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Anderson et al.

[11] 3,869,330

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[54] APPARATUS FOR APPLYING A LABEL TO A PACKAGE

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[52] U.S. Cl..... **156/380**, 156/477 R, 156/487, 156/499, 156/556, 156/566

[51] **Int. Cl.**.... **B32b 31/20**, B65b 61/26, B65c 9/36

[58] **Field of Search**.... 156/487, 486, 477 R, 477 B, 156/499, 556, 566, 380

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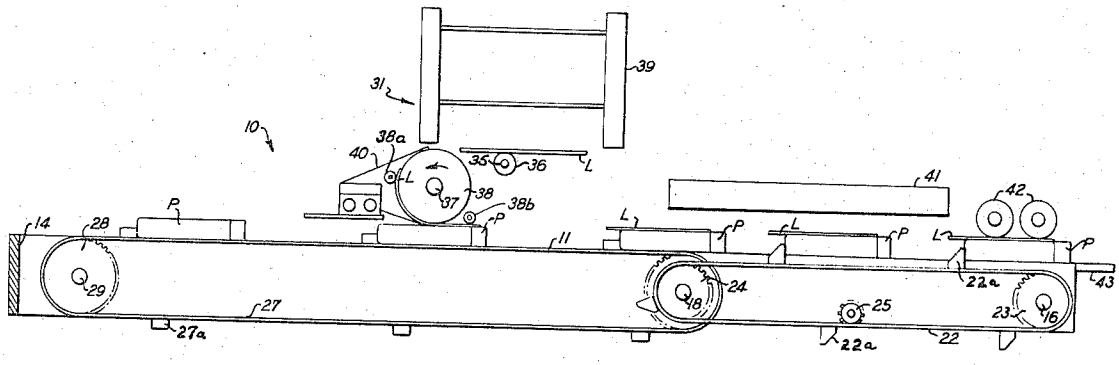
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[57] **ABSTRACT**

An adhesive coated label is adhibited to a package by first adhering only one edge of the label to the package to positionally secure the label and then applying an even pressure to the surface of the label progressively from one side in order to effect a uniform bond between the label and package. When a heat activated type adhesive is used the label is heated by a radiant type heater prior to the application of pressure. The continuous movement of the package through a radiant heater is effective to provide a complete and even activation of the adhesive coating. Assemblies capable of affixing one or more labels to a continuously moving package or affixing one label to a plurality of consecutive sides of a package are also disclosed.

