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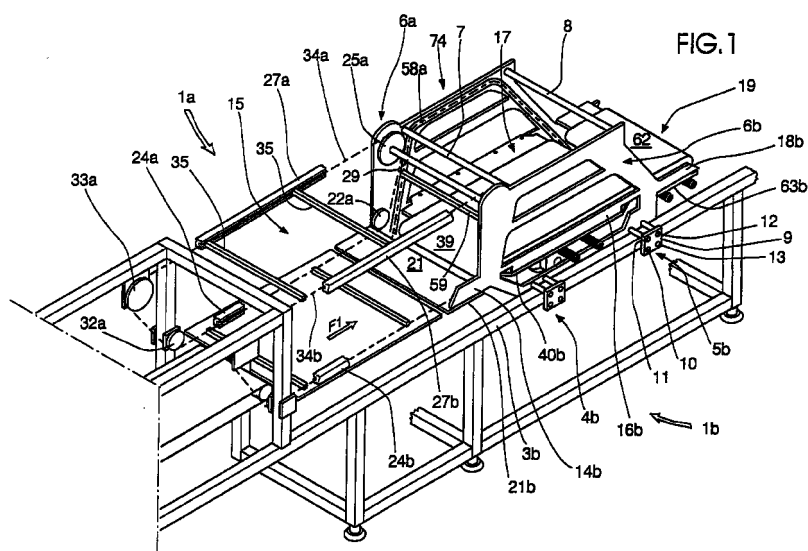
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(54) **Conveyor-wrapper unit for packaging machine**

(57) -A conveyor-wrapper unit comprises two suspended plates (6a, 6b), which extend longitudinally and vertically, and are supported in a detachable manner by the uprights (1a, 1b) of the frame, by means of securing/release means (77a, 4a, 5a, 4b, 5b). -The said suspended plates (6a, 6b) support two or more conveyor-means (15, 17, 19), which are oriented longitudinally, disposed in succession, and can translate the objects

along a segmented translation path, and a wrapper (74), which is oriented longitudinally, and which includes one or more wrapping bars (59), which are oriented transversely, and are moved along an orbital path which circumscribes one (17) of the said conveyor-means (15, 17, 19).



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Description

Field of the Invention

[0001] -The present invention relates to a conveyor-wrapper unit for an automatic packaging machine of the so-called "sleeve" type.

[0002] -More particularly, the present invention comes within the specific context of automatic machines which are designed to package objects such as boxes or batches of products (for example casks, cans, bottles etc.), by means of pieces or sheets of packaging material, such as sheets of heat-shrink material, in which the said pieces are wrapped individually in the form of a "sleeve" around the objects, which are translated with continuous motion along a packaging path, in order then to pass the individual object/piece assemblies obtained into a heat-shrink oven, in order to heat to a specific temperature the pieces wrapped, which, when they cool, are heat-shrunk onto to the objects, and thus consolidate the packaging.

Background of the Invention

[0003] -At present, for example see patents US-5,203,144, US-5,203,146 and US-5,463,846 in the name of the same applicant as the present patent application, these machines substantially have a base, consisting of two heavy lateral walls, which are obtained by casting or by means of a metal framework, which are spaced transversely, extend longitudinally, are designed to support the transverse ends of various mechanical units which form a segmented line for translation of objects, and are designed to support a piece wrapper and a piece supplier.

[0004] -The segmented line for translation of objects, substantially from upstream towards downstream, comprises a series of mechanical units, and more particularly a conveyor belt, which is surmounted by longitudinal guides which form longitudinal ducts for the products, and is designed to supply the said products in longitudinal rows, in which the transverse ends of the said conveyor are secured to, and supported by, the said walls; a multiple-belt conveyor, along which the batches are formed, the transverse ends of which are secured to, and supported by the said walls; a batch former, disposed beneath the said multiple-belt conveyor, which is designed to form and supply in the downstream direction the batches of products, in which the said former has its transverse ends secured to, and supported by, the said walls; a first conveyor for supply of objects, which is oriented longitudinally, and is designed to supply the batches longitudinally along a first section of the packaging path, in which the said first conveyor has its transverse ends secured to, and supported by, the said walls; a second wrapping conveyor, which is oriented longitudinally, disposed downstream, and is slightly spaced relative to the said first conveyor,

thus giving rise to a first aperture between the said first and the said second conveyor, and is designed to receive the batches presented by the said first conveyor, and to convey them along a second section of the packaging path, in which the said second conveyor has its transverse ends secured to, and supported by, the said walls; and, finally, a third receipt conveyor, which is oriented longitudinally, disposed downstream, and is slightly spaced relative to the said second conveyor, thus giving rise to a second aperture between the said second and the said third conveyor, and is designed to receive the batches obtained from the said second conveyor, and to translate them along a third section of the packaging path, in which the said third conveyor has its transverse ends secured to, and supported by, the said walls.

[0005] -The unit wrapper substantially consists of two frames, which extend longitudinally and vertically, and are disposed respectively on both sides of the said second conveyor, with their respective lower ends resting on, and supported by, the said two lateral walls of the machine.

[0006] -The said two frames, additionally, each have respective guides for chains, in which the latter are wound in a closed path in two separate vertical-longitudinal planes, disposed on two opposite longitudinal sides of the second conveyor, and in which the said chains are designed to support the opposite ends of one or more wrapping bars, oriented transversely, which move through the said first and the said second aperture, along a closed orbital path which circumscribes the said second conveyor, such as to transport and wrap the pieces of packaging material around the objects.

[0007] -The unit supplier is substantially disposed beneath the line for translation of the objects, and in the vicinity of the said first aperture, and supplies pieces of packaging material from the base upwards, via the said first aperture, and onto the initial portion of the said second conveyor.

[0008] -Owing to their heavy structure and their substantial size, the said machines are preferably assembled on the site of their future use, such that initially the base with the lateral walls is formed and/or positioned, and the operations of preparation-completion of the walls are then carried out (for example attachment of supports), and then the above-described mechanical units of the packaging machine are assembled on the said completed walls.

[0009] -Owing to their complexity, these operations, and in particular those relating to completion of the walls and assembly of the mechanical units must be carried out by expert, specialised technicians-fitters from the company which produces the packaging machine, who temporarily, and sometimes even for several weeks, are transferred to this location, bringing with them sophisticated mechanical tooling.

[0010] -In addition, in the said machines, when it is necessary to replace one or more mechanical units

and/or the components which constitute them, as a result of accidental breakage and/or for maintenance, the machine is stopped, all the components which prevent access to the component to be replaced are removed, the latter is replaced, all the components previously removed in order to obtain access are correctly re-fitted, and then the re-assembled machine is timed and then re-started.

[0011] -Finally, depending on the type and shape of the objects to be packaged (e.g. monolithic prismatic objects or batches of products), whilst maintaining the same operative method for wrapping of the pieces, the said machines have different configurations, i.e. different completion of the walls in order to support different mechanical units, in which, for example, according to a first operative configuration, the first conveyor can consist of an inert sliding plate, on which there are translated batches of bottles thrust by suspended bars, and, according to a second configuration, the above-described first conveyor can consist of a belt conveyor which is wound around a closed path.

[0012] -These machines, thus structured, have a series of disadvantages.

[0013] -A first disadvantage is owing to the fact that the operations of completion of the walls, as well as the operations of assembly of the various mechanical units, which are carried out by fitters/maintenance operators working between the two walls of the packaging machine, i.e. in a narrow inaccessible space, are difficult and laborious, with consequent long execution times, and thus a relatively high cost of final production of the machine. In this context, with reference to the specific difficulties encountered, it should be pointed out that it is particularly problematic to obtain a translation path for the objects which is co-planar, i.e. which is free from steps, between the said first, second and third conveyors.

[0014] -A second disadvantage is owing to the fact that the completion of the walls and assembly of the various mechanical units involves transfer of various technicians/fitters to the place of use of the machine, together with relatively sophisticated mechanical tooling, thus giving rise to costs of transfer and transport which add further to the cost of final production of the machine itself.

[0015] -A further disadvantage is owing to the fact that, in view of the various configurations which can be assumed by the said machine, it is necessary to have a plurality of different bases with walls, and a plurality of different completion fittings for the said walls, with a consequent high cost for design, and further additional costs for the various executions of the bases and completion fittings.

[0016] -A further disadvantage is owing to the fact that any replacement of some mechanical units, as a result of accidental breakage and/or wear, requires lengthy periods of work, and a long stoppage of the machine, with a consequent high cost for execution of

the repair, and a high production loss.

Objects of the Invention

[0017] -The object of the present invention is to eliminate the above-described disadvantages.

[0018] -The invention, which is characterised by the claims, solves the problem of creating a conveyor-wrapper unit which is particularly suitable for a packaging machine of the "sleeve" type.

