

Dec. 26, 1972

H. C. ARTELT, JR

3,707,424

ADJUSTABLE LABEL FORM SLITTER FOR ADDRESSING MACHINES

Filed Aug. 31, 1970

6 Sheets-Sheet 1

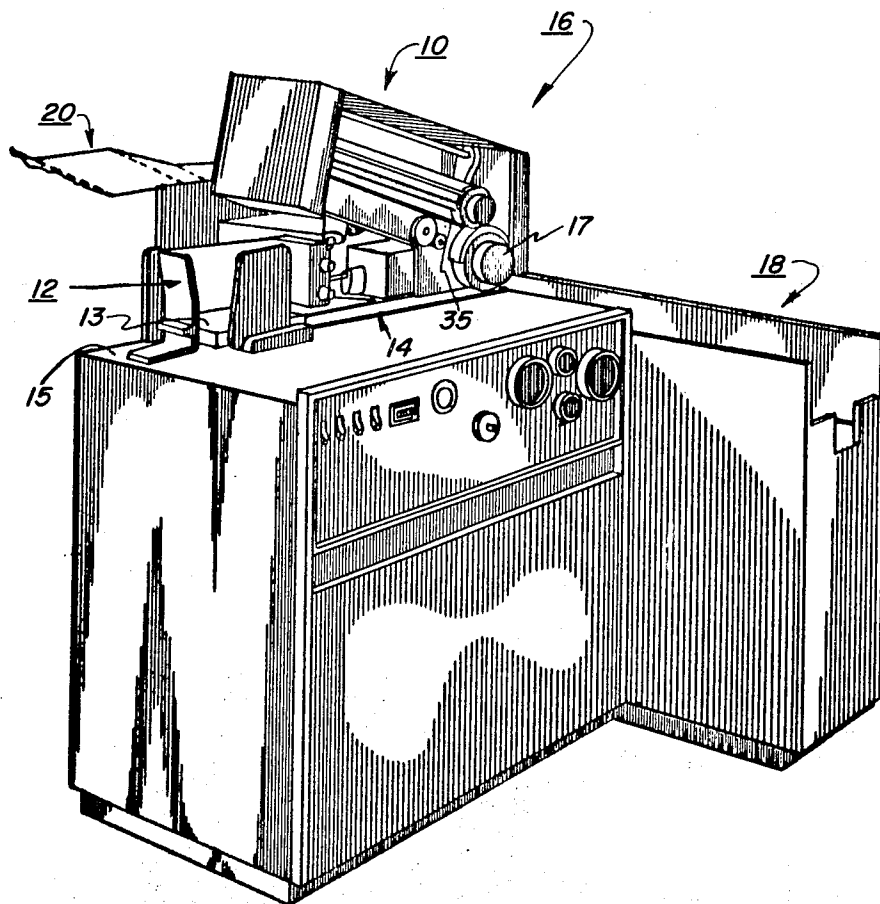


FIG. 1

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6 Sheets-Sheet 2

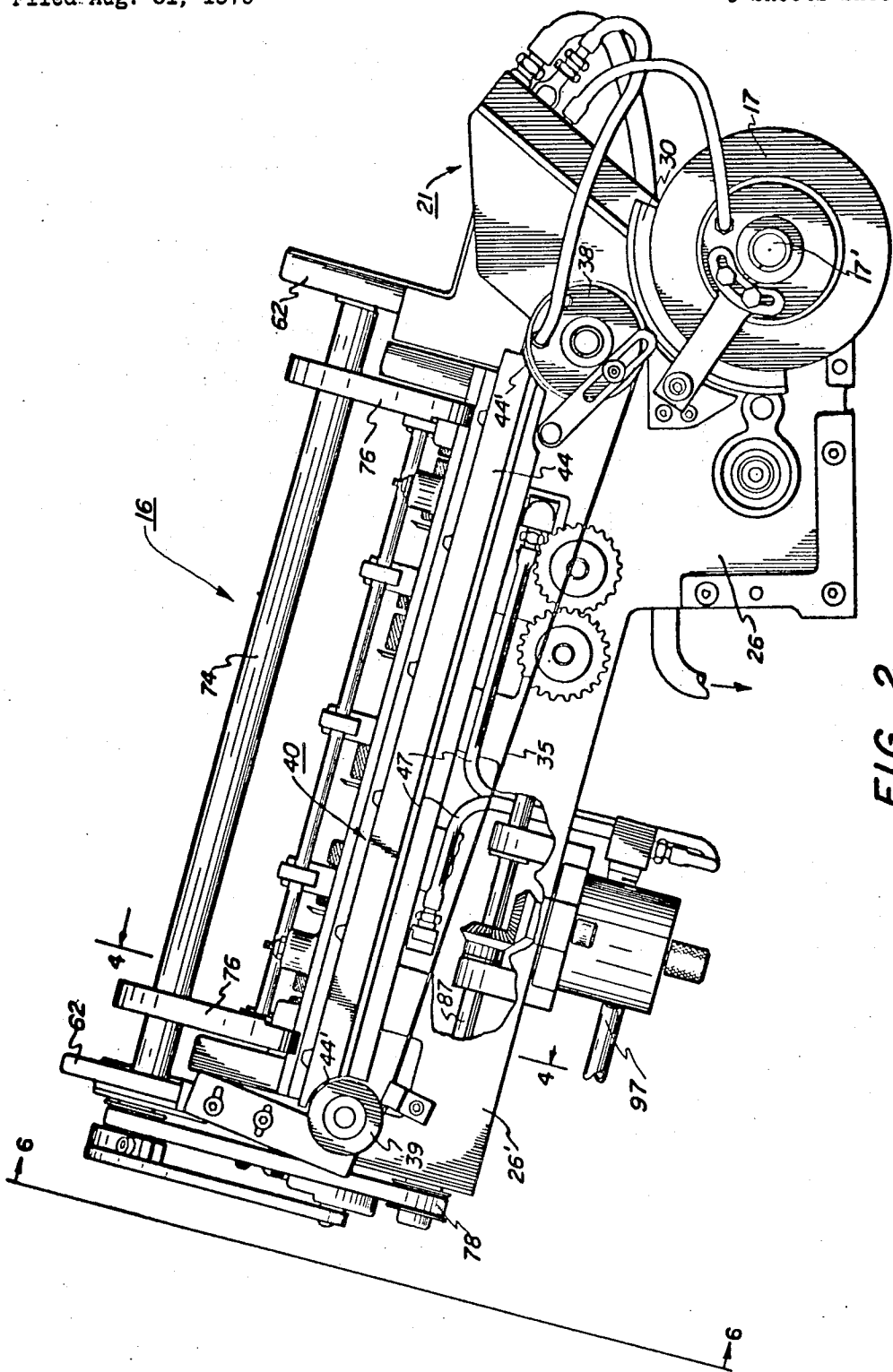


FIG. 2

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6 Sheets-Sheet 3

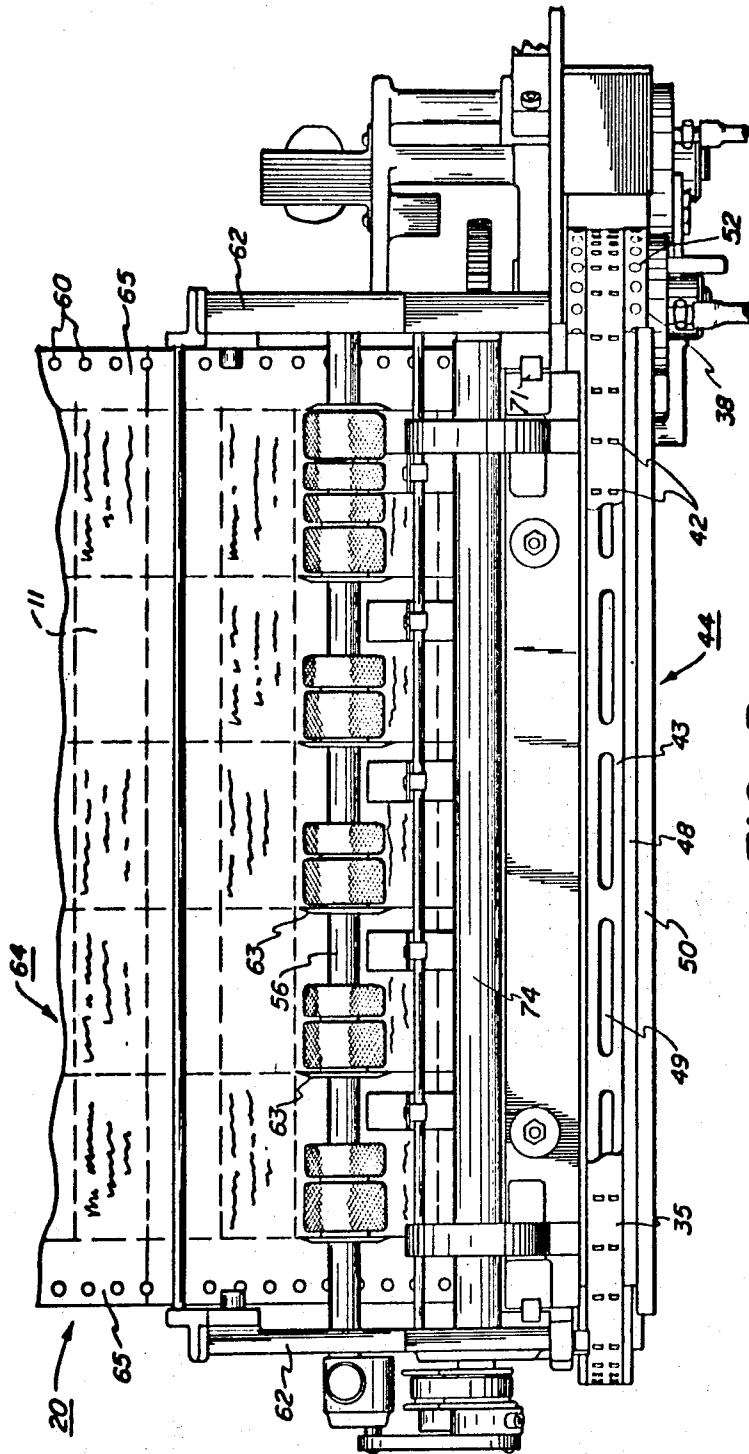


FIG. 3

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6 Sheets-Sheet 4

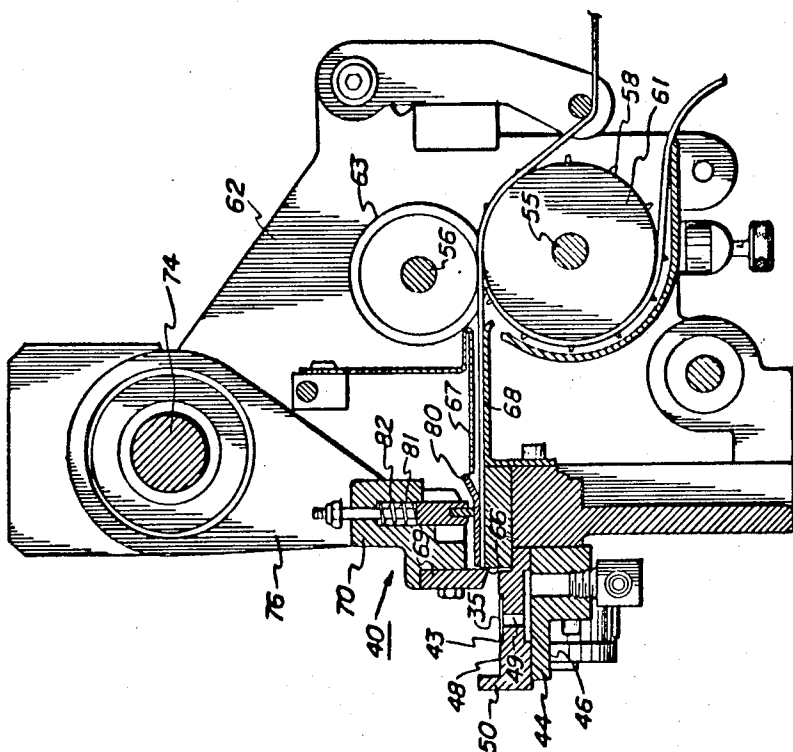


FIG. 4

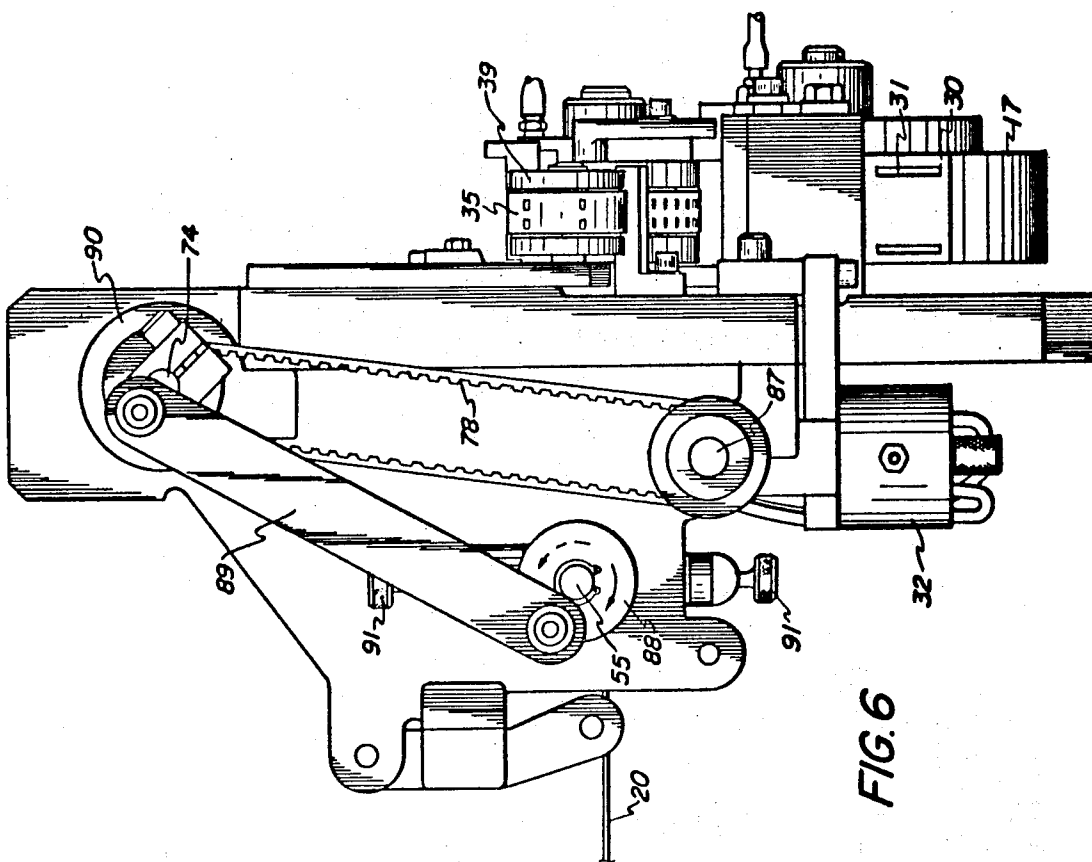


FIG. 6

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6 Sheets-Sheet 5

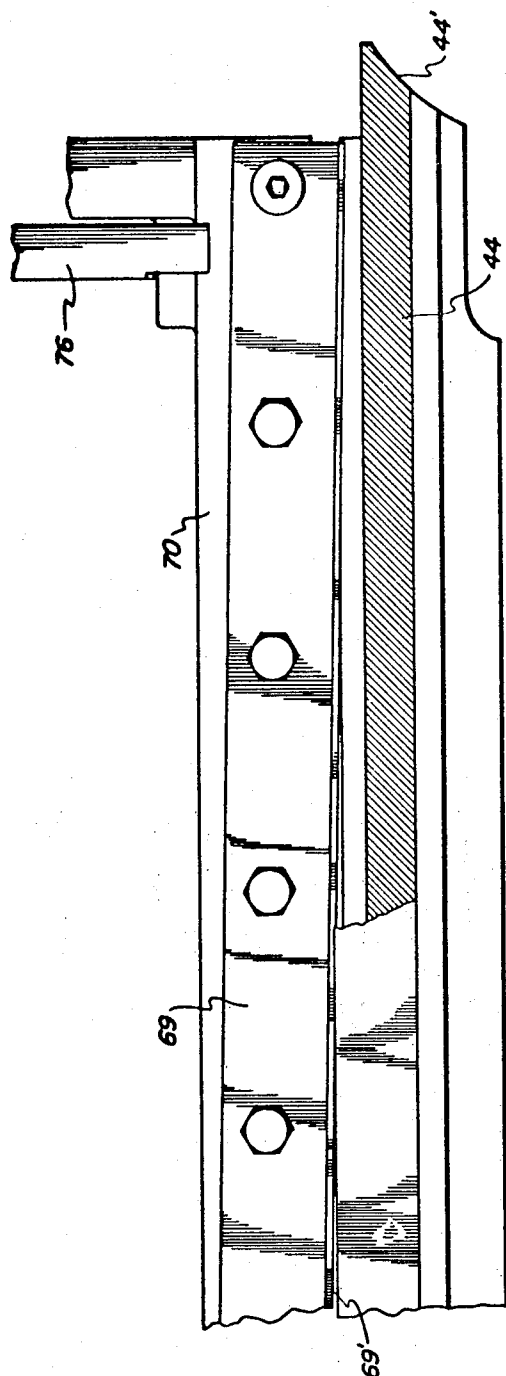


FIG. 5

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6 Sheets-Sheet 6

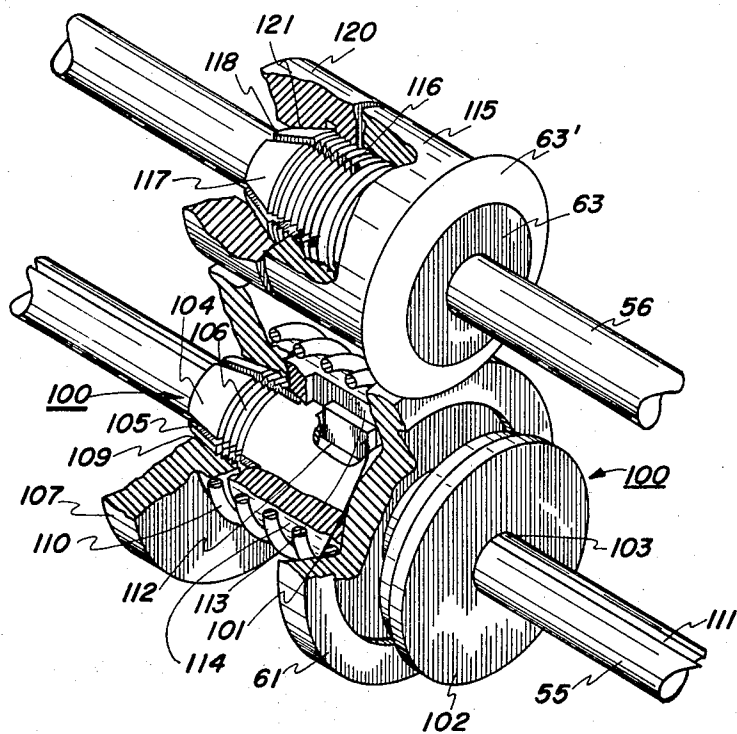


FIG. 7

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ADJUSTABLE LABEL FORM SLITTER FOR ADDRESSING MACHINES

