

March 17, 1959

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2,877,846

CONTROL SYSTEM FOR FEEDING MECHANISM

Filed Oct. 10, 1956

3 Sheets-Sheet 1

Fig. 1.

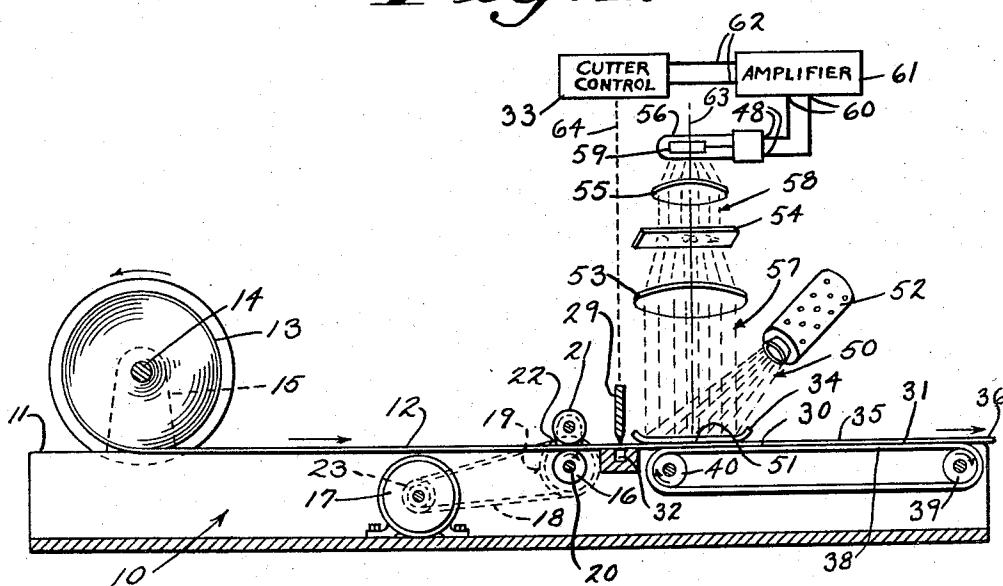
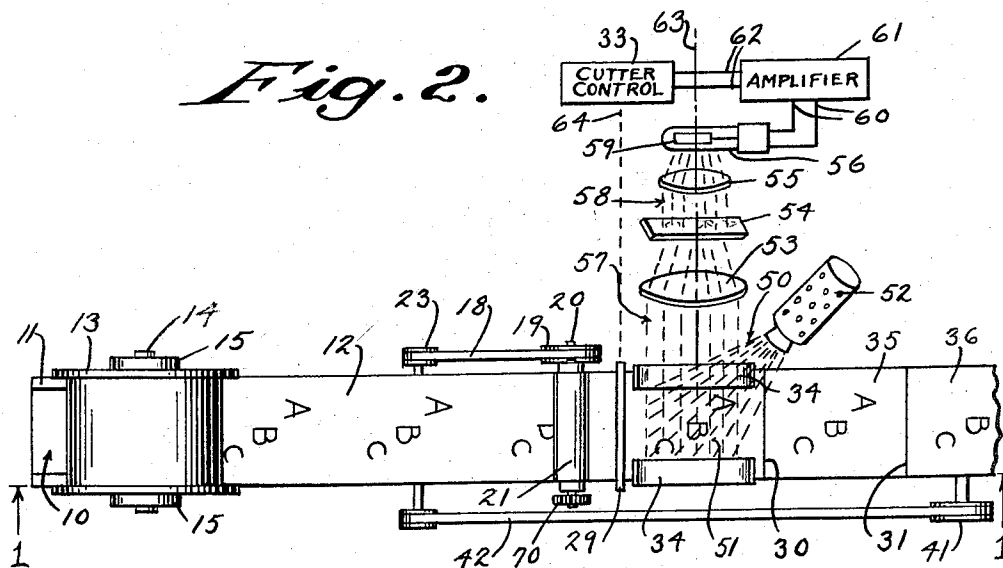


Fig. 2.



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Fig. 3.

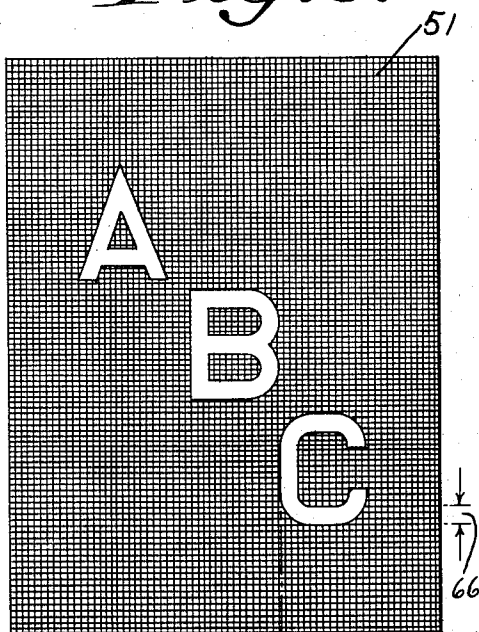


Fig. 4.

