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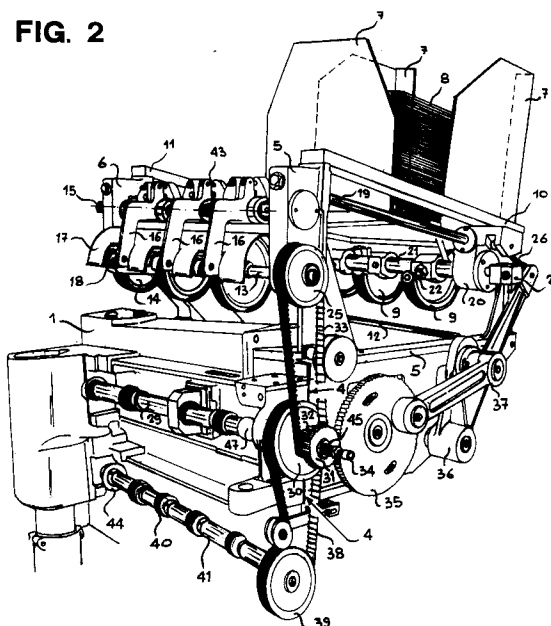
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I-20123 Milano(IT)**(54) **Device suitable for converting a wrapping machine fed by a continuous paper band into a cartoning machine fed by stacked cardboard cutouts.**

(57) The device suitable for converting a wrapping machine fed by a continuous paper band into a cartoning machine fed by stacked cardboard cutouts includes a framework (5,6) which supports a hopper (7) for stacks of cardboard cutouts (8) and which is connectable to an end (1) of the wrapping machine. A rotating shaft (21), provided with half wheels (9) and suckers (22), is reciprocatingly slidable, by kinematic elements (20,26,35,36,37), along guides (19) supported by the frame (5,6), from a position under the cardboard cutouts (8) to a plurality of transfer wheels (14). The individual cutouts (8) after being taken from the stack by the suckers (22), are fed through rollers (18) and the transfer wheels (14) and then deflected in a downward feed plane to the wrapping machine by fairing elements (17).

FIG. 2**EP 0 484 903 A1**

The present invention relates to a device suitable for wrapping parallelepipedal products in a cardboard wrapping, which can be mounted on machines made for wrapping said products in paper wrappings, so that said machines, equipped with the device of the present invention, are capable of equally wrapping the product in paper and in cardboard.

Products having the above indicated shape can be wrapped in paper (soft package) or in cardboard (rigid package), depending on the requirements of the market.

When the wrapping is made of paper, said paper arrives from a reel with a continuous band which is mounted on the wrapping machine, which is manufactured exclusively for performing paper wrappings; if the wrapping is instead made of cardboard, in most cases the material required to perform said wrapping of the product does not arrive from a reel but is constituted by flat portions of rigid or semi-rigid material which are punched or cutout with an appropriate shape and which are provided with scores at the folds for forming the box.

Currently, no machines capable of performing both soft packaging and rigid packaging are commercially available.

It is therefore necessary to install a machine for each type of wrapping and therefore two separate packaging lines.

The device according to the present invention is particularly suitable for complementing wrapping machines for soft packaging equipped with rotating wrapping wheels, and has the purpose of eliminating a packaging line for rigid packaging, since by mounting the device according to the present invention on a soft-packaging line, said line can alternately produce the two types of wrapping.

The device according to the present invention, suitable for converting a paper-wrapping machine fed by a continuous paper band into a cartoning machine fed by stacked cardboard cutouts, arriving from a magazine provided on said device, is characterized in that it comprises a frame which is rigidly connectable by means of related first means, with the cartoning machine and defines, on a side which is directed toward said machine, a pair of shoulders which support, in a transverse and parallel manner, a first shaft and a second shaft which are mutually superimposed, said first shaft being provided with pairs of angle brackets which elastically contrast one another, said second shaft being provided with a plurality of transfer wheels which are keyed thereon, said frame being provided, in an upward position, with a hopper for containing mutually stacked cardboard cutouts and being provided, on the side opposite to the one directed toward the cartoning machine, with

pneumatic-mechanical elements for removing the cutouts, said elements being alternatively movable between said sides and being actuated by related second means, third means for the rapid engagement/disengagement of the transmission of the motion of the cartoning machine to the device being provided on the side directed toward said machine, a plane for the descent of the cardboard cutouts into feeds toward said machine being furthermore defined between said side directed toward the machine and the cartoning machine itself.

