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(54) Carton sealer using paper tapes

(57) A carton sealer using paper tapes includes a work table (1), an elevator (2), two tape machines (3), and a contact wheel unit (4). When a carton (10) is placed and moved on the table, it touches a following wheel (351) of an upper tape machine and is adhered with a paper tape. The carton and the following wheel continue to move forward until a micro switch 3511) separates from a projection (3531) of a turning member (353) of the following wheel and an air cylinder (3553) touches again the micro switch and is stopped. Then a spring (3543) pulls back the following wheel and press wheel (352) to their original position, finishing one round of tape sealing operations.

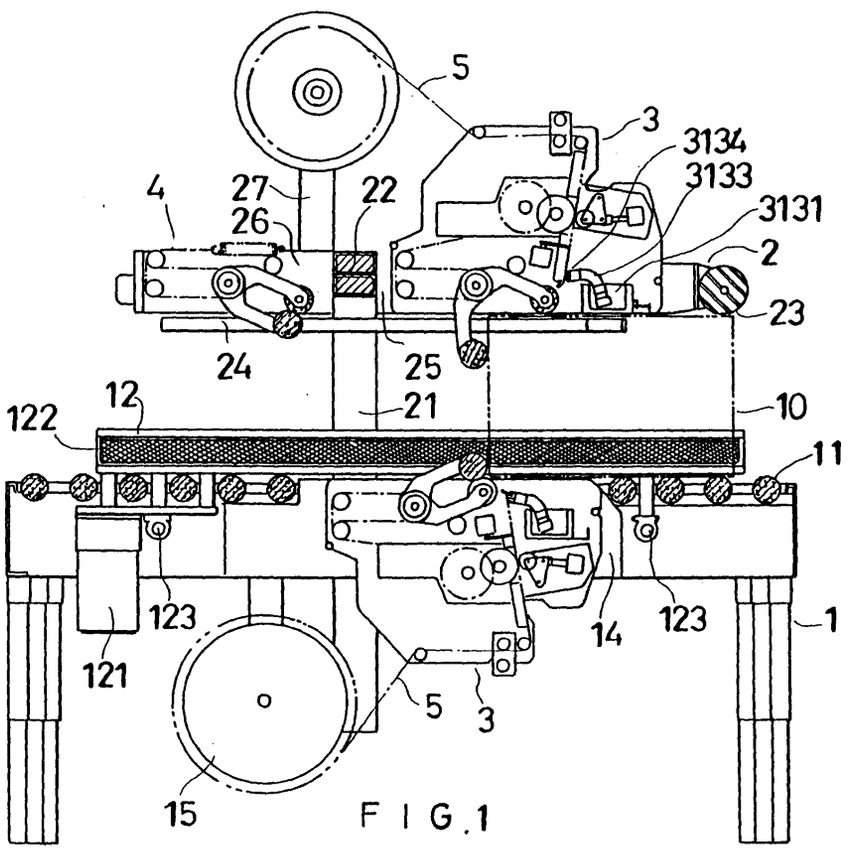

FIG.1

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Description

FIELD OF THE INVENTION

[0001] This invention relates to a carton sealer using paper tapes, particularly using a paper tape, which is adhered automatically on a carton.

[0002] A common conventional carton sealer uses a brown yellow plastic glued tape or a transparent plastic tape in sealing cartons. It is impossible to use tapes made of brown packing paper, which has different physical features from the aforesaid tapes.

[0003] However, the aforesaid plastic tapes become useless after removal from cartons, and are discarded as garbage. As widely known, plastic cannot erode biologically for a long time, polluting our environment and underground water to give a large impact to our daily life. In addition, if it is burned, it will give out toxic gas to impair our health. So a pressing tendency nowadays is to use as little plastic for bags or tapes as possible.

OBJECTS OF THE INVENTION

[0004] A principal object of the invention is to provide a carton sealer using a paper tape for sealing an upper flap and a bottom portion of a carton automatically by means of an upper and a lower tape machine.

[0005] Another object of the invention is to provide a carton sealer having a contact wheel unit behind the upper tape machine for applying once more a pressing action to the already adhered tape on a carton, ensuring that the tape is adhered firmly.

[0006] Another object of the invention is to provide a carton sealer having a water container to supply water at a constant temperature to a brush to give moisture to the glue of a paper tape so as to obtain good viscosity of the paper tape to be applied.

[0007] A further object of the invention is to provide a carton sealer having a plate unit for holding a paper tape for a cutter to cut at a proper time so that the tape may be moisturised and have considerable tensile strength and, therefore, not liable to be torn off.

[0008] One more object of the invention is to provide a carton sealer having a push wheel and a press wheel held on the same shaft with Cupertino of a spring and an air cylinder for obtaining proper adhering pressure with elastic pulling to suit to different tensile strengths of paper tapes.

SUMMARY OF THE INVENTION

[0009] According to the present invention there is provided a carton sealer as defined in Claim 1.

[0010] Other preferred features of the invention are defined in the subsidiary claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011]

Figure 1 is a front view of a preferred embodiment of carton sealer in accordance with the present invention;

Figure 2 is a side view of the carton sealer of Figure 1;

Figure 3 is a an exploded perspective view of a tape machine of the carton sealer of the present invention;

Figure 4 is a cross-sectional view of the tape machine of the carton sealer of the present invention;

Figure 5 is a right side view of the tape machine of the carton sealer of the present invention;

Figure 6 is a left side view of the tape machine of the carton sealer of the present invention;

Figure 7 is a plan view of the tape machine of the carton sealer of the present invention;

Figure 8 is a front view of the carton sealer of the present invention, showing it at one stage of a cycle of operations;

Figure 9 is a front view of the carton sealer in the present invention, showing it at another stage of a cycle of operations; and

Figure 10 is a perspective view of a contact wheel of the carton sealer of the present invention, showing its direction of movement.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0012] A preferred embodiment of a carton sealer in accordance with the present invention, as shown in Figs. 1 and 2, includes a work table I, an elevator 2, two tape machines and a press wheel unit 4 as main components combined together.

[0013] The work table 1 includes a roller unit 11, a conveyor 12 consisting of a motor 121, a conveyor belt 122 for moving cartons 10, a threaded rod 123 for adjusting the conveyor belt 122 to match cartons to be moved thereon. Further, the work table 1 includes a tape machine chamber 14 under the work table 1 for depositing a lower tape machine 3 therein, and a wheel frame 15 below the table 1.

