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(54) **Hose folding apparatus**

(57) The apparatus to transfer and initially fold a stocking or a tight hose or the like comprises: a support 10, 12 for the coming manufactured article with a transversal slot 14 and a sliding surface 16 leading to transverse conveyors 51, 53 and an endless conveyor 20 having a laterally projecting finger or stem 34 adapted to drag the article through said slot thus folding the manufactured article and depositing it on the conveyors which are operative to move the folded article transversally to the direction of displacement of the conveyor, in order to remove it from the finger or stem 34. A pivoted element (38) may co-operate with the stem 34 to grip the article and a reciprocable press element (60) may assist transverse removal of the folded article by the conveyors 51 and 53, Figs. 7—9 (not shown).

Fig.1

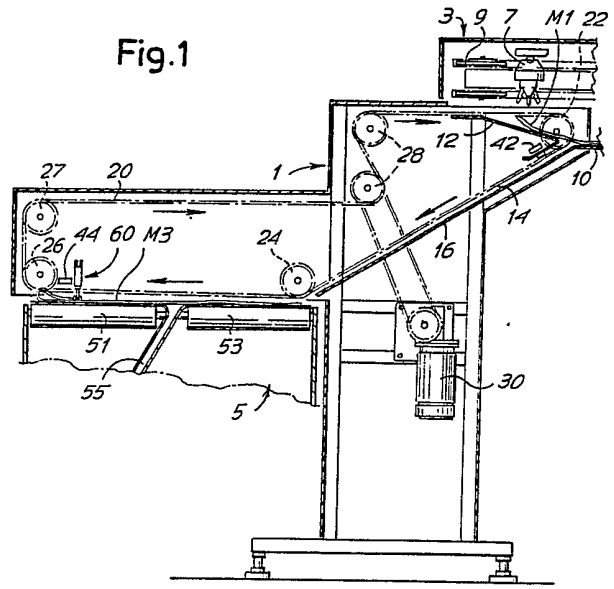
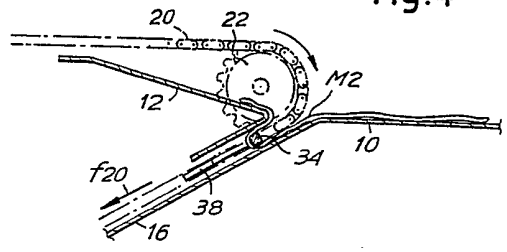


