provided for the drives, frame beams, air ducts, and other equipment. The replacement air is passed into the hood wall 45;10,20 through ducts 44,51,52 preferably connected to the hood wall 45 at the driving side (FIG. 3).

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Fig. 3 is a schematic sectional view in the direction of width of the machine at the wire part 110, and the illustration shows the stationary hood wall 45 at the driving side as well as the L-shaped displaceable hood wall 10 formed at the tending side, which wall 10, thus, forms the ceiling and the other side wall. The replacement air  
30 into the hood is passed from the duct 44 as the air flow  $A_1$ , and it is distributed into the ducts 51,62 as the air flows  $A_2$  and  $A_3$ , of which the air flow  $A_2$  is blown into the space in the interior of the hood as the flows  $A_4$  through the duct 62 that has

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been formed in the interior of the fixed hood wall 45, and the flow  $A_3$  is passed from the duct 51 into the duct 52 and further into the duct 62 placed in the interior of the L-shaped hood wall 10, from which it is passed through the blow openings as the flows  $A_5$ . Circulation flow is introduced as the inlet flows  $A_7$  into the interior of the hood through the ducts 64 and 65 as the flows  $A_6$ . The hood is sealed in relation to the rest of the machine hall, and the displaceable hood walls 10,20 are sealed in relation to the stationary hood wall 45 and to the floor of the machine hall, for example, by means of brush seals or labyrinth seals (not shown in the illustrations). The duct 52 has been made resilient so that displacement of the hood wall 20 does not create problems. The temperature of the replacement air is 40...90 °C, preferably 60...70 °C, and its humidity is 5...30 grams of H<sub>2</sub>O per kilogram of dry air, preferably 10...20 grams of H<sub>2</sub>O per kilogram of dry air. The temperature of the circulation air is 40...70 °C, preferably 45...55 °C, and its humidity is 50...200 grams of H<sub>2</sub>O per kilogram of dry air, preferably 65...115 grams of H<sub>2</sub>O per kilogram of dry air.

Fig. 4A is a schematic enlarged illustration in part of an exemplifying embodiment of the construction of the hood wall 10,20,45 in accordance with the invention, in which hood wall there is a continuous sound-insulating and noise-insulating outer wall 61 placed at the side of the machine hall and an inner wall 63 placed inside the hood, between which walls an air duct 62 has been formed, out of which duct 62 the air is passed into the space inside the hood out of slots that have been formed at the joints 67 provided in the inner wall 63. In the exemplifying embodiment of Fig. 4B, separate blow openings 68 have been made into the inner wall 63, through which openings the air is blown into the interior of the hood. The exhaust air is evacuated from the interior of the hood through the exhausts provided in the process of the paper machine.

The inside face of the inner wall 63 of the hood elements 10,20,45 is made of a sheet material, preferably a stainless material, which permits easy cleaning and high strength of the wall 63 face. The lower face of the ceiling can be coated with a suitable material, for example teflon, to improve the cleanliness. Since the air

## 2193701

8

flowing in the interior of the wall is preferably heated, condensed water is not formed on said face. The outer wall 61 of the wall construction is made of an insulating material and of a sheet material, preferably glass wool and aluminum. The thickness of the entire wall construction is 300...500 mm. Besides the preferred  
5 exemplifying embodiment described above, the hood walls can also be collapsible or of bellows construction or equivalent. Hoods made for small paper machines may consist of ceiling and wall constructions that can be lifted off.

Above, the invention has been described with reference to some preferred exemplify-  
10 ing embodiments of same only, the invention being, however, not supposed to be strictly confined to the details of said embodiments.

EMBODIMENTS OF THE PRESENT INVENTION IN WHICH AN EXCLUSIVE PRIVILEGE OR PROPERTY IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A hood for a wire part, a press section or a press and wire section in a paper/board machine, comprising:
  - enclosure means arranged around the wire part, a press section or a press and wire section for defining a closed interior of the hood, said enclosure means comprising at least one component having an outer wall and an opposed inner wall facing the interior of the hood, said outer wall being spaced from said inner wall to form an air duct therebetween, said inner wall having openings extending between said air duct and the interior of the hood; and
  - first ventilation means extending into the interior of the hood through said enclosure means for ventilating the interior of the hood, and
  - first ventilation means for directing a replacement air flow into and through said air duct formed between said outer and inner walls such that the replacement air flows into the interior of the hood through said openings in said inner wall.
2. The hood of claim 1, wherein said opening are arranged in said inner wall such that the replacement air flow is directed toward a middle region of the machine.
3. The hood of claim 1 or 2, wherein the machine has a tending side and a driving side, said enclosure means comprising a first vertical side wall arranged at the driving side, a second vertical side wall arranged at the tending side and a ceiling extending between said first and second vertical side walls, said ceiling being formed integral with said second vertical side wall.
4. The hood of claim 3, wherein said second vertical wall comprises a first wall portion placed around the wire part and a second wall portion placed around

the press section, said first and second wall portions being separately displaceable in opposite directions from one another.

