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(54) APPARATUS FOR STEAM FIXING OF STOCKINGS AND SIMILAR ARTICLES

VORRICHTUNG ZUM FIXIEREN VON STRÜMPFEN UND DERGLEICHEN MITTELS DAMPF

APPAREIL DE FIXATION A LA VAPEUR DE BAS ET D'ARTICLES SEMBLABLES

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(56) References cited:
GB-A- 2 138 856
GB-A- 2 236 545

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Description

TECHNICAL FIELD

[0001] The present invention relates to the technical field concerned with the apparatuses for treating of stockings.

[0002] More particularly, the present invention relates to an apparatus for steam fixing of woman stockings, like tights or the like.

BACKGROUND ART

[0003] It is known that, in manufacturing of woman stockings, the same are usually submitted, after the painting phase, to a thermic fixing treatment by means of steam, and to a drying phase; stockings are then submitted to a subsequent phase of controlling for the presence of defects, in order to discard the defective stockings.

[0004] Apparatuses for controlling, fixing and drying of stockings are known, which generally comprise a rotating turret, able to transport subsequently the stockings to be treated up to the various operating stations, comprising a stockings inserting station and a stocking extraction station.

[0005] Stockings are inserted on suitable molds, which are usually constituted by curved tubular elements, defining the stockings profile. Moulds are held at the rotating turret periphery, being regularly spaced.

[0006] Apparatuses like those described above can be found, e.g., in Italian patent N. 1231352 and in Italian patent applications N. BO91A 000339 (IT-A-125 30 35) and N. FI91A 000233 (IT-A-125 28 02).

[0007] In the above cited apparatuses the fixing phase is achieved by introducing molds inside a chamber, which is fed with water steam and where the fabric is submitted to a permanent shaping.

[0008] An important requirement for the fixing apparatuses is to minimize the steam chamber, so as to reduce the steam consumption, and the time required for the steam introduction and for emptying the chamber from steam. For this purpose, steam chambers are known, which are made of a pair of shells or walls, one of whose is movable for opening and closing the chamber. Patent N. 1225876 shows, by example, a fixing apparatus in which the steam chamber has opposite lateral walls, one of which is fixed, and the other one is movable to allow the chamber to be closed, for introducing the steam, and then the chamber to be opened, thus allowing molds to be moved. On the said walls, pressing pads are mounted, fit to engage and to compress stockings on their molds, when the steam chamber is in its closed position.

[0009] In the solution disclosed in the patent application N. BO91A 00039 (IT-A-124 59 90) the apparatus comprises a double steam chamber fit to receive, while in an open position, respective pairs of molds. Said steam chamber is made of two symmetrically movable shells, fit to be sealingly coupled at their respective front edges; the cited shells, when in their closed position, have internal walls which cling to the moulds.

[0010] The GB-A-2138856 discloses a hosiery processing method and apparatus. The apparatus includes a support frame with a plurality of hosiery carrying forms supported by a driving chain mechanism. A flat steam chamber includes a stationary wall and a movable wall both having peripheral seals. The movable wall can be moved toward and away from the stationary wall to open and close the steam chamber. The hosiery carrying frames are held stationary temporarily at the steam chamber while steam is injected in the chamber and the movable wall is moved to close the chamber and set the fibres of the hosiery.

[0011] In the apparatuses performing the technical solutions illustrated above, opening the fixing chamber walls causes a sudden drop in temperature, so providing evident problems due to condensation forming, together to a steam dispersion. The last fact causes some energy wasting, and makes the working environment less comfortable.

[0012] A further drawback is due to the high amount of time the moulds stay into the steam chamber. In fact, that time affects the cycle rate of the others operating phases, which are usually faster; increasing that time means reducing the apparatus productivity. On the opposite side, reducing the fixing time below a threshold value compromises the success of thermal treatment.

DISCLOSURE OF THE INVENTION

[0013] It is the object of the present invention to make an apparatus allowing to effectually achieve the steam fixing of stockings or the like, by assuring in the meantime a small steam consumption, without energy wasting and without decreasing the workers operating comfort.

[0014] The above mentioned object is achieved, according to the Claims contents, by an apparatus for steam fixing of stockings or similar articles, which comprises a case (17), internally defining a steam chamber (18), having a flattened shape along a longitudinal plane coincident with a forwarding plane for moulds (2) which are upwardly supported and oriented downwardly, the said case (17) being provided, at its entrance and at its exit, of closing doors (19), and being also provided, at its upper part, with a longitudinal slit (21), fit to allow said molds (2) to pass along the said steam chamber (18), said slit (21) being also fit to be closed around the molds (2) by sealing means (22).

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The characteristic features of the invention are set out in the following, with particular reference to the accompanying drawings, in which:

- Figure 1 shows a schematic plain view of an apparatus for treating woman stockings, of the tights type;
- Figure 2 shows a side view of the apparatus of figure 1;
- Figures 3a and 3b show a vertical section view of the fixing station of the above mentioned apparatus, in various operating phases;
- Figure 4 shows a partial upper view of said fixing station;
- Figures 5a and 5b show a view of a detail of said fixing station, according to the section plane V-V of Figure 4, in various operating phases.

BEST MODE OF CARRYING OUT THE INVENTION

[0016] With reference to the aforesaid Figures, 1 indicates an apparatus for controlling, steam fixing and drying of woman stockings, of the type of tights or the like.

[0017] Apparatus 1 carries and moves in an intermittent way, according to a ring path, a series of molds 2, arranged in pairs and fit to inserting on each of them corresponding stockings to be treated. Molds 2 are made of suitably shaped solid glass bodies.

[0018] More particularly, as can be seen in Fig. 2, molds 2 have a flattened shape, and an outline getting narrower towards their free end, which substantially corresponds to the stockings feet.

[0019] Molds 2 are turned downwardly, in order to allow stockings to be inserted from down upwards, and they are held upwardly, by means of respective stems 3, by a pair of chains 4, defining the said ring path. The ring path extends along a longitudinal direction defined by a fixed frame 5.

