(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 078 284**
B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication of patent specification: **20.04.88**

(51) Int. Cl.^{4}: **B 65 B 9/14,** B 65 B 43/26, B 65 B 53/06

(21) Application number: **82901411.7**

(22) Date of filing: **30.04.82**

(86) International application number: **PCT/DK82/00038**

(87) International publication number: **WO 82/03833 11.11.82 Gazette 82/27**

(54) METHOD AND APPARATUS FOR THE PACKING OF STACKED GOODS WITH SHRINK FOIL.

(30) Priority: **04.05.81 DE 3117531**

(43) Date of publication of application: **11.05.83 Bulletin 83/19**

(45) Publication of the grant of the patent: **20.04.88 Bulletin 88/16**

(84) Designated Contracting States: **AT BE CH DE FR GB LI LU NL SE**

(56) References cited:
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EP 0 078 284 B1

Courier Press, Leamington Spa, England.

Description

This invention relates to a method of packing a stack of goods with a shrink foil which shrinks under the influence of heat, whereby the foil is fed from above in the form of a tube from a supply to a shrink frame, the free end of the tube is secured to the shrink frame and spead open, the tube is welded together transversely and cut at a distance from the free end adjusted to the height of the stack to provide a sealed length of the tube and to separate the sealed length of the tube from the supply respectively, the sealed length of the tube being carried over the stack by the downwardly moving shrink frame and whereby the heat shrinking takes place during the subsequent upward movement of the shrink frame and an apparatus for performing the said method.

Such a method and an apparatus for the packing of goods has become known from the DE—A—21 46 464. The known apparatus allows to rationalize the method to a very high degree, thus enabling it to be carried out at one single station and without any significant effort on the part of the operating personnel.

However, at high performances, there is the danger that the shrink foil which is intended for the next following stack is shrunk by the upwardly-flowing heat too early. Therefore, the output capacity of the known method and of the known apparatus is restricted in practice.

In order to overcome this disadvantage the method of this invention is characterized in that during the heat shrinking the foil which is intended for the next following stack of goods is shielded against the heat. One can thus in a simple manner avoid that this foil is exposed to so much upwardly-flowing heat that it is shrunk too early.

The apparatus of this invention for performing the above mentioned method comprises a vertically movable shrink frame provided with spreading and gripping means, the apparatus including the shrink frame being adapted to heat the foil surrounding a stack, means for feeding a tubular foil from a supply down towards the shrink frame from above, welding and cutting-off mechanism being mounted above the shrink frame and is characterized in that there is provided a heat-shielding device between the foil which is intended for the next following stack of goods and the shrink frame.

A further development of the apparatus is characterized in that the heat-shielding device is provided by the welding mechanism which comprises a pair of welding jaws which are arranged to close together during the shrinking. One can thus in a simple manner accomplish a shielding-off of that foil which is not yet to be shrunk.

A further development of this embodiment is characterized in that the heat-shielding device is provided by plates or screens which are placed above the welding mechanism, thus making a feeding of the foil possible even during the shrinking process, so that a new length of foil is already hanging ready when the shrinking process is concluded.

Further developments of this embodiment are defined in claims 5 and 6.

The invention will now be described in closer detail with reference to the accompanying drawings which, to a high degree, are schematized, and where

fig. 1 is an embodiment of the apparatus according to the invention, seen obliquely in perspective from the front,

fig. 2 shows this apparatus seen from the side,

fig. 3 shows this apparatus seen from the side,

fig 4 shows this apparatus seen from the side, but with the moveable parts in another position,

fig. 5 is a cutting-off and welding mechanism for the apparatus, shown in schematic form and partly in section,

fig. 6 seen from above and in schematic form, shows how the pre-spreading of the foil is effected by means of movable suction boxes and a set of small grippers, and

fig. 7 shows a gripper of the type shown in fig. 6, in double right-angled configuration and on a larger scale.

In fig. 1 there is shown an apparatus consisting of a horizontal shrink frame 1 which is vertically movable on a column 2, said frame being designed to pack a box-shaped stack 3 with shrink foil. The foil is in the form of a tube and comes from a supply roll 4 at the back of the apparatus. The foil or tube is fed from here via rollers or slide rails up over the apparatus and out into a console 5 which ends above the shrink frame 1. The console 5 has built-in mechanisms for the cutting-off and the welding-together of the tube.

The console 5 also contains a pair or rollers for the feeding of the foil. The inner edges of the shrink frame 1 are equipped with heating elements. With the present invention it can be expedient for these elements to be gas burners. Finally, the apparatus has a control panel 6 with a programme control arrangement.

