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(71) Applicant: **Primus CE, s.r.o.**
742 58 Pribor (CZ)

(72) Inventors:
- **Odersky, Michal**
  742 21 Koprivnice (CZ)
- **Glac, Antonin**
  737 01 Horni Zukov (CZ)

(74) Representative: **Malusek, Jiri**
Kania, Sedlak, Smola
Mendlovo namesti 1 a
603 00 Brno (CZ)

(54) Apparatus for guiding of the workpiece for the ironing machine

(57) An apparatus for guiding of the workpiece for the ironing machine consisting of an upper roller (63) that leads the main belt (5) consists of a belt conveyor (50) on which belts (62) are driven between the upper driver roller (63) and bottom fixed tube (69), wherein on tube (69) ribs (61) are mounted in a distance next to each other between the belts (62); the ribs (61) are on the bottom part of the belt conveyor (50), starting below the bottom tube (69) up to one third or half of the length of the belt conveyor (50) and the belts (62) of the belt conveyor (50) fit closely to the main belt (5).

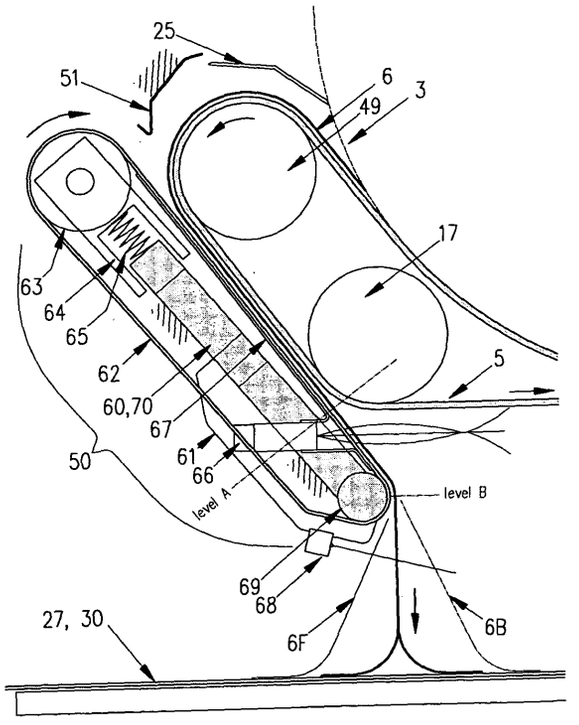

Fig.3

EP 1 602 775 A1

Description

Technical field of the invention

[0001] The invention concerns an apparatus for guiding of the workpiece to the folding table of the ironing machine.

State of the art

[0002] From EP 1 413 667 A1, an ironing machine is known that is equipped with so-called balancer, which is a specially modified balance beam consisting of two cylinders by means of which the ironed workpiece, e.g. a sheet, folded up on the folding table. To ensure that the workpiece is placed down on the folding table in the desired way, it was necessary to place a guiding device between the place where the ironed workpiece leaves the ironing cylinder and the folding table to guide the workpiece just above the folding table where the mentioned balancer works. The workpiece is folded up by the so-called "zig-zag" system and the balancing beam cylinders ensure ironing of the edges of workpiece folds.

[0003] Fig. 1 shows in a schematic way the ironing machine fitted with the guiding device according to the state of the art, which is then shown in more detail on Fig. 2. It is visible that it consists of a supporting plate, against which the main guiding belt is lead, and this plate and the guiding belt guide the workpiece. The end of the plate is still too high above the folding table and therefore the guiding device includes another cylinder, against which a smaller roller rotates. The workpiece passes between these rollers and then it is laid on the folding table. However, in practice the parameters for ironing cannot sometimes be set up optimally and the workpiece has too high residual moisture content or it is too dry. Due to friction, it is also charged with electrostatic charge, which causes displacement of the workpiece's edges from the desired direction and it is also unpleasant for the operator who receives electric shocks. The undesired displacement of the front workpiece edge occurs immediately after the roller outlet when the workpiece starts to wind up on these rollers, which may spoil the ironing, and the machine must be stopped. If the workpiece is fitted with laces (strings) or bows, these also have a greater tendency to wind up on the rollers. To neutralize the static discharge, special electrodes are used, but their function is not always optimal, because they are mounted close to other constructional parts which partially eliminate their functioning. Apart from that, the device is mounted on a part of the machine that is difficult to access, just as the access to an incorrectly ironed workpiece is also difficult.

