United States Patent

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[54] **ARRANGEMENT FOR CONTROLLABLY FEEDING CONNECTED BAG ELEMENTS TO FILLING OR LIKE APPARATUS**
12 Claims, 4 Drawing Figs.

[52] **U.S. Cl.** **53/29,** 53/187
[51] **Int. Cl.** **B65b 43/12**
[50] **Field of Search** 53/28, 29, 187, 384, 390, 385, 35, 37

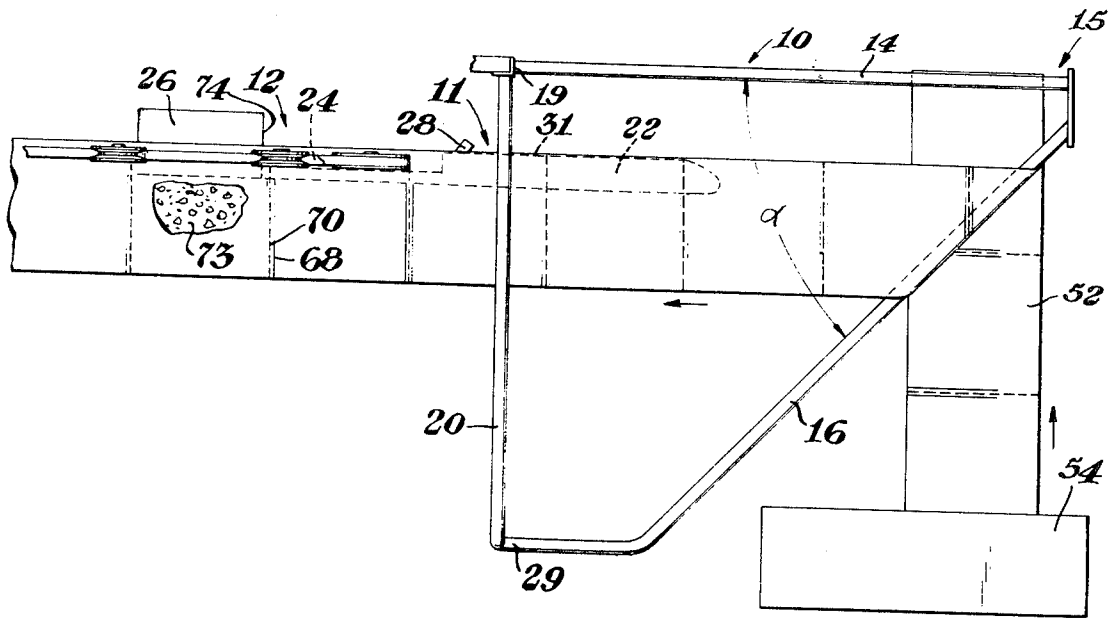
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ABSTRACT: A device for controllably feeding connected bag elements to filling apparatus comprising: a horizontally disposed first bar or elongated member, and a second such bar extending diagonally downwardly from the forward end of the first bar such that the bars open angularly toward the apparatus In operation, the bags are initially threaded top wise over the horizontal bar and then directed downwardly underneath and around the diagonal bar, and therefrom directed to the apparatus. The device is taught for usage with apparatus which mounts the bags as they are received, in a curtain-and-rodlike fashion by means of an open end loop located at the top end of each bag.



