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(54) **OPEN-END TYPE OF SPINNING APPARATUS WITH IMPROVED DEVICE FOR LOADING A NEW TUBE IN THE DOFFING CYCLE AND METHOD FOR LOADING A NEW TUBE IN THE DOFFING CYCLE OF THE OPEN-END TYPE SPINNING APPARATUS**

OFFENEND-SPINNVORRICHTUNG MIT VERBESSERTER VORRICHTUNG ZUM LADEN EINER NEUEN HÜLSE IM DOFFING-ZYKLUS UND VERFAHREN ZUM LADEN EINER NEUEN HÜLSE IM DOFFING-ZYKLUS DER OFFENEND-SPINNVORRICHTUNG

TYPE D'APPAREIL DE FILAGE À BOUT LIBRE AVEC DISPOSITIF AMÉLIORÉ POUR CHARGER UN NOUVEAU TUBE DANS LE CYCLE DE LEVÉE ET PROCÉDÉ POUR CHARGER UN NOUVEAU TUBE DANS LE CYCLE DE LEVÉE DE L'APPAREIL DE FILAGE À BOUT LIBRE

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**Description**SCOPE

**[0001]** The present invention relates to an open-end type of spinning apparatus with an improved device for loading a new tube in the doffing cycle and the method for loading a new tube in the doffing cycle of said open-end type spinning apparatus.

PRIOR ART

**[0002]** As is known, the tube restraint system in a spinning apparatus intervenes in the phase of loading a new tube in the doffing cycle, i.e. after an already formed reel has been removed from the tips of the reel-holder arm to be taken away, and a new empty tube must be positioned between the same tips to serve as support for the yarn, so as to wind and form a new reel thereon.

**[0003]** In this step the empty tubes are taken from a special basket positioned above the winding unit; in this basket there are four or five empty tubes lying for example horizontally; the basket is positioned slightly inclined to ensure that at least one tube is at the lower end of the basket itself at all times.

**[0004]** In this step, the doffing tray, which is provided on the spinning apparatus, grasps the lower tube by means of suitable pincers to position it between the tailstocks of the reel-holder arm. Because of gravity and the inclination of the basket, all the tubes will lean against each other.

**[0005]** For this reason, tube restraint devices are known in the art which have the purpose of separating the tubes from each other so as to facilitate the step of automatically capturing them by means of special pincers: in the absence of such restraint devices, the pincers would not easily be able to pick up the empty tube and, inserting themselves forcefully between the tubes, could also damage the empty tubes.

PRESENTATION OF THE INVENTION

**[0006]** The known solutions described above have drawbacks and limitations, essentially due to the fact that they provide for the use of complex, expensive, and not very flexible devices for carrying out the loading of a new tube in the doffing cycle.

**[0007]** These devices, in effect, provide for the use of complex mechanisms which must coordinate a plurality of components so that they may unload the reel formed, separate the new tubes, pick up a new tube and load the latter between the tailstocks without jams or collisions among the various moving parts.

**[0008]** Often, such devices are also slow because the corresponding operations are sequential and therefore the various steps are carried out according to a precise and rigid succession. Cited solutions are known from GB 2179066 A, US 4638956 A, JP S5335030 A, US 4125990

A.

**[0009]** The need is therefore perceived to resolve the drawbacks and limitations cited with reference to the known art.

5 **[0010]** This requirement is satisfied by an open-end type spinning apparatus according to claim 1 and by a method for loading a new tube in the doffing cycle of said open-end type spinning apparatus according to claim 9

10 DESCRIPTION OF THE DRAWINGS

**[0011]** Further features and advantages of the present invention will become more understandable from the following description of the preferred and non-limiting embodiments thereof, wherein:

15 figure 1a shows a perspective view of an open-end type spinning apparatus according to an embodiment of the present invention;

20 figure 1b shows a partial perspective view of the apparatus of figure 1a;

figure 2 shows a side view, partially in section, of the spinning apparatus of figure 1b, in the initial configuration of not picking up a new tube;

25 figure 3 shows a side view, partially in section, of the spinning apparatus of figure 1b, in a configuration of separating and picking up a new tube from the other tubes contained in the tube-holder basket;

30 figure 4 shows a side view, partially in section, of the spinning apparatus of figure 1b, in a configuration of delivering the tube just picked up between the related tailstocks;

35 figure 5 shows a side and top view of a pair of tailstocks in an open configuration, suitable to receive a new tube;

figure 6 shows a side view of the pair of tailstocks of figure 5 in a closed configuration suitable to rotatably support a new tube.