[0004] The current guiding device is also not very convenient in that the workpiece passes between the main belt and the bottom supporting plate. When a thicker workpiece is ironed and leaves the ironing machine insufficiently dried, then the plate does not deflect upon the resistance of the workpiece and the workpiece gets stuck.

[0005] The aim of the invention is to present an apparatus for guiding of the workpiece for the ironing machine which would enable faultless leading of the workpiece to the folding table, preventing faulty workpiece displacement and facilitating better function of the electrode eliminating electrostatic discharge.

Summary of the invention

[0006] The above shortcomings are eliminated to a great extent by an apparatus for guiding of the workpiece to the ironing machine, whose main idea is that it consists of a belt conveyor on which belts are driven between the upper driver roller and bottom fixed tube, wherein on tube ribs are mounted in a distance next to each other between the belts; the ribs are on the bottom part of the belt conveyor, starting below the bottom tube up to one third or half of the length of the belt conveyor and the belts of the belt conveyor fit closely to the main belt.

[0007] In an advantageous embodiment the bottom tube is fixed to the frame and arranged between the loop of belts, and the tensioning elements are mounted between the frame and the bearing box of the driving roller.

[0008] In another advantageous embodiment the frame and the axis of the driving roller are arranged in a sliding manner on journals resp. in a bearing placed in the bearing box.

[0009] In another advantageous embodiment in the lengthwise centre of the conveyor a technological opening covered with technological plate is arranged.

[0010] Further it is advantageous when the belts are equipped with steel threads.

[0011] For better ironing there an electrode for air ionization can be installed on ribs and an optical diffuse sensor to control folding, mounted on the belt conveyor above the fixed tube can be installed.

Description of the drawings

[0012] The apparatus will be further described with the help of drawings, while Fig. 1 represents the ironing machine with an apparatus for guiding of the workpiece to the folding table of the ironing machine according to the state of the art; Fig. 2 shows this apparatus in detail; Fig. 3 shows the apparatus according to the invention from the side view; Fig. 4 shows the front view of the apparatus from Fig. 3; and Fig. 5 shows the ironing machine with the apparatus for guiding of the workpiece to the ironing machine according to the invention.

Description of illustrative embodiments

[0013] Fig. 1 and 2 show the ironing machine 100 with apparatus 110 for guiding of the workpiece to the folding table of the ironing machine according to the state of the

art, which is described above. Fig. 3 shows the side view of the apparatus according to the invention. It is obvious that it consists of belt conveyor 50, whose belts 62 fit closely to main belt 5 guided by upper rollers 49 and 17. Belts 5 and 62 in position along each other move in the same direction. Belt conveyor 50 consists of upper driving roller 63 and tensioning structure 60 ended with fixed tube 69 at the bottom. Between upper roller 63 and tensioning structure 60, spring-loaded tensioning elements 65 are mounted. It is visible on Fig. 4 that there are several belts 62 (8 in this case), and between them, there are flat separating ribs 61 mounted on tube 69. These ribs 61 are arranged in such a way that they stick out above belt 62 from the bottom of tube 69 upwards, approx. to the half-length of belt conveyor 50. These ribs guide individual belts 62 as well as workpiece 6 from tube 69 towards folding table 27, preventing the workpiece from winding back to belts 62 of belt conveyor 50. Optionally, electrode 68 may be mounted on ribs 61 for air ionization on outlet B from belt conveyor and for neutralization of electrostatic charge of the workpiece. Above tube 69, sensor 66 is mounted on belt conveyor 50, which is a part of the evaluation system of the machine function.