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SHEET 1 OF 2

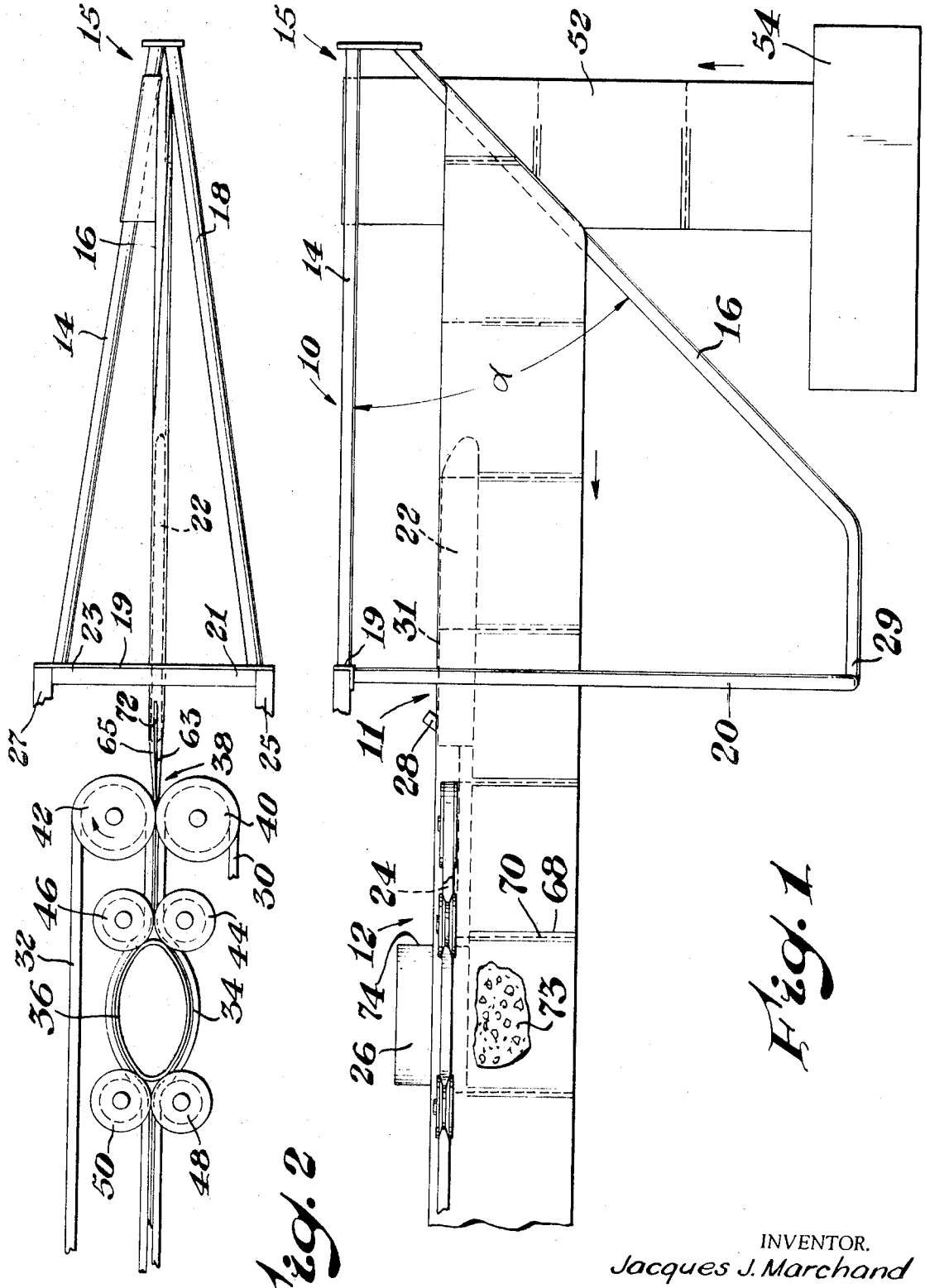


Fig. 2

Fig. 1

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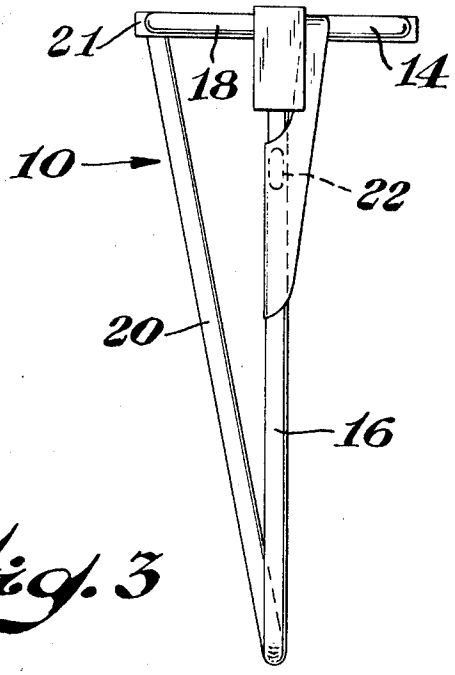


