Feb. 25, 1964 C. E. MONSEES ETAL 3,122,072

TUBE FORMER INSERT

Filed March 15, 1963

Fig. 1.

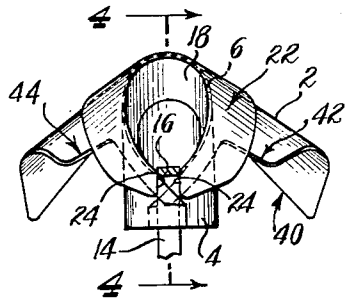
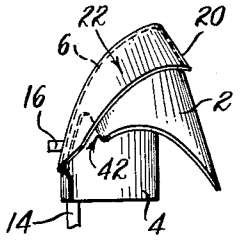


Fig. 2.



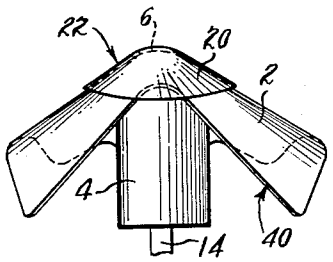


Fig. 3.

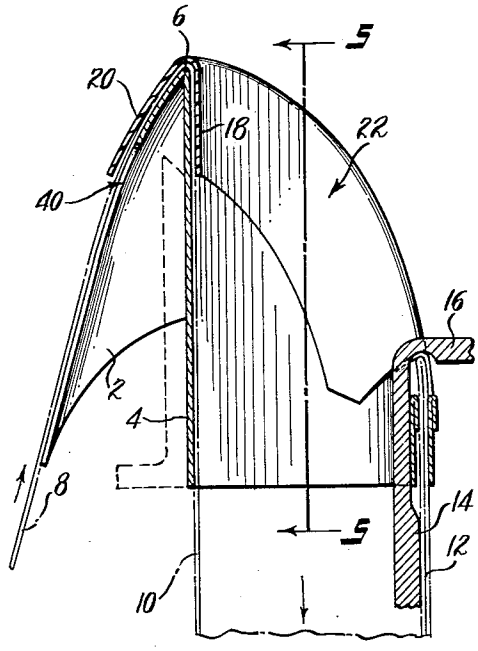


Fig. 4.

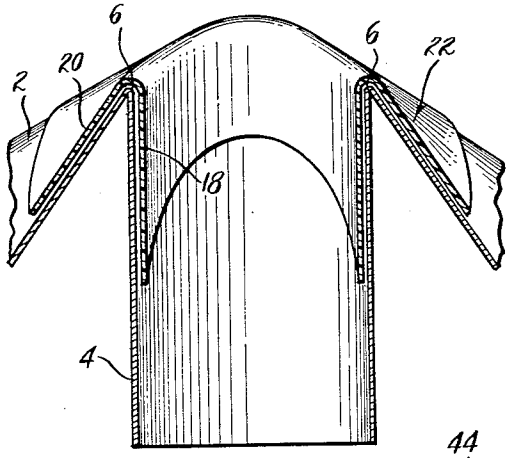


Fig. 5.

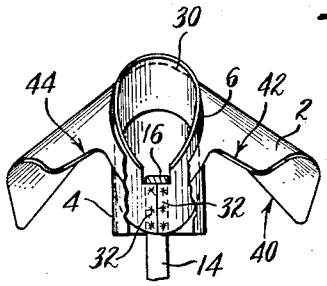


Fig. 6.

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TUBE FORMER INSERT

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5 Claims. (Cl. 93—82)

This invention relates to tube formers for guiding and directing a flat web of bag forming material into tubular shape.

The particular invention constitutes an improvement on the tube formers shown, for example, in the patent to Cooper et al. 2,982,334 and in the patent to Monsees et al. 2,940,408.

The tube formers shown and described in the above-noted patents are of the open type wherein a web of material is guided over a collar-like guide portion and to and over junction edge between the guide portion and a hollow tube and downwardly in the inside thereof to assume a tubular shape corresponding to the inner diameter of the tubular portion of the former. Most such formers, however, are subject to a disadvantage in that the bag forming material does not always conform exactly to the junction edge and in many instances stress lines appear in the finished bag, which detract from their pleasing appearance. Such stress lines are in fact minute creases in the bag material. This disadvantage is overcome by the present invention wherein an open tube former of the type mentioned is provided with an inner tubular mandrel portion to positively cause the web to conform to its desired shape. The mandrel portion is floatingly mounted but so arranged that it cannot move downwardly in the tube former but is free for limited lateral movement and serves to eliminate the stress lines mentioned above. In one form of the invention the inserted floating mandrel is secured to a backing bar at only one side of the mandrel so that the remainder of the mandrel is free to float laterally. In another form, the mandrel tube is provided with a laterally extending flange overlying substantially the entire length of the junction edge and generally conforming to the shape of the collar-like guide portion of the tube former. This flange overlies the web of sheet material sliding along the guide portion and positively directs it to the junction edge and holds it thereagainst while it is being turned and directed downwardly into the tube.

