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(10) so that the sanding unit (13; 32) is movable between a retracted position in which the sanding element (20) is positioned inside the sanding machine (10) for sanding the aforesaid pieces and an extracted position (E) in which the sanding element (20) exits, at least partially, from the sanding machine (10) so as to be able to be replaced.



Description

Sanding machine

[0001] The invention relates to a sanding machine for sanding pieces made of wood or similar materials and/or of metal or similar materials and/or of plastics or similar materials. Sanding machines are known comprising a frame supporting a conveying belt arranged for conveying pieces to be sanded along an advancement direction.

[0002] These sanding machines further comprise one or more transverse sanding units and/or one or more longitudinal sanding units arranged in sequence along the advancement direction.

[0003] The transverse sanding units each comprise a pair of belts: a first inner supporting belt, or lamellar belt, and a second more external belt, or abrasive belt for sanding the pieces.

[0004] Such belts are wound in a loop around movement rollers and are moved transversely to the aforesaid advancement direction so as to sand the workpieces transversely to the latter.

[0005] The aforesaid longitudinal sanding units each comprise an abrasive belt wound in a loop around respective movement rollers and moved by the latter parallelly to the aforesaid advancement direction so as to sand the workpieces parallelly to the latter.

[0006] One drawback of known sanding machines is that the operations of replacing the aforesaid belts, in particular the belts of the transverse sanding units positioned in the first or last position with respect to the machine inlet or interposed between another two sanding units, are uneasy and laborious, this entailing long machine downtime and consequently reducing the productivity of the sanding machine.

[0007] In fact, in order to perform the aforesaid operations it is necessary for two operators to be positioned to the side of the machine tool, to insert hands and arms inside the sanding machine and extract/insert respectively the used/new belts.

[0008] A further drawback of known sanding machines is that they are very bulky.

[0009] This is due to the fact that the sanding units have to be suitably spaced apart from one another so as to enable operators to insert their hands and arms to perform the aforesaid operations of replacing belts.

[0010] One object of the invention is to improve sanding machines. A further object is to provide sanding machines that enable the abrasive belts to be replaced simply and rapidly. Another further object is to obtain sanding machines that are not very bulky.

[0011] The invention provides a sanding machine as defined in the independent claim 1.

[0012] Owing to the invention, it is possible to make a sanding machine that enables said sanding means to be replaced easily and fast, in particular the sanding means of the transverse sanding units positioned in the first or last position with respect to an inlet of the sanding ma-

chine or interposed between another two sanding units.

[0013] In fact, said slidable connecting means enables, during a replacement step, said sanding units to be extracted from the sanding machine so as to make said sanding means easily accessible for an operator.

[0014] Further, this makes the sanding machine according to the invention not very bulky, i.e. more compact than known sanding machines.

[0015] It is in fact no longer necessary to space apart the sanding units to enable an operator to replace said sanding means. The invention can be better understood and implemented with reference to the attached drawings that illustrate an embodiment thereof by way of non-limiting example, in which:

Figure 1 is a schematic side view of the sanding machine according to the invention including a sanding unit in a retracted position and with some details removed to highlight others better;

Figure 2 is an enlarged detail of Figure 1;

Figure 3 is a perspective view of the sanding machine of

Figure 1 with some details removed to highlight others better;

Figure 4 is a view like that of Figure 3 with the sanding unit in an extracted position;

Figure 5 is a front view with the sanding unit in an extracted position.

[0016] With reference to Figure 1 there is shown a sanding machine 10 for sanding pieces, which are not shown, made of wood or similar materials and/or of metal or similar materials and/or of plastics or similar materials.

[0017] The sanding machine 10 comprises a frame 11 supporting a conveyor belt 12 arranged for conveying the pieces to be sanded along an advancement direction A.

[0018] The sanding machine 10 further comprises a transverse sanding unit 13 and a pair of longitudinal sanding units 31, 32 arranged in sequence along the advancement direction A. In particular, the transverse sanding unit 13 is interposed between the pair of longitudinal sanding units 31, 32.

