

Feb. 2, 1971

J. H. GRUVER ET AL

3,560,309

ADDRESSING AND IMPRINTING MACHINE

Filed June 18, 1968

5 Sheets-Sheet 1

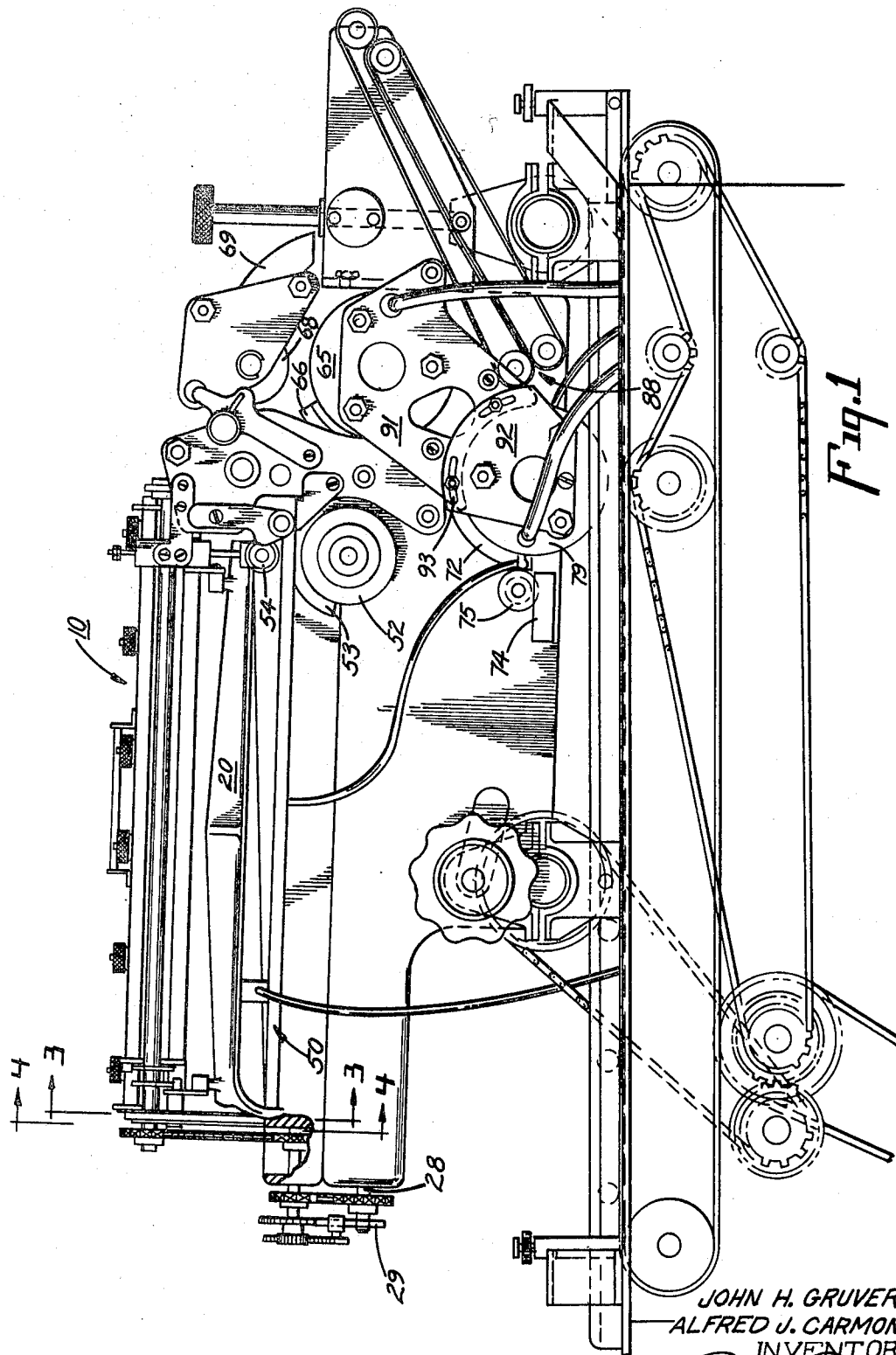


Fig. 1

