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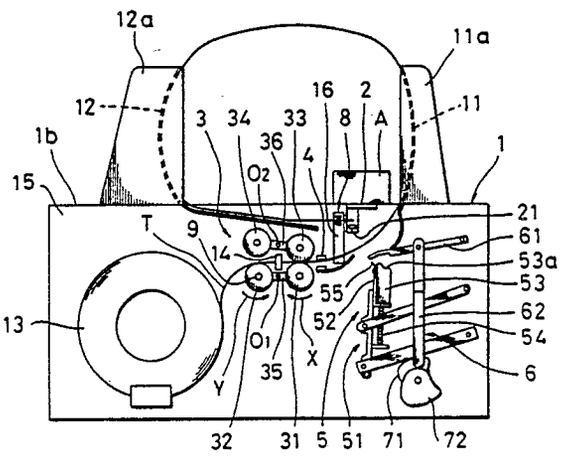
(54) Binding apparatus with a tape.

(57) A binding apparatus with a tape (T) in which the tip of a heat-bonding tape reeled out from a reel is rotated substantially by one revolution to form a tape loop, the tape (T) is further reeled out from the reel to enlarge the loop in size, an article to be bound is inserted into the loop, the tape is reeled in such that the tape is wound round the article to be bound, the tip of the tape where the tape starts winding and the end thereof, where the winding terminates, are heated and bonded to each other as pressurized by pressurizing and heating means (5), and the tape is cut at its predetermined portion. Until the tape bonded portion is cooled to complete or substantially complete the bonding after the pressurizing and heating means (5) has been separated from the tape (T), the tape bonded portion is still continuously pressed to prevent the bonded surfaces of the tape (T) from coming off from each other, assuring reliable binding.

Fig. 1



EP 0 321 623 A1

"BINDING APPARATUS WITH A TAPE"

The present invention relates to apparatus for automatically binding a stack of paper money, a variety of cards, envelopes or the like with a binding tape made of paper or the like.

There has been used a binding apparatus in which a binding tape made of paper or the like is wound round an article to be bound such as a stack of paper money, and the leading end of the tape where the tape starts winding is bonded to the end where winding terminates.

As a mechanism for winding a binding tape round the periphery of an article to be bound in binding apparatus of the above-mentioned type, there is known a mechanism in which a tape guide passage in the form of an arch is disposed above a table of the binding apparatus, the leading end or tip of a binding tape being delivered from under the table to this tape guide passage, causing the tape to be fed along the tape guide passage to form a tape loop. An article to be bound is inserted in this loop, and the winding tape is reeled in so that the tape is wound round the periphery of this article to be bound. Such a mechanism is disclosed by Japanese Unexamined Utility Model Publications 39765/1982, 4562/1983 and 45281/1983.

In the arrangement of the above-mentioned prior art, the tape guide passage in the form of a large arch is secured to the upper surface of the table and an article to be bound needs to be inserted and placed in the centre of the arched tape guide passage. Accordingly, the tape guide passage gets in the way of the article to be bound, and the apparatus as a whole is high and large in dimensions, resulting in difficult manipulation. Further, the above-mentioned arrangement has the defect that, unless the binding tape is securely fed along the tape guide passage, the tape guide passage may get clogged at its mid-portion with the tape or the tape may be caught by the tape guide passage to make it difficult to form a loop. It is therefore required to dispose a mechanism capable of assuring smooth travelling of a binding tape. A variety of such mechanisms have been also disclosed in the prior arts above-mentioned. However, all the mechanisms disclosed include a complex tape guide passage which subsequently complicates the binding apparatus, resulting in increased manufacturing costs.

In order to overcome the defects of the arch-shape tape guide passage above-mentioned, there has been proposed an arrangement in which a rotatable arm which holds the tip of the tape is rotated around an article to be bound thereby winding a binding tape round the article (Japanese Unexamined Patent Publication No. 55811/1984). However, the structure of the arm operating mechanism is relatively complex and still presents the defect that the binding apparatus is oversized.

In order to make a binding apparatus of compact design, there has been proposed an apparatus comprising:

tape rotating means for rotating, substantially by one revolution, the tip of a heat-bonding tape reeled out from a reel, thereby to form a loop;

tape travelling means for further reeling out the tape from the reel to enlarge the loop to a predetermined size and for reeling the tape into the reel such that the tape is wound round an article to be bound inserted in the loop; and

pressurizing and heating means for heat bonding the tip under pressure, where the tip starts winding, of the tape wound round the article to be bound and the end thereof, where the winding terminates (Japanese Unexamined Patent Publication No. 7041/1987).

In this apparatus, the bonding may be solidified by cooling the heat-bonded portion of the tape up to a certain point after the pressurizing and heating means has been separated from the tape bonded portion. According to this apparatus, however, both operations of pressurizing and heating the tape are carried out by a single pressurizing and heating means. Accordingly, immediately after the pressurizing and heating means has been separated from the bonded portion of the tape, the bonded portion is still hot, whereby the bonding is not yet solidified. Therefore, the reaction toward the force of tightening the article to be bound often causes the bonded surfaces to detach from each other.