12 Claims, 7 Drawing Figures



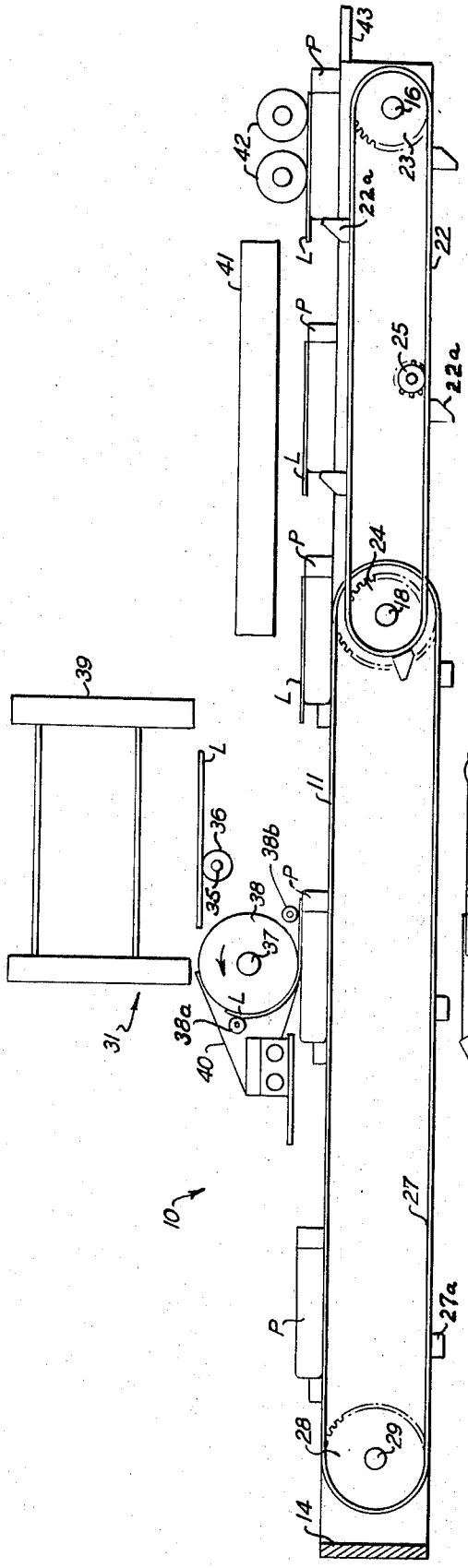


Fig. 1

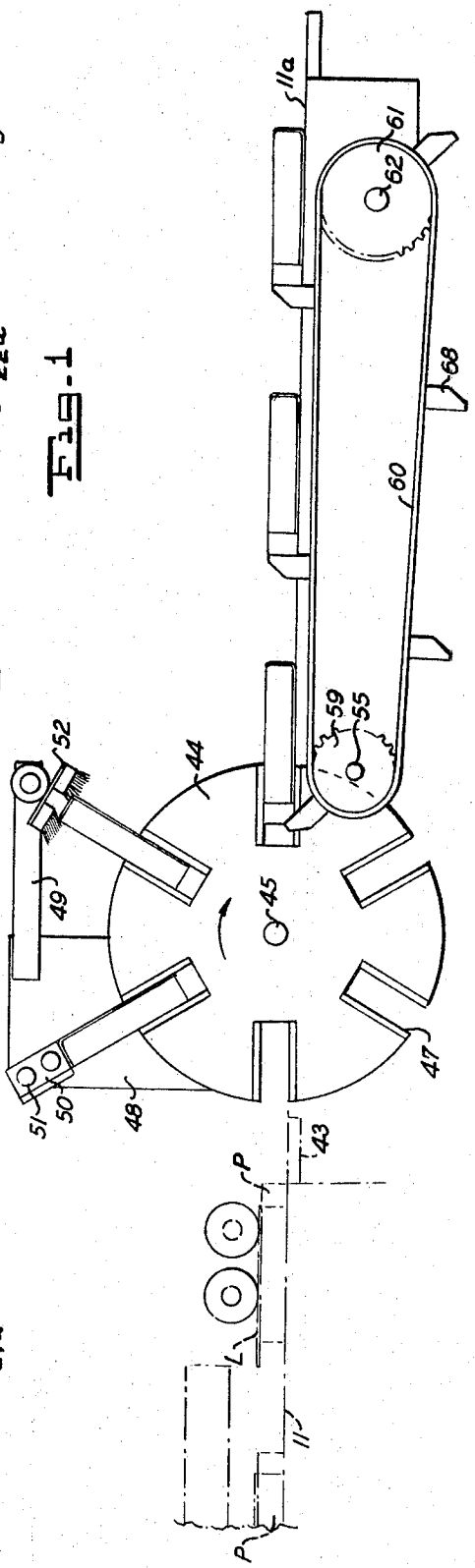


Fig. 2

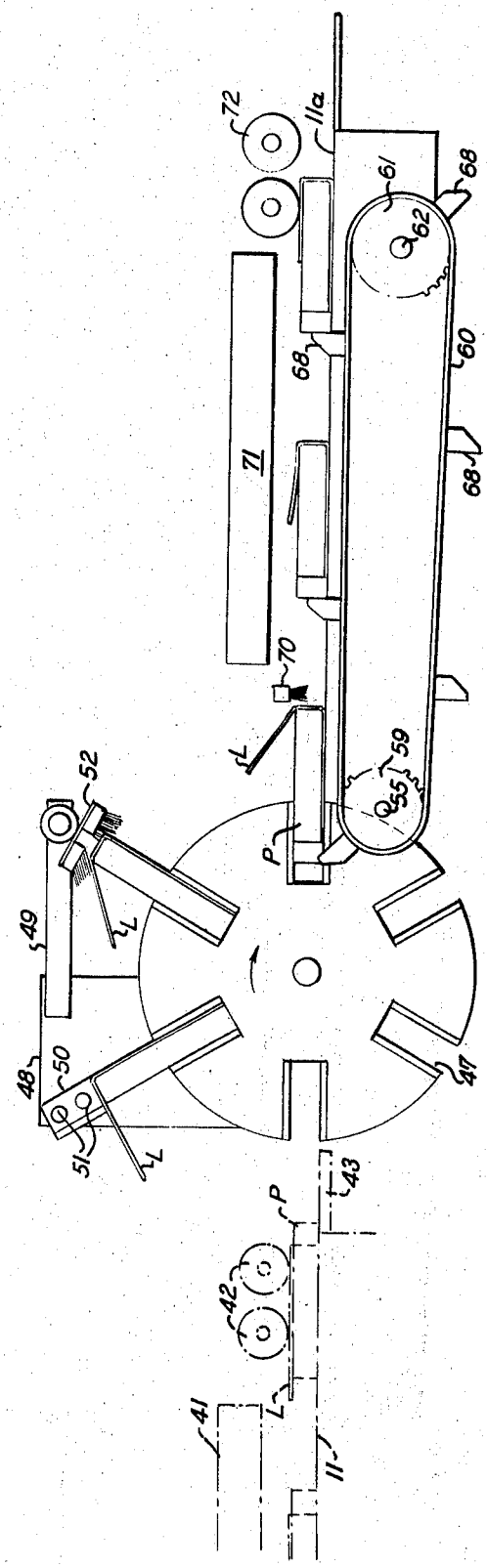

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Fig. 3

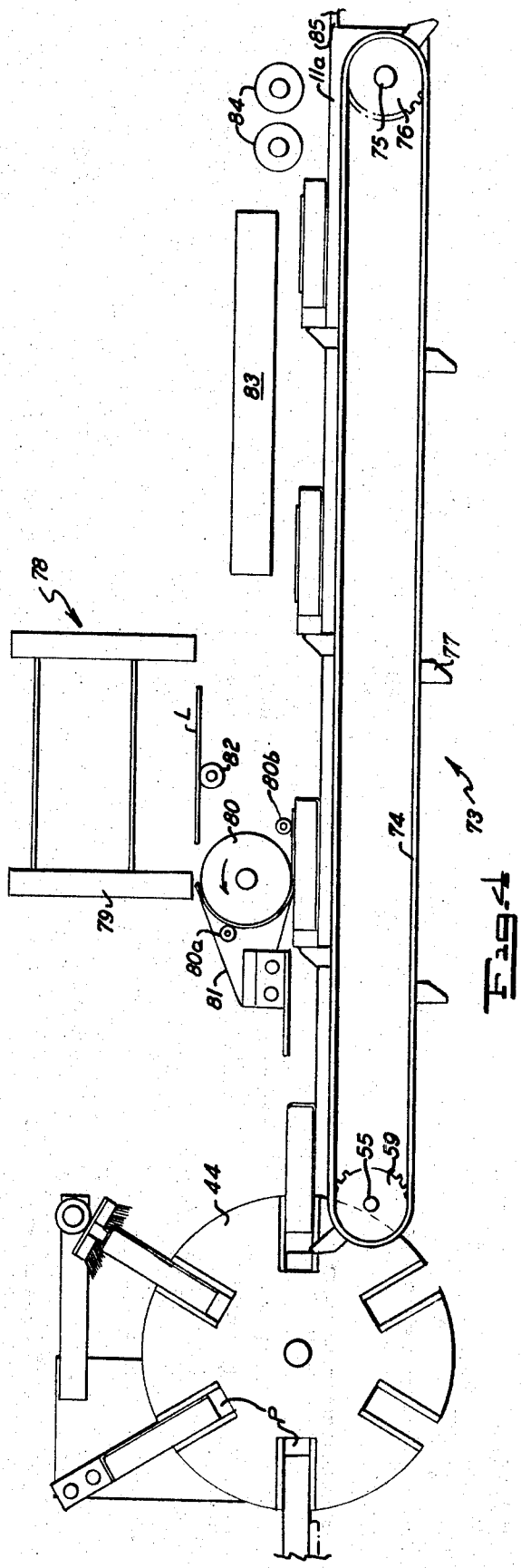

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Fig. 4

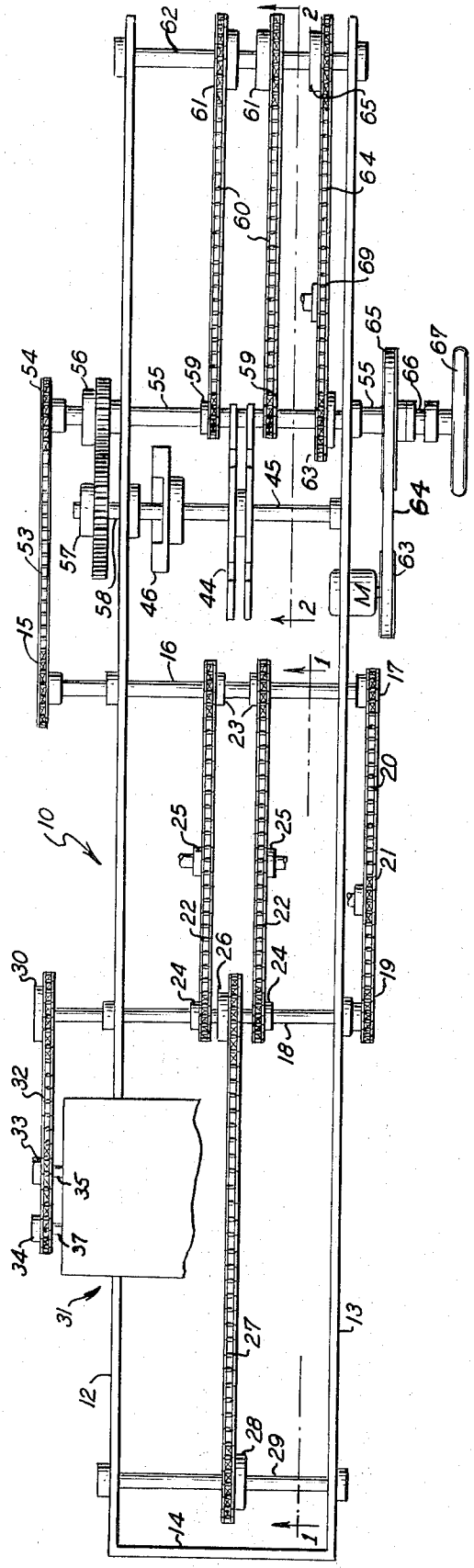


