

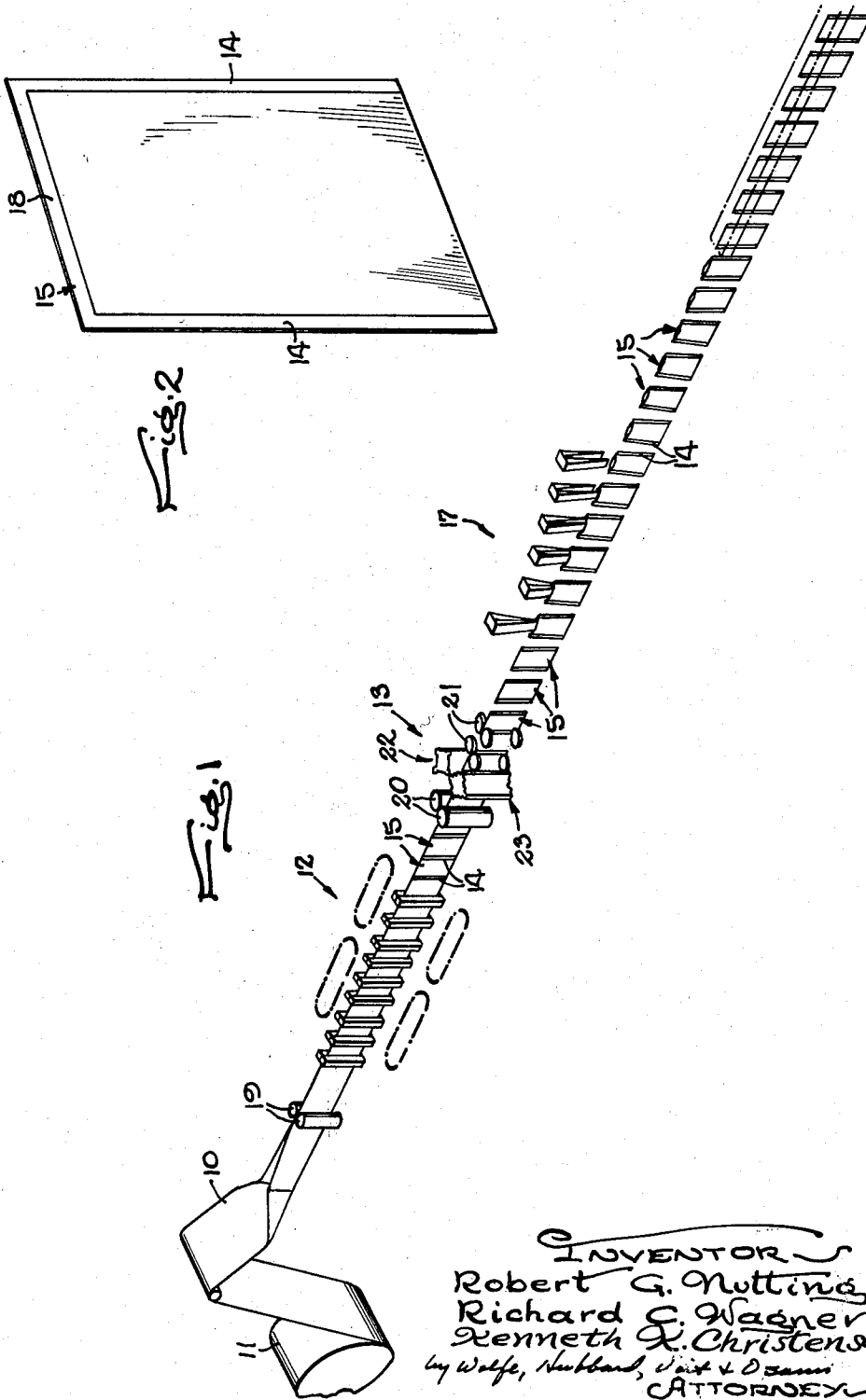
May 11, 1965

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ROTARY CUT-OFF DEVICE WITH INTERCHANGEABLE
CUTTER AND ANVIL ELEMENTS

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Original Filed April 10, 1961

