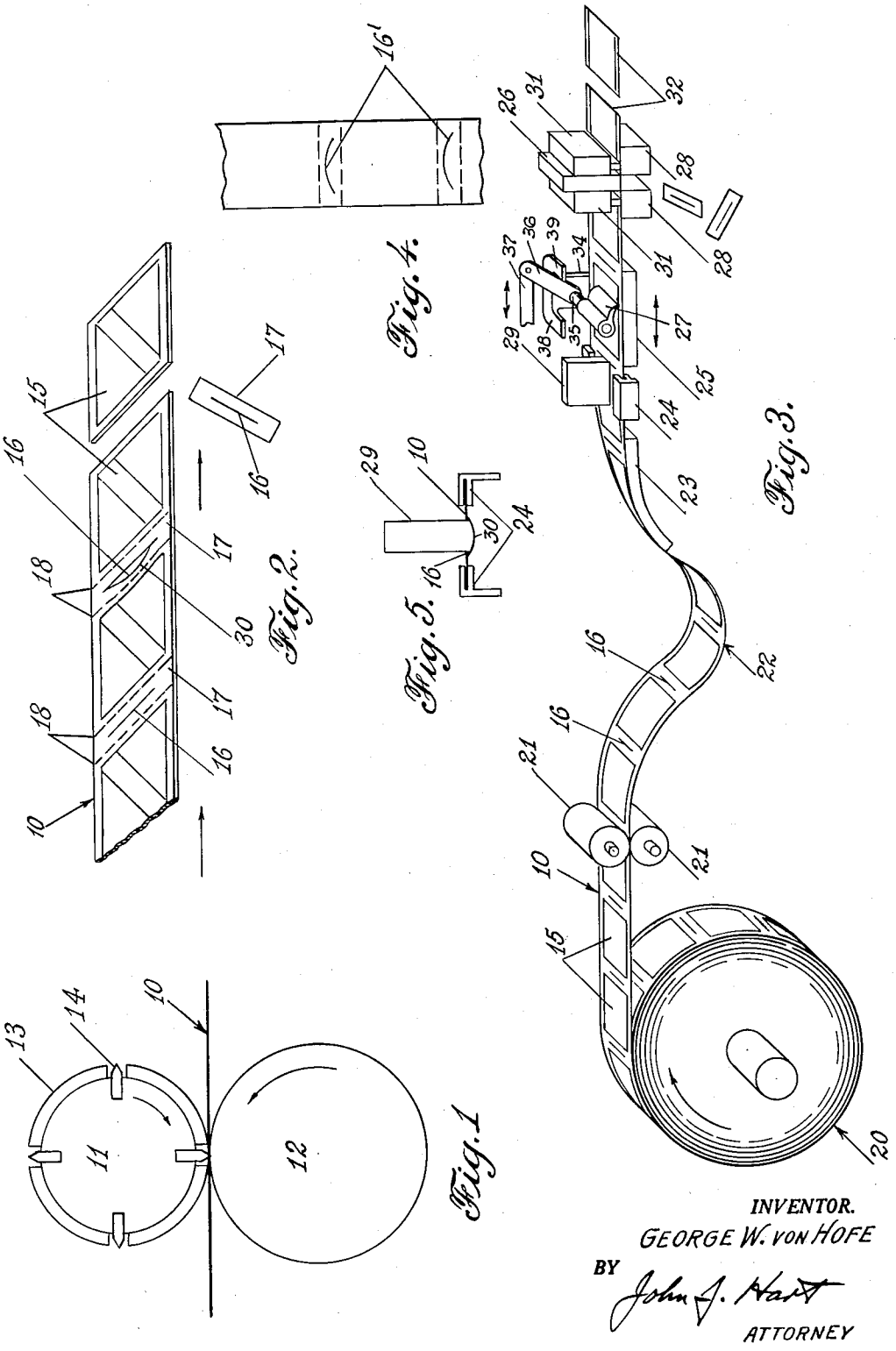
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FEEDING AND CUTTING DEVICE FOR PRINTED LABELS

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FEEDING AND CUTTING DEVICE FOR PRINTED LABELS

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The present invention relates to labels for articles such as bottles, containers, etc., and the invention is primarily concerned with the manufacture of printed labels from a continuous rolled web of such labels.