5. The hood of any one of claims 1 to 4, wherein the replacement air is dry air such that when said second ventilation means pass the replacement air flow through said air duct between said outer and inner walls, the hood is maintained warm thereby preventing a substantial temperature difference between the replacement air in said air duct and air in the interior of the hood.
6. The hood of any one of claims 1 to 5, further comprising second ventilation means extending into the interior of the hood through said enclosure means for ventilating the interior of the hood.
7. The hood of claims 6, wherein said second ventilation means are arranged to pass a circulation air flow having a set temperature and humidity based on the temperature of a paper web running in the machine.
8. The hood of any one of claims 1 to 7, wherein said enclosure means comprise hood walls for surrounding a basement space of the paper/board machine to enclose parts of the wire part, a press section or a press and wire section placed in the basement space.
9. The hood of any one of claims 1 to 8, wherein an inner face of said inner wall is made of a stainless sheet material.
10. The hood of any one of claims 1 to 9, wherein said outer wall is made of an insulating material and a sheet material.
11. The hood of any one of claims 1 to 10, wherein said outer wall is made of glass wool and aluminum.

12. The hood of any one of claims 1 to 11, wherein said at least one component of said enclosure means comprises a plurality of discrete material layers to improve the sound insulation capacity of said at least one component of said enclosure means.
13. The hood of any one of claims 1 to 12, wherein the hood is sealed in relation to the rest of a machine hall in which the machine is situated by at least one of a brush seal and a labyrinth seal.
14. The hood of any one of claims 1 to 13, wherein said enclosure means comprises hood walls, at least one of said hood walls including openable doors for servicing or taking measurement related to operation of the machine.
15. The hood of claim 3, wherein said second vertical side wall includes at least one transparent portion for maintaining a sight connection with the interior of the hood.



