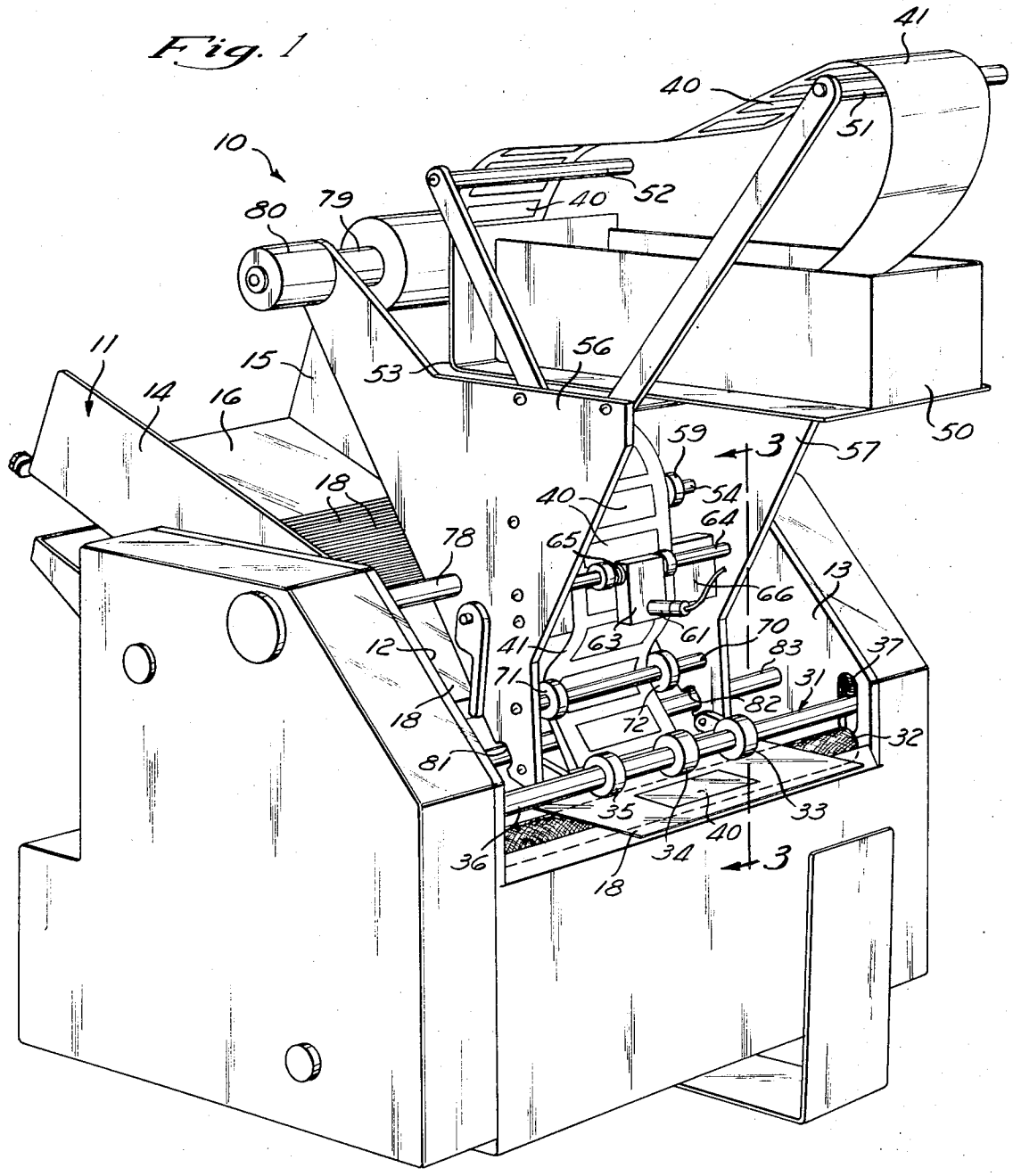
March 20, 1973 T. R. PITUCH ET AL 3,721,601