[0014] The elevator 2 includes a vertical post 21 stand on the work table 1 and a horizontal beam 22 fixed on the vertical post 21, a guide wheel unit 23 in a front side for folding flaps of a carton so as to let the carton move

smoothly on the table 1. The elevator 2 further has a guide frame 24 under the horizontal beam 22 so as to be moved back and forth in order to limit the position of a carton and to guide it to move forward smoothly. Further, the elevator 2 has an upper tape machine chamber 25 in a front portion of its interior and a rear base 26 in a rear portion of its interior so that an upper tape machine 3 and a press contact wheel unit 4 may be deposited therein. In addition, a wheel frame 27 is provided at a proper point on the elevator 2.

[0015] Each of the two tape machines 3 includes a plate unit 31, a clamp plate unit 32, a press wheel unit 33, a transmit unit 34, a contact wheel unit 35, and a cutter unit 36 as its components combined together.

[0016] The plate unit 31 consists of a main plate 311 and an auxiliary plate 312 respectively provided with many corresponding holes for combining other components between the plates 311 and 312. Further a case 313 is provided at a front end of the plate unit 31, and an L-shaped frame 314 is fixed at a bottom for fixing a guide wheel unit 315 and a width adjusting rod 316.

[0017] The clamp unit 32 consists of a thick plate 321, a guide plate 322, a press plate 323, and a contact block unit 324 combined together.

[0018] The thick plate 312 is a little inclined, having a notch 3211 on an upper side, a plurality of threaded holes 3212 and a recess 3213 in the upper side.

[0019] The guide plate 322 is fitted in the notch 3213, having a rectangular hole 3221 to face a rectangular hole 3231 of the press plate 323.

[0020] The press plate 323 has the rectangular hole 3231 and another hole 3232 in a lower portion for combining the contact block unit 324, and combine boles 3233 each consisting of a large hole and a small hole around an outer circumference.

[0021] The press wheel unit 33 consists of a press wheel 331, two push plates 332, 332, a connect shaft 333, a stationary plate 334, an air cylinder 335, a housing 336, and a lid 337 combined together.

[0022] The press wheel 331 has a proper softness in its circular surface, pivotally connected with the two push plates 332, 332.

[0023] The two push plates 332, 332 are also connected with a shaft 3321 at an upper end, and the shaft 3321 is also pivotally connected with the connect shaft 333.

[0024] The stationary plate 334 is fixed with the air cylinder 335, with an output shaft of the air cylinder 335 protruding through the stationary plate 334 to connect with the connect shaft 333. Then the stationary plate 334 with the related components are deposited in the housing 336, with the two push plates 332, 332 having their lower holes 3322, 3322 pivotally connected with the housing 336 and functioning as fulcrums to be pushed by the air cylinder 335 to force the press wheel 331 to move near to the paper tape on the clamp plate unit 32 to keep it in a properly tense condition.

[0025] The lid 337 closes on the housing 336, having a notch 3371 in a side for a pipe of the air cylinder 335 to pass through. The transmit unit 34 consists of a power source 341, a large gear 342, a shaft 343, a transmit wheel 344, a small gear 345 and a case 346 combined together.

[0026] The power source 341 may be a motor or an air cylinder to connect and move the large gear 342 engaging the small gear 345, which is connected with and rotates the transmit wheel 344 extending into the notch 3211 of the thick plate 321 and move the tape with Cupertino of the press wheel 331.

[0027] Then the transmit unit 34 is deposited in the case 346, which is then combined with the thick plate 321 by means of a projecting edge 3461 of both sides of a rear end and holes 3462 with screws.

[0028] The contact wheel unit 35 consists of a following wheel **351**, a press wheel 352, a turning member 353, a push gear 354, a press gear 355, and a centre shaft 356.

[0029] The following wheel 351 and the press wheel 352 are positioned in an opposite position, respectively fixed with the press gear 355 and with the push gear 354. Further, the turning member 353 is connected with one side of the following wheel 351, having a projection 3531 to contact a micro switch 3511 so as to control the air cylinder 3553 in its operation.

[0030] Around the push gear 354 extends a first endless chain 3541, which also extends around a first roller 3542 elastically pulled by a spring 3542. Further, a second endless chain 3551 extends around the press gear 355 and around a second roller 3552 pulled by the air cylinder 3553.

[0031] The cutter unit 36 consists of a shaft housing 361, a spring 362, a shaft 363 and a cutter 364. The cutter has a hole 3641 at one side for a shaft 3642 to fit through to connect with an air cylinder 365, which has an end base 366 to pivotally connect with a T-shaped base 367 fixed with the auxiliary plate 312. Then the cutter 364 cuts the tape at the proper time, moved by the air cylinder 365.

[0032] After the above-mentioned components are assembled together, as shown in Figs. 4-7, the tape *5* extends from the wheel frame 15,27, guided by the guide wheel 315 on the L-shaped frame 314 and the width adjusting rod 316 to move between the thick plate 321 and the guide plate 322 to reach the following wheel 351 and the press wheel 362. Then the tape *5* is moved forward by the transmit wheel 344 with Cupertino of the press wheel 331. A water container 3131 at a constant temperature is provided with the work table 1, supplying water of proper temperature to a container 3131 in the case 313. Then water flows through an curved arm 3133 to a brush 3134 fixed at an outer end of the arm 3133, and then the brush, moisturised with water, brushes the glue on the tape *5* so as to increase the viscosity and adhesiveness of the tape 5.

[0033] The press wheel unit 4 has the same structure as the contact wheel unit 35 of the tape machine 3 and

will, therefore, not be described minutely here again. The press wheel unit 4 consists of a following wheel 41, a press wheel 42, a turning member 43. a push gear 44, press gear 45, and a centre shaft 46. The following wheel 41 and the press wheel 42 are located in an opposite direction, respectively fixed with the push gear 44 and the press gear 45, with the following wheel 41 connected in the inside, with the turning member 43 having a projection 432. Around the push gear 44 extends a third endless chain 441, which also extends around a third roller 442 elastically pulled by a spring 443. Around the press wheel extends in an opposite direction a fourth endless chain 451, which also extends around a fourth roller 452 pulled by an air cylinder 453.