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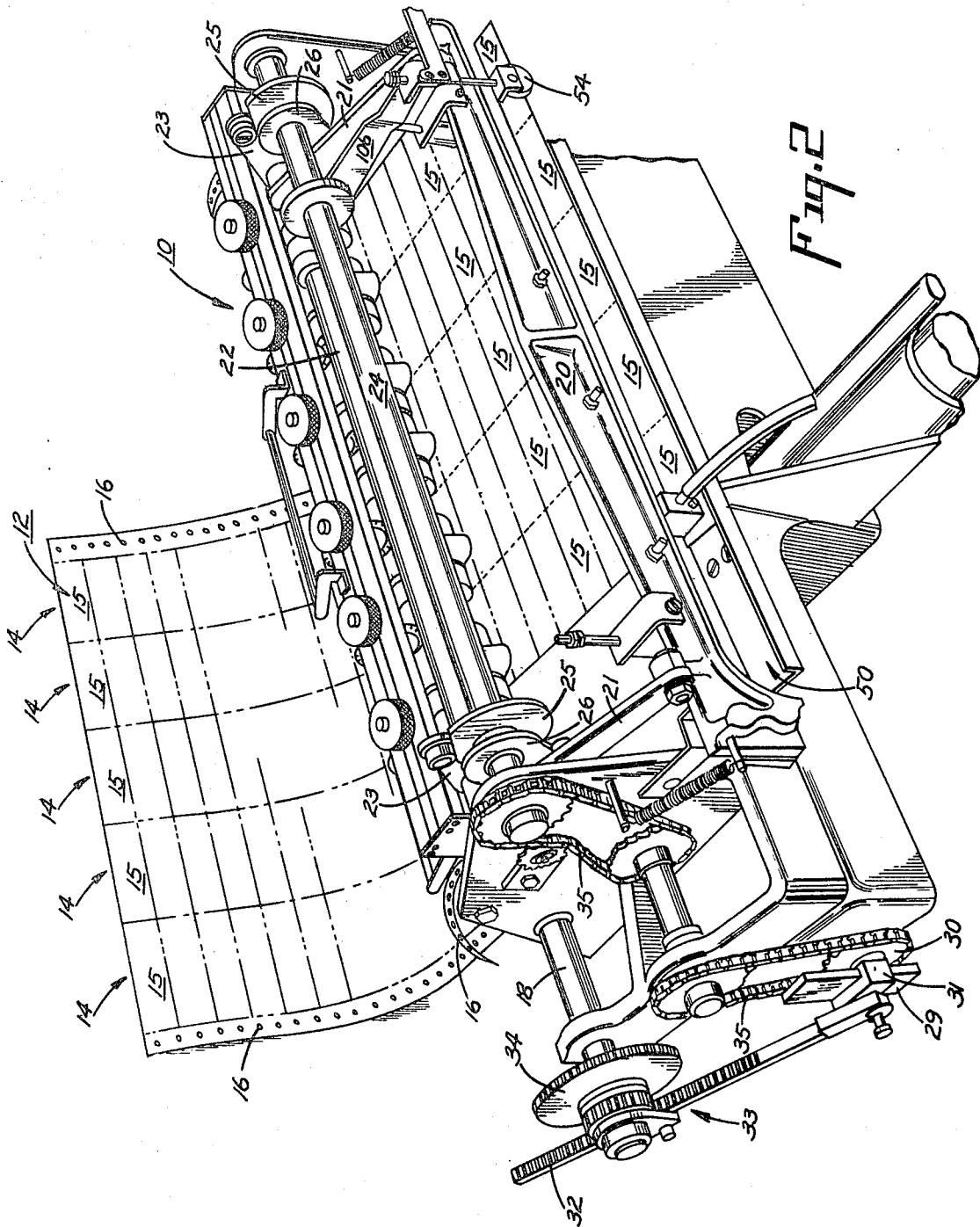
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5 Sheets-Sheet 2