Further characteristics and advantages of the invention will become apparent from a preferred but not exclusive embodiment, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a view, in broken (not solid) lines, of a machine for wrapping products in a soft package, which for the sake of brevity is hereinafter termed "basic machine"; said basic machine is provided with a rotating wrapping wheel 1 and with a paper reel 2; the broken line with arrows of said figure 1, which starts from the reel 2 and reaches point "A" (insertion in the descent plane) indicates the path followed by the paper to produce the soft package; in said figure 1, solid heavy lines indicate the device according to the present invention, mounted on the basic machine;

figure 2 is a perspective view of the device according to the invention;

figure 3 is a perspective view of the same apparatus from another angle, in order to point out details which cannot be identified in figure 2; figures 4, 5 and 6 are schematic views of the path of the cardboard cutout from the beginning of the cycle up to its insertion in the descent plane (point "A" of figures 1 and 6);

figure 7 is a sectional view of the front coupling which converts the basic machine for soft packages into a cartoning machine for rigid packages;

figure 8 is a perspective view of the front coupling described in figure 7.

With particular reference to figure 1, the reference numeral 1 indicates a rotating cartoning wheel of the "basic machine", and 2 indicates a paper reel intended to feed said machine for packaging soft packages.

The connection between the basic machine and the device of the present invention occurs between two planes of contact on the line indicated by 4 in figure 2; in said figure 2, 1 indicates the end of the basic machine; the coupling between said machine and the device occurs by means of bolts which engage threaded holes defined on the end 1.

In this manner, two shoulders 5 and 6 of the device of present invention form a monolithic unit with the "basic machine". Figure 2 also indicates the sides 7 of a hopper which contains the stacked cardboard cutouts 8 intended to form the rigid packages.

A frame which encloses the device according to the present invention is formed by the shoulders 5 and 6, stiffened by reinforcements 10 and 11 and by a spacer 12.

A shaft indicated by 21 is provided with three half-wheels 9, each of which has a sucker 22; by means of a support 20, the shaft 21, by virtue of a known kinematic system, moves with a reciprocating rectilinear motion by sliding on guides 19 of figure 2 and 19a of figure 3.

Through holes defined on the shaft 21 and a rotating pneumatic coupling 23, a negative pressure created by a vacuum pump allows the suckers 22 to engage the cardboard cutouts 8 one at a time from below.

Figure 3 shows that a gear 27 is fixed to the end of the shaft 21 and in turn engages a rack 28 which is fixed to the shoulder 6; the reciprocating rectilinear motion of the shaft 21 with the gear and the rack creates a bidirectional rotary motion on said shaft 21, which moves back and forth and rotates about its own axis.

Figures 4, 5 and 6 schematically indicate the rotation directions of the shaft 21 along the rectilinear advancement direction thereof.

In figure 4, the shaft 21 is at its rightward stroke limit and the suckers 22 aspirate the cutout; by reversing the direction of the rectilinear motion, by virtue of the kinematic system, it is evident in figures 5 and 6 that the direction of rotation of the shaft 21 is reversed; said shaft 21, with the suckers still aspirating, carries the cutout toward transfer wheels 14 of figure 2.

A shaft 15 arranged parallel above a shaft 13 is provided with six angle brackets 16 which are divided into two groups of three mutually contrasting brackets; each bracket is provided, at its lower end, with a rubber-covered roller 18 which can freely rotate about its own pivot, see figures 2, 4, 5 and 6; a fairing or U-shaped element 17 arranged above the wheels 14 keeps the cardboard cutout guided until it is inserted in the descent plane (point "A" of figure 1).

The six rollers 18 mounted on the angle brackets compress the cardboard on the wheels 14 by means of springs 43, increasing the adhesion of said cardboard for good traction without slippages which might cause displacements with respect to the cycle.

The kinematic system which moves the shaft 21 of figure 2 in a reciprocating rectilinear direction is constituted by gears 31 and 35, which are in turn connected to a connecting rod 37, an L-shaped lever 36 and an articulated connecting rod 26.