The invention further includes redesign of the guiding or collar portion of the former to eliminate sources of substantial friction.

It is, therefore, an object of this invention to provide an improved tube former assembly capable of producing tubular bags free of blemishes.

Another object is to provide a tube former of the type set forth having an internal tubular mandrel and means for covering the space between the mandrel and the tube former to preclude entry of foreign matter between the mandrel and the material being formed.

Still another object is to provide a tube former of the type set forth wherein means are provided to positively guide and hold sheet material against the junction edge to enforce intimate surface contact between the bag material and that edge throughout its length.

A further object is to provide a tube former of the type set forth having a partially floating but readily removable internal mandrel.

A still further object is to provide a tube former having the advantages set forth but which is yet of extreme simplicity in construction, economical to manufacture and highly efficient and reliable in operation.

Further and additional objects and advantages will become apparent to those skilled in the art as this description proceeds with reference to the accompanying drawings wherein:

FIG. 1 is a front view of a preferred form of the present invention;

FIG. 2 is a side elevational view of the former shown in FIG. 1;

FIG. 3 is a rear elevational view of the former of FIG. 1;

FIG. 4 is an enlarged vertical sectional view through the former of FIG. 1; taken along the line 4—4 of that figure;

FIG. 5 is a transverse sectional view taken along the line 5—5 of FIG. 4; and

FIG. 6 is a view similar to FIG. 1 but showing a modified form of the invention.

The basic tube former of the present invention is shown and described in patents numbered 2,982,334 and 2,940,408, previously identified. Such tube formers comprise a guiding sheet metal portion 2 generally in the form of a collar, the upper surface of which intersects a vertical hollow tube 4 along a junction line 6 which extends generally oblique to the vertical axis of the tube 4. Actually the junction edge 6 lies in a curved surface but will be referred to herein as extending oblique to the axis of the tube 4. A web of bag forming material 8 (see FIG. 4) is suitably guided from a supply reel onto the rear portion of the collar-like guide 2 as seen in elevation in FIG. 3. The guide portion 2 directs the film of material 8 to assume a compoundly curved shape and to bring the side edges thereof inwardly to overlapping relation at the front of the tube 4. The bag forming material is caused to fold over the junction edge 6 and to assume the tubular shape shown at 10 in FIG. 4 with overlapping front edges 12. As shown and described in 2,982,334, the machine is provided with a backing bar 14 of magnetic material which bar is fixedly mounted on the machine frame and has a horizontal portion 16 extending over the aforementioned junction edge at the forward lowest portion thereof. The backing bar 14 is integrally joined to the portion 16 and is resilient. A magnetic heat sealing means (not shown here) periodically attracts the backing bar 14 to apply pressure and heat to the overlapping edges 12 to form a longitudinal seam in the tube 10. The structure thus far described is fully shown and more fully described in the patents previously mentioned.

Referring now to FIGS. 1 through 5, the present invention involves the use of a further element comprising an internal tubular mandrel 18 slightly smaller than the internal diameter of the tube 4 and which extends downwardly therein at least from the junction edge 6. In the preferred form of the invention, the tubular mandrel 18 is formed of a light plastic material, such, for example, as from a sheet of polyester resin. The upper edge of the tubular mandrel 18 is of substantially the same shape as the junction edge 6 and is formed to provide a lateral outwardly extending flange 20 overlying the junction edge 6 and then formed to substantially the same shape and curvature as the guide portion 2. The dimensions are such, however, that a clearance space exists between the mandrel 18 and the tube 4 and between the flange portion 20 and the guide portion 2. At its forward portion the insert 22 comprising the mandrel 18 and flange portion 20, terminates in spaced ends 24 (see FIG. 1) closely adjacent the side edges of the backing bar 14 and portion 16 thereof. Thus, the backing bar prevents the insert from twisting and binding in the tube 4 but permits free upward movement thereof and free lateral floating movement within the limits of the clearance provided.

In use, the web of bag forming material 8 is first threaded through the tube 4 and so arranged as to conform to the guide portion 2 whereupon a downward pull on the tubular structure 10 will cause the web material to be

drawn over the junction edge 6 and through tube 4 into tubular shape. After the sheet material is thus threaded, the insert 22 is placed in position as shown in the drawings and permitted to rest thereon solely by its own weight. It has been found that the presence of the mandrel portion 18 and flange portion 20 produces a more uniform quality of bag without the stress marks previously mentioned and permits the use of a wider variety of bag forming material than was heretofore possible. It is to be noted that the insert 22 is completely free floating and conforms quite snugly to the surface of the bag forming material 8. Thus, some frictional drag is developed between the bag forming material and the tubular mandrel portion 18 which frictional drag exerts a downward pull on the insert to hold it snugly in place at all times and to enforce smooth movement of the material over the junction edge 6. The frictional drag, however, is not great.