Summary of the Invention

[0019] -More particularly, the object of the present invention is a conveyor-wrapper unit for a packaging machine of the "sleeve" type, which extends longitudinally, and is provided with a base comprising a first, longitudinal lateral upright and a second, longitudinal lateral upright, which are spaced transversely, between which there are disposed various conveyors, which are designed to translate from upstream in the downstream direction the objects to be packaged, along a segmented straight packaging path, in which there are provided wrapping means, which are designed to wrap around the objects pieces of packaging material, whilst the said objects are being translated from upstream in the downstream direction along the said segmented straight translation path, in which the said conveyor-wrapper unit is characterised in that it comprises two suspended plates which extend longitudinally and vertically; in that the said two suspended plates are supported respectively in a detachable manner, one from the said first upright and the other from the said second upright, by means of securing/release means; in that the said suspended plates support two or more conveyor means, which are oriented longitudinally, disposed in longitudinal succession, and can translate objects from upstream in the downstream direction along the said straight segmented path for translation of objects; in that the said conveyor means are slightly spaced longitudinally, in order to form a first aperture and a second aperture upstream and downstream from one of the said conveyor means; and in that the said suspended plates support a wrapper, which is oriented longitudinally, and includes one or more wrapping bars, which are oriented transversely, and can be moved along an orbital path which circumscribes the said one of the said second conveyor means, by passing through the said first aperture and the said second aperture.

[0020] -A first advantage of the present invention consists in the fact that the completion and assembly of some mechanical units of the machine is quick and easy, and does not require execution of difficult operations between the walls of the machine, with a consequent reduction in the execution times, and thus a corresponding reduction of the final production cost of the machine.

[0021] -A further advantage of the present invention

consists in the fact that the path for translation of objects, formed by the said first, second, and third conveyors, is perfectly co-planar, and does not require execution of difficult operations between the walls of the machine.

[0022] -A further advantage of the present invention consists in the fact that the assembly of the said mechanical units can take place almost entirely in the workshop of the production company, using the tooling present in the workshop itself, thus giving rise to a reduction in the costs for transfer of the fitters, with a further corresponding reduction in the final production cost of the machine.

[0023] -A further advantage of the present invention consists in the fact that it is possible the same base for various configurations of the packaging machine, with a consequent reduction in the costs of design and completion of the said bases.

[0024] -A further advantage of the present invention consists in the fact that maintenance and/or replacement of some components is quick and easy, with consequent reduction in the work times, and thus in the corresponding costs, and also with reduction of the machine stoppage times, and thus with a lower production loss.

Brief Description of the Drawings

[0025] -Further characteristics and advantages of the present invention will become more apparent from the following detailed description of a preferred practical embodiment, provided purely by way of non-limiting example, with reference to the figures of the attached drawings, in which:

- Figure 1 is a schematic three-dimensional view of a packaging machine, on which there is assembled the conveyor-wrapper unit which is the subject of the present invention;
- Figure 1A is a schematic three-dimensional view similar to figure 1, with the said conveyor-wrapper unit raised;
- Figure 2 is a schematic two-dimensional view from above, with some parts removed in order better to show other parts, of the machine in figure 1;
- Figure 3 is a two-dimensional view of the left-hand side of the machine in figure 1;
- Figure 3A is a two-dimensional view according to the line 3A-3A in figure 2;
- Figure 4 is a two-dimensional view of the right-hand side of the machine in figure 1;
- Figure 4A is a two-dimensional view according to the line 4A-4A in figure 4;
- Figure 4B is a schematic two-dimensional view according to the line 4B-4B in figure 4;
- Figure 4C is a schematic two-dimensional view according to the line 4C-4C in figure 4;
- Figure 5 is a schematic two-dimensional view of the

right-hand side of the machine in figure 1, in an alternative configuration; and

- Figure 5A is a two-dimensional view according to the line 5A-5A in figure 5.

Description of the Preferred Embodiment

[0026] -With reference to the following description, some numerical references are followed by the letters "a" or "b", in order to indicate their position respectively on the right and on the left relative to an observer who has his back turned upstream from the machine.

[0027] -With reference to figure 1 and 1A, the packaging machine consists of a frame formed from longitudinal members and cross members which substantially form two lateral frame-uprights indicated as 1a and 1b.

[0028] -On two transversely opposite longitudinal members, 3a and 3b, see also figures 3 and 4, there are fitted securing clamps, 77a, 4a and 5a on the longitudinal member 3a, and 4b and 5b on the longitudinal member 3b, which are designed to support a conveyor-wrapper unit which is the subject of the present invention, which has two suspended plates 6a and 6b, spaced transversely, which extend longitudinally and vertically, and have their upper ends interconnected by means of two cross members 7 and 8.

[0029] -Each of the said securing clamps 77a, 4a, 5b, 4b, 5b, see for example in particular the clamp 5b, figure 1-4-4B, consists of a square jaw 9, which is perforated in the vicinity of the four vertices, and is disposed against the outer side of the longitudinal member 3b, in which the said holes support in a through manner four screws 10, 11, 12 and 13, which are oriented transversely, disposed two above, and two below, the said longitudinal member 3b, the shanks of which extend transversely, and pass through holes provided in the suspended plate 6b, which is disposed against the inner side of the longitudinal member 3b itself, in which the said screws 10, 11, 12 and 13 support at their inner end four clamping nuts, of which only two, 11d and 10d can be seen in figure 4b, in order to form a parallel clamp, which clasps the said longitudinal member 3b.

[0030] -By means of these securing clamps, it is possible to implement substantially three conditions, and more particularly, if the four nuts 10d, 11d etc. for the screws 10, 11, 12 and 13 of each securing clamp 77a, 4a, 5a, 4b, 5b are tightened, the suspended plates 6a and 6b are integral with the longitudinal members 3a and 3b; if the said nuts 10d, 11d etc. are loosened, the suspended plates 6a and 6b themselves can slide longitudinally on the cross members 3a and 3b; and, finally, if at least the lower screws 10 and 13 of each clamp are removed, the suspended plates 6a and 6b can be raised and moved away, as illustrated in figure 1A.

[0031] -With reference to figg. 1 3 and 4, going from upstream in the downstream direction, relative to the direction F1 of advance of the objects, the suspended plates 6a and 6b have three respective consecutive lon-

gitudinal portions, and, more particularly:

- a first portions upstream, indicated as 14a and 14b, which are designed to support a first conveyor-means indicated as 15, the plane of which for transport of objects forms a first segment 101 of a packaging path indicated as 100 in fig. 4;
- a second central portions, indicated as 16a and 16b, which are designed to support beneath them a second conveyor-means indicated as 17, the plane of which for transport of objects forms a second segment 102 of the packaging path 100, see fig.4, and to support a wrapper indicated as 74 as a whole with wrapping bars 59; and,
- third portions downstream, indicated as 18a and 18b, which are designed to support a third conveyor-means indicated as 19, the transport plane of which forms a third segment 103 of the packaging path 100.

[0032] -With reference also to figure 4A, the first portions 14a, 14b of the said suspended plates 6a and 6b have beneath them two respective longitudinal extensions 20a and 20b, which are designed to support the transverse ends 21a and 21b of an inert sliding plate 21, and upwards, at a first level, they support two respective first wheels 22a and 22b and the two downstream ends 23a and 23b of two respective first guides 24a and 24b for pair of respective chains 34a and 34b, as well as, at a higher level, two respective second wheels 25a and 25b and the two downstream ends 26a and 26b of two respective second guides 27a and 27b for said chains 34a and 34b. -In addition, see figg. 2 and 3, on side "a" of the machine, in the vicinity of the upper wheel 25a, but on the outer side of the plate 6a, the first portion 14a supports a driven wheel 28, around which there is wound a chain 37, in which the said wheel 28 is keyed onto a shaft 29, which also has keyed onto it the said wheels 25a and 25b.

[0033] -With reference to figure 3 and 4, the said two pairs of guides 24a, 24b and 27a, 27b for chains have their respective upstream ends 30a, 30b and 31a, 31b supported by means of a column and a longitudinal member of the frame-uprights 1 a and 1b, which also support two respective third wheels 32a and 32b, and two fourth wheels 33a and 33b, thus forming two respective guided paths for the two chains 34a and 34b, which are wound in a closed path in respective vertical-longitudinal planes, in which the said chains 34a and 34b support the opposite ends of a plurality of suspended transverse thrust bars 35.

[0034] -With reference also to figure 3A, which illustrates side "a" of the machine according to the line 3A-3A in figure 2, and with reference to figure 4B, the second portions 16a, 16b of the said suspended plates 6a and 6b support the second conveyor-means 17 and the wrapper 74, such that the said second conveyor-means 17 has its upstream end slightly spaced from the down-

stream end of the inert sliding plate 21, in order to form a first aperture A1, for the reasons described in greater detail hereinafter.

[0035] -More particularly, see in particular fig. 4B 4 and 3A, the second conveyor-means 17 consists of a conveyor 38 with a belt 39, which has a support structure consisting of a horizontal plate 40, and two pendent supports 41a and 41b, wherein the transverse ends 40a and 40b of the said horizontal plate 40 are secured to the respective central portions 16a and 16b of the respective suspended plates 6a and 6b, and in which the said pendent supports 41a and 41b are secured to the lower side of the said horizontal plate 40, in order to support respectively the opposite ends 42a and 42b of a shaft 42 of a first tension roller 43, and the opposite ends 44a and 44b of a shaft of a second tension roller 45, as well as, by means of the pendent support 41a, the end portion 46a of a shaft 46, onto which there is keyed a guide roller 47, which is designed to drive the belt 39, in which the said portion 46a extends transversely beyond the suspended plate 6a, in order to support keyed onto its end 46c, an outer wheel 48, see also fig. 3, around which there is wound a chain 52, for the reasons which will become apparent hereinafter. -The other end 46b of the said shaft 46 is supported by the pendent support 41b, fig. 4.