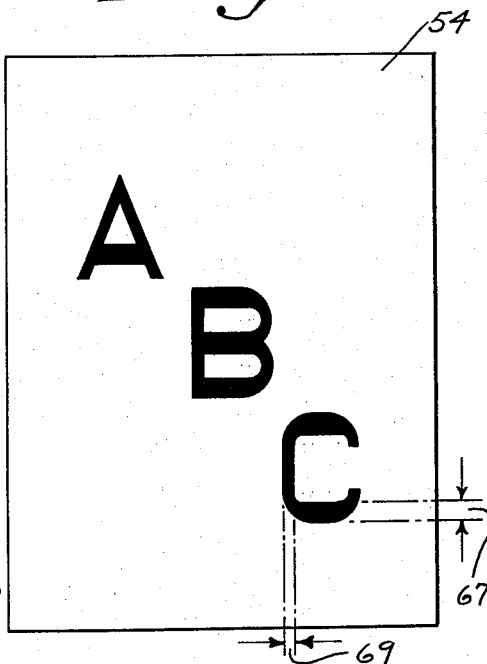


Fig. 5.

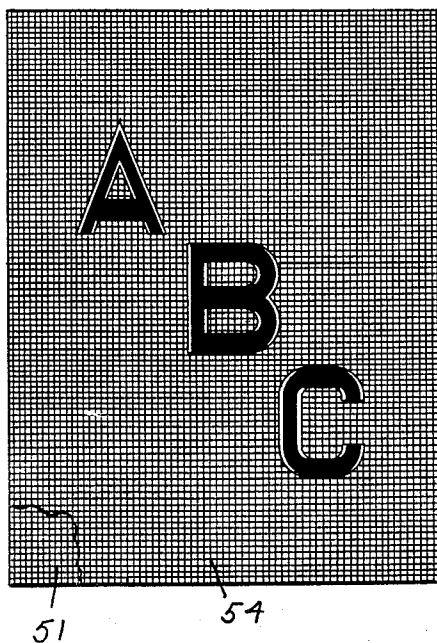
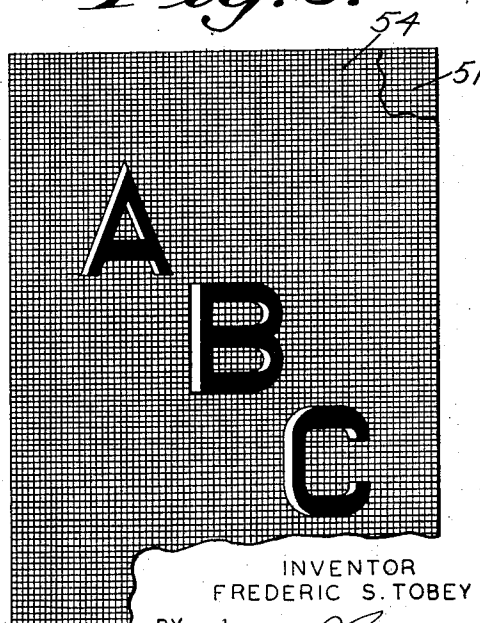


Fig. 6.



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3 Sheets-Sheet 3

Fig. 1.

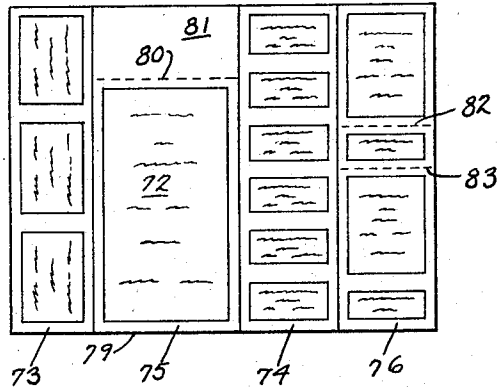


Fig. 8.

