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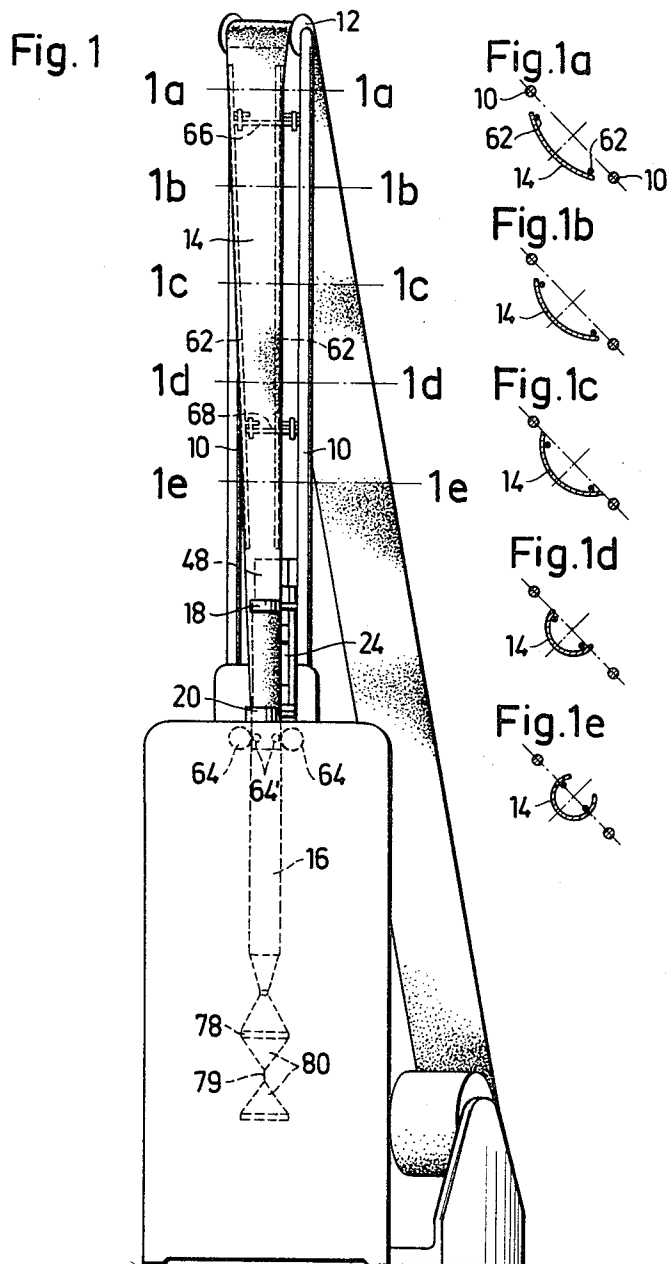
H. C. CORNELIUSSON ET AL