ADDRESS LABELER MEANS

Filed Nov. 12, 1970 4 Sheets-Sheet 1

Fig. 1



INVENTORS
THOMAS R. PITUCH,
STANLEY E. TRUESDELL,
& BRIAN W. WINSTON
BY
McNENNY, FARRINGTON, PEARNE & GORDON

ATTORNEYS

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ADDRESS LABELER MEANS

Filed Nov. 12, 1970 4 Sheets-Sheet 2

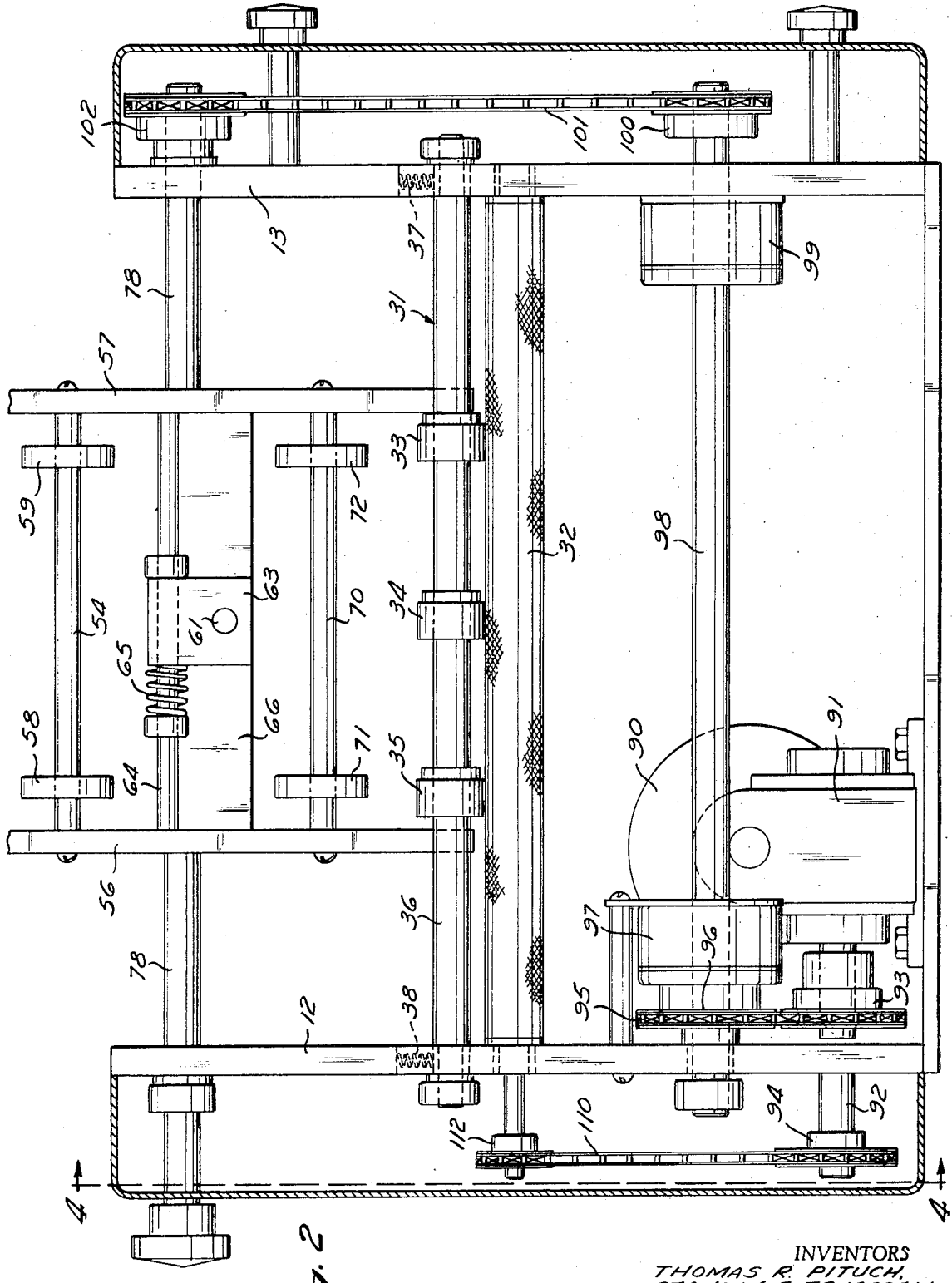

Fig. 2

INVENTORS
THOMAS R. PITUCH,
STANLEY E. TRUESDELL,
& BRIAN W. WINSTON
BY
McNENNY, FARRINGTON, PEARNE & GORDON

ATTORNEYS

March 20, 1973 T. R. PITUCH ET AL 3,721,601

ADDRESS LABELER MEANS

Filed Nov. 12, 1970 4 Sheets-Sheet 3

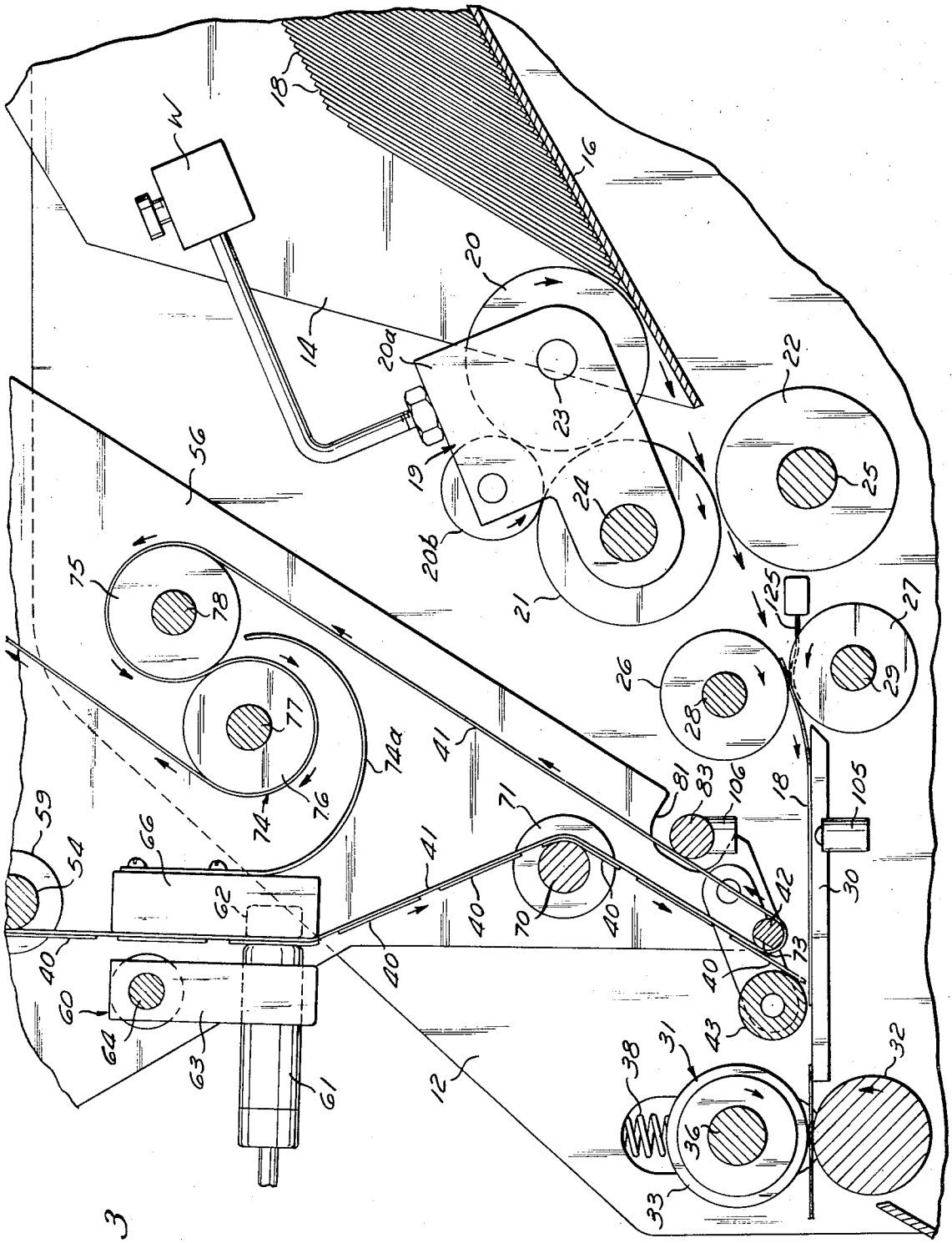

Fig. 3

INVENTORS
THOMAS R. PITUCH,
STANLEY E. TRUESDELL,
& BRIAN W. WINSTON
BY
McNENNY, FARRINGTON, PEARNE & GORDON