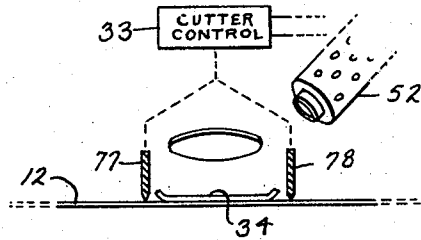
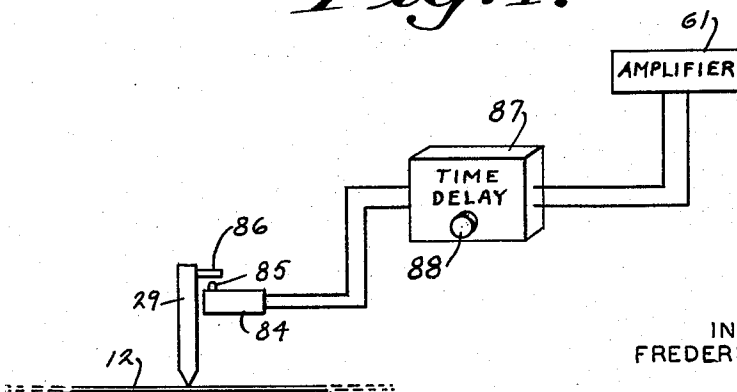


Fig. 9.



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CONTROL SYSTEM FOR FEEDING MECHANISM

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12 Claims. (Cl. 164—49)

This invention relates generally to apparatus for performing serial operations on a succession of impressions such as labels or other repetitive indicia arranged in strip form, and more specifically to control mechanism for operating a severing or other tool acting on a traveling strip, which mechanism is sensitive to the longitudinal orientation of the strip but is relatively insensitive to its transverse orientation.

In order to facilitate the description of the instant invention, the term "impression" is used. It should be understood however that "impression" is used in its broadest connotation, and not in the restrictive sense of something produced by ink transfer. Thus, the term "impression" as used herein is intended to include any indicia or design which is printed, lithographed, photographed or produced by any other method in a repetitive manner upon a strip or roll of material.

As a further aid to simplification of the description, a specific embodiment of a label severing mechanism is described. Specific references to labels and to the severance thereof from a strip should not be construed as limitations, however, as the invention is equally applicable to impressions other than labels and to operations other than severing. For example, the invention might be applied to the printing of names upon Christmas cards.

It is common practice in the printing industry to produce impressions on cylinder presses set up to print from an extended web or roll of stock so that the operation is substantially continuous and the impressions appear in a repetitive series on a strip of the stock. If the impressions are intended as labels the same are often cut from the strip just prior to use, either by the label manufacturer or by the user.

Obviously, the cutting of discreet labels from a traveling strip requires that the advancing strip be accurately oriented with relation to the cutter. It is equally apparent that a system of levers and/or cams can be used to associate a label feeding roller and cutter so that the cutter operates in accordance with a predetermined rotational movement of the feed roller. Unfortunately, however, the feed roller-label drive generally is not positive, unless formed as a part of the press creating the impression, and cannot be made positive in most instances. Further, if the labels are made of materials which are not dimensionally stable, as they often are, mechanical indexing is not suitable unless closely attended. These difficulties are compounded and become particularly acute if the labels are produced upon a roll of material having an adhesive backing, which resists feeding. Overcoming these obstacles is an object of this invention, which provides means for accurately cutting labels from a strip thereof irrespective of the material upon which the labels are produced or slippage in the feed thereof.

One solution to the problem of orienting label feed with a cutter has been to use photoelectric devices for signaling the cutter. In such systems the photoelectric detector is actuated by a register or eye-mark printed as

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a part of or along the margin of each individual label in the strip. While the use of eye-marks is a well established practice, it is not without its disadvantages. For example, after the label is applied, it contains a mark that has no further function, and which represents a distraction from what is frequently an expensive, artistic or functional design. One partial solution to this problem has been to integrate the eye-mark into the label design, but unfortunately this solution cannot be used in cases where the label contains no substantial color areas, and in any event, this procedure adds an undesired inhibition to at least a part of the label. Another object of this invention is to completely eliminate the necessity for using eye marks, thus permitting the entire label to serve its intended functional purpose without inhibitory design limitations.

As a corollary to the last mentioned object, it is a further object of this invention to provide means for automatically severing or dispensing labels from a strip thereof, even though the label was not initially designed for such automatic dispensing.

In addition to slippage in feeding, or longitudinal slippage, label strips are prone to drift transversely in dispensing apparatus. Since the material upon which the labels appear is frequently very thin, mechanical guides are not effective in preventing this transverse drift. In the aforementioned eye-mark system for signaling cutters, transverse drift has been compensated for by making the mark of sufficient transverse dimension to give the required signal irrespective of drift of the label strip, which manifestly compounds the previously mentioned disadvantages of the eye-mark system. Accordingly, an additional object of this invention is to provide apparatus which functions to give accurate longitudinal control of the cutter while permitting transverse displacement or drift of the label strip.