[0019] In an embodiment of the invention, which is not shown, it is possible to have a different arrangement of the transverse sanding unit 13 and of the pair of longitudinal sanding units 31, 32.

[0020] In a further embodiment of the invention, which is not shown, it is possible to have one or more transverse sanding units and/or one or more longitudinal sanding units arranged in sequence, with any arrangement, along the advancement direction.

[0021] In another embodiment of the invention, which is not shown, it is possible to have, in addition to, or instead of the aforesaid longitudinal sanding units, roller sanding units and/or tangential-disc sanding units.

[0022] The transverse sanding unit 13 is of known type and, for this reason, is disclosed briefly with reference to

Figures 1 and 4.

[0023] The transverse sanding unit 13 comprises a further frame 14 rotatably supporting a plurality of rollers 15, 16, 17 and 18 positioned, at a retracted position R (Figure 1) of the transverse sanding unit 13, above the conveyor belt 12, and having respective axes extending substantially parallelly to the advancement direction A.

[0024] In particular, the transverse sanding unit 13 comprises a first roller 15, a second roller 16, a third roller 17 and a fourth roller 18.

[0025] The first roller 15, the second roller 16 and the third roller 17 tension and move a supporting belt 19, or lamellar belt, which is not disclosed below as it is of known type, closed in a loop on the first roller 15, on the second roller 16 and on the third roller 17.

[0026] On the other hand, the first roller 15, the second roller 16 and the fourth roller 18 tension and move an abrasive belt 20, closed as a loop on the first roller 15, on the second roller 16 and on the fourth roller 18, the abrasive belt 20 being arranged outside the supporting belt 19.

[0027] The transverse sanding unit 13 further comprises a pressing device 21, arranged for exerting suitable pressure on a portion of the abrasive belt 20 in the direction of the conveyor belt 12 so as to exert greater or lesser sanding pressure on the pieces to be machined.

[0028] In particular, the pressing device 21 is arranged transversely to the advancement direction A and is divided into a plurality of pad blocks that are not shown that are adjacent to one another.

[0029] The pad blocks are drivable independently one from the other so as to each press a portion of the abrasive belt 20 with a different pressing force.

[0030] Alternatively to the aforesaid independent pad blocks, a single pressing element, or pad, can be provided.

[0031] The transverse sanding unit 13 further comprises a motor 22 for rotating one of the rollers 15, 16, 17, 18 so as to move the abrasive belt 20 and the supporting belt 19 transversely, in particular perpendicularly to the advancement direction A so as to sand the pieces transversely, in particular perpendicularly, to the latter. The aforesaid longitudinal sanding units 31, 32 are disclosed briefly inasmuch as they are of known type.

[0032] In particular, these longitudinal sanding units 31, 32 each comprise a respective abrasive belt 23, 24 wound as a loop around respective movement rollers 25, 26 and moved by the movement rollers 25, 26 parallelly to the advancement direction A so as to sand the pieces parallelly to advancement direction A.

[0033] The sanding machine 10 further comprises slidable connecting means 27, shown with greater detail in Figure 2, arranged for slidably connecting the transverse sanding unit 13 to the sanding machine 10.

[0034] In particular, the slidable connecting means 27 enables the transverse sanding unit 13 to be moved along a movement direction M that is substantially horizontal and perpendicular to the advancement direction A, be-

tween the retracted position R (Figures 1 and 3) in which the transverse sanding unit 13, and with it the belts 19 and 20, is positioned inside the sanding machine 10 for sanding the aforesaid pieces, and an extracted position E (Figures 4 and 5) in which the transverse sanding unit 13, and with it the belts 19 and 20, exits, at least partially, from the sanding machine 10 to enable the belts 19 and 20 to be replaced.

[0035] In an embodiment of the invention, which is not shown, the movement direction M is substantially vertical and perpendicular to the advancement direction A.