An output shaft 44 of figure 2 is provided, at its end, with a conical seat by means of which, with a simple operation, a rotating blade-holder shaft of the basic machine is replaced with a shaft 41, which is provided with acceleration rollers 40 which have the purpose of keeping the card properly flat during its descent.

The shaft 29 of figure 2 is part of the basic machine and is modified in order to allow the conversion thereof; the motion of the shaft 29 is drawn from the basic machine and is in step with the invention.

The shaft 29 of figure 2 is conveniently modified in its length; its extension comprises a shaft 45, and a front coupling is interposed between said two shafts; said coupling is shown in figure 7, but can also be provided in another manner.

Figure 7 is a sectional view of the above mentioned coupling, wherein 46 indicates a part of the base of the basic machine; at one end of the shaft 29 there is a blind hole which has the purpose of accommodating two cages of roller bearings 42 which in turn have the purpose of supporting the end of the shaft 45; a sleeve 47 is rigidly associated with the shaft 29 by means of a key 48; a slot is defined at the end of the sleeve 47 and has such dimensions as to be able to accommodate, in width and depth, a block 51, which in turn slides longitudinally within a through slot 52 defined on the shaft 45; a screw 34, on which a circumferential groove is defined at 49, has the purpose of moving the block 51 longitudinally by means of two screws 50 which engage therein.

Therefore, by tightening the screw 34, the block 51 enters the slot defined in the sleeve 47 and the two shafts 29 and 45 are mutually rigidly associated, becoming monolithic; the motion arriving from the shaft 29 is transmitted to the shaft 45, which transmits it to the gears of the kinematic system, figure 2, and to the pulleys 25, 32, 30, 39 by means of the belts 33 and 38.

By removing the paper flap from the descent plane, the basic machine is ready for packaging rigid packages.

In order to be able to package soft packages, it is sufficient to unscrew the screw 34 to disengage the shafts 29 and 45 and make them mutually independent, and it is furthermore necessary to mount the rotating blade-holder shaft of the basic machine instead of the shaft 41, figure 2; then the paper flap arriving from the reel is inserted in the descent plane.

The shaft 45 of figure 7 is supported by the roller cages 42 and by a bearing 53; a nut 54 of figure 7 is used to lock the screw 34 in the set position.

Rings 55 and 56 are used to lock the bearing 53 and the other elements of the coupling.

Figure 8 is a perspective view of the coupling between the shafts 29 and 45.

Although the present invention has been described in its preferred embodiment, it should be understood that it is not limited thereto, since it is susceptible to numerous variations and additions, without abandoning the concept of the present invention as described and according to the following claims.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1. Device suitable for converting a wrapping machine fed by a continuous paper band into a cartoning machine fed by stacked cardboard cutouts (8) arriving from a magazine (7) provided on said device, characterized in that it comprises a frame which is rigidly connectable, by means of related first means, with the cartoning machine and defines, on a side which is directed toward said machine, a pair of shoulders (5,6) which support, in a transverse and parallel manner, a first shaft (15) and a second shaft (13) which are mutually superimposed, said first shaft (15) being provided with pairs of angle brackets (16) which elastically contrast one another, said second shaft (13) being provided with a plurality of transfer wheels (14) which are keyed thereon, said frame being provided, in an upward position, with a hopper (7) for containing mutually stacked cardboard cutouts (8), and being provided, on the side opposite to the one directed toward the cartoning machine, with pneumatic-mechanical elements (9,20-23) for removing the cutouts, said elements being alternatively movable between said sides under the actuation of related second means (20,31,35-37), third means (29,45,47) for the rapid engagement/disengagement of the transmission of the motion of the cartoning machine to the device being provided on the side directed toward said cartoning machine, a plane (A) for the descent of the cardboard cutouts into

feeds toward said cartoning machine being furthermore provided between said side (1) directed toward said device and the cartoning machine itself.

