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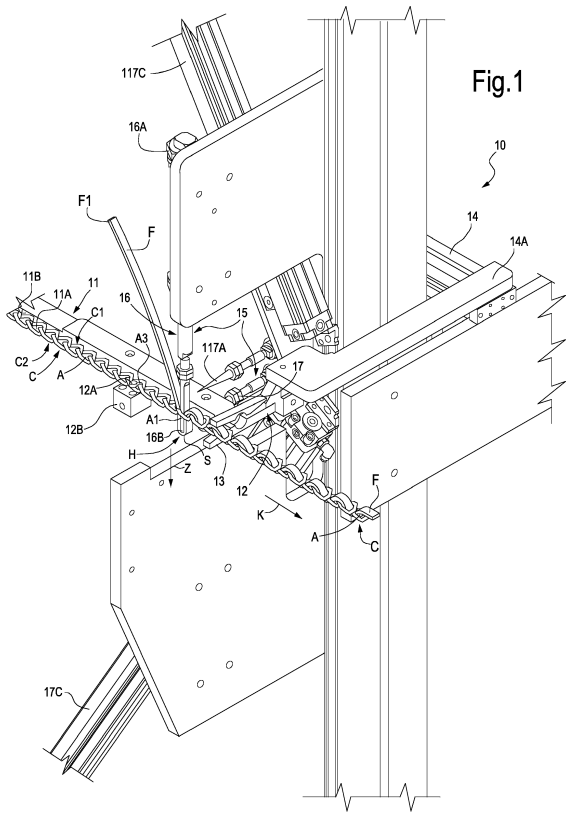
(54) **MACHINE FOR INTRODUCING A RIBBON INSIDE THE RINGS OF A CHAIN**

(57) A machine for introducing a ribbon inside the rings of a chain according to an undulated trend, comprising
- a sliding guide for the chain;
- means for controlled feed of the chain on said guide;
- means for blocking a part of the ribbon on the chain, with said ribbon longitudinally facing at least in part a first face of said chain, so that one end of said ribbon, opposite the direction of feed of the chain, is free;
- a first insertion unit adapted to push, in a first direction, a portion of ribbon into a first ring of the chain it is facing, to form an increasing eyelet (or loop) on the opposite face of the first ring with respect to that of insertion, said first insertion unit being adapted to act until the free end of the ribbon passes through said first ring, reaching the second face of the chain;
- a second insertion unit adapted to push, in a second direction opposite said first direction, the portion of ribbon that has passed through said first ring into a second ring to form an increasing eyelet (or loop) on the opposite face of said second ring with respect to that of insertion into the second ring, said second insertion unit being adapted to act until the free end of the ribbon passes through said second ring, returning to the first face of the chain.

Fig.1



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Description

TECHNICAL FIELD

[0001] The present invention relates to a machine for producing, preferably but not exclusively, finishes of fashion accessories such as belts, handles and shoulder straps of handbags made with chains and ribbons of textile materials, leather or synthetic materials, woven into the chains.

[0002] More in particular, the invention relates to a machine for introducing a ribbon inside the rings of a chain according to an undulated trend.

State of the art

[0003] Fashion accessories, and in particular handbags, with handles and shoulder straps made with chains inside which ornamental ribbons are woven, have been available on the market for several years.

[0004] Currently, the operation of associating the ribbons with the chains is performed exclusively by hand, with noteworthy expenditure of labor.

[0005] The speed required of the labor force often translates into problems of imprecision in the steps of insertion of the ribbon into the chain, with the obvious problems of quality that this causes.

Object and summary of the invention

[0006] The object of the present invention is to expedite the operations of association of ribbons inside chains.

[0007] Another important object of the present invention is to obtain a machine that allows a production of chains with ribbon of high quality.

[0008] One more object of the present invention is to produce a machine that allows ribbons to be associated with chains in such a way as to reduce the personnel employed for this operation.

[0009] These and other objects, which will be more apparent below, are achieved with a machine for introducing a ribbon inside the rings of a chain according to an undulated trend, which comprises:

- a sliding guide for the chain;
- means for controlled feed of the chain on this guide;
- means for blocking a part of the ribbon on the chain, with the ribbon longitudinally facing at least in part a first face of the chain, so that one end of the ribbon, opposite the direction of feed of the chain, is free;
- a first insertion unit adapted to push, in a first direction, a portion of ribbon into a first ring of the chain it is facing, to form an increasing eyelet (or loop) on the opposite face of the first ring with respect to that of insertion, the first insertion unit is adapted to act until the free end of the ribbon passes through the first ring, reaching the second face of the chain;
- a second insertion unit adapted to push, in a second direction opposite the aforesaid first direction, the portion of ribbon that has passed through the first ring into a second ring, subsequent to the first with respect to the direction of feed of the chain, to form an increasing eyelet (or loop) on the opposite face of the second ring with respect to that of insertion into the second ring, said second insertion unit is adapted to act until the free end of the ribbon passes through the second ring, returning to the first face of the chain.

[0010] Other aspects of the invention are found in the appended claims and in the description below.

Brief description of the drawings

[0011] Further characteristics and advantages of the invention will become more apparent from the following description of a preferred but non-exclusive embodiment thereof, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Fig. 1 represents a front perspective view of a machine according to the invention, during an operating step thereof;
Fig. 2 represents a rear perspective view of a machine according to the invention, during an operating step thereof;
Fig. 3 represents a side view of the machine of the preceding figures, in a first initial operating step;
Fig. 4 represents a side view of the machine of the preceding figures, in a second operating step;
Fig. 5 represents a side view of the machine of the preceding figures, in a third operating step;
Fig. 6 represents a side view of the machine of the preceding figures, in a fourth operating step;
Fig. 7 represents a side view of the machine of the preceding figures, in a fifth operating step;
Fig. 8 represents a side view of the machine of the preceding figures, in a sixth operating step;
Fig. 9 represents a side view of the machine of the preceding figures, in a seventh operating step.

Detailed description of an embodiment of the invention

[0012] With reference to the figures cited above, a machine for introducing a ribbon inside the rings of a chain according to an undulated trend is indicated as a whole with the number 10. The chain being processed is indicated as a whole with the letter C, while a ring of the chain is indicated with the letter A. The ribbon, which can be made of any non-rigid, flaccid material such as fabric, nonwoven fabric, leather, imitation leather, film etc., is indicated as a whole with the letter F.

[0013] The chain C can have flat dimensions, or have an extension, or length, prevalently longitudinal, a transverse width corresponding substantially to the width of a ring A, and a thickness similar to the thickness of a ring

or of a pair of rings, in the areas in which two subsequent rings are superimposed. Hereinafter, the sides of the chain defined by the longitudinal length and by the transverse width, or the opposite "wide" sides of the chain, on which the rings A are open, are defined as "faces" C1 and C2.

[0014] The machine 10 is provided with a frame, not indicated specifically, with which the various components indicated below are associated.

[0015] The machine 10 comprises a sliding guide 11 for the chain C (in Fig. 1 the guide is sectioned along its centerline to allow better viewing), in this example defined by a sliding surface 11A , preferably horizontal or preferably slanting in a single direction, or with normal lying on a vertical plane, and opposite lateral containment edges 11 B. These edges 11 B can be spaced at a distance from each other to adjust the width of the guide as a function of the width of the chain. Moreover, in other preferred embodiments, the edges are held pushed against the chain, to create a predetermined friction, adjustable, and ensure a particularly precise feed movement.