[0014] It is visible on Fig 4 that there is a free space approx. at a width of one belt in the centre of the belt conveyor. Technological plate 67 is mounted there. In this place, there is no belt and its function is performed by technological plate 67. It is also obvious that while the right edge of the belt conveyer is fixed to the frame of the machine, the left edge is floating on journals 72. Driving roller 63 is also mounted free in horizontal direction on bearing 73 through bearing box 64. This helps eliminate production inaccuracy of width of frame 60 of the belt conveyer or the width of the ironing cylinder; with the belt width of 3.2 m, there may be size variations. At he same time, this installation absorbs heat dilatation of frame of belt conveyor 50 and cylinder 63.

[0015] Fig. 5 shows the ironing machine with mounted apparatus 74 according to the invention.

[0016] During operation, the ironed workpiece 6 is separated from ironing cylinder 3. If it sticks on it, it is detached by means of detaching metal sheet 25 and runs below guiding plate 51 to the space between the main belt 5 and belts 62 of belt conveyor 50 and between belts 5 and 62 it is guided to outlet B from belt conveyer 50. If the end of the workpiece tends to wind up back to belts 62 of belt conveyor 50, it is detached from belt conveyor 50 owing to the presence of ribs 61 and it is passed down to the folding table 27.

[0017] If a thicker workpiece is ironed, then by the resistance that the workpiece creates between the belts and due to the inherent flexibility of belts 62, enhanced by spring-loaded tensioning system of ironing belt 5, the gap between belts 5 and 62 gradually expands and the workpiece passes through.

[0018] Belts 62 are fitted with steel threads, which significantly eliminate electrostatic charge. Apart from this, optional electrode 68 may be fitted to rigs 61. Apart from the belt conveyer, there are no cylinders or other structural elements in the proximity of the electrode, therefore ionization is not eliminated by them and is more efficient.

[0019] It is also advantageous to use optical diffuse sensor 66. A characteristic property of optical sensor 66 is that the sensor is at the same time an emitter and a receiver of a light beam and the workpiece itself is the reflection surface for this beam. If the sensor receives a beam reflected by the workpiece, it means that the workpiece cuts the extended axis of the sensor. This information is evaluated by the machine control unit and it is basic information to control the folding process of workpiece 6.

[0020] An advantage of this solution is also the fact that the ironing machine, which is equipped with an apparatus for the guiding of the workpiece to the folding table according to the older type may be easily modified. It suffices to dismantle the bottom plate and unwinding set of rollers mounted below the outlet from the plate and replace it with the apparatus according to the invention. The current machine may thus easily be modernized in a modular way.

Claims

1. An apparatus for guiding of the workpiece for the ironing machine consisting of an upper roller (63) that leads the main belt (5), **characterized in that** it consists of a belt conveyor (50) on which belts (62) are driven between the upper driver roller (63) and bottom fixed tube (69), wherein on tube (69) ribs (61) are mounted in a distance next to each other between the belts (62); the ribs (61) are on the bottom part of the belt conveyor (50), starting below the bottom tube (69) up to one third or half of the length of the belt conveyor (50) and the belts (62) of the belt conveyor (50) fit closely to the main belt (5).

2. An apparatus according to claim 1, **characterized in that** the bottom tube (69) is fixed to the frame (60) and arranged between the loop of belts (62), and the tensioning elements (65) are mounted between the frame (60) and the bearing box (64) of the driving roller (69).

3. An apparatus according to claim 1 or 2, **characterized in that** the frame (60) and the axis of the driving roller (63) are arranged in a sliding manner on journals (72) resp. in a bearing (73) placed in the bearing box (64).

4. An apparatus according to claims 1 to 3, **characterized in that** in the lengthwise centre of the conveyor (50) a technological opening covered with technological plate (67) is arranged.

5. An apparatus according to claim 1, **characterised in that** the belts (62) are equipped with steel threads.

6. An apparatus according to claim 1 or 2, **characterized in that** there is an electrode (68) for air ionization installed on ribs (61).