[0020] The chains 4 wrap around a pulley 6 at one end of the frame 5, and around a corresponding pair of reels at the opposite end of the same frame 5. Pulley 6 is operated by an engine member 8, for intermittently forward the molds 2.

[0021] Operating the engine 8 allows to move the molds 2 successively to a station 9 for loading the stockings to be treated; to a station 10 for controlling said stockings for defects; to first station 11 and to a second station 12 for discarding defective stockings; to a station 13 for fixing the non-defective stockings into a suitable steam chamber; to a drying station 14; and finally to a station 15 for extracting stockings and for driving away them.

[0022] The pairs of molds 2 are suitably rotatable, one with respect to each other, about a hinging pivot 16, so that one of the molds can go near the other one. Said rotation is made with known means, not shown in the drawings, downstream of the said drying station 14, to allow the subsequent extracting operation of stockings in the station 15.

[0023] In order to allow that, only one of the two molds 2 in a pair is stiffly constrained to the chains 4, by means of stem 3, in a fixed position, while the other mold 2 is rotatable about the hinging pivot 16.

[0024] Molds 2 are carried back to their spreaded position upstream of the loading station 9.

[0025] The fixing station 13 is provided with a case 17, defining the steam chamber 18. The case 17 has a shape which is flattened about a longitudinal plane coinciding with the molds 2 forwarding plane. The case 17 is provided, at the entrance and at the exit of the steam chamber 18, with closing doors 19, sideways hinged about pivots 20 having vertical axis. The molds 2 pass through a longitudinal slit 21 made on the upper wall of the case 17 (see Fig. 3a). The slit 21 is fit to be closed, around the molds 2, by a pair of bulkheads 22, which are hinged about respective shafts 23, longitudinally mounted sideways of the case 17; bulkheads 22 can swing, respectly driven by a first jack 24 and by a second jack 25, by means of respective compound levers 26,27.

[0026] Each one of the bulkheads 22 carries a pair of packings 28,29, extending longitudinally with respect to the said bulkheads 22 and arranged on perpendicular faces of the same, which respectively constitute a bottom face and a side face when they are in a configuration closing the slit 21 (see Fig. 3b). Bottom packings 28 are fit to make a seal by contact with the said upper wall of the case 17, while the side packings 29 make a seal by respectively contacting one each other. (see Fig. 3b).

[0027] Is to be noted that packings 28,29 are made of elastic material, so that they can wrap around molds 2 passing through the slit 21, thus making a seal with the said molds 2. An optimum seal of packings 28,29 on molds 2 is achieved because the said molds 2 are made of glass, and because they are moistened by the steam contained into the fixing chamber 18.

[0028] At the entrance and at the exit of the fixing chamber the bulkheads 22 are put in contact with corresponding sealing packings 30, mounted on doors 19.

[0029] For closing the fixing chamber 18, doors 19 are integral with arms 31, hinged on the above mentioned pivots 20; on each door 19 at least two closing arms 31 are provided; they are swingly mounted on suitably spaced horizontal planes. Each of the closing arms 31 is bended, by means of an appendage 32, to the stem 33 of a respective jack 34, which is hinged, in its turn, sideways of the case 17.

[0030] The jack 34 operates the rotation of arms 31 between the door 19 opening position, which is indicated with a dashed line 31a in Fig. 4, and a closing position.

[0031] As shown in Fig. 5a and in Fig. 5b, clamping members 35 of the doors 19 are provided, fit to ensure a suitable closing force for pressure sealing the fixing chamber.

[0032] The clamping members 35 comprise a latch 36, which is driven for vertically sliding over rails 37, on a side of the case 17, and which is operated with a reciprocating motion by means of an actuating member 38, the latter being fixed to the same case 17. The latch

36 is provided with two protruding, conical-ended pivots 39, placed at suitable heights and vertically coaxial. Pivots 39 are fit to engage, when in the clamping position, corresponding vertical holes 40, made on the closing arms 31; when in said position, they force the closing of the closing arms 31 by means of their conical end.

[0033] The chamber 18 is fit to be fed with steam by means of a known system, in order to perform the fixing of stockings carried by molds 2 inside the same chamber 18.

[0034] In order to do that, the jacks 34 open the doors 19 by operating the arms 31, which are rotated to their opening position 31a (see Fig. 4) while, at the same time, jacks 24,25 rotate the bulkheads 22 to the opening position 22a of slit 21, being said position raised from the case 17 (see Fig. 3a).

[0035] As shown in Fig. 4, molds 2 proceed on a plane which is vertical and longitudinally median with respect to the case 17, in the direction which has been indicated with an arrow A. As an example, the position reached by a mold at the entrance of the case 17 has been indicated with 2a.

[0036] Molds 2 pass through the slit 21 placed on the upper side of the case 17.

[0037] After the molds 2 have been inserted into the steam fixing chamber 18, the closing of doors 19 is operated by means of arms 31, and the closing of bulkheads 22 is operated as well, so sealingly closing the slit 21 around the molds 2 by means of the packings 28,29 (see Fig. 3b).

[0038] The sealing of the fixing chamber 18 is ensured by the clamping members 35, that lock the arms 31 by means of the latch 36, after the doors 19 have been closed (see Fig. 5a). Indeed, the pivots 39 of said latch 36 are forced, by means of their conical end, into the corresponding holes 40 of the closing arms 31 (see Fig. 5b).

[0039] Opening the steam chamber 18 is made in the opposite way, at the end of the fixing phase, in order to allow the molds 2 to be moved forward.

[0040] It should he noted that the fixing chamber 18 extends straightly and longitudinally with respect to the forwarding direction of molds 2. This allows multiple pairs of molds 2 to be inserted into the fixing chamber 18, e.g. three pairs of molds 2, as shown in Figures 1 and 2.