ATTORNEYS

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ADDRESS LABELER MEANS

Filod Nov. 12, 1970 4 Sheets-Sheet 4

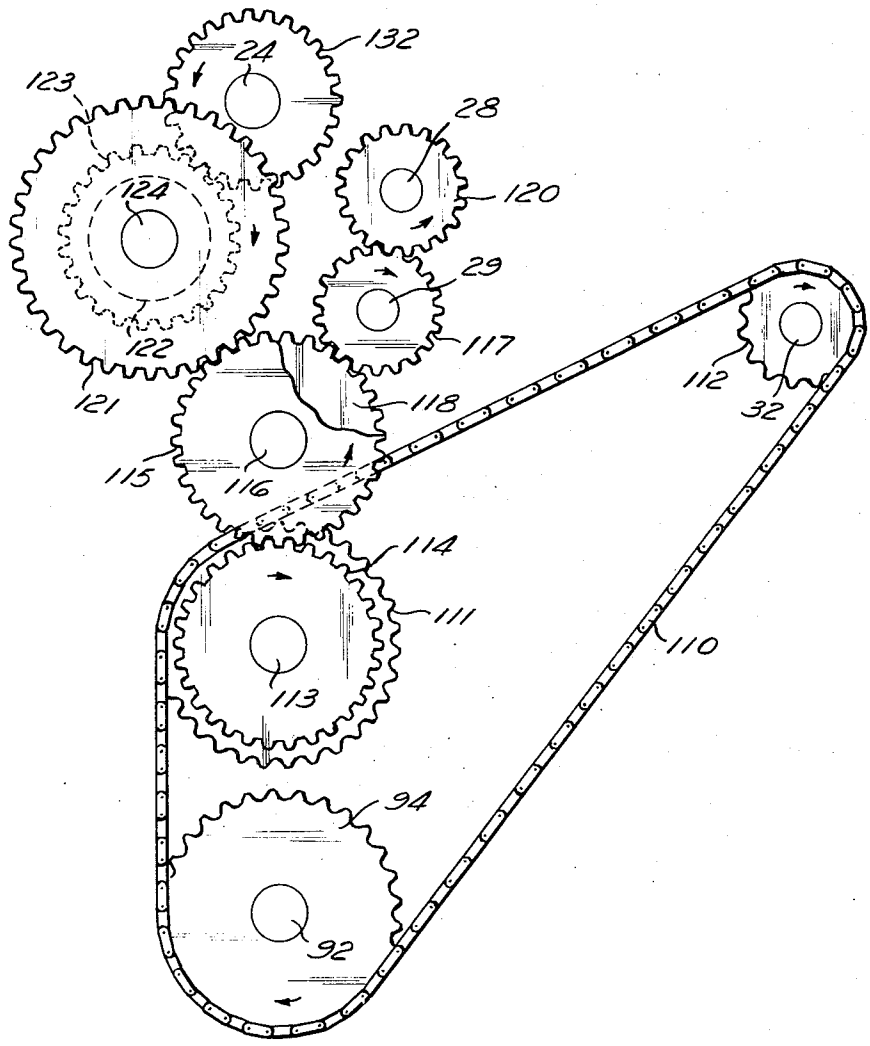

Fig. 4

INVENTORS
THOMAS R. PITUCH,
STANLEY E. TRUESDELL,
& BRIAN W. WINSTON
BY
McNENNY, FARRINGTON, PEARNE, & GORDON

ATTORNEYS

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ADDRESS LABELER MEANS

Thomas R. Pituch, Blackwood, N.J., and Stanley E. Truesdell and Brian W. Winston, Mentor, Ohio, assignors to Avery Products Corporation, San Marino, Calif.

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Int. Cl. B44c 1/24
U.S. Cl. 156—542 5 Claims

ABSTRACT OF THE DISCLOSURE

A machine and method for applying pressure-sensitive adhesive labels to flat articles. The method and machine according to this invention are particularly suitable for applying address labels to envelopes. The apparatus includes feed rolls which are intermittently operated to deliver envelopes into a first set of pinch rolls. The first set of pinch rolls is continuously driven and grips the envelope while driving the envelope to a second set of pinch rolls. The second set of pinch rolls is driven at a speed corresponding to the speed of the first set of pinch rolls. A labeling head is positioned between the first and second pinch rollers and applies a label to the article as the article is driven between the pinch rolls. The article is gripped by at least one of the pinch rolls while the label is applied.