Recent advancements in adhesive and plastic film technology have made available many new plastic and woven cloth adhesive-backed materials for the production of labels. The pliability and stretchability of these materials is an advantage in producing labels for application to non-planar or uneven surfaces, but, as is readily apparent, the labels tend to stretch and distort somewhat as a strip thereof is fed for cutting into individual labels. It is a further object of this invention to provide a cutting signal, the sensitivity of which may be adjusted to compensate for such stretching or distortion, so that labels are cut to the desired longitudinal dimension even though stretched and distorted at the instant of cutting.

According to the illustrated embodiment of the invention, a negative image of a label, or a distinctive portion thereof, is arranged so as to intercept a projected positive image of individual labels as a strip thereof is advanced for cutting. A photoelectric mechanism is disposed to read net light flux on or through the negative image, which light flux will diminish to a minimum value as the projected positive image registers with the negative image. This light flux node is detected by the photoelectric mechanism, which actuates further mechanism, such as a cutting tool, in response thereto. Accurate longitudinal dimensioning is accomplished irrespective of transverse drift of the strip of impressions by shortening or lengthening the transverse dimension of individual elements or strokes of the negative image while maintaining the transverse center-to-center orientation of these elements and while maintaining the longitudinal dimension of the said individual elements or strokes of the negative image substantially equal to the longitudinal dimension of the projected positive image at the plane of interception thereof. Longitudinal stretching of the strip may be compensated for by a similar longitudinal stretching of the negative image.

Further advantages and details of the invention will be apparent from the detailed description which follows and from the accompanying drawings in which:

Fig. 1 is a sectional, diagrammatic, side elevation view of a label cutter embodying the invention, taken on the line 1—1 of Fig. 2;

Fig. 2 is a diagrammatic plan view of the apparatus shown in Fig. 1, with the optical elements thereof displaced obliquely to facilitate illustration;

Fig. 3 is an enlarged plan view of one of the labels in the label strip of Figs. 1 and 2;

Fig. 4 is a view of a negative of the label of Fig. 3 as seen from above and at the point of focus through the lens 55 of Figs 1 and 2, with the transverse dimension of individual elements of the image uniformly shortened;

Fig. 5 is a view of the negative of Fig. 4 superimposed upon the label of Fig. 3, and in registry therewith;

Fig. 6 is a view of the negative of Fig. 4 superimposed upon the label of Fig. 3 with the label displaced to the left to illustrate the effect of transverse drifting of the label strip;

Fig. 7 is a portion of a multiple label strip produced upon a cylinder press, illustrating various size labels produced simultaneously;

Fig. 8 is a diagrammatic side elevation view of a modification of the apparatus in Fig. 1, in which dual cutters are arranged to trim two sides of a label simultaneously; and

Fig. 9 is a diagrammatic side elevational view of a further modification of the apparatus of Fig. 1, illustrating means for disabling the photoelectric detector during a portion of each cutting cycle.

Referring to the details of the drawings, Fig. 1 illustrates in diagrammatic side elevation one form of the invention from which, in order to facilitate illustration, many mechanical details and housings for the various components have been omitted. In Fig. 1, the apparatus is illustrated as comprising a table 10 having a planar top surface 11 over which a strip 12 of repetitive impressions or labels is passed after unwinding from a roll 13 thereof. The strip dispensing roll 13 has a shaft 14 rotatably retained by pillow blocks 15.

The strip 12 is fed across the table top 11 by means of a feed roll 16 arranged with its axis transverse to the direction of travel of strip 12 and driven by means of a motor 17, pulley 23, V-belt 18 and a sheave 19 keyed to the shaft 20 of the feed roll 16. Disposed in the same vertical plane, parallel with and above the feed roll 16 is a backup roll 21 which may be vertically adjustable with reference to feed roll 16 so that the peripheries of the feed and backup rolls form a nip 22 which will grip and feed the strip 12 with minimum slippage.

To the right of the feed and backup rolls in Fig. 1 and forwardly with reference to the direction of travel of the strip 12, is a cutting knife 29 arranged to make transverse cuts across the strip 12 as indicated at 30 and 31 in Fig. 1. In order to assure complete cutting of the strip 12, clearance 32 is provided through and beneath the table 11. Cutter 29 is actuated by a cutter control 33 in a manner described more fully hereafter. The cutter 29 is represented functionally, and it should be understood that it will normally be guided in its vertical descent and that a suitable rack is normally provided to adjust the cutter longitudinally along the strip. Further, if high speed operation is desired, it may be preferable to oscillatably mount the cutter so that it will move longitudinally with the strip at the approximate longitudinal velocity thereof as it descends in its cutting movement.

