

United States Patent

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[54] **REGISTRATION GAUGE FOR A WEB BURSTER**
5 Claims, 9 Drawing Figs.

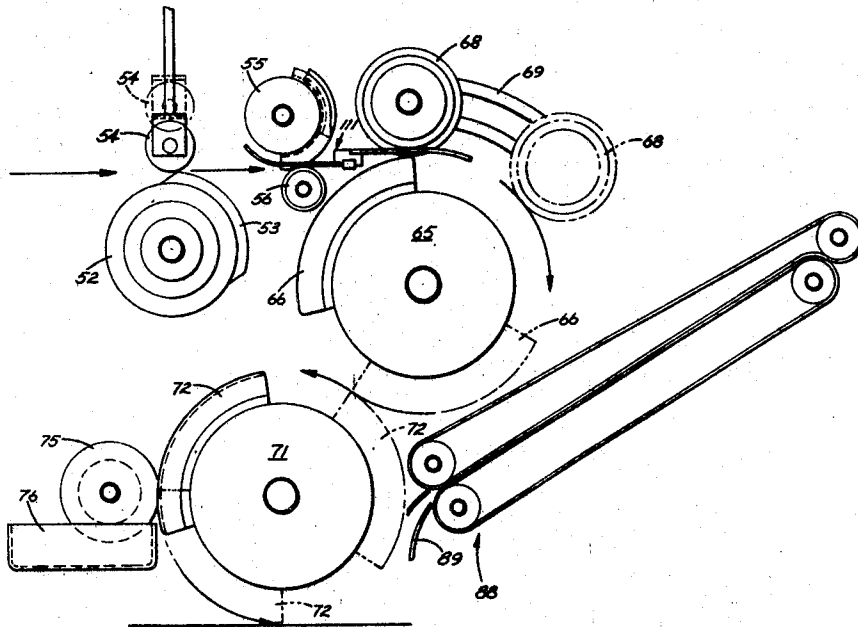
[52] U.S. Cl. 225/96,
 225/100
 [51] Int. Cl. B26f 3/02
 [50] Field of Search 225/94, 96,
 100, 106

[56] **References Cited**

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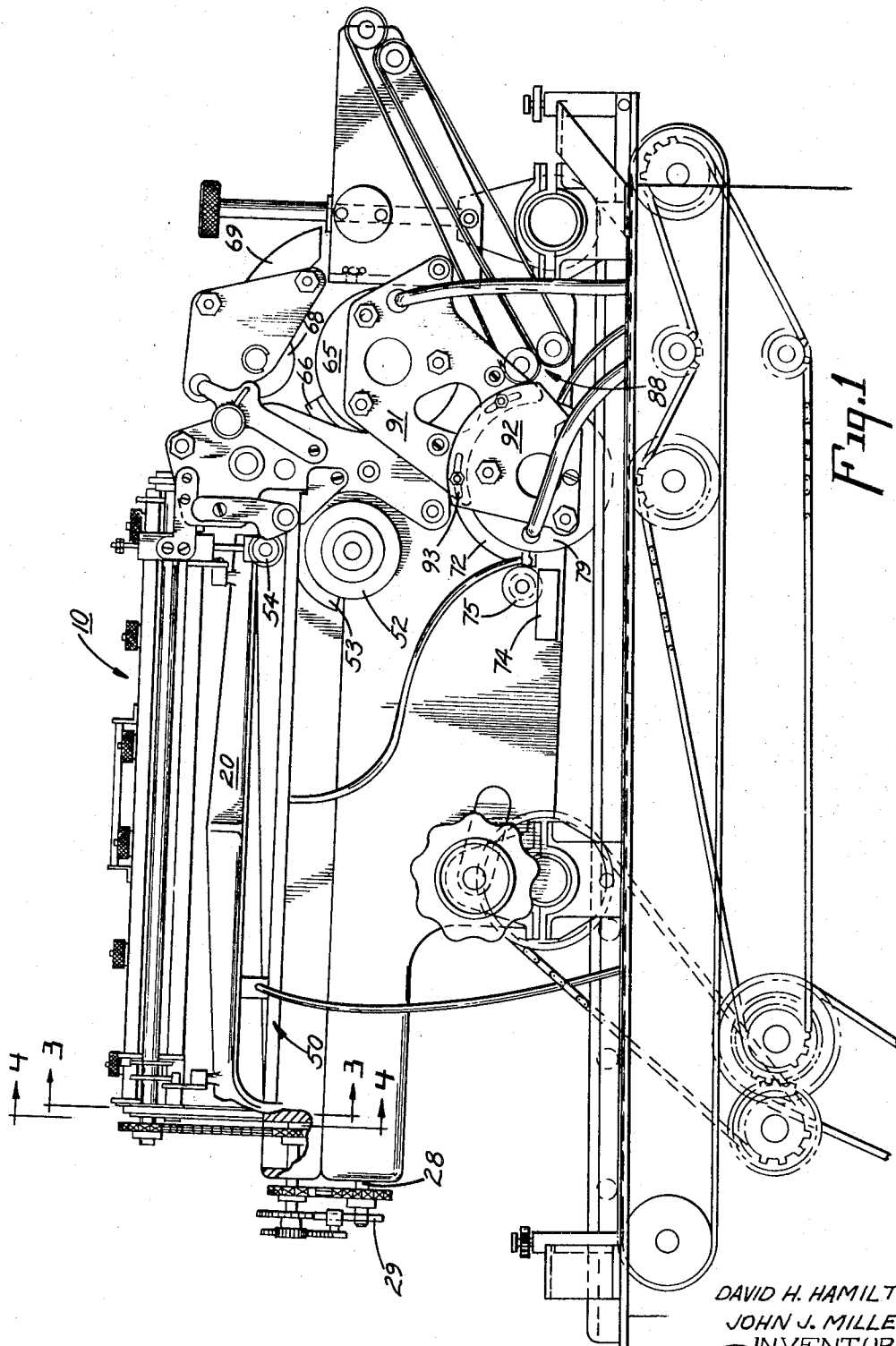
ABSTRACT: A machine is provided which perforates along a web between columns of information, e.g. addresses, and thereafter cuts a strip off the end of the sheet, taking only one address from each column to produce a strip containing a series of address units connected by perforated areas. Finally, the strip is pulled to burst it progressively, unit-by-unit, into labels or heat transfer printing masters as the case may be, and each unit of information is applied to an item such as a magazine or newspaper moving along a conveyor. The same machine is also capable of adjustment so as to cut and apply units from a single column web.



