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Coates

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[54] **PACKET FORMING**

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[73] Assignee: **Molins Limited,** London, England

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[30] **Foreign Application Priority Data**

July 17, 1970 Great Britain 34,755/70

[52] **U.S. Cl.** ..... **93/12 R,** 93/59 CE, 93/59 ES

[51] **Int. Cl.** **B31b 1/28**

[58] **Field of Search** ..... 93/12 C, 12 R, 36 DA, 93/59 CE, 59 ES, 84 FF; 279/3

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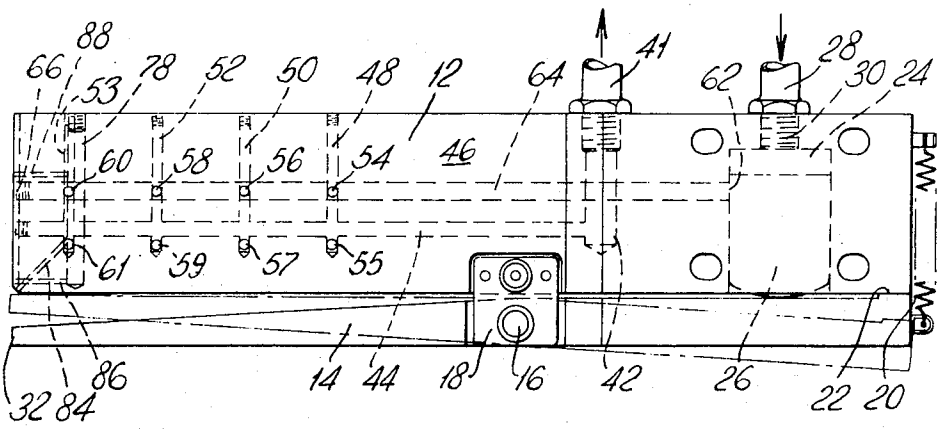
[57] **ABSTRACT**

A method of and apparatus for making packets, the method comprising folding the packet material round a former, securing the packet material to form an open-ended packet, collapsing the former so as to allow easy removal of the packet from it, and blowing the formed packet off the former by means of one or more jets of air.

18 Claims, 5 Drawing Figures



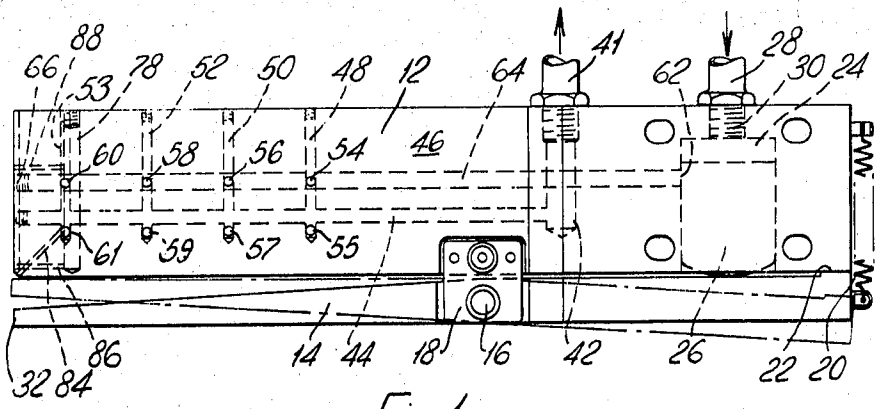


FIG. 1.

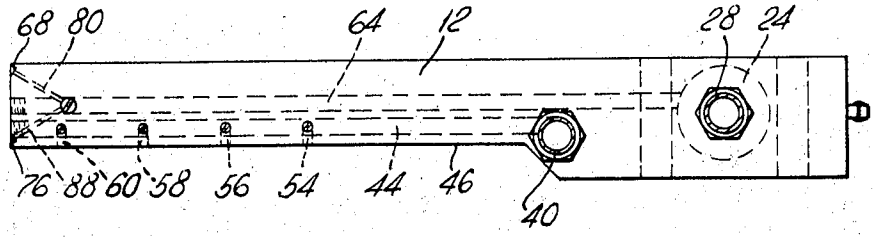


FIG. 2.

