

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 870 682 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

14.10.1998 Bulletin 1998/42(51) Int Cl.⁶: **B65B 53/06**(21) Application number: **98201065.4**(22) Date of filing: **03.04.1998**

(84) Designated Contracting States:

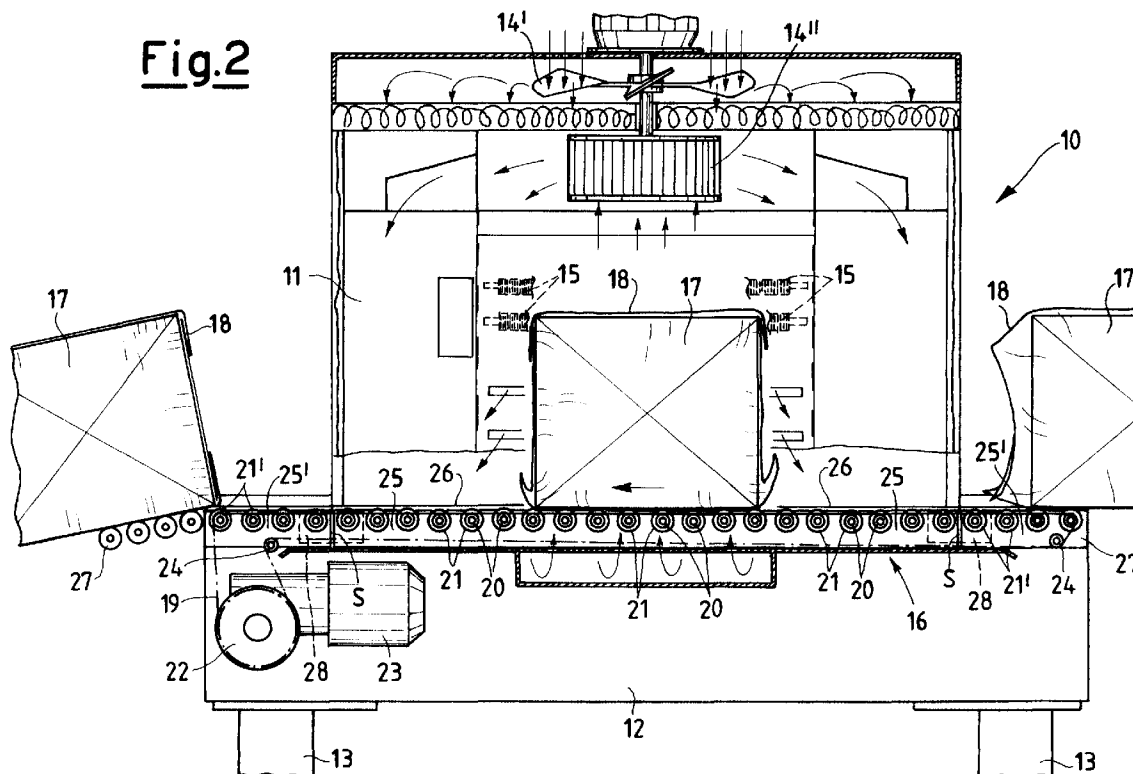
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**

Designated Extension States:

AL LT LV MK RO SI(71) Applicant: **INTERDIBIPACK S.p.A.**
I-20017 Mazzo di Rho(Milan) (IT)(72) Inventor: **Di Bernado, Pietro**
20017 Mazzo di Rho (IT)(30) Priority: **11.04.1997 IT MI970833**(74) Representative: **Martegani, Franco et al**
Via Damiano Chiesa, 56
20099 Sesto San Giovanni (Milano) (IT)**(54) Roller conveyor for the heat-shrink tunnel of a packaging machine**

(57) A chain conveyor for heat-shrinkage environments like a heat-shrinkage tunnel, said tunnel (10) including a tunnel-shaped chamber (11) located on a base framework (12), a ventilation device (14', 14'') and heating elements (15) said conveyor being placed in the lower part of said tunnel-shaped chamber (11) and adapted for receiving the articles (17) placed into a film (18)

which must be heat-shrunk on said articles. According to the invention, said conveyor includes a chain (19) that slides engaged, at least partially, on the teeth of a series of gearwheels (20) which are integral with the extremity of each one of an identical series of rollers (21), rotating on their own axes integral with said framework (12). The chain (19), forming a closed ring, is put into motion by a ratio-motor (23), placed in said framework (12).