It is an object of the present invention to provide a binding apparatus with a tape capable of preventing the bonded surfaces of a tape from detaching from each other, thereby assuring reliable binding.

The above-mentioned object can be achieved by providing a binding apparatus with a tape which comprises:

tape rotating means for rotating, substantially by one revolution, the tip of a heat-bonding tape reeled out from a reel, thereby to form a loop;

tape travelling means for further reeling out the tape from the reel to enlarge the loop to a predetermined size and for reeling the tape into the reel such that the tape is wound round an article to be bound which has been inserted in the loop;

pressurizing and heating means for heat bonding the tip under pressure, where the tape starts winding, of the tape wound round the article to be

bound and the end thereof, where the winding terminates; and

cutting means for cutting a predetermined portion of the tape bonded by the pressurizing and heating means,

and which is characterized by further comprising sub-pressurizing means for continuously pressing the bonded portion of the tape for a predetermined period of time after the pressurizing and heating means has been separated from the bonded portion of the tape.

According to the above-mentioned arrangement, the sub-pressurizing means can continuously press the bonded portion of the tape for a predetermined period of time after the pressurizing and heating means has been separated from the tape. Therefore, the bonded portion of the tape can be continuously pressed while the bonded portion is cooled to solidify the bonding up to a certain point. This prevents the bonded surfaces of the tape from detaching from each other, assuring reliable binding.

The further characteristics of the present invention will be apparent from the following description with reference to the accompanying drawings, in which:

Figure 1 is a schematic front view illustrating the inner mechanism of a binding apparatus with a tape in accordance with the present invention;

Figure 2 is a plan view of the inner mechanism of a binding apparatus of Figure 1;

Figure 3 is a sectional view of a torque limiter;

Figures 4 (a) to (f) show binding steps;

Figure 5 is a view, with portions broken away, of a binding tape; and

Figures 6 and 7 are respectively a front and a perspective view, illustrating the operation of a moving and holding means.

In Fig. 1, the binding apparatus of the present invention includes a table 1, a receiving plate 2, moving and holding means 8 forming tape rotating means, tape travelling means 3, a pressurizing and heating unit 5 forming pressurizing and heating means, a sub-pressurizing unit 6 forming sub-pressurizing means and a cutter 55 forming cutting means.

An article A to be bound, such as a stack of paper or the like, is to be placed on the table 1. This table 1 is divided into a front table 1a and a rear table 1b. In order to facilitate checking of the inner mechanisms, the front table 1a can be separated from the rear table 1b so that the inside of the table 1 can be exposed. When these front and rear tables 1a and 1b are joined, a passage groove 10 for a binding tape T is formed between the front table 1a and the rear table 1b (See Fig. 2). During a winding operation, the binding tape T is adapted to pass through the passage groove 10. Guide plates 11 and 12 extending from above the table 1 to under the table 1 are respectively disposed at the left and right sides of the passage groove 10. One guide plate 11 is disposed at a side remote from a reel 13 of the binding tape T disposed under the table 1, while the other guide plate 12 is disposed at the side of the reel 13.

The guide plates 11 and 12 are disposed to facilitate travelling of the binding tape T reeled out from the reel 13, as well as to enable the binding tape T itself to hold its loop shape above the table 1. To this end, the guide plate 12 has a portion under the table which is disposed substantially in parallel with the table 1, while the guide plate 11 has a curved portion under the table 1. The guide plate 11 has a lower end portion connected to a pressurizing plate 61 of the sub-pressurizing unit 6 to be discussed later (See Fig. 1). This lower end portion of the guide plate 11 can be so bent as to follow the movement of the sub-pressurizing unit 6. The portions of the guide plates 11 and 12 over the table 1 have tips opposite to each other with a gentle inclination.

The portions of the guide plates 11 and 12 over the table 1 are respectively housed in support frames 11a and 12a standing on the table 1, of which opposite faces are opened and which have a channel-shape section. The support frames 11a and 12a have widths slightly larger than those of the guide plates 11 and 12, and have heights equal to those of the portions of the guide plates 11 and 12 over the table 1. When the binding tape T is sent along the portions of the guide plates 11 and 12 over the table 1, the support frames 11a and 12a prevent the binding tape T from being shifted widthwise to assure smooth travelling of the binding tape T.

The receiving plate 2 flush with the upper surface of the table 1 is disposed in the vicinity of the guide plate 11 of the table 1. This receiving plate can advance and retract from the inside of the rear table 1b toward the passage groove 10 and vice versa. The receiving plate 2 has a holding plate 21, and the binding tape T can be held by and between the lower surface of the receiving plate 2 and this holding plate 21. More specifically, in working steps to be discussed later, the receiving plate 2 may advance toward the passage groove 10 at such working steps that the binding tape T needs to be held, and may retract into the rear table 1b at other working steps. The receiving plate 2 is used when portions of the binding tape T are bonded to each other. Accordingly, the receiving plate 2 preferably has a square shape in front view and may be made of a heat-resistant material such as an iron sheet.