The spreading and the securing of the foil is automated, i.e., the apparatus is fully automatic. for this purpose, the apparatus is equipped with a pair of suction boxes 7 and 8 mounted on the bottom of the shrink frame 1, and which on rails are controlled for synchronous movement towards each other and away from each other. On the suction boxes 7 and 8 are mounted elements which lie below the suction surfaces, but which extend towards the corresponding element on the other suction box. However, these elements are offset from each other in such a way that the suction surfaces of the suction boxes can still lie almost or completely up against each other.

One or more suction blowers 9, 10 are mounted on each of the suction boxes 7 and 8, as shown in fig. 2 in association with the suction box 7. The suction side of these blowers is naturally connected to the suction boxes, while the pressure side is connected to the drawer-like elements 11 and 12 which extend under each suction box and can be pushed in under this, or be in a half-drawn-out position in a direction towards each other or in towards the middle of the shrink frame 1. This results in the provision of upwardly-inclined nozzle slots. When the drawer-like elements 11 and 12 are in the pushed-in position, which is the case when the suction boxes 7 and 8 are fed in against each other, the discharge of air from the suction blowers is effected in another manner. It should be noted that the drawer-like elements can also be mounted on the suction boxes in a fixed way. As shown in fig. 6, on the suction boxes 7 and 8 there is also mounted a first set of small grippers 13, 14, 15 and 16. For the sake of clarity, these grippers are not shown in the foregoing drawings. These grippers have the double right-angled configuration as shown in fig. 7. Fig. 6 also shows a tube 17 of shrink foil which in its folded-together state has a double fold in each side, i.e., an inwardly-bent edge and two outwardly-turning edges in each side.

As shown in figs. 1, 3 and 4, in conclusion the suction boxes 7 and 8 have a second set of large grippers 18, 19, 20 and 21 in the form of pivotable stays capable of swinging between a horizontal and a vertical position around horizontal axes. In fig. 3 the stays 19 and 20 are in the horizontal position, in that the stays run at right angles to the plane of the paper.

Finally, above and in connection with the shrink frame 1 is mounted a second horizontal frame 22 supported underneath by a column 23. The column 23 can have a built-in telescopic part, thus enabling the distance of the frame 22 from the shrink frame 1 to be varied.

Fig. 5 shows a cutting-off and welding mechanism which is built into the outer end of the console 5. A pair of rollers 24 and 25 feed the foil 26 to a slot between two pairs of holding jaws 27, 28, 29 and 30, of which the last-mentioned and lower pair also serve as welding jaws. A knife 31 is fastened to an endless chain 32, 33 and is driven forwards and backwards by a not-shown motor in the suggested supports. The knife can also be driven in the same direction the whole way around. The apparatus functions in the following manner:

At the start of an operation, the shrink frame will be in its upper position, e.g., the position shown in the drawings. The feeding of the foil now takes place by means of the pair of rollers 24 and 25 until the lower edge of the foil is level with the lower edges of the suction boxes 7 and 8. Like the jaws 27, 28, and 29, 30, the suction boxes 7 and 8 are, of course, moved into a position away from each other, so that the foil can pass freely. The length of the foil hanging downwards is naturally adjusted in accordance with the height of the stack to be packed. This length can be measured off by means of the programme control arrangement, but it can also be effected automatically with sensors already known within the art.

When the feeding of the foil is brought to an end, the suction boxes 7 and 8 are fed in towards each other so that they surround the lower edge of the foil. The suction blowers 9, 10 and others are then started, and the suction boxes 7 and 8 are withdrawn a small distance away from each other and stopped. This position is shown in figs. 3 and 6. In this position, the small grippers 13, 14, 15 and 16 are activated and swing in the direction of the arrows as shown in fig. 6, whereby they secure the four outwardly extending edges of the foil cross section externally. The suction boxes 7 and 8 are then made to continue their movement until the foil cross section is opened so much that the second set of grippers 18, 19, 20 and 21 can safely swing up inside the foil. This happens at the same time that the first set of small grippers 13, 14, 15 and 16 swing back into the start position as shown in fig. 6. It should be mentioned here that the second set of grippers 18, 19, 20 and 21 are disposed a good distance from the suction surfaces to ensure a correct upswing, and that this distance takes on significancé in the following step, during which the suction boxes move further away from each other and thus through the grippers 18, 19, 20 and 21 tighten the lower part of the foil cross section to form a rectangle. This results in the foil being drawn free of the suction surfaces, thus allowing air to flow in. The effect is that the suction blowers now come to supply air out of the upwardly-inclined nozzle slots at the drawer-like elements 11 and 12, which are in the position as shown in fig. 3. A stream of air is thus blown up into the foil from two sides, and the foil can now be released by the jaws 29 and 30 at the top, after the knife in the meantime has been activated. The suction boxes 7 and 8 end in the position shown in fig 4, where the frame 22 is of significance, in that the size of the frame 22 is of such dimensions that it can prevent the upper part of the now formed foil hood from swinging from side to side or flapping as a result of turbulence in the air. As mentioned, the frame 22 can be adjustable in height if stacks of varying heights are being worked with. Hereafter, the foil hood can be drawn down over the stack 3 without being damaged by the upper corners or edges of the stack. This is carried out by feeding the frames and the parts mounted thereon down the column 2. When the shrink frame has reached its bottom position, the suction boxes are moved so much in towards each other that the grippers 18, 19, 20 and 21 relieve the foil to such an extent that the grippers can swing down into the horizontal position free of the foil, after which the shrinking can begin during the upwards movement of the shrink frame. Prior to this, however, the jaws 27, 28 and 29, 30 can have been moved towards each other into the closed position, thus shielding-off the foil which must not be shrunk prematurely. In this connection it can also be envisioned that regular heat-shielding plates or screens can be mounted, thus allowing the foil to be fed while the shrinking is being carried out, so that a length of foil is hanging ready under the jaws 27, 28 and 29, 30 when the shrink frame has reached its upper position and is ready for a new operation, whereby time can be saved. Consideration can also be given to cooling that space or those spaces through which the foil is fed by means of a cooling fan.