Fig.2**EP 0 870 682 A1**

Description

This invention relates to a chain conveyor for packaging machines in general.

In particular, the invention applies to packaging machines that include an environment for heat-shrinking a plastic film, i.e. a heat-shrinkage tunnel, or a heat-shrinkage chamber, identified by a so-called movable hood.

The invention is described by way of a non-limiting example in relation to a tunnel.

All experts in the heat-shrinkage technique know that if the conveyor belts of the type now used in the heat-shrinkage tunnels are working, they must be kept uninterruptedly turning in order to avoid problems. This is necessary in order to avoid damages both to the article to be packed and to the components of the conveyor passing through the tunnel which, in case of stopping, would warp irremediably.

Moreover, in the heat-shrinkage tunnel even in the case of discontinuous work, since the conveyor is continuously turning, the parts of the conveyor that keep entering and exiting the tunnel remove heat from the inside to the outside of the tunnel thus causing a useless consumption of energy.

Because of this, in order to get the optimum shrinkage temperature for each kind of material, it becomes necessary to provide energy continuously.

The high working temperature implies that the parts that get into contact with the articles, and especially with the packaging and wrapping film, turn hot. It becomes then necessary also to think about providing a cooling circuit, or a similar device, for example one having effect also on the rollers of the conveyor.

Another possible inconvenience that a conventional tunnel may present is the presence of marks on the articles subject to the packaging.

In order to avoid such inconvenience, conveyors in conventional tunnels, consist of rollers mounted on chains that translate through the tunnel and at the same time also rotate on their own axes.

Besides, the rotational translation motion of the roller conveyors can cause accidents that could be very dangerous to the machine operators.

As a consequence, one of the general objects of this invention is to eliminate, in an extremely simple, economical and particularly efficient way, all the technical problems as well as the inconveniences of the known art previously mentioned.

Said object is accomplished by the making of a chain conveyor for heat-shrinkage tunnels which presents the characteristics explained in the claims appended. The structural and functional characteristics of this invention as well as its advantages, in comparison with those of the known art, will become more evident after examination of the following description which refers to the accompanying drawings which show one embodiment of a tunnel in which it has been applied a con-

veyor according to the principles of the invention. In the drawings:

- Figure 1 is a perspective view of a heat-shrinkage tunnel equipped with a conveyor according to the invention;
- Figure 2 is a side elevation section; and
- Figure 3 is a detail of the conveyor according to the invention; and
- Figure 4 is a section on the line IV-IV of Figure 3. In the drawings, only by way of a non-limiting example of one practical application of the invention, the conveyor of the invention is applied to a heat-shrinkage tunnel, indicated overall by 10, but it can obviously be applied to tunnels of different types. With reference to Figure 2 of the drawings, the heat-shrinkage tunnel (10) includes a metallic tunnel-shaped chamber (11) placed on a base framework (12), equipped with legs (13).

Figure 2 shows that over the tunnel-shaped chamber (11) there is a ventilation device which is suitable both for the cooling of the tunnel structure and the heat-shrinkage of the material in which the articles are wrapped.

This ventilation device may include a fan which, in its part 14', supplies the air for the cooling of the tunnel-shaped chamber walls (11) and, in its other part 14", guarantees the circulation of warm air inside the tunnel, the air being heated by heating elements such as the electrical resistances schematized in (15).

A conveyor, indicated overall by (16), will be placed in the lower part of the tunnel-shaped chamber (11) of the tunnel in order to receive the articles (17) placed inside a film (18) which must be heat-shrunk on them.

The conveyor (16), realized according to the invention, includes a chain (19) that slides, at least partially engaged with them, on the teeth of a series of gearwheels or gears (20).