Fig.4

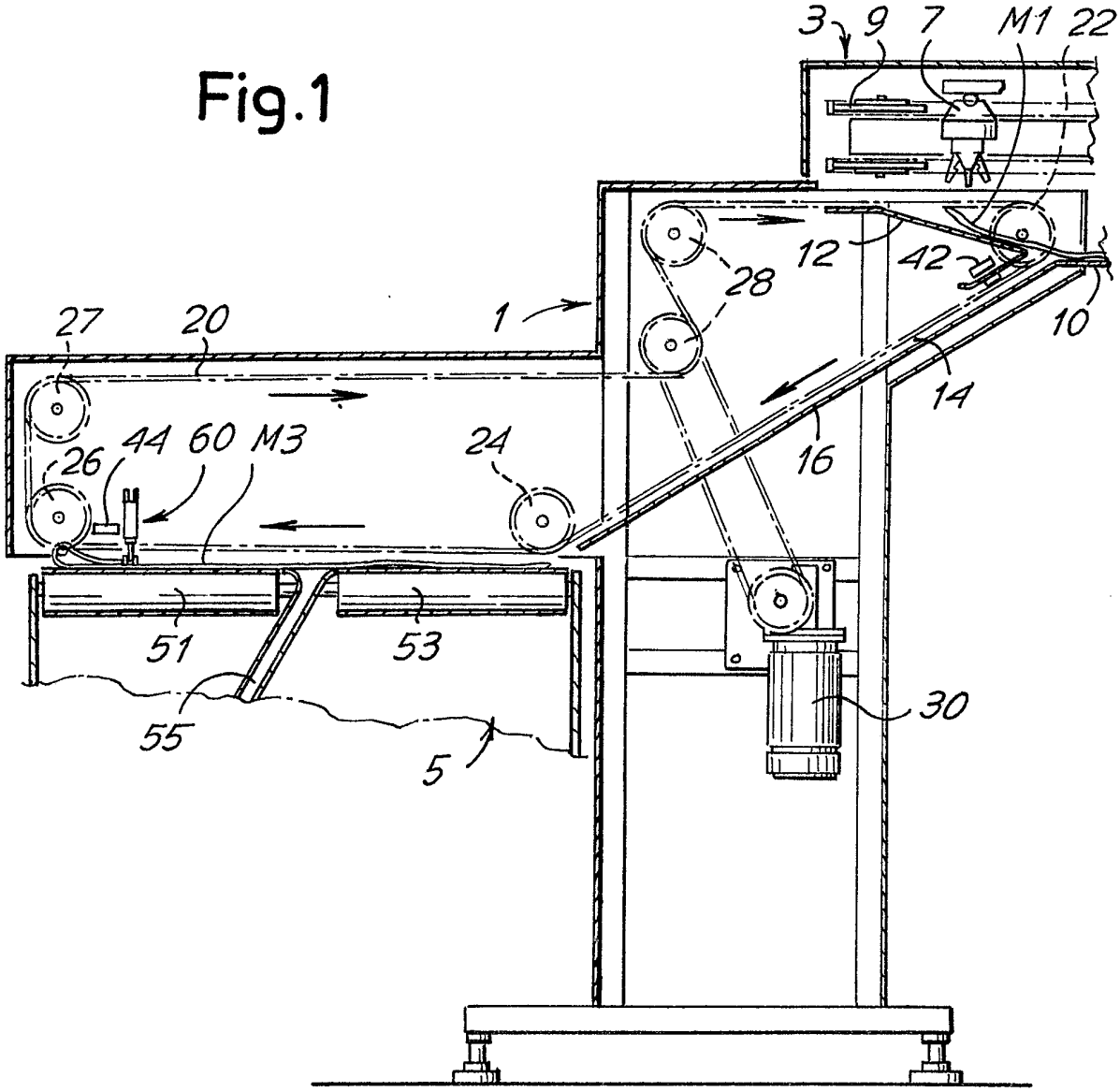


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The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy. This print takes account of replacement documents later filed to enable the application to comply with the formal requirements of the Patents Rules 1982.