The manufacture from a web of accurately sized and shaped labels bearing printed matter thereon, has long been a problem to the art. This is in large part due to the fact that with changes in atmospheric conditions, the length of a web will vary, causing variations in the distance between recurrent printed areas upon it. Furthermore, it is very difficult to provide a feeding means which will at all times feed the exact amount of web in timed relation to other mechanisms, such as cut-off knives. Accordingly, in the practice of most prior methods of manufacture, there usually is an accumulation of errors which finally results in the production of imperfect labels. In an attempt to solve this problem, the art has devised numerous mechanisms for regulating the feed of the web so as to preserve the printed areas of the labels in registration with the cutter. Many of these mechanisms are controlled by a series of apertures or cut-outs provided at predetermined spaced intervals along the web. The disadvantage of providing such cut-outs in the webs is that their presence introduces other problems, such as disfiguration or mutilation of the labels, clogging of punch and die with varnishes and thermoplastics that may be coated on the web, building up of metal in punch and die if the web includes metallic foil, removing the cut-out pieces of web from the cutting mechanisms, etc. Other mechanisms which are controlled by spots or registering marks on the web merely attempt to average out the errors and are not entirely accurate in performance.

It is an object of the instant invention to improve on these prior methods of manufacturing labels and to avoid their disadvantages.

Another object of the invention is to provide a roll consisting of a web of printed labels and made so that it can be readily and accurately cut into labels of predetermined size.

A further object of the invention is to provide a simple, accurate and practical method of severing the printed labels from the roll.

Other objects and advantages of the invention will become apparent from the following description when read in connection with the accompanying drawings in which Fig. 1 is a diagrammatic view showing a form of printing means which may be employed in carrying out the invention; Fig. 2 is a perspective view illustrating the steps performed on the printed web; Fig. 3 is a perspective diagrammatic view showing the method of registering and cutting the web to form the labels; Fig. 4 is a plan view of a portion of a modified form of web and Fig. 5 is an end elevational view showing the manner in which the web is distorted.

For the purpose of illustration, the invention will be described in the following specification by way of example as employed in the production of rectangularly-

shaped labels, although it will be understood that the invention may be employed to equal advantage with labels having shapes other than rectangular.

Referring to Fig. 1 of the drawings, the numeral **10** designates the web which may be made of one or more layers of the same or different materials, such as paper, or paper and varnish, or paper metallic foil and varnish, or any one or a combination of such materials or other materials. The web may or may not have thereon, a coating of adhesive material, such as a suitable glue or heat activatable thermoplastic material. The web **10** is passed between a printing roll **11** and a backing roll **12**, which may be of any suitable construction known to the art and driven in the customary fashion of such rollers. The printing roll **11** is provided with a series of printing plates **13** alternately arranged around the periphery of such roll with relation to a series of knife blades **14**. It will thus be understood that as web **10** passes between rolls **11** and **12**, there will be provided thereon, by the printing plates **13**, a spaced series of printed areas **15** such as shown for example, in Fig. 2 of the drawings, and intermediate such printed areas **15** a spaced series of slits **16** by the knives **14**. It will be observed from Fig. 2 of the drawings, that the slits **16** which are formed without removing any material from the web, but by a mere cut of the blades **14**, are each elongated and has its ends spaced inwardly from the side edges of the web. The slits **16** should have a length between one-third and two-thirds the width of the finished label and preferably have a length approximately equal to one-half the width of the finished label. The slits **16** are located in the web portions **17** which are intermediate the printed areas **15** and whose width in the web is indicated by the dotted lines **18**. While it is preferred that the slits **16** be straight and be positioned centrally of the web portions **17** as is shown in Fig. 2, it will be understood that such slits may have other configurations, such as for example, the curved configuration of the slits **16'** shown in Fig. 5 of the drawings. It will also be understood that in printing the areas **15**, the inks usually bleed from the plates onto the web portions **17** connecting such areas, so that it is extremely important in manufacturing a label of this type, that the web portions be cut out with exactness, otherwise the appearance of the label will be affected. The slits **16** make possible this accomplishment as will now be explained.

