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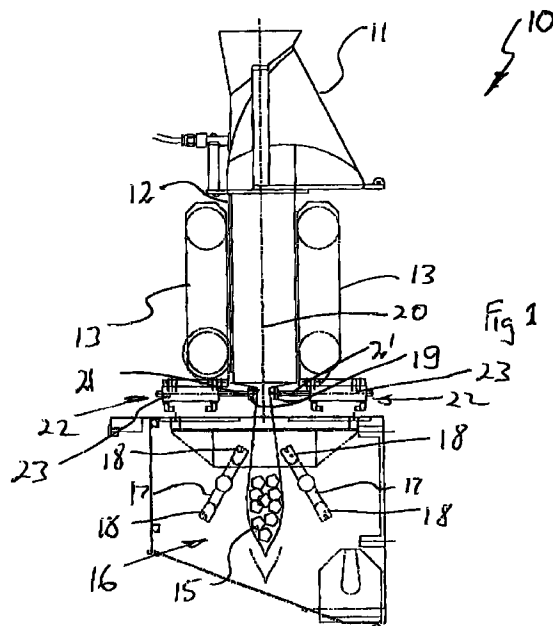
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(54) **Squeezing device in a form-fill-seal packaging machine**

(57) A packaging machine (10) through which tubular bag material (12) passes. Product (15) is delivered to the interior of the bag material (12) so that when the end portion (16) of the bag material (12) is severed, a discrete package is formed containing the product (15). To aid in settling the product the tubular bag material (12) is caused to transversely contract to cause acceleration and deceleration of the end portion (16).



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## Description

### Technical Field

[0001] The present invention relates to packaging machines which deliver product to the interior of tubular bag material, and form discrete packages therefrom.

### Background of the Invention

[0002] Described in U.S. Patent No. 4,663,917 is a rotary packaging machine which receives tubular bag material and forms discrete packages therefrom, with material being packaged located therein. Typically, the tubular bag material is formed from a ribbon of material past about a former, with the longitudinal edges being joined to form the tubular bag material. Typically, the bag material is propelled through the packaging machine by rollers or belts, such as the drive system of U.S. Patent No. 4,910,943.

[0003] Certain materials do not settle well within the bag being formed. This generates a number of problems including difficulty in respect of sealing the bag and the bags occupying an unnecessary volume. Still further, the inability of the material to settle will frequently require the machine's operation to be slowed.

### Object of the Invention

[0004] It is an object of the present invention to overcome or substantially ameliorate the above disadvantages.

### Summary of the Invention

[0005] There is disclosed herein a packaging machine through which tubular bag material passes and to which products to be packaged is delivered, with the bag material being transversely severed to form discrete packages, said machine including a pair of bag engaging members located on opposite sides of the bag material which engage the tubular bag material to cause transverse contraction thereof, the transverse contraction causing acceleration of an end portion of the bag material, which is to form a next bag, to aid in settling the product, and a drive mechanism to cause reciprocation of the bag engaging members to cause the transverse contraction to be intermittent.

### Brief Description of the Drawings

[0006] Preferred forms of the present invention will now be described by way of example with reference to the accompanying drawings, wherein:

Figure 1 is a schematic front elevation of a packaging machine;

Figure 2 as a schematic side elevation of the pack-

aging machine of Figure 1;

Figure 3 is a schematic front elevation of a further packaging machine; and

Figure 4 is a schematic side elevation of the packaging machine of Figure 3.

### Detailed Description of the Preferred Embodiment

[0007] In Figures 1 and 2 of the accompanying drawings, there is schematically depicted a packaging machine 10. In this embodiment, the packaging machine 10 includes a former 11 which receives a strip of packaging film to form the film into tubular bag material 12. The edges of the film are joined, with the film being pulled through the packaging machine 10 by a pair of driven belts 13. The bag material 12 passes vertically downward through the machine 10.

[0008] Through the cavity 14 of the former 11, product 15 is delivered to be located in the end portion 16 of the bag material 12, which end portion 16 is to be severed from the bag material 12 to form a discrete package. Typically, the packaging machine 10 would include a pair of rotatably driven arms 17, the ends of which are provided with sealing jaws 18, and a blade to sever the bag being formed from the tubular bag material 12. There may be stripper bars associated with the jaws 18 to strip the bag material 12. Closer bars may also be used.