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U.S. Cl. 156—521

4 Claims

ABSTRACT OF THE DISCLOSURE

An article addressing machine for use with an uncut label supply sheet. The addressing machine includes a labeling head with a label transfer wheel and transport means for supplying articles to the transfer wheel for addressing thereof. A guillotine cutter serves to cut the label sheet transversely, there being a label transport belt to carry the cut labels from the cutter to the transfer wheel. Means are provided to advance fresh label sheet to the cutter with rotary knives upstream of the cutter to preslit the label sheet transversely between the label rows before the label sheet reaches the cutter. To facilitate handling of different size and type label sheets, the rotary knives and their cooperating shears are supported for adjusting movement transverse of the label sheet, with releasable locking means being provided to maintain the knives and shears fixed in selected position.

This invention relates to article addressing machines, and more particularly to an improved label form slitting means for article addressing machines.

In machines for addressing articles such as envelopes, newspapers and the like, labels are supplied conveniently in the form of a sheet or strip of uncut labels normally arranged in rows four or five abreast. Typically, these labels are generated by a computer. As can be appreciated, the addressing machines include knife means to cut the supply sheet or strip into individual labels as required for use by the machine. Following cutting, the individual labels are transported or carried to a transfer means where the address information or the label itself is transferred to the articles.

However, the label size and number of label rows on the label supply sheet or strip may vary from time to time. For example, in some applications, the label supply sheet may have labels arranged in four rows. In a later application however, this may change to a five-row configuration. Any change in label sizes, orientation, etc. normally necessitates a change or adjustment of the label knife means, particularly those knives which cut the label sheet along its axis, if correct sizing of the labels is to be assured.

It is a principal object of the present invention to provide a new and improved article addressing machine.

It is an object of the present invention to provide an article addressing machine incorporating improved means for cutting the label supply sheet into individual labels for use by the addressing machine.

It is an object of the present invention to provide an adjustable knife arrangement for preslitting an uncut label supply sheet before the sheet reaches the label cutter, the knife arrangement facilitating changeover from one label size to another.