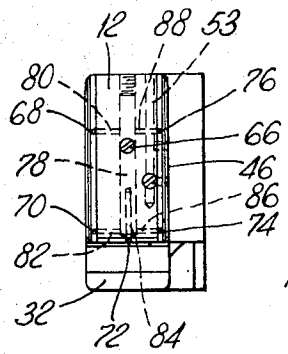


FIG. 3.

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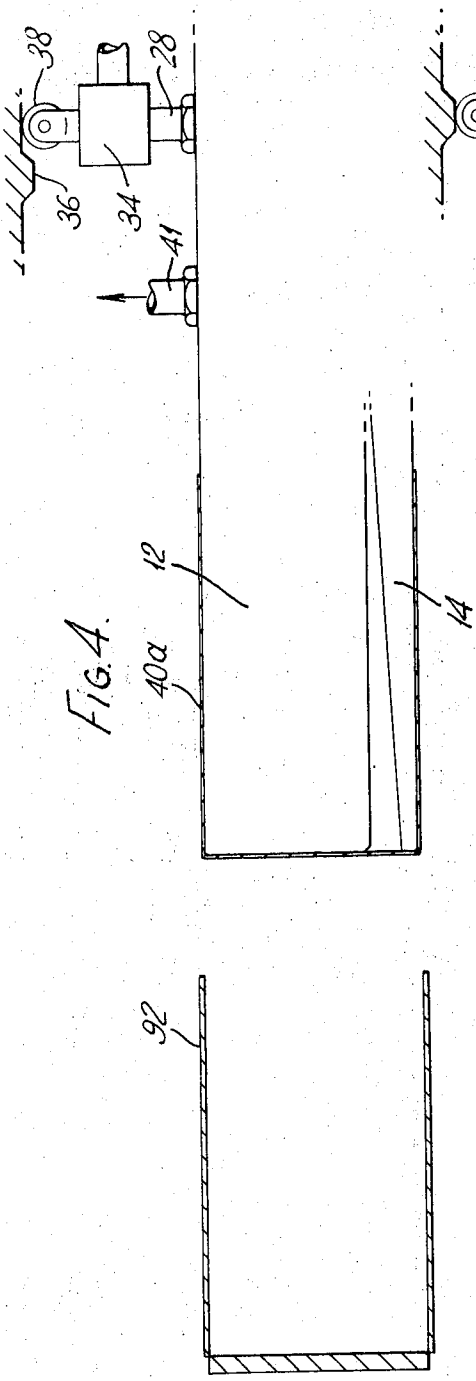

FIG. 4.

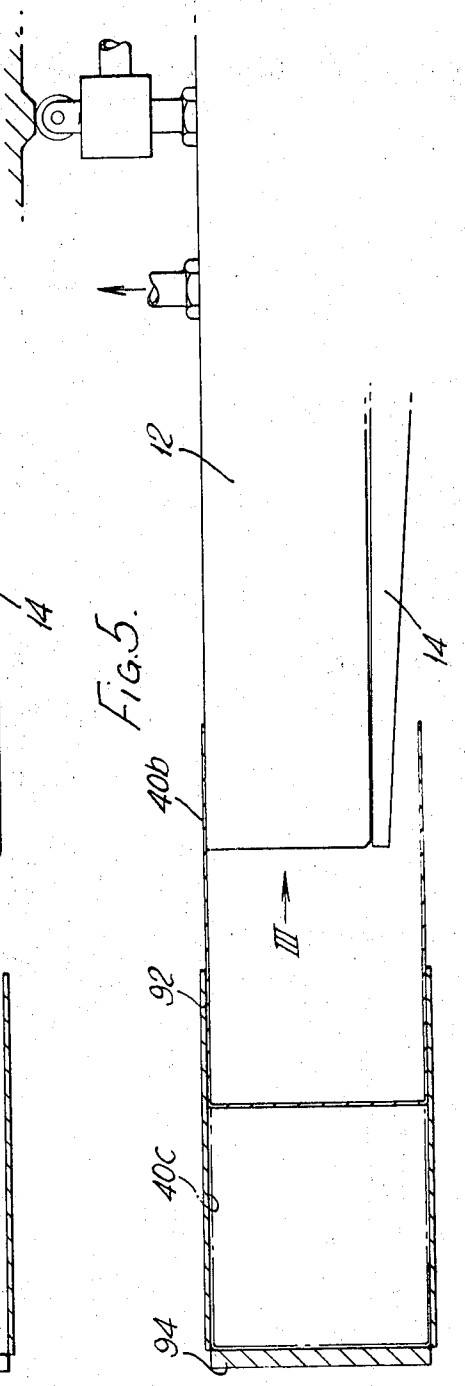

FIG. 5.