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Fig.1



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Fig.2

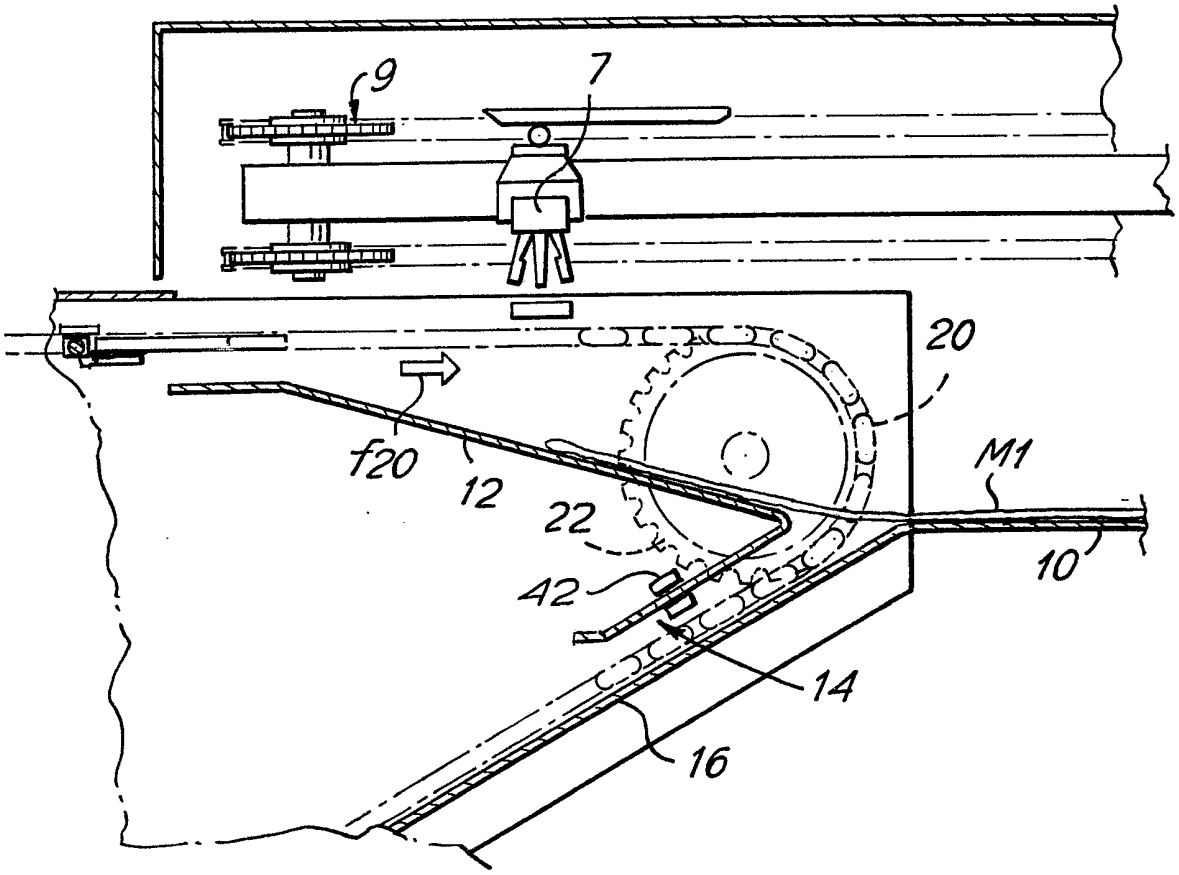
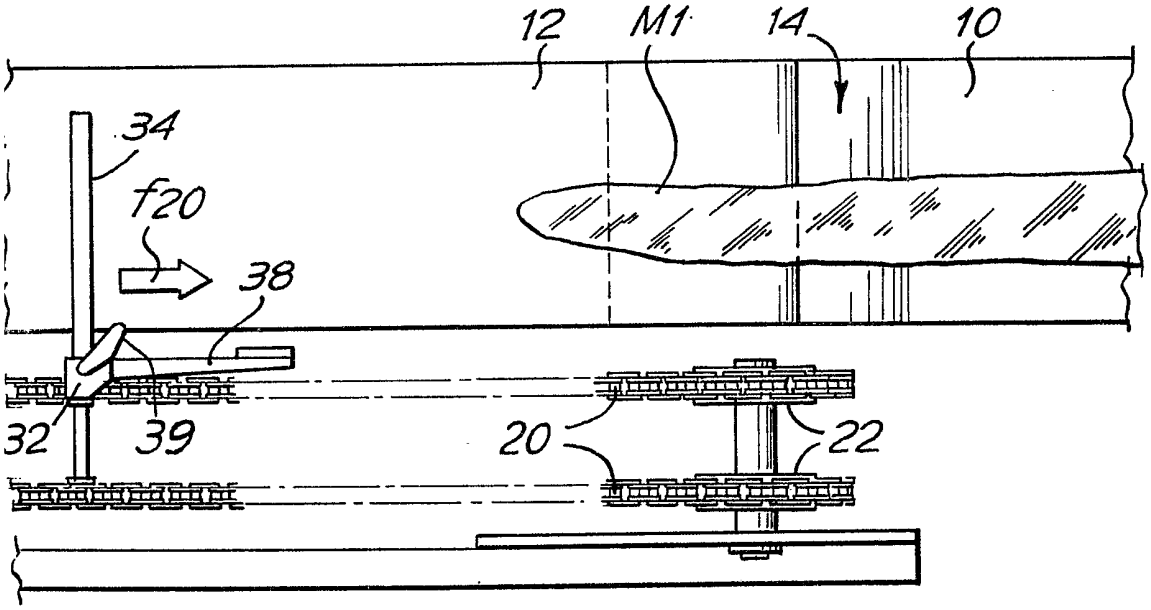