[0016] The machine 10 also has means 12 for controlled feed of the chain C on the guide 11, which comprise, for example, gripper 13 adapted to clamp the chain C when controlled. In this example, preferably, the gripper 13 is provided downstream with respect to the area of insertion H of the ribbon into the chain with reference to the direction of feed K of the chain (indicated by the arrow marked with K, concordant to the guide 11).

[0017] The gripper 13 is associated with a translation actuator 14, for example a pneumatic cylinder that allows it to move; the gripper is fixed to the actuator 14, for example, by means of a bracket 14A. As will be more apparent below, the gripper 13 clamps the chain during the steps of insertion of the ribbon F into the same chain, are then moved (still clamping the chain) by a desired step, for example the distance corresponding to the length of a single ring, drawing with them the chain; the gripper is opened (a pneumatic control member is associated, for example, with the gripper) and returned (again by means of the translation actuator 14) to the preceding position and are then clamped on the chain again. It should be noted that in Figs. 1 and 2, in order to simplify the drawing, the gripper is always shown open, or not clamping the chain; however, it must be understood that in these figures the gripper clamps the chain, or are closed, just as in the other figures.

[0018] The means 12 for controlled feed of the chain C can also (or alternatively) comprise a rotating reel, motorized, on which the chain with the ribbon inserted is wound (and which can help to pull the chain), not shown in the figures.

[0019] The means 12 for controlled feed of the chain on the guide 11 also comprise a centering and/or retaining abutment 12A placed on the guide 11 upstream of the area of insertion H of the ribbon into the chain. This abutment is adapted to be reversibly inserted, when controlled, into a respective ring A3, positioned on the opposite side with respect to the gripper 13 with respect to the area H. For example, this abutment is moved by a translation actuator 12B, positioned vertically, so that the abutment 12A, fixed to the actuator, is able to translate inside the ring of the chain, or to withdraw in a position outside the ring, releasing it.

[0020] The machine 10 also comprises means for blocking a part of the ribbon F on the chain C, with the ribbon that is longitudinally facing at least in part the first face C1 of the chain C, so that one end F1 of the ribbon, opposite the direction of feed of the chain (indicated by the arrow marked with K, concordant to the guide 11), is free.

[0021] In the preferred embodiments, as in this example, the gripper 13 presses the ribbon on the chain and, therefore, besides acting as means for movement of the chain, the gripper produces blocking of the ribbon on the chain.

[0022] According to the invention, the machine 10 comprises a first insertion unit 15 adapted to push, in a prima direction (indicated by the arrow Z), in this example a vertical direction from top to bottom, a portion of ribbon F into a first ring A1 of the chain it is facing, to form an increasing eyelet S (or loop) on the opposite face C2 of the first ring A1 with respect to that of insertion, as can be seen in Figs. 1, 2, 4 and 5.

[0023] This first insertion unit 15 is adapted to act until the free end F1 of the ribbon F passes through the first ring A1, reaching the second face C2 of the chain (Fig. 6), or in this example the lower face.

[0024] Preferably, the first insertion unit 15 comprises a pusher 16, arranged above the guide 11 (with the exception of the final part of its movement through the chain), which has, for example, a translation actuator 16A (for example a pneumatic cylinder) with an insertion end 16B that is moved by the same actuator in direction incident to the faces of the chain, in this example the direction Z orthogonal to the sliding surface 11A of the guide 11.

[0025] In practice, the insertion end 16B of the pusher 16 encounters the ribbon F that is above the first ring A1, pushes the portion of ribbon inside the ring A1, passing through it, thus creating the eyelet S that increases, on the opposite face, with the travel of this pusher inside the ring, until the pusher is stopped and returned to the initial position, above the first ring (Figs. 2, 5 and 6).

[0026] The first insertion unit 15 also comprises a removal device 17, that has a first inserter 17A, arranged below the guide 11, associated with actuation means that make the inserter movable from a standby position (Figs. 1, 3 and 4) to a position inserted in the eyelet S formed by the pusher 16. Subsequently, the first inserter 17A is movable in a direction away from the sliding guide 11 (Figs. 2, 5), drawing with it the part of ribbon not yet inserted in the subsequent rings, so that the eyelet S is enlarged until the free end F1 of the ribbon passes through the ring A1 and the related portion of ribbon, from

the first ring A1 is located completely below the chain C, or below the second face C2 thereof.

[0027] Advantageously, in this embodiment, the first inserter 17A is associated with a pair of movement actuators 17B and 17C.

[0028] The first actuator 17B, for example a pneumatic cylinder, is adapted to move the inserter 17A, for example having a pointed or common end adapted to enter the eyelet S, according to a horizontal direction X or, more in general, according to a direction X incident to a plane parallel to the direction of sliding of the chain and of the two pushers, or in this example a vertical plane.

[0029] The second actuator 17C, for example a pneumatic cylinder, is adapted to move the inserter 17A on the aforesaid plane to move away from said guide, preferably with a direction slanting from the guide toward the rear part of the machine, or the part opposite the area of insertion H, or slanting from the top toward the bottom.

[0030] In this example, the first actuator 17B is fixed, for example by means of a bracket 17D, to the second actuator 17C, so that this latter moves the assembly formed by the first actuator 17B and by the related inserter 17A, as can be seen in Figs. 2 and 5.

[0031] The machine 10 also comprises a second insertion unit 115, the same as the first unit 15, but arranged with the related pusher below the guide 11 and functionally overturned with respect to the first unit 15, or arranged symmetrically to the first unit 15 with respect to the guide 11, as can be seen in the figures. Hereunder the components of the second insertion unit 115 corresponding to the components of the first unit 15 will be indicated with the same reference numerals, increased by 100.

[0032] In this example, the pushers 16 and 116 (and more in particular their ends 16B and 116B) of the two units 15 and 115, are mutually aligned, or translate with their operating ends along a same vertical line.

[0033] Therefore, the second insertion unit 115 is adapted to push, in a second direction 1Z, opposite the first direction Z, the portion of ribbon that has passed through the first ring A1, into a second ring A2 to form an increasing eyelet S2 (or loop) on the second face C1, as can be seen, for example, in Figs. 4 and 5. The second insertion unit 115 is adapted to act until the free end F1 of the ribbon passes through the second ring, returning above the first face of the chain.

[0034] The second insertion unit 115 then has a second removal device 117 with a second inserter 117A moved by two actuators 117B and 117C.

[0035] Naturally, the machine comprises an electronic control system for the actuators and the various parts, for example a PLC system, not indicated in the figures.