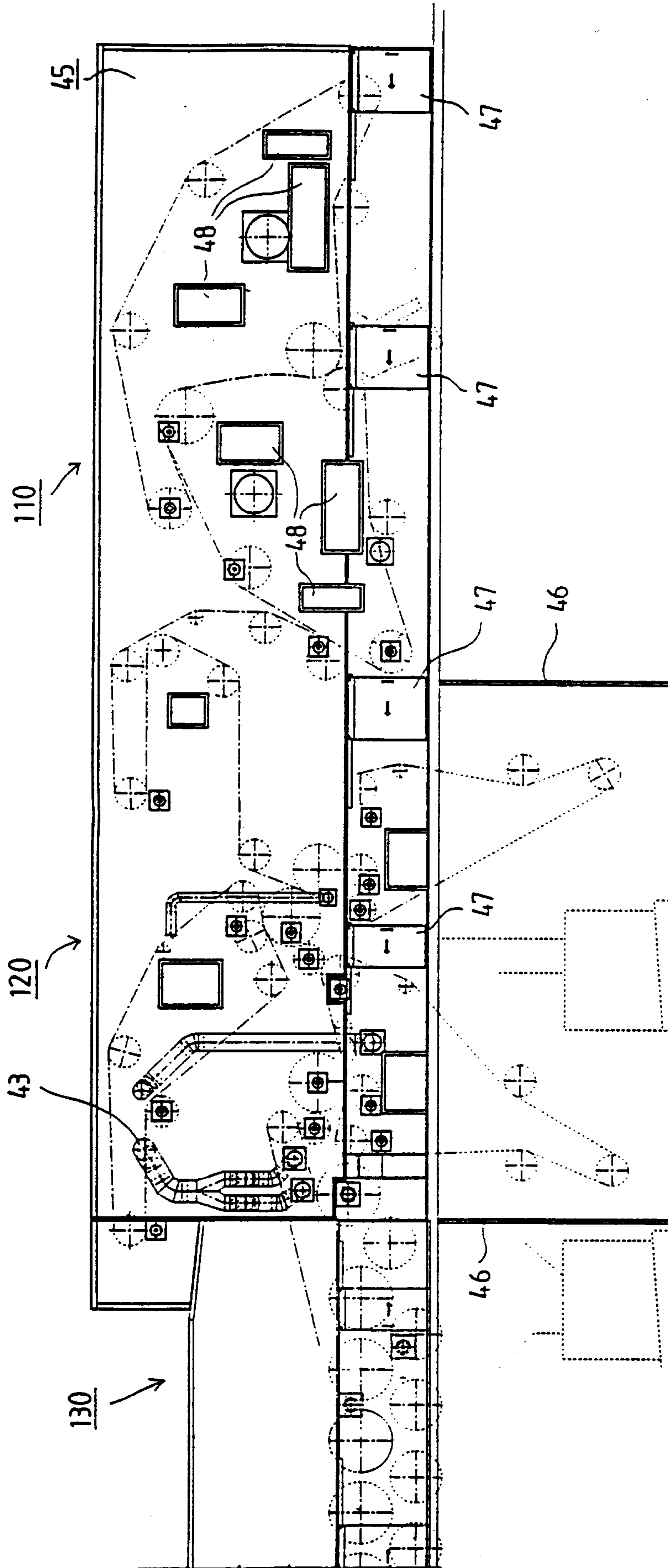


FIG. 2