Located to the right of the cutter knife in Fig. 1 are a pair of holddowns 34 disposed to flatten and confine vertically that portion of the strip passing between the holddowns 34 and the top surface 11 of the table 10. After having been severed by knife 29, segments 35 and 36 of the strip 12 are carried away by an endless belt conveyor 38 trained around a head pulley 39 and tail pulley

40. The conveyor 38 is driven at the head pulley 39 by means of a sheave 41 and V-belt 42 (see Fig. 2). Severed segments of the strip 12 are discharged over the head end of conveyor 38.

Disposed above the table top 11 and arranged to cast a beam of light 50 upon the portion 51 of strip 12 retained between holddowns 34 is a light source 52. Above the aforesaid portion 51 of strip 12 are arranged in axial alignment a group of optical elements including an image forming lens 53, a negative transparency 54, a focusing lens 55 and the cathode 59 of a photocell 56. Light 57 reflected from the strip 12 forms an image of the portion 51 of the strip passing through the beam of light 50 on the image forming lens 53. This image is a positive image of the aforesaid portion of the strip and in passing lens 53 is reduced somewhat and projected upon a negative transparent image 54 disposed above and in axial alignment with the image forming lens 53. The dimensions of the negative are such that its image corresponds substantially in dimension with the dimension of the projected positive image at the plane of interception, except as explained hereafter.

The net light flux 58 passing through the negative transparency 54 is focused by a lens 55 upon the cathode 59 of a photocell 56. Thus, as successive impressions on the strip 12 pass beneath the optical elements 53, 54 and 55 a variable amount of net light flux 58 falls upon the cathode 59 of photocell 56. When the positive image projected from the advancing strip 12 coincides with the negative image 54, the net light flux 58 is at a minimum or node and this diminution of net light flux produces a corresponding electrical effect at the output terminals 43 of photocell 56. The particular arrangement of optical elements is illustrative only, and, if desired, the negative image may be opaque, in which case the photocell may be arranged to detect net light flux reflected from the lower surface of the opaque negative. Also, if the material upon which the label is impressed is transparent, as in many wrapping materials, the light source may be located beneath the table 11 and arranged to project a negative image. In such case, the stationary image would be positive and light nodes would appear at the cathode of the photocell 56 as previously described. The term "reversed" is sometimes used hereafter to express the relationship between the projected and stationary images, and such term is intended to mean that the images carry the relationship of positive and negative without the implication that they were photographically reproduced, or without implication as to which of the two images is uppermost.

The output of photocell 56 is connected to the input terminals 60 of an amplifier 61, which has its output terminals 62 connected to the cutter control 33. Thus, the operation of cutting knife 29 is made responsive to the orientation of strip 12 with respect to the axis 63 of optical parts 53, 54 and 55. The mechanical connection between cutter control 33 and knife 29 is indicated functionally by a dotted line 64 in Fig. 2. The knife may be actuated, as will be clear to those skilled in the art, by a solenoid, pneumatic, hydraulic or other mechanism.

Fig. 2 illustrates in top plan the items previously described in connection with Fig. 1. In order to facilitate illustration the axis 63 of optical elements 53, 54, 55 and cathode 59 of photocell 56 has been displaced obliquely in order to make the top view of the portion 51 of strip 12 visible. As is apparent in Fig. 2, a gear drive 70 may be utilized between the driven feed roll 16 and backup roll 21, so that they may be rotated at the same peripheral velocities.

As previously mentioned, transverse drifting of the strip 12 may occur and is difficult to restrain. This difficulty is overcome by preparation of the negative image 54 in the manner illustrated in Figs. 3, 4, 5 and 6. Fig. 3 is a top plan view of the portion 51 of strip 12 which is projected as a positive image into the optical system 53, 54

and 55 and is shaded to indicate a white impression upon a black background, but it should be understood that this representation is illustrative only.

Fig. 4 is a top plan view of the negative transparency 54 as seen from above and at the point of focus through the lens 55, and it may be observed that the negative illustrates a reversal of the image in Fig. 3, that is, a black impression on a white background. The particular view through the lens 55 has been taken in order to facilitate the description and comparison of the negative image 54 with its respective relationship to the portion 51 of strip 12. It will be apparent that it is the usual practice to provide condensing lenses, such as lens 53 to concentrate light reflected from the portion 51 for purposes of controlling the same within relatively specifically defined concentrations rather than by a general dispersion. The negative image will then be desirably of a smaller area than that of the portion 51. In addition, an image of relatively small area permits fewer focusing lenses, such as lens 55 and less expensive viewing equipment. Accordingly, the views of Figs. 4, 5 and 6 have been taken as shown, preferably at the focus of the lens 55 to provide the appearance of sameness in relative area dimensions of the portion 51 and the image 54 to permit comparative "overlays" in the various views.