The tape travelling means 3 for reeling in and out the binding tape T is disposed under the table 1 substantially at its centre. The tape travelling means 3 has a delivery roller 31 and a binding roller 32, made of rubber or the like, both pivotally connected to a lateral plate 15 of the rear table 1b. The delivery roller 31 is so controlled as to be rotated in the forward direction (indicated by the arrow X in Fig. 1) and is used when reeling out the binding tape T on the reel 13 from the guide plate 11 to the guide plate 12. The binding roller 32 is so controlled as to be rotated in the reverse direction (indicated by the arrow Y in Fig. 1) with respect to the delivery roller 31.

A metallic sub-roller 33 is mounted on the lateral plate 15 immediately on the delivery roller 31 substantially at its axis. This sub-roller 33 may come in contact with the delivery roller 31. A metallic sub-roller 34 is disposed immediately on the binding roller 32 substantially at its axis. This sub-roller 34 may come in contact with the binding roller 32. The delivery roller 31 and the binding roller 32, and the sub-rollers 33, 34 are respectively mounted on arms 35 and 36 respectively rotatable around axes 01 and 0_2. The arm 36 is rotated so that, when reeling out the binding tape T on the reel 13, the delivery roller 31 comes in contact with the sub-roller 33 (consequently, the sub-roller 34 is separated from the binding roller 32 at this time), and so that, when reeling in the binding tape T to bind the article A to be bound, the binding roller 32 comes in contact with the sub-roller 34, in contrast with the above.

As shown in Fig. 3, a torque limiter 100 is disposed on a drive shaft 9 of the binding roller 32. This torque limiter 100 includes: a cylindrical housing 101 coaxially connected to a drive shaft 9a at the side of a motor (not shown); a friction plate 102 which is disposed in the housing 101 such that the rotation of the friction plate 102 with respect to the housing 101 is regulated and which is movable axially of the drive shaft 9; a friction plate 103 which is in surface- contact with the friction plate 102 and which is connected to a drive shaft 9b at the side of the binding roller 32; and a compression coiled spring 104 housed in the housing 101 for pressing the friction plate 102 toward the friction plate 103. This torque limiter 100 is adapted so that, for as long as the rotational torque of the drive shaft 9 is below a predetermined value, the friction plate 103 is rotated following the friction plate 102, and such that, when the torque exceeds a predetermined value, slippage occurs between the friction plates 102 and 103 to prevent the transmission of torque exceeding a predetermined value to the binding roller 32. Accordingly, this not only prevents excessive fastening of the binding tape T when the article to be bound with the tape T is bound, but also wear of the binding roller 32 because of slippage occurring between the binding tape T and the binding roller 32. Preferably, the shaft 9a and/or the housing 101 may be moved toward and away from the drive shaft 9b. In such a case, the pressurizing force of the compression coiled spring 104 to the friction plate 102 may be adjusted as necessary, enabling the binding amount of the binding tape T to be adjusted when an article to be bound is bound with the tape.

A guide plate 14 for positioning the binding tape T widthwise is mounted on the lateral plate 15 at the tape travelling portion between the delivery roller 31 and the binding roller 32.

Fixing and holding means 4 is mounted on the lateral plate 15 in the vicinity of the delivery roller 31 and the sub-roller 33. This fixing and holding means 4 includes a pair of upper and lower holding members 4a and 4b by and between which the binding tape T can be held (See Fig. 4). One holding member 4a is mounted on the lateral plate 15 so that the vertical position of the holding member 4a is adjustable, while the other holding member 4b is vertically movable in association with a link mechanism (not shown).

The moving and holding means 8 is mounted on the lateral plate 15 between the fixing and holding means 4 and the receiving plate 2. This moving and holding means 8 includes holding members 8a and 8b which are not only vertically and longitudinally movable but also rotatable with the binding tape T held by and between the holding members 8a and 8b (See Fig. 4). This moving and holding means 8 may be not only vertically movable from the fixing and holding means 4 to the vicinity of the receiving plate 2, but also longitudinally movable from a window portion 16 formed in the lateral plate 15 toward the passage groove 10. The holding members 8a and 8b are a pair of overlapping leaf springs of steel. The binding tape T may be held by the longitudinal movement of the holding members 8a and 8b into the passage groove 10. A pair of leaf springs forming the holding members 8a and 8b have tips which are outwardly turned to facilitate holding of the binding tape T at the time of the longitudinal movement above-mentioned (see Fig. 7). For the vertical movement above-mentioned, the moving and holding means 8 is rotated substantially by one revolution such that the positions of the holding members 8a and 8b are inverted (See Fig. 6).

The pressurizing and heating unit 5 is disposed below the receiving plate 2 in Fig. 1, and is used to heat bond portions of the binding tape T to each other. This pressurizing and heating unit 5 includes a link 51, a receiving stand 52 interlocking with the link 51, a heater 53 secured to the receiving stand 52, and a support for the receiving stand 54 dis-

posed at the lower end of the receiving stand 52. The link 51 is vertically moved by a first eccentric cam 71 connected to a motor (not shown) as a drive source of the entire binding apparatus. The heater 53 may be a cartridge heater and is provided at it's upper right end with a concave 53a. The support 54 may be a resilient member such as a coil spring such that, when the heater 53 approaches the receiving plate 2, portions of the binding tape are gradually pressed to the receiving plate 2.