[0009] To aid in settling the product 15, there is provided a pair of bag engaging members 19 located on opposite sides of the bag material 12 which are caused to reciprocate transversely of the tubular material 12 to cause intermittent transverse contraction thereof. More particularly, the members 19 are caused to reciprocate linearly in unison in opposite directions generally normal to the longitudinal axis 20 of the tubular bag material 12. This transverse contraction of the bag material 12 causes the end portion 16 to vertically accelerate (upwardly) and then to downwardly accelerate upon retraction of the members 19 to aid in settling the product 15. This takes place prior to the jaws 18 engaging the material 12. Typically, the bag engaging members 19 would reciprocate horizontally between three and six times per second, preferably four times per second.

[0010] The bag engaging members 19 are attached to rods 21 of pneumatic rams (drive mechanism) 22. Typically, the rams 22 would have a cylinder body 23 attached to the frame of the packaging machine 10. Air under pressure would be delivered intermittently to the rams 22 to cause horizontal linear reciprocation of the members 19.

[0011] In respect to the above referred embodiment, it should be appreciated that operation of the bag engaging members 19 does not affect the speed at which the tubular bag material 12 is moved through the packaging machine 10 by the belts 13.

[0012] Reciprocation of the bag engaging members 19 is also preferably coordinated with delivery of the

product 15 to the interior of the bag material 12 so that the bag engaging members 19 do not inhibit delivery of the product 15 to the end portion 16. Typically, a weighing machine would be associated with the packaging machine 10 and would deliver discrete volumes or weights of product 15 to the tubular bag material at the times required.

**[0013]** In Figures 3 and 4 of the accompanying drawings, a further preferred form of the present invention is shown. In this embodiment, the same reference numerals have been employed, however, the bag engaging members 24 are attached to arms 25. The arms 25 extend to stepping motors 26 which causes angular oscillation of the arms 25 and therefore angular oscillation (reciprocation) of the members 24 to cause transverse intermittent contraction of the tubular bag material 12. The angular oscillation of the arms 25 is about fixed horizontal parallel axes, generally transverse of the bag material 12 so that the arms 25 move in unison in angular opposite directions.

**[0014]** The above-mentioned stepping motors 26 may be replaced with rotary cylinders or servo motors.

**[0015]** The bag engaging members 19 and 24 contract and then allow the bag material 12 to expand, at least once while each bag is being formed, that is before the jaws 18 prevent movement of the portion 16, and therefor before the bag is formed. This would take place when product 15 is within the length of bag material 12 to form the next bag. Preferably the members 19 and 24, as seen in Figures 1 and 3, engage and release the bag material 12 before the jaws 18 engage the bag material 12. Preferably the members 19 and 24 would extend and retract at least twice for each bag being formed.

**[0016]** The members 19 and 24 rapidly engage and retract with respect to the bag material 12, the movement of the members 19 and 24 being preferably such that the lower portion 16 of the material 12 actually lifts, as seen in Figures 1 and 3.

**[0017]** As can be seen from the above two embodiments, the members 19 and 24 have a component of their direction of movement normal to the bag material 12, that is horizontal. The embodiment of Figures 1 and 2 has the members 19 move only horizontally, while in the embodiment of Figures 3 and 4, the members 24 have a vertical and horizontal component to their direction of movement.

### Claims

1. A packaging machine (10) through which tubular bag material (12) passes and to which products (15) to be packaged is delivered, with the bag material (12) being transversely severed to form discrete packages, said machine (10) including a pair of bag engaging members (19) located on opposite sides of the bag material (12) which engage the tubular bag material (12) to cause

transverse contraction thereof, the transverse contraction causing acceleration of an end portion (16) of the bag material (12), which is to form a next bag, to aid in settling the product (15), and a drive mechanism (22) to cause reciprocation of the bag engaging members (19) to cause the transverse contraction to be intermittent.

2. A packaging machine (10) according to claim 1, wherein the bag engaging members (19, 24) reciprocate so as to have a component of their movement normal to the bag material (12).

3. A packaging machine (10) according to claim 2, wherein the tubular bag material (12) passes vertically downwardly through the machine (10) and the bag engaging members (19) are caused to reciprocate substantially horizontally in unison in opposite directions.

4. A packaging machine (10) according to claim 2 or 3, wherein the drive mechanism includes a pair of rams (22), each associated with a respective one of the bag engaging members (19), with the rams (22) being actuated to cause reciprocation of the bag engaging members (19).

5. A packaging machine (10) according to claim 2, 3 or 4, wherein the bag engaging members (19) are caused to reciprocate between 3 and 6 times per second.

6. A packaging machine (10) according to claim 5, wherein the bag engaging members (19) are caused to reciprocate approximately 4 times per second.

7. A packaging machine (10) according to any one of claims 1 to 6, wherein the bag engaging members (19) contract and then allow the bag material (12) to expand, at least once for each bag formed.