[0041] This fact allows to suitably increase the fixiny time for stockings, so obtaining an optimum result, still keeping an high mold forwarding rate. In this way the fixing time does not affect the rate of the other operating phases, as in the known art fixing chambers; thus it can be increased without decrease the apparatus high productivity.

[0042] Another advantage due to the straight arrangement of the fixing chamber 18 is that molds 2 are not subject, during their forwarding, to any centrifugal force, which could cause some kind of molds oscillations; thus, there is no risk for stockings to be damaged by touching the internal walls of the fixing chamber 18.

[0043] The fixing chamber 18 is of very small size, particularly in its width, which is only large enough to arrange the molds 2. It is to be noted that all the chamber 18 closing members and all the molds 2 moving members are placed externally with respect to the case 17.

[0044] As a result, the steam consumption for fixing the stockings is very low.

[0045] A very important feature of the fixing apparatus of the present invention is that the case 17 defining the steam chamber 18 is substantially closed for the whole operating cycle. The case 17 is opened only at its entrance and exit doors 19, and at the slit 21, for a short period of time, which is enough to allow the molds 2 to come in to, and to go cut from, the fixing chamber 18.

[0046] Therefore, there is no steam waste in the working environment. as for the traditional fixing apparatuses; this allows saving energy and improves the workers operating conditions.

[0047] Moreover, is to be underlined that the above described apparatus is very simple from the structural and functional points of view.

[0048] The present description has been made for exclusively illustrative and non limiting purposes, and it is therefore obvious that all the modifications or variants can be applied to that description, which are suggested by any practical carrying out and which are however included in the field of the following claims.

Claims

1. Apparatus for steam fixing of stockings or similar articles; characterized in that it comprises a case (17), internally defining a steam chamber (18), having a flattened shape along a longitudinal plane coincident with a forwarding plane for moulds (2), which are upwardly supported and oriented downwardly, the said case (17) being provided, at its entrance and at its exit, of closing doors (19), and being also provided, at its upper part, with a longitudinal slit (21), fit to allow said molds (2) to pass along the said steam chamber (18), said slit (21) being also fit to be closed around the molds (2) by sealing means (22).

2. Apparatus according to Claim 1, characterized in that the said sealing means (22) have a pair of bulkheads; able to swing about respective longitudinal axes, said bulkheads being mounted on opposite sides of the said case (17), being operable by reciprocating actuating means (24,25) and being provided with packings (28,29) extending longitudinally for sealingly closing said slit (21).

3. Apparatus according to Claim 2, characterized in that the said packings (28,29) are placed on respectively perpendicular walls of said bulkheads (22),

forming the lower and side walls of the same when they are in a position closing the said slit (21), being the said lower packings (28) fit to sealingly engage the upper wall of said case (17), and being the said side packings (29) fit to sealingly engage one each other.

4. Apparatus according to Claim 1, characterized in that said doors (19) are fixed to closing arms (31). hinged to the said case (17) on vertical pivots (20), able to swing driven by reciprocating actuating means (34), which are fit to rotate the above mentioned arms (31) for moving the said doors (19) between an opening position and a closing position.

5. Apparatus according to Claim 1, characterized in that it comprises clamping members (35) for clamping said doors (19), each one of whose members is provided with a latch (36), vertically slidable on one side of said case (17) and reciprocably operated by means of an actuating member (38), restrained to the same case (17), said latch (36) carrying at least one protruding vertical pivot (39) fit to engage, when in the clamping position, a corresponding hole (40), vertically made in a closing arm (31) of a respective door (19).

6. Apparatus according to Claim 5, characterized in that said latches (26) carry a pair of said protruding pivots (39), placed at a suitable heigth, each one of whose being provided with a conical end, and being arranged coaxially on a vertical axis and fit to engage, when in the clamping position, corresponding holes (40), vertically made in respective closing arms (31) of said doors (19), thus forcing their closing by means of said conical ends.

7. Apparatus according to Claim 1, characterized in that the said case (17) extends straightly, in order to allow the concurrent arrangement of a plurality of molds (2) pairs inside the said chamber (18) during the fixing phase.

Patentansprüche

1. Vorrichtung zur Dampffixierung von strümpfen oder ähnlichen Produkten, dadurch gekennzeichnet, daß ein Behälter (17) verwendet ist, der in seinem Innenraum eine Dampfkammer (18) aufweist, die entlang einer sich in Längsrichtung erstreckenden Ebene eine geglättete Oberfläche aufweist, wobei die Orientierung der Ebene mit einer Orientierung einer weiterführenden Ebene für Formen (2) übereinstimmt, welche in Aufwärtsrichtung abgestützt und in Abwärtsrichtung orientiert sind, wobei der Behälter (17) im Bereich seines Einganges und seines Ausganges mit Verschlußtüren (19) ausgestattet ist und wobei der Behälter (17) zusätzlich im Bereich seiner oberen Erstreckung mit einem Längsschlitz (21) versehen ist, der dazu dient, die Formen (2) in die Dampfkammer (18) einzuführen, wobei der Schlitz (21) ebenfalls dafür ausgestattet ist, um abdichtend um die Formen herum durch Dichtmittel (22) geschlossen zu werden.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Dichtmittel (22) ein Paar von Abschottungen aufweisen, die dafür geeignet sind, um relativ zu Längsachsen herumzuschwingen, wobei die Abschottungen auf einander gegenüberliegenden Seiten des Behälters (17) angeordnet sind und von zugehörigen Betätigungsmitteln (24, 25) positionierbar sind und daß die Abschottungen mit Dichtungen (28, 29) ausgestattet sind, die sich in Längsrichtung erstrecken, um den Schlitz (21) dichtend zu verschließen.

3. Vorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß die Dichtungen (28, 29) jeweils im Bereich von senkrechten Wänden der Abschottungen angeordnet sind und untere Wände sowie Seitenwänden der Abschottungen ausbilden, wenn diese derart positioniert sind, daß der Schlitz (21) geschlossen wird, und wobei die unteren Dichtungen (28) dafür geeignet sind, abdichtend in die obere Wand des Behälters (17) einzugreifen und wobei die seitlichen Dichtungen (29) dafür geeignet sind, abdichtend ineinander einzugreifen.

4. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Türen (19) im Bereich von Verschlußarmen (31) befestigt sind und daß die Türen (19) verschwenkbar mit dem Behälter (17) von vertikalen Drehgelenken (10) verbunden sind sowie daß die Türen (19) dazu in der Lage sind, bei einem Antrieb durch zugehörige Betätigungsmittel (34) eine Schwingbewegung durchzuführen, wobei die Betätigungsmittel (34) dazu ausgestattet sind, die bereits erwähnten Arme (31) zu verschwenken, um die Türen (19) zwischen einer Öfnungspositionierung und einer Verschlußpositionierung zu bewegen.

5. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß Verriegelungseinrichtungen (35) zum Verriegeln der Türen (19) vorgesehen sind, wobei jede dieser Verriegelungseinrichtungen (35) mit einer Verriegelung (36) ausgestattet ist, die in vertikaler Richtung gleitfähig auf einer Seite des Behälters (17) geführt und von Mitteln einer Betätigungseinrichtung (38) geeignet gesteuert wird, die zum selben Behälter (17) gehörig ist, wobei die Verriegelung (36) mindestens ein vorstehendes vertikales Drehgelenk (39) trägt, das dafür geeignet ist, in der Verschlußpositionierung in eine zugehörige

Ausnehmung (40) einzugreifen, die sich in vertikaler Richtung innerhalb eines Verschlußarmes (31) einer zugehörigen Tür (19) erstreckt.

6. Vorrichtung nach Anspruch 5, dadurch gekennzeichnet, daß die Verriegelungen (26) ein Paar der vorstehenden Drehachsen (19) tragen, die auf einer zweckmäßigen Höhe positioniert sind und daß jede der Verriegelungen (36) mit einem konisch gestalteten Ende ausgestattet ist, wobei die Verriegelung (36) koaxial zu einer vertikalen Achse angeordnet und dafür geeignet sind, in einer Verschlußpositionierung in zugehörige Ausnehmungen (40) einzugreifen, die sich in vertikaler Richtung in zugehörigen Verschlußarmen (31) der Türen (19) erstrecken, wobei hierdurch ein Verschließen der Türen durch ein Eingreifen der konischen Enden erzwungen ist.

7. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß der Behälter (17) sich im wesentlichen gradlinig erstreckt, um eine gleichzeitige Anordnung einer Mehrzahl von Paaren von Formen (2) unterhalb der Kammer (18) während der Fixierungsphase zu ermöglichen.

Revendications

1. Appareil de fixation à la vapeur de bas ou d'articles similaires, caractérisé en ce qu'il comprend un boîtier (17) définissant intérieurement une chambre de vapeur (18), ayant un profil aplati le long d'un plan longitudinal coïncidant avec un plan d'avancement pour des moules (2), qui sont supportés vers le haut et orientés vers le bas, ledit boîtier (17) étant muni, à son entrée et à sa sortie, de portes de fermeture (19) et étant également muni, à sa partie supérieure, d'une fente longitudinale (21), adaptée pour permettre auxdits moules (2) de passer le long de ladite chambre de vapeur (18), ladite fente (21) étant également adaptée pour être fermée autour des moules (2) par des moyens de fermeture étanche (22).

2. Appareil selon la revendication 1, caractérisé en ce que les moyens de fermeture étanche (22) ont une paire de cloisons de séparation, susceptibles d'osciller autour d'axes longitudinaux respectifs, lesdites cloisons de séparation étant montées sur des côtés opposés dudit boîtier (17), étant manoeuvrables par des moyens d'actionnement en va et vient (24, 25) et étant munies de garnitures (28, 29) s'étendant longitudinalement pour fermer de manière étanche ladite fente (21).

3. Appareil selon la revendication 2, caractérisé en ce que lesdites gamitures (28, 29) sont placées sur des parois perpendiculaires respectives desdites cloisons de séparation (22), formant leurs parois inférieure et de côté quand elles sont dans une position fermant ladite fente (21), lesdites gamitures inférieures (28) étant adaptées pour venir en contact étanche avec la paroi supérieure dudit boîtier (17), et lesdites garnitures de côté étant adaptées pour venir en contact étanche l'une avec l'autre.

4. Appareil selon la revendication 1, caractérisé en ce que lesdites portes (19) sont fixées à des bras de fermeture (31), articulés auxdits boîtiers (17) sur des pivots verticaux (20), susceptibles de basculer en étant entraînées par des moyens d'actionnement en va et vient (34), qui sont adaptés pour faire tourner les bras (31) mentionnés ci-dessus pour mouvoir lesdites portes (19) entre une position d'ouverture et une position de fermeture.

5. Appareil selon la revendication 1, caractérisé en ce qu'il comprend des organes de serrage (35) pour serrer lesdites portes (19), chacun de ces organes étant muni d'un verrou (36), coulissant verticalement sur un côté dudit boîtier (17) et manoeuvré en va et vient au moyen d'un organe d'actionnement (38), assujetti au même boîtier (17), ledit verrou (36) portant au moins un pivot (39) vertical en saillie adapté pour venir en relation d'engagement, dans la position de serrage, avec un trou correspondant (40), réalisé verticalement dans un bras (31) de fermeture d'une porte respective (19).

6. Appareil selon la revendication 5, caractérisé en ce que lesdits verrous (36) portent une paire desdits pivots (39) en saillie, placés à une hauteur appropriée, chacun d'eux étant muni d'une extrémité conique, et étant disposé coaxialement sur un axe vertical et adapté pour venir en relation d'engagement, dans la position de serrage, avec des trous correspondants (40), réalisés verticalement dans des bras (31) de fermeture respectifs desdites portes (19), pour forcer ainsi leur fermeture au moyen desdites extrémités coniques.