2. Device according to claim 1, characterized in that said first means for rigid association with the cartoning machine are constituted by a plurality of bolts which engage related threaded holes defined in the end (1) of said machine which is directed toward the device.
3. Device according to claim 1, characterized in that said pairs of angle brackets (16) are constituted by shaped rockers which are mounted so as to be able to oscillate transversely on said first shaft (13), their lower ends being provided with respective rubber-covered rollers (18), their upper ends being provided for the compression of helical springs (43) having a substantially horizontal axis.
4. Device according to claim 1, characterized in that said transfer wheels (14) are rotated below a fairing (17) for cardboard cutouts which has its concavity directed toward said descent plane (A).
5. Device according to claim 1, characterized in that said pneumatic-mechanical elements for removing the cardboard cutouts comprise a third shaft (21) which is transverse to the direction of translatory motion of said cutouts, a plurality of half-wheels (9) being keyed on said shaft (21) in a parallel manner, said half-wheels (9) being provided for contact and for removal by adhesion with the lower faces of the cutouts (8) contained in the hopper, corresponding elements (22) for aspirating said cutouts being provided at the beginning of the active contact portion of said half-wheels.
6. Device according to claim 5, characterized in that said aspiration elements are constituted by a set of suckers (22), each of which is connected to a conventional source which produces a negative pressure.
7. Device according to claims 1 and 5, characterized in that said second means for the actuation of said pneumatic-mechanical elements with a reciprocating motion comprise a pair of mutually meshing gears (31,35), the small end of a connecting rod (37) being pivoted to at least one (35) of said gears, an end of an L-shaped lever (36) being in turn articulated to the big end of said connecting rod (37), the opposite end of said L-shaped lever (36) being

articulated by a movable support (20) on a first longitudinal guide (19) which is located laterally below said hopper (7), a further second guide (19a) being provided on the opposite side of said hopper, said second guide being parallel to said first one, a further support sliding on said second guide, a gear (27) being keyed on the end of said third shaft (21), said gear meshing with a linear rack (28) which is longitudinally rigidly associated with the frame, the advancement or retraction of said supports (20) causing the rotation of said gear (27) on the rack (28) and the rotation of the third transverse shaft (21), with removal of a cutout and conveyance thereof on the transfer wheels (14).

8. Device according to claim 1, characterized in that said quick engagement/disengagement means are constituted by a fourth transverse shaft (29) which is supported by the frame so as to be parallel to said first (15) and second (13) shafts and arranged below them, said shaft being divided, proximate to one end, into two half-shafts (29,45) which can be connected by means of a coupling (47) of the head-on insertion type which is coaxial thereto, said shaft being provided, at its opposite end, with at least one ring (55,56) for the actuation of axial movements which are defined with respect to the frame and are suitable for activating/deactivating said coupling by mutually connecting/disconnecting the half-shafts (29,45) and consequently the device to/from the cartoning machine.

