Aug. 7, 1973 A. G. ENSKAT 3,751,324

HIGH SPEED LABELING SYSTEM

Filed Dec. 16, 1970 3 Sheets-Sheet 1

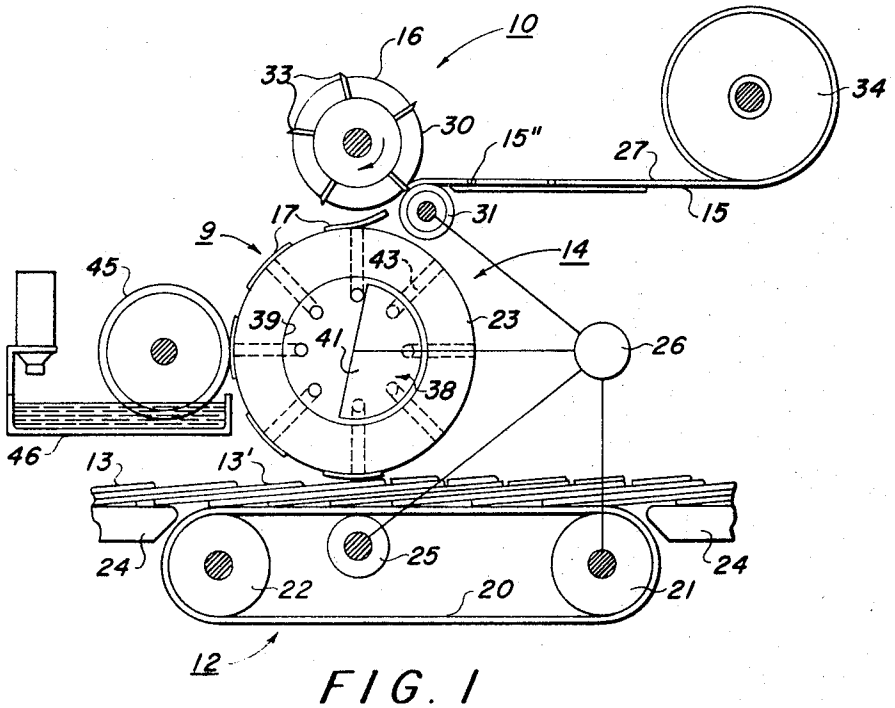


FIG. 1

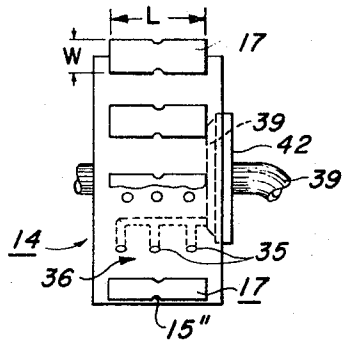


FIG. 2

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HIGH SPEED LABELING SYSTEM

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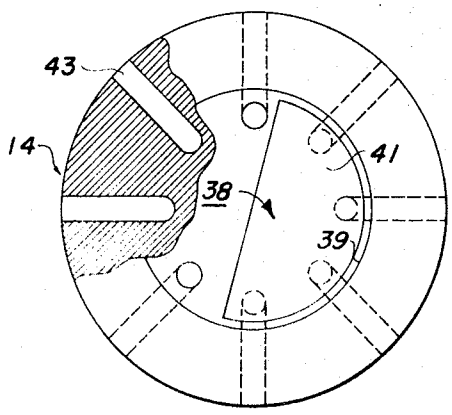