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3,540,638

Sheet 1 of 4



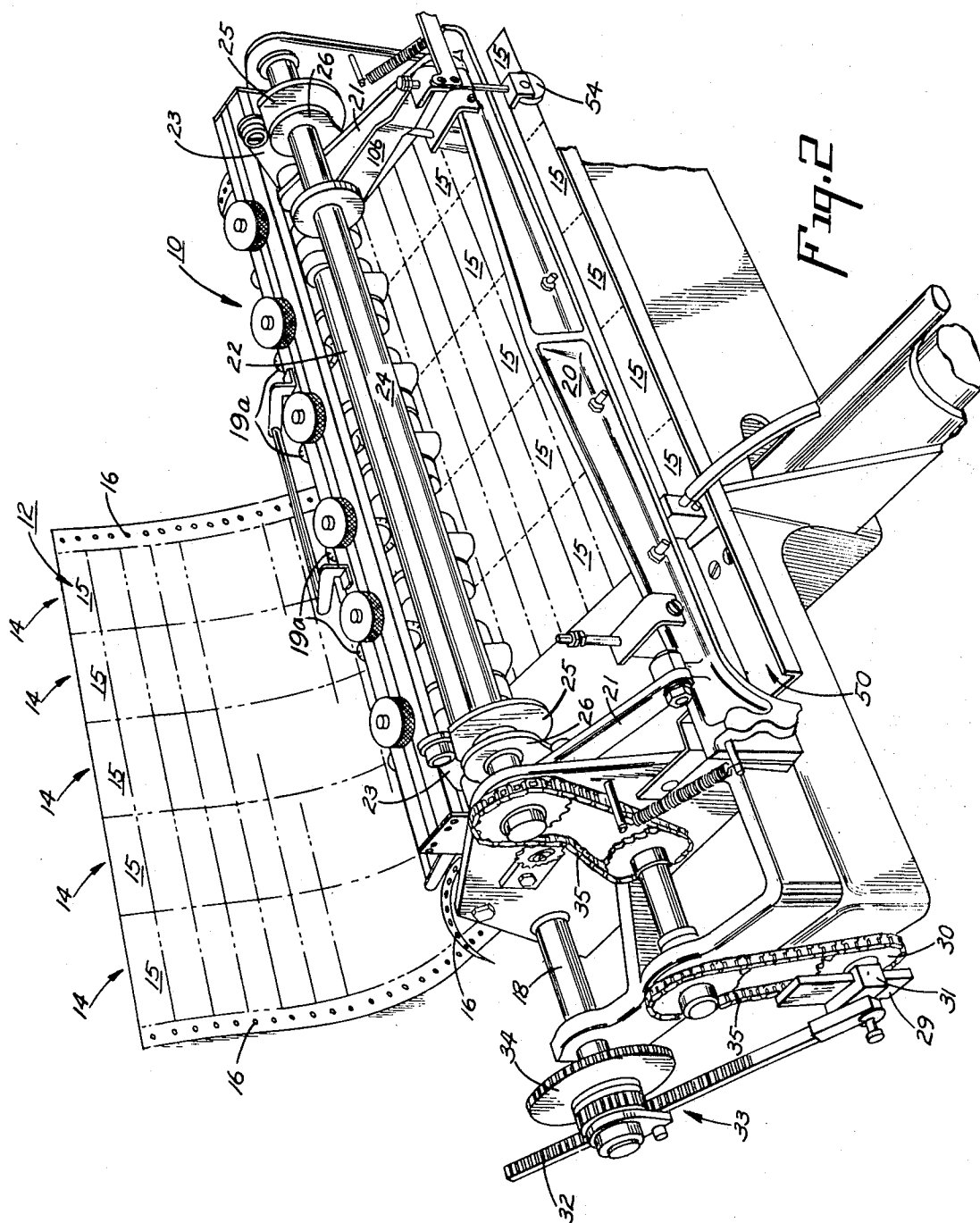
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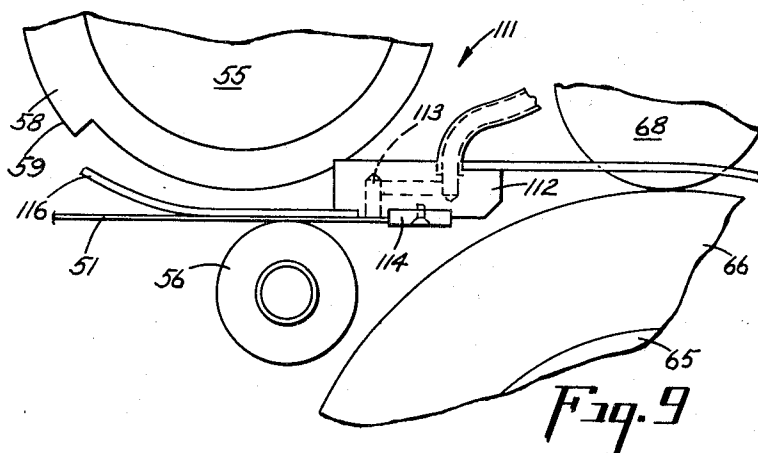
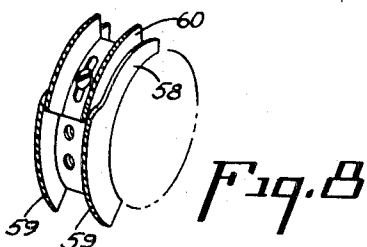
