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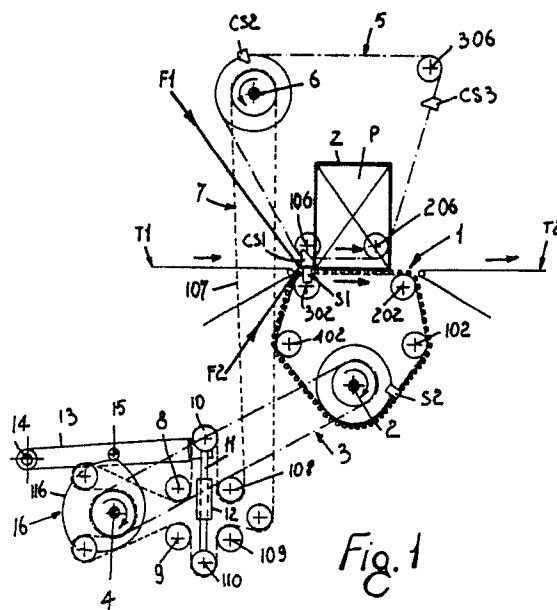
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54 **Sealing and cutting apparatus for continuous automatic wrapping machines.**

57 In a sealing and cutting apparatus for wrappers of thermoplastic films, where the sealing members (S1, S2) and counter-sealing members (CS1, CS2, CS3) are connected in phase to a central driving shaft (4) through respective chain drives (3-7), the chain (107) for the counter-sealing members is controlled by buffer means (8 to 16) that, under command, delay or advance the movements of said counter-sealing members, whereby the latter timely move along with the sealing members during the active working step, and then they slow down or stop or move rearwards in order to permit a successive product (P, P1) to reach the sealing and cutting station, and finally they move forward with a suitable advance to stretch the film on the rear side of the product and to move along therewith to said sealing and cutting station.



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"Sealing and cutting apparatus for continuous automatic wrapping machines"

The present invention relates to an apparatus for the sealing and cutting of wrappers of thermo-plastic film, in which the wrapper enclosing the product is formed by two separate webs of film which are sealed together and cut so as to obtain a tubular wrapper. A known machine of this type comprises a feed conveyor for the products to be wrapped, intermediate carrier means carrying a film sealing member, a further conveyor, arranged above the said intermediate carrier means, carrying the counter-sealing members which are intended to cooperate with the sealing member in order to seal and cut at appropriate points that two films giving origin to the wrapper, and a discharge conveyor for the wrapped products. Such a machine is disclosed, for example, in the Italian Patent Application No. 12431 A/86, filed on 21/02/86 in the name of the same applicant.

According to the invention, at least one sealing member is mounted on a slat conveyor which is bridged between a feed conveyor and a discharge conveyor. The conveyor carrying the counter-sealing members is actuated in timed relationship with the conveyor carrying the sealing members by a central driving source and by means of chains or equivalent means. The chain for transmitting the movement to the conveyor carrying the counter-sealing members is driven by buffer means controlled by a lever-and-cam system actuated by said central driving source, the arrangement being such that said counter-sealing members are actuated with a variable motion, more particularly, such that said sealing countermembers will be first advanced synchronously with the sealing members, then will be stopped or moved back to permit a new product to enter the sealing/cutting station, and, finally, they will be advanced at such a speed as to follow up the product at the rear thereof until they reach the co-operation position with the sealing members to carry out the sealing and cutting step in order to sever the wrapper of heat-shrink film from the films which give origin to said wrapper.

Further characteristics of the invention, and the advantages resulting therefrom, will become apparent from the following description of a preferred embodiment thereof, shown by way of non-limiting example in the figures of the accompanying two sheets of drawings, wherein:

Figures 1, 2 and 3 are diagrammatic side views of the apparatus of the invention, during successive operational steps.

In figure 1, T1 indicates a horizontal conveyor which feeds, at a suitable speed, the products P to be wrapped, and T2 indicates the conveyor which moves away the wrapped products and which is in

line and co-planar with said conveyor T1. Between T1 and T2 there is bridged, with a stretch thereof co-planar with them, a slat conveyor 1 which supports the product during the wrapper sealing and cutting step and during the transfer from T1 to T2. The conveyor 1 is passed around the shafts 2-102-202-302-402, the shaft 2 being actuated by a chain and sprocket drive 3 which is driven by a drive shaft 4.

The conveyor 1 carries one or more sealing members S1-S2 which are equally spaced apart and disposed transversely to the path of travel of the product P to be wrapped. Said sealing members are of conventional type and are so arranged as to effect two parallel seals and one intermediate cut therebetween.