7. Appareil selon la revendication 1, caractérisé en ce que ledit boîtier (17) s'étend rectilignement, afin de permettre la disposition concurremment de plusieurs paires de moules (2) à l'intérieur de ladite chambre (18) pendant la phase de fixation.

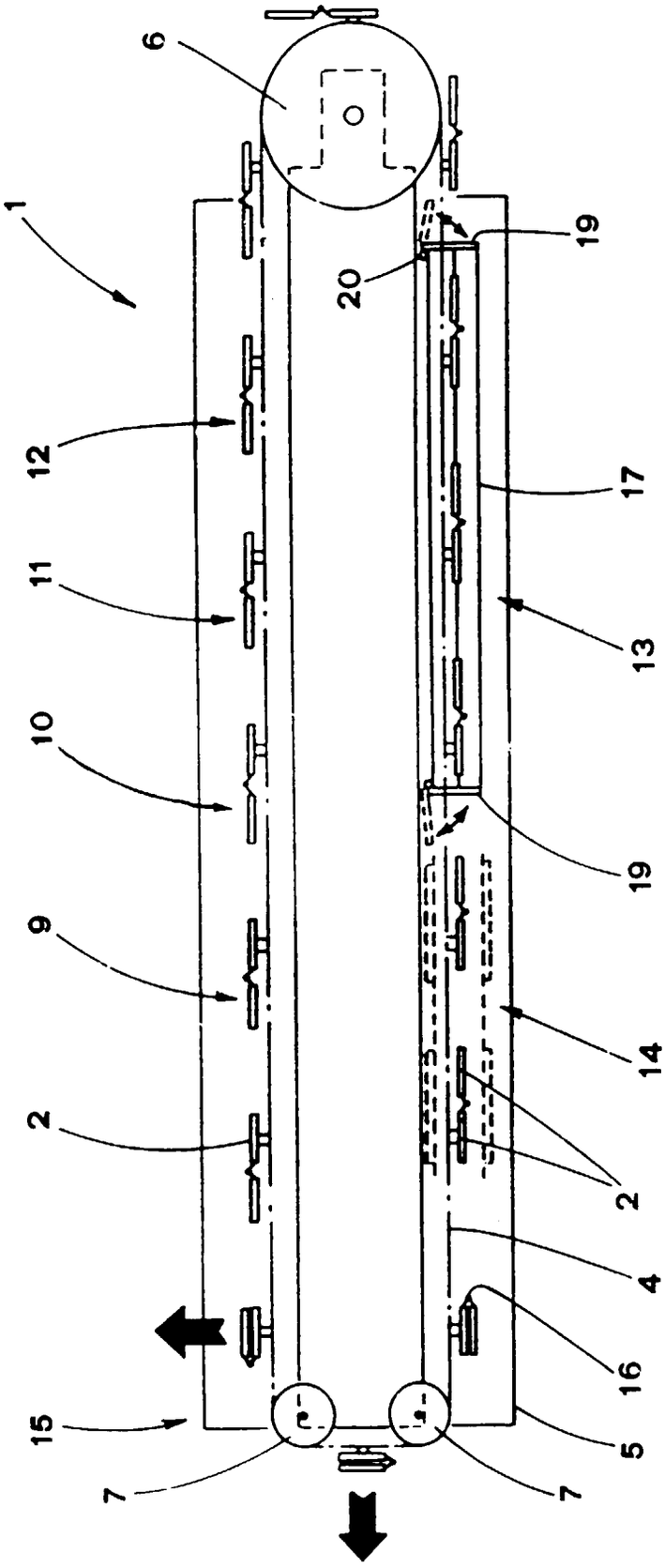


FIG.1

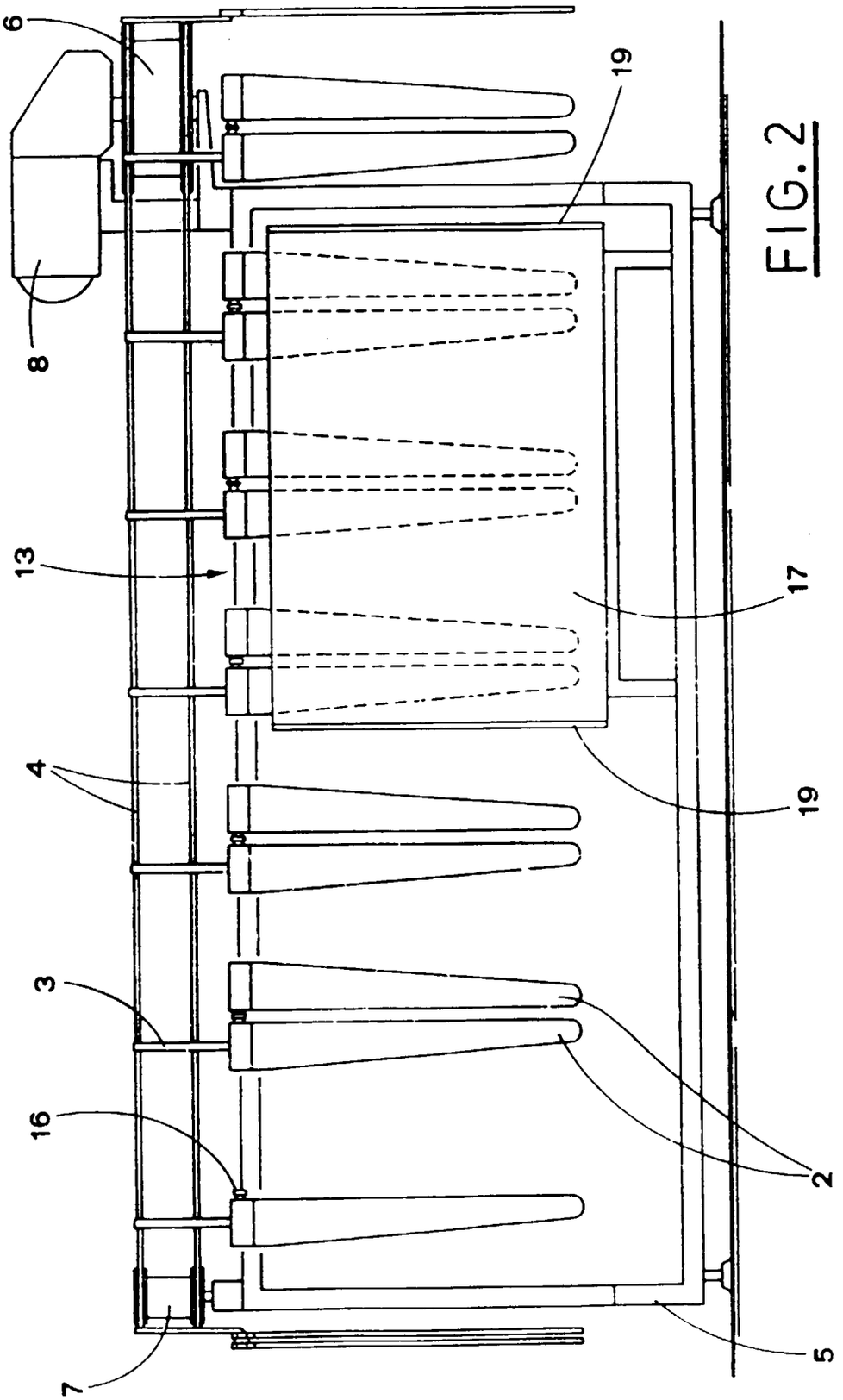