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PACKET FORMING

This invention concerns packet making in which one or more pieces of sheet material are folded around a former to form each packet. The invention is particularly concerned with the production of what are commonly referred to as "soft packs" for cigarettes; that is to say packets consisting of a foil inner part surrounded by an outer part of paper. The packets may for example each be transferred from the former into a holder in which the packet remains while a bundle of compressed cigarettes is being inserted into the packet with the aid of a mouthpiece, as described in British Patent Specification No. 1,171,762.

According to the present invention a method of making packets comprises folding the packet material round a former, securing the packet material to form an open-ended packet, collapsing the former so as to allow easy removal of the packet from it, and blowing the formed packet off the former by means of one or more jets of air.

Conveniently the packet material may be held on the former by suction applied through the former while the packet material is being folded round the former.

Preferably the air supplied to blow the packets off the former automatically causes the former to collapse.

According to another aspect of this invention, apparatus for making packets comprises a former, means to fold packet material round the former, means to secure the packet material to form an open-ended packet, means to collapse the former so as to allow easy removal of the packet from it, and means to blow the formed packet off the former.

According to a further aspect of this invention, a packet former comprises a former body and a member movable relative to the main former body between an outer position, in which it is spaced from the body and in which the body and the member together define a cross-section corresponding to the desired internal cross-section of a packet, and an inner position in which the member lies closer to the body so that the cross-section of the former is less than the cross-section of the packet, the former body having passageways in it through which air can be supplied under pressure to outlets in the body arranged to produce air jets to blow the packet off the former.

The former body may also have a second set of passageways in it through which suction can be applied to ports in the faces of the body to hold the packet material onto the former while it is being folded around the former.

Preferably the movable member is biased towards the outer position and is moved automatically by air pressure to the inner position when air is applied to blow the packet off the former.

In a preferred embodiment the former body includes a cylinder having a piston in it, which controls the position of the movable member, so that when air is supplied to the cylinder, the piston moves the movable member to the inner position. The cylinder may have an outlet communicating with the passageways through which air is supplied to blow the packet off the former, the outlet being arranged so that it is only exposed, so as to receive air from the cylinder, when the piston is in its position corresponding to the collapsed condition of the former.

Conveniently the movable member may be pivoted to the former body. The pivot preferably lies between the piston and the end of the former from which the packet is blown off, and in which the piston moves outwards to collapse the former the operative part of the former around which the packet material is to be folded being in the region of the end from which the packet is blown off.

An example of a cigarette packet former according to this invention will now be described with reference to the accompanying drawings in which:

FIG. 1 is a front-view of the former;

FIG. 2 is a plan view of the former;

FIG. 3 is an end view of the former, looking in the direction shown by the arrow III in FIG. 5;

FIG. 4 is a front view showing diagrammatically how the former may be used, the former being shown in this view with a packet on it; and

FIG. 5 is similar to FIG. 4 but shows a later stage of the operation, with the packet leaving the former.

Referring to FIG. 1, the former consists of a main body 12 and a member 14 which is pivoted by a pin 16 to a bracket 18 mounted on the body 12. A spring 20 biases outwardly the operative part of the member 14 (i.e., around which the packet material is folded) which is the part to the left of the pivot pin 16 in FIG. 1. The member 14 has a stop 22 at its right-hand end which rests against the side of the body 12 in order to define exactly the outer position of the member 14.

Within the body 12 there is a cylinder 24 and a piston 26. Compressed air is admitted to the cylinder 24 from an inlet pipe 28 which is connected to the cylinder 24 by a passage 30. The outer end of the piston 26 bears against the inside face of the member 14. When air is admitted to the cylinder 24, the piston 26 moves outwards, thus causing the member 14 to move against the tension of the spring 20, about the axis of the pivot pin 16, to the position shown in FIG. 5, and indicated by broken lines in FIG. 1. When air is no longer applied to the cylinder 24, the spring 20 pulls the member 14 back into the position shown in FIG. 1, thus at the same time pushing the piston 26 back into the cylinder 24.

