

12 **EUROPEAN PATENT APPLICATION**

21 Application number: **89311032.0**

51 Int. Cl.⁵: **B65C 9/18, B65C 9/14**

22 Date of filing: **26.10.89**

30 Priority: **27.10.88 US 263177**

43 Date of publication of application:
30.05.90 Bulletin 90/22

84 Designated Contracting States:
DE FR GB IT

71 Applicant: **B & H MANUFACTURING COMPANY**
3461 Roeding Road
Ceres California 94307(US)

72 Inventor: **Bright, Lyn E.**
3625 Lockwood Road
Ceres California 95307(US)

74 Representative: **Williams, Trevor John**
J.A. KEMP & CO. 14 South Square Gray's Inn
London WC1R 5EU(GB)

54 **Convertible labelling machine.**

57 A convertible labeling machine comprising a label transport, preferably a rotating vacuum drum (19), which transports labels from a label pick up station to a label applying station, and a container transport (14) which transports containers to, through and from the label applying station. Such label transport/container transport having a main frame including a main plate (30) and elements, such as motors, air and vacuum supplies and mechanical and electrical connections. Two or more interchangeable modules are provided each of which is readily attachable to and detachable from the main plate to perform two or more of the following labeling operations: (1) a continuous supply of label stock which is severed across the label stock into separate labels which are supplied to the label transport; (2) feeding individual labels from a stack of the same; (3) die cutting labels from a continuous strip, leaving scrap material; (4) peeling labels having with pressure sensitive from a strip of backing.

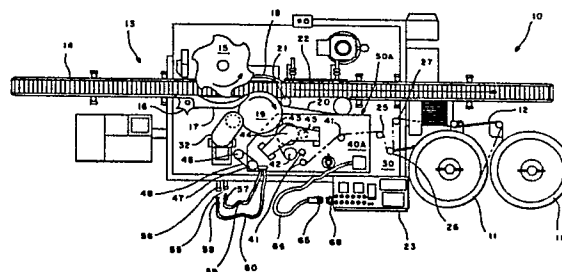


FIG. — 1

EP 0 370 633 A1

CONVERTIBLE LABELING MACHINE

This invention relates to a convertible labeling machine.

Labeling machines are of several types. For example one type of labeling machine pulls a continuous length of label stock from a roll of such stock, feeds the label stock through a cutting station where it is severed into individual labels by a cut extending entirely across the strip of label material, applies each severed label to a rotating vacuum drum which picks up the label at a label receiving station, holds the label on its cylindrical surface and transports the label to a label applying station. Between the two stations glue may be applied to the leading and/or trailing ends of the label to adhere it to a container or a solvent may be applied to form an adhesive in situ on a label or heat may be applied to soften the label material and cause it to become adhesive.

At the label applying station a container transport causes containers to pass by the vacuum drum in tangent contact with the label on the drum. The label may be released by release of vacuum at the point of tangent contact or, as in U.S. Patent No. 4,500,386, it may be confined between the vacuum drum and an arcuate pad which is concentric to the drum.

This invention is concerned primarily with a label feed or supply up to the point where the label is received from the label supply mechanism and is deposited on the vacuum drum for transport to a label applying station. Various label transports may be employed, for example vacuum belts, but the invention is illustrated with reference to the preferred label transport which is a rotating vacuum drum. Various container transports and label applicators may be employed, for example those of U.S. Patents Nos. 4,500,386; 3,834,963; or 4,108,709.

The continuous label feed may be of the type shown in the following U.S. Patents: Nos. 3,765,991; 3,834,963; 4,108,711; 4,181,555; 4,406,721; 4,500,386; 4,519,868 and 4,704,173. Other label feeds may also be employed.

Another type of label feed is what is known as the "cut and stack" feed in which labels are pre-cut and are arranged in a stack in a magazine from which they are extracted one at a time and supplied to a vacuum drum. Representative of such label feeds is that of U.S. Patent 3,472,722 and a preferred type of stack feed is that described in United States patent application entitled "STACK FED LABELING MACHINE", filed October 28, 1988, Serial No.