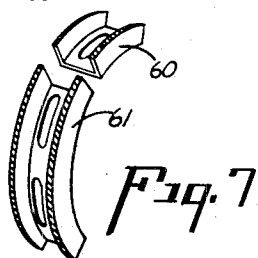
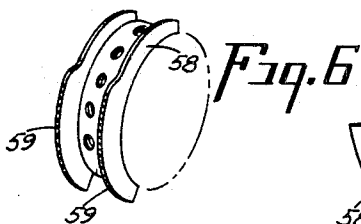
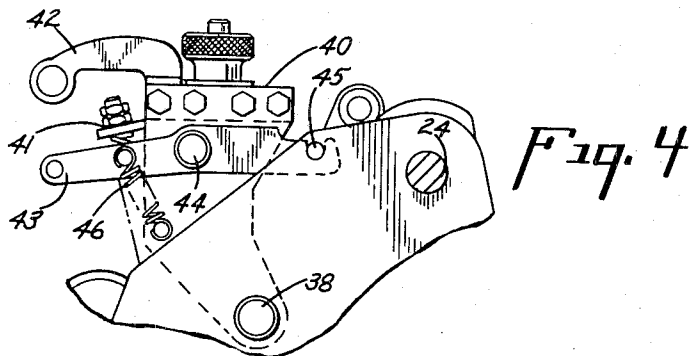
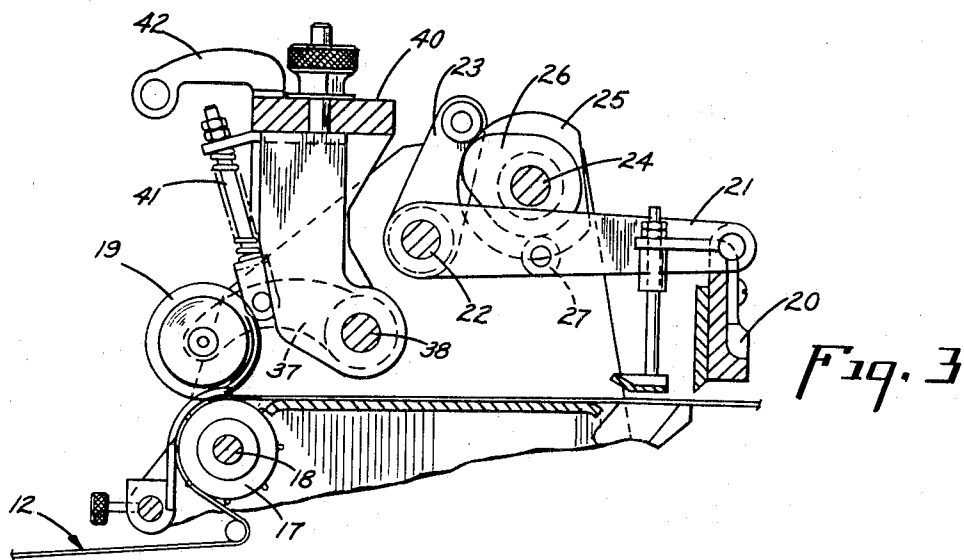
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Sheet 2 of 4