FIG. 3

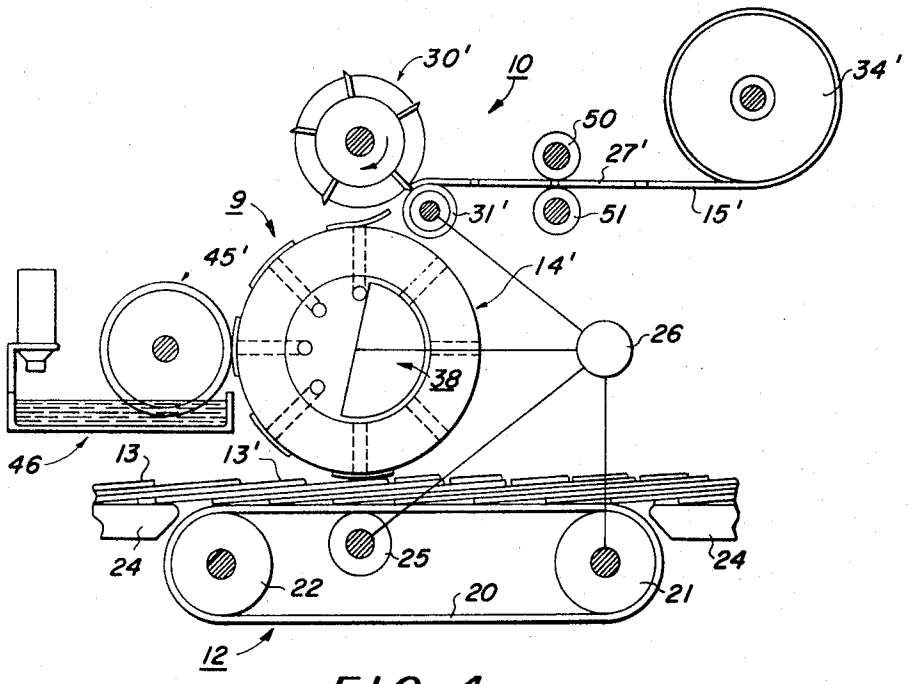


FIG. 4

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HIGH SPEED LABELING SYSTEM

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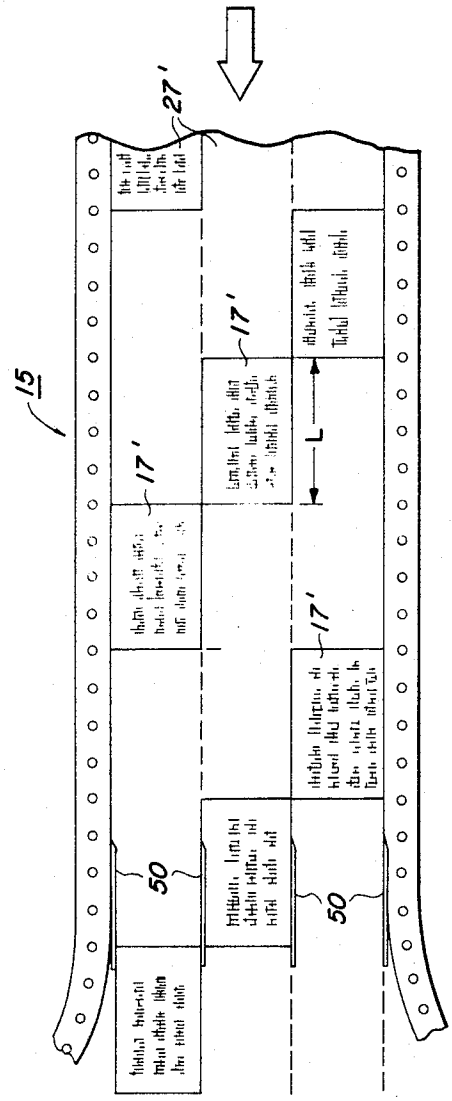