Another type of label feed is represented by Hoffmann U.S. Patent No. 4,181,555 in which a

continuous strip of label material is supplied from a roll, labels being printed on the strip which are severed from the strip leaving scrap material. The severed labels are supplied to a vacuum drum and the scrap material is rolled up and disposed of. The cutting mechanism is known as a die cutter and is typified by that shown is Hoffmann U.S. Patent No. 4,181,555.

Yet another type of label feed is used with pressure sensitive labels which are adhered to a continuous strip of backing material. The labels are peeled from the backing and supplied to a vacuum drum and the backing is then rolled up and disposed of.

A need often arises to change a labeling operation from one such type of machine to another. This need can be fulfilled by having completely different machines, for example a roll fed machine, a cut and stack machine, a die cut machine and a pressure sensitive machine. However to provide separate machines for each of these modes of operation is expensive and cumbersome both from a capital standpoint inasmuch as different machines must be purchased or built and from the standpoint of maintenance and operation. In addition, replacement of a total machine in a line setup is time consuming (resulting in extended line shut-down and is consequently very expensive.

It is an object of the present invention to provide a labeling machine which can be readily and quickly changed from one mode of operation to another with a minimum of substitution of parts.

In accordance with the present invention a single vacuum drum (or other type of label transport) with associated equipment such as a glue applicator and a single container feed and label applying component are provided with two or more label feed modules each of which can be quickly removed and installed.

The invention is illustrated by way of example in the accompanying drawings, in which:

Figure 1 is a schematic view of a labeling machine of the standard roll fed type referred to above;

Figure 2 is a similar view of a labeling machine of the cut and stack or magazine type referred to above;

Figure 3 is a similar view of a labeling machine in which the labels are die cut from a strip of label material; and

Figure 4 is a similar view of a labeling machine in which the labels are pressure sensitive and are carried on a backing from which they are stripped.

Referring now to Figure 1, the machine there

shown is generally designated by the reference numeral 10 and it comprises a roll 11 of label stock 12. A spare roll is shown at 11A. A container transport is shown at 13 comprising a conveyor 14, a star wheel 15, an indexing member 16 to supply containers in timed and spaced relation to the star wheel, a container guide 17 and a curved pad 18 to hold containers against the vacuum drum 19 to wrap labels about the containers. Also shown are a driven roll down belt 20 on rollers or pulleys 21, one of which is driven and a stationery roll down pad 22. These elements serve to secure the label more securely to the container. The star wheel 15 and the guide 17 and pad 18 will be recognized as components of the machine of U.S. Patent 4,500,386. It will be understood that other types of container feed and label applicator may be used.

Also shown are an electric control panel 23.

The label stock 12 passes around rollers such as those shown at 25, 26 and 27 which may embody a dancer mechanism to maintain appropriate tension on the label stock.

Shown at 30 is a main frame plate beneath which various drive elements, which are not shown but are well known in the art, are mounted. The vacuum drum 19 is mounted on the main frame plate 30, being driven (rotated about its cylinder axis) from beneath the main frame plate. Also shown is a glue applicator 32 which may, for example, oscillate toward and away from the labels on the vacuum drum, or ridges may be employed on the vacuum drum to elevate the leading and trailing ends of the drum to contact the glue applicator. See, for example, U.S. Patent 3,834,963.

Mounted on the main frame plate 30 is a plate 40A which fits within or onto the main plate 30 and secured thereto by suitable, standard means (not shown), for example by bolts such that it can be readily installed or removed as desired. Mounted on the plate 40A are rollers 41 to guide the label stock, a feed roller 42 to pull the label stock from the roll 11 and a cutter 43 which may be of the general type shown in U.S. Patent No. 3,834,963 including a rotary cutter 44 and a pivoting cutter 45 such as shown at 142 and 146, respectively, in Figure 9 of such patent.

Also shown in Figure 1 is a sprocket 46 mounted on the main frame plate 30 and driven from beneath such plate, a sprocket 47 mounted on the plate 40A and a chain 48 connecting the two sprockets. The sprocket 47 drives the roller 42 and the cutter 43.

