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BAGMAKING APPARATUS

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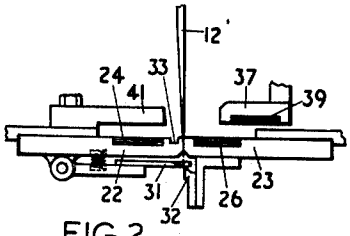

FIG. 2.

FIG. 3.

FIG. 4.

FIG. 5.

FIG. 6.

FIG. 7.

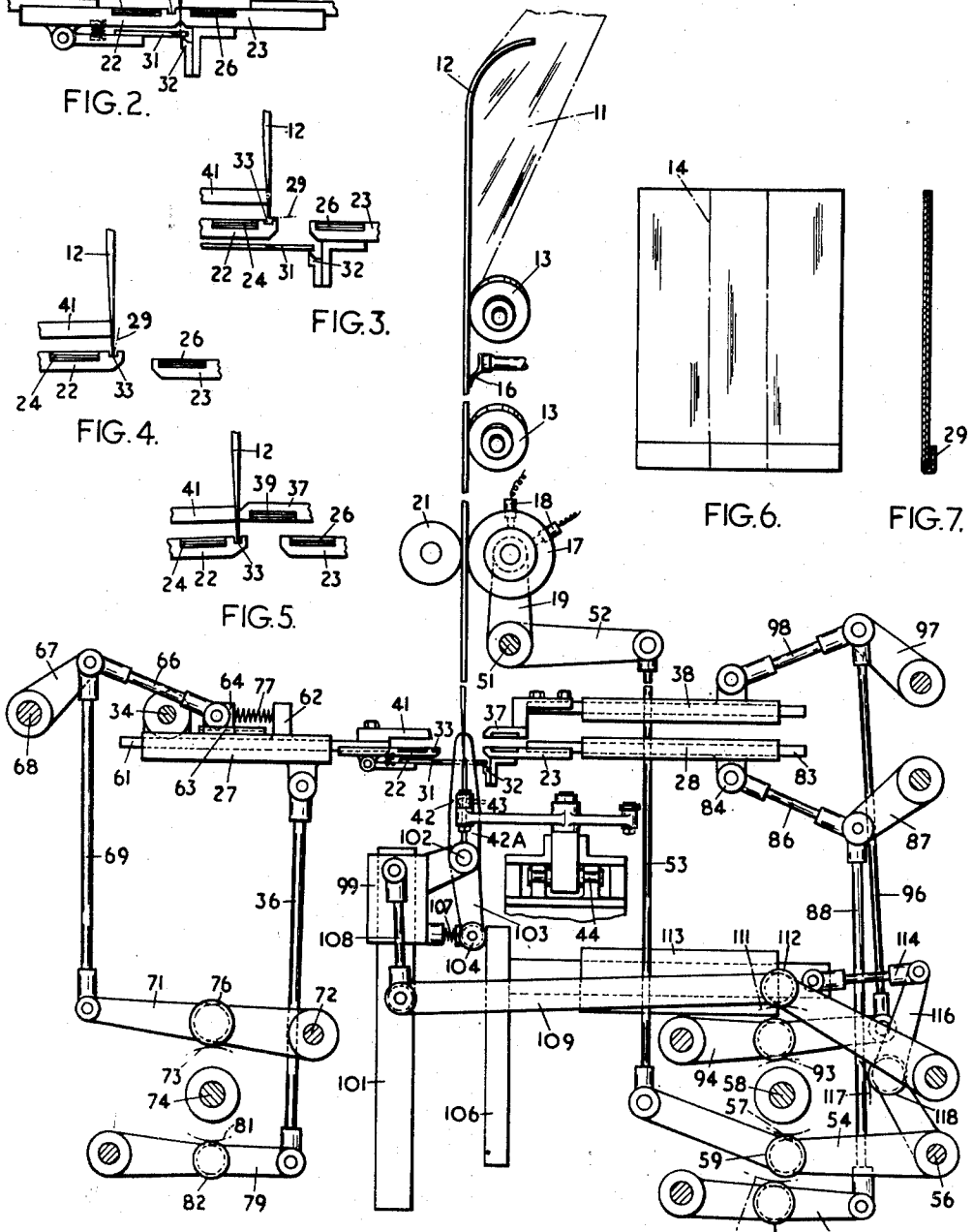

FIG. 1.

