

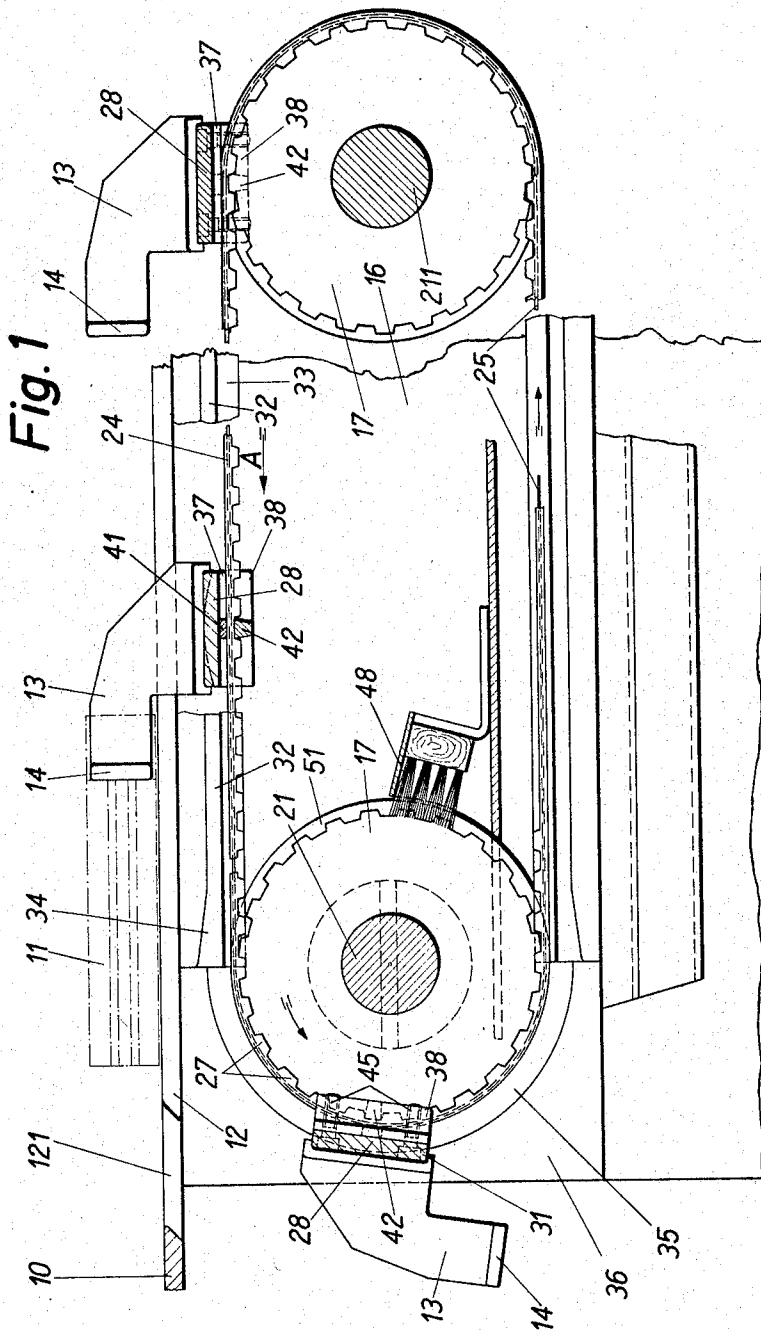
Nov. 1, 1966

A. SCHMERMUND
PACKING MACHINES

3,282,407

Filed Sept. 23, 1964

5 Sheets-Sheet 1



INVENTOR
ALFRED SCHMERMUND

BY *Nolte and Nolte*
ATTORNEYS

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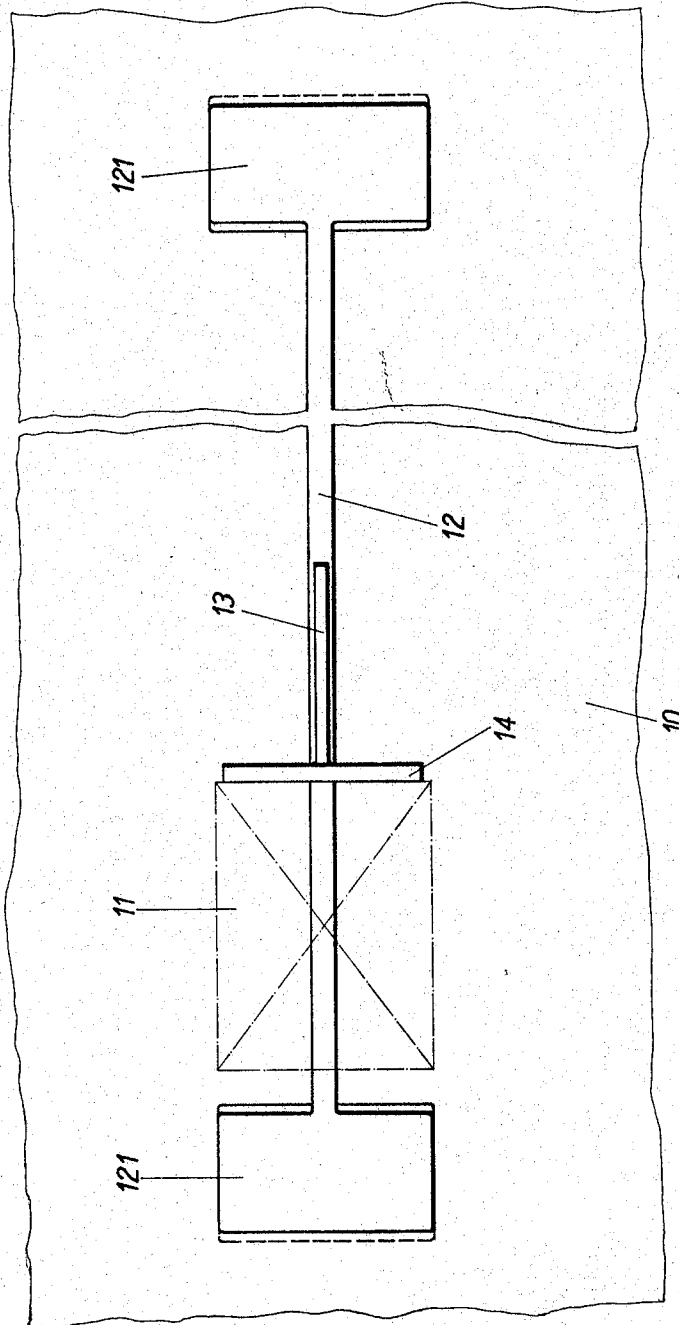