[0036] -Again, the said second portion 16a, 16b, beneath the horizontal plate 40, has a neutral shaft 49, see fig. 2 and 3, which is supported by the suspended plates 6a, onto which there are keyed a drive wheel 50 and a driven wheel 51, in which the wheel 50 engages with the chain 37 in order to transmit the motion to the wheel 28 which is keyed onto the shaft 29 of the wheels 25a and 25b, and the wheel 51 is engaged with the said chain 52, which is also wound around a wheel 53, which is keyed onto a drive shaft 54, see also figure 2.

[0037] -In order to constitute the wrapper 74, again beneath the said horizontal plate 40, in the downstream direction, see figure 2 3 and 4, there is disposed a shaft 55, the ends 55a and 55b of which are supported by the suspended plates 6a and 6b, which supports keyed onto it two wheels 56a and 56b, which are disposed internally and laterally relative to the suspended plates 6a and 6b, and a wheel 57, which is disposed externally and laterally relative to the plate 6a, in which the said wheels 56a, 56b are engaged with respective chains 58a and 58b, which are designed to support the opposite ends of transverse wrapping bars 59, wherein the said two chains 58a, 58b are wound in a closed path in respective longitudinal vertical planes, and pass within guides 60a and 60b, see fig. 4B, which are secured to the inner surfaces of the respective two suspended plates 6a and 6b, in order to move the said bars 59 in an orbital path which circumscribes the conveyor 38, see in particular figures 3 and 4.

[0038] -With reference also to figure 3 4 and 4C, the third portions 18a and 18b of the said suspended plates 6a and 6b consist of two extensions 78a, 78b, which are

designed to support the third conveyor-means 19, in which the said third conveyor 19 has its end in the upstream direction slightly spaced from the end in the downstream direction of the second conveyor-means 17, in order to form a second aperture A2, for the reasons described in greater detail hereinafter.

[0039] -More particularly, see in particular fig. 4C, the third conveyor-means 19 consists of a conveyor 61 with a belt 62, which has a support structure consisting of a horizontal plate 63 and two pendent supports 64a and 64b, in which the transverse ends 63a and 63b of the said horizontal plate 63 are secured to the respective portions 18a and 18b of the respective suspended plates 6a and 6b, and in which the said pendent supports 64a and 64b are secured on the lower side of the said plate 63, in order to support, see figure 3A and 4, the opposite ends 65a and 65b of a shaft 65 of a first tension roller 66, the opposite ends 67a and 67b of a shaft of a second tension roller 68, as well as, by means of the pendent support 64a, see also fig. 2 and 3, the end portion 69a of a shaft 69, onto which there is keyed a guide roller 70, which is designed to drive the belt 62, wherein the said portion 69a extends transversely beyond the suspended plate 6a, in order to support keyed onto its end 69c an outer wheel 71, around which there is wound a chain 72, for the reasons described hereinafter. The other end 69b of the said shaft 69 is support by the pendent support 64b.

[0040] -The chain 72 itself is also wound around the wheel 57 keyed onto the shaft 55, onto which there are keyed the wheels 56a and 56b, which move the chains 58a and 58b of the wrapping bars 59.

[0041] -In addition, supported by the frame-uprights 1a and 1b, there are provided means 75 for supply of pieces, illustrated schematically only in figure 4, disposed beneath and in the vicinity of the first aperture A1, which can supply pieces of packaging material from the base upwards via the said first aperture A1, onto the initial portion of the said second segment 102 of the packaging path 100.

[0042] -By means of this structuring, see in particular figure 3, when the drive shaft 54 rotates anti-clockwise, by means of the kinematic connection provided by the wheel 53 with the chain 52 and the wheel 48, there is rotation anti-clockwise of the shaft 46 of the guide roller 47 of the belt 39 of the conveyor 38 of the second conveyor-means 17, and, by means of the chain 52 itself, there is clockwise rotation of the wheel 51 keyed onto the neutral shaft 49, and thus, by means of the wheel 50 keyed onto the latter, the chain 37 and the wheel 28, there is clockwise rotation of the shaft 29, and thus of the corresponding wheels 25a and 25b keyed onto the latter, around which there are wound the chains 34a and 34b of the suspended thrust bars 35 of the first conveyor-means 15.

[0043] -Again by means of anti-clockwise rotation of the drive shaft 54, by means of the kinematic connection provided by the wheel 73 together with the chain 72

and the wheel 71, there is rotation in an anticlockwise direction of the shaft 69 of the guide roller 70 of the belt 62 of the conveyor 61 of the third conveyor-means 19, and by means of the same chain 72, there is rotation in an anti-clockwise direction of the wheel 57 keyed onto the shaft 55, and thus of the wheels 56a and 56b keyed onto the latter, around which there are wound the chains 58a and 58b of the wrapping bars 59 of the wrapper 74.

[0044] -Figures 5 and 5A illustrate the conveyor-wrapper unit which is the subject of the present invention, according to a second, alternative operative configuration, which is designed in particular to wrap monolithic prismatic objects, in which the first conveyor-means 15 consists of a conveyor 81 with a belt 82, similar to those previously described with the references 38 and 61.

[0045] -More particularly, see figg. 5 and 5A, the said conveyor 81 has a support structure which consists of horizontal plate 83, and of two pendent supports 84a and 84b, in which the transverse ends 83a and 83b of the said horizontal plate 83 are secured to, and supported by, two respective lower longitudinal extensions 20a, 20b of the respective suspended plates 6a and 6b, and in which the said pendent supports are secured to the lower side of the said plate 83, in order to support the opposite ends 85a and 85b of a shaft 85 of a first tension roller 86, the ends (of which only 87b can be seen in figures 5 and 5a) of a shaft of a second tension roller 88, and the end 89b of a shaft 89, onto which there is keyed a roller 90, which is designed to drive the belt 82. The opposite end portion 89a of the said shaft 89 is supported by the pendent support 84a, and then extends transversely beyond the suspended plate 6a, and has keyed onto its end 89c a wheel 91, which is connected by means of a chain, for example by means of the chain 52 according to the preceding embodiment, see figure 3, to the drive unit, in order to impart the correct rotation to the shaft 89 of the drive roller 90.

[0046] -With reference to the foregoing description, in order to assemble the machine, according to a first possible strategy, in the mechanical workshop of the production company, on the ground or on an appropriate workbench, assembly takes place of the conveyor-wrapper unit which is the subject of the present invention, which substantially includes the two suspended plates 6a and 6b, the first conveyor-means 15 (i.e. the plate 21 of fig. 1 to 4C or the conveyor 81 of fig. 5-5a), the second conveyor-means 17 (i.e. the conveyor 38), the wrapper 74, the third conveyor-means 19 (i.e. the conveyor 61, in order then to carry out easy checks and/or easy modifications, such as to obtain perfect coplanarity between the transport sections formed by the said first, second and the said third conveyor, and thus to analyse whether correct functioning is taking place, obtaining the conveyor-wrapper unit object of the present invention.

[0047] -Then, the said pre-assembled and tested conveyor-wrapper unit, see figure 1A, is transported to

the location in which the machine is to be used, in which there has already been provided the frame with longitudinal members 3a and 3b, in order to dispose the said pre-assembled and tested conveyor-wrapper unit directly onto said frame, simply by securing the clamps 77a, 4a, 5a, 4b and 5b onto the said longitudinal members 3a and 3b, in order then to assemble the two chains 52 and 72 for motorisation.

[0048] -It is apparent that this eliminates the disadvantages of the prior art caused by the laborious and problematic completion of the walls and caused by assembly of the various mechanical units operating between the walls of the same prior art; putting into practice quick and easy assembly with consequent reduction of the execution times, and thus corresponding reduction of the final production cost of the machine.

[0049] -In addition, in this context, it should be pointed out that the path of translation of the objects, formed by the said first, the said second, and the said third conveyor, is perfectly straight, i.e. the three transport segments are perfectly co-planar relative to one another, since this alignment has been checked before the conveyor-wrapper unit is disposed on the frame, and since securing of the said conveyor-wrapper unit onto the frame does not affect this alignment.

[0050] -Again with reference to the foregoing description, it should be pointed out that there is elimination of the disadvantages derived from transfer to the place of use of the machine, of various expert and qualified technicians-assemblers, as well as of the corresponding sophisticated mechanical tooling, by providing assembly which requires in this place of use only the presence of a hoist and of an ordinary mechanical operator, who is provided with minimal mechanical tooling.

[0051] -Even if a different assembly strategy were selected, such as that of assembling the conveyor-wrapper unit at the place in which the machine is to be used, it is apparent that since it is possible to assemble the mechanical units of the conveyor-wrapper unit on the ground, rather than between the walls of the base, this assembly is easier, simpler and faster, thus providing the above-described advantages.

[0052] -Again with reference to the conveyor-wrapper unit which is the subject of the present invention, it is apparent that the unit eliminates the disadvantages caused by lengthy working times and machine stoppages for replacement of some components, since removal of the said conveyor-wrapper unit from the base means that the said operations are easier, simpler and faster.

[0053] -In addition, if required, it is also possible to replace a faulty conveyor-wrapper unit quickly with a new conveyor-wrapper unit which is operative, with a minimal loss of production for stoppage of the machine.

