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(54) **Device for rotating a mattress on the working table of a hemming machine**

Vorrichtung zum Drehen einer Matratze auf dem Arbeitstisch eines Säumers

Dispositif pour tourner un matelas sur la table de travail d'une machine à coudre les ourlets

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(56) References cited:
EP-A- 0 264 618
DE-A- 3 914 913
FR-A- 1 567 893
GB-A- 1 144 954
US-A- 1 513 090
US-A- 2 934 219

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Description

The present invention relates to a device for rotating a mattress on the working table of a hemming machine.

It is known that it is necessary to rotate by an angle of 90° a mattress on the working and transport table of a hemming machine in order to perform operations at the corners in passing from the hemming of the transverse sides to the hemming of the longitudinal sides.

In hemming machines provided with a stationary sewing machine, the mattress is currently rotated mostly by hand.

Hemming machines have also been proposed which comprise devices for rotating the mattress with respect to the sewing machine. Devices of this kind are known from European patent application publication no. 264618 in the name of the same Applicant, from European patent no. 330.285, from German patent application publication no. 3521559, and from French patent no. 1,567,893. In known devices, the mattress slides on a table during rotation, and therefore friction forces arise which make the rotation angle inaccurate. Known devices furthermore do not solve the problem of turning over the mattress in order to perform the hem on the other side.

The technical aim of the present invention is to provide a device that allows to obviate these drawbacks, so that the orientation of the mattress with respect to a hemming machine becomes accurate and so as to mechanize the mattress turning-over operations, which are currently performed by hand by the same operator who controls the hemming machine, with great effort and waste of time.

Within the scope of this aim, an object of the present invention is to provide a device that is reliable in operation and versatile in use in relation to the various shapes and dimensions of the mattresses.

This aim and this object are achieved with a device whose characteristics are defined in the claims.

Further characteristics of the present invention will become apparent from the following description on the basis of the accompanying drawings, wherein:

figure 1 is a perspective view of the device, applied to a mattress hemming machine;
figures 2 and 3 are perspective views of the device, taken from a different viewing angle, with the pusher in raised and lowered position respectively;
figure 4 is a plan view of a variation of the device; and
figure 5 is a lateral elevation view of the variation of figure 4.

With reference to figures 1 to 3, the device comprises a frame composed of a post 1 having a square cross-section and rising to the side of a transport and working table 2 constituted by rows of mutually parallel free rollers 3. The rollers 3 are very close to each other but are not in mutual contact, so that they can rotate freely in both directions A and B and allow the handling of a mattress 4 placed thereon.

A carriage 5 can be positioned on the post 1, and a bracket 6 cantilevers out from said carriage and supports a hemming machine 7 comprising a conventional sewing machine equipped with means for guiding a tape that is meant to be stitched so as to cover the stitch lines joining the upper and lower faces 8 and 9 of the mattress 4 to the perimetric band 10.

The inclination of the bracket 6 is adjustable to allow to orientate the hemming machine 7 at an angle allowing diagonal stitching suitable to form a rounded ridge 11 surrounding the upper and lower faces of the mattress.

An arm 12 protrudes from the top of the post 1 and supports, at its end, a sleeve 13 the axis C of which is vertical and passes at the region where the hemming machine forms its stitch.

A substantially bracket-like vertically hinged structure 14 is rotatably supported in the sleeve 13 and is composed of an upright 15, rigidly coupled, by means of two arms 16 and 17, to a pivot which is rotatable within the sleeve 13, and of a beam 18 that cantilevers out from the lower end of the upright 15 and is supported by a brace 19 that joins the beam 18 to the top of the upright 15.

A pivot 20 is furthermore mounted at the top of the upright so that it can rotate about a vertical axis; a diametrical female thread 21 is formed in said pivot and is engaged by a threaded rod 22.

The threaded rod 22 is driven by a motor 23 installed on a platform 24 that is laterally rigidly coupled to the arm 13.

The actuation of the threaded rod 22 in one direction or the other, owing to the off-centered position of the pivot 20 on which the rod 22 acts with respect to the axis C, accordingly produces the rotation of the structure 14 by an angle of substantially 90°.