The plate 40A together with the elements mounted on it (including those mentioned above and those mentioned below) constitute a module 50A. All mechanical drive power to the module 50A is provided by this interface, i.e. the sprocket 46 connected to the drive of the machine as a whole,

the sprocket 47 connected to the mechanically driven elements of the module and the chain 48 connecting the two sprockets.

Also shown in Figure 1 are an air pressure fitting or connector 55 and a vacuum fitting or connector 56 which may be connected to a source of air pressure and vacuum, respectively, of the machine and which are connectable to quick release fittings or connectors 57 and 58, respectively, which connect through lines 59 and 60, respectively, to appropriate parts of the module 50A. For example air pressure may be used to blow labels off of the cutter 43 and vacuum may be used to hold labels on the cutter 43. These are optional features.

Also shown is an electrical connector 65 connected by a cable 66 to the elements which are a part of the module 50A and are beneath the plate 40A, for example motors to operate the cutter 43 and the feed roller 42. The connector 65 plugs into a receptacle 68 on panel 23. These electrical connections and the panel 23 provide all electrical power and signal interfaces between the fixed part of the machine and the module 50A.

With the module 50A installed, the chain 48 engaged with the sprockets 46 and 47, the connectors 57 and 58 connected to connectors 55 and 56 if desired or if necessary and connector 65 connected to receptacle 68 the machine is ready to apply labels from the label stock 12.

The vacuum drum 19, the glue applicator 32 and the container feed 13 including star wheel 15 are, of course, operating to perform their respective functions as are other parts of the machine.

Assume now that it is desired to change from a roll fed machine to a stack fed machine. In that case the machine of Figure 1 is stopped, chain 48 is removed, the connectors 57, 58 and 65 are disconnected and the module plate 40A is detached and the entire module 50A is removed. Then module 50B shown in Figure 2 is installed in place of the module 50A. The label feed rollers are not used. In Figure 2 elements which are common to the roll fed machine (Figure 1) and the stack fed machine (Figure 2) are similarly numbered and perform the same functions as described above in connection with Figure 1. The module 50B, mounted on plate 40B, is installed in the same manner as plate 40A in Figure 1. Mounted on plate 40B is a label receptacle 75 containing a stack of labels 76 arranged vertically on their edges. The front end of the receptacle is open at 77 so that labels can be extracted one at a time by a rotating vacuum wheel 78 driven by the sprocket 47 through a mechanical connection beneath the plate 40B. Also, as described in U.S. patent application Serial No. , filed , entitled, a current of air may be blown into the receptacle 75 to separate the labels

adjacent the aforesaid opening. Each label in turn is extracted from the receptacle 75 by vacuum on the wheel 78 and is delivered to the vacuum drum 31.

A plate 79 at the rear of receptacle 75 is pressed forwardly (to the left as viewed in Figure 2) by a motor mounted on and under plate 40B which is connected to the plate 79 through a slip clutch to exert a constant pressure on the stack of labels as the stack is depleted.

The vacuum connector 58 will, of course, be in place to apply vacuum to the vacuum wheel 78 and the air pressure conductor 57 will be connected to supply air to be blown into receptacle 75. The chain 48 will also be in place. The machine will then be started.

If it is desired to change the machine to a die cutter type such as shown in Figure 3, the module 50B will be removed in a manner similar to removal of the module 50A as described above and module 50C shown in Figure 3 will be installed.

Referring now to Figure 3, a module 50C is mounted on plate 40C which, like plates 40A and 40B, is mounted on main plate 30. Mounted on plate 40C is a plate 85 which carries a die cutter assembly 86 such as that described in U.S. Patent 4,181,555. A strip 87 of label material is pulled from a roll 88 and labels are cut from this strip by die cutter assembly 86. This strip is pulled through a guide 88 by rollers 89, one of which is driven and passes to the die cutter rollers 90, one of which has on it one or more blades shaped to sever a label of the desired shape, the other roller serving as a back up or anvil roller. The severed label proceeds to the vacuum drum 19 and the scrap material 94 is pulled down over one of the rollers 90 (the back up or anvil roller) and through guide 96 to take up roller 97. Further details of the construction and mode of operation will be found in U.S. Patent 4,181,555, the rollers there being shown in Figure 5 at 40 (the cutting roller with blades) and 41 (the back up or anvil roller) and the label/scrap separation being shown in Figure 3. Air pressure connector 57 in Figure 3 of this present application is connected to operate the blower 43 of Figure 5 of Patent 4,181,555, if desired. The chain 48 will, of course, be engaged with sprockets 46 and 47 and the connector 65 will be plugged in.