[0054] -Finally, the above-described conveyor-wrapper unit eliminates the disadvantages relating to completion of various bases for every possible configuration of the packaging machine, by providing a con-

veyor-wrapper unit which does not require completion of the walls of the base.

[0055] -The preceding description of the conveyor-wrapper unit is provided purely by way of non-limiting example, and thus it is apparent that there can be made to it all changes or variants which are suggested by practice and by utilisation or use, within the scope of the following claims.

Claims

1. Conveyor-wrapper unit for a packaging machine of the "sleeve" type, which extends longitudinally, and is provided with a base comprising a first, longitudinal lateral upright and a second, longitudinal lateral upright, which are spaced transversely from one another, between which there are disposed conveyors, which are designed to translate from upstream in the downstream direction objects to be packaged, along a segmented straight packaging path, in which there are provided wrapping means, which are designed to wrap around the objects pieces of packaging material, whilst the said objects are being translated from upstream in the downstream direction along the said segmented straight translation path, **characterised in that** it comprises two suspended plates (6a, 6b), which extend longitudinally and vertically; **in that** the said two suspended plates (6a, 6b) are supported respectively in a detachable manner, one from the said first upright (1a) and the other from the said second upright (1b), by means of securing/release means (77a, 4a, 5a, 4b, 5b); **in that** the said suspended plates (6a, 6b) support two or more conveyor-means (15, 17, 19), which are oriented longitudinally, disposed in longitudinal succession, and can translate the objects from upstream in the downstream direction along the said straight segmented path (100) for translation of objects; **in that** the said conveyor-means (15, 17, 19) are slightly spaced longitudinally, in order to form a first aperture (A1) and a second aperture (A2) upstream and downstream from one (17) of the said conveyor means; and **in that** the said suspended plates (6a, 6b) support a wrapper (74), which is oriented longitudinally, and includes one or more wrapping bars (59) which are oriented transversely, and can be moved along an orbital path which circumscribes the said one (17) of the said conveyor-means (15, 17, 19), by passing through the said first aperture (A1), and the said second aperture (A2).
2. Conveyor-wrapper unit according to claim 1, **characterised in that** the said securing/release means (77a, 4a, 5a, 4b, 5b) can assume three conditions, according to which in the first condition the suspended plates (6a, 6b) are secured to and integral with the uprights (1, 1b); in the second condition the

suspended plates (6a, 6b) are disposed such as to slide longitudinally along the uprights (1a, 1b); and in the third condition the suspended plates (6a, 6b) are disposed such as to be detachable from the uprights (1a, 1b).

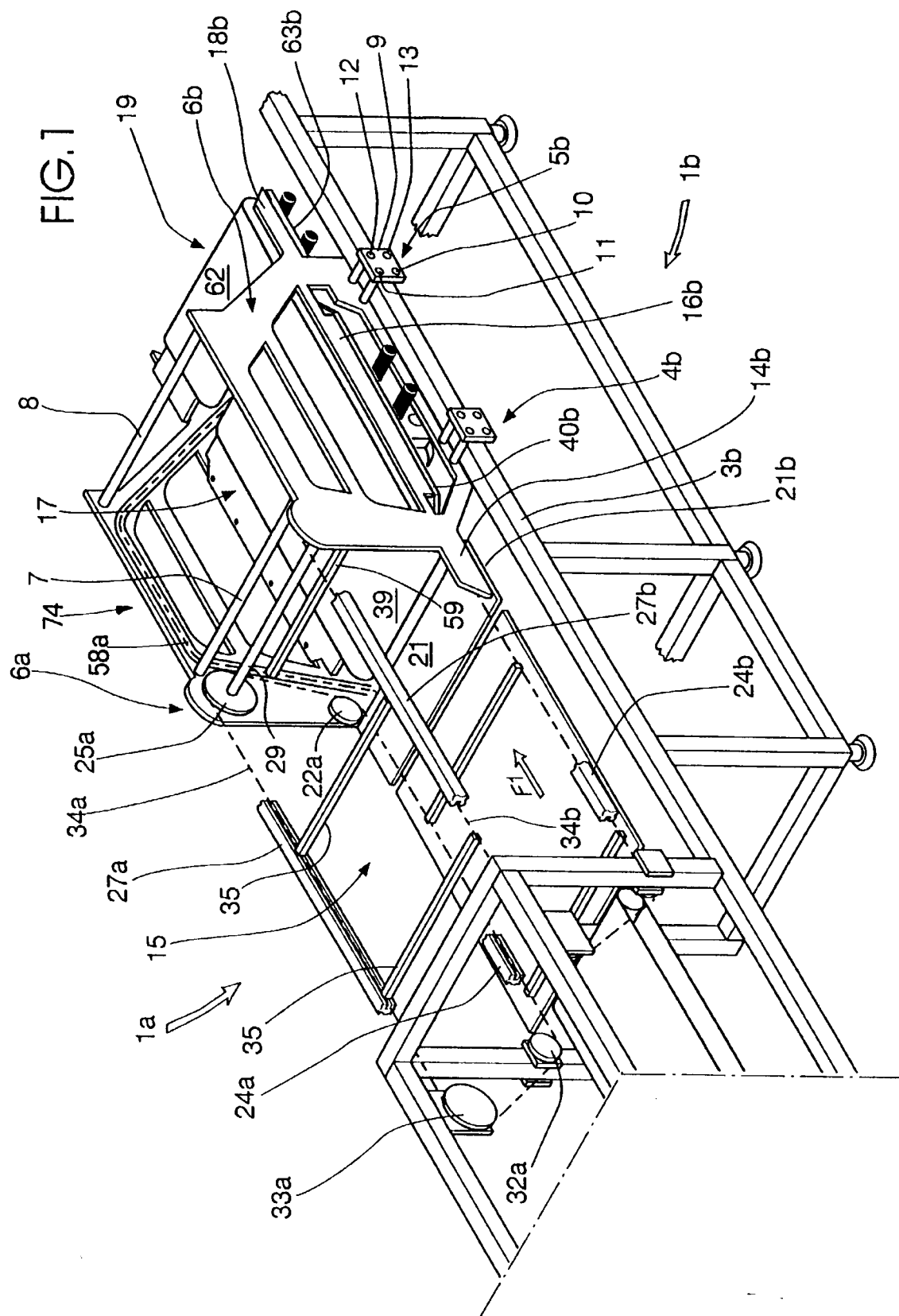
3. Unit according to claim 1, **characterised in that** the said suspended plates (6a, 6b) have first portions (14a, 14b) upstream, which support first conveyor-means (15), which are oriented longitudinally, and can translate the objects from upstream in the downstream direction along a first segment (101), which is co-planar relative the said straight path (100) for translation of objects; **in that** the said suspended plates (6a, 6b) have second, central portions (16a, 16b), which support second conveyor-means (17), which are oriented longitudinally, disposed downstream, and slightly spaced relative to the first conveyor-means (15), thus providing the first aperture (A1) between the said first (15) and the said second (17) conveyor-means, and can receive the objects obtained from the said first conveyor-means (15) and convey them in the downstream direction along a second segment (102) which is co-planar relative to the said straight path (100) for translation of objects; **in that** the said suspended plates (6a, 6b) have third portions (18a, 18b) downstream, which support third conveyor-means (19), which are oriented longitudinally, which are disposed downstream, and are slightly spaced relative to the said second conveyor-means (17), thus providing the second aperture (A2) between the said second (17) and the said third (19) conveyor-means, and can receive the objects obtained from the said second conveyor-means (17) and convey them in the downstream direction along a third segment (103), which is co-planar relative to the said straight path (100) for translation of objects; and **in that** the said suspended plates (6a, 6b) support a wrapper (74) which is oriented longitudinally, and includes one or more wrapping bars (59), which are oriented transversely, and can be moved through the said first (A1) and the said second (A2) aperture, along an orbital path which circumscribes the said second conveyor-means (17).
4. Conveyor-wrapper unit according to claim 3, **characterised in that** the said first conveyor-means (15) comprise an inert sliding plate (21), which is surmounted by a conveyor (22a, 22b, 24a, 24b, 25a, 25b, 26a, 26b, 34a, 34b) with suspended thrust bars (35); **in that** the said second conveyor means (17) comprise a conveyor (38) with a belt (39); and **in that** the said third conveyor-means (19) comprise a conveyor (61) with a belt (62).
5. Conveyor-wrapper unit (figures 5, 5A) according to claim 3, **characterised in that** the said first con-

veyor-means (15) comprise a conveyor (81) with a belt (82); **in that** the said second conveyor means (17) comprise a conveyor (38) with a belt (39); and **in that** the said third conveyor-means (19) comprise a conveyor (61) with a belt (62).