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Fig. 2



INVENTOR
ALFRED SCHMERMUND

BY *Nolte and Nolte*
ATTORNEYS

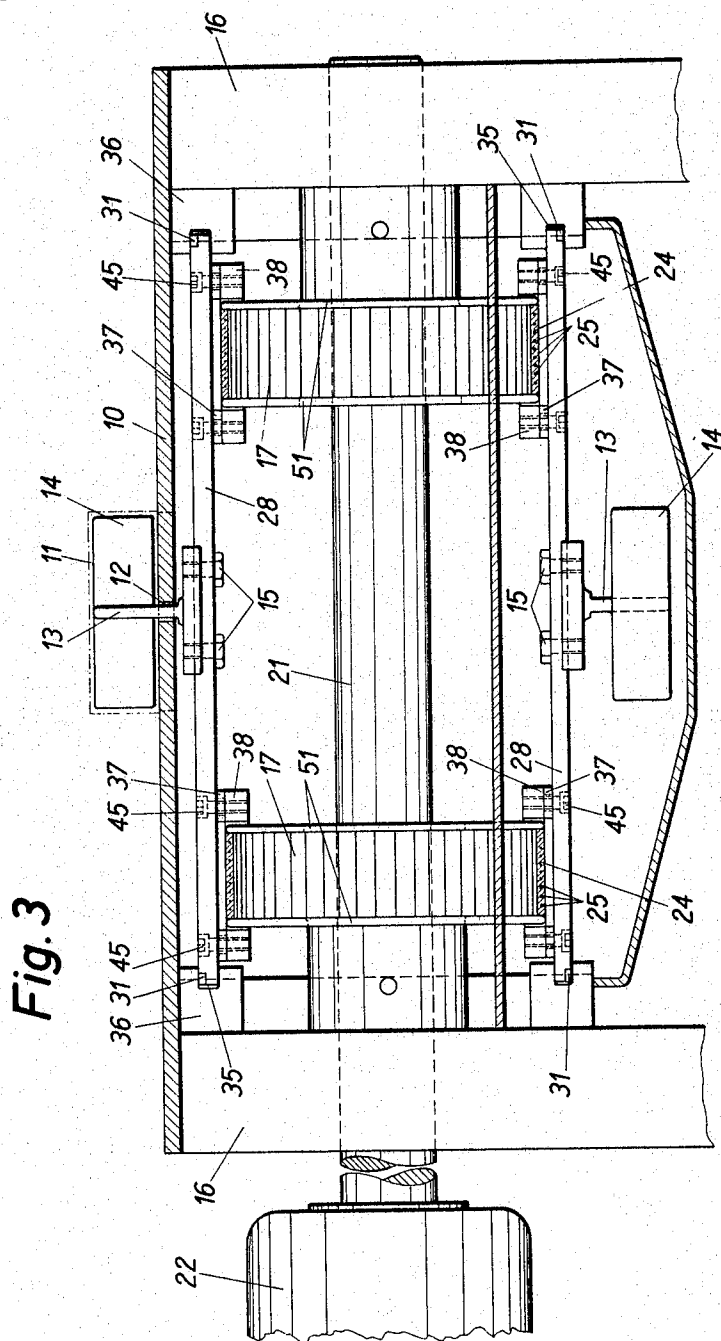
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INVENTOR
ALFRED SCHMERMUND