[0034] Referring to Figs. 1, 8, 9 and 10, when a carton 10 is moved onto the table 1, it touches the contact wheel 351 of the tape machine 3 on an upper position, and begins to be adhered with a tape 5 coming from the upper tape machine 5. as shown in Fig. 8. Then the contact wheel 351 continues to move forward together with the carton being moved, with the micro switch 511 separating from the projection 3531 of the turning member 353, and with the air cylinder 3533 moving to touch the micro switch 3511 to be stopped. Then the spring 3543 pulls the contact wheel 351 and the press wheel 352 back to its original position, finishing one round of sticking a tape on a carton.

[0035] The carton sealer using a paper tape in accordance with the invention has two important features as follows:

1. It includes two tape machines which are able to use a paper tape for sealing a carton automatically, compared with a conventional carton sealing machine which can only use a plastic tape.

2. It includes an elevator provided with a press wheel unit at its rear end, repeating the compressing action with comparative force to the already adhered tape once again for perfecting the sealing operation, and resulting in more effect in sealing.

[0036] While the preferred embodiment of the invention has been described above, it will be recognised and understood that various modifications may be made therein and the appended claims are intended to cover all such modifications which may fall within the spirit and scope of the invention.

Claims

1. A carton sealer using paper tapes, comprising:

a work table including a roller unit and a conveyor, said conveyor having a motor and a conveyor belt for moving a carton, a threaded rod respectively provided at two opposite sides for adjusting said conveyor belt according to the size of cartons to be sealed, a tape machine chamber below said work table for receiving a lower tape machine therein and a tape wheel frame combined with said lower tape machine;

an elevator including a vertical post standing on said work table and a horizontal beam fixed on said vertical post, a guide wheel unit fixed in front of said elevator for pressing down foldable flaps of a carton so as to let the carton move forward smoothly on said conveyor belt, a guide frame provided in a lower portion for limiting the position of a carton and guiding it to move forward, an upper tape machine chamber provided in a front portion of an interior for receiving an upper tape machine, a rear base in a rear portion of said interior for receiving a press wheel unit, and a tape wheel frame fixed at a proper location;

two tape machines respectively including a plate unit, a clamp plate unit, a press wheel unit, a transmit unit, a contact wheel unit and a cutter unit, a paper tape being hung respectively on two tape wheel frames and extending around a guide wheel unit fixed on an L-shaped frame, and then extending between a thick plate and a guide plate of said clamp plate unit and reaching a following wheel of said contact wheel unit, said paper tape then being easily moved forward by a transmit wheel of said transmit unit co-operating with a press wheel of said press wheel unit, each said tape machine further respectively having a water container of constant temperature fixed with said table for supplying water of proper temperature to a water case, said water case then supplying water to a curved arm and then to a brush attached on an outer end of said curved arm, said brush brushing and coating water on the glue on said paper tape so as to increase the viscosity and adhesiveness of said paper tape; and

a press wheel unit having the same structure as said contact wheel unit of each said tape machine, including a following wheel, a press wheel, a turning member, a push gear, a press gear and a centre shaft, said following wheel and said press wheel being positioned in an opposite direction, said following wheel fixed with said push gear, said press wheel fixed with said press **gear**, said following wheel further fixed with said turning member in an inside, said turning member having a projection, around said push gear extending a third endless chain which also extends around a third roller pulled by a spring, around said press gear extending a fourth endless chain which also extends around a fourth roller pulled by an air cylinder; and the arrangement being such that

a carton can be placed and moved on said table to contact said following wheel of said upper tape machine and then said tape beginning to be adhered on said carton, said carton further being moved and carrying said following wheel forward together until said projection of said turning member separates from a micro switch, said air cylinder being stopped when moving to touch again said micro switch, said spring then pulling back said following wheel and said press wheel to their original position to finish one round of tape sealing operations.

2. A carton sealer using paper tapes as claimed in Claim 1, wherein each said tape machine comprises:

a plate unit including a main plate and an auxiliary plate, said main plate and said auxiliary plate respectively having a plurality of corresponding holes for combining other components between them, a case in a front end, an L-shaped frame on a bottom for fixing a guide wheel unit and a width adjusting rod; and
a clamp plate unit consisting of a thick plate, a guide plate, a press plate and a contact block unit, said thick plate being inclined a little and having a notch and a recess on an upper side and a plurality of threaded holes, said guide plate fitting **in** said notch of said thick plate and having a rectangular hole facing a rectangular hole of said press plate, said press plate having said rectangular hole, another hole below said rectangular hole for combining with said contact block unit, and a plurality of combine holes spaced around an outer circumference;

3. A carton sealer using paper tapes as claimed in Claim 2, in which each tape machine comprises:

a press wheel unit including a press wheel, two push plates, a connect shaft, a stationary **plate.** an air cylinder, a housing and a lid, said press wheel having a soft circular surface and pivotally connected with said two push plates at two sides, each said push plate combined with a shaft at one end, said shaft then being connected pivotally with said connect shaft, said air cylinder being connected with said stationary plate and having its output shaft connected with said connect shaft, said press wheel unit being located in said housing, said two push plates respectively having a hole in a lower end for a shaft to fit in and in two sides of said housing to function as fulcrums to allow said push plates to swing, said air cylinder pushing said press wheel to move nearer to said paper tape located in said clamp plate unit so as to keep said tape in a properly tense condition, said lid closing on said housing and having a notch for a pipe of said air cylinder to pass through.

4. A carton sealer using paper tapes as claimed in Claim 3, in which each tape machine comprises:

a transmit unit including a power source, a large gear, a shaft, a transmit wheel, a small gear and a case, said power source being a motor or and air cylinder and rotating said large gear engaging with said small gear, said small gear and said transmit wheel both being fixed on said shaft to rotate together, said transmit wheel extending in said notch of said thick plate and rotating to move said tape with Cupertino of said press wheel, said transmit unit being located in said case, said case being combined with said thick plate at one side by means of two opposite projecting edges and a hole for a screw to screw in and a threaded hole of said thick plate as well.

5. A carton sealer using paper tapes as claimed in Claim 4, in which each tape machine comprises:

a contact wheel unit including a following wheel, a press wheel, a turning member, a push gear, a press gear and a centre shaft, said following wheel and said press wheel being located in an opposite direction, said following wheel being fixed with said push gear, said press wheel fixed with said press gear, said push gear fixed with said turning member in an inside, a side turning member having a projection to touch a micro switch for controlling an air cylinder, around said push gear extending a first endless chain which also extends around a first roller pulled by a spring, around said press gear extending a second endless chain which also extends around a second roller pulled by said air cylinder.