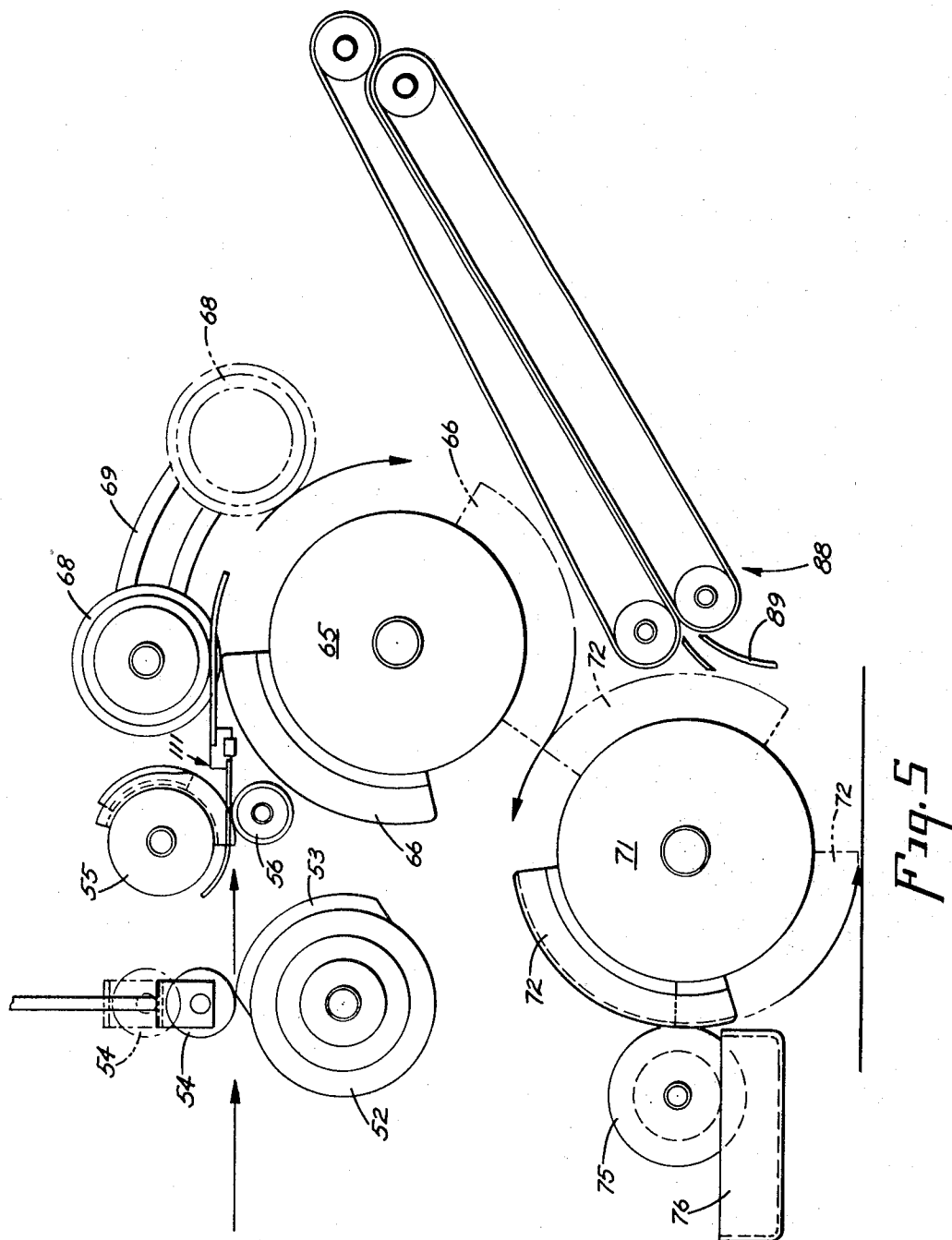
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REGISTRATION GAUGE FOR A WEB BURSTER

RELATED SUBJECTS

This invention is a specific device for coordinating a strip connected by perforation, with two sets of rollers for applying a unit-bursting pull, as described in U.S. Pat. application Ser. No. 737,935 filed June 18, 1968.