The structure 14 is completed by a rectangular frame 24a fixed to the beam 18 proximate to the upright 12 and at the front of which two pneumatic jacks 25 and 26 are applied vertically; the stems of said jacks protrude downward and support respective pads 27 and 28.

Two guiding bushes for a pair of vertical parallel rods 29 and 30 are installed in the beam 18; said rods rise from a bar 31 that lies below the beam 18 and acts as a pusher to make the mattress 4 rotate about the axis C.

A horizontal plate 32 protrudes from the upper edge of the bar 31 on the working table 2 and is meant to rest on the upper face of the mattress when the bar 31 is in the lowered condition and in abutment against a perimetric side, that is to say, in contact with the band 10.

The bar 31 can be raised and lowered on the table 2 by means of a pair of jacks 33 and 34, in which the cylinders are mounted on the beam 18 and the stems are rigidly coupled to the bar 31.

The described device is completed by a series of

vertical rollers 35 freely mounted on the member 35a that delimits the working table 2 on the side of the hemming machine. The vertical rollers 35 form a vertical wall for guiding the mattress 8 during the hemming of its longitudinal and transverse sides.

The device operates as follows. In order to hem the longitudinal and transverse sides of the mattress, the bar 31 is raised with respect to the working table 2 and is co-planar with respect to the vertical rollers 35.

The mattress 4, after being transferred onto the rollers 3 of the table 2, is positioned so that its side to be hemmed (for example the transverse one, as in figure 2) abuts against the rollers 35, and is then made to advance in the direction A through the hemming machine 6 to form the hem along the corner formed by the band 10 with respect to the upper face.

When the trailing corner of the mattress is located at the axis C, the jacks 25 and 26 are activated and, by descending, lock the mattress 4 on the roller table 2. At the same time, the jacks 33 and 34 are actuated so as to move the bar 31 into a position that is adjacent to the band 10 of the freshly hemmed side and so as to make the plate 32 rest on the upper face of the mattress. It should be noted that the height of the bar 31 and of the rollers 35 is such as to prevent mutual contacts when the bar 31 is in lowered position.

At this point the motor 23 is activated and, by means of the rod 22, acts on the structure 14, turning it by 90° about the axis C. At the end of this operation, the mattress 4 is orientated so that its longitudinal side is adjacent to the vertical rollers 35.

After activating the jacks 25, 26 and 33, 34 again, thus raising the pads 27 and 28, the bar 31, and the plate 32, the longitudinal side is hemmed according to the above described procedures and so are the other sides, until the entire perimeter is completed.

Advantageously, the rotation axis C of the structure 14 passes on the inside of the peripheral edge of the mattress proximate to the hem.

In this manner, the hem at the corners of the mattress can follow a circular arc-like path that allows to form rounded corners.

The substantial advantage of the device is provided by the rollers 2; since they are freely rotatable in both directions, they considerably reduce the resistance of the mattress to rotation. It is furthermore possible to interpose between the rollers 2 means that turn the mattress over, after one face thereof has been hemmed, in order to complete the hemming of the opposite face.

For this purpose, the rollers 3 of the working table 2 are arranged so as to allow to arrange between them two frames 36 and 37 that can be raised by jacks (not shown, but easily imaginable) from a position in which they are co-planar with respect to the table 2 into an opposite position, in which they substantially form a V with respect to the table 2 (see figure 5).

The frames 36 and 37 are constituted by respective arms 38 that are articulated within the roller table 3 and extend in the opposite directions A and B, respectively, between the rollers that form the various rows and are appropriately spaced so as to form a seat for accommodating the arms 38.

Slats 39 extend at right angles from each arm 38 in opposite directions and are accommodated between the various rows of rollers 3.

A mattress is turned over by placing it on one frame, for example on the frame 36, and by then rotating said frame about its fulcrum so that the mattress 4, after moving beyond the vertical position due to inertia, rests against the other frame 37, raised beforehand in front of the frame 36 so as to assume an inclined position. Once the mattress rests on the frame 37, said frame is lowered to deposit the mattress in overturned position on the roller surface 3.