6. A carton sealer using paper tapes as claimed in Claim 5, in which each tape machine comprises:

a cutter unit including a shaft housing, a twist spring, a shaft and a cutter, said cutter having a hole in an upper side for a shaft to pass through to connect with an air cylinder, said air cylinder having a end base to connect pivotally with a T-shaped base, said T-shaped base being fixed with said auxiliary plate, and said cutter being moved by said air cylinder for cutting said tape at the proper time.

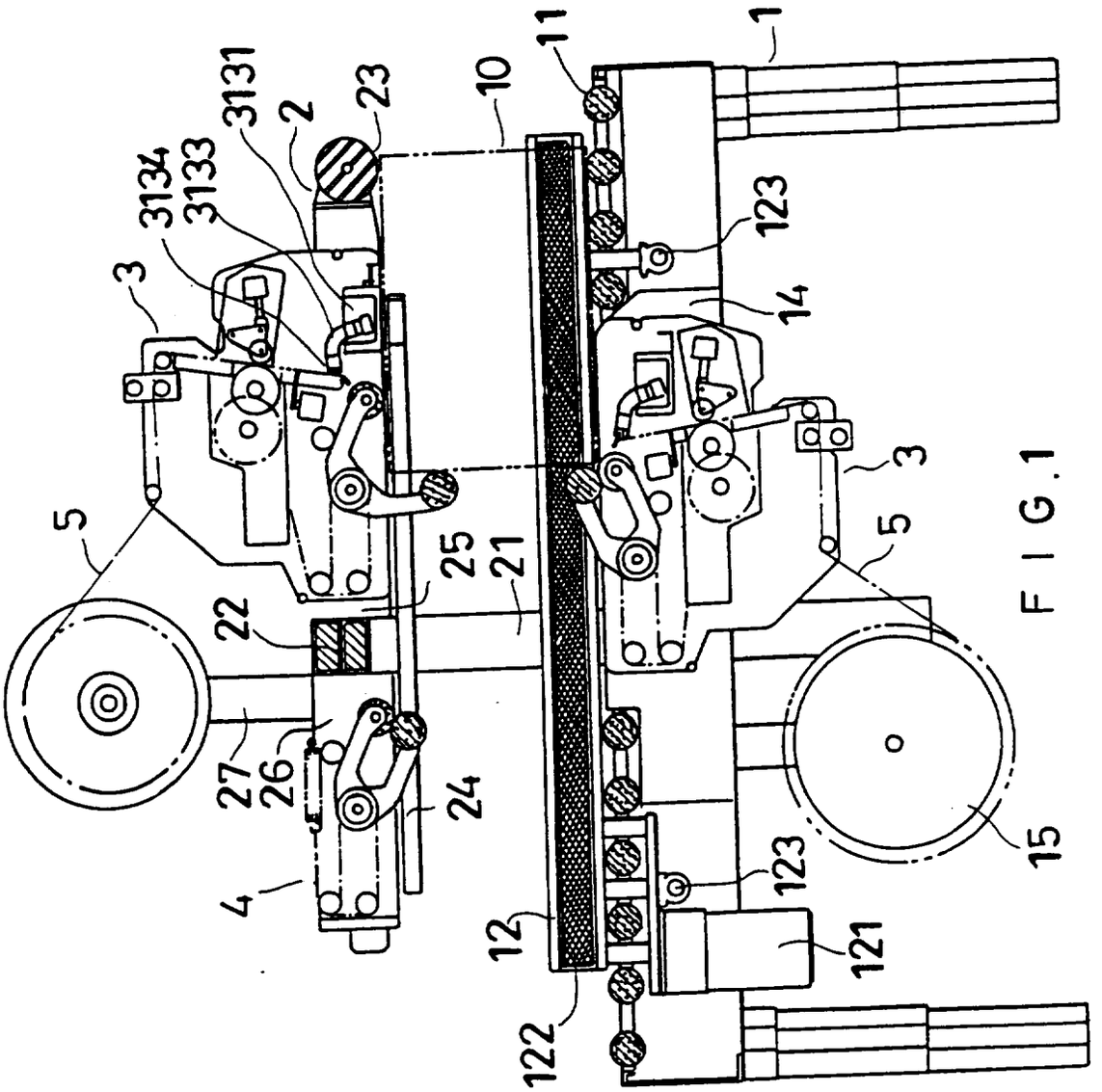
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FIG.1