BACKGROUND OF THE INVENTION

Machines have been designed to automatically apply address labels to flat surfaces such as postcards, envelopes, brochures, catalogues, etc. These machines automatically apply pressure-sensitive labels and eliminate time-consuming, piece-by-piece label application. Such machines generally include feed rolls which are intermittently operated to pick successive blank envelopes from a stack and deliver such envelopes to a conveyor. The conveyor consists of a plurality of parallel, constantly driven belts which carry the envelope to a labeling head. Each envelope is stopped by a gate beneath the labeling head and the head applies a label to the envelope. The gate is then removed and the conveyor carries the labelled envelope from the machine. Gravity type hold-down rolls are provided along the extent of the belts at spaced intervals to prevent any substantial misalignment of the envelope on the belt. Of course, the gate tends to properly align the envelope beneath the labeling head.

Although such machines are suitable for their intended purposes and are capable of applying up to 10,000 labels per hour on envelopes, the machines are complex, heavy, and large, due in part to the intermittently operating gate mechanism, and to the relatively long conveyor belt reach between the feed rolls and the labeling head.

SUMMARY OF THE INVENTIONN

This invention provides an address labeler which eliminates the need for relatively long conveyors between the feed rolls and the labeling head and which securely grasps and drives each envelope on a continuous basis through the labeling station while a label is being applied. The machine according to this invention eliminates the need for a stopping gate to properly align the envelope to thus reduce the size and complexity of the machine.

According to this invention, an addressing labeler includes means for maintaining a stacked array of envelopes and means for feeding individual envelopes from the stacked array to a label-applying position beneath a labeling head. First and second pinch roll means are located at opposite ends of the label-applying position and these pinch rolls are spaced apart a distance less than the longitudinal extent (measured in the feed direction) of the envelope. A label is applied to each envelope while the envelope is driven and gripped by at least one of the pinch roll means.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a label-applying machine according to this invention;

FIG. 2 is a fragmentary, front elevational view of the machine;

FIG. 3 is a fragmentary, cross sectional view, the plane of the section being indicated by the line 3—3 in FIG. 1; and

FIG. 4 is a cross sectional view, the plane of the section being indicated by the line 4—4 in FIG. 2.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to the drawings, a labeling machine **10** is illustrated. The machine **10** includes an envelope hopper **11** mounted between side plates **12** and **13**. The hopper **11** is located at the rear or infeed end of the machine and includes side guide plates **14** and **15** and a base plate **16**. The base plate **16** carries a stacked, fanned array of envelopes **18** and slopes downwardly toward a feed roll assembly **19**. The side plates **14** and **15** are laterally adjustable by means (not shown) so that envelopes having varying widths may be fed through the machine.

As may be seen most clearly in FIG. 3, the feed roll assembly **19** includes first and second upper feed rolls **20** and **21**, and a lower stationary roll **22**. he feed roll is mounted on and is intermittently driven by a shaft. The feed roll **20** is a rubber knurled roll rotatably mounted in a carriage **20***a* which is pivoted to the shaft **24** and which is provided with a weight W. The feed roll **20** is intermittently driven by a roll **20***b* which frictionally engages the roll **20** and the roll **21**. The stationary roll **22** is mounted on a shaft **25** which is mounted on a U-shaped bracket (not shown), which in turn is mounted on a cross bar (not shown) extending between the plates **12** and **13**. The roll **22** is adjustable toward and away from the surface of the roll **21** by means (not shown) to accommodate the thickness of a single envelope **18**.

Each envelope **18** is successively fed by the feed roll assembly to a first pair of pinch rolls **26** and **27**. The pinch rolls **26** and **27** are mounted on and are continuously driven by drive shafts **28** and **29**, respectively. Each envelope is driven by the rolls **26** and **27** across a labeling table **30** and then to a second pair of pinch rolls **31** and **32**. The pinch roll **31** comprises a plurality of rollers **33**, **34**, and **35** which are mounted on a shaft **36**. The shaft **36** is mounted in bearings (not shown) and is biased against the roll **32** by springs **37** and **38**. The pinch rolls **26** and **27** also comprise an array of individual rollers corresponding to the rollers **33–35**. The pinch roll **32** has a knurled surface and is continuously driven to continuously drive the pinch roll **31**.