Taken as a whole, it can be foreseen that especially the programme for the operation of an apparatus according to the invention will be variable within a wide range. It must thus be noted that it is not necessary to move the suction boxes towards each other at the end of the process in order to release the grippers 18, 19, 20 and 21 from the foil. One can thus turn the grippers directly free of the foil to the horizontal position.

Claims

1. Method of packing a stack (3) of goods with a shrink foil which shrinks under the influence of heat, whereby the foil is fed from above in the form of a tube from a supply (4) to a shrink frame, the free end of the tube is secured to the shrink frame (1) and spead open, the tube is welded together transversely and cut at a distance from the free end adjusted to the height of the stack (3) to provide a sealed length of the tube and to separate the sealed length of the tube from the supply (4) respectively, the sealed length of the tube being carried over the stack (3) by the downwardly moving shrink frame and whereby the heat shrinking takes place during the subsequent upward movement of the shrink frame (1), characterized in that during the heat shrinking the foil which is intended for the next following stack of goods (3) is shielded against the heat.

2. Apparatus for performing the method according to claim 1, comprising a vertically movable shrink frame (1) provided with spreading and gripping means (13—16; 18—21), the apparatus including the shrink frame being adapted to heat the foil surrounding a stack (3), means for feeding a tubular foil from a supply (4) down towards the shrink frame (1) from above, welding and cutting-off mechanism (29, 30, 31) being mounted above the shrink frame, characterized in that there is provided a heat-shielding device between the foil which is intended for the next following stack of goods and the shrink frame (1).

3. Apparatus according to claim 2, characterized in that the heat-shielding device is provided by the welding mechanism which comprises a pair of welding jaws (29, 30) which are arranged to close together during the shrinking.

4. Apparatus according to claim 2, characterized in that the heat-shielding device is provided by plates or screens which are placed above the welding mechanism (29, 30).

5. Apparatus according to claim 2, characterized in that the heat-shielding device is provided by plates or screens which are placed below the welding mechanism (29, 30).

6. Apparatus according to one of the claims 3 to 5, characterized in that one or more cooling fans are provided which are arranged to blow air in that space or those spaces through which the foil is fed, especially inbetween the plates or the screens.

Patentansprüche

1. Verfahren zur Verpackung eines Stapels Güter (3) mit einer unter Hitzeeinwirkung schrumfenden Schrumpffolie, wobei die Folie von einem Vorrat (4) dem Schrumpfrahmen von oben in Form eines schlauches zugeführt wird, das freie Ende des Schlauches an dem Schrumpfrahmen (1) befestigt und gespreizt wird, der Schlauch querverschweißt und abgeschnitten wird in einem Abstand von dem freien Ende, der entsprechend der Höhe des Stapels (3) eingestellt ist, um eine versiegelte Länge des Schlauches zu gewährleisten und um die versiegelte Länge des Schlauches jeweils von dem Vorrat (4) abzutrennen, wobei die versiegelte Länge des Schlauches durch eine Abwärtsbewegung des Schrumpfrahmens über den Stapel (3) gebracht wird, und wobei die Heißschrumpfung während der darauffolgenden Aufwärtsbewegung des Schrumpfrahmens (1) erfolgt, dadurch gekennzeichnet, daß die für den nächstfolgenden Stapel Güter (3) vorgesehene Folie während der Heißschrumpfung gegen die Hitze abgeschirmt wird.