40 **[0012]** The elements or parts of elements in common between the embodiments described hereinafter will be indicated at the same numerical references.

DETAILED DESCRIPTION

45 **[0013]** With reference to the aforementioned figures, a total schematic view of an open-end type spinning apparatus according to the present invention is collectively indicated at 4.

50 **[0014]** In particular, the spinning apparatus 4 comprises at least one spinning head 8 having a spinning unit 12 and a reel winding unit 16, wherein the reel winding unit 16 winds, onto a tube 20, a reel of yarn obtained from the underlying spinning unit 12.

55 **[0015]** The spinning apparatus 4 comprises a tube-holder basket 24 housing a plurality of tubes 20 on which to wind the yarn.

**[0016]** For example, such tubes 20 are arranged in a

horizontal position and stacked on each other in direct contact with each other.

**[0017]** The spinning apparatus 4 further comprises a doffing tray 28 which may be positioned at the spinning unit 12 and provided with pick-up and transport devices 32 for a tube 20 from the tube-holder basket 24 to a pair of tailstocks 76,80 (figures 6-7) of the reel winding unit 16.

**[0018]** For example, the pick-up and transport device 32 comprises a pair of pincers 40,44 suitable to grip a tube 20, provided with respective actuation means 48.

**[0019]** According to the invention the doffing tray 28 comprises a tube separator device 52 having a support arm 56 which supports two blades 60, 64 which are movable so as to intercept a number of tubes 20 contained in the tube-holder basket 24 and to separate them at least partially from a tube 20' destined to be grasped by the pick-up and transport device 32 and placed between the tailstocks 76, 80.

**[0020]** Preferably, the reel winding unit 16 comprises a pair of levers 68,72 which support left and right tailstocks 76, 80, suitable to support a tube 20, hinged one to the other and with an elastic means 84, for example a spring, interposed in order to mechanically connect the levers 68,72 to each other, allowing the simultaneous opening and closing thereof by acting on only one of said levers.

**[0021]** The doffing tray 28 is also provided with actuating devices of at least one of said levers 68, 72, so as to control the opening and closing thereof.

**[0022]** Said tailstocks 76,80 are mounted floating on the respective levers 68,72 so as to automatically center the tube 20 on the tailstocks 76,80, during the closing step thereof.

**[0023]** Advantageously, the tube separator device 52 and the pick-up and transport device 32 are mechanically independent of each other, so that they may be operated separately.

**[0024]** In particular, the pincers 40,44 are provided with actuation means 48 which are mechanically independent from the movement means 88 of the tube separator device 52.

**[0025]** According to the invention, the tube separator device 52 comprises the pair of blades 60,64 retractable so as to reach, in the extracted position (figure 3), the tube-holder basket 24, intercepting a group of tubes 20 and separating them from a tube 20' destined to be gripped by the pick-up and transport device 32.

**[0026]** According to the invention, the tube separator device 52 is provided with movement means 88, which permit the passage from a retracted configuration to an extracted configuration according to a substantially rectilinear movement, and with tilting means 92, which allow the tilting of the blades 60,64 according to a tilting axis X-X substantially parallel to a horizontal lying axis of the tube 20' to be picked up.

**[0027]** For example, the movement means 88 comprise a piston 94 to which a joint 96 is attached with a peg, to the joint 96 of which are integral the separator

blades 60,64 and a cam 100 attached to the doffing tray 28.

**[0028]** According to the invention, the tilting means 92 comprise a skate 104, integral with said blades 60,64 and engaged in a cam 100 provided with a groove 108 which defines a curvilinear path suitable to allow said tilting movement of the blades 60,64.

**[0029]** Preferably, the open-end type spinning apparatus 4 comprises a control unit programmed for:

- monitoring the formation step of a reel being formed around a relative tube 20,
- checking the presence of a plurality of tubes 20 in the tube-holder basket 24,
- providing for the unloading of a formed reel from a pair of tailstocks 76,80,
- moving, independently of each other, the tube separator device 52 so as to separate the plurality of tubes 20 from a chosen tube 20' to be picked up, and the pick-up and transport device 32 so as to grasp the chosen tube 20' and position it next to said pair of tailstocks 76,80.