BY *Nolte and Nolte*
ATTORNEYS

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Fig. 4

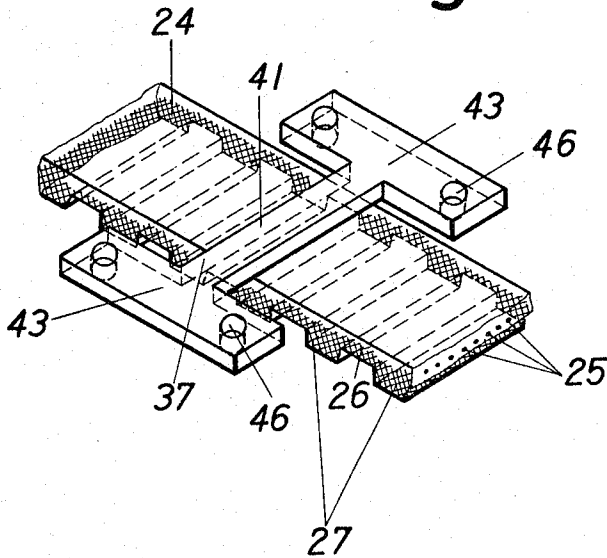
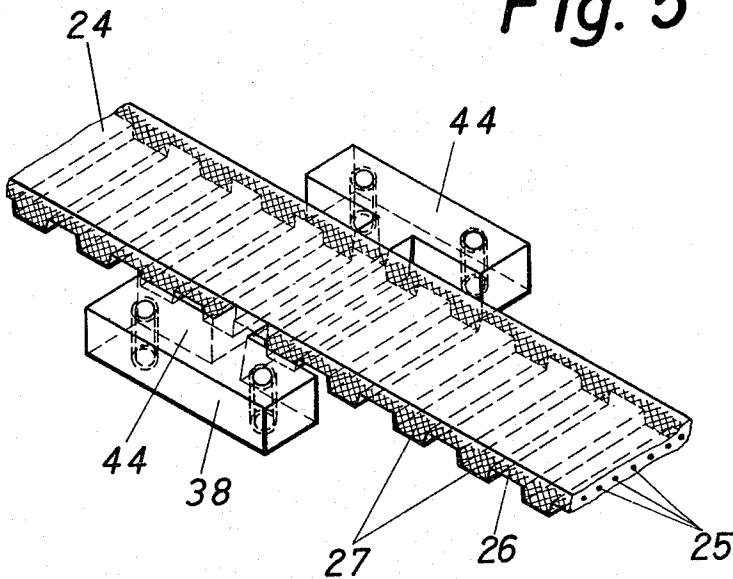