The cutter 55 is secured to the receiving stand 52 so that the vertical position of the cutter 55 can be adjusted, with the cutter 55 being adjacent the lateral side of the heater 53 at the side of the fixing and holding means 4. This cutter 55 made of a steel flat plate has an upper end turned toward the fixing and holding means 4, and the upper surface of the cutter 55 is saw-toothed. The cutter 55 may be adjusted such that its upper surface is flush with the upper surface of the heater 53.

The sub-pressurizing unit 6 is driven by a second eccentric cam 72 coaxially connected to the first eccentric cam 71. This sub-pressurizing unit 6 includes the pressurizing plate 61 and an elevating lever 62. The pressurizing plate 61 disposed substantially horizontally has a right end rotatably mounted on the lateral plate 15, and a left end so formed as to be housed in the concave 53a of the heater 53 being flush with the upper surface of the heater 53 at the time when pressing the binding tape. The elevating lever 62 has an upper end connected to the centre of the pressurizing plate 61 and a lower end engaged with the second eccentric cam 72.

The eccentric cams 71 and 72 control the timings of vertical movement of the pressurizing and heating unit 5 and the sub-pressurizing unit 6, respectively. More specifically, the configuration of the eccentric cams 71, and 72 shifted in phase permits the pressurizing and heating unit 5 and the sub-pressurizing unit 6 to be lifted up substantially simultaneously until they come in contact with overlapping portions of the binding tape T, and also permits the sub-pressurizing unit 6 to be lowered after the pressurizing and heating unit 5 has been lowered. This enables the sub-pressurizing unit 6 continuously to press the bonded portion of the binding tape T for a predetermined period of time after the pressurizing and heating unit 5 has been separated from the binding tape T.

These above-mentioned operating members such as the fixing and holding means 4, the moving and holding means 8, the pressurizing and heating unit 5 and the sub-pressurizing unit 6, are so adapted as to be interlocked with one another through the link mechanisms, the cam mechanisms and the like. It is noted that operating switches, clutch mechanisms and the like are not shown in the drawings.

The binding tape T is constituted by a main material t such as paper which is not meltingly bonded, and thermoplastic resin P laminated on at least one side of the main material t (See Fig. 5). Thus, overlapping portions of the binding tape T can be heat bonded by heating these portions with the heater 53. Preferably the tape T has a width of 25 to 50 mm.

The following description will discuss the operation of the binding apparatus having the arrangement above-mentioned, with reference to Fig. 4 (a) to (f) showing the working steps.

The binding tape T reeled out from the reel 13 passes through the gap between the binding roller 32 and the sub-roller 34 separated from each other, is held by and between the delivery roller 31 and the sub-roller 33, and passes through the gap between a pair of holding members 4a and 4b separated from each other. The tip of the binding tape T is held by the moving and holding means 8 which has been moved to a position in the vicinity of the fixing and holding means 4 (hereinafter referred to as the lower position) (See Fig. 4 (f)). From this position, the moving and holding means 8 is rotated substantially by one revolution to a position in the vicinity of the receiving plate 2 (hereinafter referred to as the upper position) (See Fig. 4 (a)).

Then, the delivery roller 31 is forwardly rotated to feed a predetermined amount of the binding tape T from the guide plate 11 along the guide plate 12, whereby a loop is formed. At this time, the delivery of the binding tape T and the formation of a loop above the table 1 can be achieved smoothly and satisfactorily by the suitably inclined guide plates 11 and 12, the support frames 11a and 12a having suitable widths, and the binding tape T fed at a suitable speed (See Fig. 4 (b)).

Then, the receiving plate 2 is moved from the inside of the table 1 toward the passage groove 10 so that the tip of the binding tape T is held by and between the holding plate 21 disposed at the receiving plate 2 and the lower surface of the receiving plate 2. Afterwards, the moving and holding means 8 passes through the window portion 16 in the lateral plate 15 and is retracted from the passage groove 10. While being rotated substantially by one revolution, the moving and holding means 8 is moved to the lower position and stands ready for the next operation. During the above-mentioned operations, the sub-roller 33 is separated from the delivery roller 31 and another sub-roller 34 is lowered into contact with the binding roller 32. The binding roller 32 is then rotated (in a direction opposite to the rotation direction of the delivery roller 31) to reel in the excessive amount of the

binding tape according to the size of the article A to be bound so that the article A is bound (See Fig. 4 (c)). It is here noted that, at the initial rotation of the binding roller 32, the moving and holding means 8 is in a retracted position relative to the inner part of the window portion 16 in the lateral plate 15.