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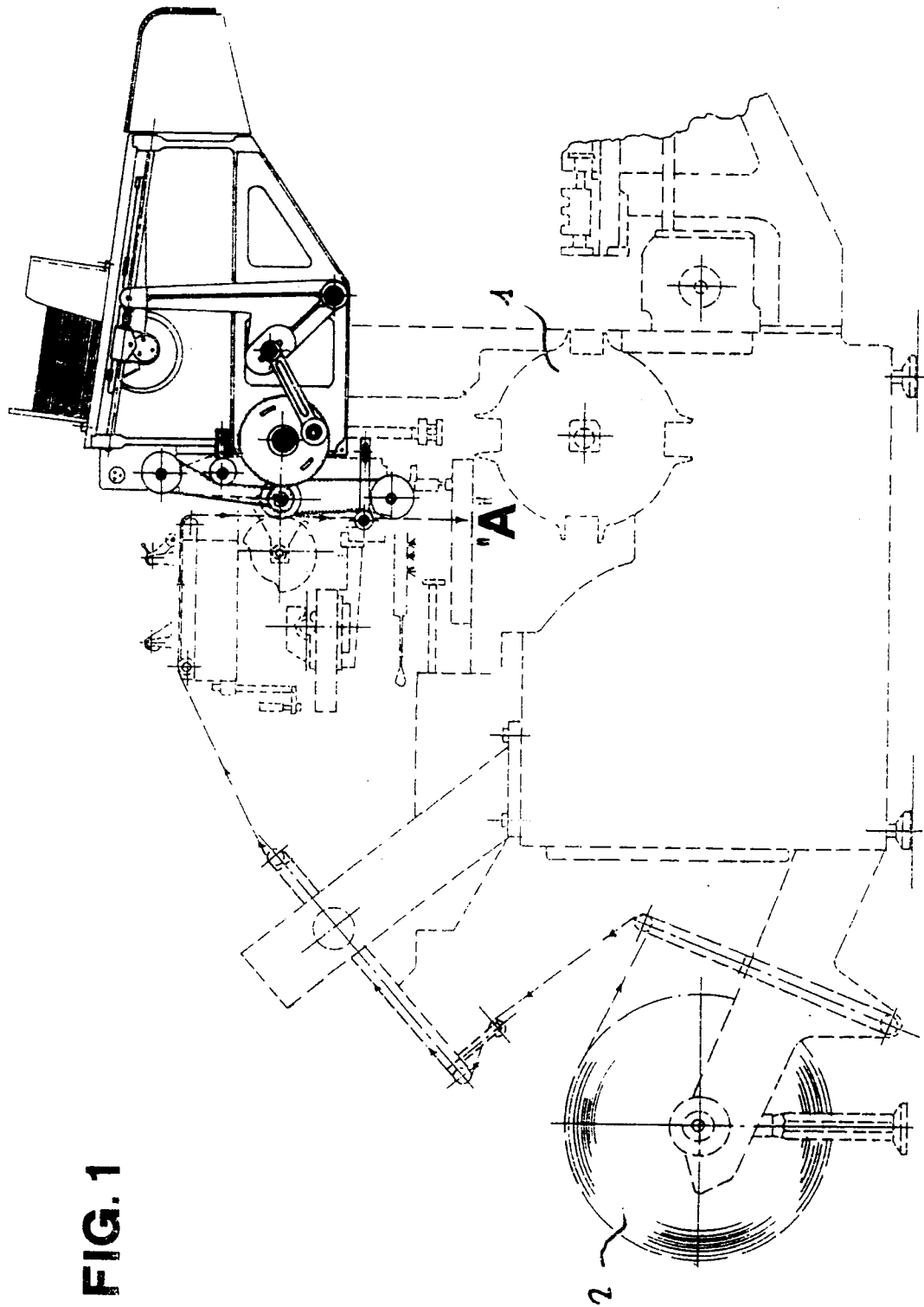