2. Vorrichtung zur Durchführung des Verfahrens nach Anspruch 1, mit einem vertikal beweglichen Schrumpfrahmen (1) mit Spreiz- und Greifeinrichtungen (13—16; 18—21), wobei die den Schrumpfrahmen umfassende Vorrichtung so ausgestaltet ist, daß sie ein einen Stapel (3) umgebende Folie erhitzt, mit einer Einrichtung für die Zufuhr einer schlauchförmigen Folie von einem Vorrat (4) von oben nach unten in Richtung auf den Schrumpfrahmen (1), einer Schweiß- und Abschneidevorrichtung (29, 30, 31), die oberhalb des Schrumpfrahmens (1) angeordnet ist, dadurch gekennzeichnet, daß zwischen der für den nächstfolgenden Stapel Güter vorgesehenen folie und dem Schjrumpfrahmen (1) eine Hitzeschutzeinrichtung vorgesehen ist.

3. Vorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß die Hitzeschutzeinrichtung durch die Schweißvorrichtung gebildet wird, die ein Paar Schweißbacken (29, 30) aufweist, die so angeordnet sind, daß sie sich während des Schrumpfvorganges schließen.

4. Vorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß die Hitzeschutzeinrichtung durch Platten oder Abschirmungen gehildet wird, die über der Schweißvorrichtung (29, 30) angeordnet sind.

5. Vorrichtung nach Anspruch. 2, dadurch gekennzeichnet, daß die Hitzeschutzeinrichtung durch Platten oder Abschirmungen gebildet wird, die unter der Schweißvorrichtung (29, 30) angeordnet sind.

6. Vorrichtung nach einem der Ansprüche 3 bis 5, dadurch gekennzeichnet, daß ein oder mehrere Kühlgebläse vorgesehen sind, die dergestalt angeordnet sind, daß sie Luft in den Raum oder in die Raüme einblasen, durch die die Folie geführt wird, insbesondere zwischen die Platten oder die Abschirmungen hinein.

Revendications

1. Procédé d'emballage d'un empilement (3) d'articles au moyen d'une feuille rétrécissable qui se rétrécit sous l'influence de la chaleur, la feuille étant amenée par le dessus sous forme d'un tube à partir d'une réserve (4) et vers un cadre de rétrécissement, l'extrémité libre du tube étant fixée au cadre de rétrécissement (1), déployée et ouverte, le tube étant soudé transversalement sur lui-même et découpé à une distance de l'extrémité libre qui est ajustée sur la hauteur de l'empilement (3) pour déterminer une hauteur scellée de tube et pour séparer la longueur scellée de tube de la réserve (4), respectivement, la longueur scellée du tube étant transportée au-dessus de l'empilement (3) par le cadre de rétrécissement qui se déplace vers le bas et le rétrécissement par la chaleur ayant lieu pendant le mouvement ascendant subséquent du cadre de rétrécissement (1), caractérisé en ce que pendant le rétrécissement à la chaleur, la feuille qui est prévue pour l'empilement d'articles (3) suivant est protégée de la chaleur.

2. Dispositif pour la mise en oeuvre du procédé selon la revendication 1, comprenant un cadre de rétrécissement (1) mobile verticalement et muni de moyens d'écartement et de saisie (13—16; 18—21), le dipossitif comprenant le cadre de rétrécissement étant adapté à chauffer la feuille entourant un empilement (3), des moyens pour faire avancer une feuille tubulaire à partir d'une réserve (4) vers le bas en direction du cadre de rétrécissement qu'elle rencontre par la haut, un mécanisme de soudage et de découpe (29, 30, 31) étant monté au-dessus du cadre de rétrécissement, caractérisé en ce qu'il est prévu un dispositif de protection contre la chaleur entre la feuille destinée à l'empilement d'articles suivant et le cadre de rétrécissement (1).

3. Dispositif selon la revendication 2, caractérisé en ce que le dispositif de protection contre la chaleur est constitué par le mécanisme de soudage qui comprend une paire de mâchoires de soudage (29, 30) montées de façon à se refermer pendant le rétrécissement.

4. Dispositif selon la revendication 2, caractérisé en ce que le dispositif de protection contre la chaleur est constitué par des plaques ou des écrans qui sont placés au-dessus du mécanisme de soudage (29, 30).

5. Dispositif selon la revendication 2, caractérisé en ce que le dispositif de protection contre la chaleur est constitué par des plaques ou des écrans qui sont placés au-dessous du mécanisme de soudage (29, 30).

6. Dispositif selon l'une quelconque des revendication 3 à 5, caractérisé en ce que sont prévus un ou plusieurs ventilateurs de refroidissement qui sont aménagés pour souffler de l'air dans le ou les espaces par lesquels la feuille est avancée, et notamment entre les plaques ou les écrans.