A preferred embodiment provides that the rollers 3 tangentially contact lower belts in engagement with driving pulleys, or that the rollers 3 have cylindrical interior bearing surfaces enclosing respective driving shafts, so that rotation of said pulleys or shafts causes rotation of said rollers.

In this way it is possible to assist the advancement of the mattress during sewing and at the same time to permit the rotation of the rollers in the opposite direction when the mattress is swung around its rear corner.

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 interpretation of each element identified by way of example by such reference signs.

Claims

1. Device for turning a mattress (4) on a working table of a hemming machine (7), comprising: a vertically hinged structure (14) supported by a fixed frame above said working table and rotatable about a vertical axis (C) that passes at the stitching region of the hemming machine; means (20-23) for rotating said vertically hinged structure between two positions that are angularly offset by 90°; means (25-28) suitable to block said mattress against said working table being rigidly coupled to said vertically hinged structure; characterized in that said working table is constituted by free rollers (2) that lie at right angles with respect to the advancement direction of the mattress (A) and are arranged in parallel rows; said rollers being spaced so as to allow to arrange between them two articulated frames (36, 37) allowing to turn the mattress over on the working table; and in that said frames can be raised, by virtue of jacks (25,26,33,34), from a position in which they are coplanar with respect to said working table into an opposite position substantially forming a V with re-

spect to said working table; said jacks (25,26,33,34) being actuated so as to turn the frame (36), on which the mattress (4) to be turned over has been placed, until said mattress rests on the opposite frame (37) that is standing by in an inclined position; said opposite frame (37) being then actuated so as to lower in order to deposit the mattress in overturned condition on the roller table.

2. Device according to claim 1, characterized in that each frame (36, 37) comprises an arm (38) that is articulated to the working table and multiple slats (39) extending at right angles to said arm in opposite directions, said arm (38), in its lowered position, being suitable to fit between two adjacent rows of rollers, said slats (39) being suitable to fit between the rollers of said two adjacent rows.

3. Device according to claim 1 or 2, characterized in that said working surface, on the side of the hemming machine (7), is delimited by a plurality of vertical free rollers (35) aligned in the direction (A) along which the mattress advances.

4. Device according to claims 1-3, characterized in that the rollers are rotated in the advancing direction of the mattress by driving means in frictional engagement with said rollers.

Patentansprüche

1. Vorrichtung zum Drehen einer Matratze (4) auf dem Arbeitstisch eine Einfaßmaschine (7), die folgendes umfaßt: eine vertikal drehbar gelagerte Struktur (14), die von einem ortsfesten Rahmen über diesem Arbeitstisch getragen ist und um eine senkrechte Achse (C), die an dem Nähbereich der Einfaßmaschine verläuft, drehbar ist; Mittel (20 - 23), um diese vertikal drehbar gelagerte Struktur zwischen zwei Positionen zu verschwenken, die um einen Winkel von 90° versetzt sind; Mittel (25 - 28), die dafür geeignet sind, die Matratze gegenüber diesem Arbeitstisch festzulegen, und die starr mit dieser vertikal drehbar gelagerten Struktur verbunden sind; dadurch gekennzeichnet, daß dieser Arbeitstisch von frei beweglichen Rollen (2) gebildet ist, die rechtwinklig zu der Vorschubrichtung der Matratze (A) liegen und in parallelen Reihen angeordnet sind; wobei diese Rollen derart mit Abstand versehen sind, daß es möglich ist, zwischen ihnen zwei gelenkige Rahmen (36, 37) anzuordnen, die es ermöglichen, die Matratze auf dem Arbeitstisch umzudrehen; und dadurch, daß diese Rahmen mittels Hebevorrichtungen (25, 26, 33, 34) von einer Position, in der sie mit dem Arbeitstisch in einer Ebene liegen, angehoben werden können in eine gegenüberliegende Position, in der sie bezüglich des Arbeitstisches im wesentlichen ein V bilden; daß diese Hebevorrichtungen (25, 26, 33, 34) betätigbar sind, um den Rahmen (36), auf dem die umzudrehende Matratze (4) plaziert ist, so lange zu drehen, bis diese Matratze auf dem gegenüberliegenden Rahmen (37) ruht, der in einer schrägen Position bereitsteht; wobei dann dieser gegenüberliegende Rahmen (37) senkend betätigbar ist, um die Matratze in umgedrehtem Zustand auf dem Rollentisch abzulegen.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß jeder Rahmen (36, 37) einen Arm (38), der an dem Arbeitstisch gelenkig gelagert ist, und mehrere Stäbe (39), die sich rechtwinklig zu diesem Arm in entgegengesetzte Richtungen erstrecken, umfaßt, wobei dieser Arm (38) in seiner gesenkten Position derart ausgestaltet ist, daß er zwischen zwei benachbarte Reihen von Rollen paßt, und wobei die Stäbe (39) derart ausgestaltet sind, daß sie zwischen die Rollen dieser zwei benachbarten Reihen passen.