**[0030]** The control unit is programmed to operate, via the support arm 56, at least one of said tailstocks 76,80 to automatically grasp and center the tube 20'.

**[0031]** The operation of an open-end type spinning apparatus according to the present invention will now be described.

**[0032]** In particular, the apparatus according to the present invention allows a method for unloading a reel to be carried out comprising the steps of:

- monitoring the formation step of a reel being formed around a relative tube 20,
- checking the presence of a plurality of tubes 20 in the tube-holder basket 24,
- providing for the unloading of a formed reel from a pair of tailstocks 76,80,
- moving, independently of each other, the tube separator device 52, so as to separate the plurality of tubes 20 from a chosen tube 20' to be picked up, and the pick-up and transport device 32, so as to grasp the chosen tube 20' and position it in proximity to said pair of tailstocks 76,80.

**[0033]** According to one embodiment, the method of loading a new tube 20' in the doffing cycle of a spinning apparatus 4 comprises the step of actuating, via the support arm 56, at least one of said tailstocks 76,80 to automatically grasp and center the tube 20'.

**[0034]** As may be appreciated from the foregoing, the open-end type spinning apparatus and the method for unloading a reel from an open-end type spinning apparatus according to the invention allows the drawbacks presented in the prior art to be overcome.

**[0035]** Advantageously, the solution of the present invention provides for the independence of the two move-

ments, i.e. the step of separating the tubes and the step of picking up and transporting the tube between the tailstocks.

**[0036]** In this way it is possible to obtain a better control of the devices because the tube arrives at the centering step on the tailstocks without having interfered with guide or thrust blades as in the solutions of the prior art. These possible contacts could in fact compromise the correct grip of the tube holder.

**[0037]** Moreover, the tube separator device, being independent of the tube-holder arm, may be operated at different times; for example, it is allowed to return with reduced speed so that the tubes made to withdraw re-descend in contact with the separator and in an orderly manner, avoiding incorrect positioning of the tubes on the respective guides.

**[0038]** Furthermore, the arm itself, as needed, may be opened not only by the tray of the open-end machine but also by hand.

**[0039]** A person skilled in the art, in the object of satisfying contingent and specific requirements, may make numerous modifications and variations to the apparatuses and methods of the present invention, all of which are within the scope of the invention as defined by the following claims.

## Claims

1. Open-end type spinning apparatus (4) comprising at least one spinning head (8) having a spinning unit (12) and a reel winding unit (16), wherein the reel winding unit (16) winds onto a tube (20) a reel of yarn obtained from the underlying spinning unit (12),

- a tube-holder basket (24) housing a plurality of tubes (20) to wind the yarn onto,
- a doffing tray (28) which can be positioned at the spinning unit (12) and fitted with pick-up and transport devices (32) of a tube (20') from the tube-holder basket (24) to a pair of tailstocks (76,80) of the reel winding unit (16),
- the doffing tray (28) comprises a tube separator device (52) having a support arm (56) which supports two blades (60) which are movable so as to intercept a number of tubes (20) contained in the tube-holder basket (24) and to separate them at least partially from a tube (20') destined to be grasped by the pick-up and transport device (32) and placed between the tailstocks (76,80),

wherein the tube separator device (52) and the pick-up and transport device (32) are mechanically independent of each other, so that they can be operated separately,

wherein said blades (60) are retractable blades (60) so as to reach, in an extracted position, the tube-

holder basket (24), intercept a group of tubes (20) and separate them from a tube (20') destined to be grasped by the pick-up and transport device (32), wherein the tube separator device (52) is fitted with movement means (88), which permit the passage from a retracted configuration to an extracted configuration according to a substantially rectilinear straight movement, and with tilting means (92) which allow the tilting of the blades (60) according to a tilting axis (X-X) substantially parallel to a horizontal lying axis of the tube (20') to be picked up, wherein said tilting means (92) comprise a skate (104) integral with said blades (60) and engaged in a cam (100) provided with a groove (108) which identifies a curvilinear path suitable to allow said tilting movement of the blades (60).