FIG. 5

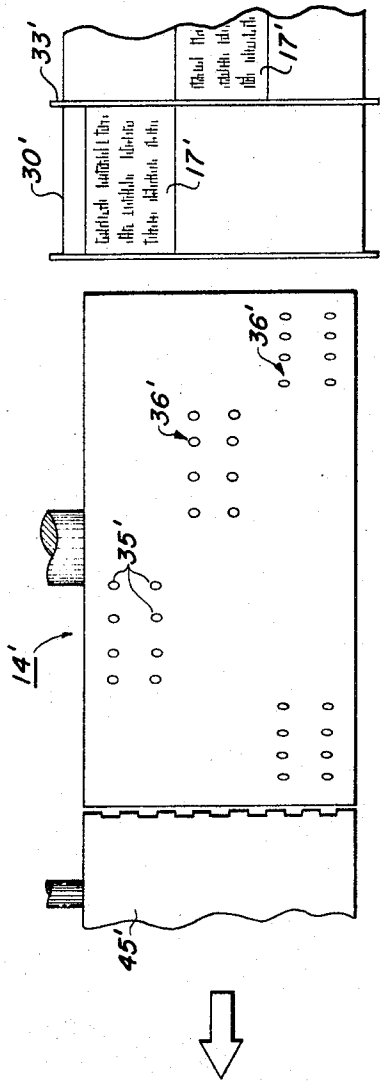


FIG. 6

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3,751,324

HIGH SPEED LABELING SYSTEM

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Int. Cl. B32b 31/00
U.S. Cl. 156—521 1 Claim

ABSTRACT OF THE DISCLOSURE

A high speed addressing machine for transferring labels or information therefrom to articles such as envelopes. The addressing machine includes a transport for supplying articles to be labeled in shingled or overlapping relationship to the machine, a label transfer wheel provided with individual groups of closely spaced vacuum holddown ports to enable a succession of closely spaced labels to be supported by the transfer wheel and carried by the transfer wheel to the articles, and a high speed cutter for separating labels from an uncut label supply into individual labels for use by the transfer wheel. As an alternate arrangement, the transfer wheel may be provided with vacuum port groups staggered along the transfer wheel periphery to accommodate a multi-row label supply.

This invention relates to an article addressing machine, and more particularly to a high speed article addressing machine with multiple label transfer wheel.

Present day article addressing or labeling machines comprise fairly complex mechanisms, the several operating components of which serve to transfer the labels or the address information thereon to the various articles such as envelopes, post cards, and the like. Due to both the complexity and interdependence of the several operating components of addressing machines on one another the maximum operating speed of these machines is normally limited to the slowest component, which in many instances comprises the label handling area; that is, the labeling head. As will be understood by those skilled in the art, the labeling head serves both to supply the individual labels and to effect transfer thereof to the articles, either of which may limit head operating speeds.

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

It is an object of the present invention to provide an addressing machine incorporating an improved labeling head transfer wheel designed to simultaneously process a plurality of labels.

It is an object of the present invention to provide an improved high speed labeling head for addressing machines with high speed label cutter and multi-label transfer wheel adapted to effectuate high label processing speeds.

This invention relates to an article addressing machine for use with uncut labels supplied as a web; comprising in combination, means for separating the web into individual labels for transfer to the articles being addressed; transfer wheel means for bringing the labels into physical contact with the articles, the wheel means having multiple vacuum port groupings comprising at least one vacuum holddown port to permit individual labels to be temporarily attached to the wheel means periphery pending transfer to the articles; and article transport means for supplying the articles to be labeled in succession to the transfer wheel means, the transfer wheel means including vacuum controlling means to selectively provide vacuum to the individual vacuum port groupings in timed relationship with movement of the transfer wheel means so as to permit each vacuum port grouping to individually attach the labels to the transfer wheel means periphery following separation from the web for subsequent transfer to the articles.

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

FIG. 1 is a schematic view of the high speed addressing machine of the present invention;

FIG. 2 is an enlarged top plan view of the addressing machine label transfer wheel;

FIG. 3 is an enlarged side view in section showing details of the vacuum control mechanism for the transfer wheel of FIG. 2;

FIG. 4 is a schematic outline showing an alternate high speed addressing machine;

FIG. 5 is an enlarged view showing a multiple row label supply web for use with the addressing machine shown in FIG. 4; and

FIG. 6 is an enlarged top plan view showing details of the label transfer wheel for the machine shown in FIG. 4, the modified label knife being displaced longitudinally from the position shown in FIG. 4 to facilitate description.