3. Vorrichtung nach Anspruch 1 oder 2, daurch gekennzeichnet, daß die Arbeitsoberfläche an der Seite der Einfaßmaschine (7) von einer Vielzahl von vertikal frei drehbaren Rollen (35) begrenzt ist, die in der Richtung (A), entlang der sich die Matratze vorschiebt, als Linie angeordnet sind.

4. Vorrichtung nach den Ansprüchen 1 bis 3, dadurch gekennzeichnet, daß die Rollen von Antriebsmitteln, die sich in Reibungskopplung mit diesen Rollen befinden, in der Vorschubrichtung der Matratze gedreht werden.

Revendications

1. Dispositif pour retourner un matelas (4) sur une table de travail d'une machine à ourler (7), comportant : une structure (14) articulée verticalement supportée par un châssis fixe au-dessus de ladite table de travail et pouvant tourner autour d'un arbre vertical (C) qui passe dans la zone de couture de la machine à ourler, des moyens (20 - 23) pour mettre en rotation ladite structure articulée verticalement entre deux positions qui sont décalées angulairement de 90°, des moyens (25 - 28) adaptés pour bloquer ledit matelas contre ladite table de travail étant reliés rigidement à ladite structure articulée verticalement, caractérisé en ce que ladite table de travail est constituée par des rouleaux montés fous (2) qui sont situés à angle droit par rapport à la direction d'avancement du matelas (A) et sont agencés en rangées parallèles, lesdits rouleaux étant espacés de manière à permettre d'agencer entre eux deux châssis articulés (36, 37) permettant

de retourner le matelas sur la table de travail, et en ce que lesdits châssis peuvent être levés, par l'intermédiaire de vérins (25, 26, 33, 34) à partir d'une position dans laquelle ils sont coplanaires avec ladite table de travail jusqu'à une position opposée formant pratiquement un V avec ladite table de travail, lesdits vérins (25, 26, 33, 34) étant actionnés de manière à faire tourner le châssis (36), sur lequel a été placé le matelas (4) à retourner, jusqu'à ce que ledit matelas vienne en appui sur le châssis opposé (37) qui est situé dans une position inclinée, ledit châssis opposé (37) étant alors actionné de manière à s'abaisser afin de déposer le matelas dans un état retourné sur la table de rouleaux.

2. Dispositif selon la revendication 1, caractérisé en ce que chaque châssis (36, 37) comporte un bras (38) qui est articulé sur la table de travail et plusieurs lames (39) s'étendant à angle droit par rapport audit bras dans des directions opposées, ledit bras (38), dans sa position abaissée, étant adapté pour être agencé entre deux rangées adjacentes de rouleaux, lesdites lames (37) étant adaptées pour être agencées entre les rouleaux de deux rangées adjacentes.

3. Dispositif selon la revendication 1 ou 2, caractérisé en ce que ladite surface de travail, du côté de la machine à ourler (7), est délimitée par plusieurs rouleaux verticaux montés fous (35) alignés dans la direction (A) le long de laquelle avance le matelas.