The pinch rolls **31** and **32** are spaced from the pinch rolls **26** and **27** a distance which is less than the longitudinal extent (measured in the feed direction) of the envelopes **18**. The pinch rolls **26** and **27** are also spaced from the feed rolls **21** and **22** a distance which is less than the longitudinal extent of the envelopes **18**. Thus an envelope passing from the feed roll assembly **19** to the pinch rolls **26** and **27** and then to the pinch rolls **31** and **32** is gripped by at least one pair of rolls **31–32**, **26–27**, or **21–22** during its travel through the machine.

As an envelope passes along the labeling table **30**, one of a series of labels **40** is applied to the envelope. Each label **40** is a pressure-sensitive adhesive label carried by a backing web **41**. The backing web **41** is intermittently driven about a peel bar **42** so that each label **40** is peeled from the backing web **41** and is directed toward the envelope **18** as is indicated in FIG. 3. As the label **40** is

peeled from the web **41**, its leading edge contacts the envelope and is applied thereto by an optional weighted roller **43**. The roller **43** may be omitted since, during a labeling operation, the web **41** is fed at the same surface speed as the envelope, or slightly less than the surface speed of the envelope, so that the label **40** is positively fed onto the envelope **18** and adheres thereto by its pressure-sensitive engagement. The rolls **32** and **33** insure proper adhesion between the label and envelope when the envelope passes between these rolls.

The pinch rolls **32–33** and **26–27** are continuously driven and the feed rollers **20** and **21** are intermittently driven by a mechanism which will be hereinafter explained so that their surface speeds are identical.

The web **41** is continuous and is folded in accordion fashion in a supply bin **50**. The web **41** is trained from the bin **50** across first and second guide bars **51** and **52**, respectively. The web **41** is then trained over a back corner of a box holder **53** which supports the bin **50** and then over a guide bar **54** which is mounted between intermediate side plates **56** and **57**. In order to maintain the web **41** in a centered position as it travels over the guide bar **54**, there is provided a pair of spaced guide members **58** and **59** on the bar **54**.

After passing over the bar **54**, the web **41** is trained through a sensing device **60** which includes a light source **61** and a photosensitive device such as a photo transistor **62**. The light source **61** extends through a block **63** which is mounted on a crossbar **64** by a torsion spring **65** so that the block **63** is biased against the label carrying side of the web **41** to exert a predetermined drag on the web **41**. The photo transistor **62** is mounted in a crossbar **66** which extends between the intermediate side plates **56** and **57**. The purpose and function of the sensing device **60** will hereinafter become apparent.

The web **41** is then trained behind a guide bar **70** which is fixed at its ends to the intermediate side plates **56** and **57** and which includes side guide members **71** and **72**. The web **41** is then wrapped around the peel bar **42**, which, as may be seen most clearly in FIG. 3, has a flattened portion **73** which aids in peeling the labels from the web so that when the web is flexed over the flattened portion **73**, the labels **40** will be peeled from the web.

To intermittently advance the web **41**, there is provided a pull roll assembly **74**. The pull roll assembly **74** includes an intermittently driven roll **75** and an idler roll **76** which is biased against the roll **75** by spring means (not shown). The roll **76** is mounted on a shaft **77** and the roll **75** is mounted on an intermittently driven shaft **78**. The web **41** is trained around the rolls **75** and **76** in the manner indicated in FIG. 3, and the web **41** then extends to a spent web take-up spool **79**. To aid in initially training the web through the assembly **74**, there is provided a threading shoe **74***a*. The threading shoe **74***a* guides the web **41** around the roll **76**. The take-up spool **79** is rotatably mounted on the intermediate side plate **56** and has a projecting end portion **80** which is driven by a belt (not shown) extending between the spool **79** and the shaft **78** to wind the web **41** about the spool **79** as the web **41** is fed through the machine.

To aid in initially training the web **41** through the machine, means are provided to tip the intermediate side plates and their associated elements in a counterclockwise direction as viewed in FIG. 1, so that the peel bar **42** and the roller **43** are raised from the labeling plate **30**. To this end, the side plates **56** and **57** are rotatably, and therefore pivotally, mounted on the shaft **78** by bushings (not shown) in the side plates **56** and **57** and the center of gravity of the side plates **56** and **57** and the elements carried thereby tend to tip in a clockwise direction as viewed in FIG. 1. The side plates **56** and **57**, however, are restrained by a stop bar **83** which extends between the side plates **12** and **13** and which abuts recessed portions **81** and **82** in the side plates **56** and **57**, respectively.