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5 Sheets-Sheet 3

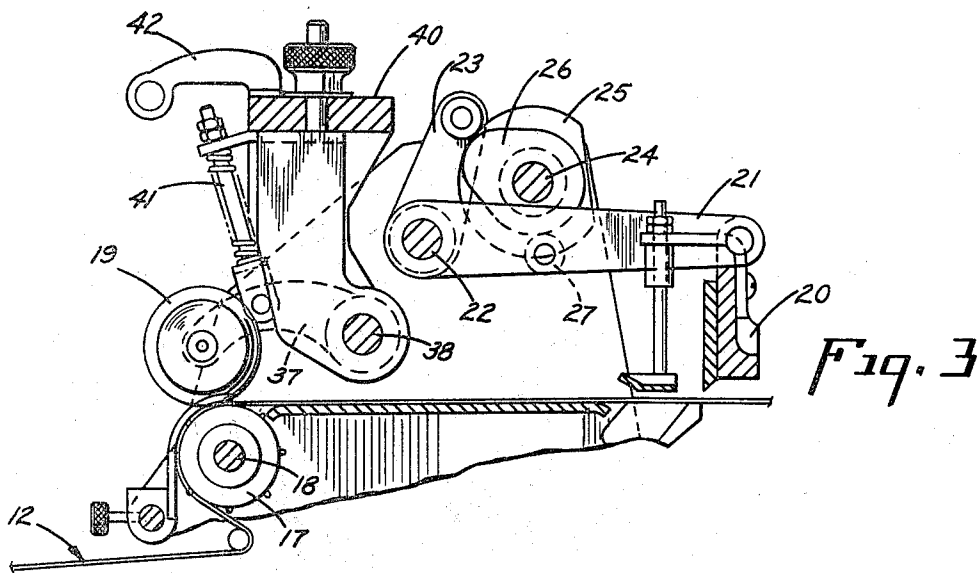


Fig. 3

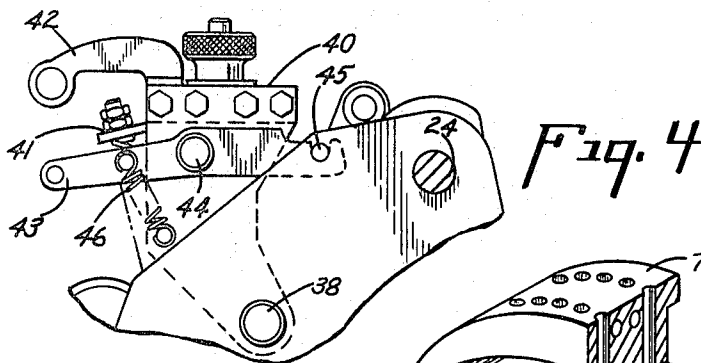


Fig. 4

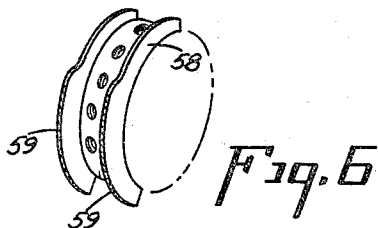


Fig. 6

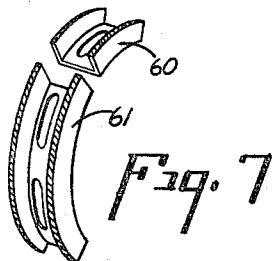


Fig. 7

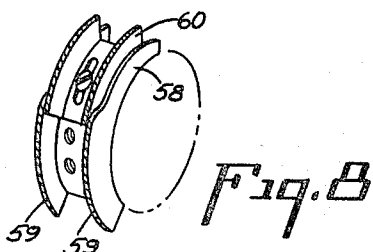


Fig. 8

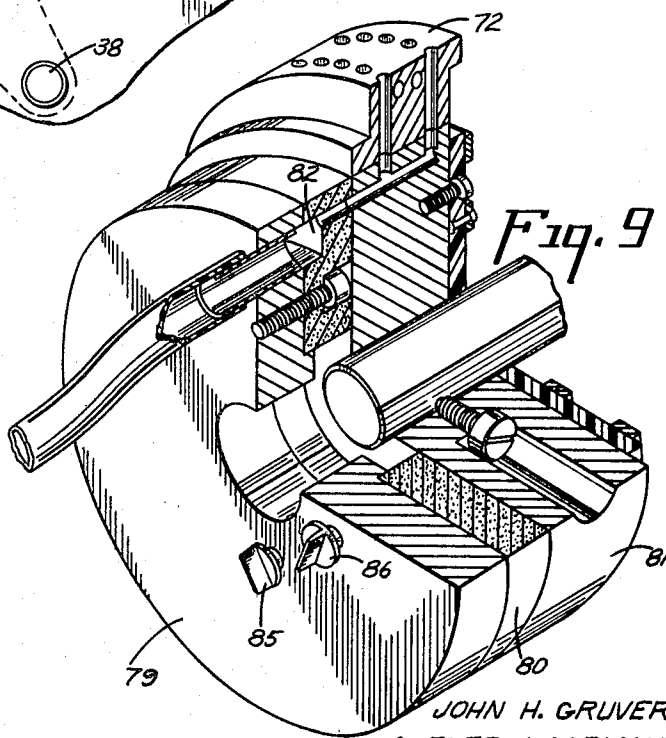


Fig. 9

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ADDRESSING AND IMPRINTING MACHINE