The gearwheels (20) are integral with one extremity of each one of an identical series of rollers (21), rotating on their own axes integral with the framework (12), and forming the supporting surface for the articles (17) inside the chamber (11) of the heat-shrinkage tunnel (10).

The chain (19) is put into motion by an additional gearwheel (22) which is integral with a ratiomotor (23) set on the framework (12).

The chain (19), set as a closed ring, slides on the gearwheels (20), on the additional gearwheel (22) of the ratiomotor (23) and on the transmission gearwheels (24) which determine proper winding and run inside the framework (12).

The chain (19) runs straight-line in its upper branch where it is engaged tangentially with the gearwheels (20) of the rollers (21), without winding on such gearwheels (20) so that the friction is really limited.

The position of the chain (19) is kept not only by the rollers themselves (21), which are housed into a special

support (25), but also by a profiled element (26) made of heat-resistant plastic material. Such material is also of much use in limiting noise and friction as well as in making assembly easier.

At the entrance and at the exit of the tunnel-shaped chamber (11) there might be placed additional rollers (21') with their relative wheelgears (20) integral with them, outside the hot area. In this way the temperature of the rollers (21') is not dangerous so that the operator can work on the machine safely, without risks of burnings.

According to the invention, the rollers (21') external to the tunnel-shaped chamber are also driven by the chain (19) previously described.

These additional rollers (21'), external to the tunnel-shaped chamber (11), are mounted on the same framework (12) by means of a support (25') separated from support 25 by a space (S). Support 25 and support 25' are coupled by a plate (28) made of a material of low heat conductivity (figures 3 and 4).

Therefore, the function of the space (S) is that of stopping the creation of a thermic bridge between the inside and the outside of the tunnel, thus preventing the heat from being transmitted outside.

An idle roller clearing chute is indicated by 27. A conveyor with these characteristics can be defined as a tangential-chain conveyor.

All that has been disclosed above with reference to the figures, shows clearly that a tangential-chain conveyor according to the invention represents the solution to previous problems and prevents from the inconveniences cited above.

The rollers remain inside the tunnel-shaped chamber so that they do not take the heat outside and useless energy loss is avoided.

Moreover, since the rollers rotate on their own axes, they never shift from their position inside the tunnel so that working operations become safer. This is because the hot parts remain inside the tunnel and operators cannot touch them by accident.

The position of the rotating rollers in relation to the framework and the tangential chain that drives them, makes the inside of the tunnel more compact. It is easily understood that a conveyor according to the invention may be used in heat-shrinkage tunnels of any type and dimension.

Besides, keeping the rollers inside the tunnel-shaped chamber allows the rollers to be less stressed by the temperature variations, so that they last longer.

One first natural consequence of this is that inside the tunnel-shaped chamber there is a minimum variation in the ideal temperature for film shrinkage.

A second consequence is that, the temperature variation being minimum, it will be very difficult for the film to melt, problems of cleaning will be very few if not absent at all and there will be no mark on the base of the articles to be packed.

It must be noted that in the conventional conveying

systems special and expensive additional welding equipments must be used to do the welding by sticking the film edges.

In this manner, the object mentioned in the preamble to the description is accomplished.

The positions of the rollers can obviously be different from those that in the drawings are shown by way of a non-limiting example only, and the number of the rollers can as well be different.

Within the protection limits of the present invention fall all conveyors using the same principles and inventive concepts applied to a tunnel, a hood, or any other system with an environment where a heat-shrinkable film is heat-shrunk on an article to be packed.

The scope of protection of the invention is defined by the accompanying claims.