Fig.3



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Fig.4

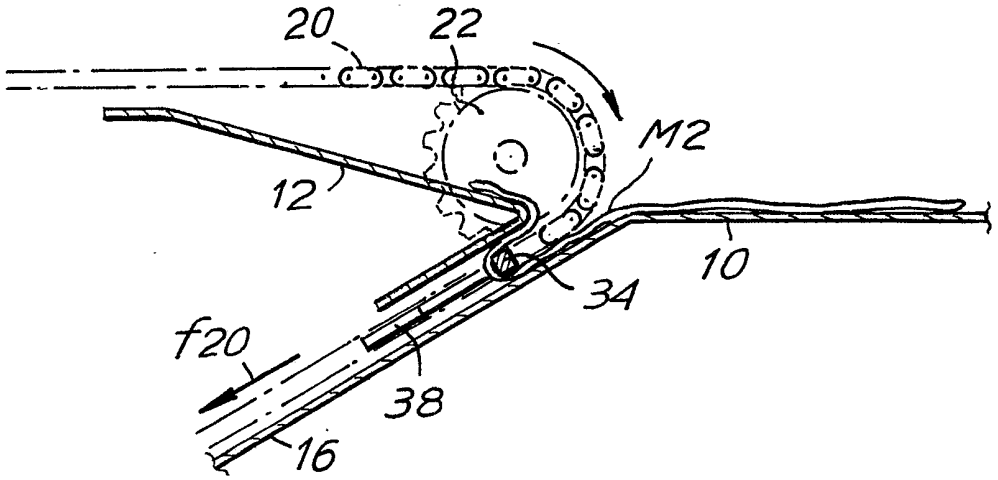


Fig.5

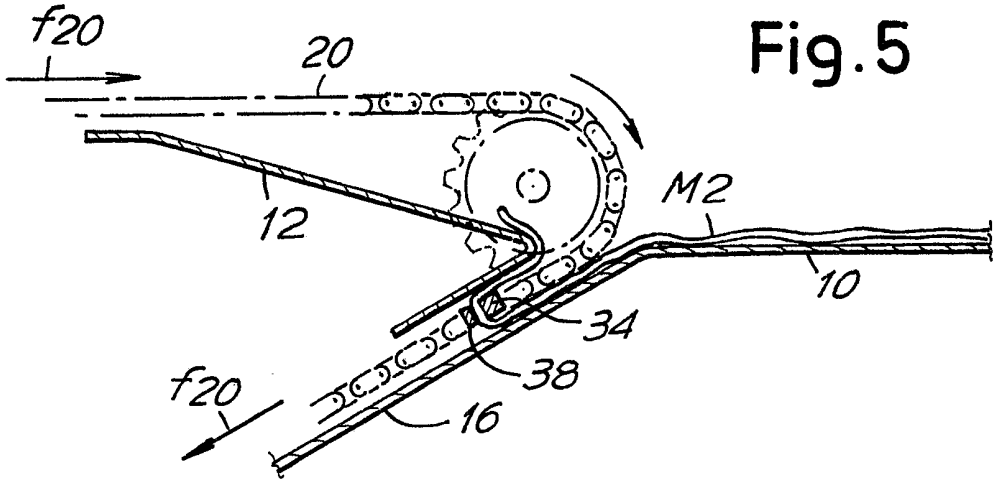
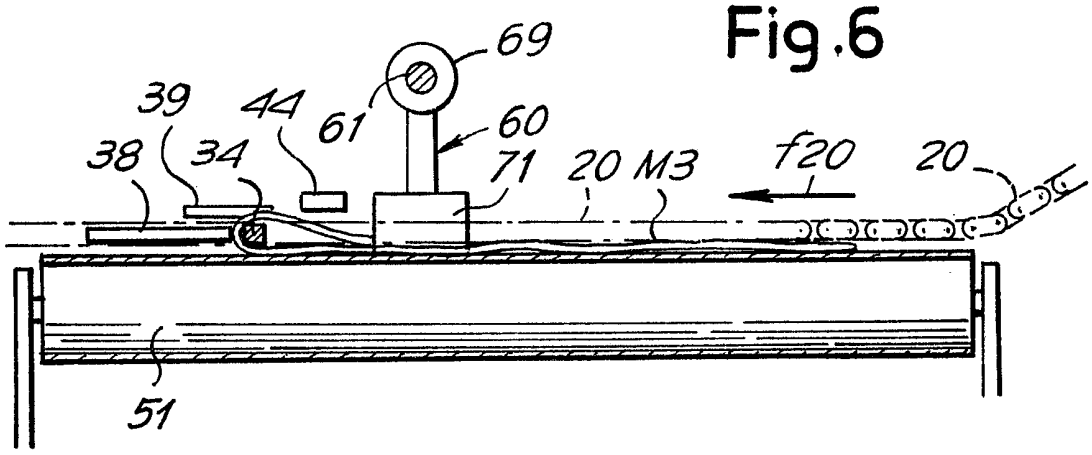