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5 Sheets-Sheet 4

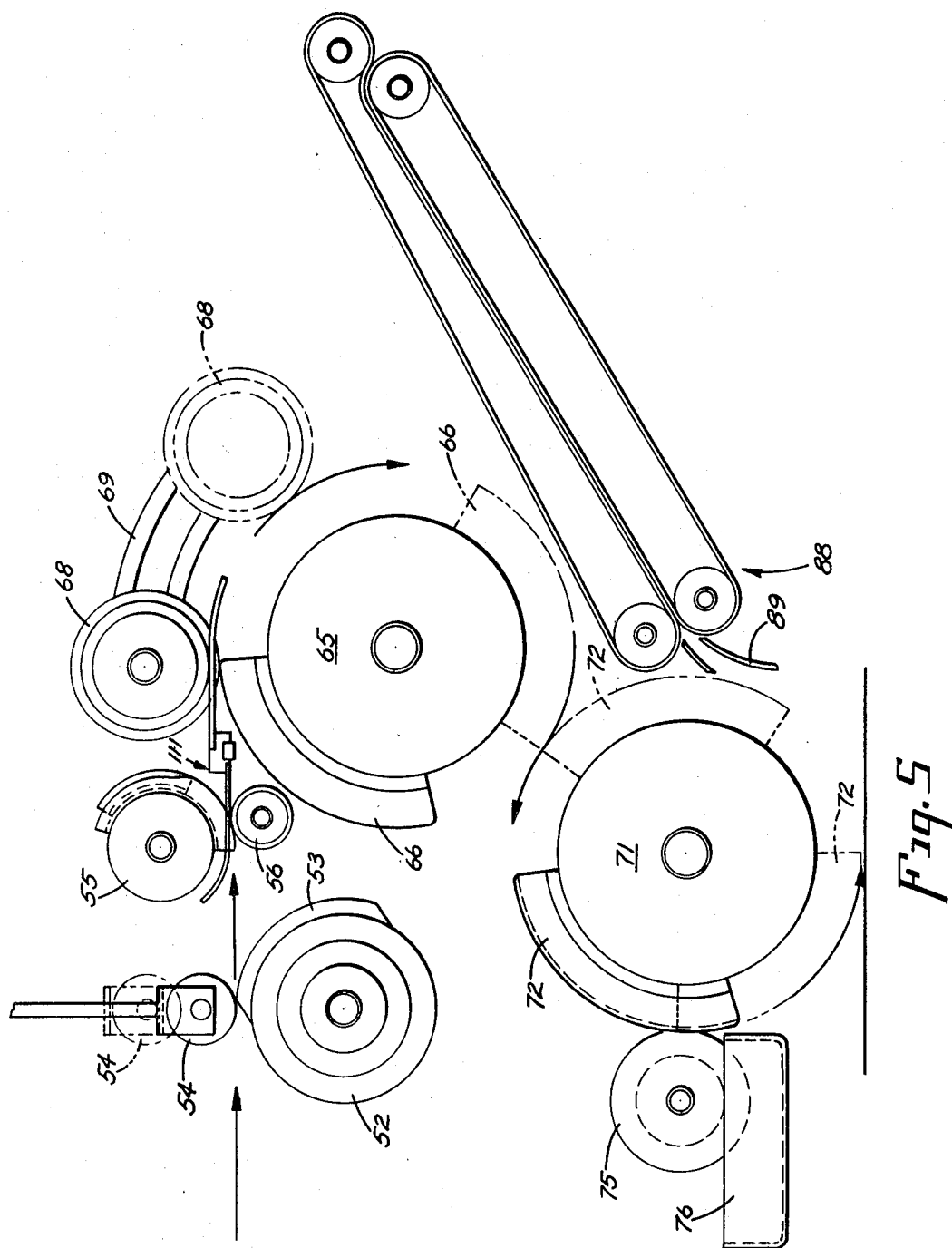


Fig. 5

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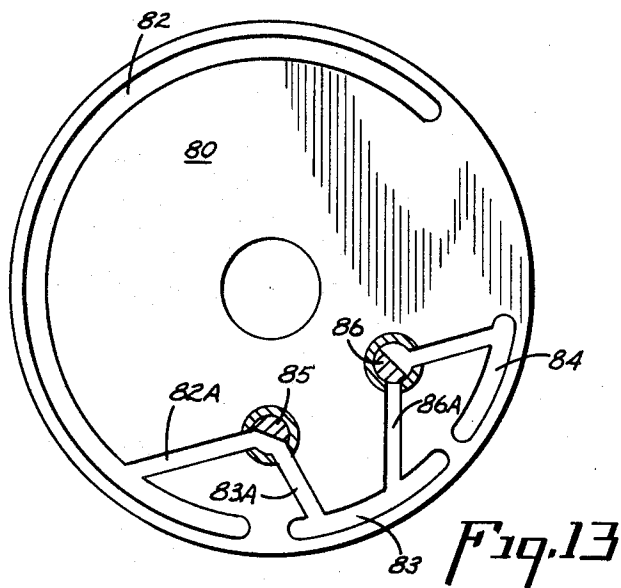
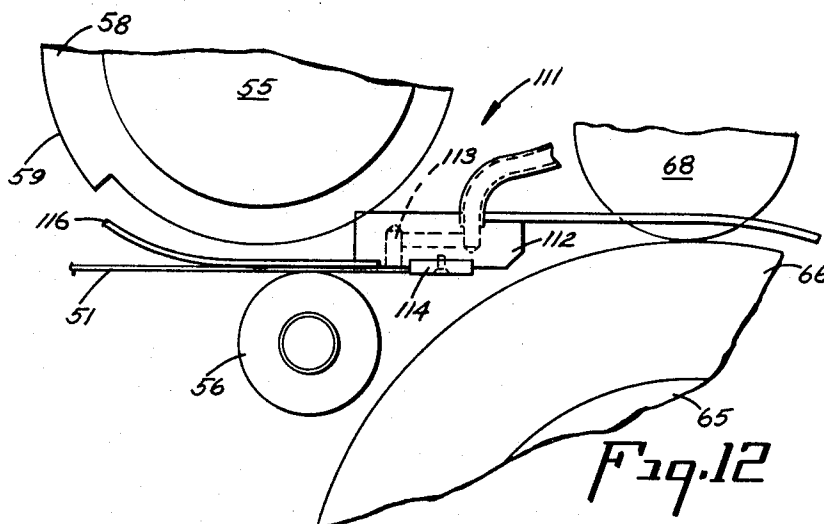
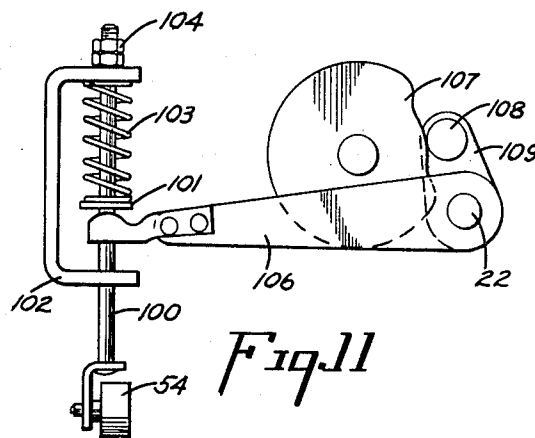
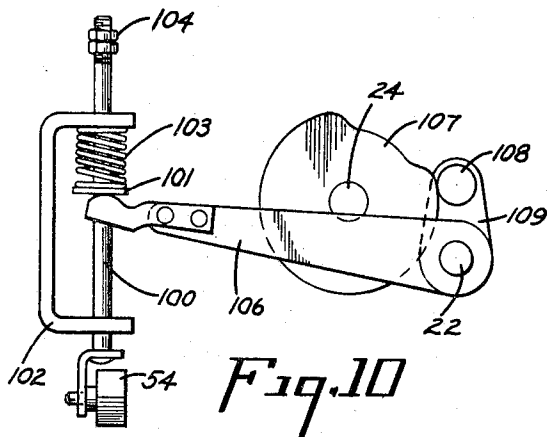
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3,560,309

ADDRESSING AND IMPRINTING MACHINE

Filed June 18, 1968

5 Sheets-Sheet 5



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3,560,309

ADDRESSING AND IMPRINTING MACHINE

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Filed June 18, 1968, Ser. No. 737,935

Int. Cl. B65c 9/18; B26f 3/02

U.S. Cl. 156—528

10 Claims

ABSTRACT OF THE DISCLOSURE

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.

BACKGROUND OF THE INVENTION

It is a known practice to sever pieces of paper from rolls or long webs for various purposes, including production of tickets, labels for attachment as mailing addresses, or pieces with wax printed in reverse for use as a heat transfer master. A very well known use is the production of billing sheets as taught in U.S. 1,955,806 and similar patents.

The teaching in U.S. 1,955,806 describes a rotary press which prints on one side of a paper web fed from a large roll. The web may or may not have something already printed on the opposite face. As the web proceeds from the printing station, the device of this prior patent severs a section by means of a guillotine blade. The cutting mechanism carries a roller on an arm which moves downwardly against a continuously moving drive roller. The movement is coordinated with the cutting action of the guillotine blade. As the web is severed by the blade, the roller presses the severed portion against the drive roller and causes the severed portion to advance away from the guillotine blade.

U.S. Pat. 2,022,198 issued to Harley is an improvement on that concept in that the pressure or idler roller is carried by the blade itself. A still further model of this concept is taught by Curtis U.S. 2,392,082 issued Jan. 1, 1946.

During the time these machines employing the severing devices and advancement conveyor were being widely used, Ridenour U.S. 2,606,681 issued in 1952 as a teaching of a label application device. This patent teaches the use of a roller having a vacuum suction holding action, and means for feeding a mailing strip to the suction roller, with means for severing the strip when it has advanced along the periphery of the roller the proper length of the mailing label portion to be severed from the strip, and with means to apply glue and press the label to a mailing piece. This is a piece-by-piece cutting and application from a long strip, or usually a roll only as wide as the mailing label.

Thereafter, computer output became the acceptable source of lists for label purposes. The computer output usually is in the form of a wide sheet with the names and addresses, or other intelligence bits, being printed from the computer in multi-column relationship, each

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individual bit being spaced from the next by an equal amount. The output from the computer requires division of these separate bits before the separate bits may be used as paste-on labels or otherwise suitable to act as a heat transfer printing master.