Upon completion of the above-mentioned operations the fixing and holding means 4 holds the binding tape T, and the moving and holding means 8 advances to hold the binding tape T. The heater 53 of the pressurizing and heating unit 5, and the left end of the pressurizing plate 61 of the sub-pressurizing unit 6 approach toward the receiving plate 2 until they nearly come in contact with the lower side of the receiving plate 2. The heater 53 and the pressurizing plate 61 press the portion of the binding tape T at the side of the reel 13 toward the lower surface of the tip of the binding tape T held by and between the receiving plate 2 and the holding plate 21 (See Fig. 4 (d)). At this time, the pressurizing plate 61 first comes into contact with the tape and presses the right sides of the portions to be bonded of the binding tape T, thereby to prevent these portions of the binding tape T from being positionally shifted. In a short time, the heater 53 comes into contact with the binding tape T to press the tape portions to be bonded, whereby these tape portions are heat bonded to each other. Thereafter, the pressurizing and heating unit 5 is further pressed and the cutter 55 of the pressurizing and heating unit 5 elevates and cuts the binding tape T which is located as stretched between the moving and holding means 8 and the heater 53.

After the portion of the binding tape T at the side of the reel 13 has been cut with the cutter 55, the pressurizing and heating unit 5 is retracted and separated from the binding tape T. At this time, the pressurizing plate 61 of the sub-pressurizing unit 6 still continuously presses the right side of the bonded portion of the binding tape T while the temperature of the bonded portion is lowered to solidify the bonding up to a certain point (See Fig. 4 (e)). Thereafter, the sub-pressurizing unit 6 is separated from the binding tape T (See Fig. 4 (f) to complete the binding operation, and stands ready for the next binding operation.

A switch S is disposed on the upper surface of the table 1 on which the article to be bound A is placed (See Fig. 2). This switch S prevents the motor from being driven simultaneously with the completion of the binding operation, assuring safety in a series of the operations above-mentioned. More specifically, while the binding operation is under way and the article to be bound A is present on the table 1, the switch S is pushed down by the weight of the article A to be bound, thereby to prevent the motor from being driven for newly feeding the binding tape T. When the binding operation is complete and the article A to be bound is removed from the table 1, the switch S projects from the upper surface of the table 1 to enable the motor to be driven.

By repeating a series of the above-mentioned operations, the binding operations can be continuously carried out. The binding apparatus of the present invention can be applied for a variety of articles including printed matter such as paper money, catalogues, public lotteries and merchandise bonds, or paper for printing, and so forth. Further, this binding apparatus can also be safely applied for articles, for example dried lavers for Japanese sushi dish which are soft in themselves and susceptible to damage if excessively bound.

In accordance with the already described embodiment, the pressurizing plate 61 of the sub-pressurizing unit 6 continuously presses the bonded portion of the tape for a predetermined period of time after the heater 53 of the pressurizing and heating unit 5 has been separated from the binding tape. Accordingly while cooling, the bonded portion of the tape is still under way and the bonding is not solidified yet immediately after the tape has been bonded, the bonded portion can be maintained as pressed, thereby to prevent the bonded surfaces from detaching from each other.

In the above-mentioned embodiment, tape delivery and binding is achieved by the tape travelling mechanism including two rollers, i.e., the delivery roller 31 and the binding roller 32, but this can be achieved by a single roller which is forwardly and reversely rotatable. The tape cutting cutter may be disposed adjacent the holding plate 21 under the receiving plate 2 and may be longitudinally moved from the inside of the table 1 toward the passage groove 10 to cut the tape.

The moving timings of the pressurizing and heating unit 5 and the sub-pressurizing unit 6 may be electrically controlled by use of solenoids, instead of mechanical control by the eccentric cams 71 and 72 as in the embodiment.

Although the present invention has been described in detail based on the embodiment of the binding apparatus with a tape with reference to the attached drawings, it should be understood that the present invention is not limited to this embodiment and is modifiable within the scope of the appended claims.

As hereinbefore discussed, in accordance with the binding apparatus with a tape of the present invention, until the tape bonded portion is cooled to complete or substantially complete the bonding after the pressurizing and heating means has been separated from the tape, the sub-pressurizing

means presses the tape bonded portion to prevent the bonded surfaces from detaching from each other, thereby assuring reliable binding.