The admission of air to the cylinder 24 is controlled by a valve 34 (see FIGS. 4 and 5) leading to the pipe 28. The valve is operated by a cam 36 acting on a follower 38, movement of which operates the valve. In fact, in use in a continuously rotating machine of the type described in the aforementioned patent the cam 36 would be stationary and the former together with the follower would move relative to the cam by rotating bodily about the axis of a carrier drum, as described in the aforementioned patent.

In FIGS. 4 and 5 the reference 40 generally refers to a packet. The packet is formed in the position shown as 40*a* in FIG. 4; 40*b* and 40*c* denote successive positions of the formed packet when the packet is blown off the former. The packet 40 is formed in the position 40*a* by folding first foil and then paper round the former and glueing the paper to form an open-ended packet. For this operation the member 14 is in the outer position shown in FIGS. 1 and 4; the cross-section of the former corresponds to the desired internal cross-section of the packet.

A source of suction (not shown) is connected to a pipe 41 which leads via passageways 42 and 44 (FIG. 1) to further passageways 48, 50, 52 and 53. These passageways communicate with ports 54, 55, 56, 57, 58,

59, 60 and 61 in the front face 46 of the body 12. Suction applied through these ports holds the foil in position upon the former while the paper is being folded round the foil.

As previously described, when the pipe 28 is connected to a source of compressed air, the piston 26 moves the member 14; when the piston 27 has reached the end of its travel, i.e., with the former completely collapsed, the inner end of the piston 26 uncovers a port 62, thus allowing air to pass into a passageway 64. Five orifices 68, 70, 72, 74 and 76 in the end face of the body 12 (see FIG. 3) are connected with the passageway 64 via a passageway 78 and further passageways 80, 82, 84 86, 88 respectively (see FIGS. 1 to 3).

Air jets issuing from the orifices blow the packets off the former.

Hence opening of the valve 34 admits compressed air to the cylinder 24 and the piston 26 moves outwards, causing the former to collapse. When the former is fully collapsed the piston uncovers the port 62, thereby automatically causing the air jets to issue from the orifices to blow the packet 40 off the former and into a holder, indicated by the reference 92 in FIGS. 4 and 5.

The holder 92 is a tubular member of rectangular cross-section corresponding to the external cross-section of the packet 40.

A removable stop 94 ensures that the packet 40 comes to rest at the desired position 40c.

The subsequent operations performed on the packet may be as described in the aforementioned patent.

A machine such as that described in the aforementioned patent may be operated over a wide range of speeds. Consequently, if the admission of air to the cylinder 24 is controlled solely by a valve operated by a cam affixed to the machine, such as the valve 34, air jets will issue from the orifices for a comparatively short time when the machine is running at a high speed and for a longer time when the machine is running slowly. In order to avoid allowing the jets to blow into the packet even after the packet has reached the position 40c when the machine is running at a relatively slow speed with the possibility that the jets might damage the packet, the jets may all be inclined to the axis of the packet so as to miss the packet (i.e., pass to the side of it) when the packet is in the holder.

Alternatively the delivery of air may be subject to a timed control device so that the air only issues from the orifices for a predetermined length of time, irrespective of the machine speed. In this case, the end 66 of the passageway 64, which is shown blanked-off in the drawings, may be open to provide a further orifice from which a jet of air may issue to help blow the packet off the former.

I claim:

1. A packet former comprising a main former body and a member movable relative to the main former body between an outer position, in which it is spaced from the body so that the cross-section of the packet former corresponds to the desired internal cross-section of a packet, and an inner position in which the member lies closer to the body and the packet former is thus collapsed, means biasing said movable member towards said outer position and a piston-cylinder device responsive to air pressure to move said member to said inner position, the former body having passageways leading to outlets through which air can be supplied under pressure to produce air jets to blow the packet off the former.

2. A packet former according to claim 1 in which the former body has a second set of passageways in it through which suction can be applied to ports in the faces of the body to hold the packet material onto the former while it is being folded around the former.

3. A packet former according to claim 1 in which the cylinder has an outlet communicating with the passageways through which air is supplied to blow the packet off the former, the outlet being arranged so that it is only exposed, so as to receive air from the cylinder, when the piston is in its position corresponding to the collapsed condition of the former.