Doane et al., 3,039,517 then adapted the sheet cutting techniques of 1,955,806 and 2,022,198 to produce narrow strips for supply to the vacuum roller and a strip divider of Ridenour 2,606,681.

Finally, Kirk, 3,341,390 developed further refinements in the cutting and separating of the strip into separate label sections, using the guillotine principle of U.S. 1,955,806 and other refinements over U.S. 2,606,681.

SUMMARY OF THE INVENTION

The advantage of this invention is to be found in the improved means to sever a strip, which is guillotined from a computer output, into discrete 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.

This invention provides for adjustment of the relative positions of the two sets of rollers to service any length of unit within the design limits of the machine.

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.

More specifically, an advantage of this invention is found in the provision of a roller couple 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.

Then, according to this invention, the raised tread segment is adjustable in length, and the fast set of rollers are adjustable along the path of the strip projecting from the advancement rollers so as to pull the unit only after it has been fully projected from the advancement roller, but with the next successive unit held by the advancement rollers.

In the practice of this invention, the first step in using the output of a computer as individual information units, such as a label, is to weaken the computer output sheet between the columns, and then cut a strip from the end of the sheet to provide an elongated strip having a series of the unit areas joined to one another in lines which are weaker than the parent material of the sheet.

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 principals 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 a perspective view of the application wheel of the invention.

FIGS. 10 and 11 are elevational views showing the movement of a novel cam controlled strip advance wheel.

FIG. 12 is an enlarged detail view of the strip register correction station as shown in FIG. 5.

FIG. 13 is an elevation of an air distributor seal as used in the application wheel of FIG. 9.

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. 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 and the perforator wheels 19 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. Blade 20 is operated by power levers 21 seen best in FIGS. 2 and 3. Refer to 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 lever 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.

One of the distinctive features of this invention is that the machine acts upon the output of the computer to perforate the sheet between the columns. Perforation produces a line area of weakness across the resultant strip cut by the blade 20. In the preferred embodiment, the sheet 12 is perforated before it reaches the guillotine knife 20, and therefore, after an individual strip is removed the several individual units 15 will be jointed by weakened perforated areas.

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

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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 19 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 which would constitute an entire circle. The pad area is of a 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. 6-7-8 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.

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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 co-operating 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 wheels and cutter wheels 19 are shifted in position along the rod 38, there may be some variation in the line spacing of resultant perforations. 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 lengths may be accommodated by this machine with only moments of time for manual adjustments required between one sheet 12 of computer output and another.

Although this machine will find its greatest use with

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multiple column sheets 12, it will service a single column sheet. By placing such a single column adjacent the pinch roll 54, the resultant single unit will be in position to be advanced by the rollers 55 and 56. In such use, the nip of rollers 68 and pad 66 is adjusted to a distance less than the length of the single unit. No bursting is involved.

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.

In the illustrated embodiment, the two wheels 65 and 71 are employed rather than one large wheel, in order to materially reduce the peripheral speed of the pads 66 and 72 which otherwise would be necessary to produce high-speed labeling. The circumferential distance each pad must travel is only half that of a large wheel doing the entire operation. One large wheel with two pads will offer some advantage, but the two wheels permit greater design flexibility for better construction and operation.

Transfer of the address unit 15 from the pad 66 to the pad 72 is accomplished by switching the air to a pressure condition in the pad 66 and a vacuum condition in the pad 72 as the two pads roll face-to-face, as shown in phantom outline in the FIG. 5.

The application wheel 71 differs from standard practice in the selectivity of vacuum and pressure distribution as shown in the combination of FIGS. 9 and 13. The FIG. 9 shows the structural detail of the application wheel. A stationary base plate 79 carries a stationary intermediate distributor carbon disc 80, in substantially conventional manner, and provides distribution of air through the illustrated conventional duct system in a revolving vacuum face section 81. In FIG. 13, the distributor face of the intermediate distributor 80 is shown. A main distribution canal 82 extends around the greater portion of the circumference. As the revolving vacuum face section 81 is aligned to that main distribution canal 82, a low pressure air system provided by a pump will cause air to enter the ports of the pad 72 and hence attract an address unit 15 to the surface. An alternate extension canal 83 is connected by branch 83A through a valve 85 to a branch 82A connecting to the main canal 82. When the valve 85 is turned to the position shown in FIG. 13, the alternate extension canal 83 will also be in a low pressure condition and therefore the vacuum holding condition of the pad 72 will persist beyond the point of address unit contact with the mailing piece, and will be lifted free of the surface where contact was made.

A valve 86 connects to a pressure system and therefore provides pressure to a pressure canal 84 at all times. When the pad 72 reaches the area of canal 84, air will emerge from the ports and force any address unit that is on the surface to be discharged. In such event, the discharged unit 15 is directed toward a belt conveyor system 88 through guides 89 (FIGS. 1 and 5), and the rejected portion is carried to a collection bin (not shown).