Referring to the drawings, there is shown the high speed labeling or addressing machine, designated generally by the numeral **10**, of the present invention. As will appear more fully herein, addressing machine **10** includes a transport **12** adapted to bring a succession of articles **13** to be labeled, such as envelopes, into operative relationship with transfer wheel **14** of labeling head **9**. Labeling head **9** incorporates a high speed knife mechanism **16** for separating the label strip or web **15** into individual labels **17** for transfer to articles **13** by transfer wheel **14**.

Article transport **12** of addressing machine **10** comprises one or more endless conveyor belts **20** operatively supported about drive and idler rollers **21**, **22** respectively. Rollers **21**, **22** are journaled for rotation on a suitable frame or base member which preferably includes a table-like upper surface **24** having an elongated aperture (not shown) therein within which transport **12** is disposed. The upper run of transport conveyor belt **20** is substantially level with surface **24** so that surface **24** normally assists belt **20** in supporting the moving articles **13** as they are carried by conveyor belt **20** past labeling head transfer wheel **14**.

To facilitate transfer of labels **17** or the information therefrom to articles **13**, an intermediate support or pressure roller **25** may be disposed opposite transfer wheel **14**, roller **25** acting to support conveyor belt **20** at the point of transfer. Drive roller **21** of article transport **12** and pressure roller **25** are driven by motor **26** in timed relation with transfer wheel **14** through suitable driving means (not shown).

To accommodate the high speed labeling envisioned, articles **13** are overlapped or shingled one upon the other on conveyor belt **20**, the exposed area **13'** serving to receive labels **17**.

In the arrangement shown in FIGS. 1–3, the label supply comprises a single row **27** of uncut labels **17** supplied from roll **34** in the form of a strip or web **15**. As will appear, the label supply for the FIGS. 4–6 arrangement consists of plural rows **27'** of uncut labels **17'** supplied in the form of a strip or web **15'**. In both the FIGS. 1–3 and in FIGS. 4–6 arrangements, however, the labels **17**, **17'** may be physically attached to articles **13** by adhesive or the label information, normally name, and Post Office address only, may be transferred from the label to articles **13**. In this latter type of label transfer, the label information is printed on a special paper containing a release agent to permit imprinting of the label information on articles **13** by transfer wheel **14**, the used labels thereafter being discarded or saved for latter reuse as adhesive type labels.

Referring to FIGS. 1–3, a roller-type knife and anvil pair **30**, **31** are provided upstream of transfer wheel **14** for separating label supply web **15** into individual labels **17**

for transfer by wheel 14. In the arrangement shown, knife and anvil pair 30, 31 are disposed proximate transfer wheel 14 such that the cut labels 17 are discharged directly by knife and anvil pair 30, 31 onto the periphery 23 of transfer wheel 14. It is understood however that knife and anvil pair 30, 31 may be positioned upstream from transfer wheel 14, and in that circumstance suitable means to transport the cut labels from knife and anvil pair 30, 31 to transfer wheel 14 would be provided.

To accommodate high speed operation, the roller-type knife 30 is provided with plural knife edges 33 projecting from the roller periphery, knife edges 33 being equally spaced from one another by a distance corresponding to the width W of labels 17. Anvil 31 is formed from a relatively hard material such as rubber and is disposed opposite knife 30 to provide a support surface for knife edges 33. Knife and anvil pair 30, 31 are operated in timed relationship with transfer wheel 14 by motor 26 by suitable drive means (not shown). As will be understood, the web of uncut labels 15 feeds between the knife and anvil pair 30, 31 and is cut thereby into individual labels 17.