Fig. 5



INVENTOR
ALFRED SCHMERMUND

BY *Nolte and Nolte*
ATTORNEYS

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Fig. 6

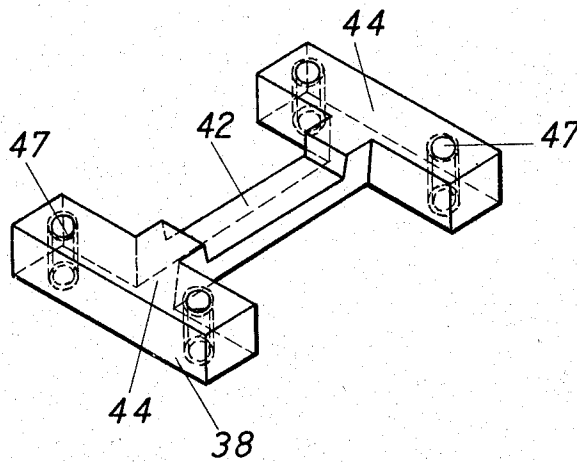
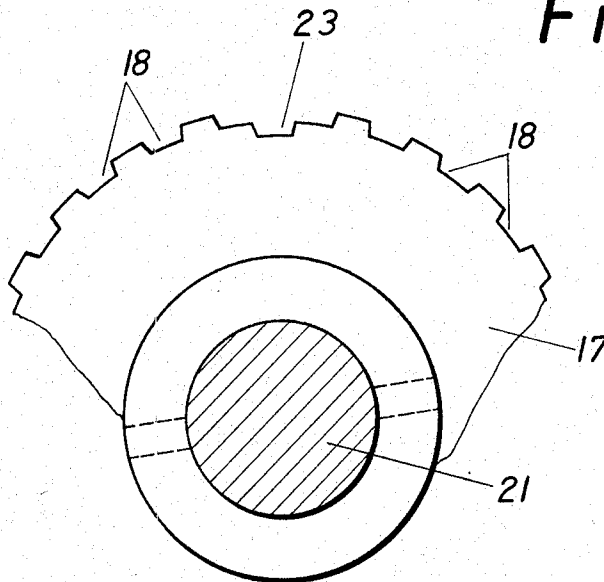


Fig. 7



INVENTOR
ALFRED SCHMERMUND

BY *Nolte and Nolte*
ATTORNEYS

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3,282,407

PACKING MACHINES

Alfred Schmermund, 62 Kornerstrasse, Gevelsberg,
Westphalia, Germany

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Claims priority, application Great Britain, Sept. 27, 1963,

38,153/63

4 Claims. (Cl. 198-175)

The invention relates to packing machines, for example to machines for packing cigarettes.

In packing machines it is often required to convey articles either before or after they have been packed from one place to another. For this purpose, it is usual to provide a feed table between the two places, the table having a slot extending between the two places, a plurality of push members being provided which are adapted to project through the slot from underneath the table, means being provided underneath the table for moving the push members along the slot so that articles are pushed by the push members from one place to the other. The means for moving the push members generally comprise two endless parallel conveyor chains linked together by transverse rods which carry the push members.

It is an object of the invention to provide an arrangement in and for a packing machine, which comprises two endless parallel conveyors linked together by transverse means carrying the push members, wherein conveyor chains are avoided.

It is another object of the invention to provide such an arrangement which does not require lubricating. Thereby soiling of parts of the machine or of articles to be conveyed by a lubricant is avoided.

Conveyor chains as hitherto used comprise a multiplicity of bearings which are liable to wear and tear. If, for example, the distance between the two places through which the articles are to be conveyed is between 6 and 8 metres, then with commonly used conveyor chains 470 to 560 bearings may be required. When in use each bearing has been worn out by only 0.1 millimetre the total length of the conveyor chain is increased by 47 to 56 millimetres. This increase of length is sufficient to upset the original setting of the machine and its correct functioning.

Accordingly, it is a further object of the invention to provide a conveyor arrangement, wherein a multiplicity of bearings, which are liable to wear and tear, are avoided.

For transmitting power, belts have been used, which have teeth and are provided with pull-resisting inserts and a wear-resisting surface. The pull-resisting inserts may comprise a plurality of steel cords, and the wear-resisting surfaces may be surfaces of layers of nylon on rubber or synthetic rubber. Such belts are known per se and are at present available in the trade under the name "Power Grip Belts." They have been used for transmitting power but, to the best of my knowledge have not been used as conveyor belts for packing machines.

It is still another object of the invention to provide a conveyor arrangement in and for packing machines, wherein the hitherto used conveyor chains are replaced by "Power Grip Belts."