[0036] Operation of the machine is for example given by the following operations managed by the electronic system, preferably performed in sequence:

- moving of the centering and/or retaining abutment 12A into a ring A3 of the chain C, to determine the correct position of the chain on the guide 11,
- closing of the gripper 13 to clamp chain C and ribbon F, with ribbon facing the chain,
- moving of the first pusher 16 downward into the first ring A1 of the chain, encountering the ribbon before entering the ring A1, thus pushing the ribbon F into the first ring and forming an eyelet S on the opposite face C2 to the face on which it entered the ring,
- moving of the first pusher 16 to exit from the first ring A1 in the opposite direction to the direction from which it entered,
- moving of the first inserter 17A into the eyelet S formed by the first pusher 16,
- moving of the first inserter 17A away from guide 11 of the chain, increasing the dimension of the eyelet S until the end F1 of the ribbon exits from the first ring A1, or the ribbon is free from the first ring up to its end F1 and is facing the face C2 of the chain opposite the face of insertion of the first pusher,
- moving of the centering abutment 12A to exit from the ring of reference A3 of the chain,
- moving of the gripper 13 in the direction of feed of the chain, drawing therewith the chain by a step equal to one ring,
- moving of said centering abutment 12A to enter a ring subsequent to the ring it entered previously,
- moving of the second pusher 116 into a second ring A2 of the chain, subsequent to the first, encountering the ribbon F before entering the ring, thus pushing the ribbon into the second ring A2 and forming an eyelet on the opposite face to the face on which it entered the ring,
- moving of the second pusher 116 to exit from the second ring in the opposite direction to the direction from which it entered,
- moving of the second inserter 117A into the eyelet S formed by the second pusher 116,
- moving of the second inserter 117A away from the guide 11 of the chain, increasing the dimension of the eyelet until the end of the ribbon F1 exits from the second ring A2.

[0037] Preferably, the gripper, after having been moved forward by one step is opened and release the chain and the ribbon, and are then moved back by one step and closed again to clamp chain and ribbon.

[0038] These steps are repeated unit the ribbon is inserted in all the desired rings of the chain.

[0039] The accompanying figures show in particular the following moments:

Fig.1 first pusher 16 inserted in the ring A1 and pushing on the ribbon, with formation of an eyelet above the lower face C2 of the chain, and end 16B of the pusher still inside the ring and the eyelet;

Fig.2 first inserter 17A inside the eyelet, to move away from the guide and increase the dimension of the eyelet;

Fig.3 initial step in which the ribbon is simply resting on top of the chain (and the gripper block the ribbon on the chain) and the two pushers are moved away from the chain;
Fig.4 first pusher 16 inserted in the ring A1 and pushing on the ribbon, forming an eyelet, and end 16B of the pusher still inside the ring and the eyelet;
Fig.5 first inserter 17A inside the eyelet, to move away from the guide and increase the dimensions of the eyelet;
Fig.6 pushers moved away from the chain, ribbon inserted in the ring A1 with the end on the side of the lower face C2 of the chain and the inserters returned to initial position, and gripper with chain translated by one step corresponding to the length of a ring;
Fig.7 second pusher 116 inserted in the ring A2 and pushing on the ribbon, with formation of eyelet above the upper face C1 of the chain, and end 116B of the pusher still inside the ring and the eyelet;
Fig.8 second inserter 117A inside the eyelet, to move away from the guide and increase the dimensions of the eyelet;
Fig.9 pushers moved away from the chain, ribbon inserted in the ring A2 with the end on the side of the upper face C1 of the chain and the inserters returned to initial position, and gripper with chain translated by one step corresponding to the length of a ring.

[0040] It is understood that the drawing only shows possible non-limiting embodiments of the invention, which can vary in forms and arrangements without however departing from the scope of the concept on which the invention is based. Any reference numerals in the appended claims are provided purely to facilitate the reading thereof, in the light of the above description and accompanying drawings, and do not in any way limit the scope of protection.

Claims

1. A machine for introducing a ribbon inside the rings of a chain according to an undulated trend, comprising

   - a sliding guide for the chain;
   - means for controlled feed of the chain on said guide;
   - means for blocking a part of the ribbon on the chain, with said ribbon longitudinally facing at least in part a first face of said chain, so that one end of said ribbon, opposite the direction of feed of the chain, is free;
   - a first insertion unit adapted to push, in a first direction, a portion of ribbon into a first ring of the chain it is facing, to form an increasing eyelet or loop, on the opposite face of the first ring with respect to that of insertion, said first insertion unit being adapted to act until the free end of the ribbon passes through said first ring, reaching the second face of the chain;
   - a second insertion unit adapted to push, in a second direction opposite said first direction, the portion of ribbon that has passed through said first ring into a second ring to form an increasing eyelet, or loop, on the opposite face of said second ring with respect to that of insertion into the second ring, said second insertion unit being adapted to act until the free end of the ribbon passes through said second ring, returning to the first face of the chain.

2. The machine according to claim 1, wherein each insertion unit comprises

   - a pusher adapted to move one end thereof in a respective incident direction to a respective face of the chain, through a respective ring to push the portion of ribbon facing the respective ring into the same ring to form on the opposite face said increasing eyelet or loop,
   - a removal device having a first inserter movable from a standby position to a position inserted in said increasing eyelet and subsequently movable in a direction away from said sliding guide, drawing with it the part of ribbon not yet inserted in the subsequent rings, so that said eyelet is enlarged until the free end of the ribbon passes through said ring.

3. The machine according to one or more of the preceding claims, wherein said means for controlled feed of the chain on said guide comprise a centering and/or retaining abutment placed on the guide upstream of the area of interaction of said insertion units, adapted to be reversibly inserted, when controlled, into a respective ring.

4. The machine according to one or more of the preceding claims, wherein said means for controlled feed of the chain on said guide comprise an actuator for movement in the direction of feed of the chain, comprising a gripper adapted to clamp the chain when controlled; preferably said gripper being provided downstream with respect to the area of insertion of the ribbon into the chain with reference to the direction of feed of the chain.

5. The machine according to claim 4, wherein said gripper is adapted also to block said ribbon on said chain, defining said means for blocking a part of the ribbon on the chain.

6. The machine according to one or more of the preceding claims, wherein said guide comprises a sliding and support surface, preferably horizontal or with

normal lying on a vertical plane, and opposite lateral containment edges preferably at an adjustable distance.

7. The machine according to one or more of the preceding claims, wherein said two insertion units are arranged on opposite sides with respect to said guide, preferably symmetrically opposite with respect to the sliding and support surface of the chain on the guide.

8. The machine according to claims 2 and 7, wherein said pushers of said units are mutually aligned, or they translate with their operating ends along a same line.

9. The machine according to one or more of the preceding claims, wherein each said inserter is associated with a pair of movement actuators, a first actuator adapted to move the respective inserter according to an incident direction, preferably orthogonal to a plane parallel to the direction of sliding of the chain and of the two pushers, and a second actuator adapted to move the respective inserter on said plane away from said guide, preferably with a slanting direction; preferably said first actuator is fixed to said second actuator so that this latter moves the assembly formed by the first actuator and by the related inserter.

10. The machine according to at least claims 1 to 5, comprising an electronic control system that enables the following operations to be carried out repeatedly:

- moving of said centering abutment into a ring of the chain, to determine the correct position of the chain on the guide,
- closing of the gripper to clamp chain and ribbon, with ribbon facing the chain,
- moving of the first pusher into the first ring of the chain, encountering the ribbon before entering the ring, thus pushing the ribbon into the first ring and forming an eyelet on the opposite face to the face on which it entered the ring,
- moving of the first pusher to exit from the first ring in the opposite direction to the direction from which it entered,
- moving of the first inserter into the eyelet formed by the first pusher,
- moving of the first inserter away from guide of the chain, increasing the dimension of the eyelet until one end of the ribbon exits from said first ring, or the ribbon is free from said first ring up to one end thereof and is facing the face of the chain opposite the face of insertion of the first pusher,
- moving of said centering abutment to exit from the respective ring of the chain,
- moving of said gripper in the direction of feed of the chain, drawing therewith the chain by a step equal to one ring,
- moving of said centering abutment to enter a ring subsequent to the ring it entered previously,
- moving of the second pusher into a second ring of the chain, subsequent to the first, encountering the ribbon before entering the ring, thus pushing the ribbon into the second ring and forming an eyelet on the opposite face to the face on which it entered the ring,
- moving of the second pusher to exit from the second ring in the opposite direction to the direction from which it entered,
- moving of the second inserter into the eyelet formed by the second pusher,
- moving of the second inserter away from the guide of the chain, increasing the dimension of the eyelet until one end of the ribbon exits from said second ring, or the ribbon is free from said second ring up to one end thereof and is facing the face of the chain opposite the face of insertion of the second pusher.