[0036] It should be noted how in the extracted position E the transverse sanding unit 13 is mounted in a cantilevered manner on the sanding machine 10, thus enabling the belts 19 and 20 to be replaced easily and rapidly.

[0037] The aforesaid slidable connecting means 27 comprises a first telescopic guide 28 and a second telescopic guide 29 positioned on opposite sides of the transverse sanding unit 13.

[0038] The first telescopic guide 28 and second telescopic guide 29 each comprise a respective first fixed guiding element 33, 34.

[0039] The first guiding elements 33 and 34, which are substantially parallel to one another, extend substantially parallelly to the movement direction M.

[0040] Further, the first guiding elements 33, 34 are fixed to opposite portions of a supporting frame 35 (Figure 4) of the sanding machine 10.

[0041] In particular, the supporting frame 35 extends substantially parallelly to the movement direction M and has the shape of an upturned 'U'.

[0042] The first telescopic guide 28 and the second telescopic guide 29 each comprise a respective second guiding element 36, 37, that is movable with respect to the corresponding first guiding element 33, 34 along the movement direction M. The second guiding elements 36, 37, which are substantially parallel to one another, extend substantially parallelly to the movement direction M and are operationally positioned below the respective first guiding elements 33, 34.

[0043] Further, the second guiding elements 36, 37 are fixed to opposite portions of the further frame 14 of the transverse sanding unit 13.

[0044] The first telescopic guide 28 and the second telescopic guide 29 each comprise a respective intermediate guiding element 38, 39, having, for example, an S-shaped section. Each intermediate guiding element 38, 39 is interposed between the corresponding fixed guiding element 33, 34 and the second guiding element 36, 37 and is slidably connected to the corresponding first guiding element 33, 34 and to the second guiding element 36, 37.

[0045] In this manner the intermediate guiding elements 38, 39 are movable along the movement direction M.

[0046] The aforesaid transverse sanding unit 13 further comprises a handle 40 fixed to the further frame 14, to enable an operator to move the transverse sanding

unit 13 between the retracted position R and the extracted position E.

[0047] In an embodiment of the invention, which is not shown, actuating means is provided, for example comprising a pneumatic or electric or hydraulic actuator, to move the transverse sanding unit 13 between the retracted position R and the extracted position E.

[0048] In another embodiment of the invention, which is not shown, further slidable connecting means is provided for slidably connecting the sanding machine 10 to the longitudinal sanding units 31, 32 for example to facilitate replacing the belts 23, 24, or to promote other maintenance operations.

[0049] In use, when it is desired to replace the belts 19, 20, or to perform maintenance operations on the transverse sanding unit 13 it is sufficient to extract the transverse sanding unit 13 from the sanding machine 10 by the handle 40.

[0050] Once the belts 19 and/or 20 have been replaced and/or the aforesaid maintenance operations have been performed it is sufficient to reposition the transverse sanding unit 13 inside the sanding machine 10 by means of the handle 40.

[0051] It should be noted how the invention disclosed above enables the belts 19, 20 of the transverse sanding unit 13 to be replaced easily and quickly, in particular the belts 19, 20 of the transverse sanding units positioned in the first or last position with respect to an inlet of the sanding machine 10 or interposed between another two sanding units 31, 32.

[0052] In fact, the slidable connecting means 27 enables, during a replacement step, the transverse sanding unit 13 to be extracted from the sanding machine 10 so as to make the belts 19, 20 easily accessible for and easily replaceable by an operator.

[0053] This moreover makes the sanding machine 10 according to the invention not very bulky, i.e. more compact than known sanding machines.

[0054] In fact, it is no longer necessary to space the sanding units 13, 31, 32 apart from one another for enabling an operator to have sufficient space to replace the belts 19, 20.