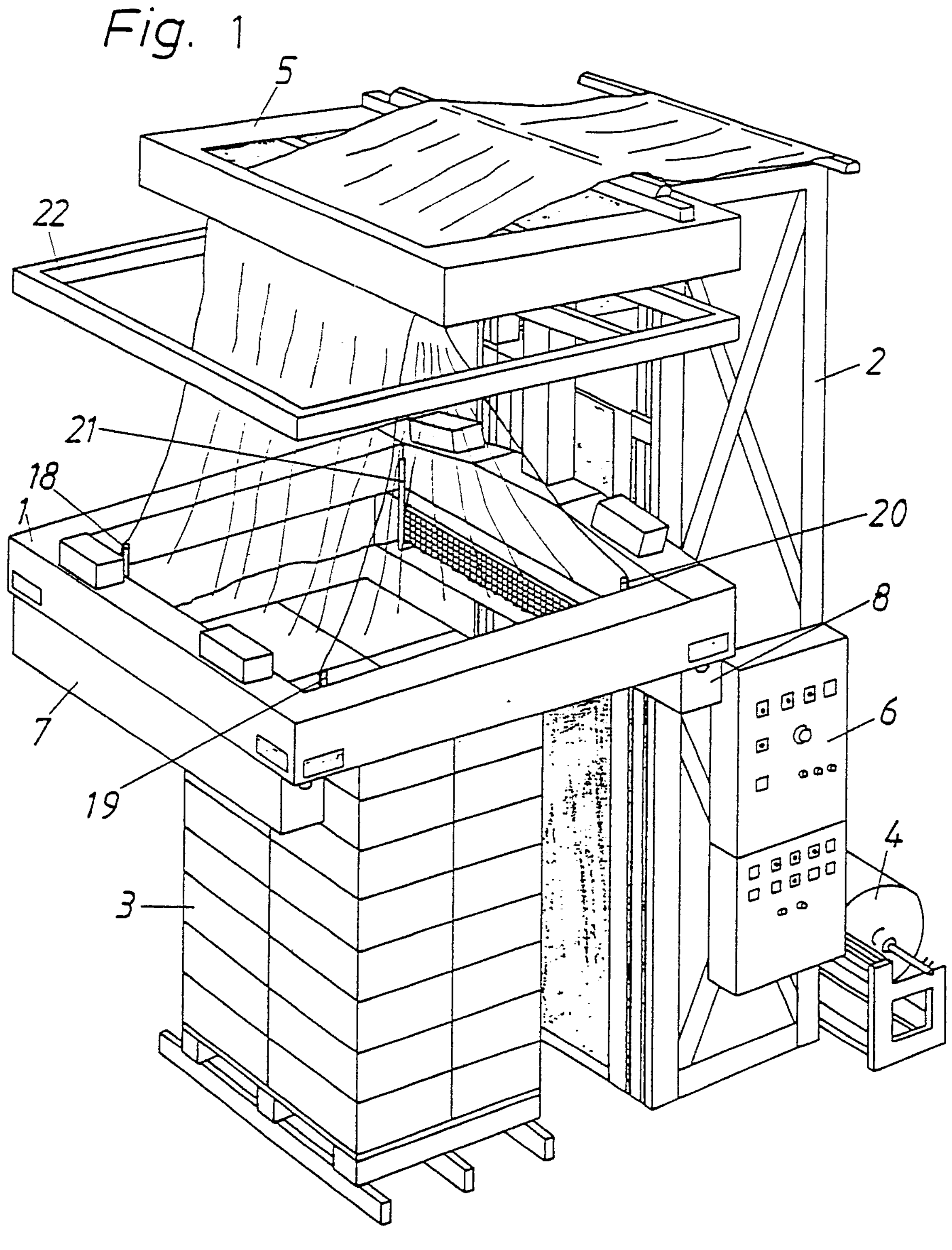
Fig. 1
5
22
2
21
18
1
20
8
6
7
19
4
3