SUMMARY OF THE INVENTION

The advantage of this invention is to be found in the improved means to position a strip, which is guillotined from a computer output, into proper coordinated relationship with respect to two sets of rollers, to sever the strip into discreet information and intelligence units. The specific use for these units, in the preferred embodiment, is as mailing indicia. The units are either attached by applied adhesive as a label or used as a transfer printing master.

The strip is weakened between the various bits of intelligence in order that a tension placed upon the strip will cause the strip to fail at the weakened point of juncture rather than the unweakened areas and pulled apart by applied tensile stress.

To pull the strip apart, the strip is gripped by two sets of rollers. The first set advances the integral strip to the second set. The second set rotates faster than the first. The result is a bursting tensile force which will cause the strip to separate at the lines of weakness.

By using a fast rotating set of rollers which have surfaces cooperating to develop a nip in timed relationship with the advancement of the strip, and simplified means whereby the rollers may be advanced or retracted to produce the nip position at any selected position along the path of the strip, the grip upon the projected strip may be produced in exact timed relationship to the feed created by a first set of slower advancement rollers. Thus regardless of the length between the weakened areas on the strip, the weakened area will fail and burst apart by applying an excessive tensile pull just at the right moment before two indicia areas of the strip can emerge from the first set of advancement rollers.

A roller couple is provided for the slower advance rollers, which has a raised tread segment on at least one of the rollers. By this construction, the advancing rollers are effective only during part of a full rotation. By having the tread section coordinated to the length of the units the strip will be advanced by unit steps rather than continuously.

In the practice of this invention, the strip is advanced between the advance rollers when the rollers are open. This invention brings the strip into a precise position so that when the rollers do close the strip will be properly gripped.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevation of a mailing machine embodying a strip making device and an intelligence application system incorporating the principles of the invention.

FIG. 2 is a perspective view of the strip making device illustrated in FIG. 1.

FIG. 3 is a partial section taken along line 3-3 of FIG. 1.

FIG. 4 is a partial section taken along line 4-4 of FIG. 1.

FIG. 5 is a diagrammatic illustration of the application system of the invention.

FIG. 6 is a perspective view of a saddle pad portion of a measuring feed roller.

FIG. 7 is a perspective view of two pad extensions mountable upon the saddle of FIG. 6 for extension of the pad area thereof.

FIG. 8 is a perspective view of the saddle illustrated in FIG. 6 with the shorter pad extension mounted thereon.

FIG. 9 is an enlarged detail view of the strip register correction station as shown in FIG. 5.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 2 of the drawings illustrates the portion of the preferred embodiment of the invention which is used to convert the computer output from a wide web to a series of individual bits. This portion is indicated by the general reference character 10. A computer output sheet is indicated by the reference character 12. Sheet 12 will have printed information bits, which hereafter will be referred to as address information in keeping with the context of the disclosure of the preferred embodiment, which is a mailing addressing machine. Because illustration of plural columns of addresses is difficult, the sheet 12 is shown divided by means of a series of lines, into columns 14 and individual address units. Each address unit, when separated from the sheet 12, will serve as either a label or a printing master, in the known manner. The lines do not actually appear on the sheet 12, but is illustrated this way to indicate the area in which cuts and divisions are made to separate the address units from the parent sheet 12. Hereafter, the separated portions of the sheet, will be referred to as address units, and will be indicated by reference character 15.

The sheet 12 is punched along each side with holes 16, in the usual manner of business forms, in order to provide a means for accurately registering the sheet both in the computer in which the original printing takes place, and in the label strip cutter 10 of FIG. 2.

Pin wheels 17, which are not visible in FIG. 2, are seen in FIG. 3. The wheels 17 are driven intermittently by a shaft 18 upon which they are mounted. The sheet 12 is threaded over the pin wheels 17 with the holes 16 engaged in the pins thereof.

Trim cutter wheels 19 are provided to trim away the selvage as the sheet 12 passes the pin wheels 17. See FIG. 3. The perforated selvage is no longer needed after the sheet is accurately guided. The remainder of the sheet between the edges will remain in controlled position because it is attached to the portion not severed. The selvage is shown emerging from the machine in FIG. 2, on the way to a waste receiver.