11. The machine according to claim 10, wherein said gripper, after having been moved forward by one step are opened and release the chain and the ribbon, are moved back by one step and closed again to clamp chain and ribbon.

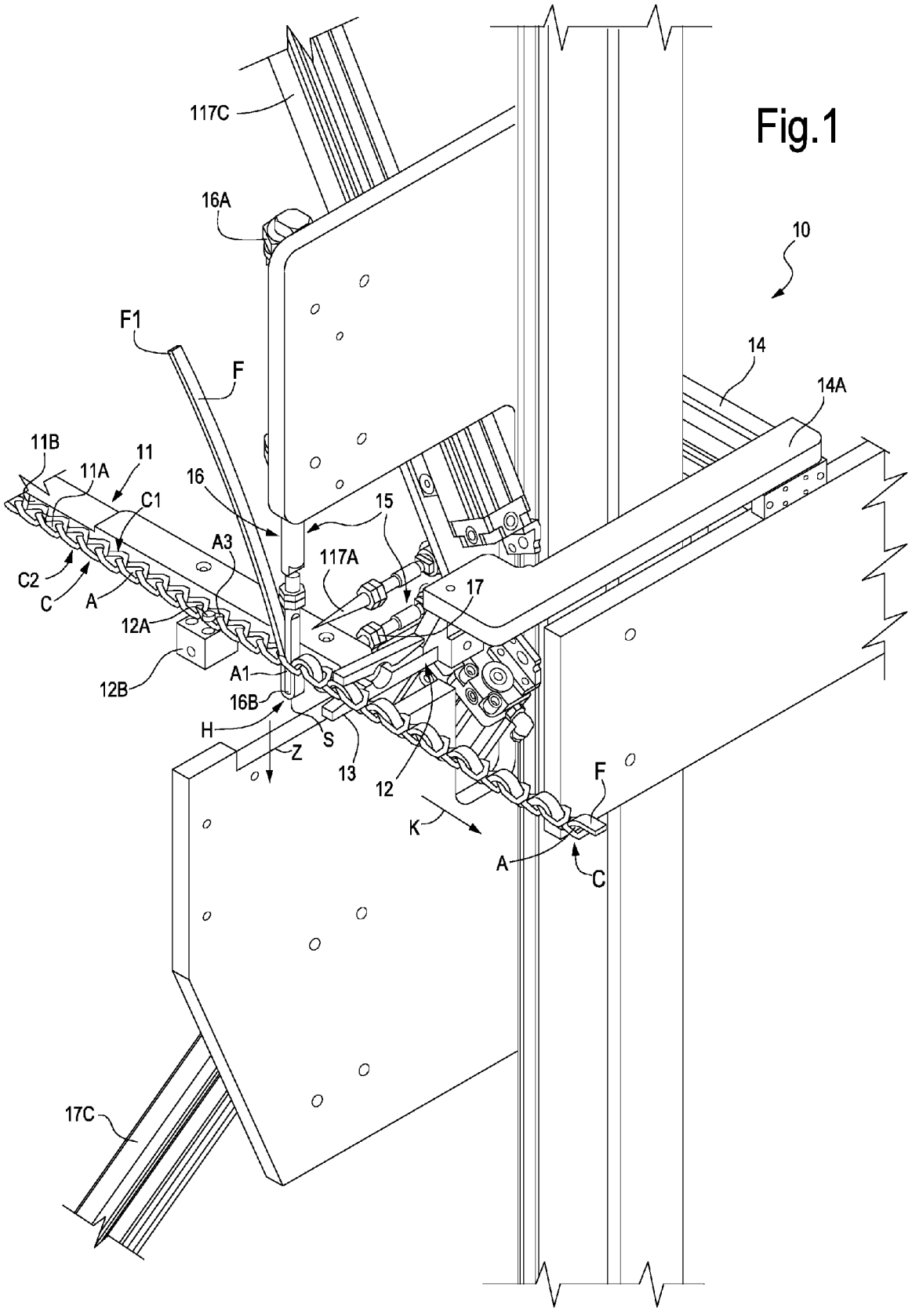
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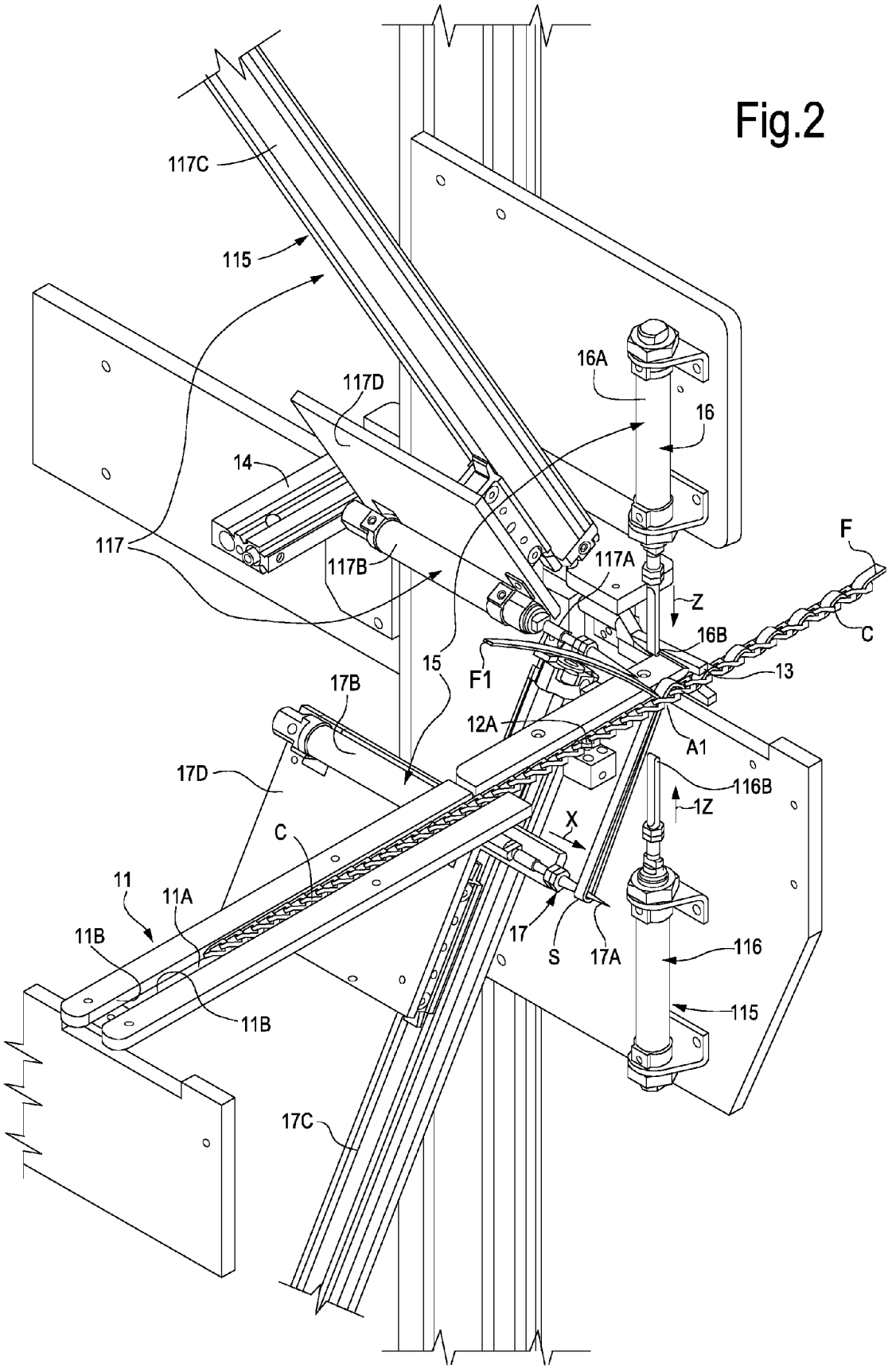
Fig.1