4. Dispositif selon l'une quelconque des revendications 1 à 3, caractérisé en ce que les rouleaux sont mis en rotation dans la direction d'avancement du matelas par des moyens d'entraînement en contact par friction avec lesdits rouleaux.

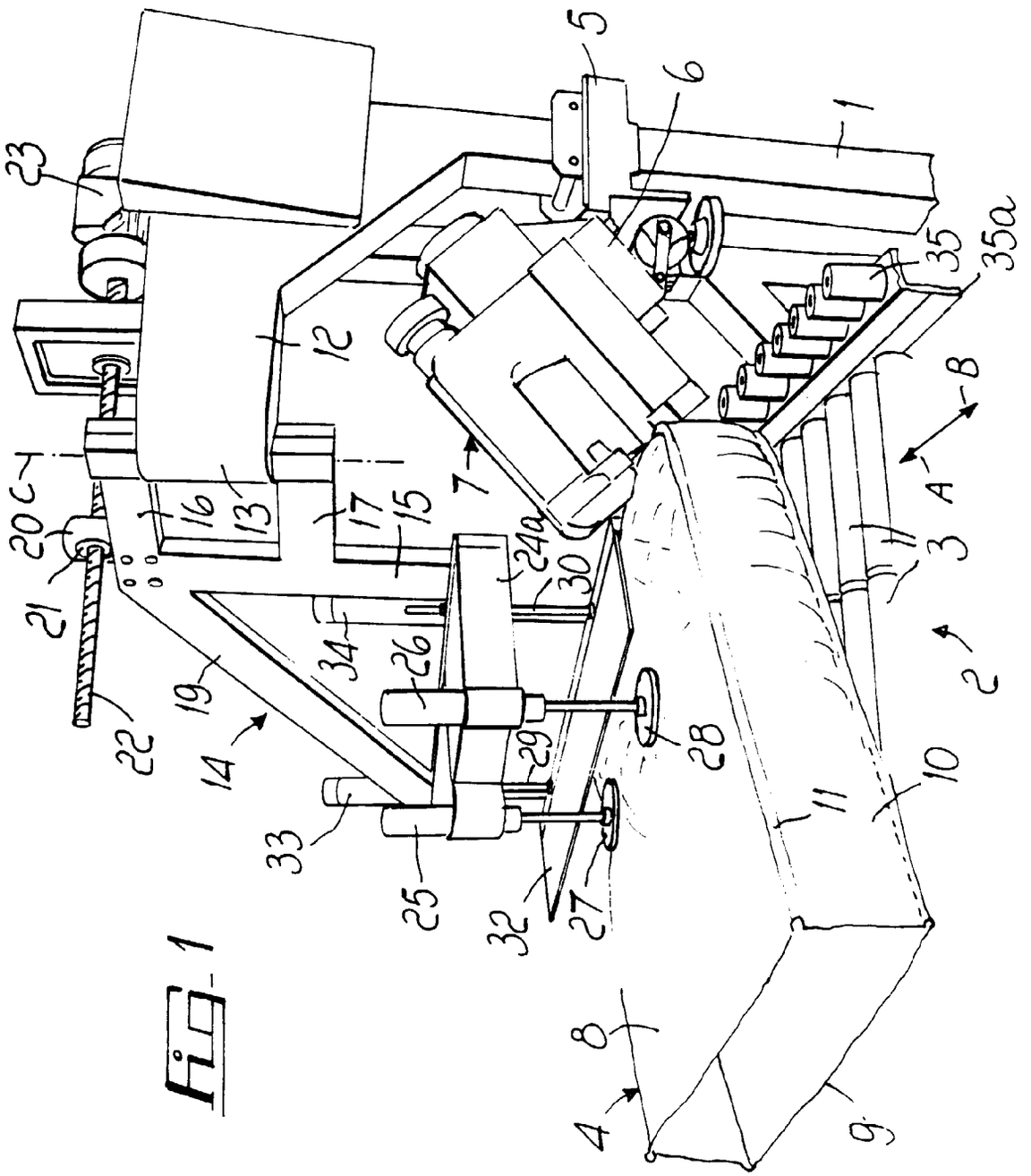