These and other objects and advantages of the invention will become clear from the following detailed description of a preferred embodiment given by way of example, when read in conjunction to the accompanying drawings, in which:

FIG. 1 is a side view, partly in section, of a portion of an embodiment of the invention;

FIG. 2 is a plan view of a portion of the embodiment of FIG. 1;

FIG. 3 is an end view, partly in section, of the embodiment of FIG. 1;

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FIG. 4 illustrates a portion of a conveyor belt and a first clamp part of the embodiment of FIG. 1;

FIG. 5 illustrates a portion of a conveyor belt and a second clamp part of the embodiment of FIG. 1;

FIG. 6 illustrates the second clamp part of FIG. 5 separately; and

FIG. 7 illustrates a portion of a toothed wheel of the embodiment of FIG. 1.

The embodiment illustrated comprises a feed table 10 for supporting articles 11. The feed table 10 has a slot 12 extending in the longitudinal direction of the table 10. At each end, the slot 12 merges into a widened opening 121. Push members 13 each having a head 14 for acting on articles 11 are provided, the push members 13 entering the slot 12 through the opening 121 at one end of the slot 12 and leaving the slot 12 through the other opening 121. The push members 13 are movable by a conveyor arrangement underneath the table 10, the table 10 and the conveyor arrangement being mounted on support walls 16.

The conveyor arrangement comprises two pairs of toothed wheels 17, one pair shown in FIG. 3 being keyed to a common shaft 21 rotatably mounted in the support walls 16, and driven by any suitable drive 22, the other pair of toothed wheel 17 being idle and mounted on a similar shaft 211 parallel to the shaft 21 and rotatably mounted in the support walls 16. In some of the gaps 18 (FIG. 7) between adjacent teeth of the toothed wheels 17, recesses 23 are provided which are tapering in a section perpendicular to the shaft 21. Two "Power Grip Belts" 24 are provided, each belt 24 being entrained about two toothed wheels 17, one of each pair of toothed wheels. Each belt 24 (see FIGS. 4 and 5) has a plurality of pull-resisting steel cords 25 inserted therein and a wear-resisting layer, preferably of nylon, which is provided with teeth 27 which mesh with the teeth of the respective toothed wheels 17, the teeth 27 of the belts 24 being received in the gaps 18 of the toothed wheels 17.

The belts 24 are parallel to each other and to the slot 12 in the feed table 10, and lie at either side of the slot 12 symmetrically thereto.

Transverse elements in the shape of bars 28 are connected to the conveyor belts 24 and carry the push members 13 which thus are linked to the conveyor belts 24. The push members 13 are bolted to the transverse bars 28 by bolts 15 and are movable with the conveyor belts 24. The transverse bars 28 are provided with rounded elements 31, at their ends, the centre of curvature of the elements 31 lying in the axis of the shaft 21 or 211 while a transverse bar travels with the respective toothed wheels 17 around the respective shaft. While travelling in the upper straight path, the rounded end elements 31 of the transverse bars 28 are guided in channels 32 provided in guide members 33. At each end, the channels 32 widen as at 34 and lead to circular guide channels 35 adjacent the peripheries of the toothed wheels 17, the circular guide channels 35 being formed by guide plates 36 carried by the support walls 16.

The transverse bars 28 are connected to each belt 24 by means of a two-part clamp illustrated in FIGS. 4, 5 and 6. Each clamp comprises two H-shaped clamp parts 37 and 38, the belt 24 being sandwiched between transverse portions 41 and 42 of the H-shaped clamp parts 37 and 38. The length of the transverse portions 41 and 42 is at least equal to the width of the belt 24 so that longitudinal portions 43 and 44 of the H-shaped clamp parts 37 and 38 lie beyond the belt 24 and can be bolted together by means of bolts 45 extending through holes 46 in the clamp part 37 and being screwed into screw-threaded holes 47 in the clamp part 38. The bolts 45 also extend through holes in the transverse bars 28 near their ends and thus connect the transverse bars 28 to the

belts 24. It will be seen that while the clamp parts 37 and 38 are tightly clamped to the belt 24 by the bolts 45, the said bolts do not penetrate through the belt 24 but lie at both sides of the belt 24. Thereby any weakening of the belt 24 by bolts penetrating through the belt is avoided. Furthermore, the clamp part 37 acts as a spacer between the respective transverse bar 28 and the belt 24. The transverse portion 42 of the clamp part 38 is conical in section perpendicular to the axis of the shafts 21 and 211 as can best be seen from FIG. 1. The clamps are so located on the belts 24, that the conical portions 42 of the clamp parts 38 are received in the conical recesses 23 of the toothed wheels 17 while the respective clamp travels with a toothed wheel 17 about its shaft 21 or 211.