Fig. 5

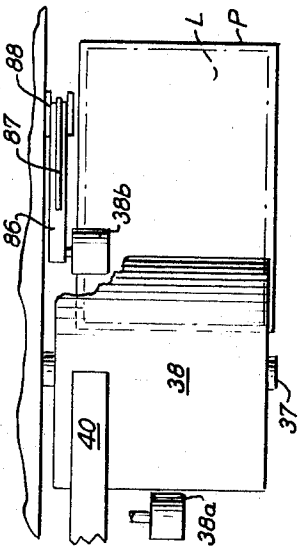


Fig. 7

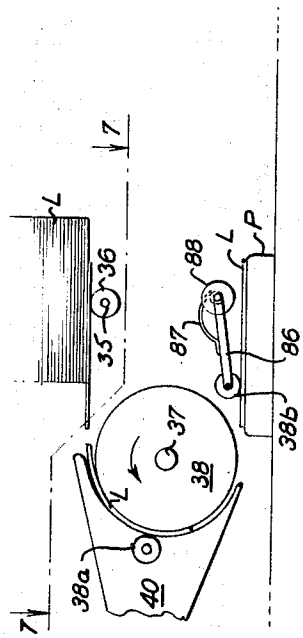


Fig. 6

APPARATUS FOR APPLYING A LABEL TO A PACKAGE

BACKGROUND OF THE INVENTION

This invention relates to a method and apparatus for applying a label to a package. In particular the invention is directed to the improved application of one or more labels to a continuously moving package.

The application of labels to packages or articles and machines for performing this function have been well known in the prior art. However, it is common knowledge that difficulties still exist, especially when air is trapped under the label thereby ultimately causing blisters or imperfections to form in the bond.