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Fig. 1

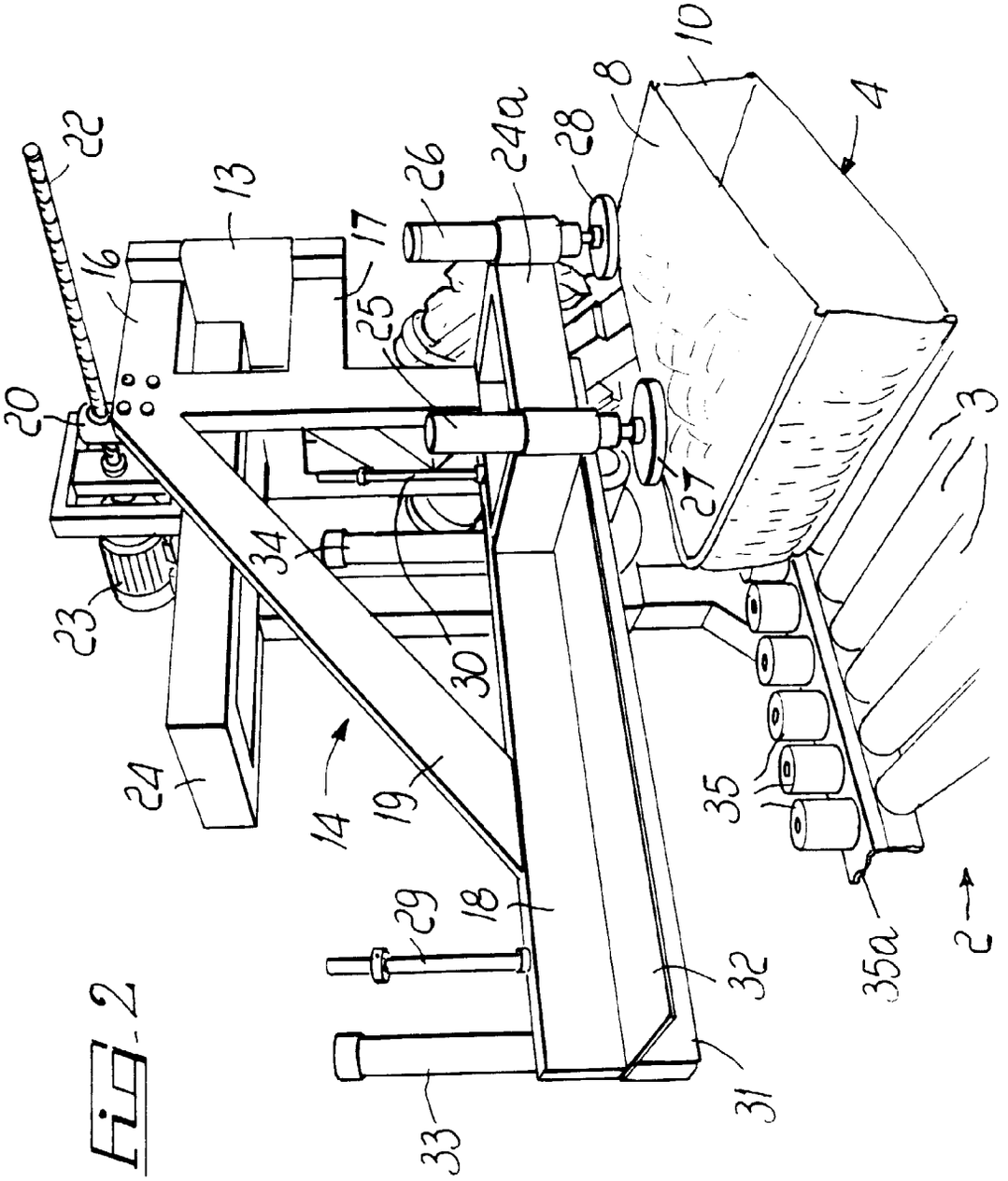

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