Fig.2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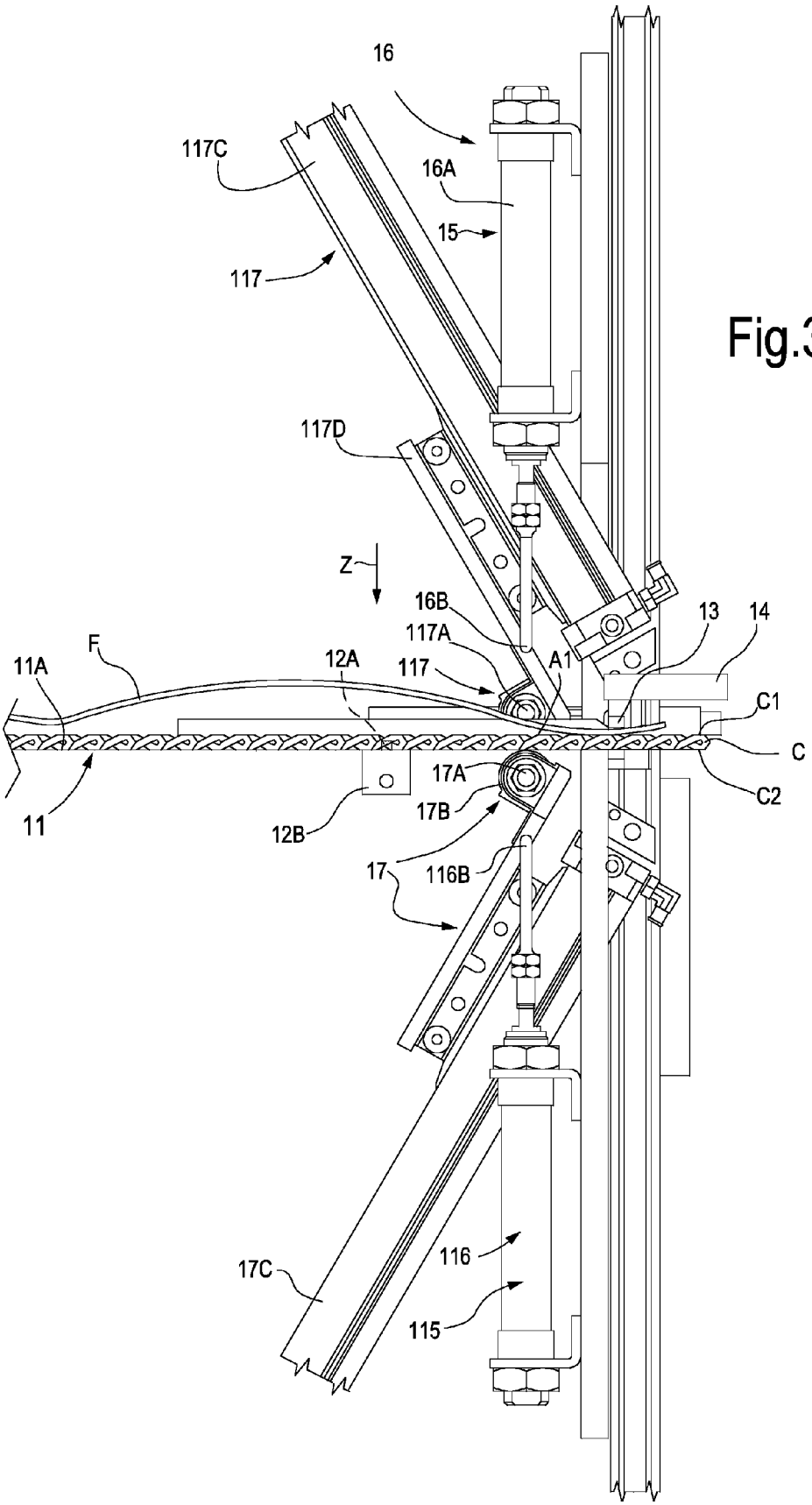
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Fig.3

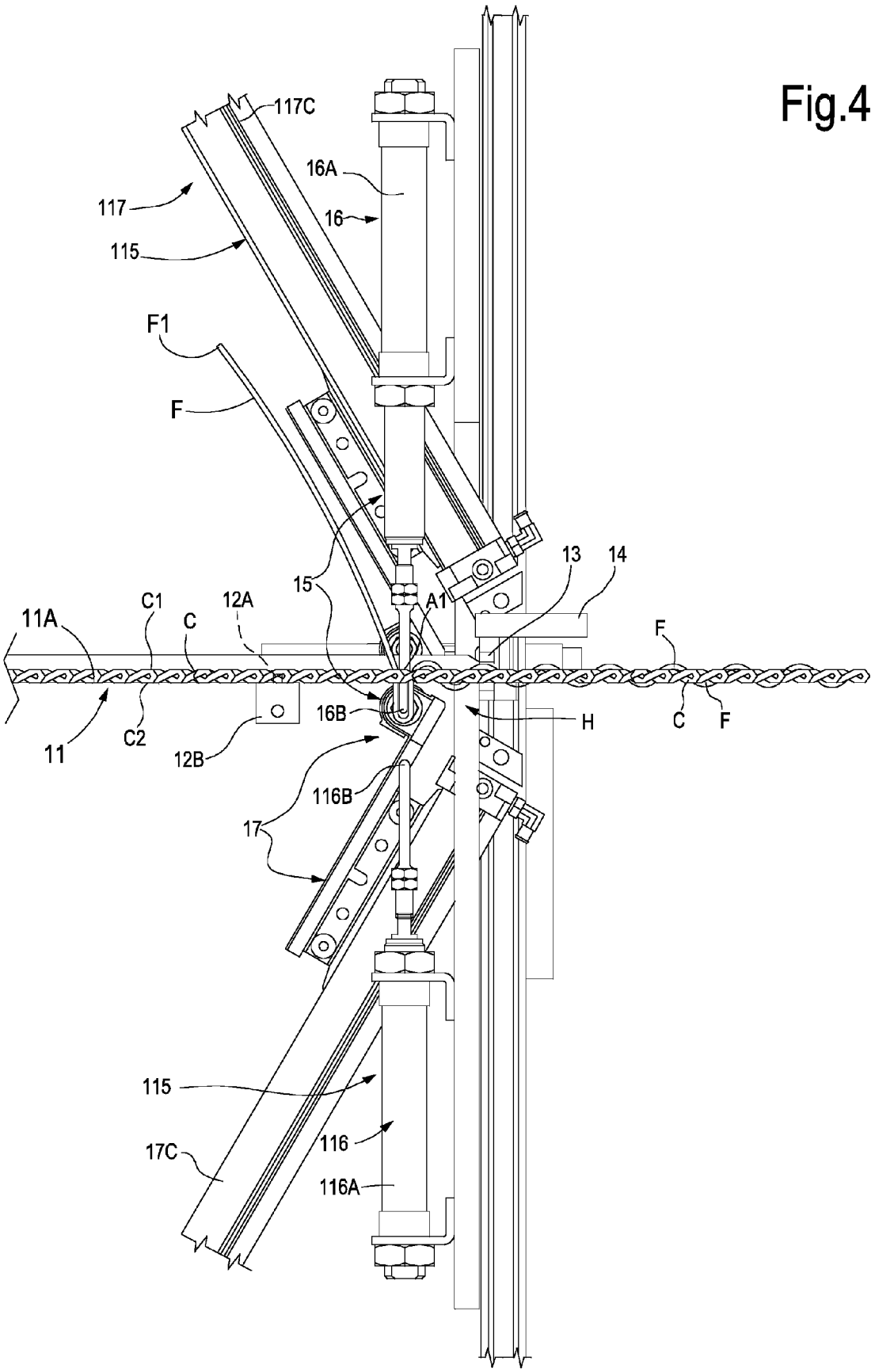
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Fig.4