FIG. 2

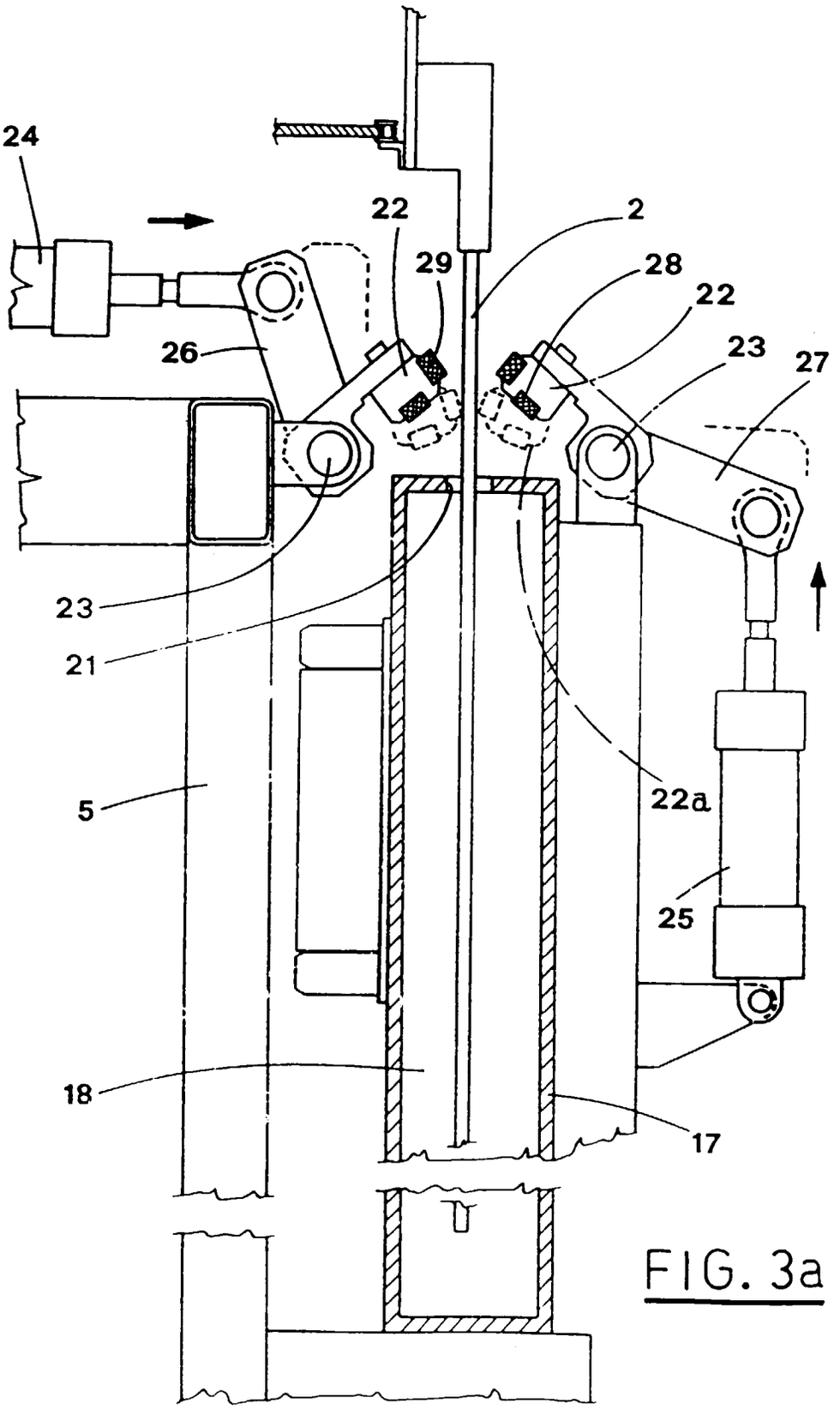


FIG. 3a

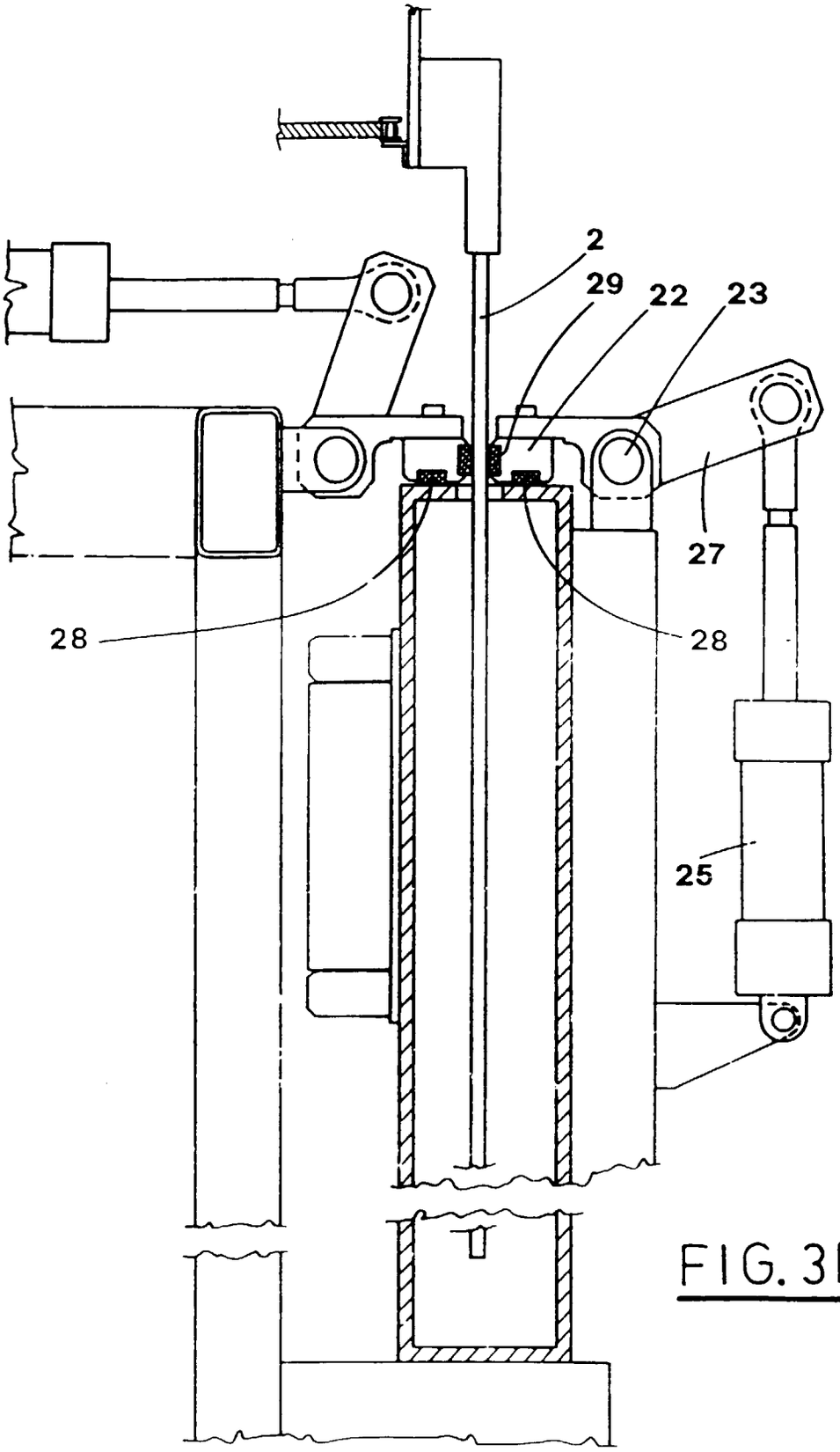
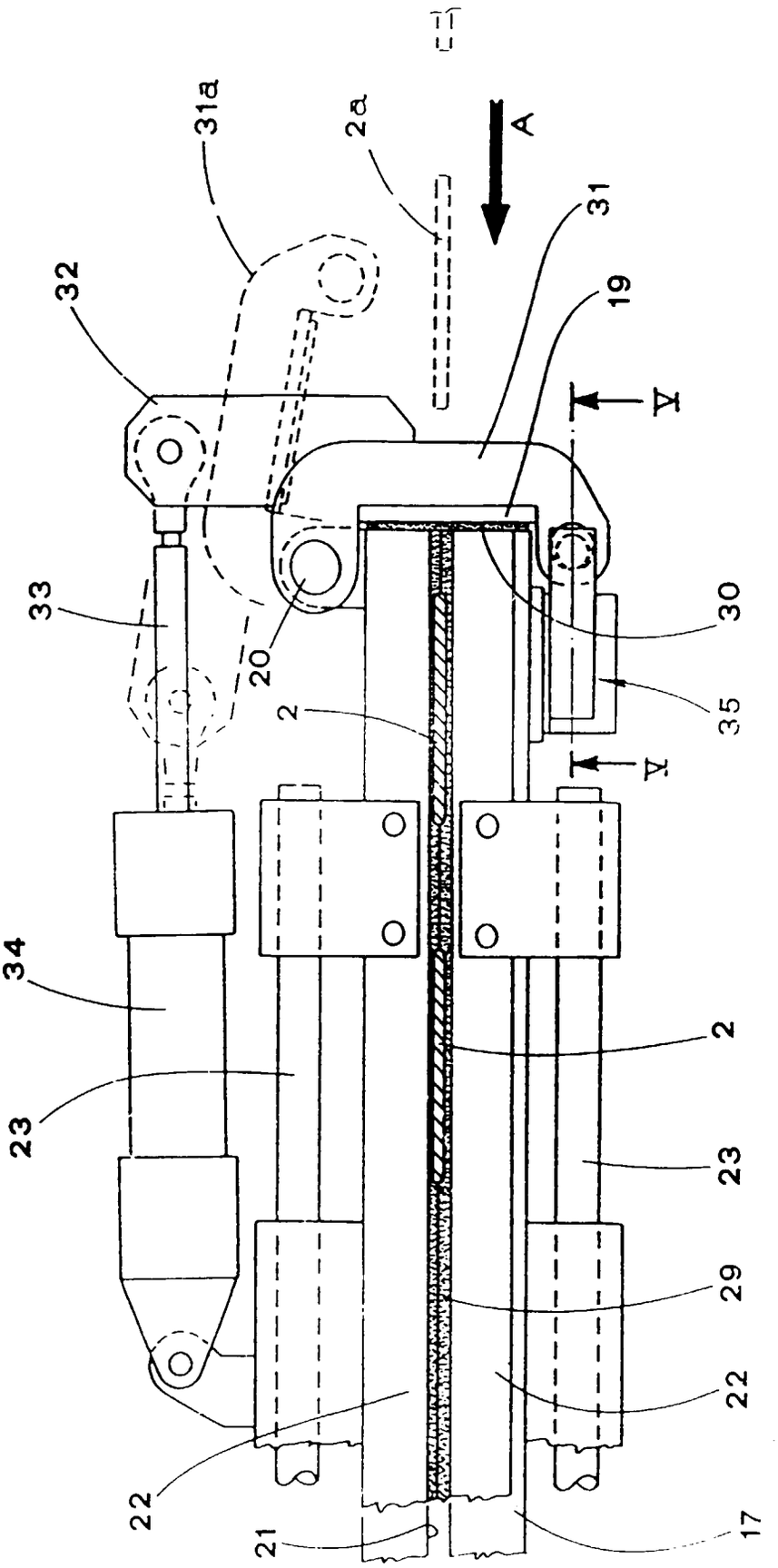