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BAGMAKING APPARATUS

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5 Claims. (Cl. 93—26)

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This invention relates to bag-making apparatus of the kind (hereinafter referred to as the "kind described") in which a web of paper, film, foil, or like wrapping material is formed into a continuous tube with a longitudinal seam, the individual bags being formed successively by sealing a portion of the tube adjacent the end to form the base of the bag and cutting the tube transversely to sever the completed bag.

According to the invention, there is provided a bag-making apparatus of the kind described, wherein the tube is formed and sealed on a former and the end portion of the tube is sealed at a position and adjacent the end of the former, and wherein the sealed end of the tube is folded over on to the tube and secured to the adjacent wall of the tube while it is on the former.

The web of wrapping material is preferably of the heat-sealing kind, in which case the longitudinal seam may be formed by means of a heated roller arranged to bear against the former.

The invention will now be described in greater detail with reference to the accompanying diagrammatic drawings, in which

Figure 1 is an elevation of part of a bag-forming apparatus according to the invention,

Figures 2 to 5 are diagrams illustrating successive stages in the formation of the base of the bag, and

Figures 6 and 7 are an elevation and sectional end view, respectively, of a bag formed on the apparatus shown in Figures 1 to 5.

Referring to Figure 1, a web 11 of heat-sealing wrapping material is drawn from a roll (not shown) and led over a former 12 which, in cooperation with suitably disposed pairs of guiding rollers 13, forms the web 11 into a flat tube enclosing the former 12 with the free edges of the web overlapping to form a longitudinal seam 14. A guiding member 16 is arranged between the pairs of guiding rollers 13 to ensure that one of the free edges of the web passes inside the other.

The seam 14 is sealed by means of heat and pressure by a resiliently mounted roller 17 provided with heated sealing elements 18. The roller 17 is carried by an arm 19 which is arranged for oscillation in timed relationship with the tube-feeding mechanism so as to be in contact with the tube only during its feeding motion. A freely mounted roller 21 is disposed adjacent the former opposite the roller 17 so as to act as a reaction member against the pressure of the roller 17.

The arm 19 is pivoted at 51 and formed with

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an extension 52 connected by a link 53 to an operating arm 54 pivoted at 56. The arm 54 is oscillated, to cause the oscillation of the arm 19, by a rotatable cam 57 secured to a cam shaft 58 and bearing against a cam roller 59 freely mounted on the arm 54.

The former 12 is disposed vertically and there is arranged just below the end of the former a pair of opposed sealing members 22 and 23 provided with heating elements 24 and 26, respectively. The sealing members 22 and 23 are mounted for reciprocation in slides 27 and 28, respectively, and arranged to nip and seal a portion 29 of the tube extending from the end of the former to form the base of the bag.

Incorporated in the sealing members 22 and 23 is a pair of knives 31 and 32, respectively, which, substantially simultaneously with the sealing operation sever the previously formed bag from the tube.

The mechanism for operating the sealing members 22 and 23 will now be described.

A slide member 61 extending from the member 22 is slidably mounted in the slide 27 and carries an abutment 62. The slide 27 also carries a supplementary slideway 63 in which is slidably mounted a block 64 connected by a pivoted link 66 to an arm 67 pivoted at 68. The arm 67 is itself connected by a pivoted link 69 to an operating arm 71 pivoted at 72 and arranged to be rocked by a rotatable cam 73 secured to a cam shaft 74 and bearing against a roller 76 freely mounted on the arm 71. A spring 77 is arranged between the abtument 62 and the block 64 to provide for resilient nipping of the portion 29 of the tube mentioned above.

For a purpose explained later, the slide 27 is pivoted on a shaft 34 and connected by a link 36 to a pivoted arm 79 arranged to be rocked by a further cam 81 secured to the cam shaft 74 and bearing on a roller 82 mounted on the arm 79.

A slide member 83 extending from the sealing member 23 is slidably mounted in the slide 28 and carries a lug 84 by which it is attached by means of a pivoted link 86 to a pivoted arm 87. The latter is oscillated by a link 88 connecting the arm 87 to a further pivoted arm 89 arranged to be rocked by a cam 91 secured to the cam shaft 58 and engaging a roller 92 carried by the arm 89.