Fig. 3

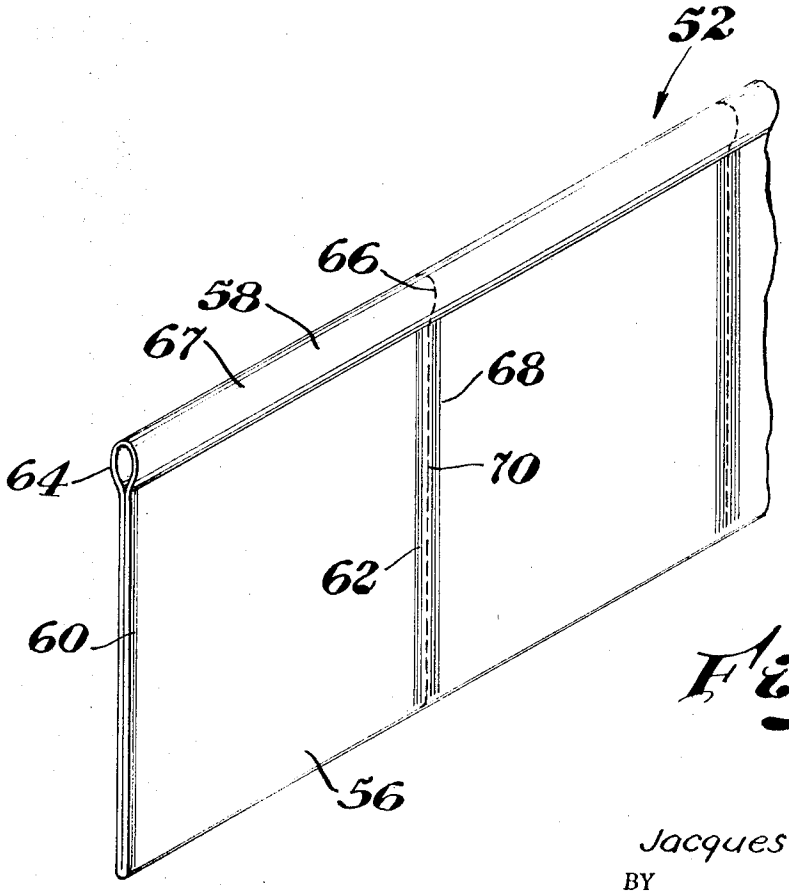


Fig. 4

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ARRANGEMENT FOR CONTROLLABLY FEEDING CONNECTED BAG ELEMENTS TO FILLING OR LIKE APPARATUS

BACKGROUND OF THE INVENTION

To effectively service small volume packaging establishments such as those frequently found in the citrus fruit packaging industries, it is frequently desirable to provide a packaging system wherein the complexity of the same is maintained at a minimal trouble-free level. To this end, it is oftentimes possible, for example, to eliminate or cut back the number of functions or steps that are required of the filling apparatus employed. Specifically, in filling operations where the bags are delivered to the apparatus in chain form, the bags can be designed to part easily after filling, and without requiring the need for a special cutting station or the like to perform such a function. Problems are encountered, however, in that such lightly connected bags tend to prematurely part from each other, thereby ruining them for use in such a packaging system. For example, the bags when wound on a roll as is the normal mode for their storage and delivery, are subjected to certain winding tensions which require the connection between the bags to be at a certain minimal level.

A more appropriate arrangement for such a system is to ship the bags in a folded pile, thereby avoiding the indicated winding tensions.

In this latter arrangement and as opposed to bag roll stock, no real initial alignment is provided for controlled feeding of the bags to filling or like apparatus which is to perform or react on such bags.

It is a primary object of the present invention, therefore, to provide improved methods and devices for controllably feeding bags to filling apparatus and the like.

It is a further object of the present invention to provide such methods and devices wherein the same are applicable for usage in a packaging system where the bags are fed to fill apparatus from a folded pile.

SUMMARY OF THE INVENTION

Briefly then, the present invention concerns a device for controllably feeding bags in chain form to filling or like apparatus. The device can comprise a horizontally arranged top or first bar, and a second or diagonal bar extending downwardly and inwardly from the forward end of the top bar with the two bars opening angularly toward the apparatus. The chain of bags is initially threaded over the top bar and then directed downwardly underneath and around the diagonal bar, and therefrom directed to the apparatus. Normally, the two bars will be at an angular spacing of about 45°. The device is taught for employment in combination with an apparatus having a mandrel at the receiving end thereof, and in a packaging system wherein each bag includes an open ended loop adjacent its top end. The mandrel complements and assists such a device in obtaining precise bag control by receiving such bags in curtain-and-rodlike fashion through the loop positioned at the top end of each bag. Such a device in combination with the aforedescribed packaging system and mandrel concept permits feeding of bags to filling apparatus from a folded pile. Nevertheless, the invention can also beneficially be employed for use in systems of the type employing bag roll stock.