F1 and F2 indicate two lengths of films unrolled from respective rolls (not shown) arranged above and below the conveyor T1, respectively, which join each other downstream of said conveyor T1, prior to the active stroke of the sealing members S1-S2. The product P fed from the conveyor T1 is wrapped, while passing from T1 to 1, with the films F1, F2 on its lower face, front face and upper face in a known manner.

CS1, CS2, CS3 indicate the counter-sealing members, which are parallel to said sealing members, are equally spaced apart and are supported at their ends by a pair of chain conveyors 5 passed around shafts 6-106-206-306 which are parallel to the shafts 2 to 402 and arranged so that said counter-sealing members will be suitably positioned opposite said sealing members during their active stroke or a portion thereof.

The timed advance movement of said sealing members and counter-members is ensured by the connection of the shaft to the drive shaft 4 by means of a chain and sprocket drive 7 which is arranged so that the shaft 6 will be rotated oppositely to the shaft 2 but at the same speed.

The chain 107 of the chain drive 7 is passed also around two pairs of stationary idle sprockets 8-108 and 9-109, so as to form two loops since said chain is passed as well on a pair of equal sprockets 10-110 which are mounted on a slide 11 parallel to said loops and supported by a stationary guide diagrammatically shown at 12. By raising and lowering the slide 11, the two loops of the chain 107 will be lengthened and shortened of the same extent, so as to accelerate and decelerate the rotation of the shaft 6, in such a manner that said counter-sealing members will be moved with a variable motion as stated before. This motion is suitably related to the motion of the sealing members by connecting the slide 11 to a lever 13 which

is fulcrumed at 14 on a stationary support and which, through its intermediate pin 15, follows the contour of a cam 16 keyed on the shaft 4. The contour of said cam controls the movement of the sealing counter-members according to the following law.

When a sealing member and counter-sealing member travel together along the active stroke for the sealing and severing of the wrapper Z which is wrapped about a product P, as shown in figure 1, the pin 15 of the lever 13 follows the portion of contour 116 of the cam 16, that is concentric to the shaft 4. As a result, the slide 11 does not move and the sealing member and counter-member advance synchronously at the same speed as determined by the shaft 4.

When the wrapper Z has been sealed and severed from the films F1-F2 and when the wrapped product has arrived completely or partly on the conveyor T2, as shown in figure 2, the portion 216 of the cam 16 will start co-operating with the pin 15 of the lever 13 and, therefore, the slide 11 will be lowered as indicated with dot-and-dash lines in the same figure 2, to displace the chain 107 in the direction opposite to the movement resulting from the shaft 4 and at such a speed as to cause the counter-sealing members to stop or to move back slowly. On the other hand, the conveyors T1-1-T2 will go on working, so that while a wrapped product goes on in its discharge movement, a new product P' is transferred from T1 to 1 and is wrapped partly with the films F1-F2. When this new product has suitably passed beyond the counter-sealing member CS2 which is in the stand-by position, the ascending portion 316 of the cam 16 will start co-operating with the pin 15 and, therefore, the slide 11 will be raised at a speed that causes an advanced movement of said sealing counter-member which is lowered and is advanced substantially in contact with the rear side of the product P', so as to spread thereon the last portion of the wrapping film and so as to support said product, thus permitting high operational speeds of the machine.

When the counter-sealing member CS2 has terminated its descending stroke and has reached the sealing member S2, the cam 16 is again in the condition of figure 1 and said cycle is repeated.

All the chains used in the apparatus of the invention are of pre-stretched type to minimize the slacks resulting from the use of said chains.

It is to be understood that many changes and modifications, especially of constructional nature, may be made to the apparatus described above; for example, depending upon the dimensions of the product to be wrapped, the length of the active stroke of the counter-sealing members may be modified to such an extent as to be equal to that of

said sealing members.

Claims

1. A sealing and cutting apparatus for automatic continuous machines for the wrapping of products in a tubular wrapper of heat-shrink film, characterized by the fact that at least one film sealing member (S1, S2) is carried by a conveyor (1) which supports the product (P,P') being wrapped during the wrapper sealing and cutting step, said conveyor (1) being connected through a first suitable transmission (3) to a drive shaft (4) which, through a second suitable transmission (7), actuates another conveyor (5) carrying at least one counter-sealing member (CS1, CS2, CS3), the said second transmission (7) being provided with buffer means (8 to 16) which are controlled by the rotation of said drive shaft (4), whereby said counter-sealing members (CS1, CS2, CS3) are moved with a variable motion, and more particularly so as to either slow down or reverse their movement after each active working step of a sealing member (S1, S2), in order to permit a new product to enter the sealing and cutting station, and in such a manner to anticipate their displacement immediately after the preceding step, in order to stretch the last portion of the wrapper on the product and to move along with said product at the rear thereof.