Fig.6



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Fig.8

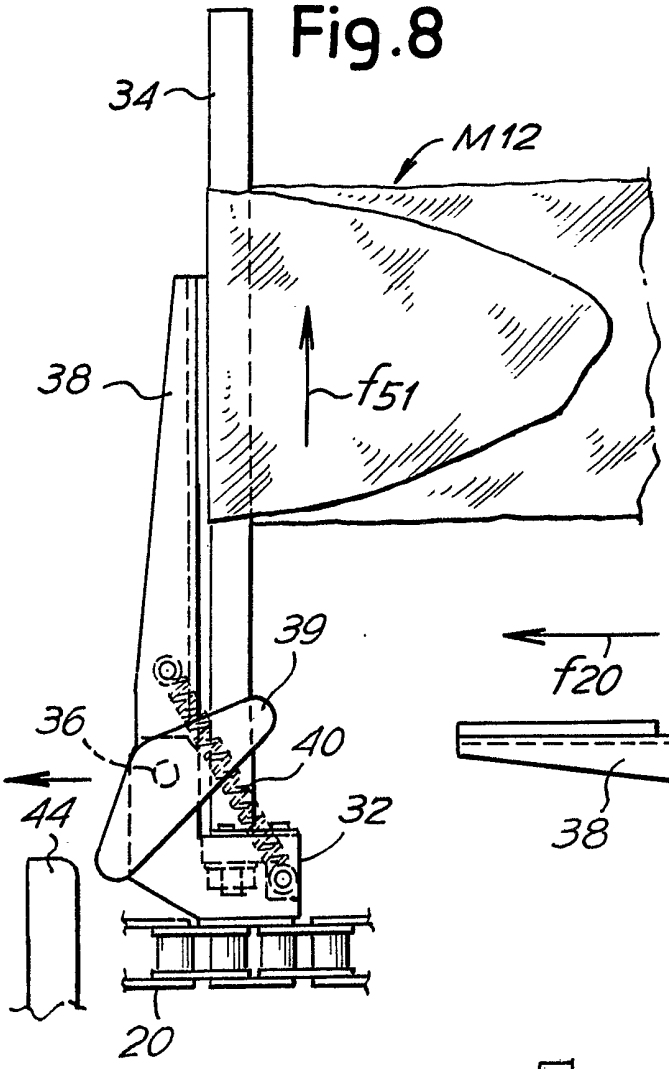


Fig.7

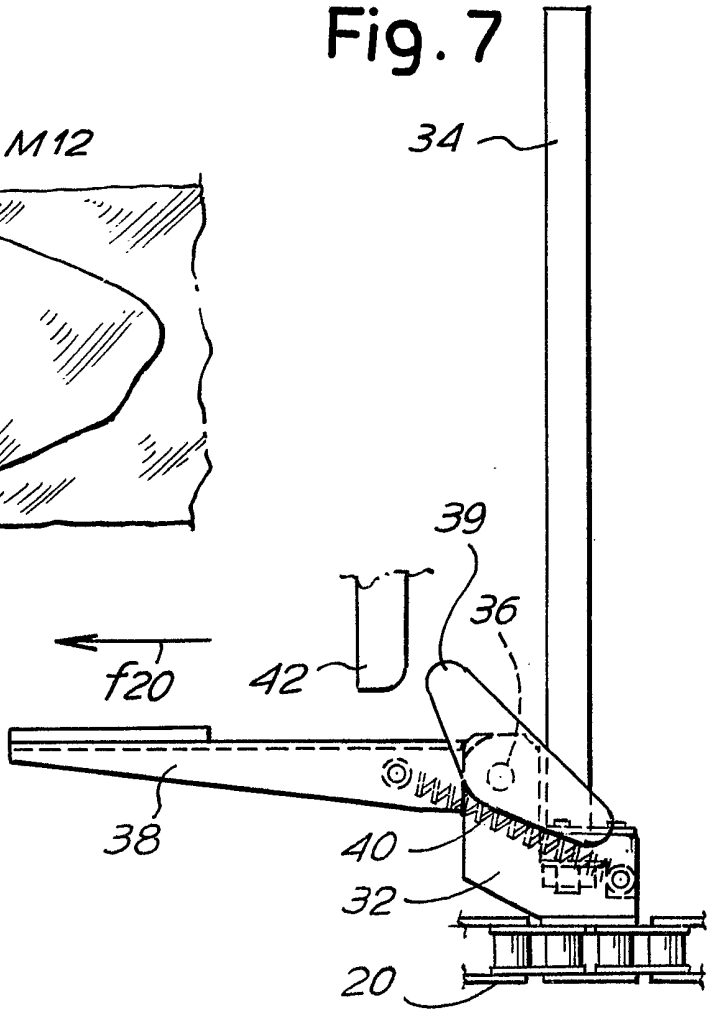
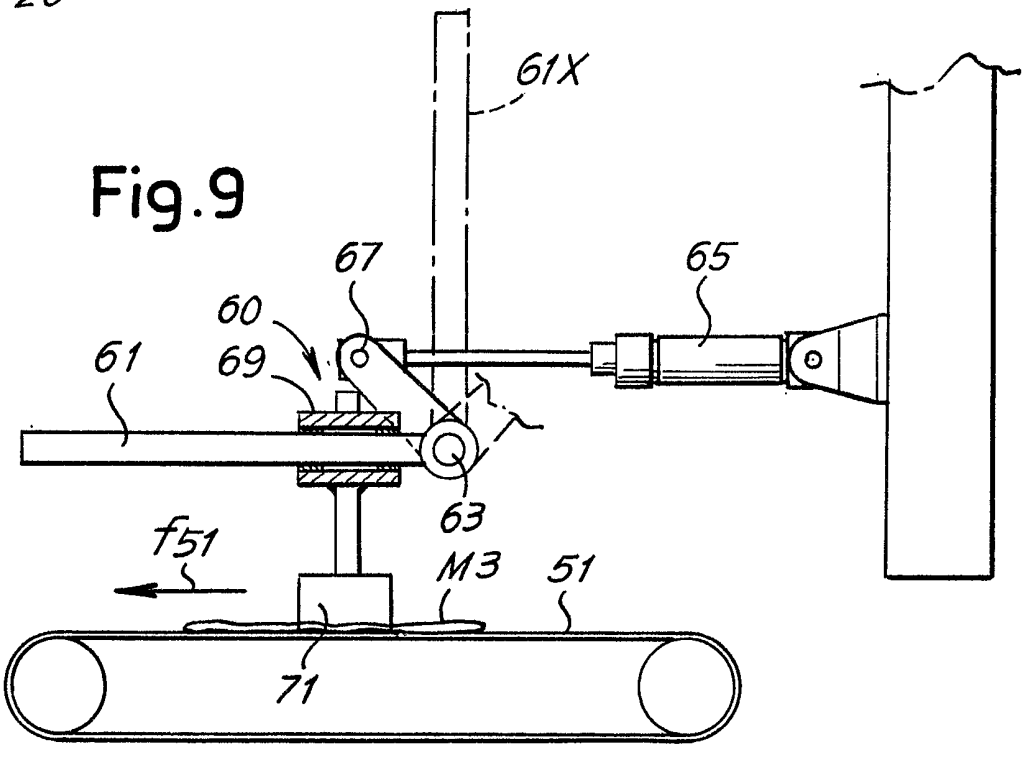


Fig.9



SPECIFICATION

Hose folding apparatus

The invention relates to an apparatus to be located between an ironing equipment and a structure for making up stockings, tight hoses and the like.