Referring now to FIGS. 2 and 4, a drive arrangement for the machine **10** is illustrated. The drive includes a motor **90** and a speed reducer **91**. The speed reducer **91** has an output shaft **92** with a first sprocket **93** mounted thereon. The output shaft **92** extends through the side plate **12** and carries a second sprocket **94** at its end. The sprocket **93** engages a chain **95** which drives a sprocket **96**. The sprocket **96** is associated with a clutch **97** mounted on a cross shaft **98**, which extends between the side plates **12** and **13**. Adjacent the side plate **13**, there is provided a brake **99** for the shaft **98**. The shaft **98** extends through the side plate **13** and has a sprocket **100** mounted thereon. A chain **101** extends from the sprocket **100** and drives a sprocket **102** which is mounted on an end of the shaft **78** which extends through the side plate **13**.

As was previously indicated, the shaft **78** is intermittently driven, and the clutch **97** and the brake **99** are provided for the purpose. Thus, as an envelope is fed across the labeling table **30**, the leading edge of the envelope breaks a light beam provided by a light source **105**. The light beam **105** is directed toward a photosensitive device such as a photo transistor **106** which is mounted on the stop bar **83**. When the intensity of the leight beam is changed, the photo transistor, through suitable circuitry (not shown), operates switch means (not shown) to release the brake **99** and engage the clutch **97** so that the shaft **78** drives the pull roll assembly **74** in the direction indicated by the arrows in FIG. 3. The switch means which operates the brake **99** and the clutch **97** is provided with an adjustable time delay device (not shown) to permit the envolope to be driven to a predetermined labeling position on the table **30**. This permits a label to be applied to a predetermined portion of the envelope (measured in the feed direction). To apply a label to different lateral portions of the envelope, the entire labeling head may be shifted by sliding the plates **56** and **57**, and therefore their associated elements, along the shaft **78**.

By driving the web **41** in the foregoing manner, a label **40** is dispensed onto a predetermined portion of the envelope passing along the table **30**. As the web **41** moves, the sensing device will alternately sense a dark area (a label) and a light area (a space between adjacent labels), and activate the photo transistor **62**. When the cell **62** senses a change from dark to light to dark, and after a short time delay to thereby permit the leading edge of the next dispensed label to be partially peeled from the web **41**, the cell **62**, through suitable circuitry (not shown), releases the clutch **97** and engages the brake **99** to stop the drive of the pull roll assembly **74**.

As was previously indicated, the feed roll assembly **19** is intermittently driven and the pinch rolls **26**, **27**, **32**, and **33** are continuously driven. This is accomplished in a manner which will now be explained.

Referring particularly to FIG. 4, a chain **110** is engaged by the sprocket **94** and extends to sprockets **111** and **112**. The sprocket **112** is mounted on an end of the roll **32**, which extends through the side plate **12** and, since the chain **110** is continuously driven, the roll **32** is continuously driven. The sprocket **111** is rotatably mounted on a stub shaft **113**, which is fixed in the side plate **12**. There is provided a spur gear **114** on the end of the shaft **113**. The spur gear **114** drives a gear **115** which is rotatably mounted on a stub shaft **116** fixed in the side plate **12**. A gear **118** is rotatably mounted on the shaft **116** and is fixed to the gear **115**. The gear **118** drives a gear **117**, which is mounted on an end of the shaft **29** extending through the side plate **12**. The shaft **28** extends through the side plate **12** and carries a gear **120**, which cooperates with the gear **117** so that the pinch rolls **26** and **27** are driven at the same peripheral speed.

The gear **115** cooperates with a clutched gear **121**. The gear **121** is constantly driven and is associated with an electrically operated clutch **122**. The clutch **122** is positioned between the gear **121** and a gear **123** which is mounted on a stub shaft **124**. The gear **123** is inter-

mitently operated by engagement of the clutch **122** and the clutch **122** is, in turn, operated in response to actuation of a finger switch **125** (FIG. 3). The actuating end of the finger switch **125** is positioned between the pinch rolls **26** and **27** and the switch **125** is electrically actuated when the actuating end of the switch senses the absence of an envelope between those pinch rolls.