Additional problems are experienced when labels coated with a heat activated adhesive are used. In many instances, the heat is applied through the label to reach the adhesive. It has been found that the variations in colors caused by the printing of the label or possibly from the materials of the ink itself cause reflection or absorption of the heat depending upon their characteristics. These variable characteristics cause uneven heat transmission to the adhesive coating resulting in incomplete activation of the adhesive. When the label is applied to a package, areas usually corresponding to certain parts of the printed matter are found to be either not bonded or only partially bonded to the package surface.

The application of the heat to the label also presents a problem of some magnitude. Heat has usually been applied by the use of a heated roller or shoe applied to the top surface of the label. In some cases the heated shoe is rubbed or wiped across the surface of the label. Both of these methods have the tendency of pulling and moving the label with respect to the package so that the label is inaccurately positioned or located on the package, again distracting from the appearance of the package.

The problems with the heating of the label and the accurate placement of the label with respect to the package are magnified substantially when the label is intended to be wrapped around several consecutive surfaces of the package.

PURPOSE OF THE INVENTION

The present invention has for its object to provide in a labeling machine an efficient and economical method of adhibiting a label to a package so that the label is both accurately positioned and uniformly bonded to the package.

A further object is to provide an apparatus for adhering a label to a package whereby the label is positionally secured with respect to the package prior to the final complete bonding of the label to the package surface.

Another object of this invention is to provide a means for heating a thermal setting adhesive on a label to completely and fully activate the adhesive coating prior to the bonding operation. A further object is to minimize the effect of the label material with respect to heat conduction to the adhesive coating.

Another object of the invention is to provide an economical and efficient means for applying labels to a series of packages at a high rate of speed and yet produce a completely bonded label in the desired location.

A still further object of the present invention is to provide a source of heat for the label adhesive activation where no actual mechanical contact with the label is required which might disturb the position of the label.

SUMMARY OF THE INVENTION

An apparatus of this invention comprises means for moving packages along a supporting table surface and means for applying labels in various arrangements to the surface of the moving package after preliminarily positionally fixing the location of the label with respect to the package surface.

An initial partial application of a label to the package is for the purpose of positionally securing the label to the package. Only one edge portion of the label is secured to the package thus providing a simple means of fixing its position prior to the later steps of effecting a complete and uniform bond. An even pressure is then applied to the surface of the label progressively across the balance of the entire surface from the fixed edge portion in order to effect a homogeneous bond across the entire label. In this way, an entrapment under the label is prevented thereby prohibiting voids or incomplete adhesion. Thus, when the label and package are subjected to humidity or hot and cold temperatures, the formation of blisters is prevented.

A radiant type heater is provided for effectively activating those labels which are coated with a thermal setting type adhesive prior to the later application of pressure. The use of a radiant heater has been found necessary in this situation to completely and effectively activate the adhesive by absorbing heat through the label itself without regard to the color or the ink composition on the label. The radiant heater supplies the necessary heat yet does not physically contact the label to possibly disturb its position.

Various arrangements are provided with the present invention so that numerous label arrangements and various sizes of labels can be applied with this apparatus. A turret wheel is provided to aid in the adhibiting of the label or labels to the package. This wheel also provides a means for rotating or turning-over the package so that the labels can be properly positioned.

A "wrap around" type label utilizing an elongated label arrangement can be applied to a plurality of consecutive sides of a package by use of this invention. The label is adhered to a first side by the arrangement described above and then wrapped and folded around the adjacent consecutive sides of the package producing a uniform bond on the additional sides. The folding and wrapping is accomplished by the progressive application of pressure to the label surfaces as the package is rotated in the turret wheel. It is to be understood that any number of label applying stations and rotating or positioning means may be provided to apply any number of labels or labels having any configuration desired.

BRIEF DESCRIPTION OF DRAWINGS

Other features of this invention will appear in the following description and appended claims, reference being made to the accompanying drawings forming a part of the specification wherein like reference characters designate corresponding parts in the several views.

FIG. 1 is a side elevational view of a labeling apparatus constructed in accordance with the invention;

FIG. 2 is a side elevational view showing a turret wheel and an additional section to the apparatus shown in FIG. 1;

FIG. 3 is a side elevational view showing another embodiment of the invention with a second label applying section;

FIG. 4 shows a side elevational view showing another embodiment for applying a second label;

FIG. 5 shows a diagrammatic plan view of the power train of an embodiment of the present invention;

FIG. 6 shows a side elevational view of a label feeding station in an apparatus made in accordance with this invention;

FIG. 7 shows a fragmentary top elevational view at the label feeding station of FIG. 6.