When valve 85 is turned to close branch 82A and valve 86 opened to connect a pressure line 86A to canal 83, then the address unit is forced off pad 72 while it is in contact with the object to be labeled, and the unit is transferred to the object.

The vacuum wheel 65 is carried by a vacuum wheel frame 91 which is shown only in FIG. 1 of the drawing. An extension plate 92 is provided to carry the stationary

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base plate 79 of application wheel 71. Plate 92 is connected to the frame 91 by the slot and bolt connection 93. Thus, the exact position in which the address unit 15 is ejected from the surface of pad 72 either for application to the surface of a passing mailing piece, or to the conveyor 88, may be selected to a precise degree in order to compensate for tolerances of the machine or its prior adjustment. The address unit being applied as a label must be laid down upon the mailing piece without being withdrawn again. An individual unit 15 used as a printing master, must be lifted from the surface and ejected from the wheel pad at the precise moment necessary to hit the guides 89. Such precision is readily obtained by rotary adjustment using the connections 93. Also, speed will effect the necessary blow-off point, and this adjustment makes proper adjustment for speed a facile accomplishment. Air pressure adjustment will assist in proper blow-off.

Successful label application or transfer printing necessitates precision advance of the individual address unit while it is in the continuous strip form and thereafter.

It is intended that the start-feed roller 52 be precisely coordinated with the rotary positions of the measuring feed roller 55 and the intermediate vacuum wheel 65. In order to establish advance of the address unit at precisely the correct moment, the pinch roll 54 is caused to lower for contact with the pad 53 on roller 52 by a coordinated drive system which operates from the same system which drives the cutter blade 20. See FIGS. 10 and 11. The roll 54 is carried on a rod 100. Rod 100 has a collar 101. A frame 102 confines a coil spring 103 between collar 101 and a frame. Elevation of collar 101 will lift rod 100 and the roll 54. Release of the collar 101 will permit the roll 54 to lower. Adjustable stop nuts 104 will provide adjustment of the maximum advance extension of the roll 54.

A lifter arm 106 is actuated from a control cam 107 through a follower 108 carried by a link 109. Arm 106 is pivoted on the shaft 22 and therefore will elevate against the collar 101 to lift the roller 54 during a majority of the revolution of the shaft 24. The spring 103 will be able to advance roll 54 only during the minority portion of the cam 107 as shown by the surface which is flattened.

As shown in FIG. 11, the arm 106 will lower beyond the extent of advancement permitted for collar 101 by the stop nut 104. The arm loses contact with any structure of the roll 54, and therefore cam and shaft movement is not transferred to the rod 100 or the roll 54 to interfere with smooth pressure upon the pad 53 of roller 52.

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.

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

What is claimed is:

1. In a machine for applying intelligence to a moving article, said machine being adapted to apply said intelligence from a sheet thereof containing discrete bits of intelligence arranged in a plurality of columns with the intelligence in each column arranged at regularly spaced intervals, and including means for feeding the sheet and means for severing the sheet between adjacent bits of intelligence of a column to produce a strip with separate discrete bits of intelligence arranged in series in said strip, strip severing means adapted to sever the strip into unit intelligence thereof onto said moving article, the improvement thereon, and an impression roller means adapted to receive said unit portions in sequence and apply the intelligence thereof onto said moving article, the improvement in said strip severing means characterized by:

means for producing a line area of weakness across said strip between each said discrete bits of intelligence which will maintain the strip as a united entity but will fail under tension prior to failure of the unweakened strip;

first drive means for advancing the strip in a direction along the series of bits at a restrained fixed rate and for projecting the strip in a path beyond said first drive means free of the restraint thereof;

second drive means in said path for accepting said projected strip, said second drive means positioned a distance from said first drive means greater than the length of one said unit portion and less than twice that distance, said second drive means advancing said strip at a rate greater than said restrained fixed rate for placing a bursting tension on the strip greater than the tensile strength of said line area of weakness.

2. In the improvement defined in claim 1, track support means for shiftable adjustment of said first and second drive means with respect to one another for accommodating said machine to strip portions of various lengths.

3. In a machine as defined in claim 1, said impression roller means comprising two rollers, a first of which is a vacuum roller with a surface having an air grid area which passes adjacent to said path, said surface turning at a peripheral speed greater than said fixed rate of the first drive means, and the second is a vacuum roller with a surface having an air grid area meeting said first roller surface tangentially and adapted to receive said strip unit portion from said first roller and rotate said portion to a position for application of said intelligence of the portion onto said moving article;

a roller running against the periphery of said first impression roller to catch said projected strip for severing such strip by bursting at said line of weakness because of said greater speed; and

means for selectively applying subatmospheric and above atmospheric pressure to said air grid patterns of said rollers to hold a separated portion and to remove said portion upon change of the air pressure, whereby, a portion will be torn from a strip by said first impression roller and thereafter pushed off said first impression roller onto said second impression roller by air pressure differential.