2. Open-end type spinning apparatus (4) according to claim 1, wherein said movement means (88) comprise a piston (94) to which a joint (96) is attached with a peg, the separator blades (60) and said cam (100) attached to the doffing tray (28) being integral to such joint (96).

3. Open-end type spinning apparatus (4) according to any of the preceding claims, wherein the pick-up and transport device (32) comprises a pair of pincers (40,44) suitable to grasp a tube (20), fitted with actuation means (48) mechanically independent of the movement means (88) of the tube separator device (52).

4. Open-end type spinning apparatus (4) according to any of the preceding claims, wherein said reel winding unit (16) consists of a pair of levers (68,72) which support left and right tailstocks (76,80), suitable to support a tube (20), hinged one to the other and with an elastic means (84) interposed, in order to mechanically connect the levers (68,72) to each other, allowing simultaneous opening and closing by acting on only one of said levers (68,72).

5. Open-end type spinning apparatus (4) according to claim 4, wherein the doffing tray (28) is fitted with actuator devices of at least one of said levers (68,72) so as to control the opening and closing thereof.

6. Open-end type spinning apparatus (4) according to claim 4 or 5, wherein the tailstocks (76,80) are mounted floating on the levers (68,72) so as to realize automatically the centering of the tube (20) on the tailstocks (76,80), during the closing thereof.

7. Open-end type spinning apparatus (4) according to any of the preceding claims, comprising a control unit programmed to:

- monitor the formation step of a reel in formation

- around a relative tube (20),  
 - check the presence of a plurality of tubes (20) in the tube-holder basket (24),  
 - provide for the unloading of a reel formed by a pair of tailstocks (76,80),  
 - move, independently of each other, the tube separator device (52) so as to separate the plurality of tubes (20) from a chosen tube (20') to be picked up, and the pick-up and transport device (32) so as to grasp the chosen tube (20') and position it next to said pair of tailstocks (76,80).
8. Open-end type spinning apparatus (4) according to claim 7, wherein the control unit is programmed to operate, via the support arm (56), at least one of said tailstocks (76,80) to automatically grasp and center the tube (20').
9. Method of loading a new tube (20') in the doffing cycle of an open-end type spinning apparatus (4) according to any of the preceding claims, comprising the steps of:
- monitoring the formation step of a reel in formation around a relative tube (20),
  - checking the presence of a plurality of tubes (20) in the tube-holder basket (24),
  - providing for the unloading of a formed reel by the pair of tailstocks (76,80),
  - moving, independently of each other, the tube separator device (52) so as to separate the plurality of tubes (20) from a chosen tube (20') to be picked up, and the pick-up and transport device (32) so as to grasp the chosen tube (20') and position it next to said pair of tailstocks (76,80).
10. Method of loading a new tube (20') in the doffing cycle of an open-end type spinning apparatus (4) according to claim 9, comprising the step of actuating, via the support arm (56), at least one of said tailstocks (76,80) to automatically grasp and center the tube (20').

### Patentansprüche

1. Offenend-Spinnvorrichtung (4), umfassend wenigstens einen Spinnkopf (8), welcher eine Spinnereinheit (12) und eine Spulenwickleinheit (16) aufweist, wobei die Spulenwickleinheit (16) eine von der darunterliegenden Spinnereinheit (12) erhaltene Garnspule auf eine Hülse (20) wickelt,
- einen Hülsenhaltekorb (24), welcher eine Mehrzahl von Hülsen (20) unterbringt, um den Garn darauf zu wickeln,

- eine Doffing-Schale (28), welche an der Spinnereinheit (12) positioniert und mit Aufnahme- und Transportvorrichtungen (32) einer Hülse (20') von dem Hülsenhaltekorb (24) zu einem Paar von Endstücken (76, 80) der Spulenwickleinheit (16) ausgerüstet sein kann,  
 - wobei die Doffing-Schale (28) eine Hülsentrennvorrichtung (52) umfasst, welche einen Halterungsarm (56) aufweist, welcher zwei Schwerter (60) haltert, welche beweglich sind, um eine Anzahl von in dem Hülsenhaltekorb (24) enthaltenen Hülsen (20) abzufangen und sie wenigstens teilweise von einer Hülse (20') zu trennen, welche dazu bestimmt ist, von der Aufnahme- und Transportvorrichtung (32) gegriffen und zwischen den Endstücken (76, 80) platziert zu werden,