7. An apparatus according to claim 1 or 2, **characterized in that** there is an optical diffuse sensor (66) to control folding, mounted on the belt conveyor (50) above the fixed tube (69).

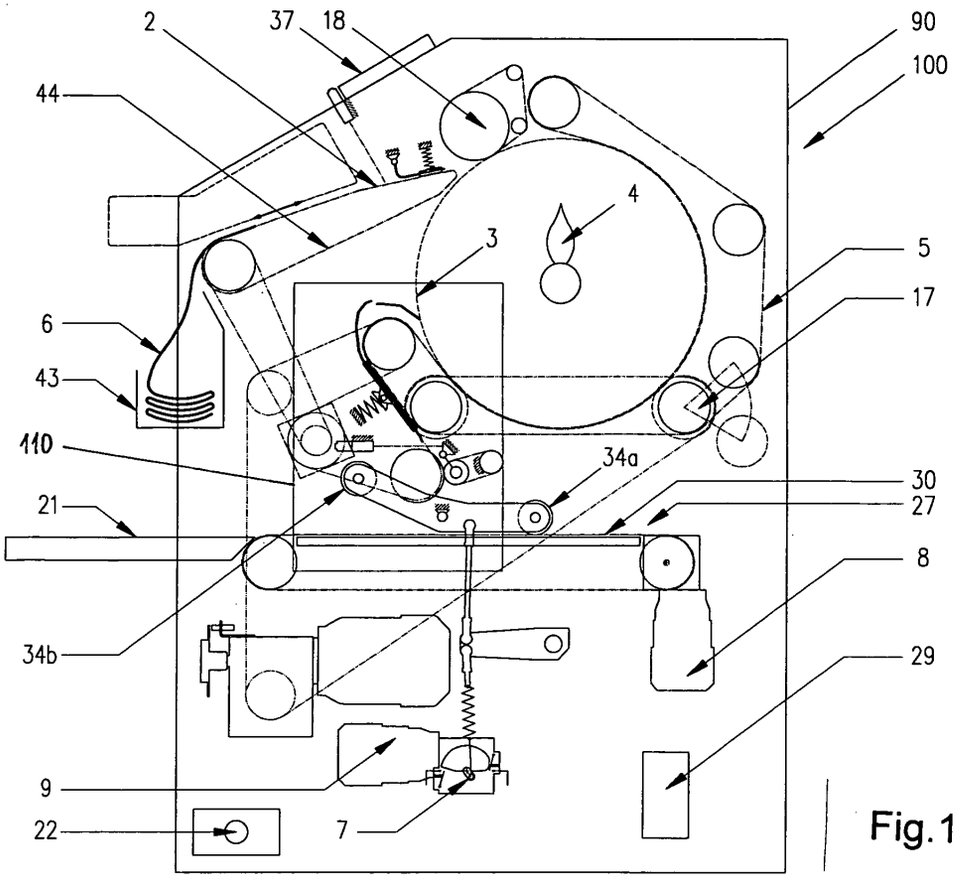
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Fig.1

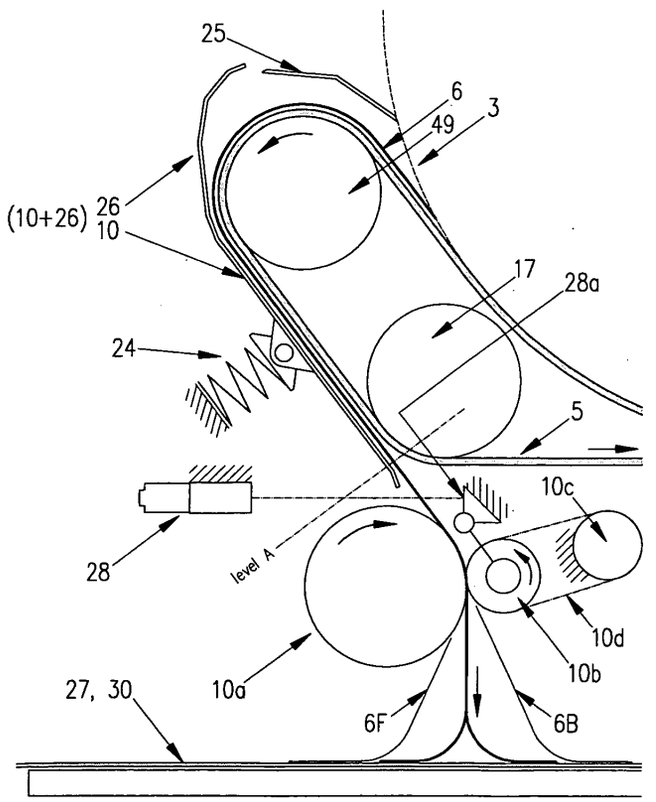
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Fig.2