FIG. 3b

FIG. 4



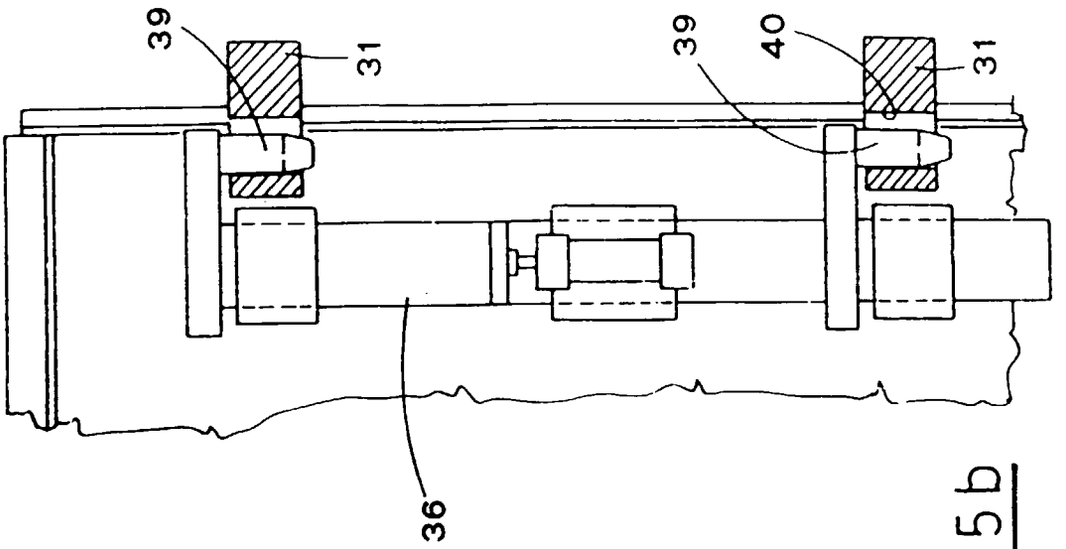


FIG.5b

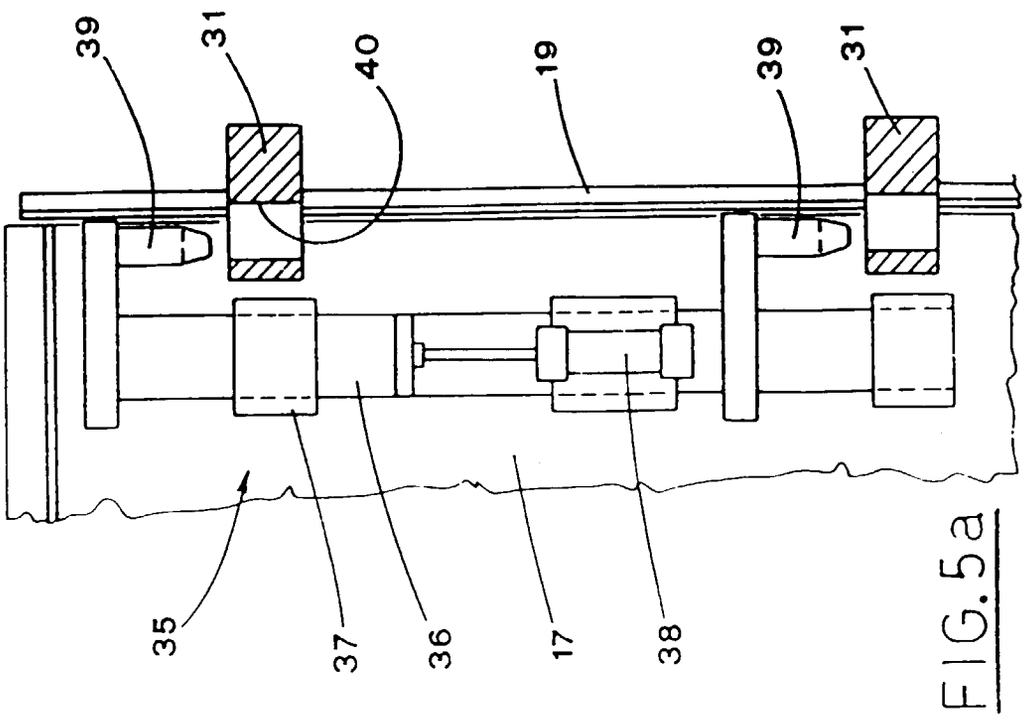


FIG.5a