3,412,656

GUIDE ROLLER DEVICE IN A MACHINE FOR TRANSFORMING
A FLAT WEB OF MATERIAL INTO TUBE SHAPE

Filed March 23, 1966

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Fig. 2

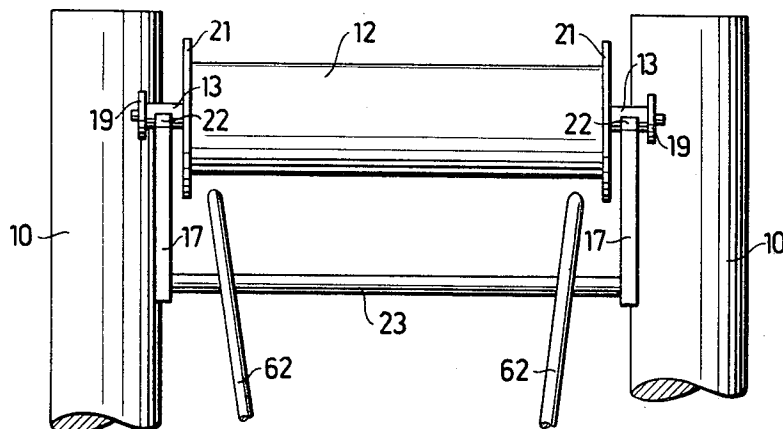
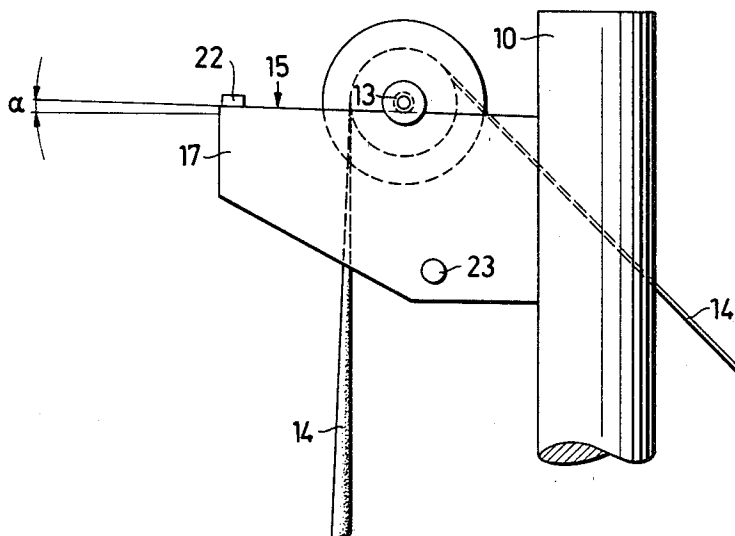


Fig. 3



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GUIDE ROLLER DEVICE IN A MACHINE FOR TRANSFORMING A FLAT WEB OF MATERIAL INTO TUBE SHAPE

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3 Claims. (Cl. 93—82)

ABSTRACT OF THE DISCLOSURE

A web of material used for forming packages is drawn from a supply roll upward and over a guide roller and then downward through a forming device which converts the flat web into tubular form. The guide roller is carried by cylindrical stub shafts at its end and is capable of rotating about the axis of the stub shafts as the web is pulled over the surface of the roller. The stub shafts, in turn, are free to roll upon a surface preferably inclined upwardly in the direction of the web pull-off side of the guide roller thus permitting the axis of the rotating roller to shift back and forth along the inclined surface to accommodate changes in the forces which act upon the web.

The present invention relates to an improvement in a guide roller device in a machine for transforming a flat web of material into tube shape, the forming into tube shape being arranged to take place after changing the feed direction of the web by means of this device.

Machines of this kind are put to special use in the packaging industry, e.g., in connection with the production of cushion-shaped, parallelepipedic or tetrahedral packages. In such machines the flat web of material is normally fed from a roll of material which is positioned near the bottom of the machine, substantially straight upwards and over a guide roller mounted at the top of two columns or the like, from which the web is fed downwards while being formed into tube shape and further worked upon. It was then found that the tube formation and the further working is highly dependent on the position of the guide roller. Furthermore, difficulties may arise in the case, where the web has been stretched so that the two edges thereof are of different lengths.

The present invention is based on the concept of allowing the web of material itself to adjust the guide roller. To this effect the device according to the invention is characterized by the fact that it includes a guide roller which is freely mounted, e.g., capable of rolling freely on a support, and around which the web is arranged to run, in such way that the position of the guide roller is determined by forces acting on the web.

The invention is described more closely in the following with reference to the accompanying drawings, which illustrate, by way of example on the one hand a machine known per se to which the invention may be applied, on the other hand a device according to the invention adapted to this invention.

FIG. 1 shows a perspective view of the machine, FIGS. 1a-1e showing sections along the corresponding section lines in FIG. 1.

FIGS. 2 and 3 show the device according to the invention in two views at right angles to each other.

In the machine shown in FIG. 1, 10 designates a vertical machine frame formed by two columns, which at its top carries a guide roller 12 for the web, e.g., a paper web 14, from which a continuous tube 16 is to be formed by bending the web into a shape similar to a cylinder.