Claims

1. Sanding machine (10) comprising a sanding unit (13; 31; 32) provided with sanding means (19, 20; 23; 24) for sanding said pieces, **characterised in that** it comprises slidable connecting means (27) for slidably connecting said sanding unit (13; 31; 32) to said sanding machine (10) so that said sanding unit (13; 31; 32) is movable between a retracted position (R) in which said sanding means (19, 20; 23; 24) is positioned inside said sanding machine (10) for sanding said pieces and an extracted position (E) in which said sanding means (19, 20; 23; 24) exits, at least partially, from said sanding machine (10) to be able

to be replaced.

2. Machine (10) according to claim 1, wherein said slidable connecting means (27) defines a movement direction (M) of said sanding unit (13; 31; 32) that is transverse, in particular substantially perpendicular, to an advancement direction (A) of said pieces.
3. Machine (10) according to claim 2, wherein said movement direction (M) is substantially horizontal.
4. Machine (10) according to any preceding claim, wherein in said extracted position (E) said sanding unit (13; 31; 32) is mounted cantilevered on said sanding machine (10).
5. Machine (10) according to any preceding claim, wherein said slidable connecting means (27) comprises at least a telescopic guide (28; 29).
6. Machine (10) according to claim 5, wherein said at least a telescopic guide (28; 29) comprises a first guiding element (33; 34) that is fixed and mounted on a supporting frame (35) of said machine (10).
7. Machine (10) according to claim 6, wherein said at least a telescopic guide (28; 29) comprises a second guiding element (36; 37), that is slidable with respect to said first guiding element (33; 34), fixed to a further supporting frame (14) of said sanding unit (13; 31; 32).
8. Machine (10) according to claim 7, wherein said at least a telescopic guide (28; 29) comprises an intermediate guiding element (38; 39) interposed between said first guiding element (33; 34) and said second guiding element (36; 37), said intermediate element (38; 39) being slidably connected to said first guiding element (33; 34) and to said second guiding element (36; 37).
9. Machine (10) according to claim 8, wherein said intermediate guiding element (38; 39) has an S-shaped section.
10. Machine (10) according to any preceding claim, wherein said slidable connecting means (27) comprises a pair of telescopic guides (28, 29) positioned on opposite sides of said sanding unit (13; 31; 32).
11. Machine (10) according to any preceding claim, wherein said sanding means (19, 20; 23; 24) comprises an abrasive belt (20; 23; 24).
12. Machine (10) according to any preceding claim, wherein said sanding unit (13; 31; 32) comprises a plurality of rollers (15, 16, 17, 18; 25; 26) for rotatably supporting said sanding means (19, 20; 23; 24).

13. Machine (10) according to any preceding claim, wherein said sanding unit (13; 31; 32) comprises a motor (22) for rotating at least one of said rollers (15, 16, 17, 18; 25; 26). 5
14. Machine (10) according to any preceding claim, wherein said sanding unit (13; 31; 32) comprises handle means (40) for moving said sanding unit (13; 31; 32) between said retracted position (R) and said extracted position (E). 10
15. Machine (10) according to any one of claims 1 to 13, and comprising actuating means for moving said sanding unit (13; 31; 32) between said retracted position (R) and said extracted position (E). 15
16. Machine (10) according to any preceding claim, wherein said sanding unit (13; 31; 32) is a transverse sanding unit (13) arranged for sanding said pieces transversely with respect to said advancement direction (A). 20