8. A packaging machine (10) according to claim 2, wherein the bag engaging members (24) are caused to angularly reciprocate in opposite angular directions in unison to cause the transverse contraction of the tubular bag material (12).

9. A packaging machine (10) according to claim 8, wherein the bag engaging members (24) are caused to angularly reciprocate about fixed parallel axes extending generally transverse of the tubular bag material (12) which moves substantially vertically through the machine (10).

10. A packaging machine (10) according to claim 8 or 9, wherein the bag engaging members (24) are caused to reciprocate between 3 and 6 times per

second.

- 11. A packaging machine (10) according to claim 10, wherein the bag engaging members (24) are caused to reciprocate approximately 4 times per second. 5
- 12. A packaging machine (10) according to any one of claims 8 to 11, wherein the bag engaging members (24) contract and then allow the bag material (12) to expand, at least once for each bag formed. 10
- 13. A packaging machine (10) according to claim 7 or 12, wherein the bag engaging members (19, 24) are rods (24). 15

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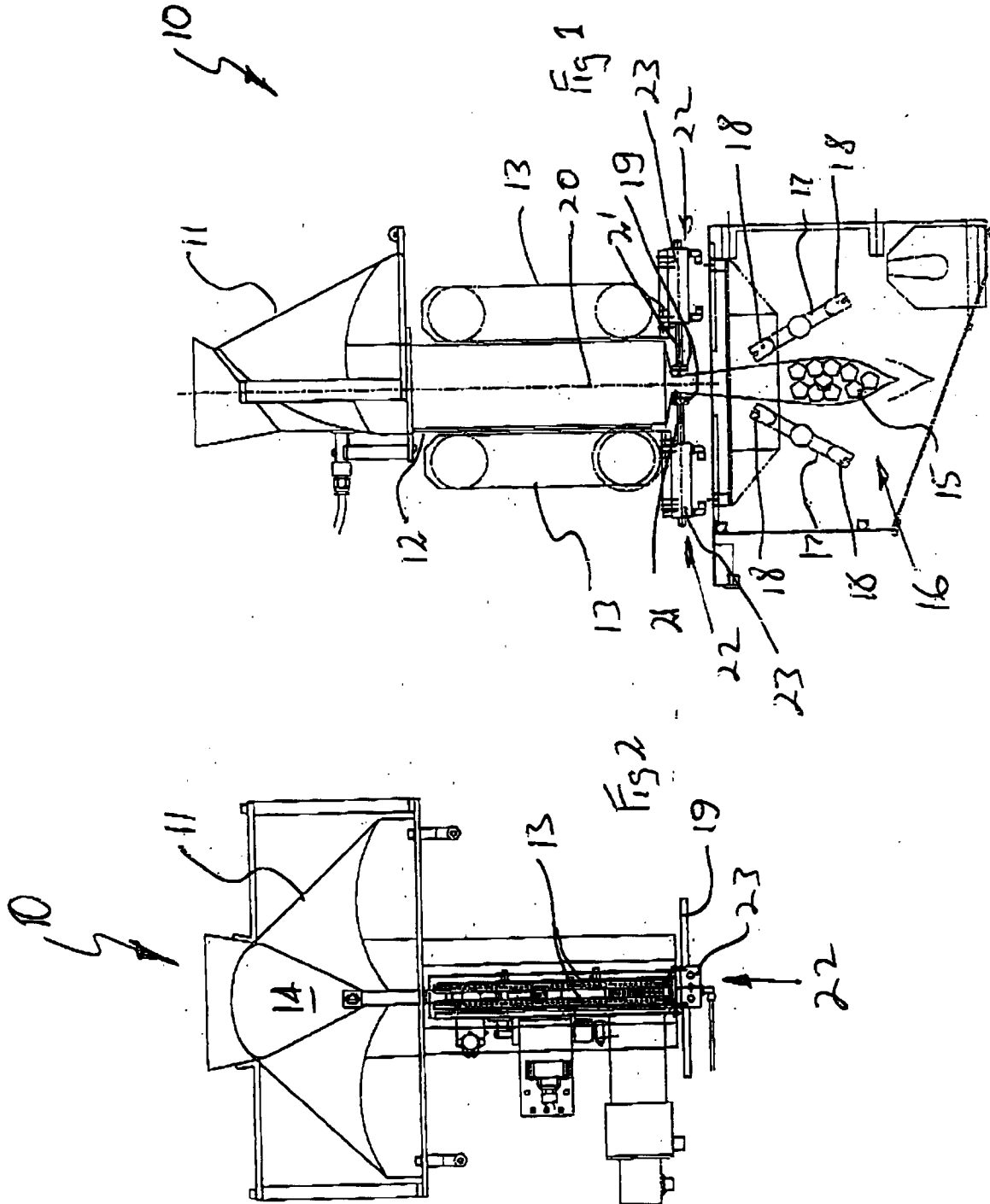
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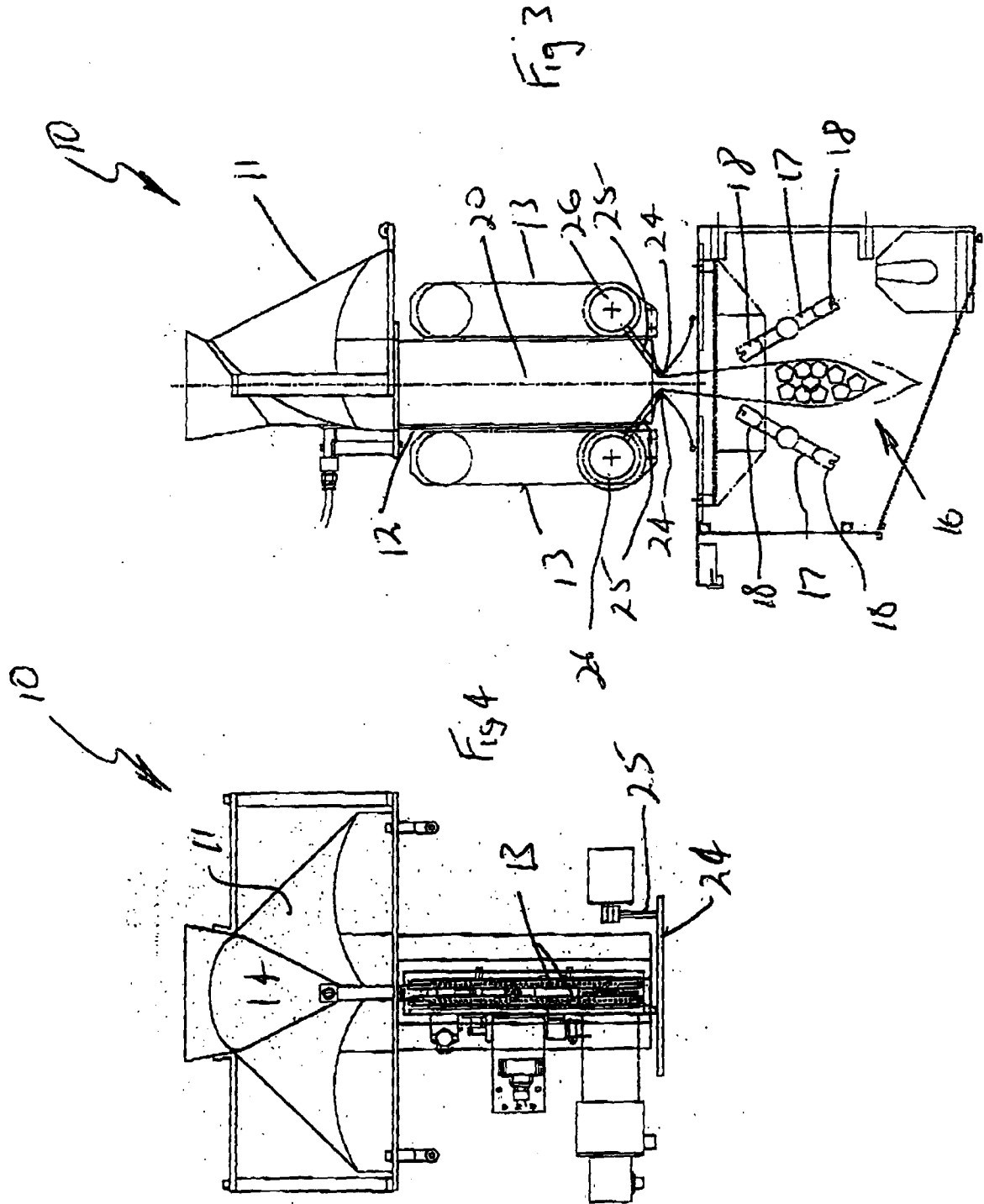
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Application Number  
EP 99 30 1831

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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		11 August 1999	Jagusiak, A
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone		T : theory or principle underlying the invention	
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P : intermediate document		& : member of the same patent family, corresponding document	

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ANNEX TO THE EUROPEAN SEARCH REPORT  
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