The web, printed and slotted in the manner hereinabove described, is usually sold to a user in the form of a roll such as the roll **20** shown in Fig. 3 of the drawings. In converting roll **20** into individual labels in accordance with the invention, the web **10** is drawn from such roll by a pair of feed rollers **21, 21** and fed into a loop **22** formed intermediate such rollers **21, 21** and a support **23**. The roll **20** may be mounted in any suitable manner to permit a proper feed of the web **10** therefrom by the rollers **21, 21** and the latter may be constructed and driven in any suitable manner known to the art. The rate of the feed of the rollers **21, 21** is preferably slightly greater than the rate of feed at which the web is drawn over the support **23**, and their feeding operations may be controlled by the loop **22** in any suitable manner known to the art.

The web **10** passes from the support **23** through a pair of longitudinally disposed, spaced guide supports **24, 24** and then onto a slidably mounted plate **25** toward a cut-off knife **26**. The means for drawing the web out of the loop **22** and feeding it to knife **26** may comprise plate **25** and a pivoted shoe **27** of any suitable construction and mounted for intermittent clamping action with the plate **25**; the arrangement being such that when shoe **27** clamps down on the web and moves toward the cut-off knife **26**, the shoe **27**, web **10** and plate **25** are advanced.

The means for accomplishing this may include a post 34 which is fixed with respect to plate 25 and pivotally carries transverse shaft 35 upon which the shoe 27 is mounted. Secured to the pivotal shaft 35 of shoe 27 is an arm 36 having connected to its outer end an actuating member 37 which may be given its reciprocating movements substantially lengthwise of the web 10 by any suitable mechanism known to the art. The pivotal movements of arm 36 on the forward movement of member 37 is limited by a stop 39 mounted on post 34 and so arranged with respect to the parts that when arm 36 comes into engagement with such stop, the shoe 27 will have come into clamping position on the web 10. After this the continued action of member 37, will through arm 36, stop 39 and post 34 advance the shoe 27 and plate 25 to advance the clamped web toward the cut-off knife 26. On the return movement of member 37, the shoe 27 will be initially raised about its shaft 35 and until the arm 36 comes into engagement with a stop 38 mounted on post 34. The raised shoe will be returned to its starting position by the continued action of member 37 on stop 38 and post 34 through arm 36. These operations of shoe 27 take place during the intervals in which the knife 26 is retracted and advanced with respect to the latter's associated die blocks 28, 28. The shoe 27 and its associated mechanisms are so constructed and arranged that on each advancing stroke of such shoe, the web 10 will be advanced an increment or distance less than the length of a printed area 15, but sufficient to bring the suceeding slit 16 in advance of a registering member 29. The registering member 29 may be of any suitable construction and supported by mechanisms constructed and arranged to bring such member into position on the web between the spaced supports 24, 24, and behind the slit 16 which has been advanced to a position ahead of such member. The action of the member 29 may take place just after the shoe 27 has finished its advancing stroke, in order not to interfere with the feed of the web toward the cutting knife 26, or it may be advanced in timed relation with the shoe 27. When the registering member so engages the web 10, it will coact with supports 24, 24 to depress the central portion of such web and cause the following edge 30 of slit 16 (note Fig. 2) to be depressed without substantially disturbing the leading edge of such slit which is rigidified by plate 25. As the shoe 27 ends its forward stroke and is lifted from the web 10, the registering member 29 will engage and push against the leading edge of slit 16; such edge forming an abutment in the path of movement of member 29. The pushing action of member 29 against the leading edge of the slit 16 will continue until such member comes to the end of its advancing stroke. It will thus be seen that registering member 29 which also functions during an inactive period of knife 26, will advance one of the slits 16 to a certain point spaced a predetermined distance from knife 26. The distance between such certain point and knife dies 28, 28 is such that a web portion 17 intermediate the third and fourth printed areas in advance of such point, is brought exactly into position between the dies 28, 28. Thus, when the knife 26 next cuts the web, such web portion will be removed. Preferably, the knife 26 should be provided on each side with spring controlled members 31, which coact with the dies 28, 28 to clamp the web in position during the cutting action. The cut label 32 may be removed from the cutting mechanism in any suitable manner, as by the suction device disclosed in my Patent No. 2,279,724, issued April 14, 1942.