For the exact formation of the web into a tube there

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are provided two tube forming members 18 and 20, of which the upper one 18 preferably is in the form of a cylindrical ring cut along a generatrix, while the lower one 20 preferably is of wholly cylindrical form and adapted to the diameter of the ready formed tube.

Between the two tube forming members 18 and 20 there is disposed a heater body 24 which together with suitable pressure means effects a longitudinal sealing of the formed tube.

For feeding the tube forward, in the example shown, the machine is provided with a number of driven feed pulleys 64 which cooperate with back-up pulleys 64' mounted in an inner sleeve 48.

For facilitating the tube formation there are provided two guiding rules 62. For each guiding rule there is further upper and lower fixing means 66 and 68, respectively, for fixing the guiding rules to the machine frame and for enabling an adjustment of their position in relation to the web.

As indicated by dashed lines at the bottom of FIG. 1, the tube is sealed after leaving the lower tube forming member 20, in mutually spaced zones lying transversely of the tube axis, viz in a sealing zone 78 and in a zone 79 at right angles thereto, whereby tetrahedral packages 80 are produced.

The machine described above is known in itself and is described more closely for example in the Swedish patent specification No. 177,444. The present invention relates, as already mentioned, to an improved guide roller device adapted to this and similar machines, which is shown on an enlarged scale in FIGS. 2 and 3, those parts corresponding to details in FIG. 1 being given the same reference numerals as in this figure.

In FIGURES 2 and 3, the guide roller has thus been designated by 12, the guiding rules by 62, two columns forming the machine frame by 10 and the web of material by 14.

The latter has been omitted, however, in FIG. 2 for the sake of clearness.

The guide roller 12 is formed with two stub shafts 13 which are arranged so as to be able to roll freely on the upper surface 15 of two substantially horizontally directed brackets 17. The roller 12 is also journaled on the stub shafts 13 so as to permit it to rotate about the axis of the stub shafts as the web is pulled over the surface of roller 12. As will be seen from FIG. 3, the surface 15 may be arranged sloping at an angle α and in relation to the horizontal plane. This angle should be between 0 and 5 degrees. For example, 2 degrees has proved to be a suitable value for the machine shown as an example. The inclination of surface 15 is upwardly from the horizontal in the direction of the side of guide roller 12 at which the web 14 is pulled off. For guiding the roller 12 axially, flanges 19 and 21 are fixed to the stub shafts 13, the flanges 21 also serving to guide the web of material. Stop blocks arranged on the brackets at the extreme ends thereof and a transverse brace stiffening the column frame are designated by 22 and 23, respectively.

Obviously, the invention is not limited to the example described above only but may be varied within the scope of the following claims.

Thus, the invention may advantageously be applied to other machines, where an equalization of forces in a web of material in connection with the bending thereof into a second direction of feed is desired. Further, the form and function of the individual details may of course be varied. For example, the upper surfaces 15 of the brackets may be formed concave or convex, according to what is found to be convenient for the machine to which the invention is applied.

We claim:

1. In a machine for transforming a flat web of material into tubular shape wherein means are provided for drawing off the web material from a supply roll in an upward direction and thence over a guide roller from which the web is then carried downwardly and converted into tubular form, the improvement comprising a pair of stub shafts located at the opposite ends of said guide roller, said guide roller being supported on said stub shafts and being free to rotate about the axis of said stub shafts as the web is drawn over the surface of said guide roller, and a generally horizontally located surface supporting said stub shafts and which enables said stub shafts to roll thereon in a back and forth direction as said web is drawn over said rotatable guide roller thereby to effect an adjustment in the position of said guide roller to accommodate a change in the forces applied to said web.

2. The arrangement as defined in claim 6 wherein said

surface which supports said stub shafts is planar and inclined upwardly from the horizontal in the direction of the web pull-off side of said guide roller at an angle in the range between 0° and 5°, preferably about 2°.

3. The arrangement as defined in claim 2 wherein the supporting surface for each said stub shaft is constituted by the upper surface of a support bracket and each said stub shaft is provided with an end flange limiting longitudinal displacement of said stub shafts on said supports.

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BERNARD STICKNEY, *Primary Examiner*.