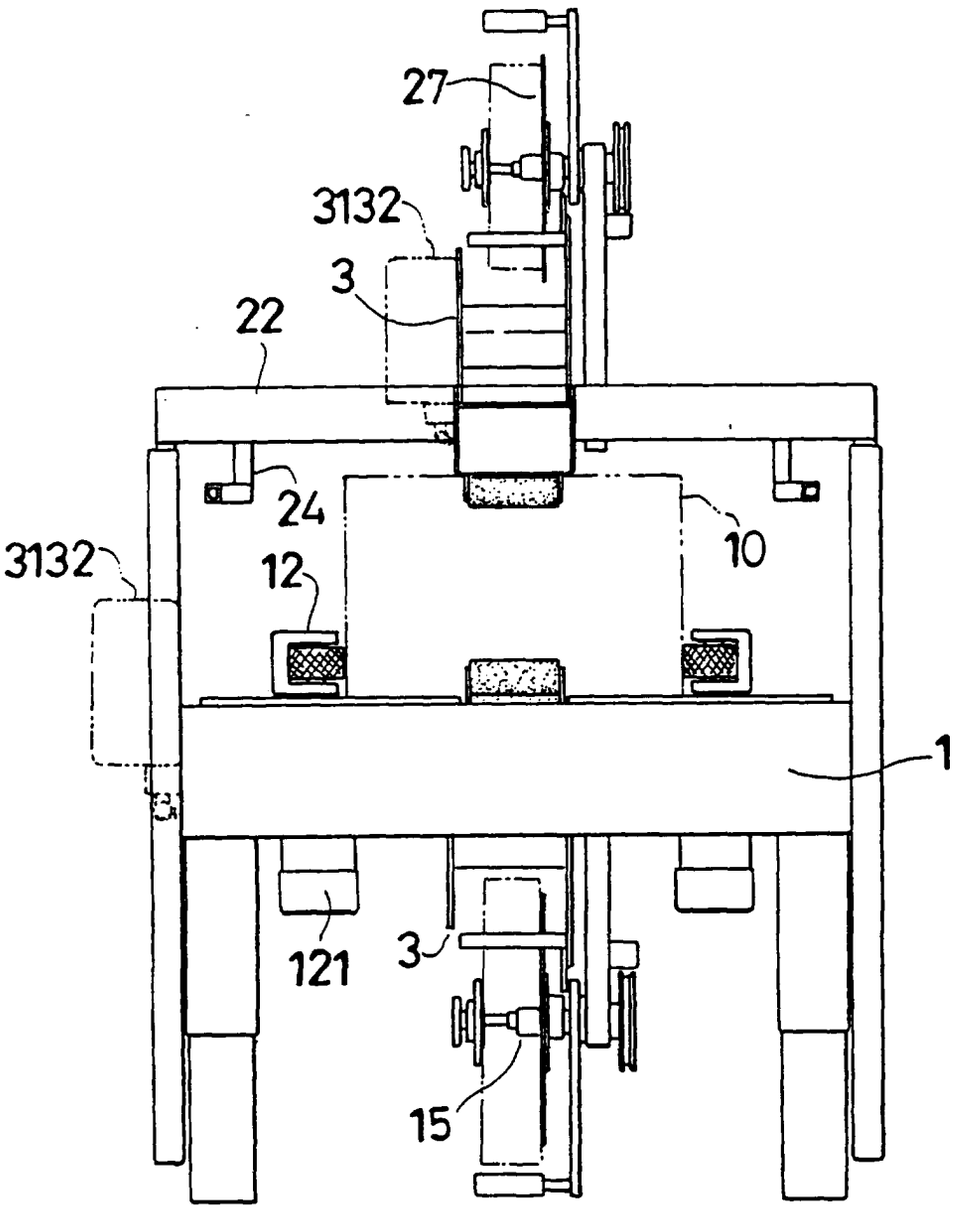

FIG.2

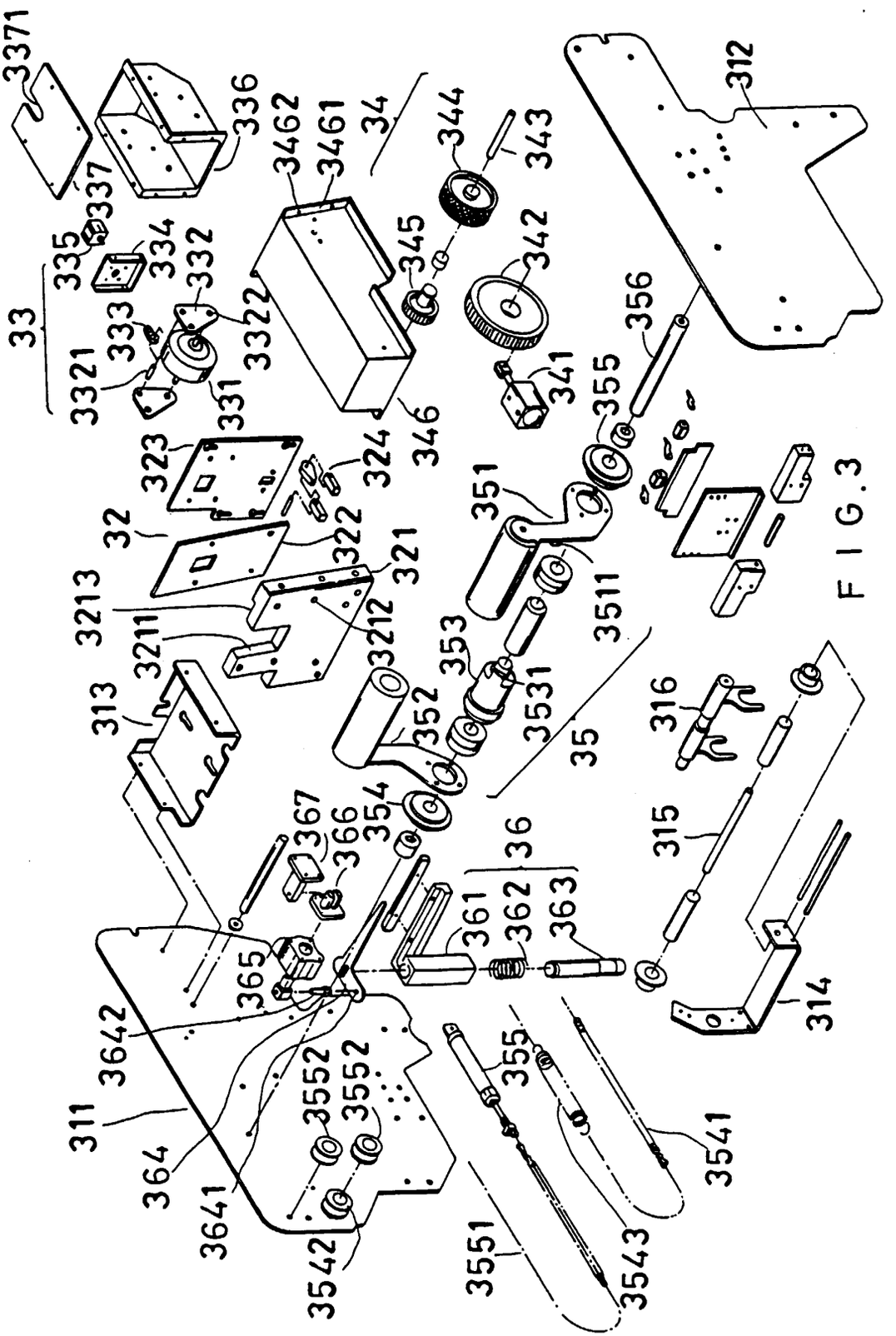
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FIG.3

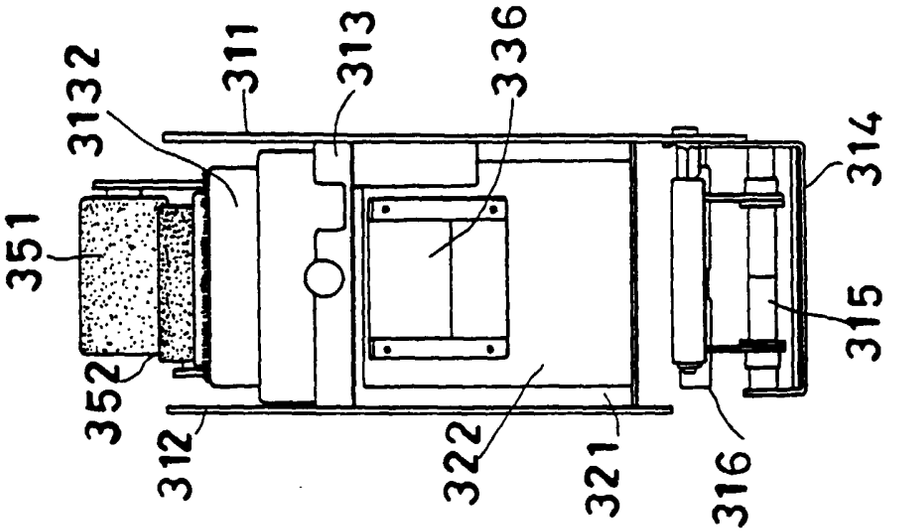
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FIG.5

