

[54] **MEANS FOR OPENING TUBULAR NET CUT  
END FOR NET BAG PACKAGING**

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93/8 R

[51] **Int. Cl.**..... **B65b 67/02**

[58] **Field of Search** ..... 53/390, 384, 183; 93/8 R

[56] **References Cited**

**UNITED STATES PATENTS**

3,342,017 9/1967 Yerkey ..... 53/390 X

3,360,901 1/1968 Gallo ..... 53/390

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[57]

**ABSTRACT**

A guide block which consists of a main block, an upper block and a lower block connected slideably through said main block to said upper block is inserted through the cut end of a tubular net of synthetic resin so that said main block and said lower block may be supported through the medium of said net texture respectively on a fixed arm and a movable arm so that said net cut end may be held open by said upper block upon being lifted for receiving goods therethrough and so that said net lower portion may be forwarded by said movable arm in co-operation with said lower block for supplying said main block with a predetermined amount of said net texture therearound.

**3 Claims, 3 Drawing Figures**

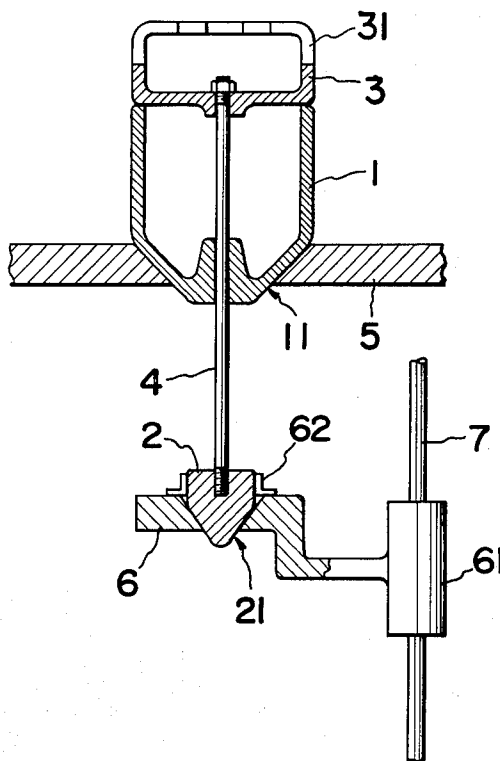


FIG. 1

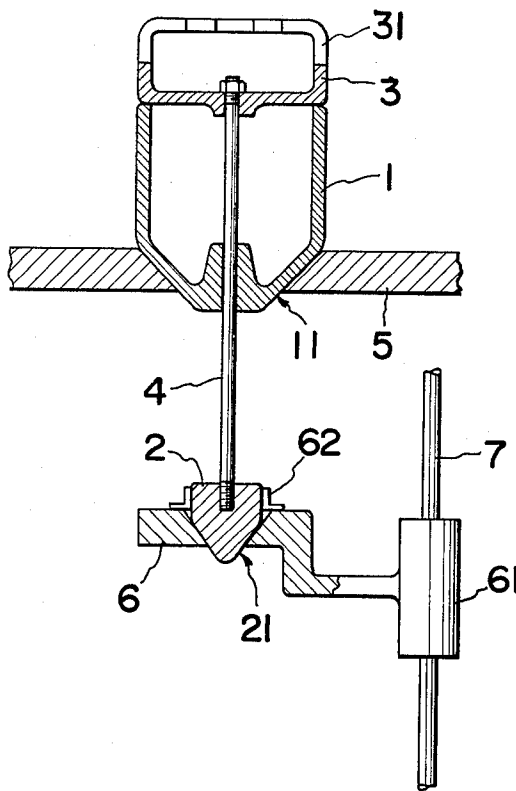


FIG. 2

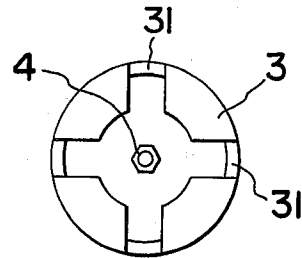
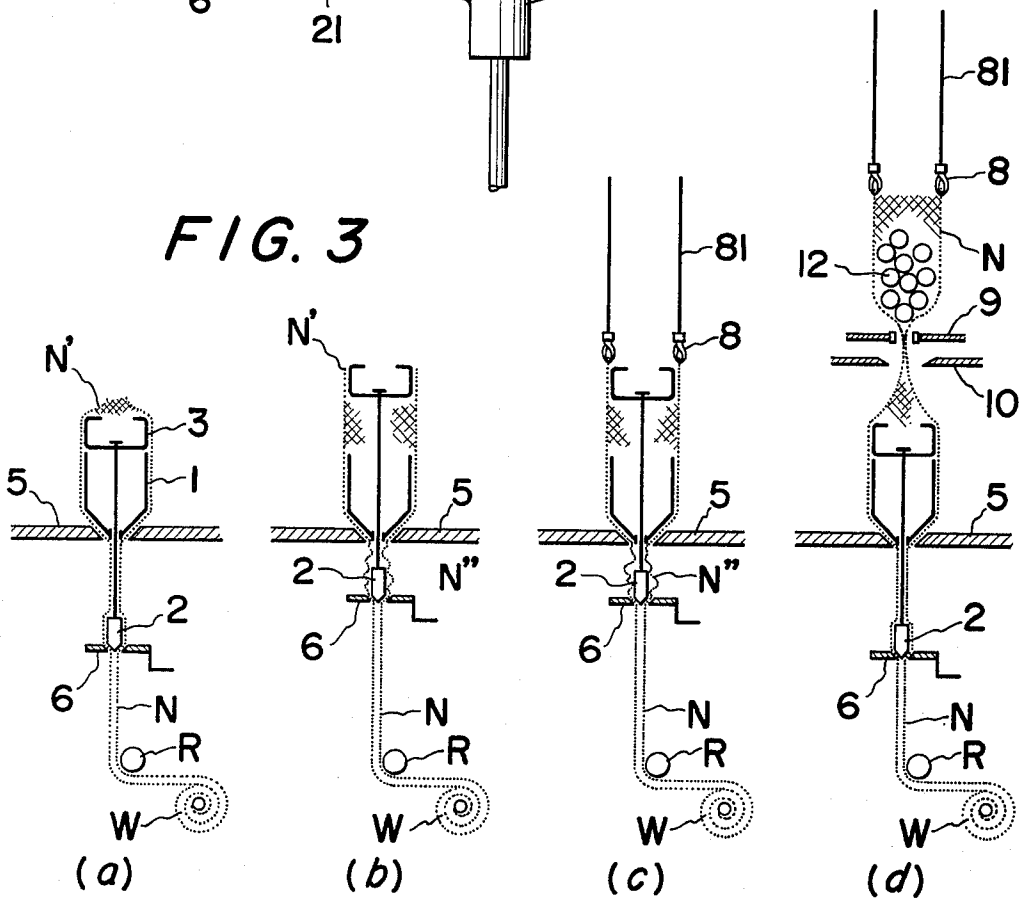


FIG. 3



# MEANS FOR OPENING TUBULAR NET CUT END FOR NET BAG PACKAGING

The present invention relates to means for packing goods such as fruits or other edible or non-edible matters for sale in net bags, and more specifically to means for opening the cut end of a tubular net of synthetic resin for receiving said goods therethrough. Said last-mentioned means is associated normally with a heat sealing means with which is closed bottom ends of said net bags and with cutting means with which is cut a portion of said tubular net below the portion which has been sealed by said heat sealer so as to form said net bags.

It is an object of the present invention to provide means for feeding a position for engaging pull-up means for said tubular net with said net front portion with which is held open said net cut end.

It is another object of the present invention to provide the above-mentioned means which will act as means for feeding a position for preparing the above-noted operation with said tubular net rear portion.

It is still another object of the present invention to provide means for the foregoing operations in a stroke.

And, it is another and important object of the present invention to provide the above-noted means which will operate as smoothly as possible.

Further objects and merits of the present invention will become apparent from the following description taken in connection with the accompanying drawings in which:

FIG. 1 is a vertical sectional view of an embodiment of the present invention.

FIG. 2 is a plan view of the guide block shown in FIG. 1.