After the sealing of the portion 29, the sealing member 23 is caused to retract while the sealing member 22 is caused to make a further forward movement to carry a folding recess 33 into alignment with the end of the of the former 12 as shown in Figure 3, such motion causing the

sealed portion 29 of the tube to bend over to the right as shown in the drawings. The sealing member 22 is then caused to pivot upwardly about the axis of the supporting shaft 34 by means of the link 36 actuated by the mechanism described above, such movement causing the sealed portion 29 to fold upwardly as shown in Figure 4. The sealing member 22 remains in that position during the operation of an upper sealing member 37 mounted for reciprocation in a slide 38 and provided with a heating element 39, the sealing member 37 pressing the portion 29 against and securing it to the adjacent wall of the tube on the former 12. During such sealing operation, an abutment member 41 carried by the sealing member 22 supports the former 12 against the pressure of the sealing member 37. The construction and operation of the sealing member 37 is similar to that of the sealing member 23, the member 37 again being actuated by a cam 93 through an arm 94, link 96, arm 97 and link 98.

Upon completion of the sealing operations described above, the sealing members 22 and 37 are retracted and the sealed end of the tube is seized by a pair of feeding grippers 42 and 42A arranged for vertical reciprocation, the end of the former 12 being suitably cut away to allow the grippers to seize the end of the tube. The grippers 42 and 42A draw off the former 12 a length of tube corresponding to the length of a completed bag, and the sealing and cutting operations described above are repeated to sever the completed bag from the tube and at the same time commence the formation of the next succeeding bag by sealing the end of the severed tube extending from the former.

The construction and operation of the grippers 42 and 42A will now be described.

The gripper 42 is mounted on a block 99 slidable on a guide 101, while the other gripper 42A is pivotally mounted at 102 on the gripper 42 and formed with an extending arm 103 carrying an actuating roller 104 arranged to be engaged by an opening member 106, the arm 103 being urged into gripping position by a spring 107.

To reciprocate the grippers 42 and 42A, the block 99 is reciprocated on the guide 101 by a link 108 connecting the block 99 to a pivoted arm 109 arranged to be oscillated by a cam 111 secured to the cam shaft 58 and arranged to bear against a roller 112 carried by the arm 109. The grippers are opened as they approach the sealed end of the tube by the opening member 106 which is slidably mounted in a guideway 113 and actuated by a link 114 connecting the member 106 with a pivoted arm 116 arranged to be oscillated by a cam 117 secured to the cam shaft 58 and arranged to engage a roller 118 carried by the arm 116.

The completed bags are delivered in succession by the feeding grippers 42 and 42A to succeeding pairs of grippers 43 mounted on a continuous chain 44 arranged to carry the bags to a filling and sealing device where the bags are filled, e. g., with powder, and their open ends sealed to complete the packages.

We claim:

1. In a bag-making apparatus of the type wherein a web of wrapping material is formed about a suitable former into a continuous tube with the edges of the web overlapping to form a longitudinal seam, a bag end-forming mechanism comprising in combination a pair of opposed transversely movable sealing members normally arranged one on each side of the path of the tube beyond and close to the end of the former, the operative portion of one of said sealing members being pivotally mounted for movement out of its transverse path, and including folding means, operating means for said sealing members arranged firstly to move said members together towards each other so as to seal a transverse portion of the tube extending from the end of the former so as to form the base of a bag close to the end of the former, then to continue the forward movement of said pivoted member while retracting the other member so as to deflect the sealed base of the bag out of its normal path, and then to pivot the pivoted member towards the former to cause its folding means to fold the deflected portion on to the adjacent wall of the tube on the former, means for sealing the meeting faces of the folded portion of the tube and the adjacent wall of the tube while the tube is supported on the former, means for withdrawing from the end of said former a length of tube corresponding to the length of a completed bag and including the folded and sealed base, and means for severing the tube transversely to form a completed bag.

2. Apparatus as in claim 1, wherein the folding means on the pivoted sealing member comprises a recess in the member arranged to be moved into alignment with the former so that, upon pivotal movement of the member, the recess embraces the end of the former and causes the deflected portion of the tube to fold over on to the former.

3. Apparatus as in claim 2, wherein the tube is formed from heat-sealing material and the transverse sealing members include heating elements to effect the sealing of the tube.

4. Apparatus as in claim 3, wherein the means for sealing the meeting faces of the folded portion of the tube and the adjacent wall of the tube comprises an auxiliary sealing member arranged to move into sealing engagement with the folded base of the bag, said sealing member including a heating element.

5. Apparatus as in claim 1, wherein the severing means comprises a pair of knives attached to the transverse sealing members so as to sever a completed bag simultaneously with the sealing of the base of a succeeding bag.

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