Perforator wheels are provided to serve as means to produce lines of weakness between columns 14. The perforator wheels are positioned between cutter wheels 19, and are hidden from view in FIG. 3, but are indicated by reference number 19a in FIG. 2. They are cutter wheels also, but with spaced cutter teeth to produce perforation cuts rather than trim cuts, as wheels 19 perform. Both the cutter wheels 19 and the perforator wheels 19a are spring urged against cooperating anvil rollers mounted on the shaft 18 between wheels 17. The anvil rollers are hidden from view in the drawings, but are conventional rollers in form. As the shaft 18 advances the sheet 12, the edges are trimmed by a cutter wheel 19 and the columns are perforated.

The shaft 18 causes the sheet 12 to advance an amount equal to the distance between address units 15 in a column, and thereafter the shaft is halted until the advanced forward edge area is severed from the sheet as a strip. The strip contains a number of address units 15 corresponding to the number of columns in sheet 12.

The strip is severed from the sheet by means of a vertically operating guillotine blade 20. See FIGS. 1 and 2. See FIG. 3 for a side illustration of the blade mounting on one of the levers 21. In FIGS. 2 and 3, a shaft 22 is shown as the mounting for the levers 21. Levers 23 are connected to the shaft 22 and to levers 21 as drivers of the levers.

A drive shaft 24 is continuously rotating and carries cams 25. Cams 25 have a uniform surface over the major portion of the periphery with a short flat recess. A cam follower on each lever 23 follows the respective cam 25. The followers hold the levers 21 and blade 20 elevated except during the period whenever the followers are on the flat area of the cams. Cams 25 are shown in FIG. 2, with the follower on the central part of the flat area thereof, and hence the blade is in its lowermost position. In FIG. 3, the followers are on the full circumference and the blade is elevated.

Another pair of cams 26 are mounted on shaft 24 and each has a pip area deviating from a regular surface. A follower 27 seen best in FIG. 3, carried by each arm 21 between the ends thereof, operates to drive the arm 21 and blade 20 downwardly in a cutting action. The downward action is fast and of short duration, as suggested by the sharp peak nature of the pip area of cams 26. Cams 25 and 26 are coordinated to raise and lower the guillotine by positive drive without the use of springs or similar apparatus.

The intermittent advance of the paper, coordinated with the operation of blade 20, is accomplished from a continuously rotating drive shaft 28 extending from a power source within the machine housing. That drive shaft is illustrated only in FIG. 1, and is hidden by a driven block 29 illustrated at the left end of the shaft in FIG. 2. Also, a sprocket 30 is secured to that shaft to receive drive therefrom.

A coupling 31, which is a block shiftable along the block 29, and adapted to be fixed in a selected position, provides an eccentric drive to actuate a rack 32. A ratchet assembly 33, carried on the end of shaft 18, operates a ratchet wheel 34 in order to impart an intermittent drive to the shaft 18. The amount of drive of the shaft 18, and consequently the amount of advance of the sheet 12, is adjustable by selecting the position of the coupling block 31 and the drive block 29.

The continuously rotating drive of drive shaft 24 is acquired from the sprocket 30 through the intermediate drive chains 35 as illustrated in FIG. 2.

In FIGS. 3 and 4, the structure is illustrated which supports the perforator and trim wheels. An arm 37 is shown as the supporting structure for the cutter and perforator wheels. There are as many perforator wheels as there are division areas between columns. Each of the arms 37 are pivoted upon a common rod 38 extending transversely of the cutter 10.

A frame 40 is also pivotally mounted upon the rod 38. Frame 40 carries a spring pressure unit 41 for each arm 37 and, as illustrated best in FIG. 3, is positioned to apply yieldable pressure upon arm 37 and consequently to the perforating wheels and to trim wheels 19. A handle 42 is employed for convenience in pivoting the frame 40 about the rod 38.

Refer to FIG. 4. The frame 40 is held in position by a lock arm 43 pivotally supported by pivot 44. A lock pin 45 carried by the side frame of the machine is engaged by arm 43 as shown best in FIG. 4, and held engaged by a spring 46. The reaction pressure of the springs in units 41 will tend to rotate frame 40 in a direction to advance the lock arm 43 along its longitudinal axis, and hence the frame is held against pivotal movement to release the pressure upon wheels 19. By grasping handle 42 and pulling the lock arm 43, the frame 40 can be released with one hand and caused to pivot upwardly. Then, the perforator wheels 20 are displaced a sufficient distance that a new sheet 12 can be threaded into or removed from the machine without interference.

In FIG. 2 a table 50 is illustrated as a receptacle for a strip section 51 of the output sheet 12 cut by blade 20. The individual address units 15 are separated from one another by a line area of weakness across the strip between each individual unit 15, which will maintain the strip but will fail under tension prior to failure of the unweakened portion of the strip.

FIG. 5 is a diagrammatic representation of the essential features of the illustrated machine in that area which handles the strip severed from the sheet 12 by the blade 20.