6. Conveyor-wrapper unit according to claim 4, **characterised in that** the said inert sliding plate (21) has its lateral ends (21a, 21b) supported by the said first portions (14a, 14b) of the said suspended plates (6a, 6b); **in that** the suspended bar conveyor (35) has one of its ends (22a, 22b, 23a, 23b, 25a, 25b, 26a, 27b) downstream supported by the said first portions (14a, 14b) of the said suspended plates (6a, 6b); and **in that** the means (28, 29, 25a, 25b) to control said suspended bar conveyor (35) are supported by the said first portions (14a, 14b) of the said suspended plates (6a, 6b).
7. Conveyor-wrapper unit according to claim 4, **characterised in that** each the said conveyors (38; 61; 81) with a belt (39; 62; 82) consist of a plate (40; 63; 83) which extends longitudinally and transversely, and has its opposite transverse ends (40a-40b; 63a-63b; 83a-83b) supported by the suspended plates (6a, 6b); **in that** on the lower surface of the said plate (40; 63; 83) there are secured a first pendent support (41a; 64a; 84a) and a second pendent support (41b; 64b; 84b) which are spaced transversely relative to one another; **in that** between the said two pendent supports there are supported two tension rollers (43-45; 66-68; 86-88) and a drive roller (47; 70; 90) with its shafts (42-44-46; 65-67-68; 85-87-88) disposed transversely; and **in that** the conveyor belt (39; 62; 82) is wound longitudinally in a closed path with an upper section which slides on the upper surface of the said plate (40; 63; 83), thus defining a transport segment (101; 102; 103), which is co-planar relative to the said straight path (100) for translation of objects, and with a lower section which is wound around the said rollers (43-45-47; 66-68-70; 86-88-90).
8. Conveyor-wrapper unit according to claim 1, **characterised in that** there is provided a drive by means of wheels (71, 57, 48, 51, 28), which are disposed on the outer surface of the said first suspended plate (6a), and are supported in a projecting manner by respective shafts (69a-69, 55a-55, 46a-46, 49, 29), in which the latter actuate the said conveyor-means (15, 17, 19) and the said wrapper (74), which is disposed between the said two suspended plates (6a, 6b).
9. Conveyor-wrapper unit according to claim 1, **characterised in that** the said first upright (1a) and the said second upright (1b) of the frame have, respectively, a first longitudinal member (3a) and a second

longitudinal member (3b), which extend longitudinally, are spaced transversely, and are designed to be connected to the respective said means for securing/release (77a, 4a, 5a; 4b, 5b).

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10. Conveyor-wrapper unit according to claim 1, characterised **in that** the said wrapper (74) comprises a shaft (55) which has its opposite ends (55a, 55b) supported by the said suspended plates (6a, 6b), which has keyed onto it two wheels (56a, 56b) 10 which are disposed inside and laterally relative to the respective suspended plates (6a, 6b) wherein the said two wheels (56a, 56b) are engaged with two respective chains (58a, 58b), which are 15 designed to support the opposite ends of transverse wrapping bars (59), and wherein the said two chains (58a, 58b) are wound in a closed path in respective longitudinal vertical planes, and move between guides (60a, 60b), which are provided by the respective two suspended plates (6a, 6b). 20
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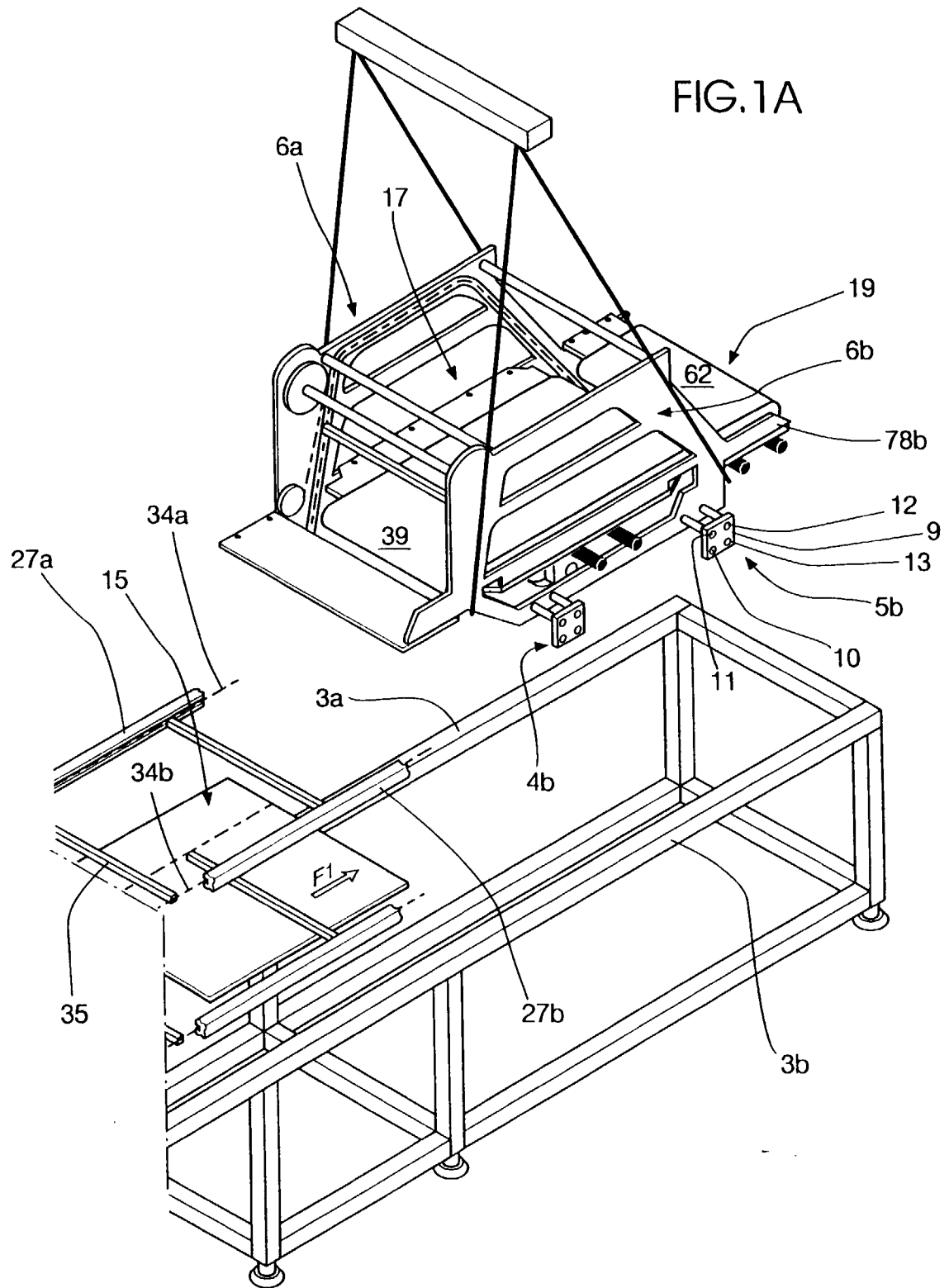