2 Sheets-Sheet 1



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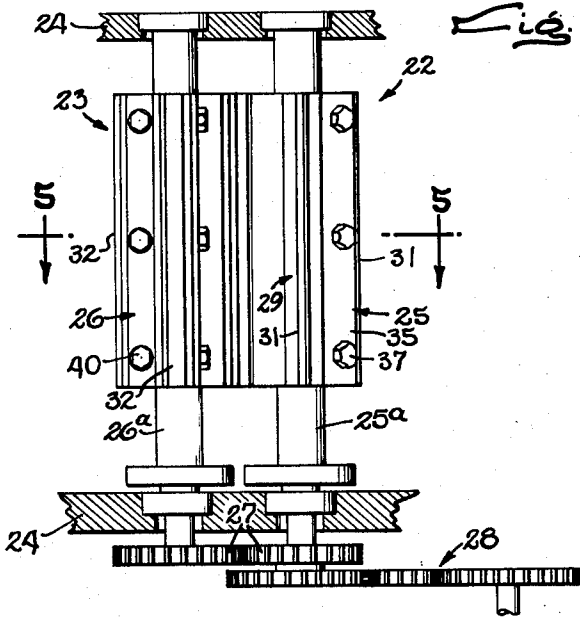


Fig. 3

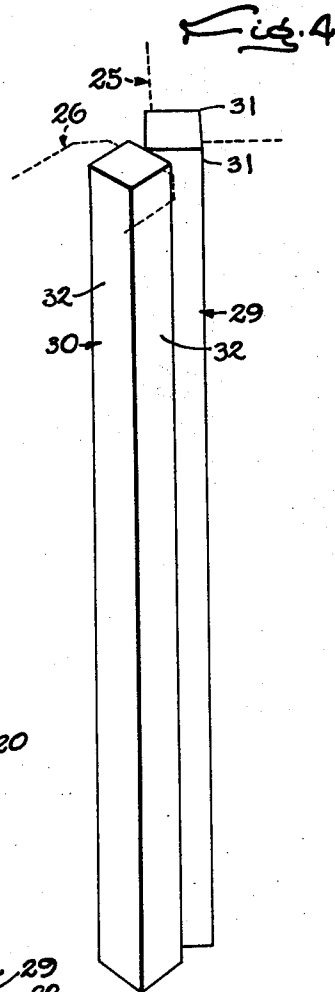


Fig. 4

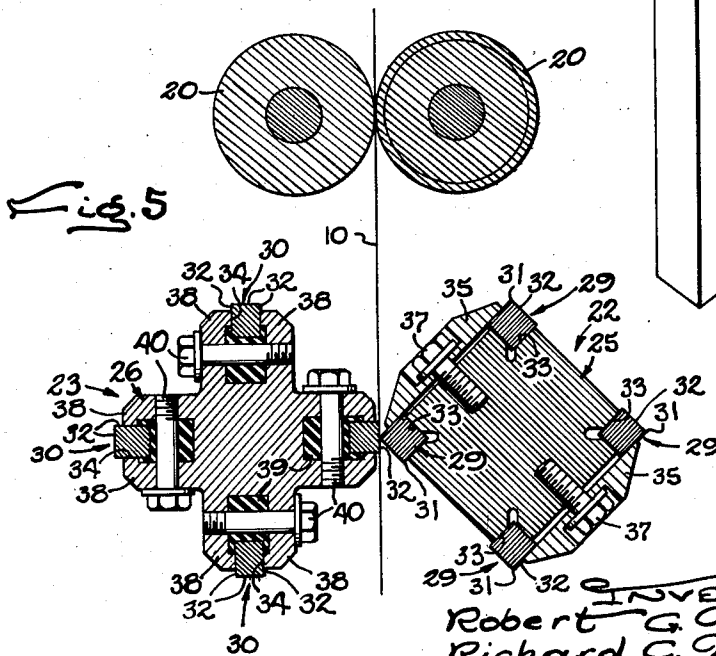


Fig. 5

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ROTARY CUT-OFF DEVICE WITH INTERCHANGEABLE CUTTER AND ANVIL ELEMENTS

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Original application Apr. 10, 1961, Ser. No. 102,048. Divided and this application Jan. 31, 1963, Ser. No. 255,318

3 Claims. (Cl. 83-346)

This invention relates to devices for severing lengths of strip material into shorter lengths, and relates more particularly to cut-off devices of the type comprising two cutting units including drums rotatably mounted on opposite sides of the strip at a cut-off station to turn as the strip is advanced endwise between the drums, one of the drums carrying a knife element and the other providing an anvil surface for pressing the strip against the knife element to cut the strip.

The general object of the present invention is to reduce substantially the frequency of required replacement of knife elements due to wear on the cutting edges.

Another object is the provision of a novel cutting unit including a set of knife elements formed and mounted in a novel manner such that each element provides a plurality of knife edges without replacement.

A further object is to form the anvil surfaces on a second set of identical elements and mount the same on the other drum to serve initially as anvils, the two sets being interchangeable and the elements being individually adjustable relative to the drums to bring all the available knife edges into operating positions when desired.