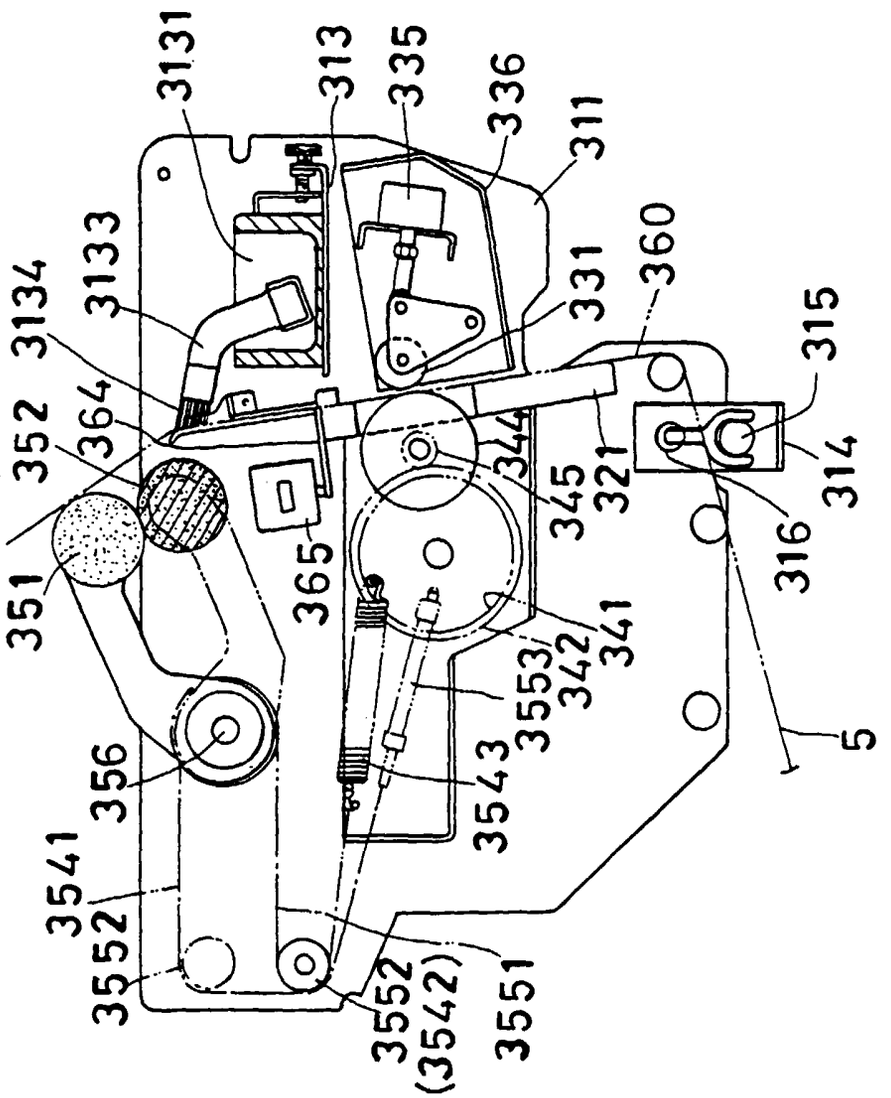
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FIG.4

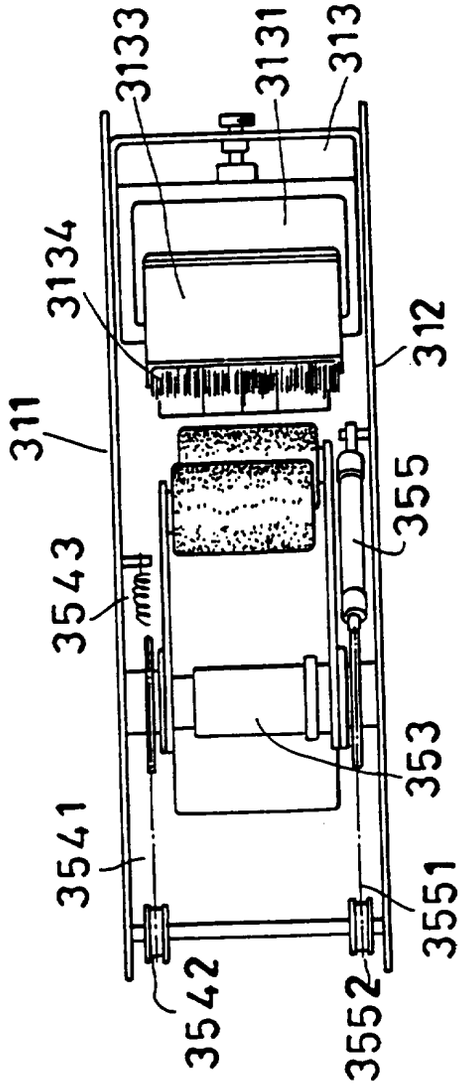
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FIG.7