Referring now to Figure 4, a machine for applying pressure sensitive labels is shown. These labels are adhered by their pressure sensitive layers to a backing from which they are peeled to be applied to the vacuum drum 31. A strip 110 of backing 112 with labels attached is pulled from a roll 113, passes through guide 114 and between rollers 115 and 116 (one of which is driven) to a peeler plate or knife 117. The backing is pulled around and under the knife 117 and proceeds via

rollers and a guide 118 to roller 119. The peeled labels are applied to vacuum drum 19. The glue applicator 32 is inactivated. The usual connection of connectors 65 and chain 48 are made.

It will therefore be apparent that a convertible labeling machine is provided which can be quickly converted from one type of machine to another, thus making use of many elements which are common to all types and requiring only substitution of modules each of which has only those components which are necessary to effect the desired change.

Claims

1. A labeling machine comprising:

(a) a label transport capable of picking up labels in sequence at a label receiving station, transporting such labels to a label applying station and releasing them at such station

(b) a container transport capable of moving containers to, through and from the label applying station and acting at the label applying station together with the label transport to apply labels to the containers and to wrap them around the containers

(c) said machine having a main frame and at least two modules to process labels in different modes, such modes being as follows:

(1) a continuous strip of label stock is drawn from a roll of the same, a cutting mechanism operates to sever individual labels from the moving strip by a cut entirely across the strip, and supplying the severed labels are supplied to said label transport (a),

(2) individual labels are supplied from a stack of pre-cut labels to the label transport

(3) a continuous strip of label material is drawn from a roll, each strip having labels printed thereon which leave scrap material surrounding the labels, printed labels are cut from the strip, the cut labels are supplied to said label transport (a) and a continuous strip of scrap material is separated

(4) a continuous strip of label material is drawn from a roll, such strip having separate pressure sensitive labels adhered to a continuous backing, labels are peeled the from the backing and are supplied them to the label transport (a) and the resulting label-free backing is separated

each said module being attachable to and detachable from the main frame of the machine.

2. The labeling machine of Claim 1 in which the label transport is a rotating cylindrical vacuum drum.

3. The labeling machine of Claim 2 in which at least one of the modules is module (1).

4. The labeling machine of Claim 2 in which at least one of the modules is module (2).

5. The labeling machine of Claim 2 in which at least one of the modules is module (3).

6. The labeling machine of Claim 2 in which at least one of the modules is module (4).

7. A method of operating a labeling machine having a main frame and having also the following components supported at least in part by such main frame:

(a) a label transport capable of picking up labels in sequence at a label receiving station, transporting such labels to a label applying station and releasing them at such station

(b) a container transport capable of moving containers to, through and from the label applying station and acting at the label applying station together with the label transport to apply labels to the containers and to wrap them around the containers said method comprising:

(1) providing at least two of the modules of Claim 1, such modules being of different types,

(2) installing on such main frame one of said modules and operating the machine,

(3) then, as need arises, removing the module so installed and installing a different module and operating the machine.