FIG. 2

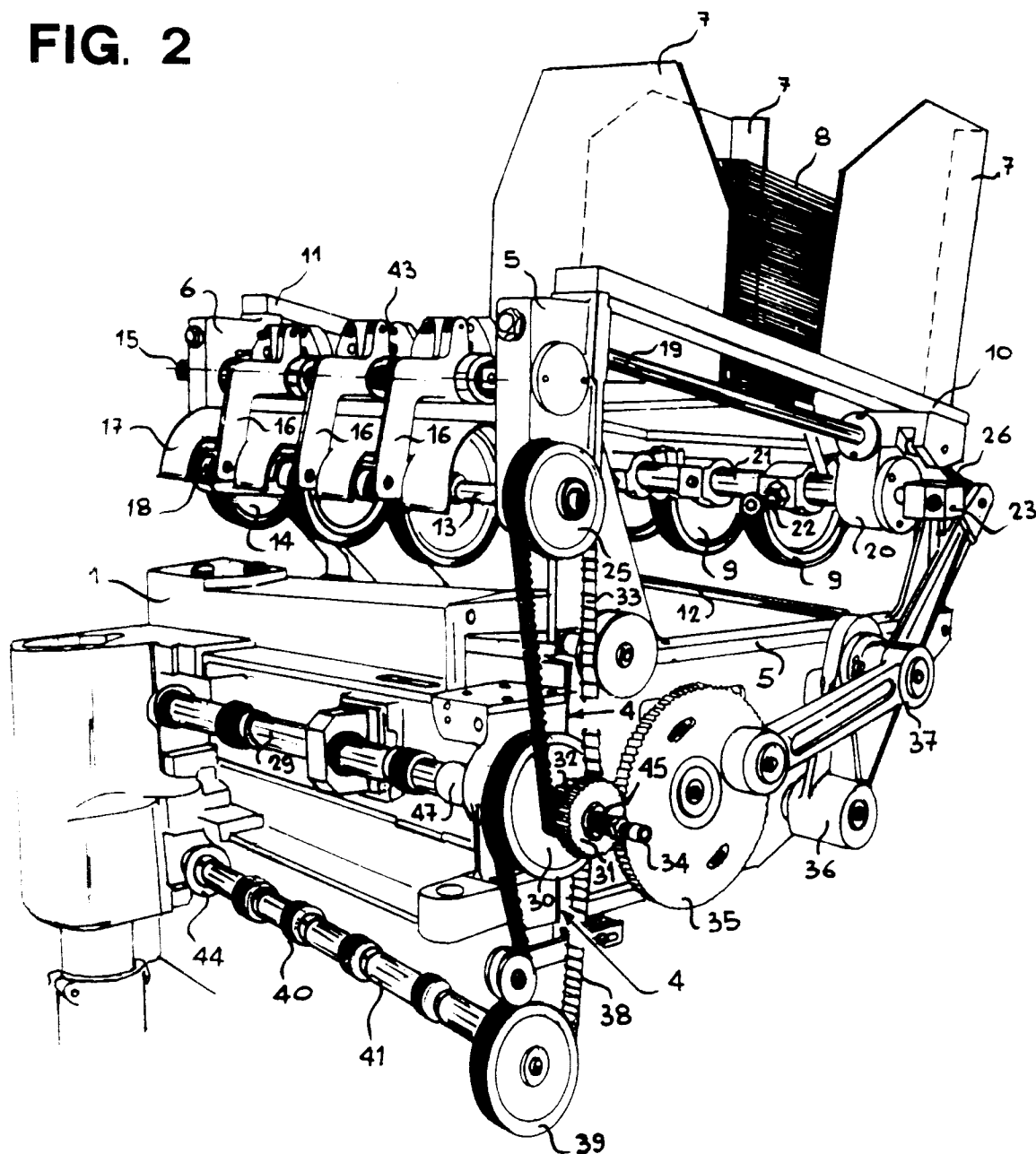