wobei die Hülsentrennvorrichtung (52) und die Aufnahme- und Transportvorrichtung (32) mechanisch voneinander unabhängig sind, so dass sie separat betrieben werden können,  
 wobei die Schwerter (60) einziehbare Schwerter (60) sind, um, in einer ausgezogenen Position, den Hülsenhaltekorb (24) zu erreichen, eine Gruppe von Hülsen (20) abzufangen und sie von einer Hülse (20') zu trennen, welche dazu bestimmt ist, von der Aufnahme- und Transportvorrichtung (32) gegriffen zu werden,  
 wobei die Hülsentrennvorrichtung (52) mit Bewegungsmitteln (88), welche den Übergang von einer eingezogenen Konfiguration zu einer ausgezogenen Konfiguration gemäß einer im Wesentlichen geradlinigen Bewegung zulassen, und mit Kippmitteln (92) ausgerüstet ist, welche das Kippen der Schwerter (60) gemäß einer Kippachse (X-X) ermöglichen, welche zu einer horizontal liegenden Achse der aufzunehmenden Hülse (20') im Wesentlichen parallel ist,  
 wobei die Kippmittel (92) ein Gleitstück (104) umfassen, welches integral mit den Schwertern (60) vorliegt und mit einem Nocken (100) in Eingriff steht, welcher mit einer Nut (108) bereitgestellt ist, welche einen kurvenförmigen Pfad identifiziert, welcher dazu geeignet ist, die Kippbewegung der Schwerter (60) zu ermöglichen.

2. Offenend-Spinnvorrichtung (4) nach Anspruch 1, wobei die Bewegungsmittel (88) einen Kolben (94) umfassen, an welchem ein Gelenk (96) mit einem Zapfen angebracht ist, wobei die Trennschwerter (60) und der Nocken (100), welche an der Doffing-Schale (28) angebracht sind, integral mit einem solchen Gelenk (96) vorliegen.
3. Offenend-Spinnvorrichtung (4) nach einem der vorhergehenden Ansprüche, wobei die Aufnahme- und Transportvorrichtung (32) ein Paar von Zangen (40,