Fig. 2

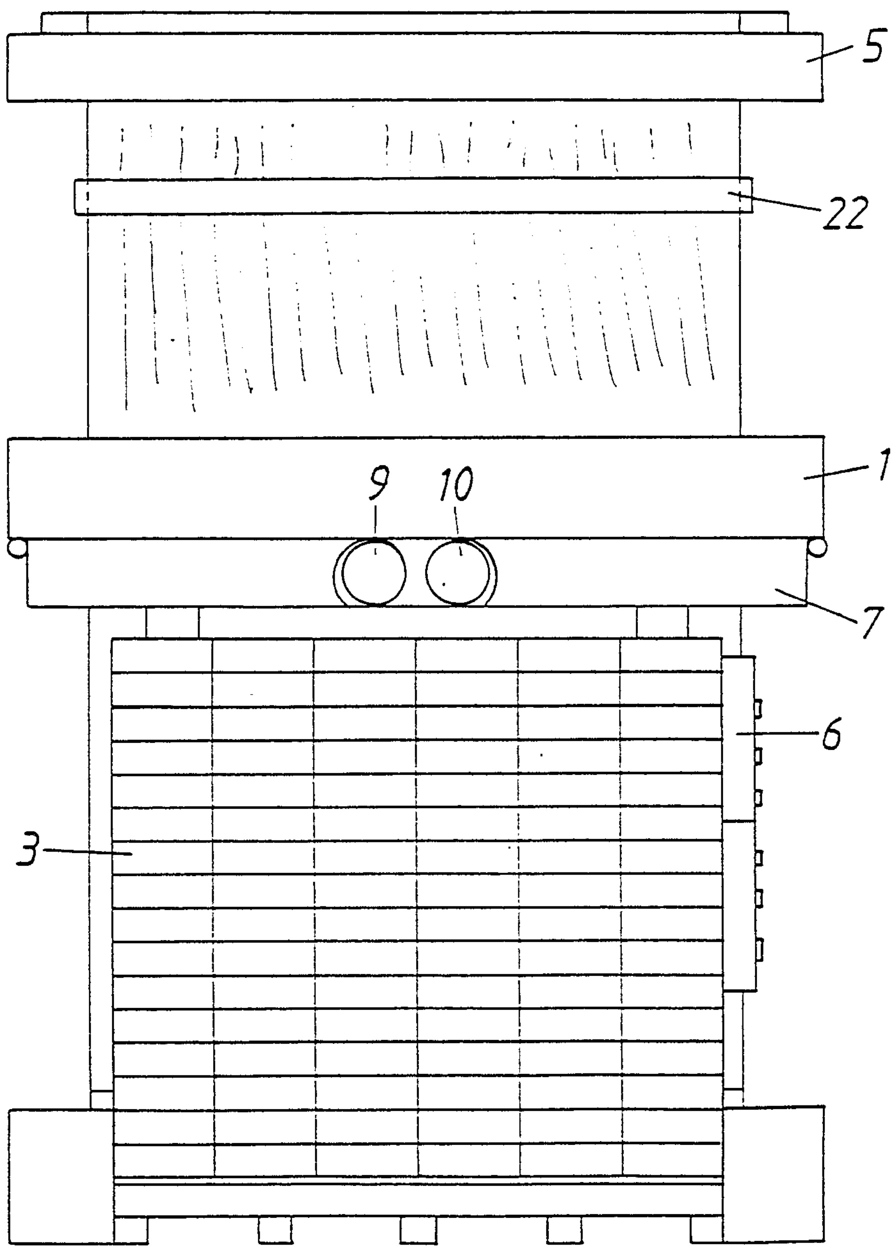

Fig. 3

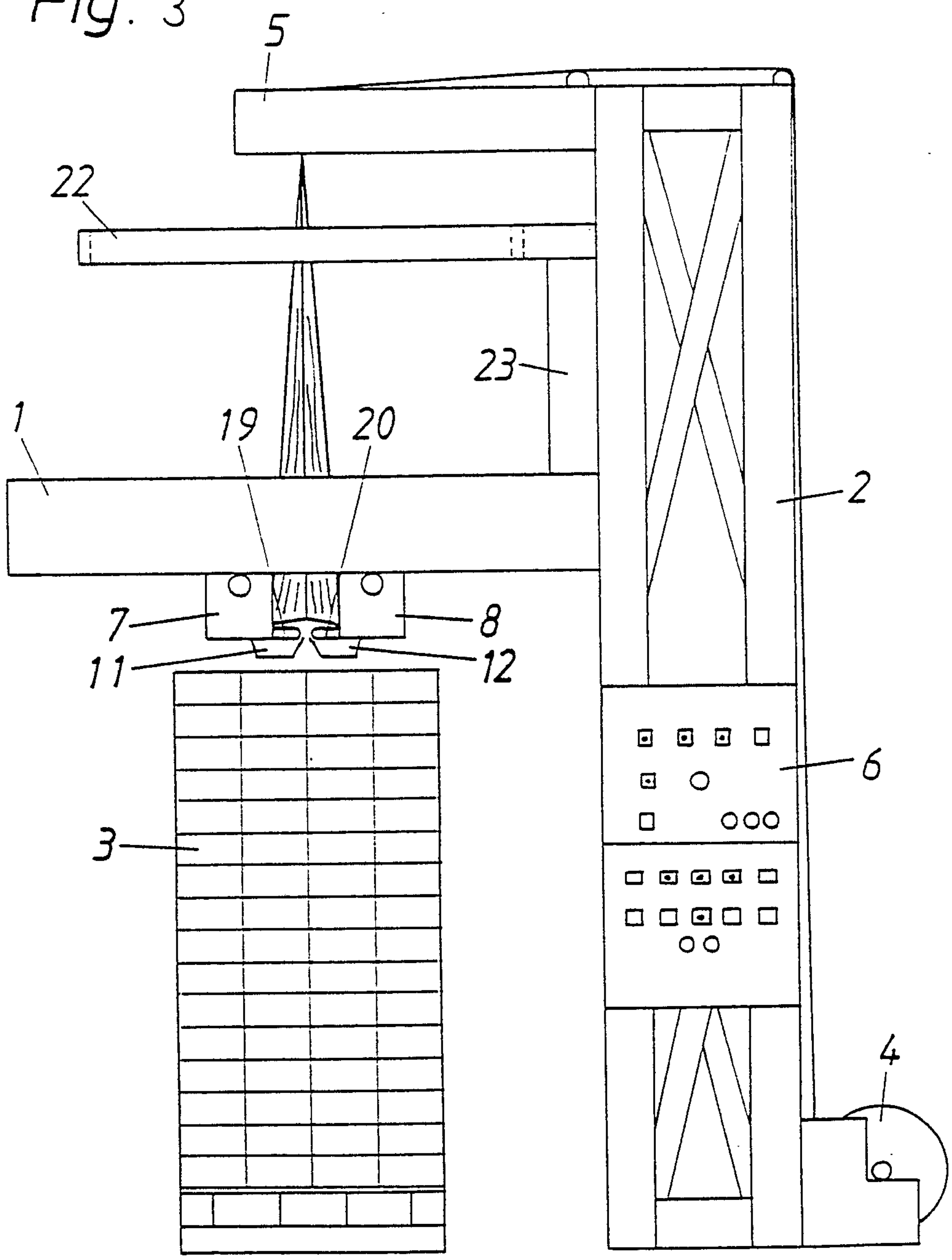