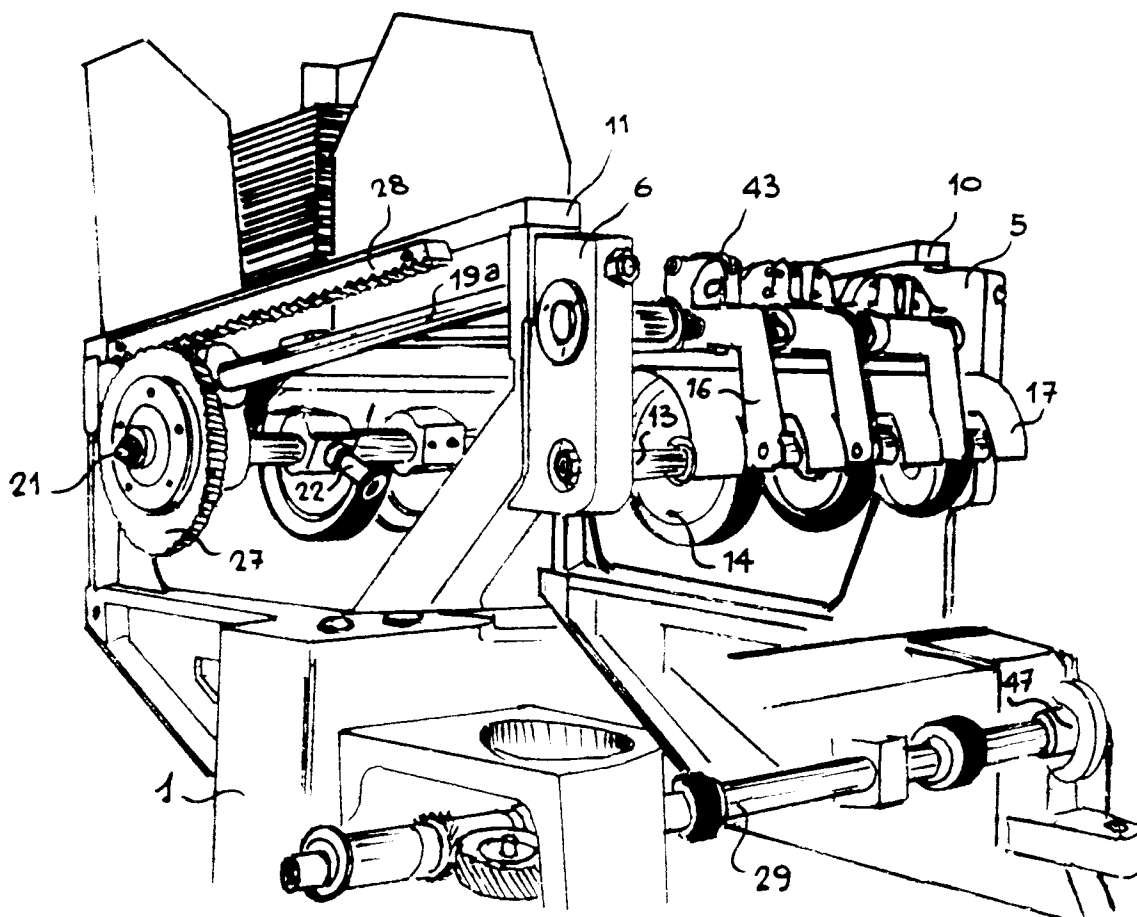