It is a further object of the present invention to provide an easily adjustable roller knife and anvil arrangement for preslitting uncut label supply sheets.

This invention relates to an article addressing machine adapted for use with a label supply sheet having margin portions with labels therebetween arranged in one or more longitudinally extending rows, the combination

comprising, transfer means for transferring labels to the articles; article transport means for bringing articles into transfer relationship with the transfer means for addressing thereof; means for cutting the label sheet between successive labels; label transport means at the outlet of the cutting means for transporting the labels to the transfer means; means cooperable with the label sheet margins to advance the label sheet to the cutting means; and adjustable knife means upstream of the cutting means for slitting the label sheet longitudinally along the edge of each label row to separate the label sheet into individual label rows and remove the sheet margins before cutting thereof by the cutting means.

Other objects and advantages will be apparent from the ensuing description and drawings in which:

FIG. 1 is an elevational view showing the addressing machine of the present invention coupled with a discharge conveyor;

FIG. 2 is a front view with parts broken away showing details of the labeling head for the addressing machine shown in FIG. 1;

FIG. 3 is a top plan view of the labeling head shown in FIG. 2;

FIG. 4 is a cross sectional view taken along lines 4—4 of FIG. 2 showing the label sheet feeding and cutting mechanisms of the labeling head shown in FIG. 2;

FIG. 5 is an enlarged view of the labeling head guillotine cutter;

FIG. 6 is an end view partially in section of the labeling head shown in FIG. 2 showing details of the labeling head driving mechanism; and

FIG. 7 is an enlarged isometric view with parts broken away showing details of the adjustable slitting knives for the labeling head shown in FIG. 2.

Referring to the drawings, there is shown the labeling or addressing machine, designated generally by the numeral 10, of the present invention. As will appear more fully hereafter, addressing machine 10 serves to transfer labels 11 themselves, or the information thereon, to articles 13. Uncut labels 11 are supplied to labeling head 16 of addressing machine 10 from a sheet or form 20 on which labels 11 are arranged longitudinally in one or more rows 64. For explanation purposes, a five row arrangement is illustrated in FIG. 2. As will appear, label sheet 20 is cut into individual labels 11 which are carried by transport belt 35 to transfer wheel 17. Wheel 17 then transfers the label itself or the information thereon to articles 13.

As is understood by those skilled in the addressing or labeling art, labels 11 may be physically transferred to articles 13 as by gluing. Alternately, the label information only may be transferred to the articles. In this latter instance, wax impressions on the label are transferred with the aid of heat and pressure to the articles, the used labels preferably being collected in a suitable storage tray (not shown) for possible reuse as glued labels or simply destroyed. In this latter type of application, transfer shoe 30 of wheel 17 incorporates suitable heating means (not shown) to facilitate transfer of the label information.

Articles 13, which may comprise envelopes, cards, newspapers, and the like, are stored in hopper 12. Article transport 14 carries the articles 13 one at a time past transfer wheel 17 where the articles are labeled. The labeled articles may be then carried to a suitable take away conveyor 18 by transport 14.

Addressing machine 10 has a table-like base 15 on which article hopper 12 and article transport 14 are operatively supported, the feeding surface of transport 14 being substantially level with the surface of base 15. In this arrangement, articles 13 rest partially on the surface

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of base 15 as they are carried past transfer wheel 17 by transport 14.

Referring particularly to FIGS. 2 and 3 of the drawings, transfer wheel 17 is supported by drive shaft 17'. Shaft 17' is rotatably journaled in the frame member 26 of labeling head 16. Frame member 26 is in turn mounted on base 15 adjacent transport 14. Transfer wheel 17 has a curved label transfer shoe 30 mounted on the periphery thereof and extending partially about the circumference of wheel 17. Wheel 17 is supported on frame member 26 opposite a suitable pressure roll (not shown) carried by base 15 and between which articles 13 are carried by transport 14. Suitable adjusting means (not shown) may be provided to enable the spacing between transfer wheel shoe 30 and the surface of the pressure roll to be varied to accommodate different thickness articles and different pressure requirements.

Vacuum holddown ports 31 (shown in FIG. 6) open to the periphery of shoe 30. Ports 31 communicate via suitable control valve means (not shown) with a vacuum source to provide vacuum to the periphery of label transfer shoe 30 for temporarily attaching labels 11 to shoe 30 during the labeling process.

In applications where labels 11 are physically attached to articles 13 as by gluing, vacuum holddown ports 31 of transfer shoe 30 are opened to the vacuum source as shoe 30 moves from a point opposite lower drive pulley 38 of label transport 35 to the area opposite article transport 14. In applications where the label information only is transferred, the vacuum control valve means in transfer wheel 17 may be altered to sustain vacuum to ports 31 of shoe 30 until shoe 30 is past the label transfer point. This facilitates removal of the used labels from the transfer area and deposit in a used label storage tray when used.

It is understood that in applications where labels 11 are physically attached to articles 13, a suitable glue dispenser or applicator, such as a dispensing roller (not shown), is provided to coat the underside of the label with adhesive prior to contact of the label with the article being addressed. In this application, the glue dispensing roller is normally disposed above article transport 14 and to the left of transfer wheel 17 as seen in FIG. 2 of the drawings.