Fig.5

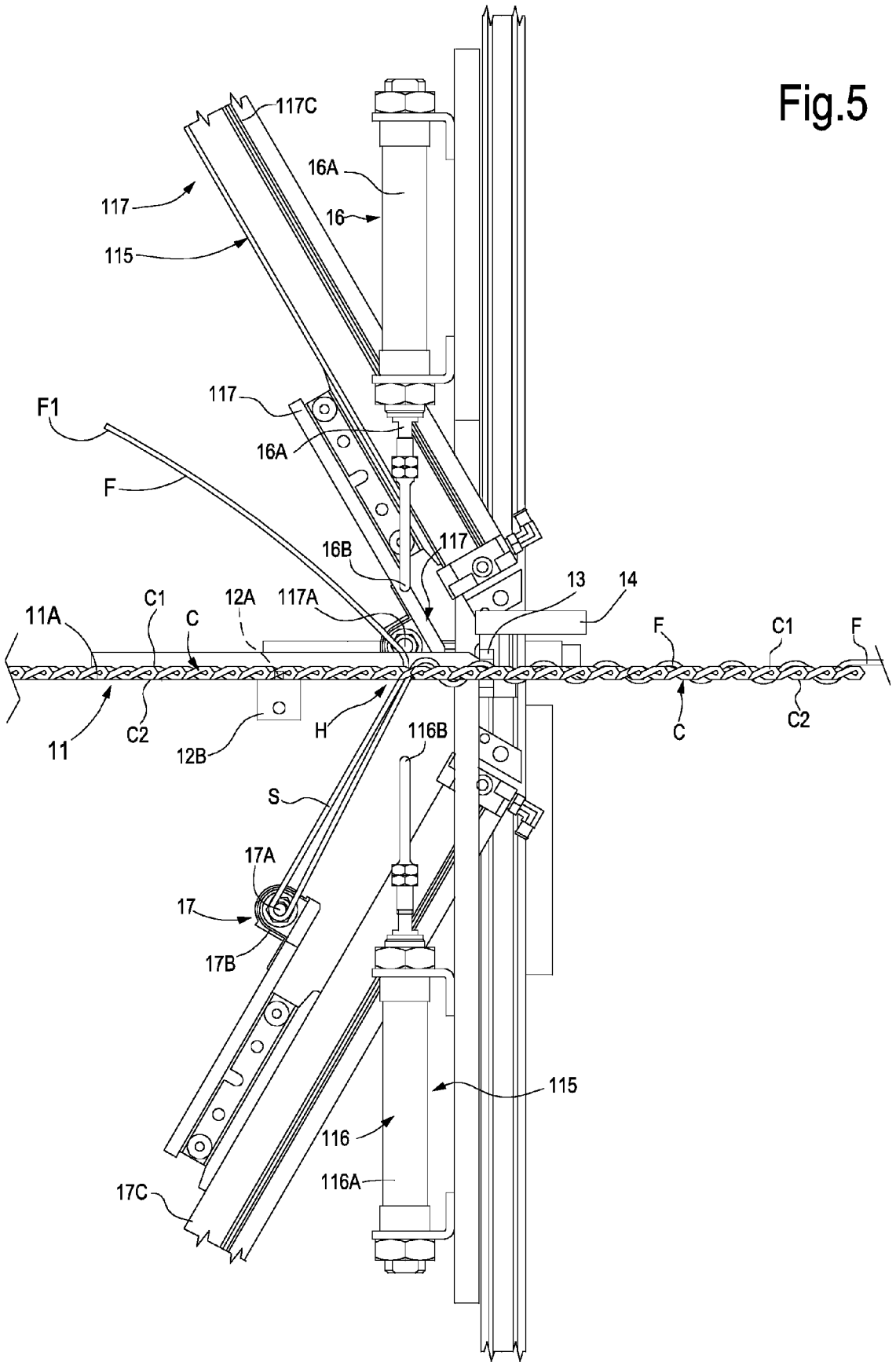
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Fig.6