A start-feed roller 52 has a pad section 53. The pad section provides a segment surface less than that would constitute an entire circle. The pad area is of predetermined length corresponding to the amount of advance movement desired for the severed strip. The location of the roller 52 is such that the end of the strip will fall over an opening in table 50 which will place the end of the severed strip in position to be wiped by the passing pad 53 but with insufficient frictional drag to cause the strip to advance off of the table 50. A pinch roll 54 is positioned above roller 52 and constructed for vertical movement between a position of contact, illustrated in full lines, and an elevated position shown in dotted outline. By pressing upon

the roller 52 with pinch roll 54, the strip will be gripped between the rollers and caused to advance. The strip will be advanced the same distance as the length of the exterior surface of pad 53.

A measuring feed roller 55 is placed in the path of the advancing strip. Roller 55 operates in conjunction with a driven roller 56. The roller 55 has a pad surface which is adjustable in length according to the length of the address unit 15 being processed. FIGS. 6-8 illustrate the manner in which the length of the pad is adjusted. The roller 55 is equipped with a saddle 58 which has two pad rails 59 of limited circumferential extension, and as such constitute a drive means for the strip to the extent that the pad rails 59 roll in conjunction with the roller 56. The pad rails 59 represent the shortest unit 15 for which the machine is designed.

Two optional extension inserts 60 and 61, when attached to the saddle 58 will extend the length of the pad rail 59 to service a longer unit 15 of the strip. Insert 60 is shown attached in operative position in FIG. 8. The proper extension and its adjusted position are determined by the length of the individual units being processed. The saddle 58 has a series of screw holes which are seen best in FIG. 6, and each of the replaceable extension inserts has one or more longitudinal slots 63. Thus, the particular insert which provides the closest approximation to correct address unit length is selected, and then further adjusted by movement with respect to the holding screws.

When the measuring feed roller 55 is properly equipped with inserts as need be to service a particular length of address unit, then the roller 55 and the roller 56 together constitute a first drive means for advancing the severed strip at a restrained fixed rate which will project the strip in a path beyond the first drive means free of restraint. That is, the unit 15 which is fed through the nip of the cooperating rollers will be free of restraint, because the nip of the rollers restrains the strip only in a substantially limited nip area of direct contact. The length of the pad areas on roller 55 is selected such that the strip will be advanced slightly more than the distance between address units such that one unit and its weakened area is projected beyond the nip between rollers 55 and 56 before the pad rails 59 of roller 55 advances to clear the idler roller 56 and completely free the entire strip. Hence, the strip is restrained at a fixed rate of advance but with one unit 15 projected free for gripping by a second strip advancing system.

The second advancing system incorporates an intermediate vacuum wheel 65 having a vacuum pad 66 which constitutes a limited circumferential segment. The vacuum pad 66 is provided with a means for drawing air through surface ports during certain angular displacement portions, and for forcing air out of those ports during other angular displacement positions. Thus, address units may be attracted to the surface in a progressive manner and similarly may be rejected from the surface in a progressive manner.

A burst feed roller 68 has a uniform circumference and is intended to serve as an idler roller for cooperation with the vacuum pad 66. In FIG. 5, vacuum pad 66 is shown at its initial contact position for the developing cycle of the wheel 65. In the position shown in FIG. 5, the roller 68 is positioned the minimum distance from the nip between roller 55 and roller 56 suitable for strip bursting, and hence is designed to service the shortest possible address unit in a series strip for which the machine is designed. Whenever a strip is advanced by the rollers 55 and 56 to extend an entire unit free of the nip, but retaining the second unit in the nip, the lead edge of the free portion will reach the nip of the roller 68 and the pad 66. Then, by rotating the pad 66 at a rate which is greater than the advance which will be permitted by the restrained fixed rate of the rollers 55 and 56, a strong tension will be placed upon the strip in shock loading. Such shock loading will cause the weakened area across the strip to yield and separate the address unit 15 projecting from the nip of rollers 55 and 56. That separated unit with the individual address indicia thereon is then progressively attracted to the surface of the pad 66 as it

rolls forward between the contacting pad 66 and burst feed roller 68.

The burst feed roller 68 is manually adjustable along a track 69 which is shown in symbolic form in FIG. 5, and may be seen in FIG. 1 projecting beyond the carriage frame which carries the roller 68. By moving the carriage frame along the track 69, the position of the initial nip between pad 66 and idler roller 68 may be selected to precisely accommodate a particular established unit length of the strip. Whenever the perforator sheets and cutter wheels 19 are shifted in position along the rod 38, there may be some variation in the line spacing of resultant perforation. The distance between the nip of rollers 55 and 56, and the nip between roller 68 and pad 66 is thus adjustable to match the address unit 15 with precision. By permitting not only a longitudinal adjustment along the tracks 69 for unit length accommodation, but permitting small adjustment for exact relationship to unit length, the error which might otherwise be accumulative, is completely eliminated. By this construction, address units of greatly varying length may be accommodated by this machine with only moments of time for manual adjustments required between one sheet 12 of computer output and another.