Label transport belt 35 is supported by a pair of pulleys 38, 39 rotatably journaled on frame member 26. Lower pulley 38, which as will appear comprises the drive pulley for belt 35, is arranged proximate the path of movement of transfer wheel shoe 30. Pulley 39, which comprises an idler pulley, is supported at the remote end 26' of frame member 26 just beyond the effective cutting width of guillotine 40.

Referring particularly to FIGS. 2-4 of the drawings, transport belt 35 comprises a flexible belt perforated at spaced points along its length. The upper run of label transport belt 35 rides in recess 43 of elongated vacuum distributing member or distributor 44 secured to frame 26 underneath the discharge side of guillotine 40. Vacuum distributing member 44 is sized to extend substantially the full distance between pulleys 38, 39, ends 44' of member 44 being suitably curved to mate with the curved portions of pulleys 38, 39 opposite thereto. The label supporting surface 48 of vacuum distributing member 44 is substantially flat with belt recess 43 extending centrally along the length thereof, the depth of recess 43 being such that the upper surface of belt 35 is substantially level with or slightly higher than the surface 48 of member 44. As best seen in FIG. 4, a raised outer lip 50 is provided along the outer edge of label supporting surface 48. The inside edge of label supporting surface 48 is defined by the lower cutting edge 66 of guillotine 40 extending therealong.

Vacuum distributing member 44 has a vacuum chamber 46 therein communicated through distributor hoses 47 with a vacuum source, represented by supply hose 97.

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A series of vacuum ports 49 are provided along the length of transport belt recess 43 to supply vacuum from chamber 46 to label transport belt 35 as belt 35 moves along recess 43. As can be understood, this arrangement provides, in cooperation with perforations 42 in belt 35, vacuum along the upper run of belt 35 to tack or attach the labels to belt 35 following operation of guillotine 40 and enable belt 35 to transport the labels laterally to transfer wheel 17.

Lower drive pulley 38 has vacuum ports 52 (best seen in FIG. 3) opening to the periphery thereof to provide holddown vacuum for carrying the labels therealong to transfer wheel 17. Suitable vacuum control means (not shown) serve to control vacuum admission to ports 52 so as to provide vacuum to the periphery of pulley 38 in the area extending from vacuum distributing member 44 to a point opposite label transfer wheel 17.

Referring particularly to FIGS. 3, 4 and 7, a pair of shafts 55, 56 are rotatably journaled on rear supports 62 of labeling head frame member 26. A pair of feed sprockets 58 are secured to lower shaft 55, sprockets being arranged to engage perforations 60 in margins 65 of label form 20. In addition, shaft 55 has mounted at spaced points therealong disc-like shearing members 61, the number and position of members 61 corresponding to the points where form 20 is to be slit longitudinally between label rows 64 and margins 65 removed. Upper shaft 56 has mounted thereon in cutting relationship to members 61 rotary knives or slitters 63. As can be understood, knives 63 cooperate with members 61 to preslit label form 20 in a lengthwise direction to thereby remove margins 65 and separate form 20 into individual rows 64. The slitted label rows 64 are later cut into individual labels 11 by guillotine 40. As will appear, shaft 55 is intermittently rotated to advance label sheet 20 toward guillotine 40, shaft 56 being suitably geared to shaft 55 for concurrent rotation therewith.

Referring particularly to FIG. 7, each shearing member 61 is slidably supported on a cylindrical housing 100. The housings 100 are in turn slidably positioned on shaft 55, the dimension of the bore 103 in housings 100 being slightly greater than the diameter of shaft 55 to accommodate slidable movement of housings 100 along shaft 55. Each member 61 and its associated housing 100 are held against rotation on shaft 56 by means of locking key 101 as will appear more fully hereinafter.

Housings 100 each have an enlarged diameter portion 102 at one end serving to limit slidable movement of the member 61 thereon in one direction (toward the right as seen in FIG. 7). The opposite end 104 of each housing 100 is formed as a segmented cone, slots 105 therein enabling the housing end 104 to be compressed radially inward into tight gripping engagement with shaft 55 as will appear. A portion of the exterior of each housing 100 adjoining end 104 is threaded at 106 to receive clamping collar 107.

Clamping collars 107 are disc-like members having a cone-shaped interior bore 109 cooperable with the cone-shaped segmented end 104 of housing 100 to compress housing end 104 radially inward into gripping engagement with shaft 55. The remaining portion of the collar bore is threaded to permit threading of collar 107 onto the threaded portion 106 of housing 100. Coil springs 110 are provided between each member 61 and the collar 107 associated therewith, springs 110 serving to bias members 61 toward the enlarged end 102 of housing 100 and into operative engagement with the side of the rotary knife 63 associated therewith.

Shaft 55 is provided with a slot-like recess 111 along the length thereof within which the locking key 101 for each member 61 is adapted to ride. Each housing 100 has a slot-like opening 112 to accommodate key 101, the key 101 projecting through housing 100 and into an elongated slot-like opening 113 in the shank portion 114 of the member 61.

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As can be understood, keys 101 serve to drivingly connect both the member 61 and housing 100 with shaft 55 for rotation in unison therewith. The locking collar 107, when tightened on the housing 100, serves to force the segmented end 104 of the housing 100 radially inward into gripping engagement with shaft 55 to thereby lock the housing 100 against axial movement on shaft 100. On release of collar 107, the housing 100 together with its member 61 may be slid axially along shaft 55 to a different portion.

The outer periphery of each knife 63 is tapered at 63' to provide a sharp knife-like cutting edge about the periphery thereof. An internally threaded collar 115 is suitably secured to the inside surface of each knife 63, collar 115 being threaded onto an externally threaded locking cylinder 116. The interior bores of each knife 63 and the locking cylinder 116 associated therewith are slightly larger than the outside diameter of shaft 56 to enable the individual knife assemblies to be slid along shaft 56 during adjustment thereof.