And, FIG. 3 is schematic views for illustrating operations of a device according to the present invention in which: (a) is a position upon insertion of a guide block into the front portion of the tubular net and prior to operation, (b) is a position upon the movable blocks being lifted and the net cut end being held open, (c) is a position upon the hooks engaging the net cut end for the same being lifted by said hooks, and (d) is a position upon goods being inserted into the tubular net and just prior to the net being cut.

In the figures, 1 is a main block which has a conical wall face 11 facing downwardly. Main block 1 is formed so that conical wall face 11 can be seated on a fixed arm 5 through the medium of the net texture as shown in FIG. 3 and main block 1 can be supported thereby.

2 is a lower block which has a conical wall face 21 facing downwardly so that conical wall face 21 can be seated on a movable arm 6 through the medium of the net texture as shown in FIG. 3 and the lower block 2 can be supported thereby.

3 is an upper block having a diameter similar to that of main block 1. Upper block 3 is formed so that the bottom portion thereof can be seated on and supported by main block 1.

Lower block 2 and upper block 3 are connected to each other with a rod 4 which extends therebetween and through main block 1 slideably thereto.

And, main block 1, lower block 2, and upper block 3 in one body compose a guide block for guiding the net texture therearound.

Movable arm 6 is provided to run at a predetermined stroke between a lower dead point which corresponds to a position of upper block 3 in which is seated upper block 3 on main block 1 and an upper dead point which corresponds to a position of upper block 3 in which is held the net cut end open. Movement of movable arm 6 may favourably be effected by a rotary cam not shown in the figures. And, in FIG. 1, 61 is a slider on which is fixed movable arm 6 and which moves on and along a vertical guide rail 7.

Further, notches 31 in upper block 3 as appearing in FIGS. 1 and 2 are provided so that the net cut end lying across said notches may easily be hooked with hooks 8 for said cut end being lifted thereby to a position where goods 12 may be inserted through said cut end so as to be packed in net bags. And, in an embodiment as shown, left and right sides of lower block 2 are shaped flat so as to be held between vertical flat faces of guide members 62 for preventing rotation of lower block 2. This is to securing lateral position of notches 31 unchangeably against hooks 8.

Now, hereunder will be stated operations in accordance with the present invention. At first, referring to FIG. 3 (a), a whole guide block which consists of main block 1 and lower and upper blocks 2 and 3 connected to each other as mentioned in the foregoing is inserted manually into the front portion of tubular net N through the cut end thereof. Tubular net N has previously been drawn out manually upwardly from a web W and through movable arm 6 and fixed arm 5. Movable arm 6 is to be located at said lower dead point of said stroke. Then, the respective conical wall faces 11 and 21 of main block 1 and lower block 2 will engage respectively fixed arm 5 and movable arm 6 through the medium of said net texture. The cut end N' of said tubular net N is drawn manually over the upper end of upper block 3. So, said cut end N' is closed on the upper face of upper block 3 as shown, by constriction of said net texture.

Subsequently, referring to FIG. 3(b), upon movable arm 6 being moved upwardly so as to achieve the predetermined stroke of the arm 6, the portion of the net texture which lies between lower block 2 and movable arm 6 is forced to be caught in therebetween by the weight of movable blocks which are composed substantially of lower and upper blocks 2 and 3. Then, the portion of said tubular net lower than the arm 6 is drawn upwardly upon said stroke of arm 6. As the net texture is initially caught in between fixed arm 5 and main block 1 by the weight of main block 1, slacked portion N'' is caused thereby between arms 5 and 6. And, as the net texture is held caught in between arm 5 and main block 1, the net cut end N' is forced to open as shown by upward movement of upper block 3 caused by the upward movement of arm 6.

Referring now to FIGS. 3(c) and (d), the present device for opening tubular net cut end are shown in association with hooks 8, heat sealers 9 and cutters 10. These associated devices are to be operated in sequence operation with foregoing device for opening net cut end and for the insertion of goods through said net cut end and for the formation of net bags containing goods therein.

Now, referring to FIG. 3(c), hooks 8 provided at the lower ends of movable rods 81 are lowered sequential to said upward movement of arm 6 so as to hook the net cut end now held open by upper block 3.