5

10

15

20

25

30

35

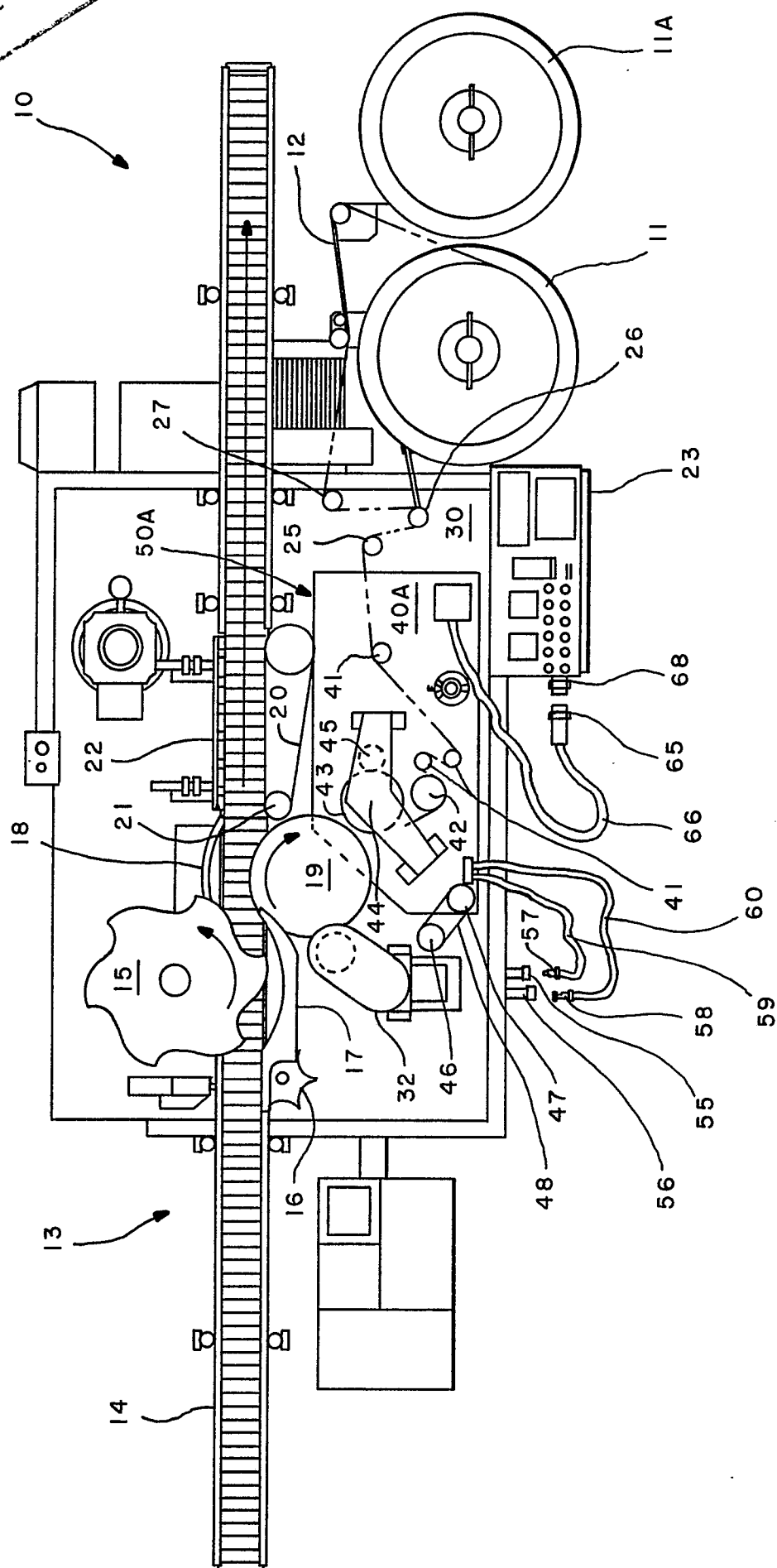
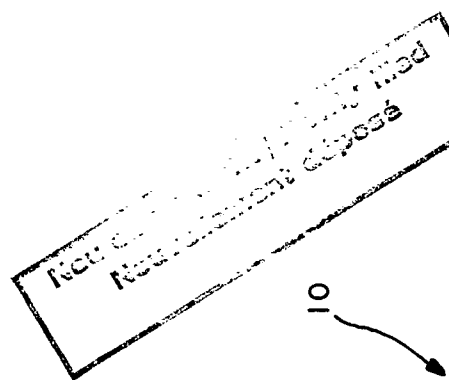
40