As will be understood by those skilled in the art, suitable means may be provided to advance web 15 from roll supply 20 to knife and roller pair 30, 31. For example, web 15 may be provided with a succession of perforations 15'' for engagement by a suitable feeder sprocket (not shown), the feeder sprocket being driven in timed relationship by transfer wheel 14 and knife and anvil pair 30, 31 to advance web 15.

Transfer wheel 14 is supported for rotation by suitable shaft means between knife and roller pair 30, 31 and article transport 12 opposite pressure roller 25, transfer wheel 14 being sized and positioned to transport cut labels 17 discharged by knife and roller pair 30, 31 into transfer contact with articles 13 on transport 12. Transfer wheel 14 is rotated in timed relationship with knife and anvil pair 30, 31 and with article transport 12 through suitable drive means (not shown) by motor 26.

Referring particularly to FIG. 2 of the drawings, transfer wheel 14 is provided with vacuum holddown ports 35 arranged in discrete groups 36. The several vacuum port groups 36 are equally spaced about the periphery 23 of transfer wheel 14 by a distance suitable to enable each port group 36 to handle an individual label 17. Vacuum control valve 38 regulates admission of vacuum from supply hose 39 to the various port groups 36 in response to movement of transfer wheel 14.

In the arrangement shown, control valve 38 comprises a stationary valve plate 41 disposed within circular recess 39 against the face of transfer wheel 14. Passages 43 are provided between the interior wall of recess 39 and the vacuum ports 35 of each individual group 36. A stationary cover 42 seals recess 39 to provided a closed vacuum distributing chamber for supplying vacuum to the various vacuum holddown port groups 36. Vacuum supply hose 39 communicates via cover 42 with the sealed recess 39.

Vacuum control valve plate 41, which in the arrangement illustrated is substantially semi-circular in shape, is arranged to open the port supply passages 43 to the vacuum source as the port group 36 associated therewith comes opposite the discharge point of knife and anvil pair 30, 31. This enables the label to be attached to transfer wheel 14 as it is cut from web 15 through the action of the vacuum supplied to ports 35. As the labels on transfer wheel 14 reach the transfer point opposite pressure roll 25, the vacuum supply to the port group 36 therefore is interrupted by valve plate 41 to permit transfer of the labels to the articles 13.

In the exemplary arrangement shown, labels 17 are physically attached to the articles 13 through the use of a suitable adhesive and accordingly the vacuum supply to the individual holddown port groups 36 need only be sustained until labels 17 are brought into physical contact with the articles 13. Where, however, the address information only is transferred to the articles 13, the configuration of valve plate 41 is changed to sustain vacuum to the individual port groups 36 past the point where the labels contact articles 13. This enables transfer wheel 14 to remove the used labels from the immediate transfer area.

For the exemplary arrangement shown, a suitable glue dispenser, wheel 45, is provided in peripheral contact with labels 17 on transfer wheel 14 upstream of the transfer point between articles 13 and wheel 14. A portion of wheel 45 is immersed in glue container 46 which carries a supply of suitable liquid glue therein.

In operation, articles 13 are arranged in shingled relationship on transport 12 and are carried thereby underneath transfer wheel 14 where the adhesive bearing labels 17 carried by wheel 14 are pressure transferred thereto. It is understood that pressure roller 25 provides the requisite support for articles 13 during the transfer process. Additionally, the various operating components comprising transport 12, transfer wheel 14, pressure roller 25 and knife and anvil pair 30, 31 are operated in timed relation and at sutable relative speeds to match each label 17 with a corresponding article 13.

The label supply web 15 feeds between knife and anvil pair 30, 31 and is there cut into individual labels 17 by the interaction of cutting edges 33 with anvil 31. As the labels 17 leave knife and roller pair 30, 31, they are picked up by transfer wheel 14 by means of vacuum in ports 35 and carried thereby into transfer contact with articles 13. It is understood that vacuum control valve 38 admits vacuum to the individual port groups 36 during the interval between the time the labels 17 leave knife and roller pair 30, 31 and the time labels 17 contact articles 13.