It may also be observed that the transverse dimensions of each portion or stroke of the black portion of the image in Fig. 4 have been uniformly shortened while retaining the same longitudinal dimension as the positive image in Fig. 3, and while retaining the original transverse center to center spacing of the individual portions or strokes. This is apparent by observing in Figs. 3 and 4 the corresponding longitudinal dimensions 66 and 67, which are substantially equal, and the corresponding transverse dimensions 68 and 69, from which it is clearly apparent that the transverse dimension 69 of one portion of the negative image 54 has been uniformly shortened with reference to the similar transverse dimension 68 of the label 51.

This dimensional transformation is best seen in Fig. 5, which is a plan view of the negative image of Fig. 4, as viewed from above and at the focus of lens 55, and placed on top of and in longitudinal registry with the positive image of Fig. 3. Fig. 5 corresponds with the point of maximum registry of strip 12 as it passes through the apparatus of Figs. 1 and 2, and in this position the cutter knife 29 is actuated because of the light flux node occurring at this point of maximum registry. It may be observed in Fig. 5 that the center-to-center orientation of the elements of the negative has not been changed. This shortening of the transverse dimension of the negative elements or strokes is referred to hereafter merely as transverse shortening.

The uniform transverse shortening of the image of Fig. 4 may be accomplished by transversely displacing an equal distance in both transverse directions a camera used in photographing the positive image of Fig. 3, while the camera shutter remains open. As will be apparent to those skilled in the art, the transversely shortened negative image may likewise be accomplished mechanically by washing out or opaquing portions of the negative after exposure and development. Likewise, the negative may be mechanically or artistically produced by hand.

Because of the uniform transverse shortening of the negative image, transverse drifting of the strip 12 will still result in a substantially identical quantum of light flux at the point of maximum registry, as is apparent from Fig. 6, in which is illustrated the condition which obtains if the image of Fig. 3 has been displaced to the left. It may be observed that the light areas around the distinctive portion of the label are still substantially identical with those in Fig. 5 from a quantitative standpoint, although they have been displaced so that all of the light appears along the lefthand borders of the im-

ages. Similarly if the label strip 12 should be displaced to the right, the light flux would remain substantially constant but would be displaced to appear at the right-hand borders of the images. At intermediate positions between those illustrated in Figs. 5 and 6, the quantum of net light flux remains substantially constant, although its position with respect to the impression changes. For purposes of illustration, a negative of the entire label has been shown. It should be understood, however, that less than the whole may be used, as long as a distinctive portion of the label is selected so that a definite node is produced at the point of maximum registry. Longitudinal stretching of the label may be compensated for by similarly stretching the negative image during its preparation, as, for example, by photographing the label in its stretched condition. Likewise, the individual elements or strokes of the negative may have their transverse dimensions lengthened rather than shortened, in which case a more complete eclipse of light will occur, even though the label strip drifts transversely as it is fed. In the latter case, the eclipse occurring at maximum longitudinal registry gives a light node which actuates the cutter as previously described. The negative may thus have its transverse dimension altered by either shortening or lengthening.

Fig. 7 illustrates a development of a typical single revolution of a cylinder press. It may be observed that labels of various sizes may be printed simultaneously, and it may further be observed that different size labels may be printed in a single strip. The single strip may then preferably be passed through laterally spaced slitter knives (not shown) to provide the strips 73, 74, 75 and 76 simultaneously or slightly ahead of the transversely arranged knife cutter or cutters. Thus, in Fig. 7, the labels of strip 73 are similarly sized and will be spaced equally along a strip after successive revolutions of the cylinder press. This same condition obtains in strip 74. In strip 75, however, it may be observed that trimming is necessary as the label 72 has an unequal margin at its upper and lower edges. Strip 76 illustrates different size labels printed alternately along a strip.

As is apparent, the single knife cutter described above in connection with Figs. 1 and 2 may be used for cutting discreet labels from label strips 73 and 74. The cutting of labels from strips 75 and 76 may be accomplished with a dual knife cutter as illustrated in Fig. 8. In Fig. 8, it may be observed that two knives 77 and 78 are disposed along the path of travel of strip 12 and are actuated by a single cutter control 33. Referring again to Fig. 7, labels may be cut from strip 75 along the lines 79 and 80 by the dual knife arrangement of Fig. 8. The portion 81 of strip 75 becomes scrap. It will be apparent that the view of Fig. 7 illustrates merely the results of a single revolution of a cylinder press and that the labels of the entire figure are repetitive longitudinally of the strip similar to the indicia or labels of strip 12 described in connection with Figs. 1 and 2. Thus, the transverse cut taken along line 79 will provide margins to each of the labels of strips 73-76, inclusive, printed in a single revolution of the cylinder press.