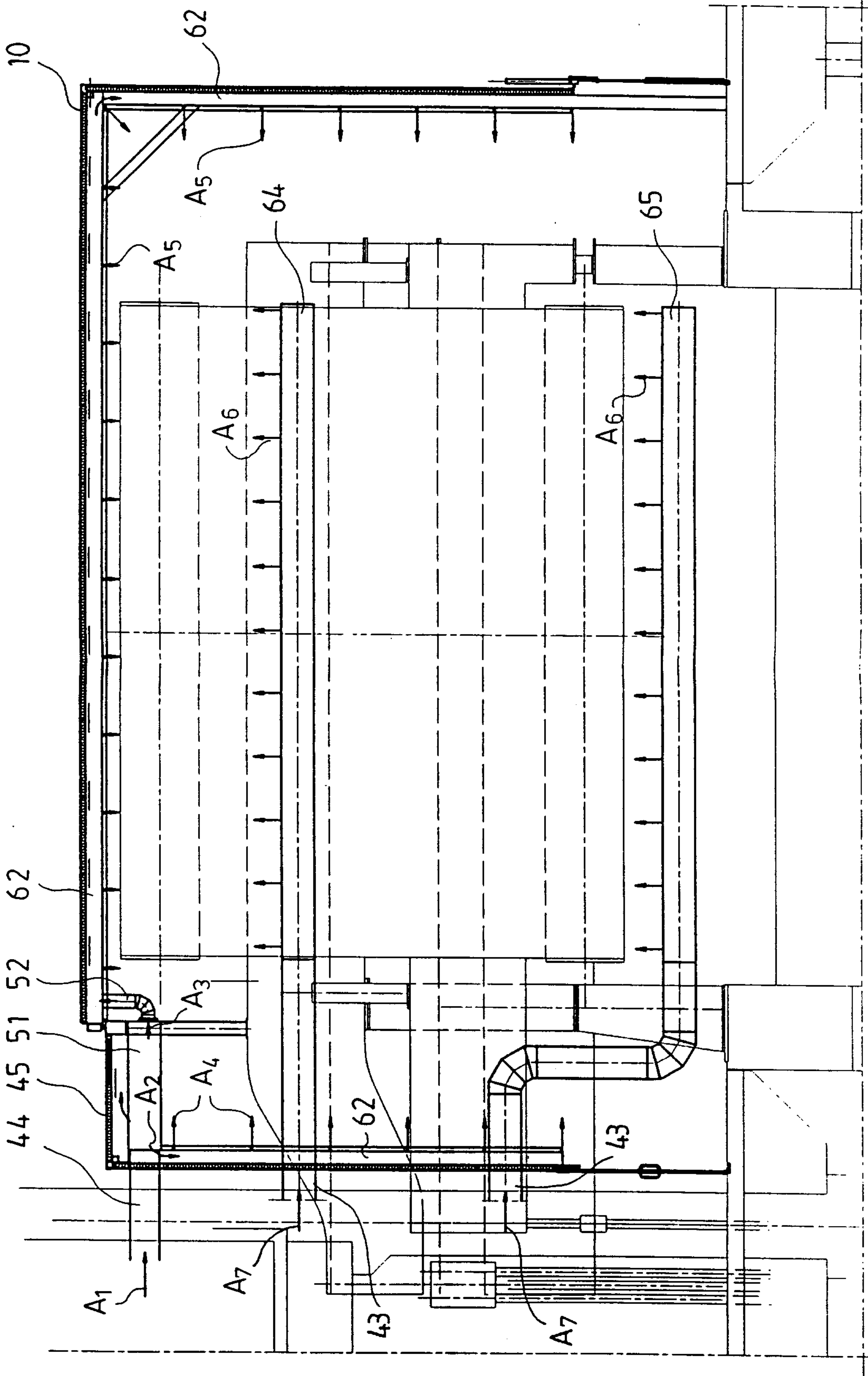


FIG. 3

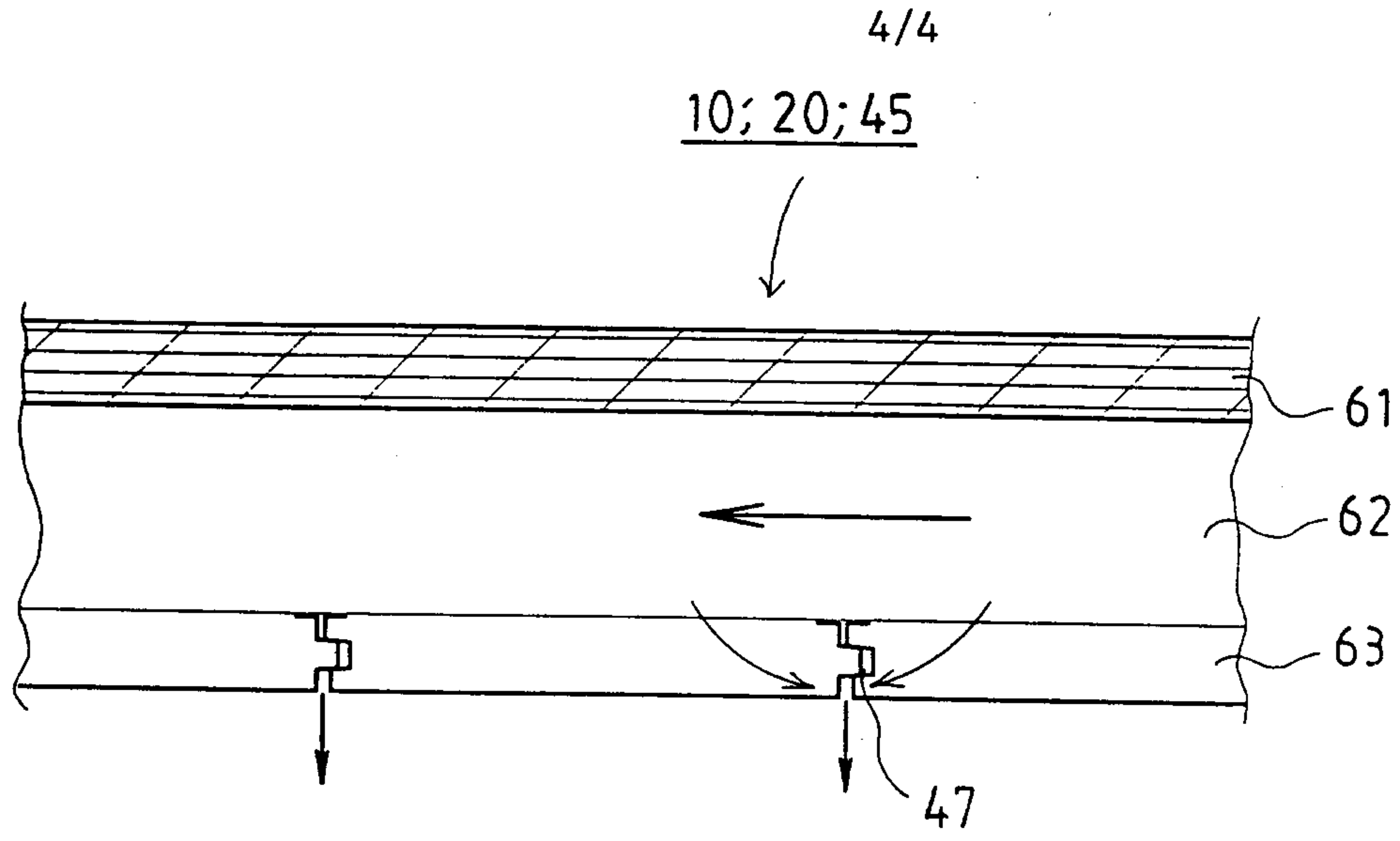