DESCRIPTION OF SPECIFIC EMBODIMENTS

More specifically, the apparatus, generally designated **10**, comprises a table or platform **11** having a conventional support structure including side members **12, 13** and end member **14.** The apparatus **10** is designed as a basic unit to which additional sections providing other capabilities may be added as desired. A label attaching mechanism **31** is disposed along the path of movement for the package P. The labels L are fed from the magazine **39** to the label applying wheel **38** via the friction wheel **36** mounted on shaft **35** as shown. A roller **38***a* is disposed in rolling contact with the applying wheel **38** to hold the label L and feed it around the wheel **38.** See in particular FIGS. **6** and **7.** The heater shoe **40** heats solely an edge portion of the label L as it is fed around the applying wheel **38.** The pressure roller **38***b* is attached to arm **86** that is pivotally mounted on shaft **88.** Spring **87** is provided to hold the roller **38***b* in an elevated position, thereby allowing the package P to pass underneath yet apply a bonding pressure to the surface of the label L. The roller **38***b* is aligned with the heater shoe **40** to contact the heated edge of the label L. Any type of pressure member and mechanism may be used to effect the desired results which are to positionally secure the label L to the package P solely along one edge portion thereof.

Heat is applied to the package P along with the partially attached label L as the package P is moved along the surface **11.** The heat element **41** in this specific embodiment is a radiant type heater. It has been discovered that radiant heat energy will penetrate the material used in the label L regardless of the color variations in the printing or variations in the composition of the material itself.

After the label L has been heated thoroughly, the pressure rollers **42** apply a pressure to the surface of the label progressively from the one edge portion thereby obtaining a complete and uniform bond between the label L and the package P. This pressure applying function securely adheres the label L to the package P without the formation of blisters or voids. It is understood that any type of pressure roller or material may be used in the composition of rollers **42,** such as silicon type rollers or the like. It is also understood that any type of radiant heat source can be used with this embodiment such as an electric or gas fired burner arrangement.

After passing onto the rollers **42,** the package P is moved onto the table extension **43** for further processing such as overwrapping or further application of labels thereto. The apparatus as shown in FIG. **1** may be attached in sequence with any of the assemblies as shown in FIGS. **2, 3** or **4,** depending upon the type of label that is being applied to the package P. In each of the embodiments shown in FIGS. **2, 3,** and **4,** a turret wheel **44** is provided to turn the package over for the purpose of applying a portion of the label or another label to additional sides of the package P. The turret wheel **44** includes six slots **47** designed to hold packages P as they are inserted therein by conveyor means used in conjunction with the apparatus of FIG. **1.** The turret wheel **44** is mounted on a shaft **45** and is driven intermittently by a Geneva wheel **46.** The shaft **45** is journaled in the side members **12** and **13.**

Any type of conveyor means may be used to move the package P through the assembly of FIGS. **1–4.** In this specific embodiment, however, the pulley **15** is connected to the shaft **16** which in turn drives the drive pulley **17.** The shaft **18** is driven by the pulley **19** and chain **20.** The double chain **22** interconnects the shafts **16** and **18** by sprockets **23** and **24,** respectively. Pusher elements **22***a* are spaced along the chain **22** for moving the packages P along the table surface **11.** Drive chain sprocket **26** is connected to the shaft **18** and in turn drives the push chain **27** and the sprocket **28** connected to the shaft **29.** The chain **27** has push elements **27***a* connected thereto which are adapted to move the packages P along the table surface **11** and into communication with the chain **22** and pusher members **22***a* for continuous movement across the table surface **11.** The sprocket **30** which is connected to the shaft **18** drives the label attaching mechanism **31.**

In the embodiment shown in FIGS. **2, 3,** and **4,** a heater block **50** including heater elements **51** is mounted on a bracket **48** above the turret wheel **44.** A wiping brush **52** is mounted on bracket **49.** The heater block **50** and the wiping brush **52** are arranged approximately 60° from each other and both are arranged approximately 60° from the surface of the table **11.** The packages P retained in the slots **47** align with the heater block and the wiping brush during the intermediate stop motion of the turret wheel **44** turned by the Geneva wheel **46.** The overlapping portion of the label L is thus heated by the heater block **50** during the package pause.