Claims

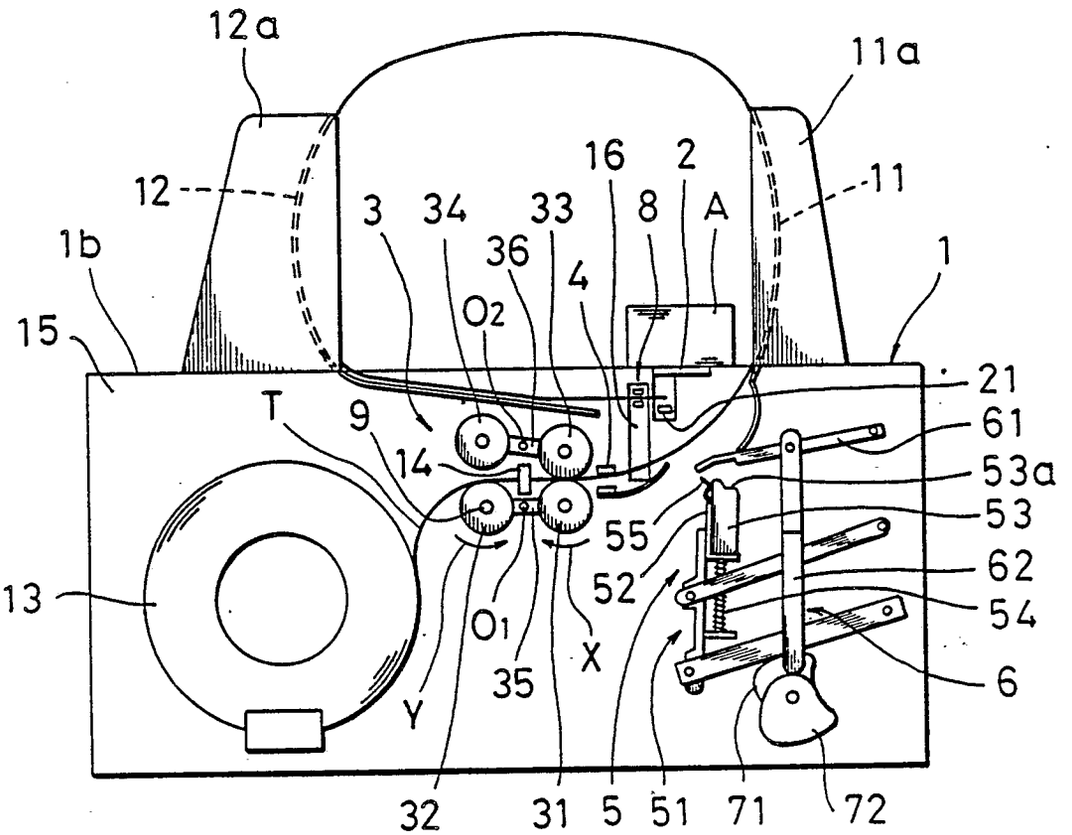
1. A binding apparatus with a tape (4) comprising:
tape rotating means (8) for rotating, substantially by one revolution, the tip of a heat-bonding tape (T) reeled out from a reel (13), thereby to form a loop;
tape travelling means (3) for further reeling out said tape from said reel to enlarge said loop to a predetermined size and for reeling said tape (T) in said reel (13) such that said tape (T) is wound round an article to be bound which has been inserted in said loop;
pressurizing and heating means (5) for heat-bonding under pressure the tip, where the tape (T) starts winding, of the tape wound round the article to be bound and the end thereof, where the winding terminates: and
cutting means (55) for cutting a predetermined portion of said tape (T) bonded by said pressurizing and heating means (15);
said binding apparatus with a tape (T) characterized by further comprising sub-pressurizing means (6) for continuously pressing the bonded portion of said tape (T) for a predetermined period of time after said pressurizing and heating means (5) has been separated from said bonded portion of said tape (T).

2. An apparatus with a tape (T) according to claim 1, wherein the pressurizing and heating means (5) and the sub-pressurizing means (6) are respectively driven by rotary cams (71, 72) shifted in phase.

3. An apparatus with a tape (T) according to claim 1, wherein the cutting means (55) is integral with the pressurizing and heating means (5).

4. An apparatus with a tape (T) according to claim 1, wherein the tape travelling means (3) is so arranged that two rollers (31, 32) rotatingly driven in opposite directions alternately come in contact with the tape, and the roller (32) for reeling in the tape is driven through a torque limiter (100).

Fig. 1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1b
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61
14
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71
72