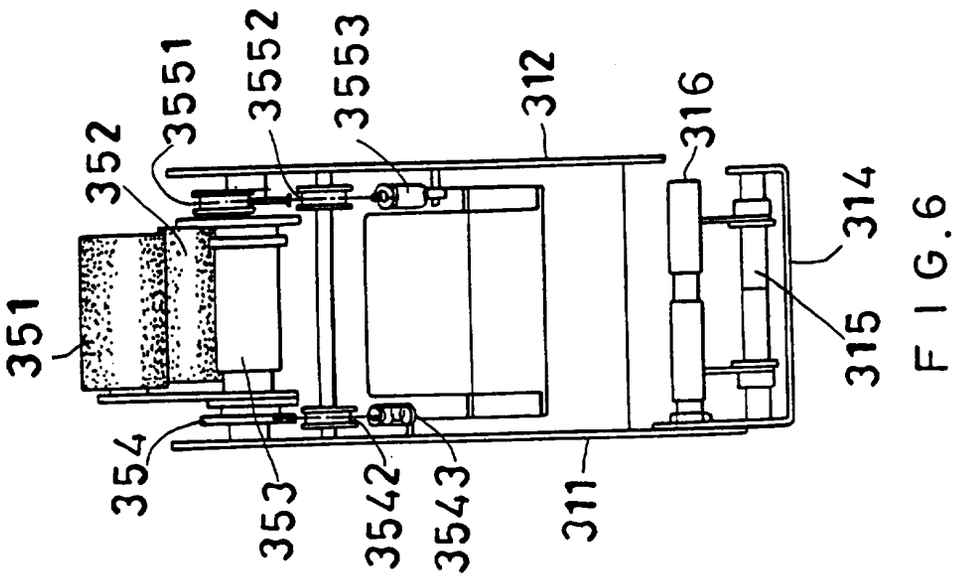
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FIG.6

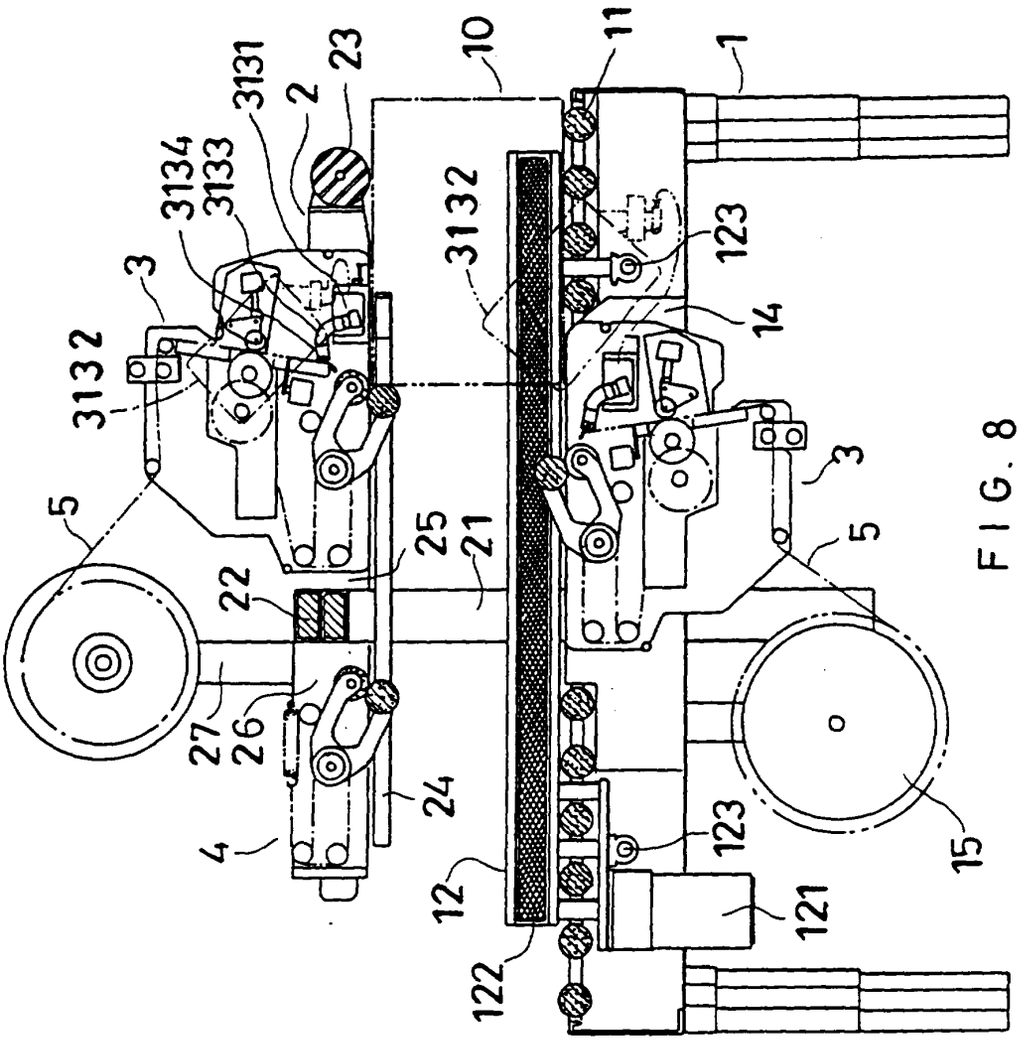
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FIG. 8

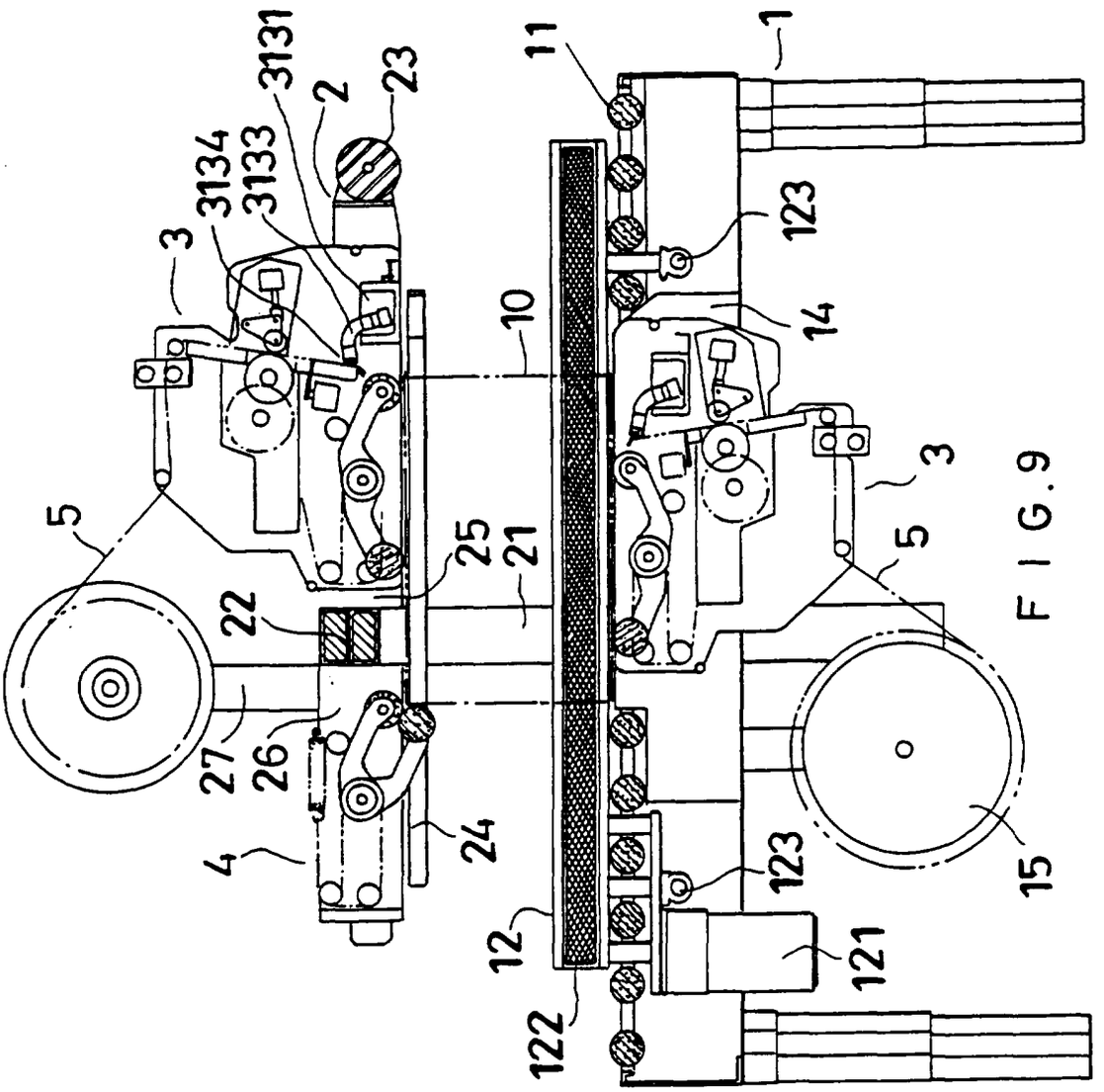
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FIG.9