The invention also resides in the novel and simple mounting of the elements on the drums.

Other objects and advantages of the invention will become apparent from the following detailed description taken in connection with the accompanying drawings, in which

FIGURE 1 is a schematic perspective view showing the various steps performed by a packaging machine embodying the novel features of the present invention.

FIG. 2 is an enlarged perspective view of a bag formed by the machine.

FIG. 3 is an enlarged fragmentary sectional view taken in a transverse vertical plane through the machine adjacent the cut-off station.

FIG. 4 is an enlarged perspective view of the knife and anvil elements.

FIG. 5 is an enlarged fragmentary sectional view taken along the line 5-5 of FIG. 3.

As shown in the drawings for purposes of illustration, the invention is embodied in a packaging machine of the type in which a web or strip 10 of heat sealable sheet material is drawn off a supply roll 11, folded longitudinally, and continuously advanced endwise along a horizontal path through heat sealing and cut-off stations 12 and 13 respectively first to form a series of cross-seals 14 dividing the web into integrally connected bags 15 and then to sever individual bags from the web. After being separated, each bag is filled at a filling station 17 with a quantity of the product to be packaged and then closed by a top seal 18. The folding, sealing, filling, and closing mechanisms are illustrated schematically in FIG. 1 and may take various forms well-known to those skilled in the art, one machine capable of performing these operations being that disclosed in our copending application Serial No. 102,048, of which this is a division and to which reference may be had for details of construction and operation not contained herein.

To draw the web 10 off the roll 11 and advance it through the machine, two sets of feed rolls 19 and 20 are spaced apart along the path of the web with the rolls of each set journaled on the machine base on opposite sides of the web to turn in frictional engagement with the latter. Accelerator rolls 21 pick up the severed bags and advance them into a conveyor (not shown) which carries them through the remainder of the machine. Both sets of feed rolls, the accelerator rolls, and the other operating mechanisms of the machine are driven by a continuously rotating, motor-driven shaft (not shown) journaled on the base beneath and paralleling the path of the web.

When the cross-seals 14 have been made, the web 10 is advanced by the feed rolls 20 through the cut-off station 13 where the terminal bag is severed from the strip. The cutting is accomplished by cutting units 22 and 23 disposed on opposite sides of the web and operable to cut the web transversely intermediate the edges of each cross-seal 14. As shown in FIGS. 3 and 5, the cutting units comprise drums 25 and 26 journaled on vertically spaced rails 24 (FIG. 3) by means of upright shafts 25^a and 26^a to turn about their longitudinal axes, the shafts being continuously rotated by the drive shaft through meshing spur gears 27 fast on the lower ends of the shafts and turned by gearing indicated generally at 28 and rotated by the drive shaft.

The two drums 25 and 26 carry knife and anvil elements 29 and 30 respectively which cooperate with each other to sever the bags from the strip. Each knife element 29 is formed with a knife edge 31 (FIG. 5) facing radially outwardly and extending transversely of the web 10 in position to engage one side of the latter at the cut-off station 13, and the anvil elements 30 are formed with flat sides 32 also facing radially outwardly and positioned to engage the opposite side of the web and press the latter against the knife edge, the peripheral speed of the drums being the same as the speed of the web and the spacing of the elements on each drum being the same as the width of the bags 15.

The present invention contemplates the provision of novel cutting units 22 and 23 in which the frequency of required replacement of knife and anvil elements 29 and 30 due to wear is substantially reduced. To this end, a plurality of knife edges 31 and anvil surfaces 32 are formed on each of the elements and the latter are mounted on the drums 25 and 26 in a novel manner for individual adjustment to bring the various edges and surfaces into operating position, and also for interchangeability of the elements 29 with the elements 30. Accordingly, the number of knife edges and flat surfaces available with one full set of elements 29, 30 is several times as large as the number of individual elements.

More specifically, the elements 29, 30 are formed as identical elongated bars of regular polygonal cross-section each having a plurality of corners forming knife edges 31 and flat sides forming anvil surfaces 32. Angularly spaced seats 33 in the drum 25 are shaped to hold the bars 29 in positions with any selected corner of each bar facing outwardly, while seats 34 in the drum 26 are shaped to hold the bars with any selected flat side of each bar facing outwardly, means being provided to clamp the bars releasably in the respective seats.