It will be understood from the foregoing, that the present invention contemplates accurately registering the web of labels with respect to the label cutting mechanism by providing a registered cut or slit in the web intermediate each pair of adjacent labels on the web, then distorting the web at a predetermined point spaced from such mechanism to form an exposed abutment of the leading edge of one of such slits and against which, may be applied a mechanical force for exactly registering a portion of such web in advance of such slit with the cutting mechanism, and then removing the portion of the web registered with the cutting mechanism. Thus, the portions of the web which have been utilized to register the printed areas of the web with the cutting mechanism, are eliminated during the cutting stroke and an unmutilated label of the exact configuration desired, is obtained. The exactitude of the registering step is believed to be due in part to the distortion of the web by the registering member 29 and the rigidifying of the web by guides 24 and plate 25, both of which cooperate to stiffen the web during the registering action of member 29. The guide members 24 by means of the overlying and underlying flanges thereof, enable the web 10 to be fed forwardly by the line contact of member 29 on a leading edge of a slit 16 without any danger of the web 10 buckling or being distorted out of its line of advancing movement.

I claim:

1. In a machine for manufacturing labels, means for feeding a web of flexible material bearing therein a series of label indicia and having a series of transverse, closed elongated slits longitudinally spaced at predetermined substantially equally spaced intervals in transverse sections of such web, into the field of action of cutting means spaced in advance of said feeding means and beyond a point in the path of feed of the web a predetermined distance greater than the length of the spaced interval between such slits and such that an advanced transverse section of the web containing a slit is positioned exactly in such field of action when a subsequent slit is at said predetermined point, said feeding means including a first means operative on said web in back of said predetermined point and a second means operative on said web in advance of said predetermined point and between said first means and said field of action in spaced relation thereto, said second means comprising reciprocating web clamping means for periodically gripping the web in advance of the first slit in the web in back of said predetermined point and for feeding it toward said field of action for the major portion of the increment of web to be advanced to bring such first slit up to said predetermined point, means for releasing said clamping means when such first slit is adjacent to said predetermined point, means for supporting the web on the advanced side of such first slit in the region of said predetermined point, said first means including a member for depressing the trailing side of such first slit and for exerting a longitudinally directed force on the exposed supported advanced side of such slit to feed the web during the release of said clamping means forwardly an amount to bring such advanced side up to said predetermined point, the combined feed of said first and second means being exactly equal to the length of the spaced interval between said slits so that when the advanced side of such first slit is brought up to said predetermined point, said advanced transverse section of the web is brought into exact registry with said field of action, said cutting means including a knife for cutting the web on both sides of the slit in such advanced transverse section thereof by simultaneously making two transverse cuts spaced the width of such section and extending from one side to the other of the web.

2. In a machine for manufacturing labels, means for feeding a web of flexible material bearing thereon a series of label indicia and having a series of transverse, closed elongated slits longitudinally spaced at predetermined substantially equally spaced intervals in transverse sections of such web, into the field of cutting means spaced in advance of said feeding means and beyond a point in the path of feed of the web a predetermined distance greater than the length of the spaced interval between such slits and such that an advanced transverse section of the web containing a slit is positioned exactly in such field of action when a subsequent slit is at said predetermined point, said feeding means including a first means operative on said web in back of said predetermined point and a second means operative on said web in advance of said

predetermined point and between said first means and said field of action in spaced relation thereto, said second means comprising reciprocating web clamping means for periodically gripping the web in advance of the first slit in the web in back of said predetermined point and for feeding it toward said field of action for the major portion of the increment of web to be advanced to bring such first slit up to said predetermined point, means for releasing said clamping means when such first slit is adjacent to said predetermined point, means for supporting the web on the advanced side of such first slit in the region of said predetermined point, means for supporting the side edges of the web adjacently in back of said predetermined point, said first means including a member for depressing the trailing side of such first slit in the region defined by the side edge supporting means and for exerting a longitudinally directed force on the exposed supported advanced side of such slit to feed the web during the release of said clamping means forwardly an amount to bring such advanced side up to said predetermined point, the combined feed of said first and second means being exactly equal to the length of the spaced interval between said slits so that when the advanced side of such first slit is brought up to said predetermined point, said advanced section of the web is brought into exact registry with said field of action, said cutting means including a knife for cutting the web on both sides of the slit in such advanced transverse section thereof by simultaneously making two transverse cuts spaced the width of such section and extending from one side to the other of the web.

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