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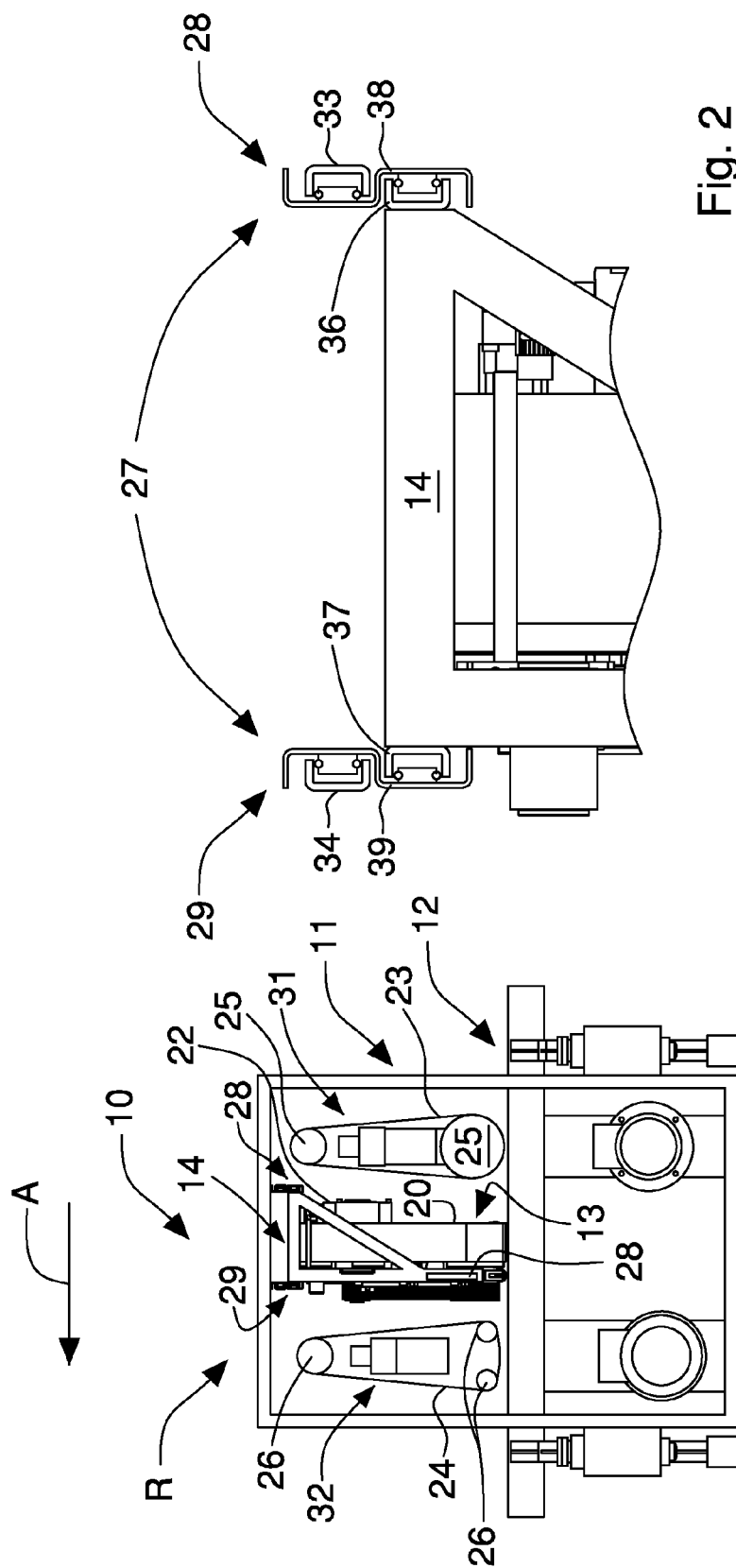