In this instance, each bar 29, 30 is made of square cross-section to provide four flat sides 32 and four knife edges 31. The drum 25 is of generally square cross-section with the four corners cut away to form V-shaped longitudinal grooves constituting the seats 33, the two walls of each of the grooves being perpendicular to each other and to the adjacent sides of the drum to receive the bars 29 with one corner facing outwardly and with at least one side of each bar spaced outwardly from the adjacent side of the drum. To hold the bars in place, plates 35 are clamped

to the sides of the drum by bolts 37 to abut against one exposed side of each bar and press the latter into the associated seat. In this way, the bars are held securely on the drum but may easily be removed and turned to exposed a different corner 31 when the corner being used becomes dull.

In the sace of the cutting unit 23, the drum 26 is cross-shaped in cross-section and the outer end of each leg of the cross is longitudinally grooved to form the seats 34 between two yieldable jaws 38. The latter are clamped against opposed sides 32 of a bar with another side of the bar facing outwardly and tangentially disposed relative to the drum. Preferably, a backing 39 of resilient material is disposed in the groove to abut against the inner side of the bar. Bolts 40 projected through one jaw and threaded into the other draw the jaws together to grip the bars.

Thus, one exposed side 32 of each bar 30 is positioned to serve as an anvil for the associated knife edges 31 on the other drum, and the bars are held securely in the seats 34 formed by the jaws 38 and the backing 39 but are easily removed by loosening the bolts 40. Accordingly, each bar 30 provides four anvil surfaces.

With the bars 30 identical to the bars 29, the two may be interchanged after all four corners 31 of each bar 29 have been dulled, the bars 30 then providing knife edges while the bars 29 serve as anvils. In this way, the eight bars originally installed on the machine provide thirty-two knife edges and thirty-two anvil surfaces, or eight complete changes without replacement. It will be evident, of course, that the knife edges are more susceptible to wear than are the flat sides and, therefore, changes will be made because of wear on the edges rather than on the sides. Further, it should be apparent that bars of other cross-sectional shapes can be used with seats shaped according to the cross-sectional shape chosen.

From the foregoing, it will be seen that cutting units as described herein substantially reduce the frequency of replacement of cutting elements 29 by providing a number of cutting surfaces 31 several times as large as the number of cutting elements 29. All that is required is the turning of the bars 29 until each corner thereof is dulled, and the eventual substitution of the bars 30 which provide an equal number of cutting edges. Then both sets of bars may be re-ground or replaced as desired.

We claim as our invention.

1. In a packaging machine, the combination of, a frame, mechanism on said frame for supporting an elongated strip of severable material and advancing the same endwise along a path in a predetermined plane through a cut-off station, first and second drums disposed on opposite sides of said path at said cut-off station and mounted on said frame for rotation about axes parallel to said plane and perpendicular to said path, first and

second sets of identical bars of regular polygonal cross-section having corners formed as knife edges, means defining a first set of seats angularly spaced around the periphery of said first drum and each shaped to hold one of said bars with a corner of the latter paralleling the drum axis and facing radially outwardly in position to engage said strip at said cut-off station, a second set of seats angularly spaced around the periphery of said second drum and each shaped to hold one of said bars with a flat side thereof facing radially outwardly in position to engage one of said corners at said cut-off station, one of said bars being fitted in each of said seats, means releasably clamping said bars in said seats, and mechanism for turning said drums in timed relation with the advance of said strip to move said corners and said surfaces simultaneously through said cut-off station in the direction of movement of the strip thereby to sever the strip into lengths determined by the spacing of the bars.

2. A machine as defined in claim 1 in which said bars are of square cross-section whereby the number of available cutting edges and anvil surfaces is eight times the number of said bars.

3. In a cut-off device for severing an elongated strip of material advanced along a predetermined path through a cut-off station, the combination of, first and second drums rotatably mounted on opposite sides of said path at said cut-off station, a first elongated bar of regular polygonal cross-section having flat sides and corners formed as knife edges, first means on said first drum for removably supporting said bar thereon with any one of said knife edges facing radially outwardly for engagement with one side of said strip, a second elongated bar also having flat sides and corners formed as knife edges, and second means on said second drum for removably supporting said second bar thereon with any one of said flat sides facing radially outwardly for engagement with the other side of said strip thereby to serve as an anvil for said first bar, said bars being of the same size and shape to be received interchangeably in said first and second supporting means.

References Cited by the Examiner

UNITED STATES PATENTS

1,577,620	3/26	Gammeter	83—346 X
2,341,956	2/44	Stande	83—346 X
2,625,224	1/53	Garrett	83—339
2,628,681	2/53	Kane	83—346

FOREIGN PATENTS

266,021 10/13 Germany.

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