FIG.2

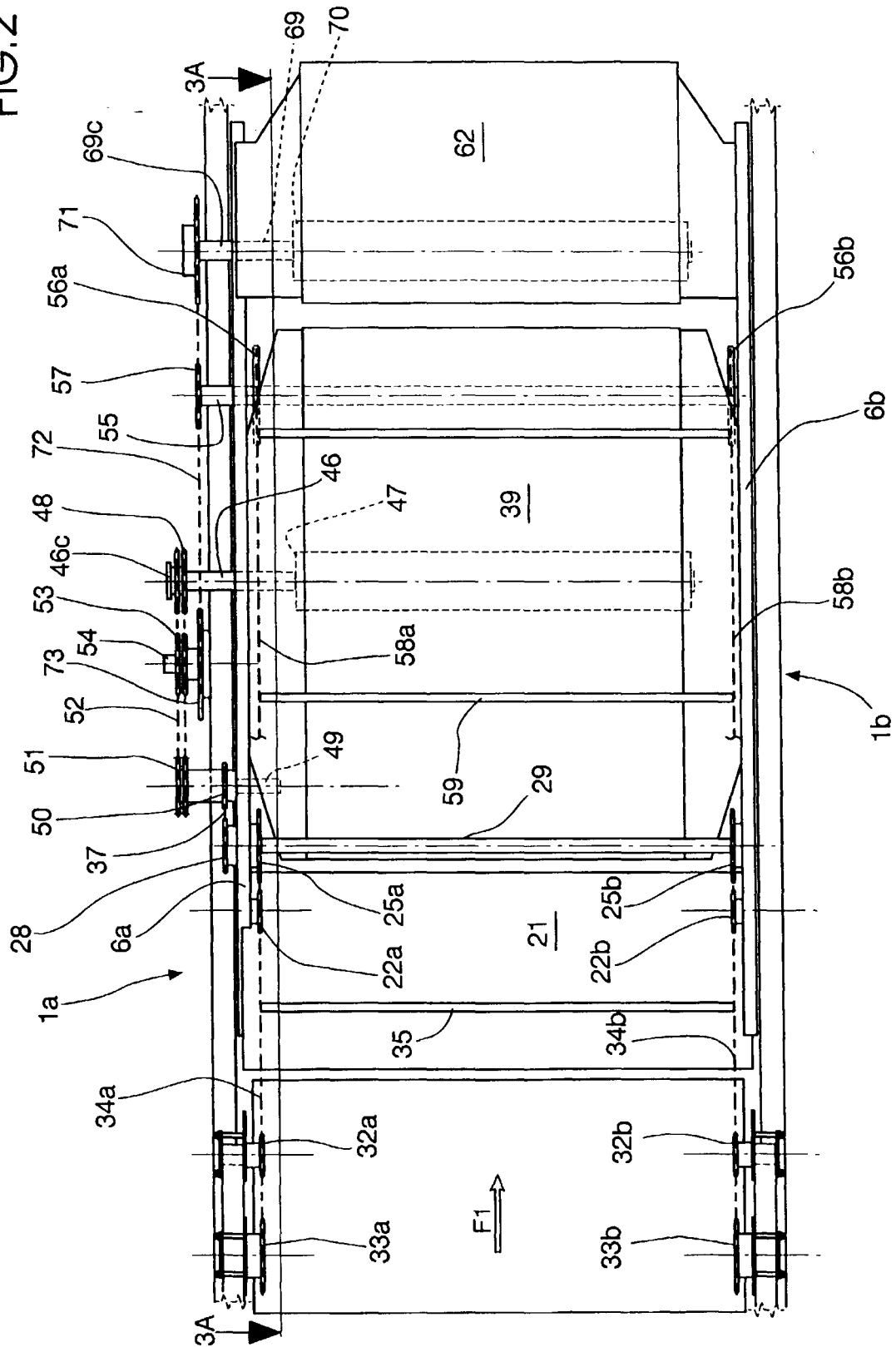
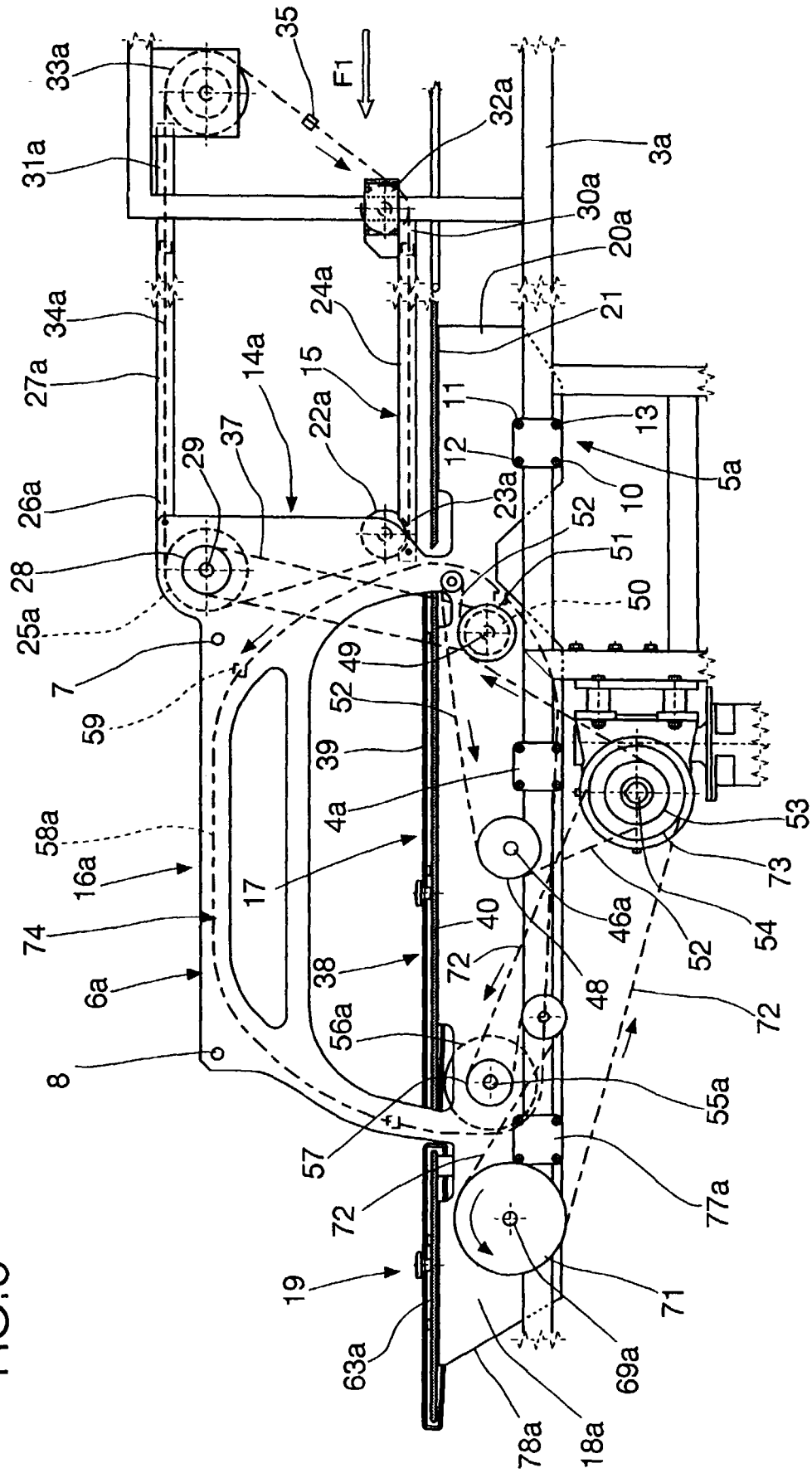
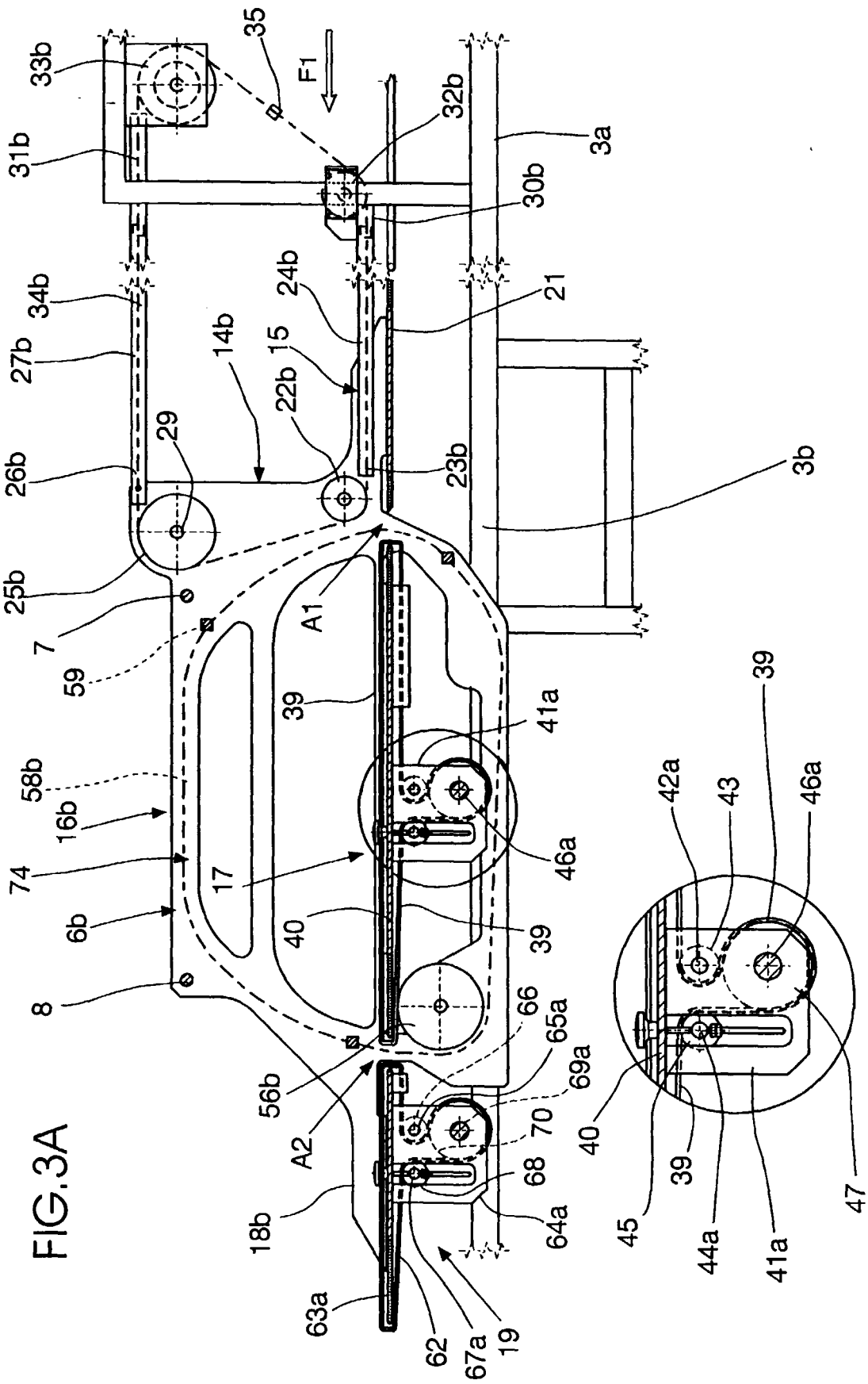