Fig. 2

Fig. 1

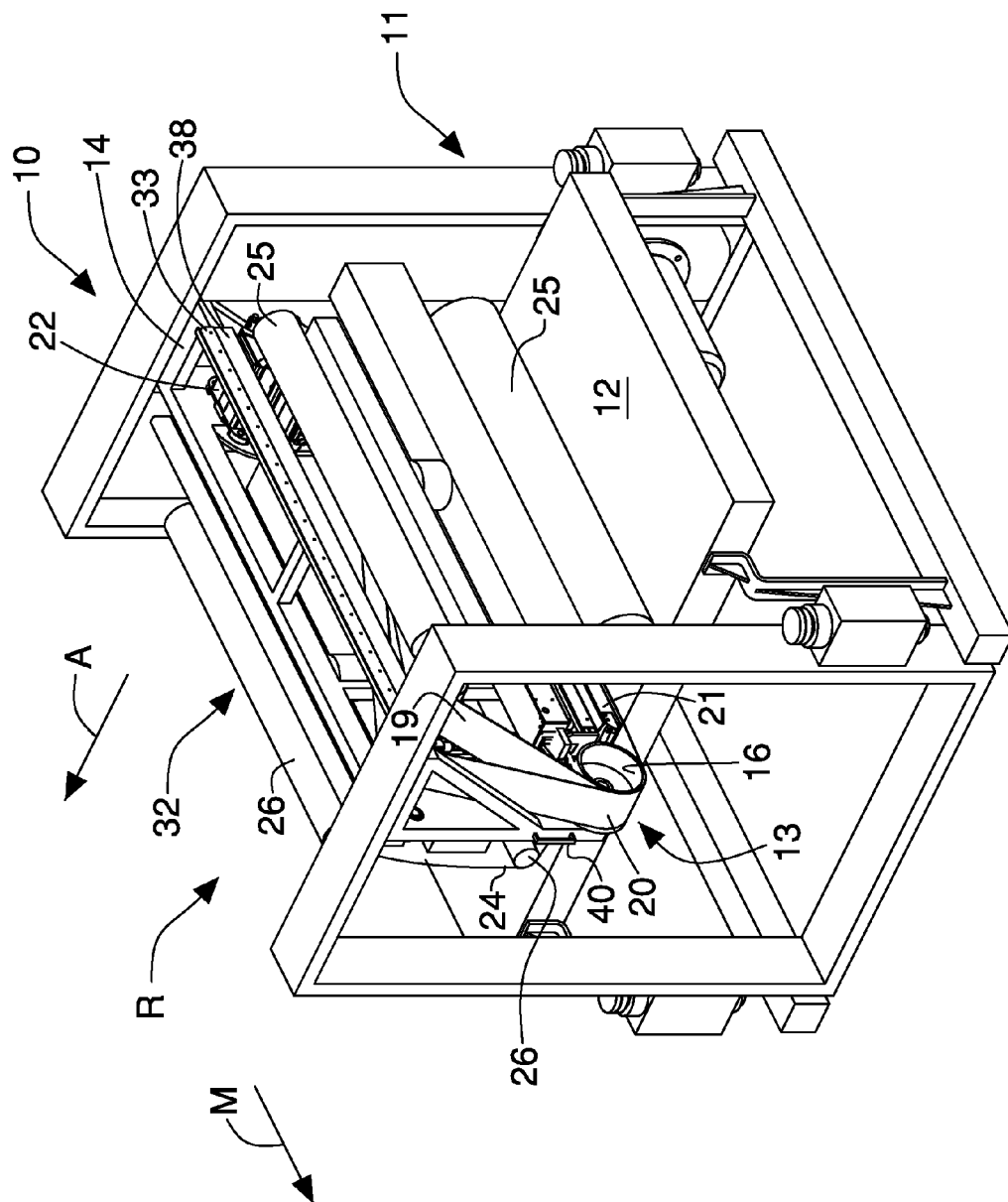


Fig. 3

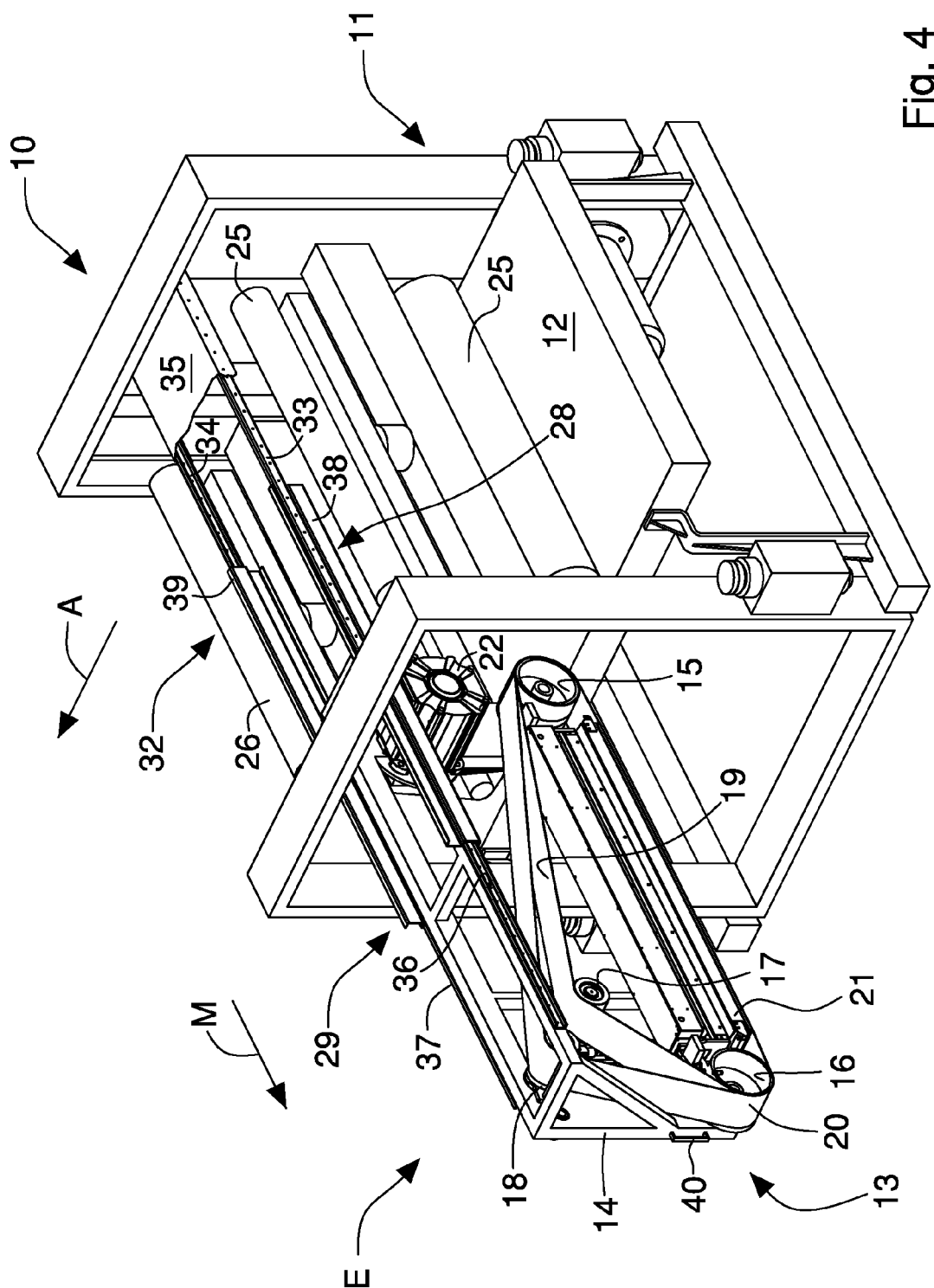


Fig. 4

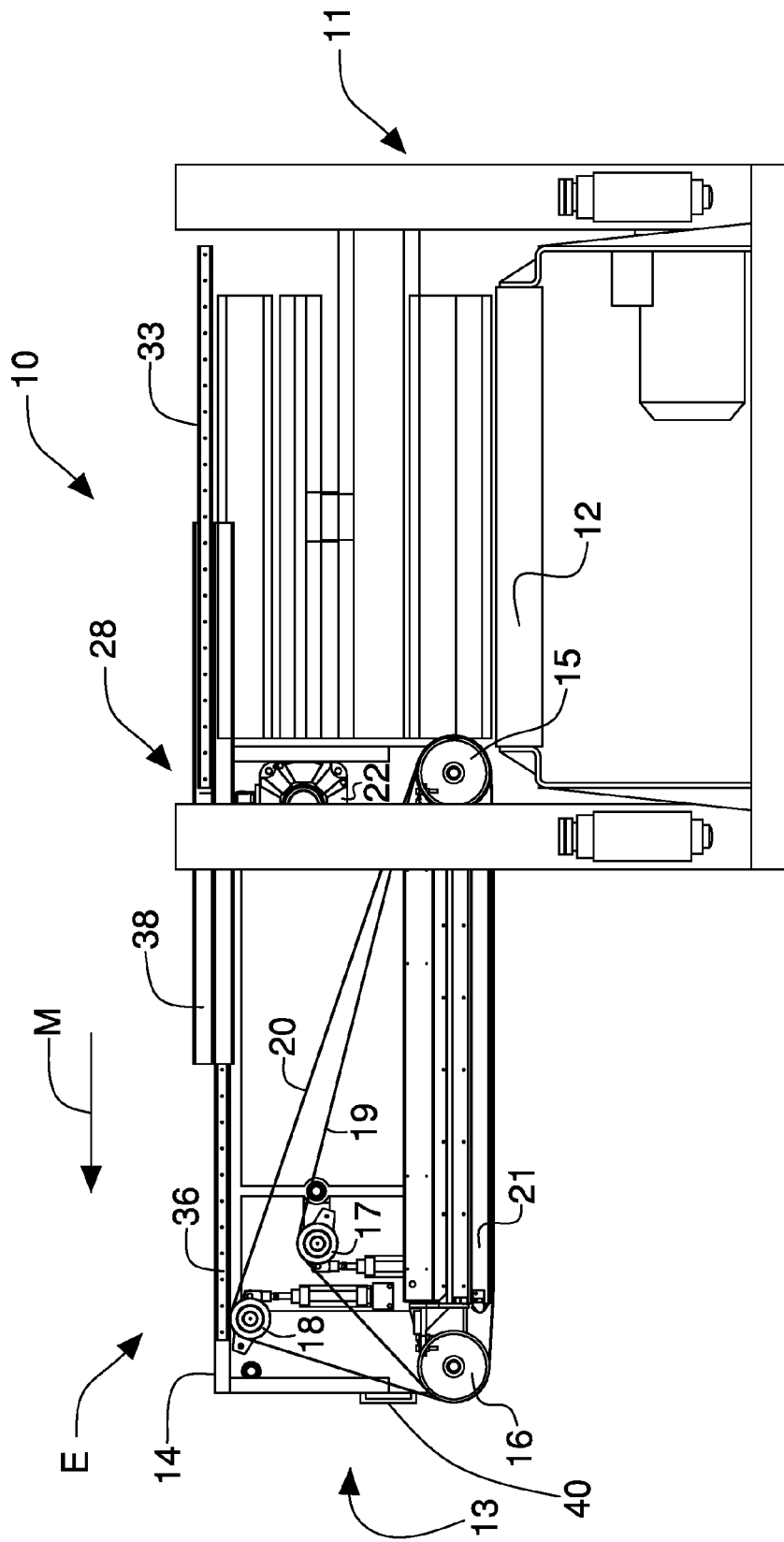


Fig. 5



EUROPEAN SEARCH REPORT

Application Number
EP 10 15 9867

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2004/087261 A1 (WANG WANG TIEN [TW]) 6 May 2004 (2004-05-06) * column 6 - column 7 * * column 24 - column 31 * * figures 2-5 * -----	1-16	INV. B24B7/28 B24B21/00 B24B21/04 B24B41/047
			TECHNICAL FIELDS SEARCHED (IPC)
			B24B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 18 June 2010	Examiner Gelder, Klaus
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category 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			

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