Similarly, labels may be cut from strip 76 by adjusting the knives 77 and 78 to cut along lines 82 and 83.

Occasionally a single label may be found which contains two identical or substantially identical impressions. Such labels might produce a premature light node and result in premature cycling of the cutter knife or knives. Means for preventing such premature cycling is illustrated in Fig. 9. Referring to Fig. 9, a switch 84 is disposed with its actuating button 85 in the path of travel of a projection 86 secured to knife 29. Each time that the knife descends the switch is actuated, which introduces a time delay unit 87 into the circuit of amplifier 61. The time delay is arranged to block the output of amplifier 61 so that cutter 29 will not be actuated during the period of time delay irrespective of signals de-

livered to the amplifier from photocell 56. Adjustment of the period of time delay may be effected by an adjustment of knob 88. The details of the time delay circuit and the means for adjustment thereof are not shown as such information is readily available.

It may be found desirable to use a time delay circuit as illustrated in Fig. 9 at all times, as mechanical feeding arrangements can be devised that will bring the label strip 12 into approximate registry with knife 29 in most instances and photoelectric means is needed only for selecting the precise instant of registry.

Other modifications and adaptations of the disclosed mechanism are contemplated and will be apparent, and it is intended that the scope of this invention shall be limited only by the following claims.

I claim:

1. In a photoelectric controlling mechanism for label feeding apparatus and the like of the type having means for advancing seriatim a series of substantially identical labels reproduced on a strip, and means for severing individual labels from said strip, the combination comprising; a negative transparency of a distinctive portion of one of the aforesaid labels; a stationary light source arranged to project a positive image of said distinctive portions of successive labels as they are advanced; said negative transparency being in a stationary position and arranged to intercept successive projected positive images in substantial registry therewith at one position of the advancing label, the negative transparency image corresponding in longitudinal dimension with the longitudinal dimension of the projected positive image at the plane of interception thereof and being uniformly altered in transverse dimension at said plane, whereby at the point of maximum registry the projected image and negative image are in substantially exact longitudinal registry but may be in transverse misalignment; photoelectric detection means responsive to the diminution of light flux passing through the negative transparency at the aforesaid point of maximum registry; and means operatively associated with the photoelectric detection means for actuating the label severing means in response to the aforesaid diminution of light flux.

2. In a photoelectric controlling mechanism for label feeding apparatus and the like of the type having means for advancing seriatim a series of substantially identical labels reproduced on a strip and means for severing individual labels from said strip, the combination comprising; a negative image of a distinctive portion of one of the aforesaid labels; a stationary light source arranged to project a positive image of said distinctive portions of successive labels as they are advanced; said negative image being in a stationary position and arranged to intercept successive projected positive images in substantial registry therewith at one position of the advancing label, the negative image corresponding in longitudinal dimension with the longitudinal dimension of the projected positive image at the plane of interception thereof and being uniformly altered in transverse dimension at said plane, whereby at the point of maximum registry the projected positive image and negative image are in substantially exact longitudinal registry but may be in transverse misalignment; photoelectric detection means arranged to intercept light from the projected positive image not absorbed by the negative image and responsive to the diminution of light at the aforesaid point of maximum registry; and means operatively associated with the photoelectric detection means for actuating the label severing means in response to the aforesaid diminution of light.

3. Apparatus according to claim 2 in which a pair of knives disposed to cut two sides of a label are actuated simultaneously by the diminution of light at the point of maximum registry.

4. In a photoelectric detecting mechanism associated with feeding apparatus and the like of the type having means for advancing seriatim a series of substantially

identical impressions repetitively reproduced on a strip, the combination comprising; a negative of a distinctive portion of one of the aforesaid impressions; a stationary light source arranged to project a positive image of said distinctive portions of successive impressions as they are advanced; said negative being in a stationary position and arranged to intercept successive projected positive images in substantial registry therewith at one position of the advancing strip, the negative image corresponding in longitudinal dimension with the longitudinal dimension of the projected positive image at the plane of interception thereof and being shortened in transverse dimension at said plane, whereby at the point of maximum registry the projected image and negative image are in substantially exact longitudinal registry but may be in transverse misalignment; photoelectric detection means arranged to intercept light from the projected positive image not absorbed by the negative image and responsive to the diminution of light at the aforesaid point of maximum registry; and means operatively associated with the photoelectric detection means for performing a preselected function in response to the aforesaid diminution of light.