FIG.3





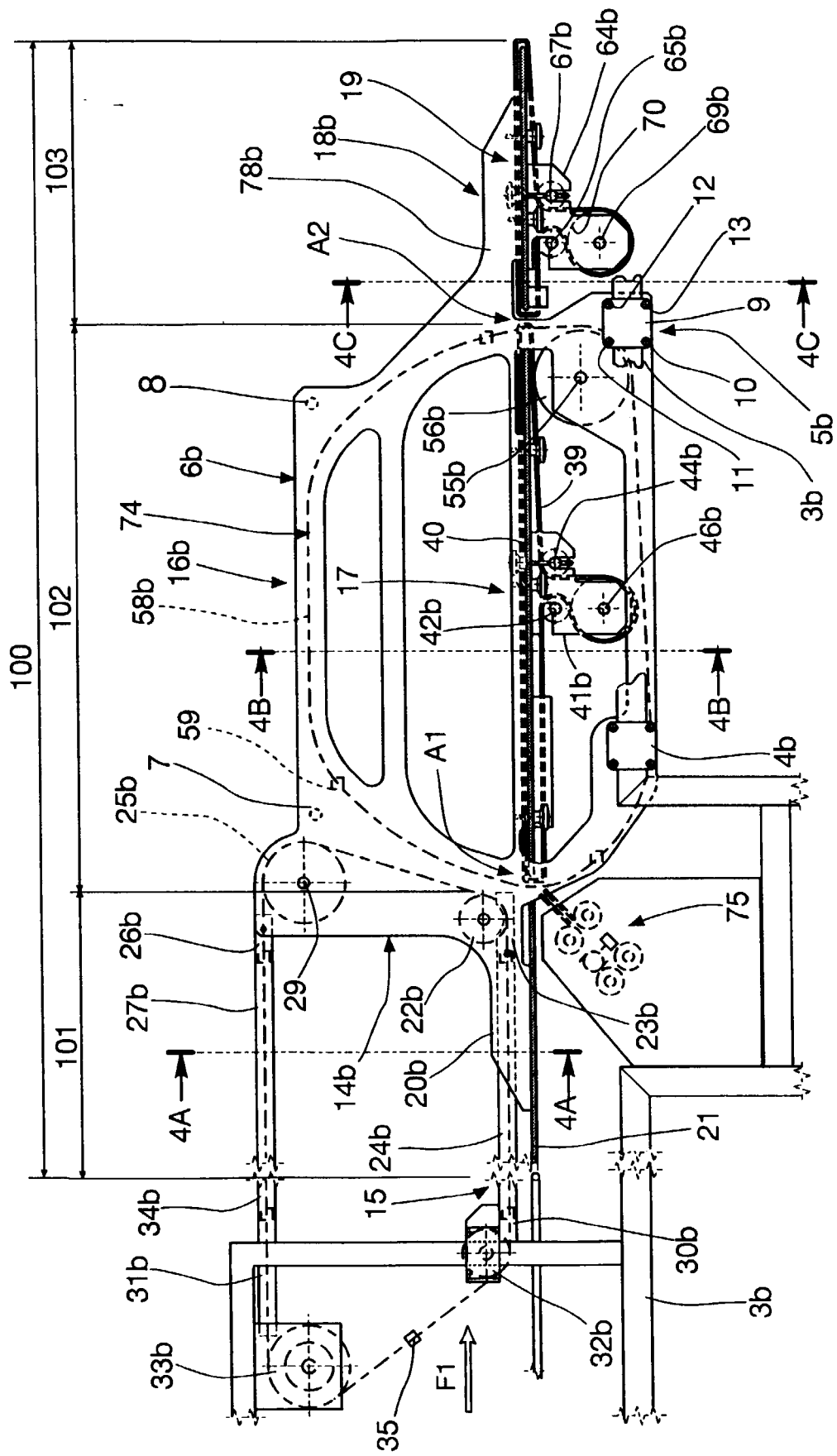


FIG. 4

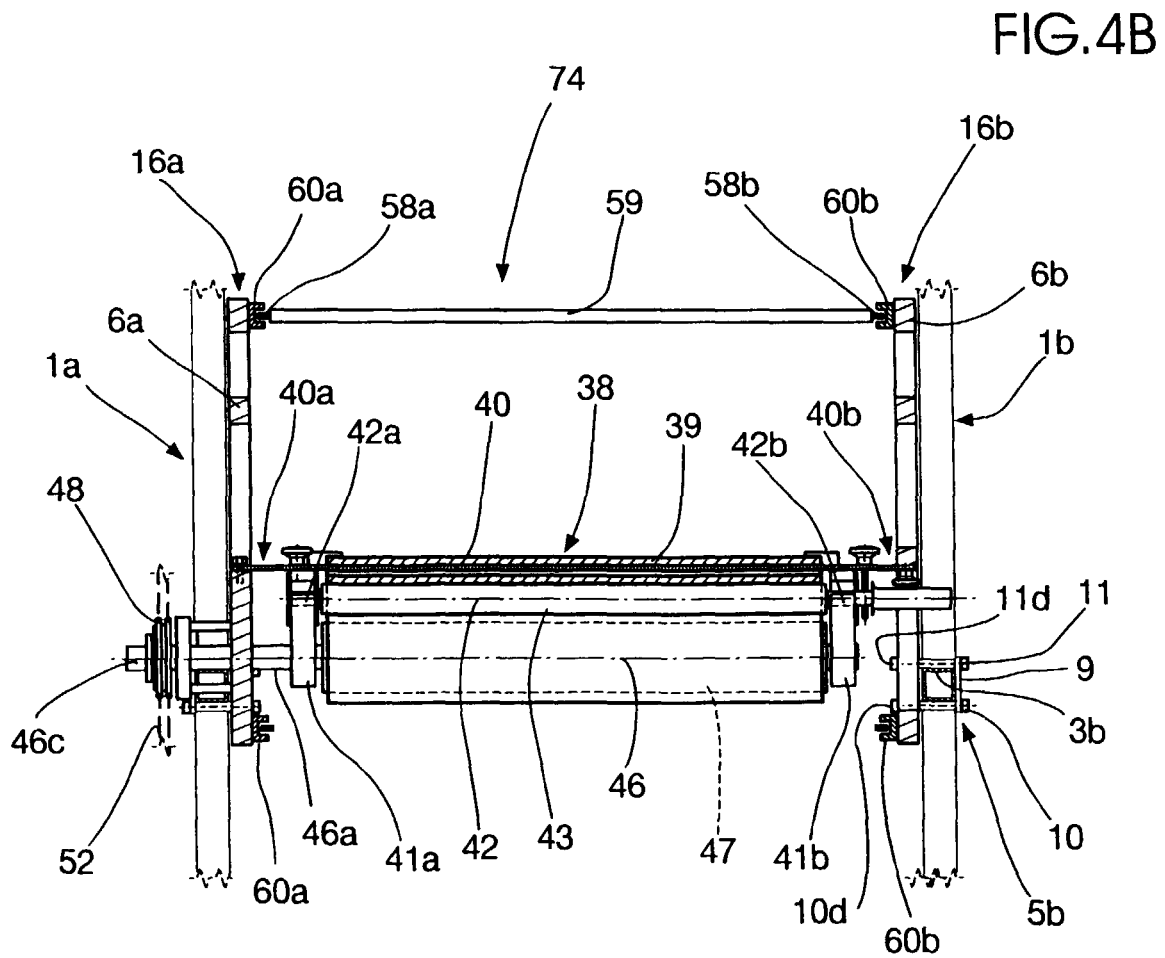
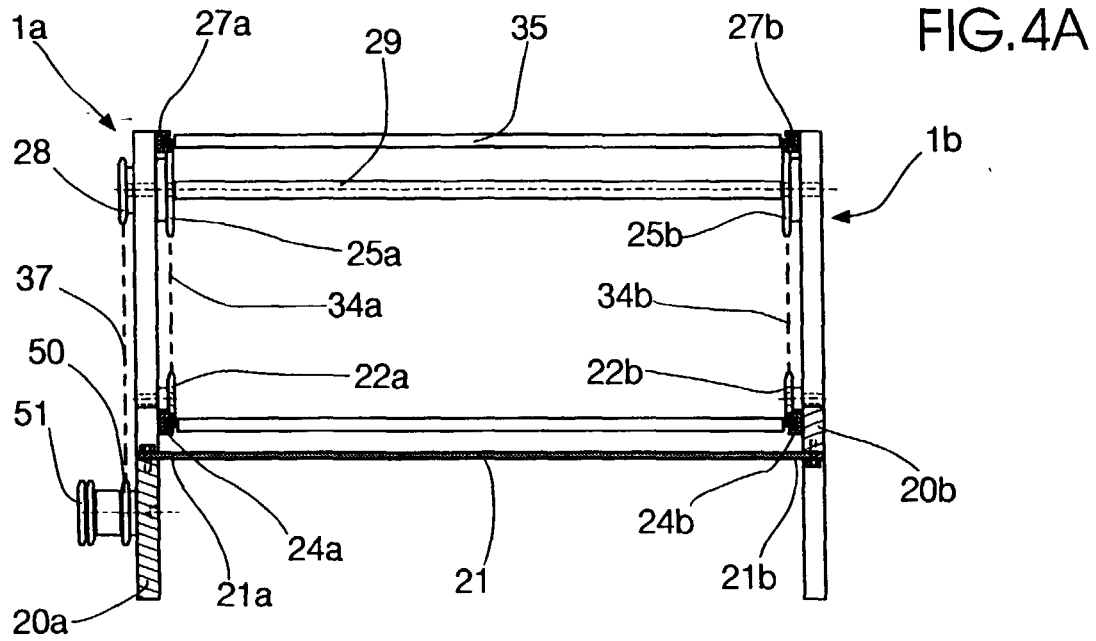