Obviously, the insert 22 may be removed at will, for any purpose desired, by simply lifting the same upwardly.

In the modification shown in FIG. 6, the free floating insert 22 is replaced by a tubular mandrel 30 which is preferably formed of metal or the like sheet material. The mandrel 30 extends downwardly in the tube 4 with the same order of clearances appropriate for the form of FIGS. 1–5 but is not provided with the outer flange portion 20. Instead the tubular mandrel 30 extends straight upwardly above the junction edge 6. It has been found that for many materials and in most cases, a mandrel of this form performs satisfactorily and insures a blemish-free bag since it positively forces the bag forming material into the desired tubular shape as soon as it reaches the junction edge 6. The forward edge of the tubular mandrel 30 is provided with ear portions 32 spot welded or otherwise firmly secured to the outer surface of the upper end portion of resilient backing bar 14. Thus, the tubular mandrel 30 is held against downward movement in the tube 4 but is free to float laterally within the confines of the tube 4. The lateral floating movement thus provided, and that inherent in the forms of FIGS. 1 through 5, insures that the mandrel portion of each form can readily accommodate itself to any flaws or changes of thickness in portions of bag material 8 which may be inherently in that material. Furthermore, the floating movement permits the mandrel to accommodate for lateral pressures that may be caused by the entry of any foreign matter between the material 8 and the mandrel.

It is to be noted that in the form of FIG. 6 the bag forming material is exposed up to the junction edge 6 and some slight space exists between that junction edge and the mandrel 30. Some particles of the product being handled or other foreign material may thus enter that space and tend to cause the bag forming material to bind. This is one disadvantage of the form of FIG. 6 but the floating mounting of the mandrel minimizes that disadvantage. The form of FIGS. 1 through 5, having the flange portion 20, is not subject to the disadvantage just mentioned since the flange portion 20 serves as a cover for the space referred to and positively prevents the entry of any product or other foreign matter between the bag forming web and the mandrel 18.

The guide portion 2 defines a compoundly curved surface and normally includes substantially flat area portions. Since those substantially flat area portions perform no real guiding function, they are removed in the present invention, as by means of the cut-outs 40, 42, and 44, thus effecting a saving of material and reducing the size and weight of the apparatus while at the same time eliminating sources of substantial friction. It is to be noted that the flange portion 20, of FIGS. 1–5, preferably extends outwardly far enough to overlie at least portions of those cut-outs and thus insure proper guiding of the web material 8 without the introduction of frictional drag.

While a limited number of specific embodiments of the invention have been shown and described herein, it is to be understood that the same are merely illustrative of the principles involved and that other forms falling within the scope of the appended claims are contemplated.

We claim:

1. In a tube former having a collar-like guide portion and a generally tubular portion joined thereto along a junction edge extending generally oblique to the axis of said tube: the combination comprising; a hollow tubular mandrel extending downwardly within and spaced slightly inwardly from said tubular portion, said mandrel extending at least up to said junction edge; a flange-like portion extending generally laterally from said mandrel and being shaped to conform substantially to the upper surface of said collar-like guide portion to overlie the same whereby to slidably rest on a web of sheet material moving thereover and positively and smoothly guide said sheet material over said junction edge and about said mandrel portion and to hold said mandrel against downward movement in said tubular portion while leaving the same free for lateral floating movement in at least one direction.

2. In a tube former having a collar-like guide portion and a generally tubular portion joined thereto along a junction edge extending generally oblique to the axis of said tube: the combination comprising; a hollow tubular mandrel extending downwardly within and spaced slightly inwardly from said tubular portion, the upper edge of said mandrel being parallel to and adjacent said junction edge and curving outwardly thereover to define a flange portion conforming to and overlying said collar-like guide portion adjacent said junction edge whereby to slidably rest on a web of sheet material being drawn over said guide portion.

3. A device as defined in claim 2 wherein said mandrel and flange portions are free of securement to said tube former whereby they are full floating thereon and readily removable therefrom.

4. A device as defined in claim 2 wherein said mandrel and flange portions are formed of sheet polyester resin.

5. A device as defined in claim 2 wherein said collar-like portion is formed to define a compoundly curved surface including some substantially flat areas, said substantially flat areas being cut away; said flange portion extending outwardly to overlie at least portions of said cut-away areas to engage and guide the upper surface of a web of sheet material over said areas.

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