FIG. 4 A

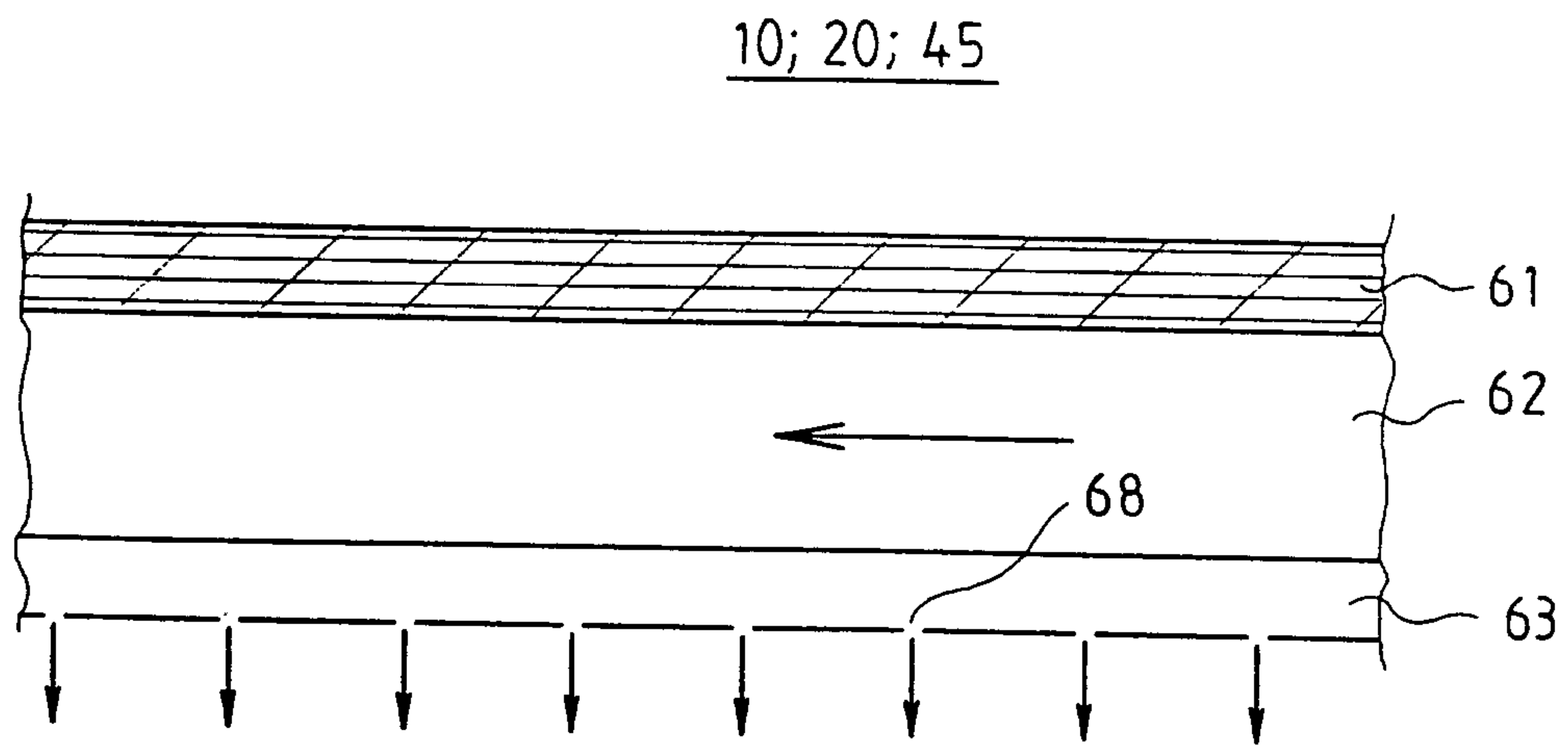


FIG. 4 B