Fig. 2

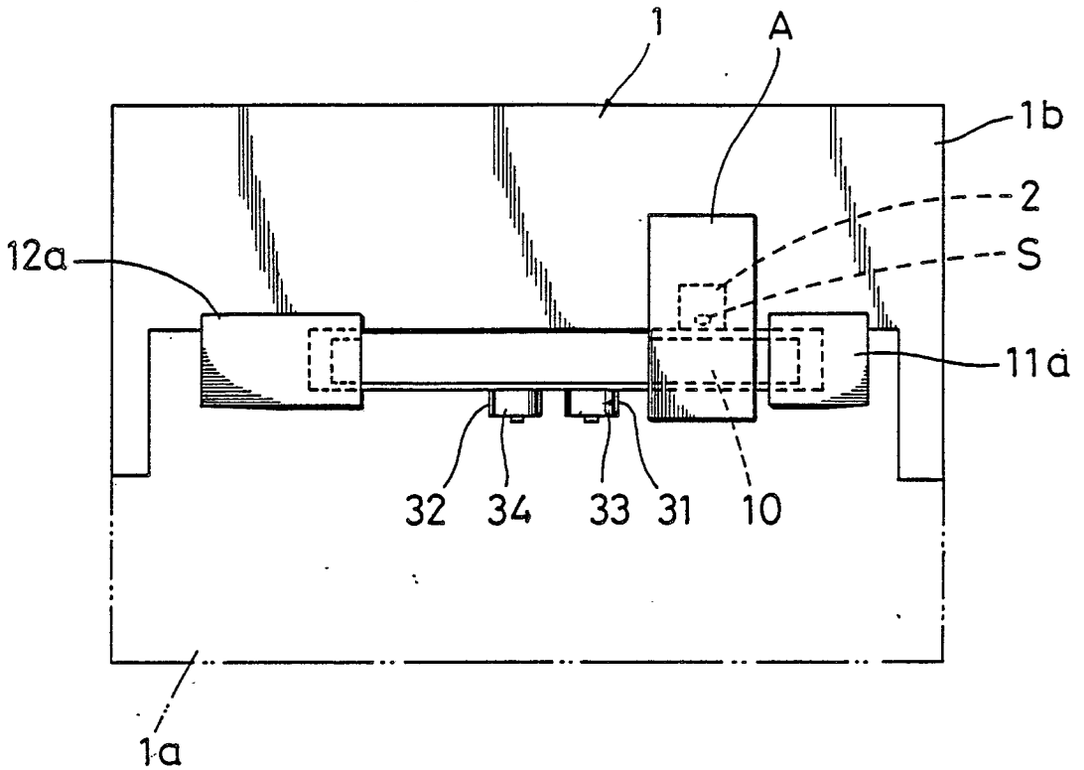


Fig. 3

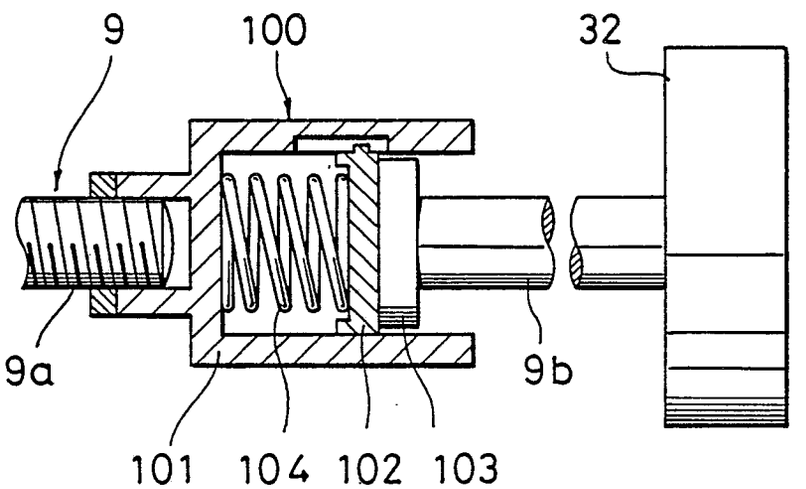
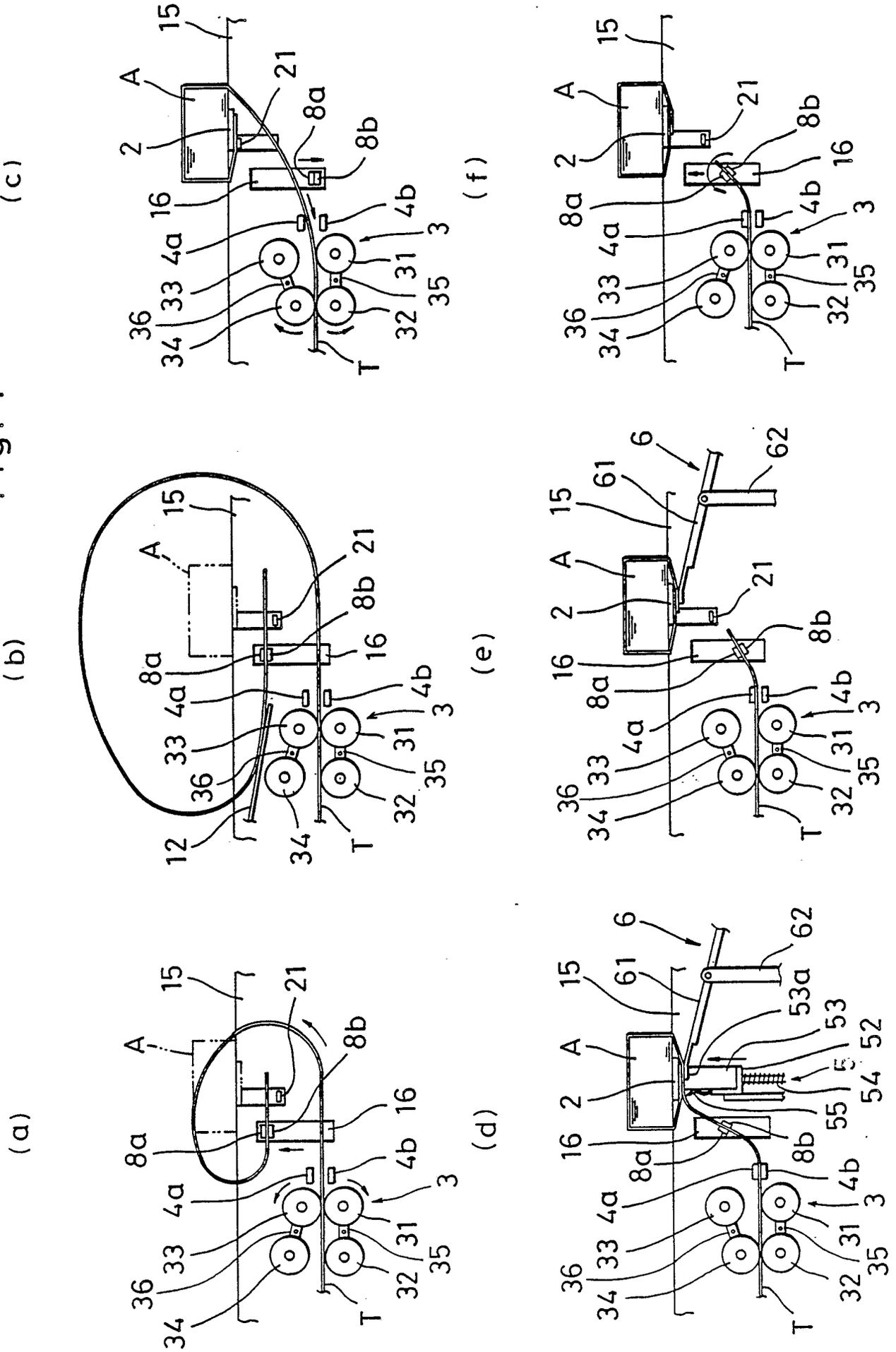