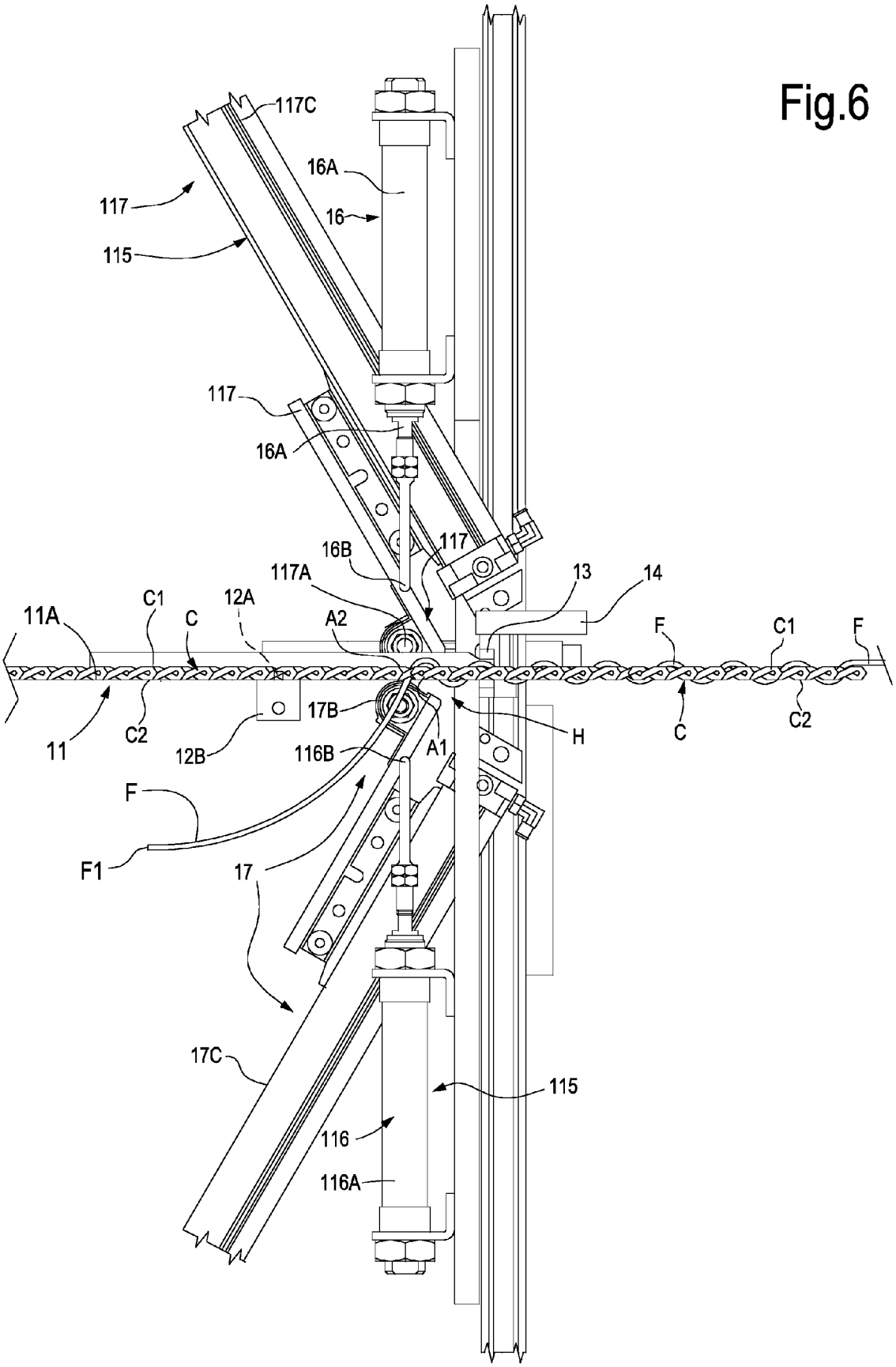
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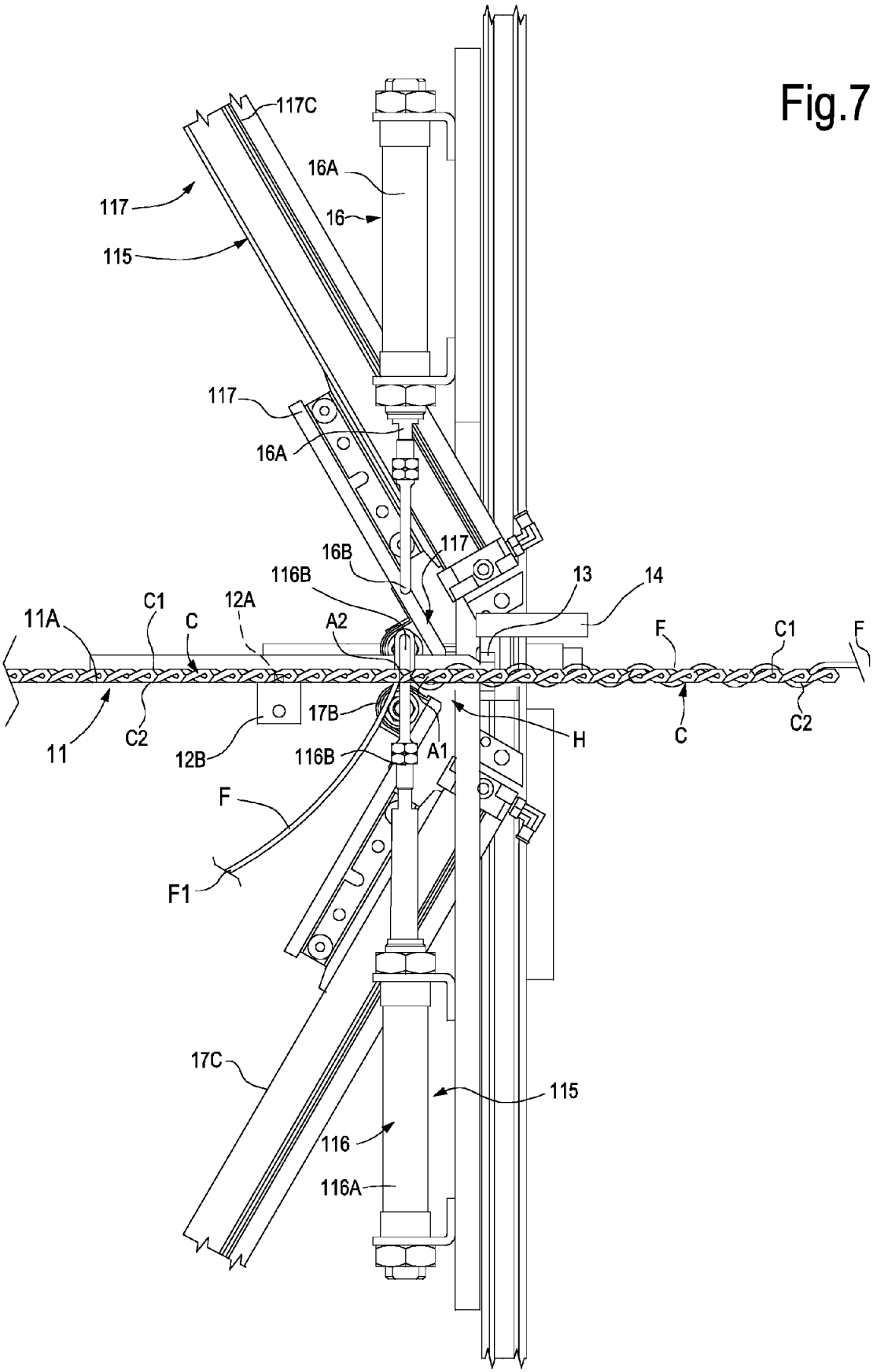
Fig.7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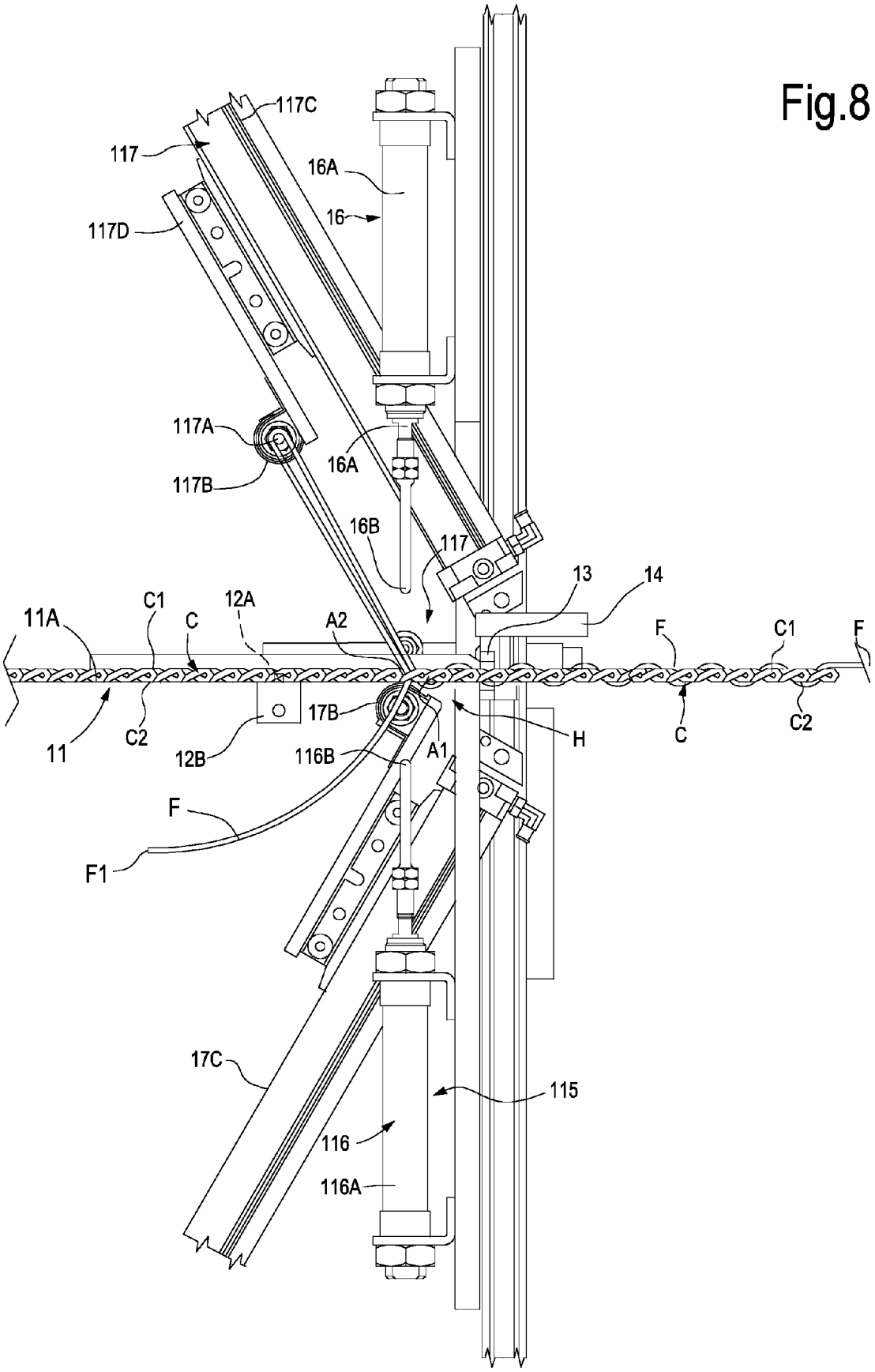
F
C1
F
11
C2
12B
17B
116B
A1
H
C
C2
F
F1
17C
115
116
116A