When the finger switch **125** senses the absence of an envelope, the clutch **122** is engaged so that the gear **123** is driven with the gear **121**. The gear **123** then drives a gear **132** which is mounted on a projecting end of the shaft **24** to thereby drive the feed roll **21**, and therefore the roll **20**.

The feed rolls **20** and **21** are driven in this manner at the same peripheral speed whenever there is an absence of an envelope depressing the switch, and therefore an absence of an envelope **18** between the pinch rolls **26** and **27**. When there is such an absence, the feed roll **20** slides the topmost envelope along the base plate **16**, between the stationary roll **22** and the driven roll **21**, and then to the pinch rolls **26** and **27**. Immediately after the envelope has been gripped and is being driven by the pinch rolls **26** and **27**, the finger switch **125** is actuated and the clutch **122** is disengaged so that the feed rolls **20** and **21** idle as the envelope is drawn through them.

The invention is not restricted to the slavish imitation of each and every detail set forth above. Obviously, devices may be provided which change, eliminate, or add certain specific details without departing from the scope of the invention.

What is claimed is:

1. Label applying means including means for maintaining a stacked array of flat articles, feed means for feeding individual articles from said stacked array to a label applying position beneath a labeling head, feed drive means for intermittently operating said feed means, first pinch roll means for positively gripping and moving articles from said feed means to said label applying position, second pinch roll means for positively gripping and moving articles from said label applying position, said first and second pinch roll means being spaced apart a distance less than the longitudinal extent (measured in the feed direction) of the articles, said labeling head being positioned between said first and second pinch roll means so that an article passing beneath said head is driven and gripped by at least one of said roll means while a label is applied to the article, sensing means for detecting the presence and absence of an article gripped by said first pinch roll means, means responsive to said sensing means for operating said feed drive means when an article is not detected at said first pinch roll means and for stopping said feed drive means when an article is detected at said first pinch roll means.

2. Label applying means according to claim **1**, including means to continuously drive said first and second pinch roll means.

3. Label applying means, including means for maintaining a stacked array of flat articles, feed roll means for removing successive articles from said stacked array, feed roll drive means for intermittently operating said feed roll means, first and second pinch roll means for positively gripping and moving articles from said feed means, label head means between said first and said second pinch roll means adapted to apply a label to each article moving between said first and second pinch roll means, said first pinch roll means being positioned between said second pinch roll means and said feed roll means and being spaced from said second pinch roll means and said feed roll means a distance less than the longitudinal extent (measured in the feed direction) of the articles, whereby an article fed through said label applying means is driven and gripped at all times by at least one of said roll means, sensing means for detecting the presence and absence of an article gripped by said first pinch roll means, means responsive to said sensing means for operating said feed roll drive means to drive said feed roll means when an article is not detected at said first pinch roll means and for discontinuing the operation of said feed roll drive means to stop the drive of said feed roll means when an article is detected at said first pinch roll means.

4. Label applying means according to claim **3**, including means to continuously drive said pinch roll means.

5. Label applying means including means for maintaining a stacked array of flat articles, feed roll means for removing successive articles from said stacked array, means to intermittently drive said feed roll means, first and second pinch roll means for positively gripping and moving articles from said feed roll means, means to continuously drive said pinch roll means, label head means between said first and second pinch roll means adapted to apply a label to each article moving between said first and second pinch roll means, said label head including a peel bar, drive means for incrementally moving a continuous web over a portion of said peel bar, said web carrying a multiplicity of spaced pressure-sensitive labels thereon, whereby the labels are successively removed from said web as said web passes over said bar, first sensing means for detecting the presence and absence of an article gripped by said first pinch roll means, means responsive to said first sensing means for driving said feed roll means when an article is detected at said first pinch roll means, second sensing means for detecting movement of an article from said first pinch roll means to said second pinch roll means, means responsive to said second sensing means for actuating said drive means to thereby advance said web, and means responsive to the advancement of a single label across said peel bar to stop said drive means and the advancement of said web.

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RALPH S. KENDALL, Primary Examiner

C. WESTON, Assistant Examiner

U.S. Cl. X.R.

156—361, 363, 442, 521, 541