As the labels are carried around on transfer wheel 14 toward articles 13, glue wheel 45 applies a thin coating of adhesive to the underside thereof. When the labels contact articles 13 by passing under wheel 14 on transport 12, the pressure contact of wheel 14 therewith transfers the labels thereto.

Referring to the FIGS. 4–6 embodiment, wherein like numerals designate like parts, label supply web 15' consists of parallel label rows 27' with adjoining labels 17' in each row spaced apart by a distance substantially equal to label width L multiplied by the number of label rows less one. In the examplary arrangement shown, supply web 15' has labels 17' arranged in three rows, each label in each row being separated from the next succeeding label in that row by a distance equal to twice the label length L. In this embodiment, the size of the various operating components, more particularly the width dimension of transfer wheel 14', knife and anvil pair 30', 31' and glue roller 45' are increased to accommodate the increased width of web 15'.

Referring to FIG. 6, vacuum holddown ports 35' open to the periphery of transfer wheel 14', the various ports 35' being arranged in individual groups 36' which in turn are disposed in three parallel rows across the periphery of wheel 14'. To correspond the holddown port groups 36' with the arrangement of labels 17' on supply web 15', each vacuum port group is spaced from the next adjoining port group in the same row by a distance along the periphery of transfer wheel 14' substantially equal to the distance between adjoining labels 17' in the same row 27' on supply web 15'. As described heretofore in connection with the FIGS. 1–3 embodiment, the vacuum supply to vacuum holddown ports 35' is controlled by valve 38 in response to rotation of transfer wheel 14'.

Disc-type knife and shear rollers 50, 51 are provided upstream of knife and anvil pair 30', 31', rollers 50, 51 cooperating to preslit web 15' between the individual label rows 27'. The slitted web 15' then passes between knife and anvil pair 30', 31' which serve to cut web 15' transveresely into individual label size pieces. Inasmuch as only one vacuum port group 36' is disposed opposite the discharge side of knife and anvil pair 30', 31' at a time, only the label 17' is picked off by transfer wheel 14' for

transfer to an article **13**. The remaining blank label size pieces cut from web **15'** are discarded.

There thus is provided on transfer wheel **14'** a series of labels **17'** in staggered relationship to one another and which are brought by transfer wheel **14'** into physical contact with articles **13** on transport **12** to transfer the label **17'** itself or address information therefrom onto articles **13**.

It will be understood that the number of label rows **27'** that comprise supply web **15'** may be varied. In addition, web **15'** may be provided with perforated margin portions to permit feeding thereof to knife and roller pair **30', 31'**. In this latter event, means would be provided to remove the margin portions, preferably upstream of knife and roller pair **30', 31'**.

While web **15'** has been described as comprising a single web of uncut labels **17'** arranged in plural rows, separate rows of uncut labels may be contemplated. In that event, suitable means to index each individual row forward to separate knife and anvil roller pairs in timed relation to movement of transfer wheel **14'** would be provided.

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 claim.

What is claimed is:

1. In an article addressing machine for use with uncut labels supplied as a web, the combination of:

means for separating said web into individual labels for transfer to the articles being labeled;

transfer wheel means for bringing said labels into physical contact with said articles, said wheel means having discrete groups of vacuum holddown ports in the periphery thereof to enable individual labels to be attached to said transfer wheel means periphery pending transfer to said article;

said groups of vacuum holddown ports being arranged in at least two distinct rows across the periphery of said transfer wheel means, said discrete groups of holddown ports being separated from the next adjoining group of holddown ports in the same row;

article transport means for supplying said articles to be labeled in succession to said transfer wheel means, said transfer wheel means including vacuum controlling means to selectively provide vacuum to individual ones of said group of vacuum port in timed relationship with movement of said transfer wheel means so as to permit each vacuum port group to individually attach said labels to said transfer means periphery following separation thereof from said web for subsequent transfer to said articles.

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U.S. Cl. X.R.

156—560, 567, 578