4. In a machine as defined in claim 1, said means for producing a line of weakness being perforator means dividing the sheet prior to severing of the strip from the end of the sheet.

5. In the machine as defined in claim 3, at least said second vacuum roller having a plurality of air duct supply canals in disconnected extension, with air switch means for providing combinations of air pressure exhaust and air intake through said grid pattern.

6. In a machine for applying intelligence to a moving article, such machine being adapted to apply intelligence from a sheet thereof containing discrete bits of intelligence arranged in a plurality of columns with the intelligence of each column arranged at regularly spaced intervals, and including means for feeding the sheet and means for severing the sheet between adjacent bits of intelligence of a column to produce a strip in which discrete bits of intelligence are spaced in series in said strip, the improvement in means to divide said strip into separate unit portions each bearing one of said bits in the series, comprising:

means for perforating said sheet between columns to thereby produce a line of weakness between each discrete portion;

a drive advancement means for accepting a strip severed from said sheet, said drive advancement means coordinated to advance the strip along its length direction upon being fully severed from said sheet;

a feed advancement means for grasping said strip as it is advanced by said drive advancement means and projecting at least one of the discrete portions free of restraint but not two, and restraining the remainder of such strip until said projected portion is removed, and thereafter advancing another portion free of restraint, and repeating such advancement until all of the strip has been separated into discrete bits;

a tension means having cooperating surfaces closing together upon said strip portion projection from said feed advancement means, said tension means pulling said strip away from said advancement means at a speed greater than the speed of strip advancement therefrom, for producing a bursting tensile force on said strip sufficient to cause said perforated line of weakness to fail; and

means to place the location of said tension means point of closure at various spaced distances from said advancement means on an operator selection basis for causing one said projected portion to be fully separated before another is projected from said feed advancement means.

7. A machine for dividing a sheet into discrete unit portions, comprising:

a sheet feeder for advancing a sheet of paper over a cutting anvil means;

at least one perforator means acting on said sheet as it is advanced, to produce a line of perforations in the direction of sheet travel;

a guillotine blade, said sheet feeder advancing said sheet to said blade by increment steps, and said blade acting to sever a series of strips off the sheet as the sheet is advanced; and

a series of coordinated means for grasping the end portion of the resultant strip and applying a pull force to the strip while holding back on the strip a distance from the end portion to the strip to part at a perforated line, and thereafter advance the strip to again present the strip end for a grasping pull.

8. A machine as defined in claim 6, further characterized in that:

said means for perforating said sheet being a series of perforator wheels cutting into the sheet as it is advanced to said cutter.

9. A machine as defined in claim 6, further characterized in that:

said drive advance means, feed advance means and tension means are each intermittent drive devices structured to grasp a strip of paper and advance the strip along a path, and coordinated to first take a newly

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created strip and move it into position to be grasped by the feed advance means, where it is advanced to the tension means but not released until a unit portion of the strip has been pulled free of the strip.

10. A machine for applying intelligence to a moving article, comprising: 5

a paper cutter structured to slice across a sheet;

a feeder adaptable to advance to said cutter either a wide sheet of several columns, or a single column web, with intelligence bits thereon oriented transversely of the feed direction; 10

perforator means for producing perforated lines of weakness between columns of multiple column sheets; three separate but coordinated drive advance devices for accepting and processing the output of said cutter: 15

(a) a feed advance means for gripping a paper strip placed therein and advancing the strip a preset distance, and then releasing the grip before repeating the cycle; 20

(b) a drive advance means for accepting the output of the cutter and advancing it into a positional relationship with the feed advance means such that when the feed advance means grips the strip, the strip will be in a preselected gauge position and will be advanced to a preknown extension position of its lead edge; 25

(c) tension means for gripping said lead edge and pulling said strip at a speed greater than the speed

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at which the feed advance means moves the strip; and

(d) a track for transit of said tension means relative to said feed advance means;

whereby, said tension means is positionable at a distance substantially equal to the width of said single column web and infinitely adjustable to each web, thereby providing a positive transfer of the single section without tearing, and at a distance slightly greater than the distance between perforated lines whenever multiple column sheets are processed.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,560,309 Dated February 2, 1971

Inventor(s) John H. Gruver and Alfred J. Carmont

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 9, lines 23 and 24, delete "telligence thereof onto said moving article, the improve-ligence" and substitute -- portions of said strip each bearing a discrete bit of intelligence --. Column 10, line 52, delete "last" and substitute -- least -- .

Signed and sealed this 4th day of May 1971.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patent.