The apparatus is designed to transfer and initially fold a stocking, a tight hose or the like. It comprises:

— a lying plane for the coming manufactured article with a transversal slot and a sliding surface in the form of a channel or the like, leading to a departing surface;

— a chain conveyor or the like, including at least a bracket stem protruding transversally, which is adapted to penetrate into said slot thus folding the manufactured article located on the lying plane and dragging it to the departing surface; and

— means on the departing surface to move the manufactured article transversally to the direction of displacement of the conveyor, and then in the direction of said bracket stem to remove it therefrom.

Pressing means can also be provided and adapted to act on said stem to engage the manufactured article at the initial dragging stage and release it when it reaches the departing surface. The pressing means can be controlled by a resilient release device, which is operated by collision cam profiles arranged along the conveyor path.

The apparatus can include a presser device in the form of a plug, adapted to press the manufactured article on means — conveyor means or the like — of the departing surface, in order to ensure removal of the stem orthogonally to the conveyor advancement direction. In practice the plug can be carried by a trolley sliding on an arm, which can be lowered to activate the plug sliding on the arm, and raised to determine the return stroke of the plug.

The drawing shows schematically a non-limitative example of embodiment of the invention.

Fig. 1 is an overall side view;

Fig. 2 and 3 show a magnified detail of Fig. 1 and a plan view of the same;

Fig. 4 and 5 show subsequent phases to that shown in Fig. 2;

Fig. 6 shows a detail of a departing phase of the manufactured article;

Figs. 7 and 8 show details of a dragging pliers;

Fig. 9 shows a plug to assist the release of the manufactured article from the gripping pliers.

The apparatus according to the invention, generally denoted with 1, is positioned between the outlet end 3 of an ironing machine for a knitted manufactured article or the like, and a machine 5 for making up the same article. In Fig. 1, a pliers unit 7 of said ironing machine is shown which is operated by a horizontal conveyor 9. This pliers unit is capable to deposit a stretched manufactured article on a plane 10 extending with a portion 12 slightly slanted and separated from the plane 10 by the transversal outlet section of a channel 14 inclined downwards and toward the machine 5, said channel being delimited in the lower part by a chute plane 16. The manufactured article released by the pliers unit 7 is disposed as shown with M1 in Figs. 1, 2 and 3 also above the channel 14. A chain conveyor 20, generally a double chain conveyor, extends and slides along the plane 16 by the side of it and of the surface 12, and is driven by chain wheels 22, 24, 26, 27 and 28 to form a path as clearly seen in Fig. 1 with a section passing above the machine 5, defined between the wheels 24 and 26. Numeral 30 denotes a motor-reducer for the intermittent motion of the conveyor 20.

The conveyor 20 has at least two pliers members protruding sideways to emerge and drag the manufactured article. Each of these pliers members has a support 32 for the engagement to the conveyor chains; a transversal stem 34 originates from the support 32 and is adapted to pass close to the surface 12, penetrate into the channel 14, pass close to the plane 16 and describe a trajectory above the lying surface of the manufactured article on the machine 5. A pressing lever arm 38 is pivoted at 36 on the support 32 and is also integral with a control rocking lever 39; a spring 40 reacting between the support 32 and the unit 38, 39 forms a resilient knee cooperating with the articulation 36 to stabilize the two positions shown in Figs. 7 and 8. In Fig. 7 the arm 38 is spaced away through 90° from the stem 34, while in Fig. 8 the arm 38 is pressed by the spring 40 against the stem 34. To operate the arm 38 in the two above positions, during the movement along the arrows f20 of the conveyor 20, along the path of said conveyor there are provided a cam 42 at the initial part of the channel 14 and a cam 44 before the driving wheel 26. The cam 42 operates the arm 38 releasing from the arrangement of Fig. 7 to the arrangement of closure against the stem 34 as shown in Fig. 8, the cam 42 acting on the rocking lever 39. The cam 44 acts instead on the rocking lever 39 in the opposite direction, so as to cause reopening of the pliers system 34, 38 shifting the arm 38 from the arrangement of Fig. 8 to the arrangement of the Fig. 7. The two cams 42 and 44 act with the advancement motion of the conveyor 20 and thus of the units carried by the supports 32.