Fig. 4

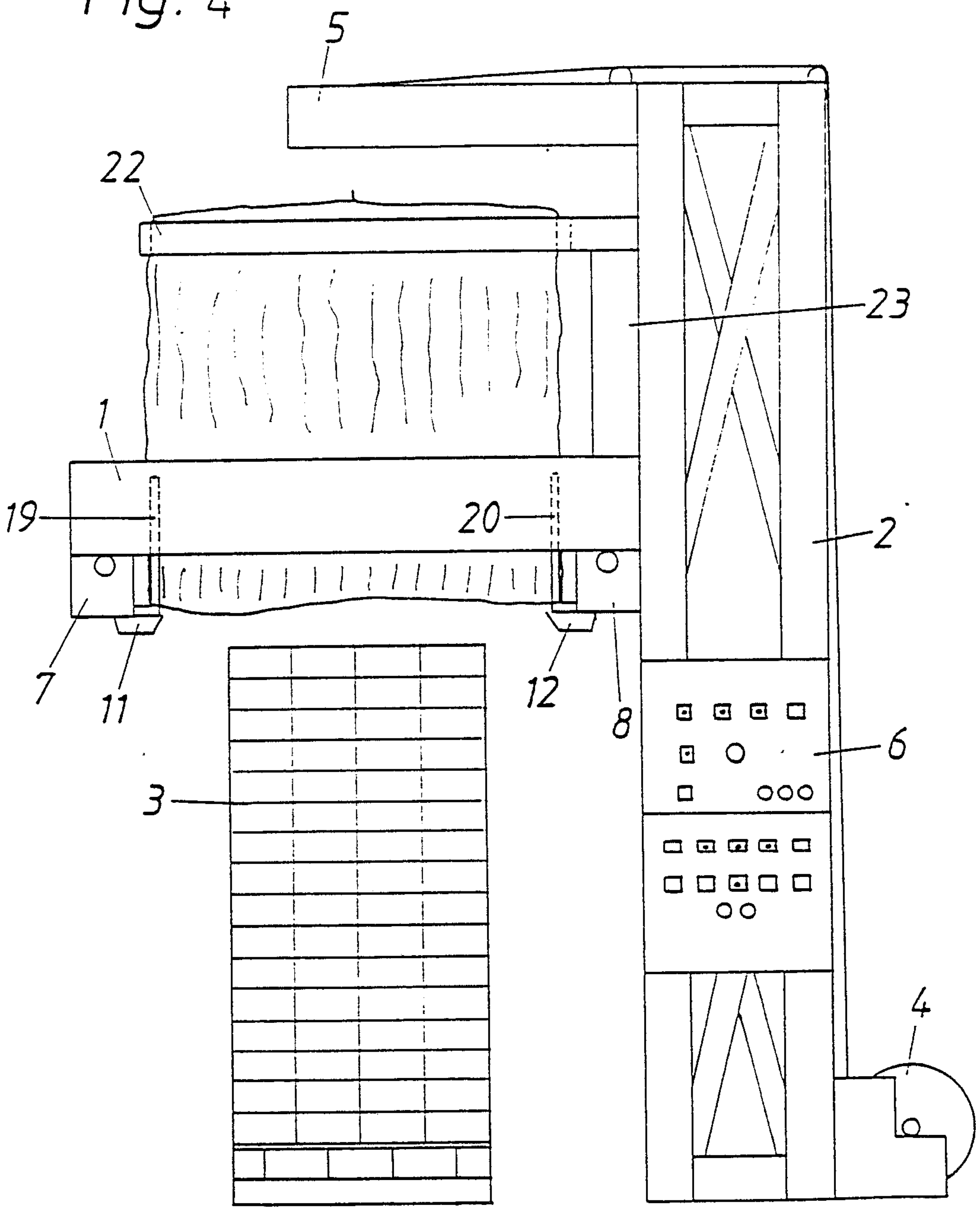

Fig. 5