- 44) umfasst, welches dazu geeignet ist, eine Hülse (20) zu greifen, und welches mit Betätigungsmitteln (48) ausgerüstet ist, welche von den Bewegungsmitteln (88) der Hülsentrennvorrichtung (52) mechanisch unabhängig sind.
4. Offenend-Spinnvorrichtung (4) nach einem der vorhergehenden Ansprüche, wobei die Spulenwickel-einheit (16) aus einem Paar von Hebeln (68, 72) besteht, welche ein linkes und ein rechtes Endstück (76, 80) halten, welche dazu geeignet sind, eine Hülse (20) zu halten, welche aneinander angelenkt sind und mit einem eingefügten elastischen Mittel (84) vorgesehen sind, um die Hebel (68, 72) mechanisch miteinander zu verbinden, was ein gleichzeitiges Öffnen und Schließen ermöglicht, indem auf nur einen der Hebel (68, 72) eingewirkt wird.
5. Offenend-Spinnvorrichtung (4) nach Anspruch 4, wobei die Doffing-Schale (28) mit Betätigungsvorrichtungen wenigstens eines der Hebel (68, 72) ausgerüstet ist, um das Öffnen und Schließen davon zu steuern.
6. Offenend-Spinnvorrichtung (4) nach Anspruch 4 oder 5, wobei die Endstücke (76, 80) schwimmend auf den Hebeln (68, 72) montiert sind, um während des Schließens davon das Zentrieren der Hülse (20) auf den Endstücken (76, 80) automatisch zu realisieren.
7. Offenend-Spinnvorrichtung (4) nach einem der vorhergehenden Ansprüche, umfassend eine Steuereinheit, welche programmiert ist zum:
- Überwachen des Bildungsschritts einer Spule in Bildung um eine jeweilige Hülse (20),
  - Überprüfen des Vorhandenseins einer Mehrzahl von Hülsen (20) in dem Hülsenhaltekorb (24),
  - Vorbereiten für das Entladen einer durch ein Paar von Endstücken (76, 80) gebildeten Spule,
  - Bewegen, unabhängig voneinander, der Hülsentrennvorrichtung (52), um die Mehrzahl von Hülsen (20) von einer aufzunehmenden, ausgewählten Hülse (20') zu trennen, und der Aufnahme- und Transportvorrichtung (32), um die ausgewählte Hülse (20') zu greifen und sie neben dem Paar von Endstücken (76, 80) zu positionieren.
8. Offenend-Spinnvorrichtung (4) nach Anspruch 7, wobei die Steuereinheit dazu programmiert ist, über den Halterungsarm (56) wenigstens eines der Endstücke (76, 80) zu betreiben, um die Hülse (20') automatisch zu greifen und zu zentrieren.
9. Verfahren zum Laden einer neuen Hülse (20') in dem Doffing-Zyklus einer Offenend-Spinnvorrichtung (4) nach einem der vorhergehenden Ansprüche, umfassend die folgenden Schritte:
- Überwachen des Bildungsschritts einer Spule in Bildung um eine jeweilige Hülse (20),
  - Überprüfen des Vorhandenseins einer Mehrzahl von Hülsen (20) in dem Hülsenhaltekorb (24),
  - Vorbereiten für das Entladen einer durch das Paar von Endstücken (76, 80) gebildeten Spule,
  - Bewegen, unabhängig voneinander, der Hülsentrennvorrichtung (52), um die Mehrzahl von Hülsen (20) von einer aufzunehmenden, ausgewählten Hülse (20') zu trennen, und der Aufnahme- und Transportvorrichtung (32), um die ausgewählte Hülse (20') zu greifen und sie neben dem Paar von Endstücken (76, 80) zu positionieren.
10. Verfahren zum Laden einer neuen Hülse (20') in dem Doffing-Zyklus einer Offenend-Spinnvorrichtung (4) nach Anspruch 9, umfassend den Schritt eines Betätigens, über den Halterungsarm (56), wenigstens eines der Endstücke (76, 80), um die Hülse (20') automatisch zu greifen und zu zentrieren.

### Revendications

1. Appareil de filage de type à fibres libérées (4) comprenant au moins une tête de filage (8) ayant une unité de filage (12) et une unité de bobinoir (16), dans lequel l'unité de bobinoir (16) enroule sur un tube (20) une bobine de fil obtenue à partir de l'unité de filage (12) placée dessous,
- un panier porte-tubes (24) logeant une pluralité de tubes (20) sur lesquels enrouler le fil,
  - un plateau de levée (28) qui peut être positionné au niveau de l'unité de filage (12) et équipé de dispositifs de prise et de transport (32) d'un tube (20') du panier porte-tubes (24) à une paire de contre-poupées (76, 80) de l'unité de bobinoir (16),
  - le plateau de levée (28) comprend un dispositif séparateur de tubes (52) ayant un bras de support (56) qui supporte deux lames (60) qui sont mobiles de façon à intercepter un nombre de tubes (20) contenus dans le panier porte-tubes (24) et à les séparer au moins partiellement d'un tube (20') destiné à être saisi par le dispositif de prise et de transport (32) et placé entre les contre-poupées (76, 80),
- dans lequel le dispositif séparateur de tubes (52) et le dispositif de prise et de transport (32) sont mécaniquement indépendants l'un de l'autre, de sorte