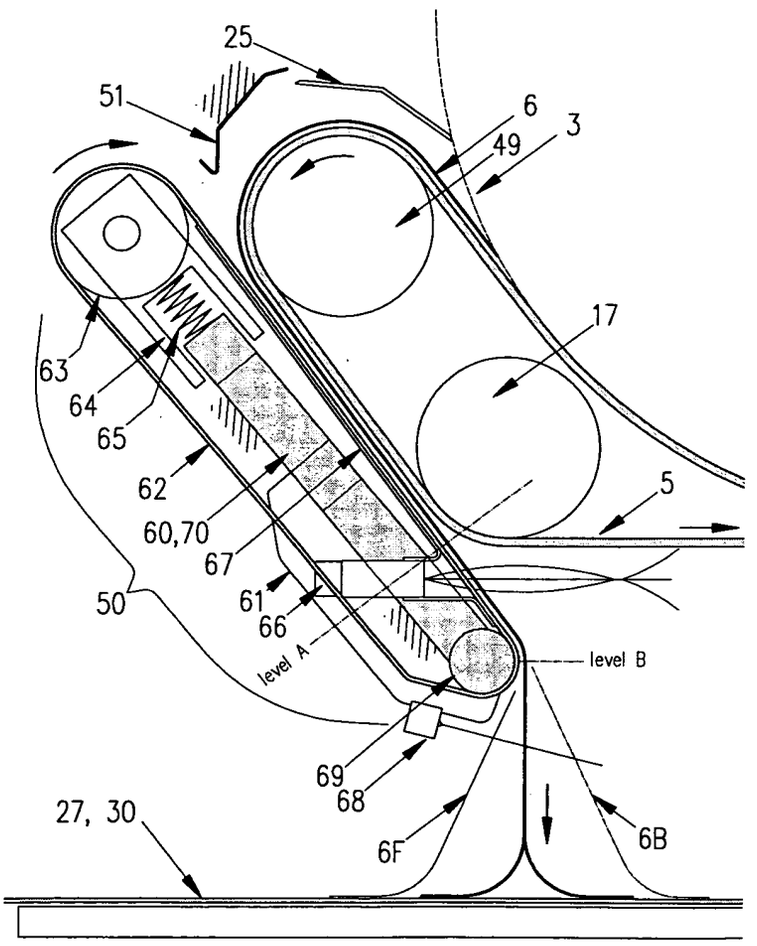
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Fig.3