Fig. 2

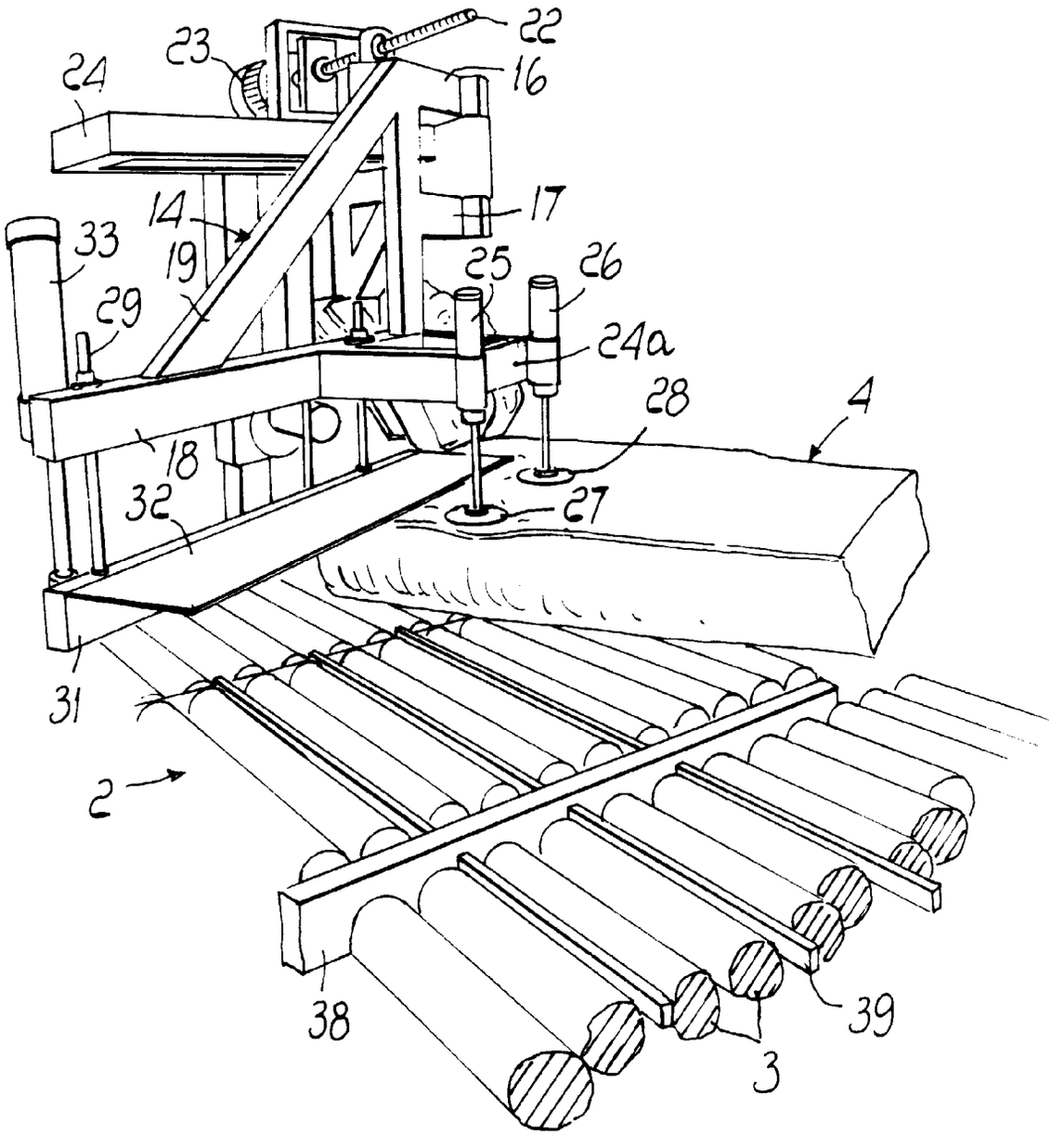


Fig. 3

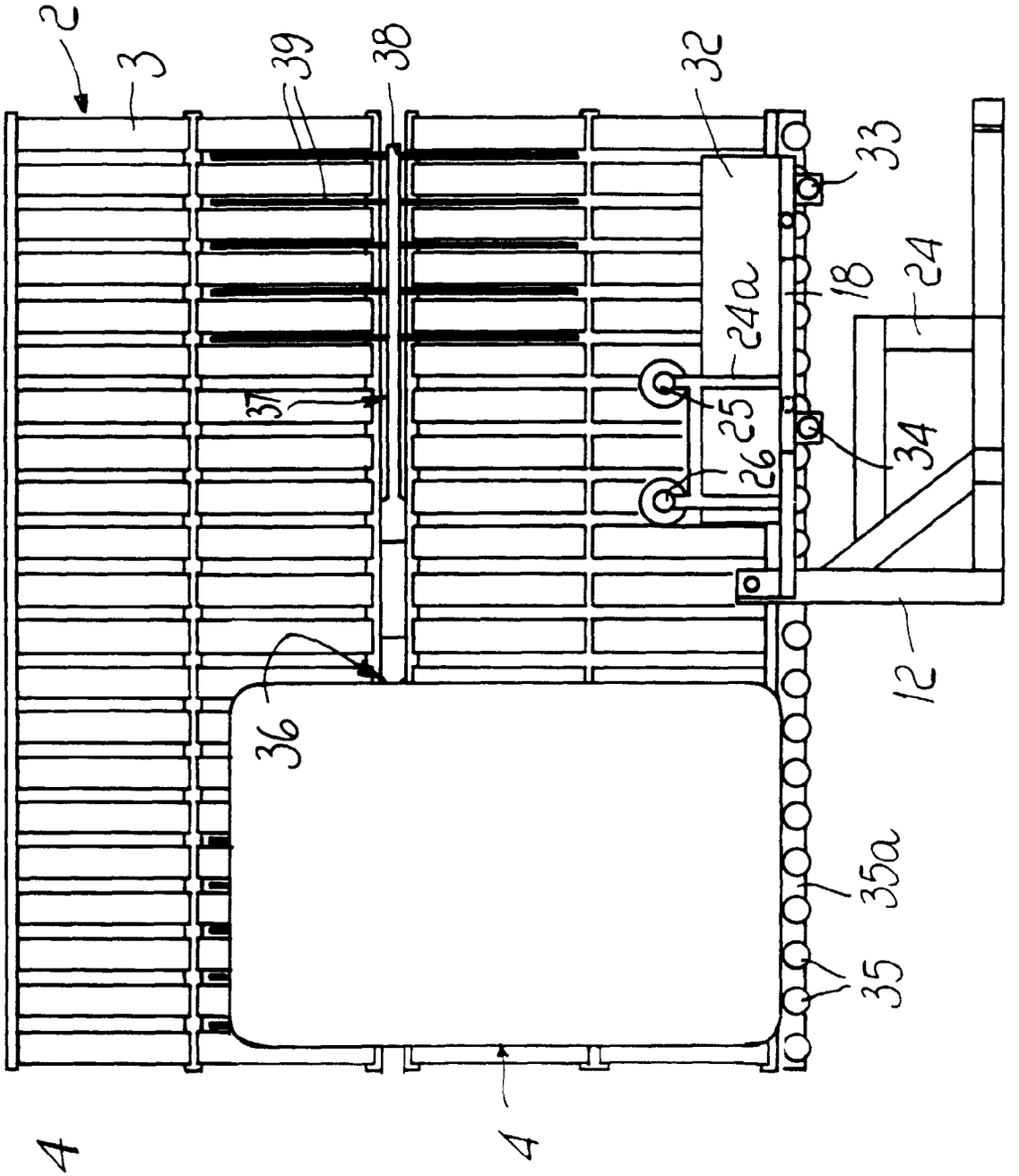


Fig. 4

Fig. 5