Subsequently, referring to FIG. 3(d), upon said net cut end being hooked, hooks 8 are lifted to a position for the insertion of goods. Said slacked portion N'' of the net texture can pass quite easily along conical wall face 11 of main block 1 when the front portion of tubular net is drawn upwardly by hooks 8. Sequential to this, said movable guide is lowered by its own weight upon arm 6 being lowered. And, upon lowering of said movable guide, a portion of said tubular net selected to form the bottom ends for net bags is sealed by heat sealers 9. Goods 12 are inserted through the net cut end which has been held open by hooks 8, and the tubular net is cut at a suitable portion of said net lower than the sealed portion for the separation of a net bag containing goods therein. Upon this, said device for opening tubular net cut end as a whole takes its original position and the newly produced cut end of the net is constricted to cover the upper block 3 upper face as shown in FIG. 3(a).

As stated above, a device in accordance with the present invention acts successfully for opening the cut end of a tubular net. And, on account of that main block 1 is supported at its conical wall face 11 by fixed arm 5 through the medium of net texture, said net texture is caught securely in between fixed arm 5 and main block 1 by the weight of main block 1 when upper block 3 is lifted in association with lower block 2 against resistance of the front portion of the tubular net texture which has been constricted. So, upward tendency of the net texture which would be caused by upward movement of upper block 1 which is quite injurious to form an open cut end of the tubular net at a predetermined position is prevented certainly.

And, on account of net texture N standing between lower block 2 and movable arm 6, the net texture N is caught securely in between said arm 6 and block 2 by the weight of upper block 3 in cooperation with lower block 2 upon upward movement of movable arm 6 for causing opening the net cut end. So, a portion of said net lower than said arm 6 is drawn upwardly to form a slacked portion N'' above said arm 6 which will help smooth lifting of the net cut end when said net cut end is pulled by hooks 8.

In fact, a tubular net of synthetic resin is in a form of a cord or rope in its natural state by its self-constriction. However, on account of the structure of the present invention, said tubular net will receive only quite a small resistance by said fixed arm 5 and movable arm 6. And, further, as the tubular net texture is forwarded upwardly in enlarging the caliber around conical wall faces 11 and 21 of blocks 1 and 2, said net texture can pass therealong quite smoothly. Accordingly, the net cut end will not be injured in the operations for drawing the tubular net to form net bags so as to receive goods therein. And, it is also important merits of this invention that the operations are very smooth

and the power required for the operations is small because of the small friction caused by the relative motion of the net texture and the parts of the device.

Having thus described my invention, what is claimed for Letters Patent is:

1. Means for opening tubular net cut end for net bag packaging device which comprises a guide block having in one body a main block, a lower block and an upper block, said main block being substantially cylindrical and having a conical wall face facing downwardly at the bottom portion thereof, said lower block having also a conical wall face facing downwardly at the bottom portion thereof, and said upper block being substantially cylindrical and having a diameter similar to that of said main block so that said upper block can be seated on and supported by said main block, said lower and upper blocks being connected to each other with a rod extending therebetween and through said main block slideably, a fixed arm for supporting said main block having a seat portion for engaging said conical wall face of said main block through the medium of a tubular net texture, and a movable arm for supporting said lower block having a seat portion for engaging said conical wall face of said lower block through the medium of said net texture, said movable arm being provided for running at a predetermined stroke between a lower dead point which corresponds to a position of said upper block in which is seated said upper block on said main block and an upper dead point which corresponds to a position of said upper block in which is held the net cut end open.

2. Means for opening tubular net cut end as claimed in claim 1 wherein said upper block being provided with notches provided substantially at the side wall portion thereof so as to receive therein hooks for hooking said tubular net texture lying thereacross.

3. Net bag packaging means which comprises means for opening tubular net cut end as claimed in claim 1, hooking means disposed above said guide block upon being seated on said fixed and movable arms for hooking said tubular net texture front portion, heat sealing means for said net texture disposed above said guide block upon being seated on said fixed and movable arms for closing bottoms for said net bags by sealing by heat, and cutting means for cutting said net texture provided between said heat sealing means and said guide block upon being seated on said fixed and movable arms for the separation of net bags from the rest of the tubular net by cutting, and sequent operation means for operating sequently said movable arm upwardly, said hooks downwardly for hooking said net front portion, said movable arm downwardly, said hooks upwardly, said heat sealing means to seal the net texture, and said cutting means to separate net bags from the rest of said tubular net.

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