FIG. 3



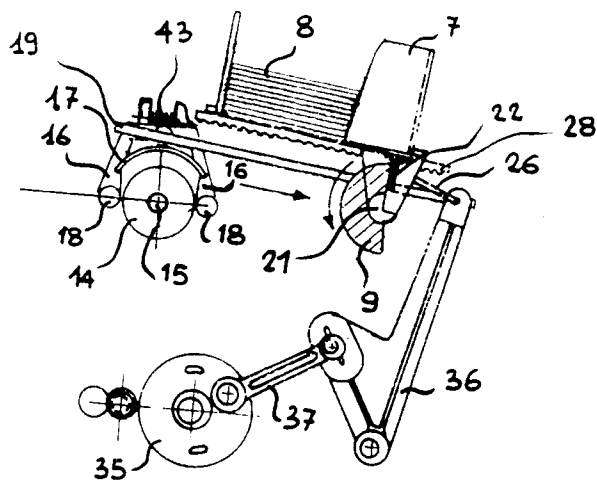


FIG. 4

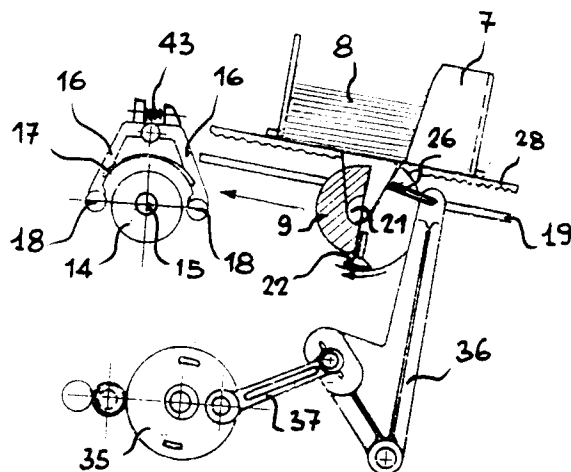


FIG. 5

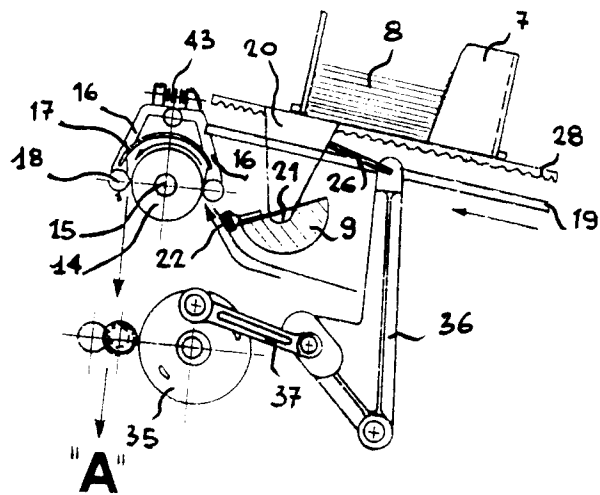
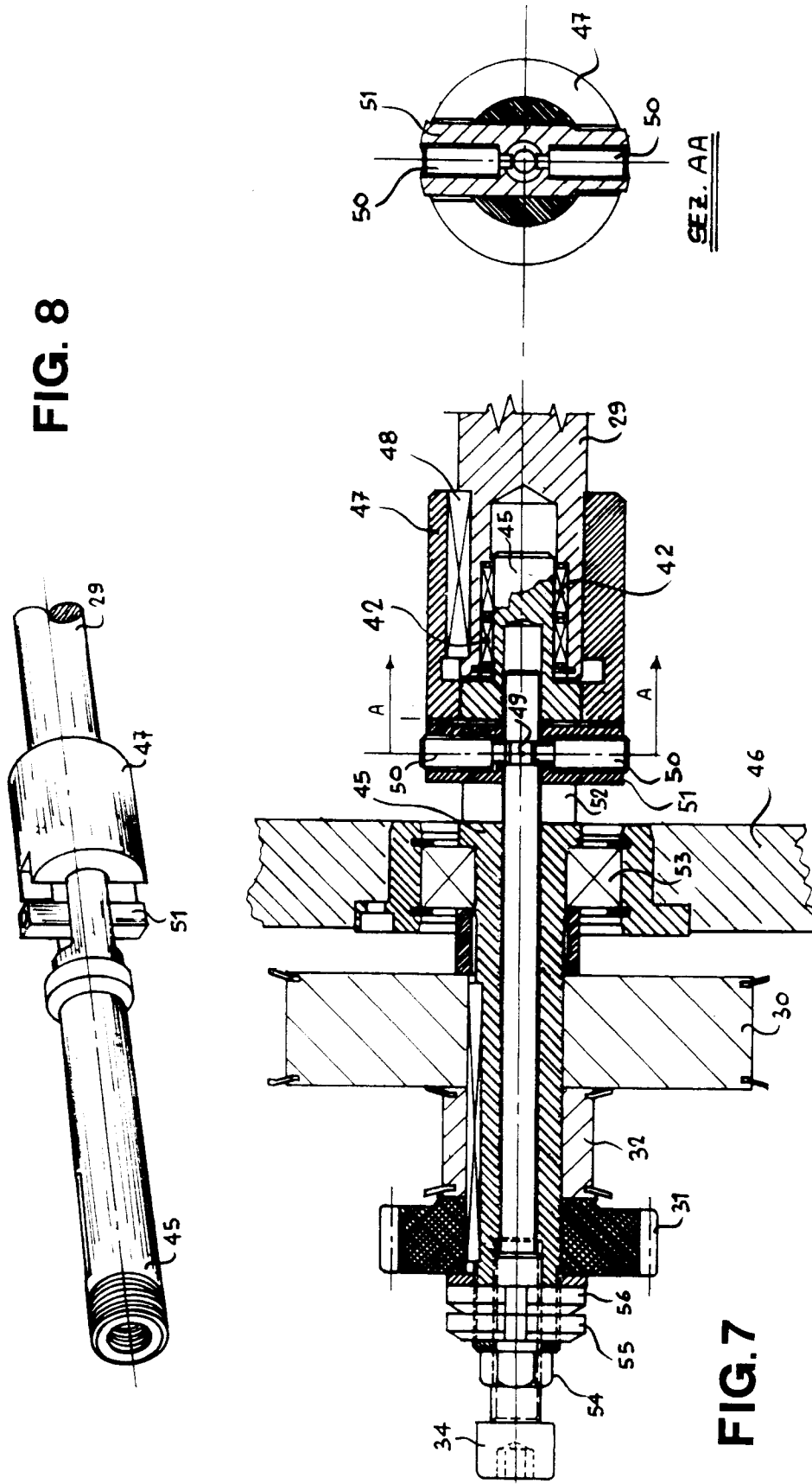


FIG. 6





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EUROPEAN SEARCH REPORT

Application Number

EP 91 11 8906

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	US-A-3 797 822 (ANDERSON, P.L.) * the whole document *	1	B65B43/18
A	FR-A-2 642 039 (G.D. SOCIETA PER AZIONI) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B65B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 18 FEBRUARY 1992	Examiner NGO SI XUYEN G.
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