In the next step movement, the label L is wiped against the end of the package P as it moves into position adjacent the wiping brush **52.** Thus, the overlapping end of the label L is heated and wiped into pressure contact for adhering the end of the label to the end of the package in these two steps. The turret wheel **44** in the next step movement is aligned again with the surface of the table **11** so that the package P may be picked up by a conveyor mechanism and removed from the turret wheel **44.**

The pulley **15** is connected to the shaft **55** by means of chain **53** and sprocket **54.** Pinion gear **56** is connected to shaft **55** and arranged to drivingly mesh with the drive gear **57.** Drive gear **57** is attached to shaft **58** and drives the conventional Geneva wheel **46.** The shaft **55** carries drive sprockets **59** which drive the double push chain **60** and end sprockets **61** mounted on shaft **62.** If desired, a drive mechanism such as sprocket **63** mounted on shaft **55** can be used to drive the auxiliary shaft **62** through the chain **64** and sprocket **65.**

A motor M is located below the side member **13** and interconnected to the shaft **55** by a drive pulley **63,** belt **64,** and driven pulley **65** attached to the shaft **55.** If desired, the attachment of the driven pulley **65** to the shaft **55** may be accomplished through a clutch **66** and hand wheel **67.** The clutch **66** is incorporated to pro-

vide a safety feature in case some portion of the mechanism becomes jammed or inoperative.

Although chain and sprocket drive mechanisms are used generally throughout the embodiments described herein, it is understood that any type of drive arrangement can be used with this invention. Chain and sprocket drive arrangements have been found to work satisfactorily since they provide a non-slip arrangement which can time the various steps and operations throughout the mechanism.

In FIG. 3, additional elements are provided for the application of labels which are of sufficient size to overlap both the front, back and one side of the package. The elements used in applying the label are identical to those shown in FIGS. 1 and 2 including the turret wheel 44. It is understood that the turret wheel 44 is used to rotate the package P and move it from a position where one side is exposed, to a position where the opposite side is exposed. The label L is first attached to the front side of the package P. The extended label L is caused to wrap around and be attached to the end of the package as described in FIG. 2.

In the embodiment of FIG. 3, a second wiping brush 70 is positioned above the table extension surface 11*a* so as to bend and fold the additional length of label L downwardly and and along the opposite surface of the package P as its moves along the surface 11*a*. A second radiant type heater 71 is provided to thoroughly heat the label extension and activate the adhesive coating. The package P is then moved along the surface 11*a* into pressure contact with the rollers 72.

A second label is applied to the package P in the embodiment of FIG. 4. In this embodiment, the shaft 55 and sprocket 59 drive a chain 74 which is threaded over sprocket 76 attached to shaft 75. Push elements 77 are spaced at intervals along the length of the moving chain 74. A second label applying mechanism 78 is positioned along the auxiliary table 11*a* immediately down stream of the turret wheel 44. The original first label is designed to overlap only the top side and the end of the package P. A second separate label is applied to the opposite side of the package. Again only one edge portion of the label is heated to positionally fix it to the package in a predetermined manner before the adhesion of the remaining portion. The second label applying means includes the label magazine 79, the label feeding mechanism 82 and the label applying drum 80, roller 80*a* and heating shoe 81. Pressure roller 80*b* is also provided to adhere the edge portion of the label to the package. The package P is passed under a second radiant type heater 83 whereby the label adhesive coating is thoroughly heated and activated. The pressure rollers 84 then apply pressure to the fixed label progressively from the leading edge towards the rear of the package. The package continues to a sorting or collating area for boxing or storage.

While the method and apparatus for applying a label to a package has been shown and described in detail, it is obvious that this invention is not to be considered as being limited to the exact form disclosed, and that changes in detail and construction may be made therein within the scope of the invention, without departing from the spirit thereof.

Having thus set forth and disclosed the nature of this invention, what is claimed is:

1. In a labeling machine including means for moving a package in a path along a support means, the combination comprising:

a. securing means for positionally securing a label to the package solely along one edge portion thereof and in a direction parallel to the direction of movement of the package along said path,

b. means for applying pressure progressively pressing the balance of the label from said edge portion across the surface of the package to obtain a complete and uniform bonde between the label and the package.