The opposite end 117 of locking cylinder 116 comprises a segmented cone, slots 118 therein enabling the end 117 of cylinder 116 to be compressed radially inward into gripping engagement with shaft 56.

A clamping collar 120 is provided for threading onto locking cylinder 116 adjacent segmented end 117 thereof. The interior of collar 120 is cone-shaped at 121 so that threading of collar 120 onto cylinder 116 brings the cone-shaped interior 121 of collar 120 into compressive engagement with segmented end 117 of locking cylinder 116 to force that portion of cylinder 116 into gripping engagement with shaft 56. By this means, knives 63 are secured in position on and for rotation in unison with shaft 56.

In the arrangement illustrated, shafts 55, 56 are round when viewed in cross section and locking key 101 and clamping collar 120 serve to drivingly couple shearing members 61 and knives 63 to shafts 55, 56 respectively. It is understood however that shafts 55, 56 and the bore portions of members 61 and knives 63, as well as the mating surfaces between member 61 and housing 100, may be irregular rather than round, as for example, square. In that event, the requisite driving engagement between members 61 and knives 63 with their respective shafts 55, 56 would be obtained, and key 101 would be dispensed with while collar 120 would only serve to hold knives 63 against lateral movement on shaft 56.

Preferably, form feed sprockets 58 on shaft 56 are supported in the same manner as knives 63 to permit lateral adjusting movement of sprockets 58 in correspondence the size label form 20 used.

To support the slitted label form as the form feeds toward guillotine 40, frame member 26 is provided with a relatively smooth lower guiding base 68 which extends to vacuum distributing member 44 and forms the lower cutting edge 66 of guillotine 40. Spaced upper guides 67 cooperate with base 68 to guide the label rows 64 to guillotine 40.

In addition to lower cutting edge 66, guillotine 40 includes an upper knife 69. Knife 69 is carried by part 70 slidably supported for up and down movement in vertical grooves 71 in labeling head frame member 26. Upper knife part 70 is reciprocated by means of an eccentric shaft 74 rotatably journaled in frame extensions 62 and connected to part 70 by links 76. Links 76 are journaled on eccentric shaft 74 by suitable bearing means (not shown) and are secured to part 70 by suitable pin means. As will appear, eccentric shaft 74 is driven in unison with vacuum drive pulley 38 from drive belt 78, shown in FIG. 6.

To maintain the slitted label sheet stationary during operation of guillotine 40, collapsible braking members 80 are suspended from the lower surface of knife part 70. Braking members 80, which are slidably received in recesses 81 in part 70, are biased downwardly by springs

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82 toward guiding base 68. As can be understood, on movement of part 70 toward base 68, braking members 80 first contact the slitted label sheet 20 to hold sheet 20 stationary during operation of guillotine 40.

To correlate feed of labels 11 with cyclic operation of label transfer wheel 17, the cutting edge 69' of knife 69 is angled so that knife 69, during the cutting stroke thereof, cuts in a scissors-like fashion from right to left as viewed in FIGS. 2 and 5. Labels 11 are accordingly cut off one by one so that there results on label transport belt 35, which is continuously driven, a series of labels 11 spaced a predetermined distance from one another. It is understood that the relative operating speeds of the several component parts of labeling head 16 including guillotine 40 and transport belt 35 are chosen to provide predetermined spacing between the labels 11 on transport belt 35 as will assure a continuous supply of labels to shoe 30 of transfer wheel 17, each label being positioned on shoe 30 in proper location for transfer of the label itself, or the address information therefrom, onto articles 13 as the articles are brought forward by article transport 14.

Addressing machine 10 is driven by a suitable motor (not shown), there being suitable power transfer means from the machine motor to article transport 14 and to transfer wheel shaft 17' in labeling head 16. Suitable clutch means (not shown) may be provided to interrupt drive to transfer wheel 17 in the event of failure of interruption in the supply of articles being labeled.

Head drive shaft 87 extends laterally along labeling head 16 and is suitably journaled in frame member 26 thereof. Both vacuum drive pulley 38 and shaft 87 are driven from transfer wheel shaft 17' through suitable power transfer means such as gears (not shown) at a speed sufficient to assure a continuous supply of cut labels to transfer wheel 17. Shaft 87 drives eccentric shaft 74 by means of drive belt 78.

Referring particularly to FIG. 6, sprocket shaft 55 has an adjustable ratchet type input clutch 88 supported on the outermost end thereof. Clutch 88 is driven in oscillating fashion by eccentric shaft 74 through link 89 which is pinned off-center to eccentric shaft pulley 90 and to clutch 88. Slitter shaft 56 is geared to rotate in unison with but in a direction opposite to sprocket drive shaft 55.

Clutch 88 includes a suitable adjustable screw 91 to enable one-way driving arc of clutch 88 to be adjusted. As is apparent, on rotation of eccentric shaft 74 by drive belt 78 to operate guillotine 40, eccentric 89 first turns the input member of clutch 88 in a forward or label sheet feeding direction (the direction shown by the solid line arrow in FIG. 6). Clutch 88 accordingly engages to drive sprocket shaft 55, which in turn drives slitter shaft 56 to advance label sheet 20, the duration of engagement of clutch 88 being adjusted to advance label sheet 20 one label width. The continued rotation of eccentric shaft 74 operates guillotine 40 to cut off the label width advanced thereunder, the cut labels dropping onto transport belt 35. While guillotine 40 is operated, drive link 89 reverses the drive to clutch 88 (the direction shown by the dotted line arrow in FIG. 6) to interrupt power to shafts 55, 56 and advance of label sheet 20.