5. Apparatus for detecting the longitudinal registry of an advancing strip of repetitive indicia with a preselected position along its path of advance irrespective of transverse drifting of said strip comprising; a stationary light source arranged to project an image of identical portions of successive indicia of the advancing strip at a stationary position along the path of travel of the strip; a stationary reversed image of one of the aforesaid distinctive portions of the indicia arranged to intercept said projected images seriatim as they are advanced, said reversed image corresponding in longitudinal dimension with the longitudinal dimension of the projected positive image at the plane of interception thereof and being altered in transverse dimension at said plane; and light sensitive means arranged to respond to the net light flux across the aforesaid plane of interception, whereby longitudinal registry of the advancing strip is indicated by said light sensitive means detecting a node of net light flux.

6. Apparatus for indicating the longitudinal registry of an advancing strip of repetitive indicia with a preselected position along its path of advance irrespective of transverse drifting of said strip comprising; a stationary light source arranged to project an image of identical portions of successive indicia of the advancing strip at a stationary position along the path of travel of the strip; a stationary reversed image of one of the aforesaid distinctive portions of the indicia bearing the relationship of photographic positive and negative thereto and arranged to intercept said projected images seriatim as they are advanced, said reversed image corresponding in longitudinal dimension with the longitudinal dimension of the projected image at the plane of interception thereof, but not corresponding in transverse dimension at said plane; and light sensitive means arranged to respond to the net light flux across the aforesaid plane of interception, whereby longitudinal registry of the advancing strip is indicated by said light sensitive means detecting a node of net light flux.

7. Apparatus for indicating the longitudinal registry of an advancing strip of repetitive indicia with a preselected position along its path of advance irrespective of transverse drifting of said strip comprising; a stationary light source arranged to project an image of identical portions of successive indicia of the advancing strip at a stationary position along the path of travel of the strip; a stationary reversed image of one of the aforesaid distinctive portions of the indicia arranged to intercept said projected images seriatim as they are advanced, said reversed image corresponding in longitudinal dimension with the longitudinal dimension of the projected image at the plane of interception thereof; and photoelectric detection means arranged to intercept the net light flux across the aforesaid plane of interception, said detection means being re-

sponsive to the diminution of light flux at the point of maximum registry of the projected and reversed images as an indication of maximum registry.

8. Apparatus according to claim 7 in which time delay mechanism is arranged to disable the detection means following each indication of maximum registry for a predetermined time interval.

9. The method of indicating the longitudinal registry of an advancing strip of repetitive indicia with a preselected position along its path of advance irrespective of transverse drifting of said strip comprising; forming a projected positive image of identical portions of successive indicia of the advancing strip at a stationary position along the path of travel of the strip; intercepting said projected positive images seriatim with a stationary negative image of one of the aforesaid distinctive portions of the indicia, said negative image being devised to correspond in longitudinal dimension with the longitudinal dimension of the projected positive image at the plane of interception thereof and to be uniformly altered in transverse dimension at said plane; observing the net light flux across the aforesaid plane of interception and indicating longitudinal registry by selecting nodes of net light flux.

10. The method of indicating the longitudinal registry of an advancing strip of repetitive indicia with a preselected position along its path of advance comprising; forming a projected image of identical portions of successive indicia of the advancing strip at a stationary position along the path of travel of the strip; intercepting said projected images seriatim with a stationary reversed image of one of the aforesaid distinctive portions of the indicia, said reversed image being devised to correspond in longitudinal dimension with the longitudinal dimension of the projected positive image at the plane of interception thereof; observing the net light flux across the aforesaid plane of interception and indicating longitudinal registry by selecting nodes of net light flux.

11. The method of severing discrete labels from a

repetitive strip thereof as the strip advances longitudinally and irrespective of transverse drift of the strip during such longitudinal advance comprising; forming a projected image of identical portions of successive labels of the advancing strip at a stationary position along the path of longitudinal travel of the strip; intercepting said projected images seriatim with a stationary negative image of one of the aforesaid distinctive portions of a label, said negative image being devised to correspond in longitudinal dimension with the longitudinal dimension of the projected positive image at the plane of interception thereof and to be shortened in transverse dimension at said plane; continuously integrating the net light flux across the aforesaid plane of interception; detecting longitudinal registry by selecting nodes of net light flux; and severing discrete labels at each light flux node.

12. The method of severing discrete labels from a repetitive strip thereof as the strip advances longitudinally comprising, forming a projected image of identical portions of successive labels of the advancing strip at a stationary position along the path of travel of the strip; intercepting said projected images seriatim with a stationary reversed image of one of the aforesaid distinctive portions of a label, said reversed image being devised to correspond in longitudinal dimension with the longitudinal dimension of the projected image at the plane of interception thereof; integrating the net light flux across the aforesaid plane of interception; detecting longitudinal registry by selecting nodes of net light flux; and severing discrete labels at each light flux node.

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