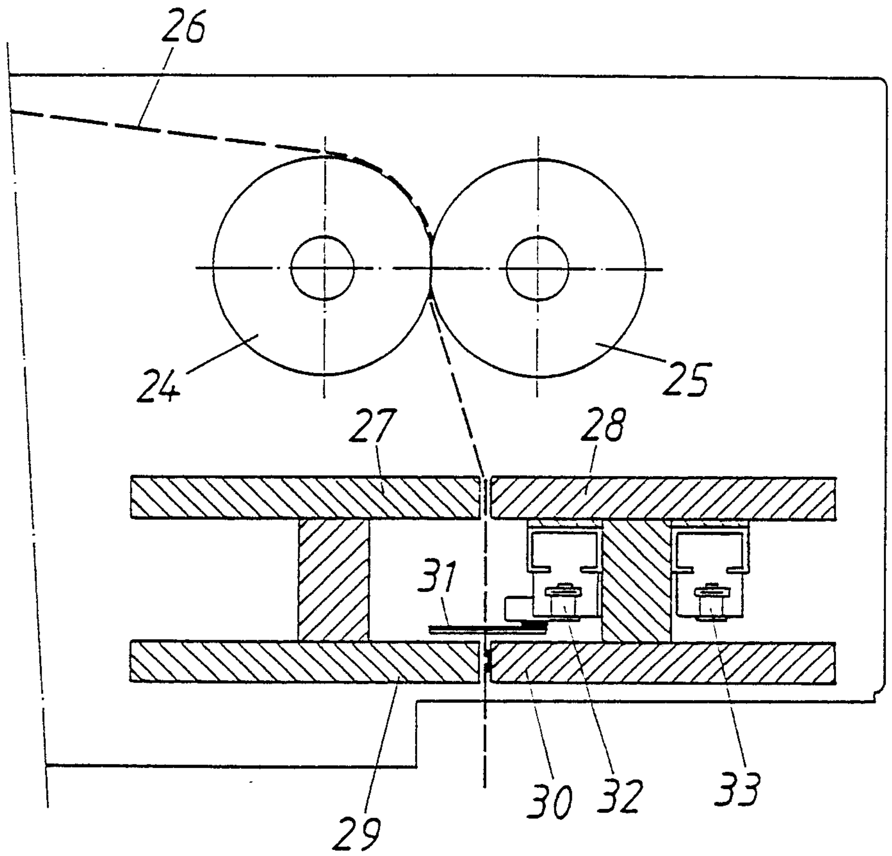

Fig. 6

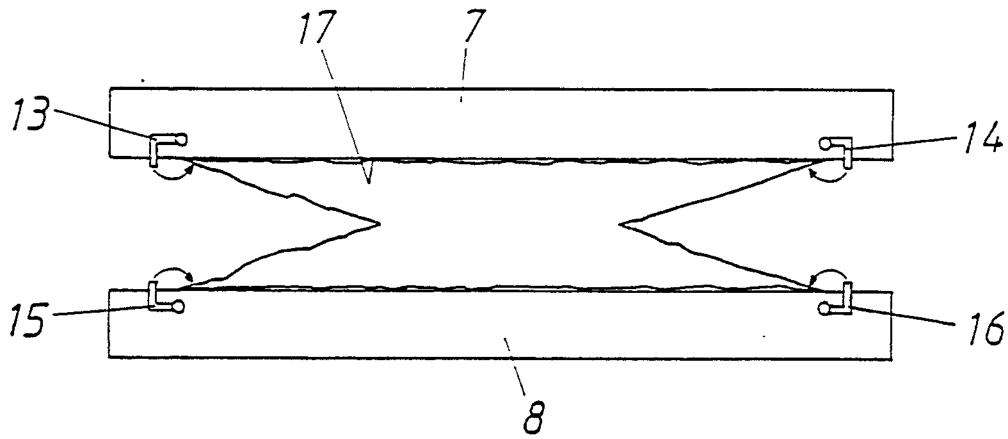

Fig. 7