FIG. 4C

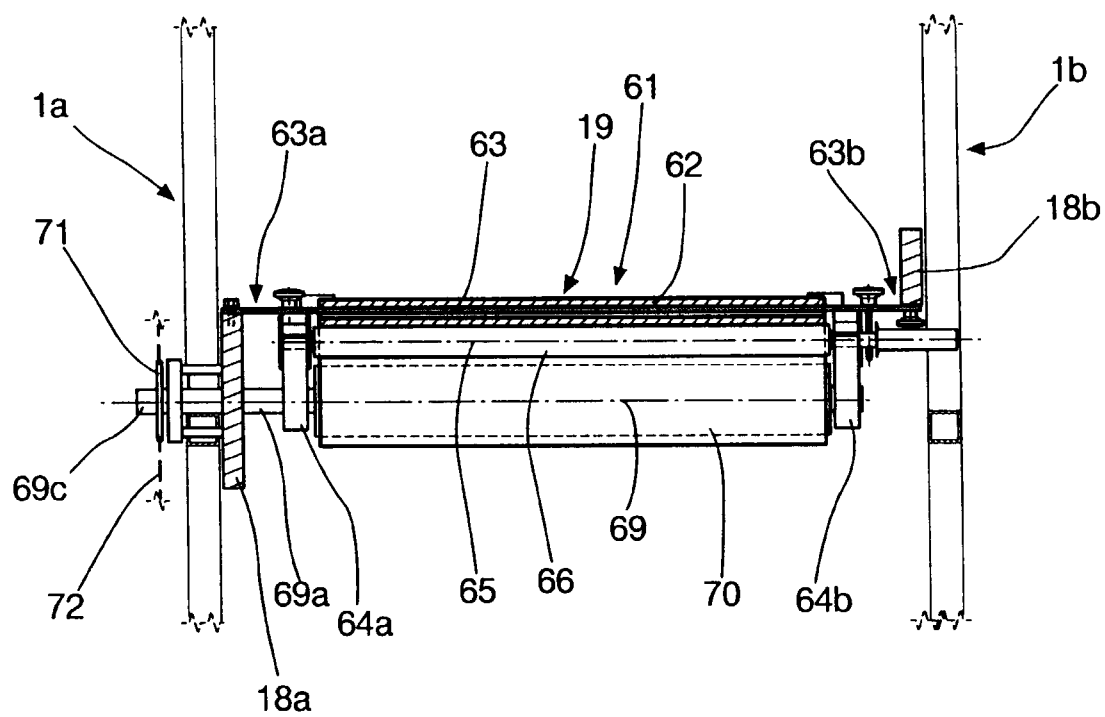


FIG. 5

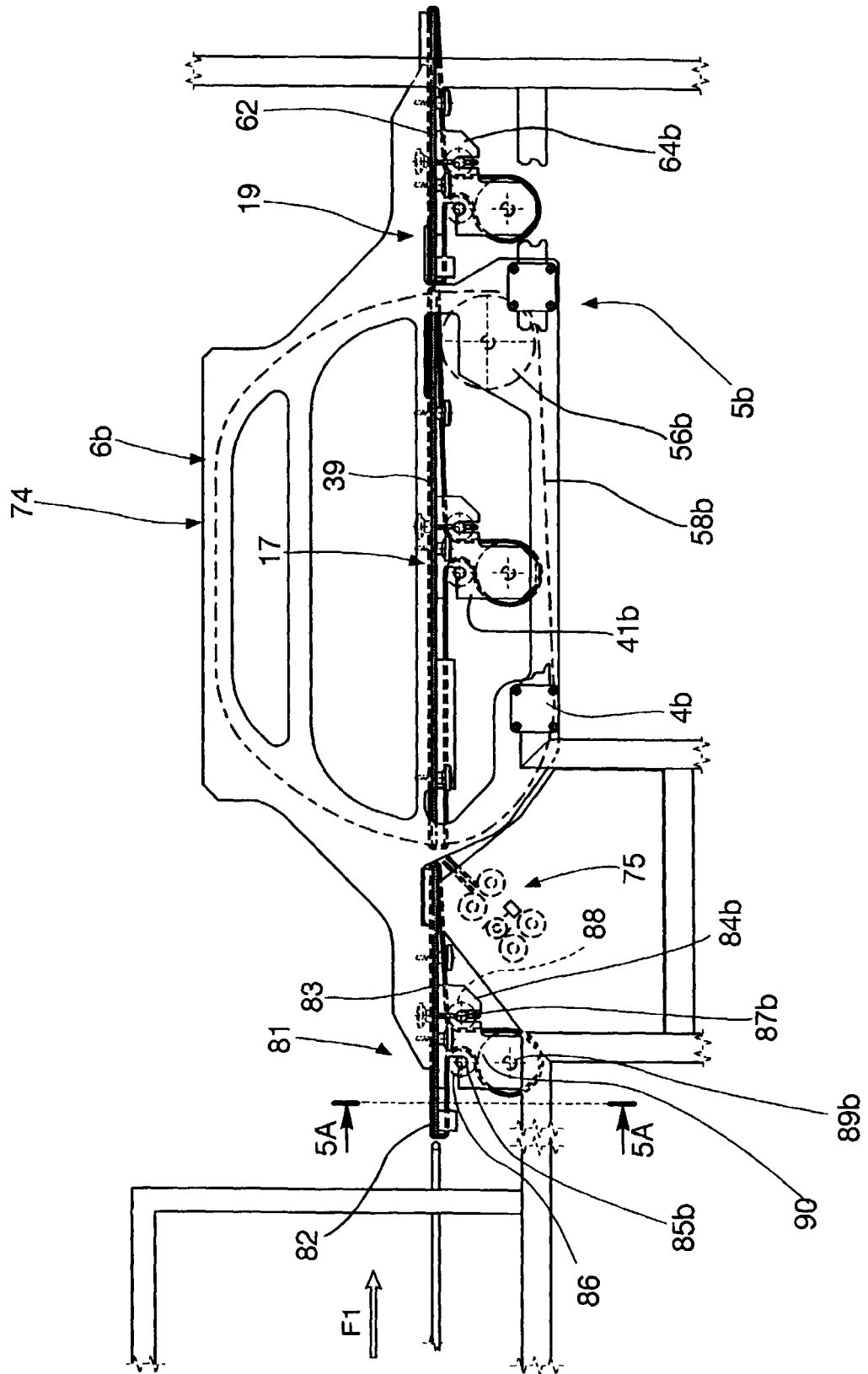
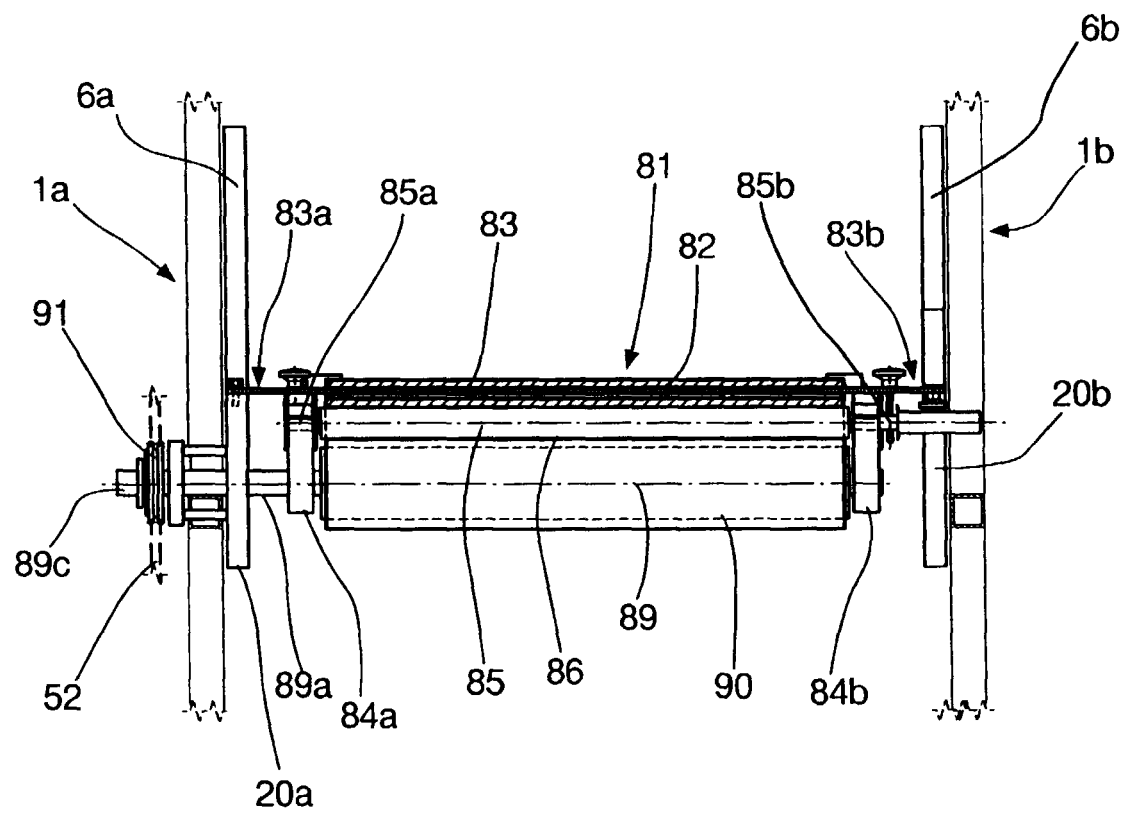


FIG.5A





European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 99 12 3293

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Place of search	Date of completion of the search	Examiner
THE HAGUE	18 April 2000	Jagusiak, A
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