Claims

1. Chain conveyor for heat-shrinkage environments like a heat-shrinkage tunnel, said tunnel (10) including a tunnel-shaped chamber (11) located on a base framework (12), a ventilation device (14', 14") and heating elements (15), said conveyor being placed in the lower part of said tunnel-shaped chamber (11) and adapted for receiving the articles (17) placed into a film (18) which must be heat-shrunk on said articles, characterized in that it includes a chain (19) that slides, at least partially engaged, on some of the teeth of a series of gearwheels (20) which are integral with the extremity of each one of an identical series of rollers (21), rotating on their own axes integral with said framework (12), said chain (19), forming a closed ring, being put into motion by a ratio-motor (23), placed in said framework (12).
2. Chain conveyor as claimed in claim 1, characterized in that said chain (19) runs straight-line in its upper branch where it is engaged with the gearwheels (20) of said rollers (21), without winding on said gearwheels (20).
3. Chain conveyor as claimed in claim 2 characterized in that the position of said chain (19) in its said upper branch is kept not only by said gearwheels (20) of said rollers (21), which are housed into a special support (25), but also by a profiled element (26) made of heat-resistant plastic material.
4. Chain conveyor as claimed in claim 1, characterized in that said chain (19) extends also to the entrance and the exit of said tunnel-shaped chamber (11) to engage additional gearwheels (20) integral with additional rollers (21') outside the hot area.
5. Chain conveyor as claimed in claim 4, characterized in that said additional rollers (21') outside the

hot area are placed on shoulders (27) made of heat-resistant plastic material.