2. An apparatus according to claim 1, characterized by the fact that the first transmission (3) is a chain transmission.

3. An apparatus according to claim 1, characterized by the fact that the second transmission (7) is a chain transmission.

4. An apparatus according to claim 3, characterized by the fact that the buffer means comprise a cam (16) keyed on the drive shaft (4), said cam controlling the movement of a slide (11) carrying a pair of sprockets (10, 110) onto which there is passed the chain (107) of the second transmission (7), whereby movement of the said slide (11) accelerates or decelerates the rotation of the shaft (6) driven by the said chain (107) and controlling the movement of the conveyor (5) which carries the counter-sealing members (CS1, CS2, CS3)

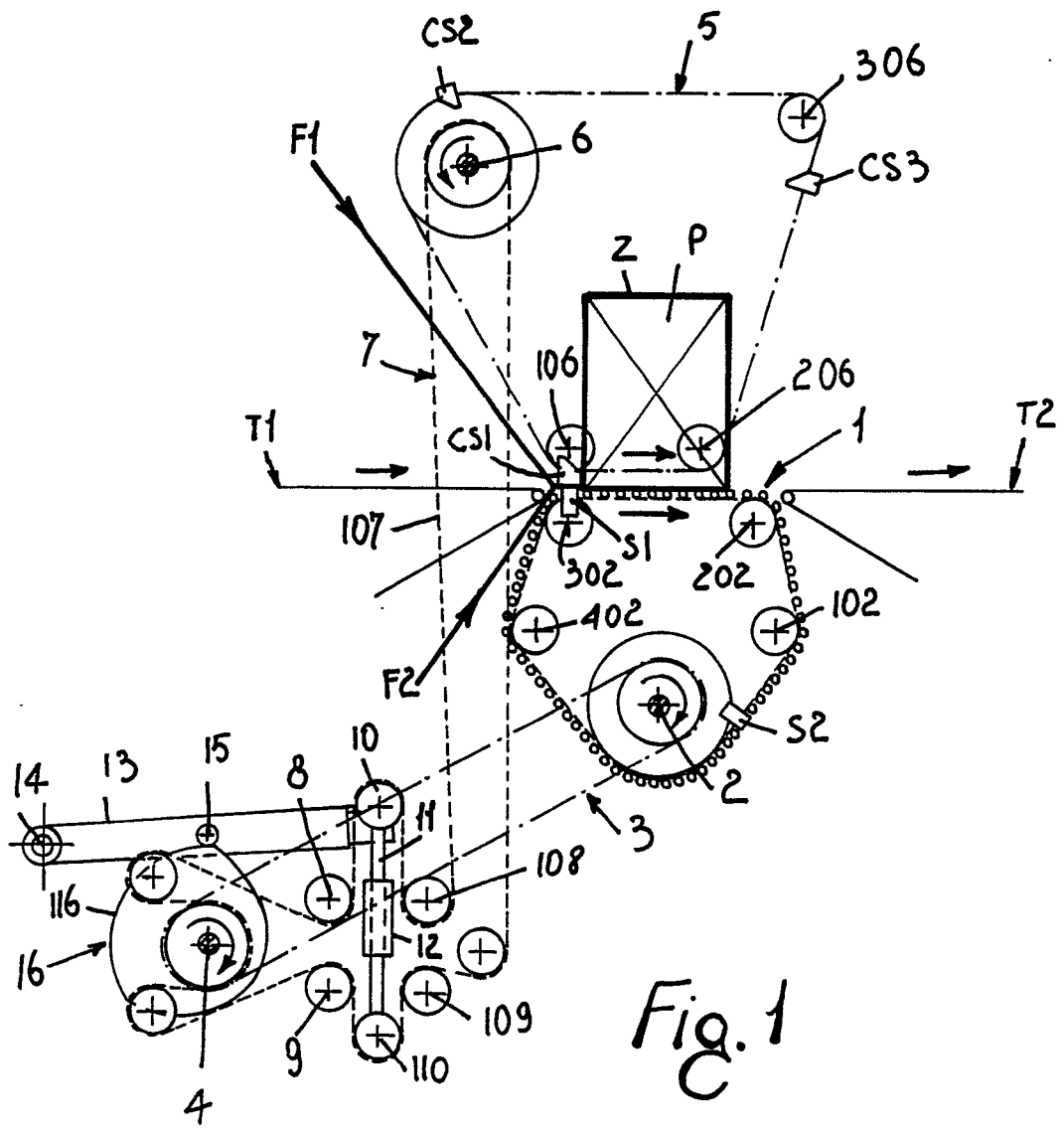


Fig. 1

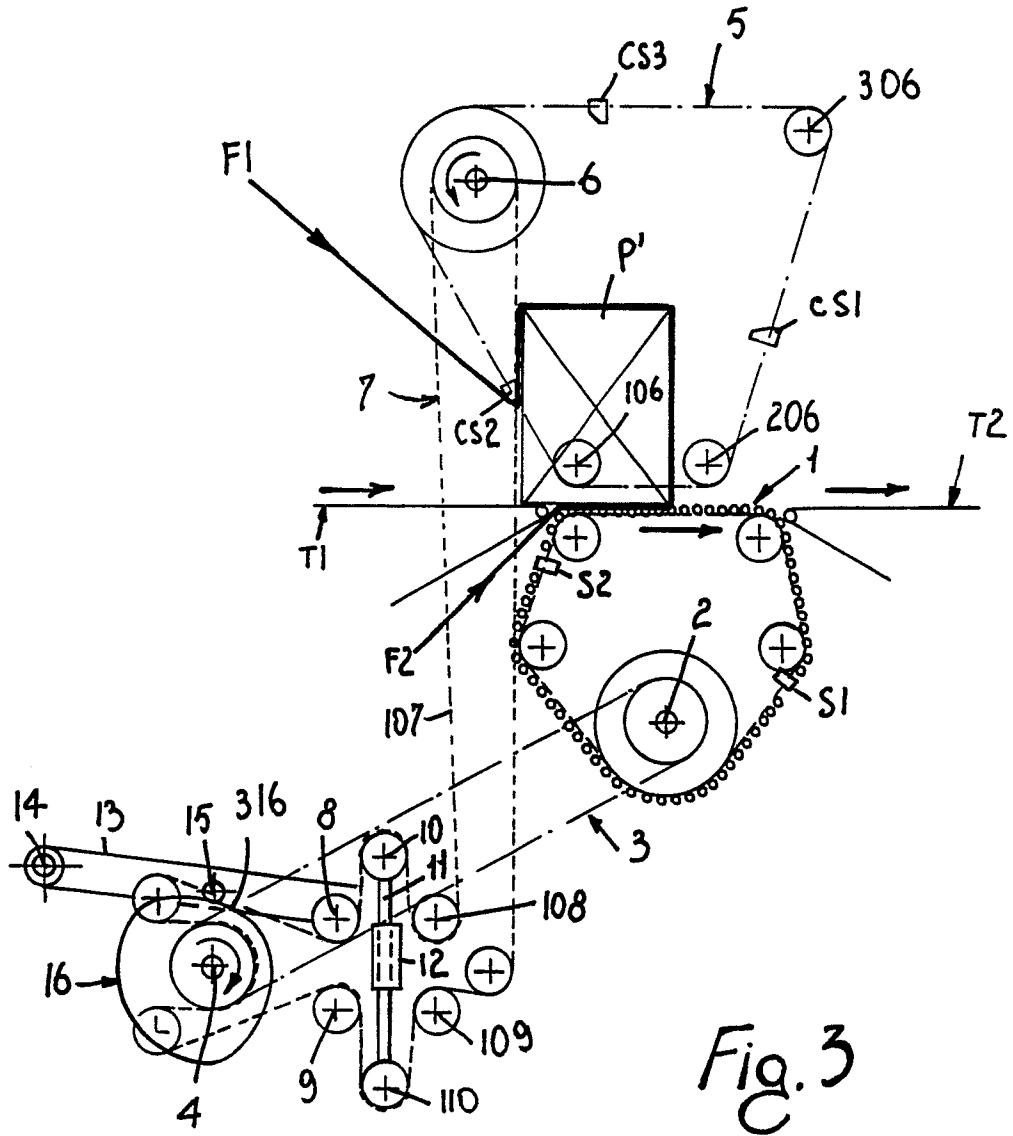


Fig. 3



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.4)
Y	US-A-3 727 365 (R. STOHLQUIST) * Column 4, line 65 - column 5, line 37; figure 1 * ---	1,2,3	B 65 B 9/02 B 65 B 51/30
Y	GB-A-1 163 038 (NIPPON CARBIDE) * Page 3, line 95 - page 4, line 15; page 7, line 123 - page 8, line 93; figures 1,7 * -----	1,2,3	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			B 65 B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 23-02-1988	Examiner JAGUSIAK A.H.G.
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	