Fig. 4


(a)
(b)
(c)
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(e)
(f)
A
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Fig. 5

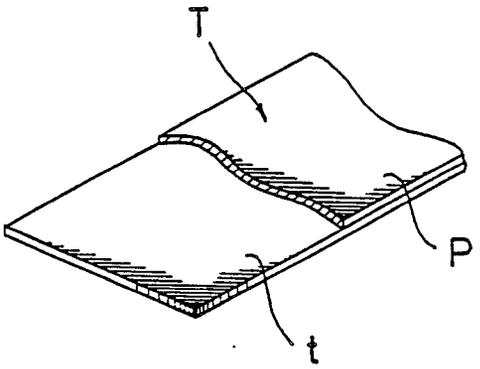


Fig. 6

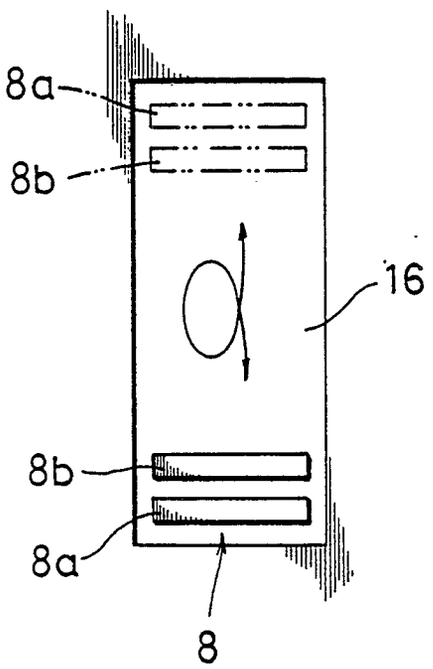
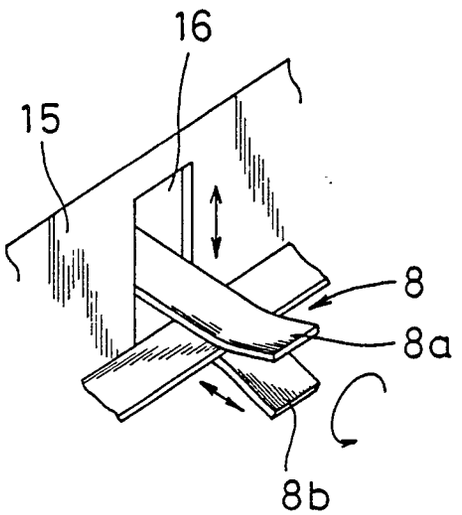


Fig. 7



European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 87 31 1424

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.4)
Y	US-E- 31 353 (SIGNODE) * Column 4, line 59 - column 5, line 12; figures 1-5 *	1,3,4	B 65 B 13/32 B 65 B 13/22
Y	US-A-4 174 995 (RECOGNITION EQUIPMENT) * Column 14, line 16 - column 15, line 46; figure 19 *	1,3,4	
A	GB-A- 489 050 (SUTTON) * Page 2, line 108 - page 3, line 7; figures 1,2 *	2	
A	CH-A- 403 621 (GIRSBERGER) * Page 1, line 73 - page 2, line 14; figures 1,2 *	3	
Y	EP-A-0 189 519 (NICHIRO) * Page 2, line 4 - page 3, line 22; figures 2,3 *	4	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

B 65 B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	24-08-1988	CLAEYS H.C.M.

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