Other objects and advantages of the present invention and its details of construction will be apparent from a consideration of the following specification and accompanying drawings wherein:

FIG. 1 is a side view of apparatus including a feeding device constructed according to the principles of the present invention;

FIG. 2 is a top view of the apparatus of FIG. 1;

FIG. 3 is a front view showing the feeding device portion of the apparatus of FIG. 1; and

FIG. 4 is an isometric view of a chain of connected bag elements constructed for usage with the apparatus and packaging systems taught herein.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now more particularly to the drawings, there is shown in FIG. 1 a feeding device 10 mounted adjacent the infeed section or forward end 11 of a filling apparatus 12.

Device 10 includes a generally horizontally disposed elongated member or first or top bar 14, and a second elongated member of diagonal bar 16 extending downwardly and inwardly from adjacent the forwardmost part 15 of top bar 14. As will be described more fully hereinafter, bars 14 and 16 open angularly toward apparatus 10 and are normally angularly spaced from each other at approximately 45°.

Device 10 further includes a first horizontally disposed support bar 18 depending rearwardly from adjacent forwardmost part 15 of top bar 14, and a crossbar 19 connecting together bars 14 and 18 adjacent forward end 11 of apparatus 12. Crossbar 19 is fixedly mounted at each end 21 and 23 by stationary supports 25 and 27, respectively. A second vertically disposed support bar 20 extends from the lower terminating end 29 of diagonal bar 16, and generally upwardly therefrom and connects to end 21 of crossbar 19, as is best shown in FIG. 3.

At its forward end 11, apparatus 12 includes a horizontally mounted mandrel 22 which is connected by means of arm 24 to a hopper or fill mechanism 26. Mandrel 22 at its top edge 31 mounts a cutting means or knife 28. Opposed continuous belts 30 and 32 extend from a region intermediate of mandrel 22 and hopper 26, as is best shown in FIG. 2, and therefrom pass snugly about the opposite sides 34 and 36, respectively, of hopper 26. Belts 30 and 32 are tightly squeezed together at their forward end 38 by pulleys 40 and 42, and at regions immediately fore and aft of hopper 26 by pulleys 44 and 46, and 48 and 50, respectively.

In operation, connected bag elements 52, as shown separately at FIG. 4, as normally delivered for filling in a cardboard or like shipping container 54 (see FIG. 1). In the preferred mode of operation, the container 54 including the bag elements 52 stored therein in a folded pile, is placed beneath device 10, and the top portion of the container cut away. The bags 52 are then fed from container 54 upwardly and around top bar 14 and thereafter directed downwardly to and underneath and around diagonal bar 16. From diagonal bar 16, the bags are directed in controlled vertical alignment to apparatus 12 for filling.

Referring now to FIG. 4, each bag 52 includes closed bottom and top ends 56 and 58, respectively, and two sides 60 and 62 closed except at their uppermost extent 64 and 66. The closed top 58 construction in combination with the open uppermost extents 64 and 66 of bags 52, forms an open-ended loop 67 disposed across the top end 58 of each bag. Bags 52 can be formed by cross sealing tubular material at spaced intervals as denoted by seals 68. A line of weakness such as perforations 70 extends along the midregion of seals 68, and therefrom upwardly through top ends 58 of bags 52.