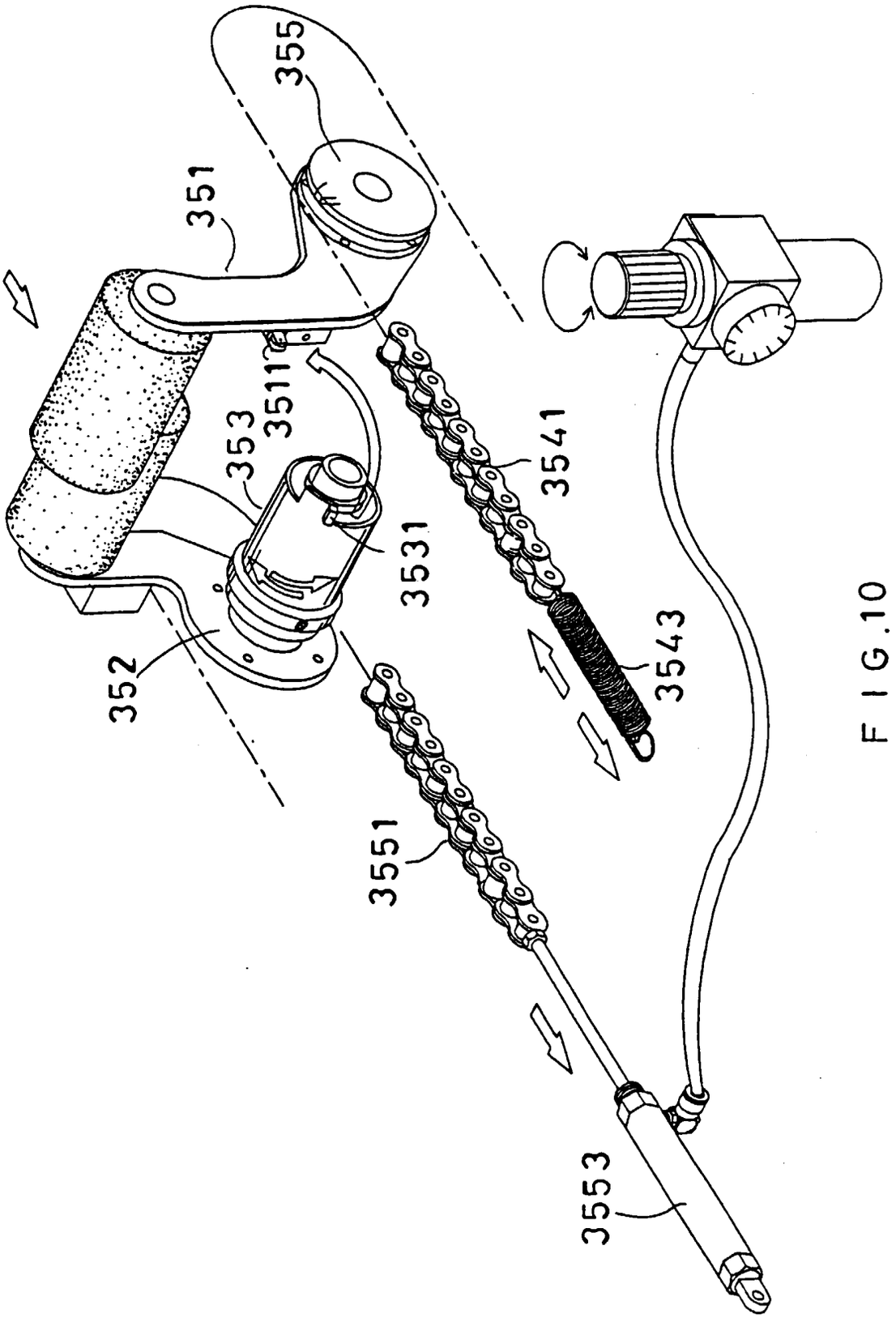

FIG.10

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 99 30 5994

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.7)
X	US 5 891 299 A (CHEN) 6 April 1999 (1999-04-06) * the whole document * ---	1-6	B65B51/06
A	EP 0 647 563 A (MARCHETTI) 12 April 1995 (1995-04-12) * column 3, line 14 - column 7, line 12; figures 1-7 * -----	1-6	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	5 January 2000	Grentzius, W

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 99 30 5994

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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05-01-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5891299 A	06-04-1999	NONE	
EP 647563 A	12-04-1995	IT MI932156 A	12-04-1995
		DE 69404254 D	21-08-1997
		DE 69404254 T	15-01-1998

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82