2. An apparatus for applying labels to packages comprising:

a. securing means for positionally securing a label to the package solely along one edge portion thereof,

b. said label including a heat activated adhesive coating disposed thereon,

c. said securing means including a first heating means to activate the adhesive along said label edge portion, and

d. adhibiting means separate from the securing means for progressively pressing the balance of the label from said edge portion across the surface of the package to obtain a complete and uniform bond between the label and the package,

e. said adhibiting means including a second heating means for activating the adhesive on the balance of the surface portion across the entire surface of the label other than said edge portion and means for pressing the heat activated adhesive side of the label against the package.

3. An apparatus as defined in claim **2** wherein

said second heating means includes a radiant type heater.

4. An apparatus for applying labels to packages comprising:

a. securing means for positionally securing a label to the package solely along one edge portion thereof,

b. said label including a heat activated adhesive coating disposed thereon,

c. said securing means including a first heating means to activate the adhesive along said label edge portion,

d. adhibiting means separate from the securing means for progressively pressing the balance of the label from said edge portion across the surface of the package to obtain a complete and uniform bond between the label and the package,

e. said adhibiting means including a second heating means for activating the adhesive on the balance of the surface portion across the entire surface of the label other than said edge portion and means for pressing the heat activated adhesive side of the label against the package,

f. said adhibiting means including a means to wipe consecutive sides of the package so that a label which is positioned to extend beyond the edge of a first side of the package in an overlapping relationship thereto would be progressively wiped and adhered to the package.

5. An apparatus as defined in claim **4** wherein

a package rotating means is provided to move the package past the wiping means,

said wiping means being positioned adjacent the rotating means to press the label against the consecu-

tive sides of the package as the rotating means rotates.

6. An apparatus for applying a plurality of labels to a package comprising:

a. a label attaching assembly disposed along a path of movement for the package to secure each label in a consecutive order,

b. each said label attaching assembly including securing means for positionally securing the label to the package solely along one edge portion thereof and separate adhibiting means for progressively pressing the balance of the label from said edge portion across the surface of the package to obtain a complete and uniform bond between the label and the package, and

c. means disposed between the label attaching assemblies to change the position of the package to expose a different surface portion onto which a further label is applied.

7. An apparatus for attaching two labels to a package comprising:

a. a label applying assembly disposed along a path of movement for the package to secure each label in a consective order,

b. each said label attaching assembly including securing means for positionally securing the label to the package solely along one edge portion thereof and separate adhibiting means for progressively pressing the balance of the label from said edge portion across the surface of the package to obtain a complete and uniform bond between the label and the package, and

c. a package rotating means disposed between the two label applying assemblies whereby the package is turned over to expose the opposite side of the package to the second label applying assembly after passing the first label applying assembly.

8. An apparatus as defined in claim 7 wherein

each said label includes a heat activated adhesive coating disposed thereon,

each said securing means includes a first heating means to activate the adhesive along said label edge portion,

each said adhibiting means includes a second heating means for activating the adhesive on the balance of the surface portion across the entire surface of the label other than said edge portion and means for pressing the heat activated adhesive side of the label against the package.

9. An apparatus as defined in claim 8 wherein

each said second heating means comprises a radiant type heater.

10. An apparatus for applying labels to packages comprising:

a. conveyor means for moving each package along a path,

b. securing means for positionally securing a label to the package solely along one edge portion that extends in a direction parallel to the direction of movement along said path, and

c. adhibiting means separate from the securing means for progressively pressing the balance of the label from said edge portion across the surface of the package to obtain a complete and uniform bond between the label and the package.

11. An apparatus as defined in claim 10 wherein

said adhibiting means includes a means to wipe consecutive sides of the package so that a label which is positioned to extend beyond the edge of a first side of the package in an overlapping relationship thereto will be progressively wipe and adhered to the package.

12. An apparatus as defined in claim 11 wherein

the label includes a heat activated adhesive coating disposed thereon,

said securing means includes a first heating means having a heater shoe disposed along one edge of the label to activate the adhesive along said label edge portion.

* * * * *