5

10

15

20

25

30

35

40

45

50

55

Fig.1

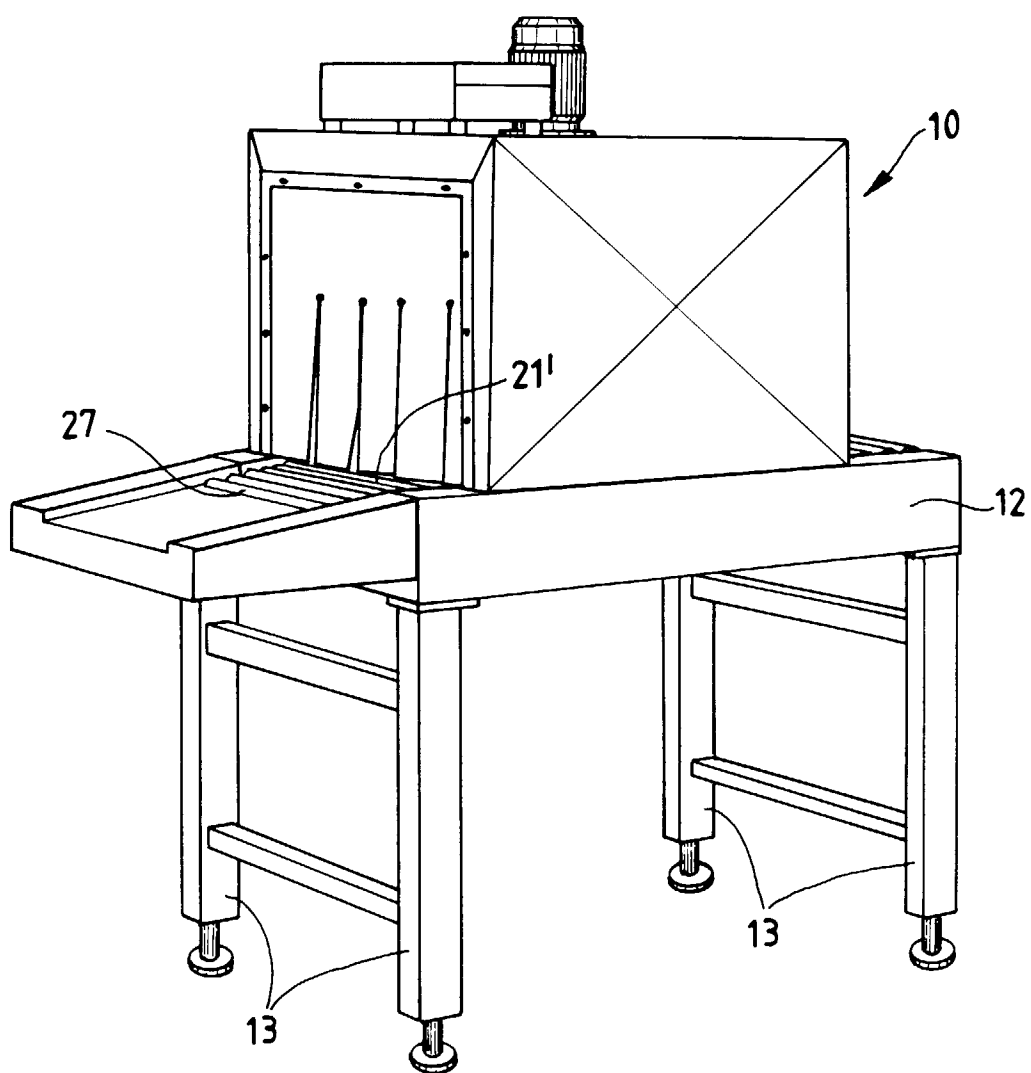


Fig.2

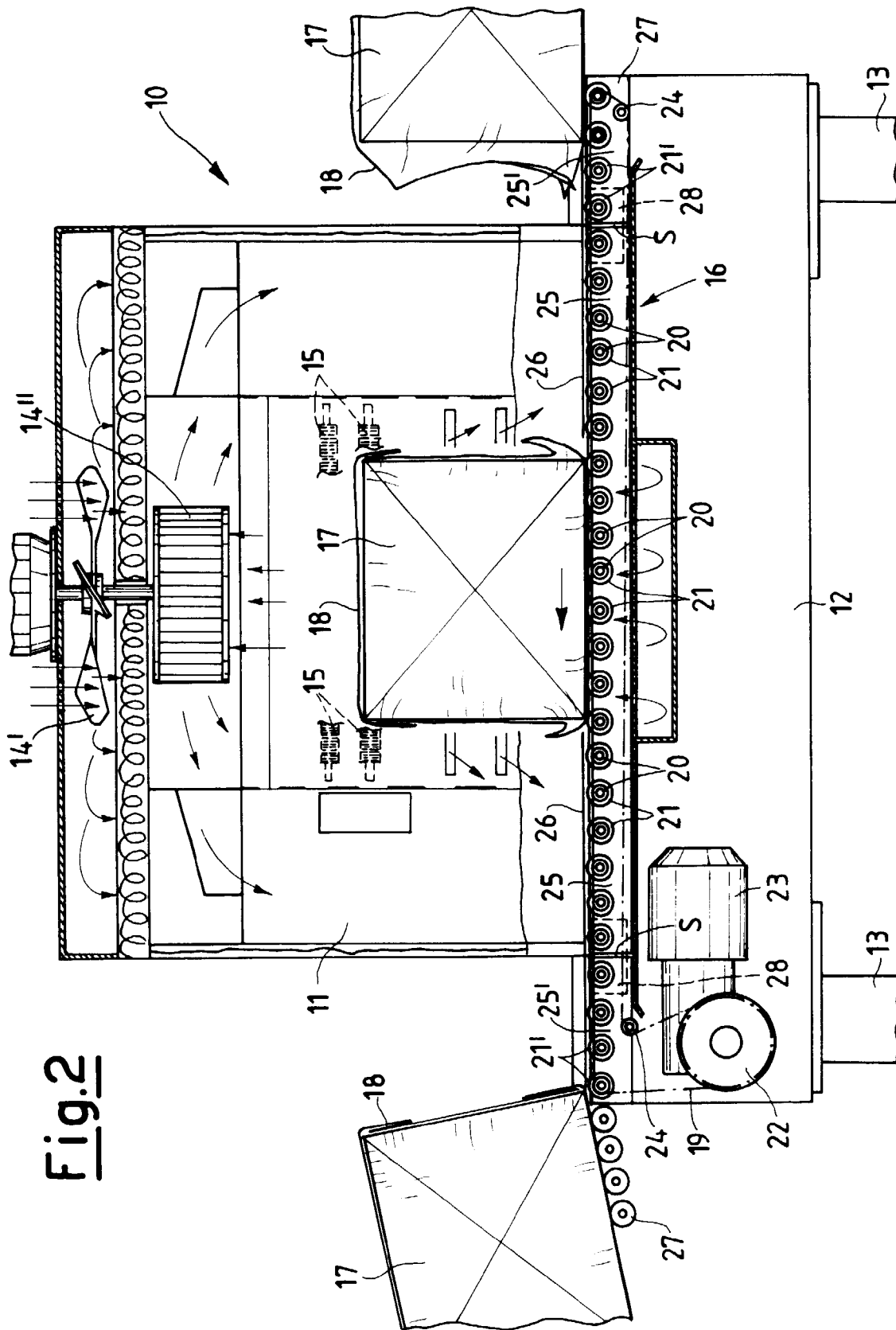


Fig.3

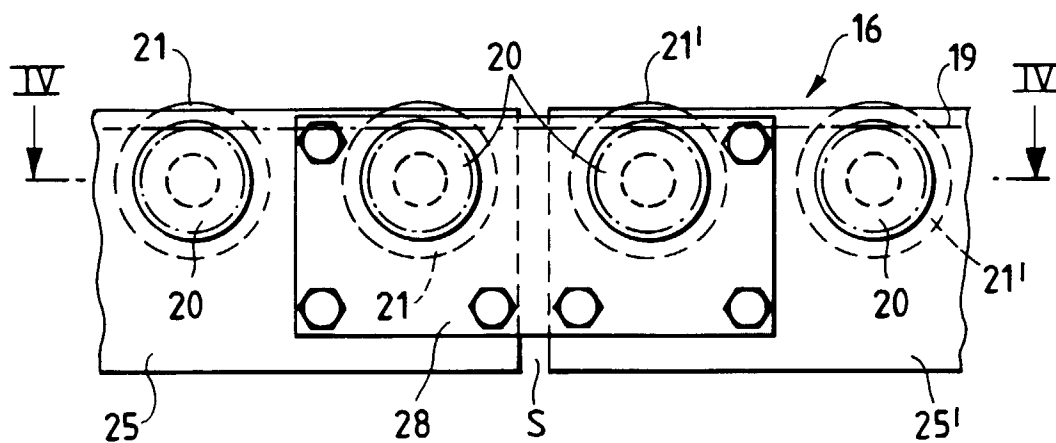
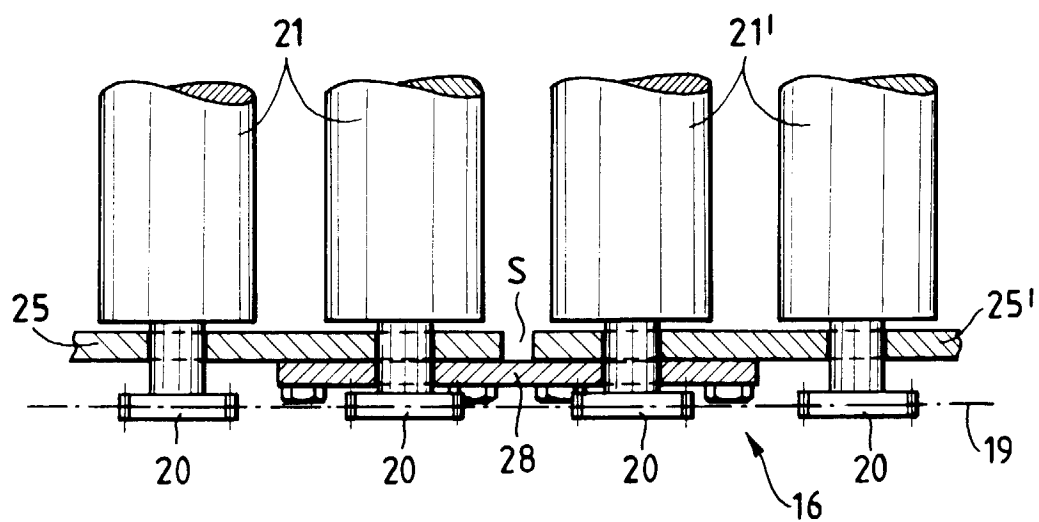


Fig.4





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 20 1065

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	DE 18 93 045 U (BECK) * the whole document *	1,2	B65B53/06
A	DE 31 18 007 A (BECK) 16 December 1982 * page 5, paragraph 3 * * page 9, paragraph 3 - page 10, paragraph 4; figures 1-4 *	3	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B65B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 10 July 1998	Examiner Claeys, H
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03 82 (P04C01)