4. A packet former according to claim 1 in which the movable member is pivoted to the former body.

5. A packet former according to claim 4 in which the pivot lies between the piston and the end of the former from which the packet is blown off, and in which the piston moves outwards to collapse the former, the operative part of the former around which the packet material is to be folded being in the region of the end from which the packet is blown off.

6. A packet former according to claim 1 in which said former extends along an axis and the outlets in the body aranged to produce air jets to blow the packet off the former are positioned to produce jets directed along paths which are sharply inclined with respect to the axis of the former so as to stop blowing into the packet when the packet has moved well clear of the former.

7. A collapsible packet former having an operative end portion around which packet material can be folded and secured to form an open-ended packet, and an inoperative end portion remote from the operative end portion; in which the former comprises a main former body, including a cylinder and piston extending transversely in its inoperative end portion, and a movable member pivoted to the body about a pivot lying between the operative end portion and the piston; the movable member being biased towards a first position in which it is spaced from the body at its operative end so that the cross-section of the former corresponds to the desired internal corss-section of the packet, and being movable, by outward movement of the piston as a result of the admission of air under pressure to the cylinder, to a second position in which it is close to the body at the operative end and the former is thus collapsed; and including at least one passageway in the main former body through which air can flow from the cylinder to at least one outlet at the operative end of the former so as to blow the packet off the former, the position at which the passageway leads into the cylinder being such that the passageway receives air from the cylinder only when the piston is moved to its outer position to collapse the former.

8. A packet former according to claim 7 in which the main former body has a second set of passageways in it through which suction can be applied to ports in the faces of the body to hold the packet material onto the former while it is being folded around the former.

9. A packet former according to claim 6 wherein the outlets are positioned to produce jets directed along paths divergent with respect to each other.

10. Apparatus for making packets comprising

a. a former for shaping packet material folded and secured thereabout, said former being adapted to expand to a predetermined cross-section corre-

sponding to the desired internal cross-section of a packet and to collapse to a smaller cross-section,

b. pneumatic responsive means for collapsing said former to said smaller cross-section, and

c. means for directing at least one stream of air against a formed packet to blow the packet off the former while the former is in its collapsed state.

11. Apparatus according to claim **10** wherein said air stream directing means comprises at least one outlet in said former arranged to produce an air jet.

12. Apparatus according to claim **11** wherein said pneumatic responsive means is responsive to air pressure to collapse said former, said apparatus further comprising conduit means extending from said pneumatic responsive means to said air stream directing means for directing said air pressure, after operating said pneumatic responsive means collapsing said former, to said air stream directing means to blow the formed packet off the former.

13. Apparatus according to claim **11** wherein said former includes at least two members movable relative to each other, said apparatus further comprising means biasing said members towards outer positions in which they are spaced from each other expanding the former to said predetermined cross-section, said pneumatic responsive means being adapted to move said members towards each other to collapse said former.

14. Apparatus according to claim **13** wherein said pneumatic responsive means is responsive to positive air pressure to move said members towards each other and collapse said former, said apparatus further comprising conduit means extending from said pneumatic responsive means to said air stream directing means for directing said air pressure, after operating said pneumatic responsive means collapsing said former, to said air stream directing means to blow the formed packet off the former.

15. Apparatus according to claim **14** wherein said pneumatic responsive means comprises at least one piston-cylinder device extending between said members to collapse said former upon admission of positive air pressure to the cylinder, said cylinder including at least one port communicating with said conduit means, said port being positioned such that said piston prevents said air pressure from passing therethrough to blow the formed packet off the former until after said piston has been moved past said port by said air pressure moving said members towards each other to collapse the former.

16. Apparatus according to claim **11** wherein said former extends along an axis and said outlet is arranged to provide an air jet directed along a path sharply inclined with respect to the axis of the former whereby the air jet will by-pass the formed packet after being blown off the former in an axial direction.

17. Apparatus according to claim **16** comprising a plurality of said outlets arranged to provide air jets directed along paths divergent with respect to each other.

18. Apparatus according to claim **13** wherein a predetermined length of said former is adapted for receiving and forming said packet material, said movable members extending along the entire predetermined length and being movable between said outer and inner positions along the entire predetermined length.

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