Referring again to FIGS. 1 and 2, bags 52 as constructed generally according to the principles as indicated in the description of FIG. 4, are particularly adapted for use in combination with apparatus 12 including a mandrel 22 protruding outwardly from the forward end 11 thereof. Specifically, from diagonal bar 16 of device 10, bags 52 are received by mandrel 22 which mounts the same in a curtain-and-rodlike fashion through the loop 67 positioned at top end 58 of each bag. From mandrel 22, top ends 58 are gripped or squeezed between belts 30 and 32, and bags 52 directed to hopper 26 via knife 28. Knife 28 longitudinally parts loops 67 such that fill openings 72 formed between the two parted edges 63 and 65 of the loop, and the two closed sides 60 and 62 of each bag. Thereafter, parted edges 63 and 65 are plowed open by the leading or forward part 74 of hopper 26, and a product fill 73

dropped from hopper 26 through fill openings 72. The bags are then directed to a sealing station (not shown) for purposes of forming a closure seal across the top ends 58 of each filled bag 52. Perforations 70 permit the bags to be manually or otherwise parted from each other such that a special cutting station or the like to perform such a function need not be required of apparatus 12.

Referring now more specifically to device 10, the angular spacing between bars 14 and 16 is normally in a range between about 40 to about 50°. At theoretical conditions, an angle of 45° would be most appropriate. However, in actual running conditions, it has been found that bags 52 as they are filled under hopper 26, round out somewhat along the sides, and since the bags are connected together, oftentimes tend to affect the alignment of the bags being directed to hopper 26 from mandrel 22. Accordingly, for some operations it will be found that optimum running conditions are obtained by slanting the mandrel (and arm 24) a few degrees with respect to the horizontal plane. Usually, such adjustment of mandrel 22 will not encompass more than a 2° to 4° shift. To accommodate adjustments to mandrel 22, the angle α between bars 14 and 16 can be adjusted accordingly such that bags 52 are fed in an aligned fashion to the mandrel.

While the present invention has been described in particularity as regards to the use of feeding device 10 in combination with packaging system including connected bag elements having loops 67 disposed adjacent top ends 58 of each bag, and further in combination with apparatus including a mandrel 22 of like mounting means, it can be readily appreciated that the use of such feeding device can be in combination with more conventional packaging systems and apparatus. Conceivably, for example, the bags shown could be replaced with those of the conventional open-top construction having other top end supporting means, and the mandrel replaced by other receiving means such as a pair of vertically disposed rolls for receiving the bags from diagonal member 16.

While certain representative embodiments and details have been shown for the purpose of illustrating the invention, it will be apparent to those skilled in the art that various changes and modifications can be made therein without departing from the spirit and scope of the invention.

What I claim is:

1. A device for controllably feeding a chain of connected bag elements to filling apparatus comprising a first elongated member, a second elongated member extending angularly with respect to the axis of said first member, said first and second members opening toward said filling apparatus, said apparatus including means for receiving said chain of connected bag elements from said feeding device, said elements comprising bags having supporting means adjacent the top end thereof, and said receiving means receiving said chain by way of said supporting means.

2. The device of claim 1 wherein said first member is generally horizontally disposed.

3. The device of claim 2 wherein the angle between said first and second members is approximately 45°.

4. The device of claim 1 wherein said receiving means comprises a mandrel.

5. The device of claim 4 wherein said mandrel and first member are both generally horizontally disposed, said first member being disposed in the plane of or upwardly of said mandrel.

6. A method of feeding a chain of connected bag elements to filling apparatus comprising:

a. directing said chain generally upwardly to a first member, and thereafter

b. directing said chain around said first member and then downwardly therefrom to a second member which is angularly disposed with respect to said first member and with said first and second member opening generally toward said apparatus, and thereafter

c. directing said chain around said second member, and thereafter

d. feeding said chain to said apparatus, said chain positively received by said apparatus wherein said connected bag elements comprise bags each having supporting means adjacent the top end thereof, and wherein said feeding step comprises directing said supporting means of said bags to a receiving means of said apparatus whereby said bags are received progressively by said receiving means through said supporting means of said bags.

7. The method of claim 6 wherein said first member is generally horizontally disposed.

8. The method of claim 6 wherein the angle between said first and second members is approximately 45°.

9. The method of claim 6 wherein said connected bag elements are fed to said first member from a folded pile.

10. The method of claim 6 wherein said first and second members include opposed inner and outer side portions respectively with said inner side portions defined as facing each other, said elements being directed to said outer side portion of said first member and topwise thereover and then downwardly to said outer portion of said second member and bottomwise thereunder and thereafter to said apparatus.

11. The method of claim 6 wherein said supporting means comprises open ended loops.

12. The method of claim 6 wherein said receiving means comprises a mandrel.