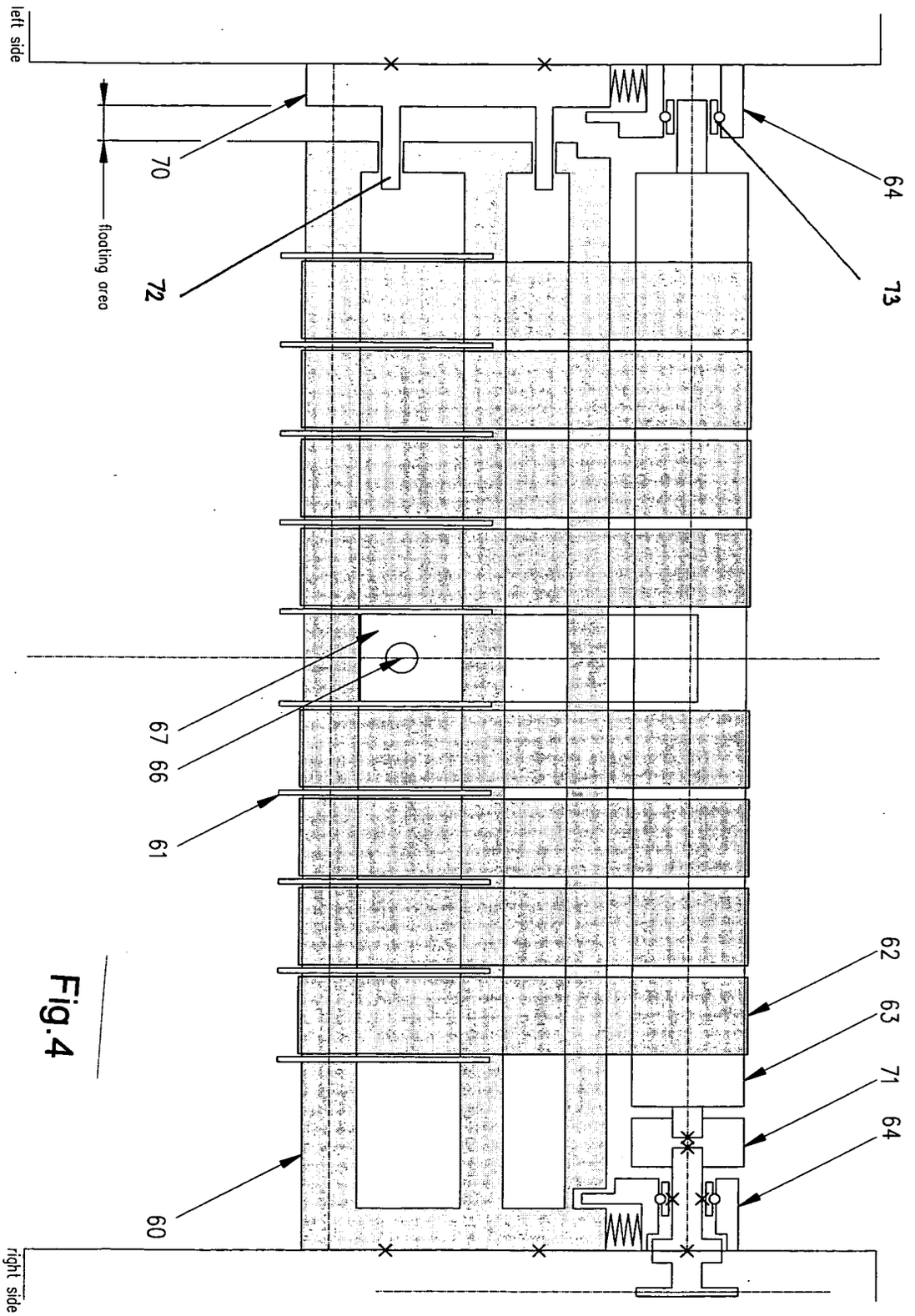
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Fig.4