OPERATION

During operation of addressing machine 10, a supply of articles 13 to be labeled is provided in hopper 12, it being understood that hopper 12 is adjustable to accommodate the various size articles. Article transport 14 feeds articles 13 singly from hopper 12 to transfer wheel 17 where the articles are labeled, the labeled articles being discharged by transport 14 onto the takeaway conveyor 18.

At the same time, labeling head 16 operates to supply labels 11 from form 20 to transfer wheel 17. Wheel 17 in

turn serves to transfer the labels 11 or the address information therefrom, onto articles 13.

With operation of addressing machine 10, clutch 88 of labeling head 16, which is drivingly connected to head drive shaft 87 via drive belt 78 and link 89, serves to index sprocket drive shaft 55 forward once each revolution of shaft 87 to advance label form 20 one label width. As label form 20 advances, knives 63 on shaft 56 in cooperation with discs 61 cut form 20 longitudinally to remove margins 65 and separate form 20 in label rows 64. At the same time, the previously slitted leading end of form 20 advances under guillotine 40 and over belt 35 where the label rows 64 are cut in succession by guillotine knife 69 into individual labels 11.

It is understood that vacuum from distributing member 44 serves, through the medium of perforations 42 in belt 35, to temporarily tack labels 11 to the portion of belt 35 moving underneath guillotine 44. As the labels on belt 35 reach drive pulley 38, the vacuum supply to ports 52 in pulley 38 retains the labels on periphery of pulley 38 until the labels come opposite the rotating transfer shoe 30 at which point the vacuum supply to ports 52 of pulley 38 is shut off to permit the labels to be transferred from belt 35 and pulley 38 to transfer wheel shoe 30. It is understood that vacuum holddown ports 31 in shoe 30 are opened to the vacuum source as transfer wheel shoe 30 comes opposite drive pulley 38 by the transfer wheel vacuum control valve means (not shown).

The label supply means, that is, strip feed sprockets 58, guillotine 40 and label transport belt 35 are driven in unison with transfer wheel 17 at speeds chosen to provide an uninterrupted supply of cut labels to transfer wheel 17, such that each label is correctly positioned on transfer wheel shoe 30 for transfer of the label itself, or the information therefrom, onto the articles 13 as they are brought forward by transport 14.

While a five row label form 20 is illustrated herein, it is understood that form 20 may comprise one or more rows. Where a different type and/or size label form is employed, form feed sprockets 58 and the cooperating shearing members and knives 61, 63 respectively are adjusted on their respective shafts 55, 56 to correlate their position with the specific label form used. In that event, clamping collar 107 for the member 61 to be repositioned is partially unscrewed to relieve the compressive force on the segmented end 104 of housing 100. This permits housing 100 together with member 61 thereon to be slid along shaft 55 to the desired position at which point clamping collar 107 is retightened to lock housing 100 into position on shaft 55. It is understood that locking keys 101 accommodate the aforescribed movement along shaft 55.

Similarly, where knives 63 are adjusted, clamping collar 120 is partially unscrewed to relieve the compressive force on locking cylinder 116 freeing knife 63 for slidable movement along shaft 56 to desired position. Clamping collar 120 may be then retightened to compress the segmented end 117 of cylinder 116 into locking engagement with shaft 56.

In addition, corresponding adjustments in the relative operating speeds of the various components of labeling head 16 may be contemplated with different types and sizes of label forms to assure a continuous and properly spaced supply of labels to transfer wheel 17.

While the invention has been described with reference to the structure disclosed, it is not confined to the details set forth, but is intended to cover such modifications, or changes as may come within the scope of the following claims.

What is claimed is:

1. In an article addressing machine adapted for use with a label supply sheet having margin portions with labels therebetween arranged in one or more longitudinally extending rows; the combination of:

transfer means for transferring labels to the articles;

article transport means for bringing the articles into transfer relationship with said transfer means for addressing thereof;

adjustable knife means for slitting said label sheet longitudinally along the edge of each label row to separate said sheet into individual label rows and partially remove said sheet margins before cutting of the individual label rows;

means for cutting said individual label rows between successive labels subsequent to said slitting;

label transport means at the outlet of said cutting means for transporting labels to said transfer means; and means cooperable with said label sheet margins to advance said sheet to said cutting means.

2. The addressing machine according to claim 1 in which said knife means comprises individual roller knife and shear pairs for each of said label sheet margins and between each pair of label rows, said label sheet passing between said knife and shear pairs enroute to said cutting means; and

means supporting said roller knife and shear pairs for adjusting movement in a direction substantially transverse to the direction of label sheet advance whereby to permit said knife and shear pairs to be operatively aligned with the edge of said label row.

3. The addressing machine according to claim 2 in which

said supporting means includes a first driven shaft adapted to slidably support said knives for adjusting movement in said transverse direction;

a second driven shaft adapted to slidably support said shears for adjusting movement in said transverse direction; and

means to selectively lock said knives and shears in adjusted position on said first and second shafts respectively.

4. The addressing machine according to claim 3 including bias means adapted to urge said knives into operative engagement with the shear associated therewith.

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U.S. Cl. X.R.

156—259, 264, 267, 528, 557, 566