An application wheel 71 is provided with a pad segment 72 which will accept an address unit from the pad 66 and apply it to a magazine or other item as it passes along a table under the wheel 71. In the illustration, the pad 72 is shown operating in conjunction with a glue pot 74 and a glue applicator wheel 75. However, the pad 72 may be equipped with heating devices which will thereby enable the pad to heat and soften reverse printing on the back of the unit and cause the units to act as printing masters, rather than applied labels. The function of this invention is essentially the same whether applying the address unit as a label, or using it as a printing master.

When the strip is cut from the sheet 12 and falls to the table 50, although precautions are taken to cause the strip to fall precisely into a given location, some windage and other variation can cause misplacement to a slight degree. Therefore, if the pad 53 and the pinch roll 54 contact the strip improperly, the strip may be advanced too much or too little for proper projection beyond the nip of the rollers 55 and 56.

Refer to FIG. 9.

The advancement of strip 51 by pinch roll 54 is timed to coincide with a position of the pad on 55 separated from roller 56. A guide 116 will direct the strip between the guide and roller 56. The strip 51 will project to the block 112 and will be attracted to the bottom surface of the block by the intake ports 113. The slight projection of the block 114 will be sufficient to arrest further advance of strip 51 because of its tight attraction to the surface surrounding the ports 113, and because the force advancing the strip is the remote position pinch roll 54.

Any additional drive by the pinch roll 54 after arrest of the strip will result in a slight buckle in the strip. Thereafter, as the pad on roll 55 form a nip with roll 56 the drive is close to the abutment, and the strip will break away from the stop block 114, and advance under the drive of the roll 55.

By providing an initial drive of pinch roll 54 great enough to assure that the strip 51 reaches block 114, the accurate placement of the forward edge of strip 51 with respect to the pad 66 is assured.

Whereas the present invention has been shown and described herein in what is conceived to be the best mode contemplated, it is recognized that departures may be made therefrom within the scope of the invention which is, there-

fore, not to be limited to the details disclosed herein, but is to be afforded the full scope of the invention as hereinafter claimed.

We claim:

1. A machine for dividing a strip into discrete portions, comprising:

means for marking across said strip for producing transverse lines of weakness;

a first drive roller couple rotating at a first speed and having cooperating segment surface sections which contact in a regular time sequence to produce drive action for said strip whenever the sections are in contact, and are spaced apart in nondriving relationship whenever the segments are not in contact;

a second drive roller couple rotating at a speed greater than the speed of said first couple;

stop means between said first and second drive couples for halting the advance of the forward edge of said strip in a position to be grasped by the said first drive roller couple when the first and second drive couples are in a coordinated relationship for acceptance of the said forward edge; and

means to advance the strip to said stop means through said space of the first couple;

whereby, said first couple will close upon said strip in a precisely predetermined relationship to pull one section from the strip by the action of said fast second drive roller couple as the strip is advanced at a slower rate by said first couple.

2. In a machine as defined in claim 1, said stop means being a vacuum shoe positioned to attract the strip into a plane in contact therewith, and an abutment surface in said plane, the combination requiring a drive force great enough to buckle the strip in order to allow it to advance further to the second drive roller couple.

3. A machine for inserting a strip into correct register with a sequentially operating apparatus comprising:

a drive roller couple having cooperating segment surface sections which contact in a regular time sequence to produce drive action for said strip whenever the sections are in contact, and which rollers are spaced apart in nondriving relationship whenever the segments are not in contact;

means for inserting said strip through the space between said first couple during the spaced interval thereof;

stop means for intercepting said strip in a precise positional relationship with respect to said couple, said stop means being yieldable in its holding action to the subsequent advancement drive action of the segments on the strip; and

means located beyond said stop means for grasping a strip advanced thereto, said means for grasping the strip being coordinated to grasp in a precisely predetermined timed relationship to said drive roller and to pull the strip at a lineal speed greater than the feeding speed of said drive roller couple to thereby pull one section from the strip in a bursting action.

4. In a machine as defined in claim 3 said stop means being a vacuum shoe positioned to attract the strip into a plane in contact therewith, and an abutment surface in said plane, the combination requiring a drive force great enough to buckle the strip in order to allow it to advance further.

5. A machine as defined in claim 3 wherein said means to grasp the strip is a second drive roller couple rotating at a speed greater than the speed of said first couple.