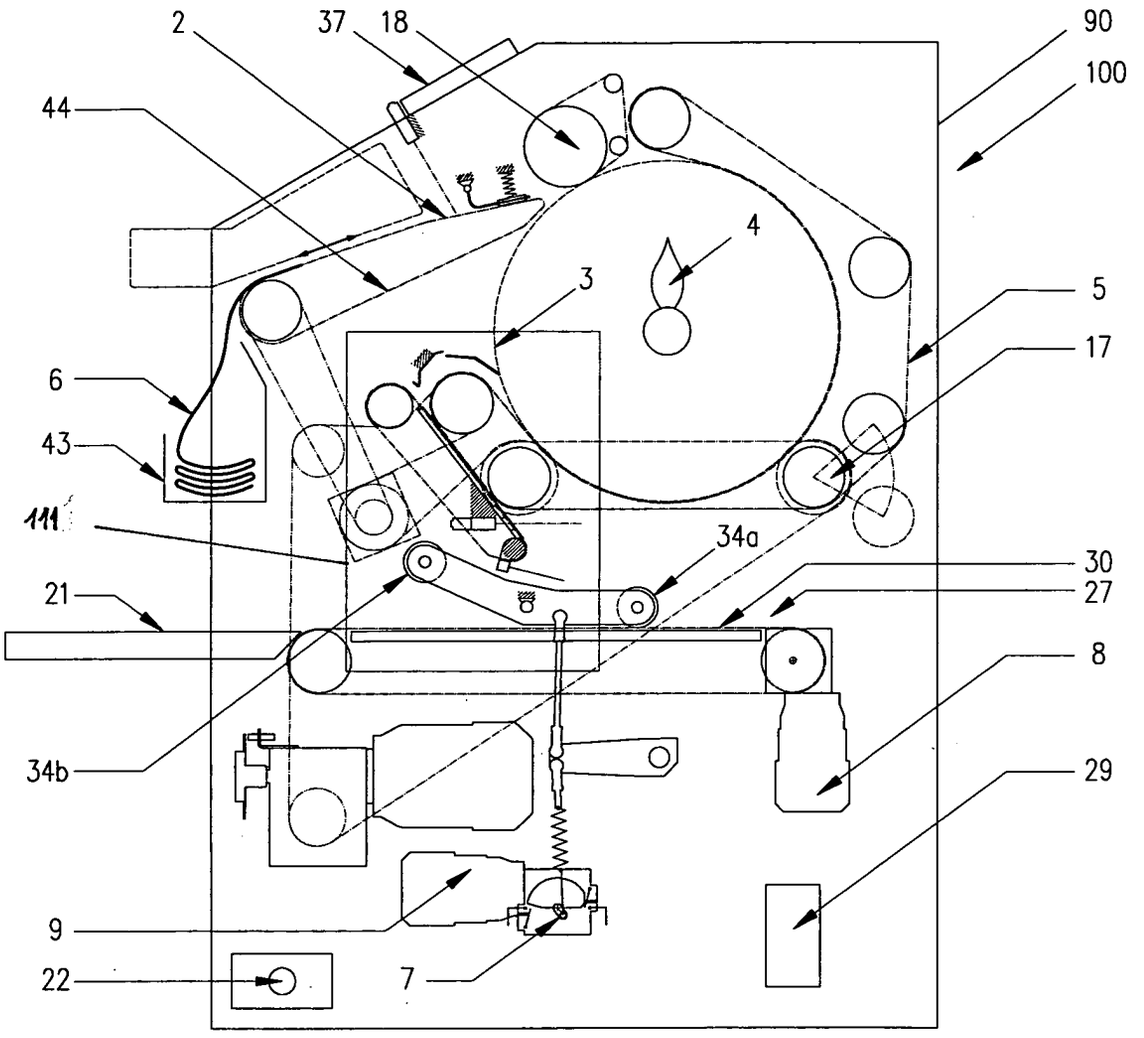

Fig.5

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EUROPEAN SEARCH REPORT

Application Number
EP 04 01 3197

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)
A,D	EP 1 413 667 A (PRIMUS N V) 28 April 2004 (2004-04-28) * paragraphs [0010], [0031]; figure 1 *	1-7	D06F69/02 D06F89/00
A	US 3 079 143 A (EJNAR JENSEN) 26 February 1963 (1963-02-26) * column 4, lines 3-9; figures 1,2,4 *	1-7	
A	DE 534 806 C (AMERICAN LAUNDRY MACH CO) 2 October 1931 (1931-10-02) * page 2, lines 1-32; figures 1,2 *	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

D06F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	8 November 2004	Weinberg, E

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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08-11-2004

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EPO FORM P0459

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