As already mentioned, the conveyor 9 leaves the manufactured article in the position M1 on the surfaces 10, 12 since the pliers means 7 is in time open. The conveyor 20 moves a stem 34 toward the driving wheel 22 while the arm 38 has been moved away from the stem 34 by means of the cam 44. The stem 34 along the path imposed by the wheel 22 enters the channel 14 and thus folds and drags the manufactured article in the arrangement M2 as shown in Fig. 4. On meeting the cam 42, the rocking lever 39 operates the arm 38 releasing in the arrangement of closure against the arm 34 (Figs. 5 and 8) engaging on the stem 34 the manufactured article folded in the

arrangement M2. Thus the manufactured article is certainly dragged along the plane 16 and above the machine 5, on which it is left in the way to be described below, when it reaches the position M3 (see Figs. 1, 6 and 9) and the arm 38 is raised from the cam 44. On further continuation of the path of the conveyor 20, these operations are repeated.

When the manufactured article has been transferred on the making up machine 5 in the position M3, it is caused to slide orthogonally to the direction of advancement of the conveyor 20, through two belt conveyor means 51 and 53, spaced apart between them to leave room for a return mouth 55 of the machine 5. The pliers unit 34, 38 brings the manufactured article in position M3 on the transversal conveyors 51 and 53. At this moment these conveyors are operated so as to remove the manufactured article from the stem 34 along arrow f1 (Fig. 8) and then orthogonally to the direction of arrow f20. In order to ensure removal of the manufactured article folded on the stem 34, a presser device 60 can be advantageously provided (see Figs. 1, 6 and 9). This device includes an arm 61 which is pivoted at 63 and can be moved in a horizontal position parallel to the surface of the conveyor 51 and arranged in the direction of arrow f51, and in a raised position like that shown with the dotted line 61X in Fig. 9; these movements can be achieved through a cylinder-piston system 65 acting on a crank 67 which is integral with the arm 61 and can be moved with it around the articulation 63. A sliding block or trolley 69 slides on the arm 61 and carries a plug 71. This plug is adapted to rest on and press the manufactured article M3 on the conveyor 51, in such a way to ensure correct removal of the manufactured article from the stem 34, from which the pressing arm 38 has been moved away by the action of the cam 44. In fact, the plug 71 ensures adherence of the manufactured article on the conveyor 51 along the arrow f51, while the block 69 slides on the arm 61. Thus the manufactured article M3 is certainly transferred by the conveyors 51 and 53 to the position required for making it up, while the stem 34 resumes its moving along the path of the conveyor 20. When the arm 61 is raised, the trolley 69 with the plug 71 slides due to gravity along the arm 61 in the direction opposite to the previous one, reassuming the initial position.

The drawing shows only an example of the invention, which can vary in the forms and arrangements.

CLAIMS

1. An apparatus for transferring and initially folding a stocking, a tight hose or the like, characterized in that it comprises: a lying plane for the coming manufactured article with a transversal slot and a sliding surface in the form of a channel or the like leading to a departing surface; a chain conveyor or the like with at least a bracket stem protruding transversally, which is adapted to penetrate into said slot thus folding the manufactured article located on the lying plane and dragging it to the departing surface; and means on the departing surface to move the manufactured article transversally to the direction of displacement of the conveyor, and then in the direction of said bracket stem in order to remove it therefrom.

2. An apparatus as in the preceding claim, characterized in that it comprises pressing means adapted to act on said stem to engage the manufactured article when the dragging stage is started and to release it when it reaches the departing surface.

3. An apparatus as in the preceding claims, characterized in that the pressing means are controlled by a resilient release device, which is operated by collision cam profiles positioned along the conveyor path.

4. An apparatus as in the preceding claims, characterized in that it comprises a presser or plug device, adapted to press the manufactured article on conveyor means, or the like, of the departing surface, in order to ensure removal of the stem orthogonally to the advancement direction of the conveyor.

5. An apparatus as in claim 4, characterized in that the presser or plug is carried by a sliding trolley on an arm, which arm can be lowered to activate the plug sliding on the arm and raised to determine the plug return stroke.

6. An apparatus for transferring and initially folding a stocking or a tight hose, to be successively made up; the whole as described above and represented by way of example in the annexed drawing.

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