45

50

55

5



**—
—
ॐ
—
F**

Not a drawing of a prior art
Reference to the prior art

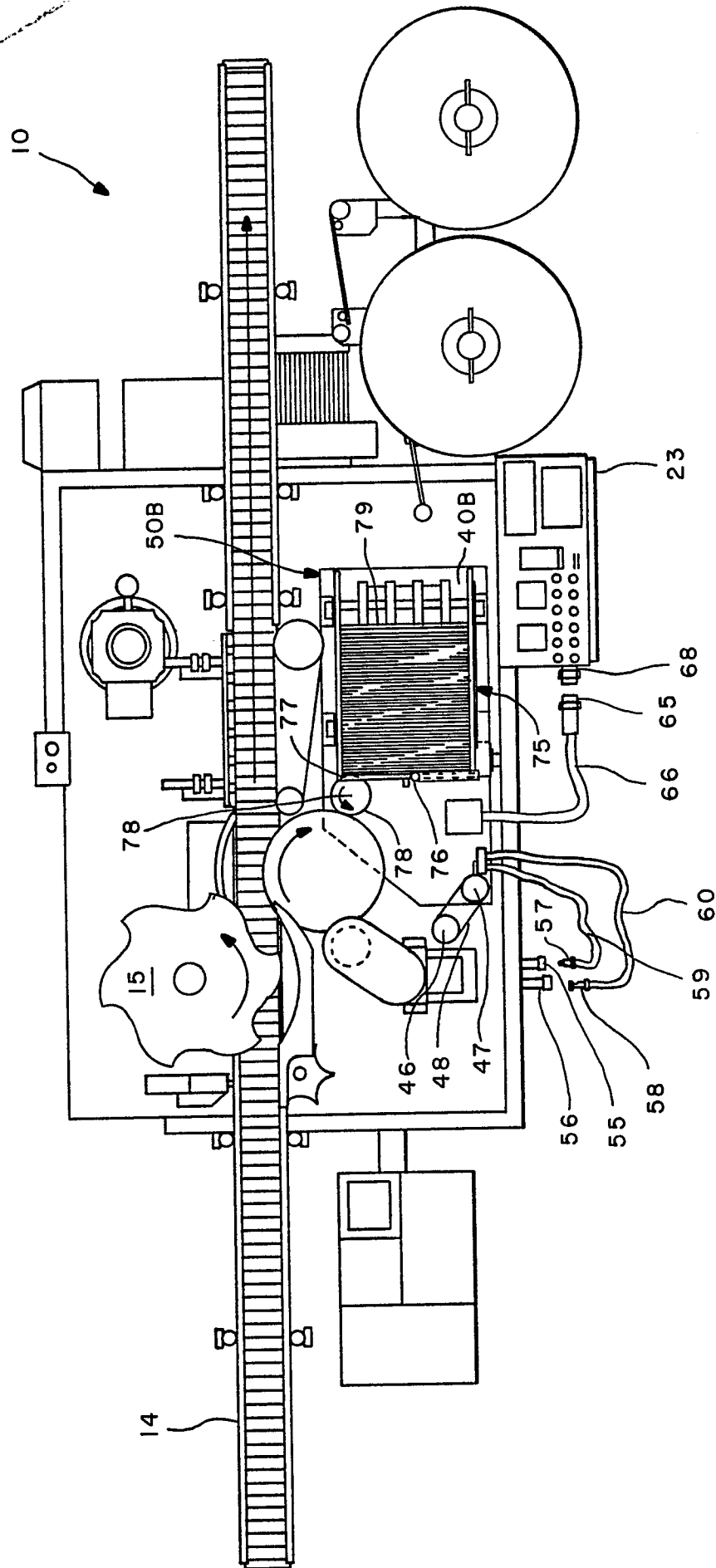


FIG.—2

Not a member of the
New England College

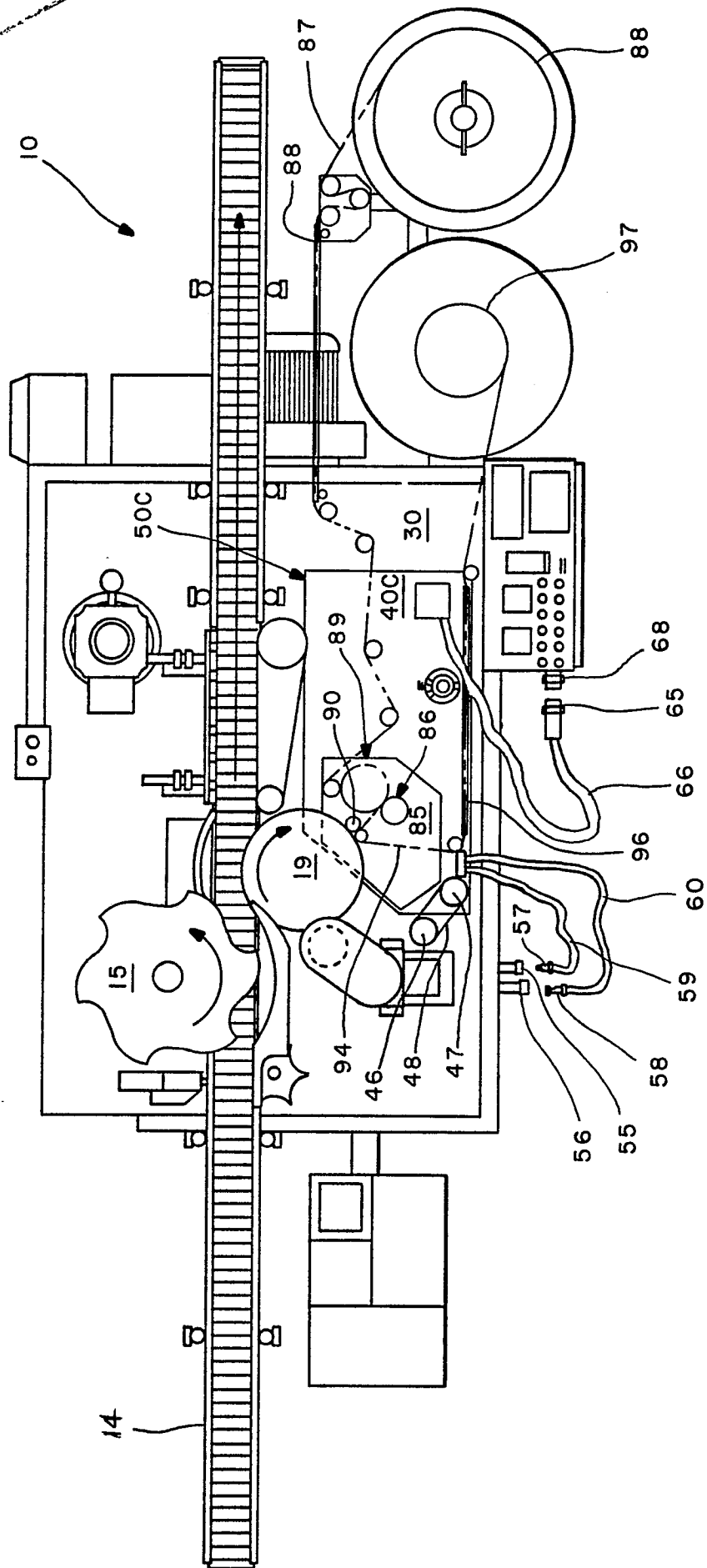


FIG. — 3



FIG. 4



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	GB-A-2 046 699 (JAGENBERG-WERKE) * Figures 1,3,4; claims 3,4 * ---	1,7	B 65 C 9/18 B 65 C 9/14
A	GB-A-2 111 941 (SERAGNOLI) * Claim 1 * ---	1,7	
A	GB-A-2 188 608 (NEW-JERSEY-MACHINE INC.) ---		
A	FR-A-2 454 848 (SITMA) ---		
A	GB-A-1 546 754 (MALKOUTZI) ---		
A	US-A-4 555 299 (VOLTMER et al.) -----		
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B 65 C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 23-01-1990	Examiner DEUTSCH J.P.M.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			