Fig.8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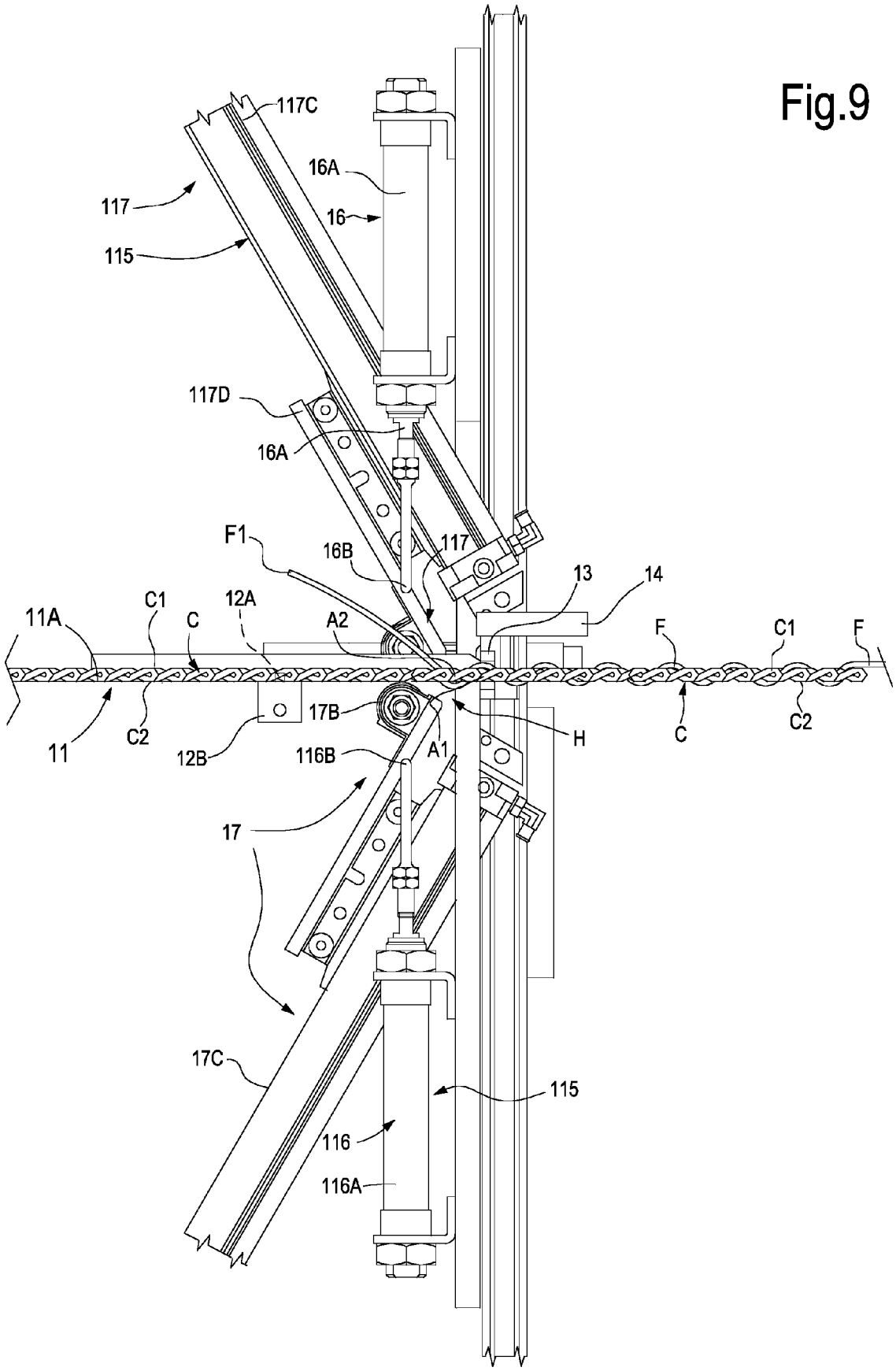
117
16A
16
117D
117A
16A
117B
16B
117
13
14
11A
C1
C
12A
A2
F
C1
F
11
C2
12B
17B
116B
A1
H
C
C2
F
F1
17C
115
116
116A

Fig.9


117C
16A
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16
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117D
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F1
16B
117
13
14
11A
C1
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12A
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C2
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17B
116B
A1
H
C
C2
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17C
115
116
116A

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EUROPEAN SEARCH REPORT

Application Number
EP 15 18 4218

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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TECHNICAL FIELDS SEARCHED (IPC)
D04D
A45C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	3 February 2016	Sterle, Dieter

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