Brushes 48 are provided for cleaning the teeth gaps 18 and recesses 23 of the toothed wheels 17.

The toothed wheels 17 are covered at their sides by discs 51.

The embodiment described operates as follows:

The toothed wheels 17 keyed to the shaft 21 are rotated by the drive 22. Thereby the belts 24 travel in the direction of the arrow A in FIG. 1, and cause the push members 13 fixed to the transverse bars 28 to penetrate the slot 12 in the table 10 through the widened opening 121 at one end of the slot 12 to travel along said slot 12 while pushing an article 11 forward along the table 10, and to leave the slot 12 through the widened opening 121 at the other end of the slot 11. The transverse bars 28 being guided by the channels 32 and by the circular guide channels 35. By connecting the transverse bars 28 to the belts 24 by means of clamps having two parts 37 and 38 in the manner hereinbefore described, any bolts, screws or like means for connecting the transverse bars 28 to the belts 24 and which would penetrate the belts 24 and may damage and weaken the same are avoided. Again, by spacing the transverse bars 28 from the belts 24 by means of the clamp portions 37 it is achieved that any dirt or dust which may in use be deposited in such spacing may fall out therefrom under the action of gravity while the belt 24 travels in an upwards or downwards direction. If the transverse bars 28 would be mounted tight against the belts 24, a temporary gap between the bars 28 and the adjacent surfaces of the belts 24 would, nevertheless, be formed while the bars 28 travel with the toothed wheels 17 in a curved path. Any dirt or dust deposited in such temporary gap would be compacted when the belts 24 and the respective bars 28 subsequently travel along a straight path. It would be difficult to remove such compacted dirt or dust which, when not removed, would buckle the belts and give rise to difficulties in use. By the provision of a permanent spacing between the transverse bars and the belts dirt and dust if deposited is not compacted and is periodically and automatically removed in use when the respective bar travels in an upwards or downward direction.

It will be also appreciated that the belts 24 do not require any lubrication or any adjustment owing to wear and tear. The brushes 48, which if desired may be omitted, serve to keep clean the teeth, the gaps 18 and the recesses 23 of the toothed wheels 17.

While I have described a specific embodiment of my invention I wish it to be clearly understood that the embodiment described and illustrated has been given by way

of example and that many modifications, omissions and additions are possible without departing from the spirit of the invention.

I claim:

1. In and for a packing machine, a conveyor arrangement comprising a plurality of members for conveying articles from one place to another, two endless parallel pull-resisting conveyor belts, a plurality of elements extending transversely to said conveyor belts, each transverse element carrying one of said conveying members, means for clamping each of said transverse elements to said conveyor belts and for distancing said transverse elements from said belts, teeth provided on each conveyor belt, toothed wheels for driving said conveyor belts, and teeth on said toothed wheels, said teeth of said toothed wheels being complementary to and meshing with teeth on said belts, wherein said clamping means each comprise a first H-shaped clamping part at one side of a conveyor belt, a second H-shaped clamping part at the other side of said conveyor belt, each H-shaped clamping part having parallel longitudinal portions and a transverse portion between said longitudinal portions, the length of said transverse portion being at least equal to the width of said conveyor belt, said transverse portion of said second clamp part being adapted to engage a gap between adjacent teeth of said conveyor belt, the longitudinal portions being parallel to the adjacent margin of said conveyor belt, and a plurality of bolts each passing outside the conveyor belt through a pair of registering holes in the longitudinal portions of said first and second clamping parts and through holes in one of said transverse elements whereby said transverse element and said first and second clamping parts are clamped to said conveyor belt.

2. An arrangement as defined in claim 1, wherein said first clamping part is arranged for distancing said transverse element from said conveyor belt.

3. An arrangement as defined in claim 1, wherein said transverse portion of said second clamping part tapers in cross-section perpendicular to said transverse portion for adapting said transverse portion to be received in a recess provided in a gap between teeth of said toothed wheels, said recess being complementarily tapering.

4. An arrangement as defined in claim 1, and comprising bolts bolting said push members to said transverse elements, each to one.

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60 MARVIN A. CHAMPION, *Primary Examiner*.

EVON C. BLUNK, *Examiner*.

R. J. HICKEY, *Assistant Examiner*.