- qu'ils peuvent être mis en fonctionnement séparément,  
 dans lequel lesdites lames (60) sont des lames (60) rétractables de façon à atteindre, dans une position extraite, le panier porte-tubes (24), à intercepter un groupe de tubes (20) et à les séparer d'un tube (20') destiné à être saisi par le dispositif de prise et de transport (32),  
 dans lequel le dispositif séparateur de tubes (52) est équipé de moyens de déplacement (88), qui permettent le passage d'une configuration rétractée à une configuration extraite selon un déplacement droit sensiblement rectiligne, et de moyens d'inclinaison (92) qui permettent l'inclinaison des lames (60) selon un axe d'inclinaison (X-X) sensiblement parallèle à un axe de disposition horizontal du tube (20') à prendre,  
 dans lequel lesdits moyens d'inclinaison (92) comprennent un sabot (104) solidaire desdites lames (60) et engagé dans une came (100) munie d'une rainure (108) qui identifie un trajet curviligne approprié pour permettre ledit déplacement en inclinaison des lames (60).
2. Appareil de filage de type à fibres libérées (4) selon la revendication 1, dans lequel lesdits moyens de déplacement (88) comprennent un piston (94) auquel un joint (96) est attaché avec une cheville, les lames de séparateur (60) et ladite came (100) attachées au plateau de levée (28) étant solidaires de ce joint (96).
3. Appareil de filage de type à fibres libérées (4) selon l'une quelconque des revendications précédentes, dans lequel le dispositif de prise et de transport (32) comprend une paire de pinces (40, 44) appropriées pour saisir un tube (20), équipées de moyens d'actionnement (48) mécaniquement indépendants des moyens de déplacement (88) du dispositif séparateur de tubes (52).
4. Appareil de filage de type à fibres libérées (4) selon l'une quelconque des revendications précédentes, dans lequel ladite unité de bobinoir (16) consiste en une paire de leviers (68, 72) qui supportent des contre-poupées (76, 80) gauche et droite appropriées pour supporter un tube (20), fixés par charnière l'un à l'autre et à un moyen élastique (84) interposé afin de raccorder mécaniquement les leviers (68, 72) l'un à l'autre, en permettant une ouverture et une fermeture simultanées par une action sur un seul desdits leviers (68, 72).
5. Appareil de filage de type à fibres libérées (4) selon la revendication 4, dans lequel le plateau de levée (28) est équipé de dispositifs actionneurs d'au moins l'un desdits leviers (68, 72) de façon à commander leur ouverture et leur fermeture.
6. Appareil de filage de type à fibres libérées (4) selon la revendication 4 ou 5, dans lequel les contre-poupées (76,80) sont montées flottantes sur les leviers (68, 72) de façon à réaliser automatiquement le centrage du tube (20) sur les contre-poupées (76, 80) pendant leur fermeture.
7. Appareil de filage de type à fibres libérées (4) selon l'une quelconque des revendications précédentes, comprenant une unité de commande programmée pour :
- surveiller l'étape de formation d'une bobine en formation autour d'un tube (20) relatif,
  - vérifier la présence d'une pluralité de tubes (20) dans le panier porte-tubes (24),
  - assurer le déchargement d'une bobine formée par une paire de contre-poupées (76, 80),
  - déplacer, indépendamment l'un de l'autre, le dispositif séparateur de tubes (52) de façon à séparer la pluralité de tubes (20) d'un tube (20') choisi pour être pris, et le dispositif de prise et de transport (32) de façon à saisir le tube (20') choisi et à le positionner à côté de ladite paire de contre-poupées (76, 80).
8. Appareil de filage de type à fibres libérées (4) selon la revendication 7, dans lequel l'unité de commande est programmée pour mettre en fonctionnement, via le bras de support (56), au moins l'une desdites contre-poupées (76, 80) pour saisir et centrer automatiquement le tube (20').
9. Procédé de chargement d'un nouveau tube (20') dans le cycle de levée d'un appareil de filage de type à fibres libérées (4) selon l'une quelconque des revendications précédentes, comprenant les étapes consistant à :
- surveiller l'étape de formation d'une bobine en formation autour d'un tube (20) relatif,
  - vérifier la présence d'une pluralité de tubes (20) dans le panier porte-tubes (24),
  - assurer le déchargement d'une bobine formée par la paire de contre-poupées (76, 80),
  - déplacer, indépendamment l'un de l'autre, le dispositif séparateur de tubes (52) de façon à séparer la pluralité de tubes (20) d'un tube (20') choisi pour être pris, et le dispositif de prise et de transport (32) de façon à saisir le tube (20') choisi et à le positionner à côté de ladite paire de contre-poupées (76, 80).
10. Procédé de chargement d'un nouveau tube (20') dans le cycle de levée d'un appareil de filage de type à fibres libérées (4) selon la revendication 9, comprenant l'étape consistant à actionner, via le bras de support (56), au moins l'une desdites contre-pou-

pées (76, 80) pour saisir et centrer automatiquement le tube (20').

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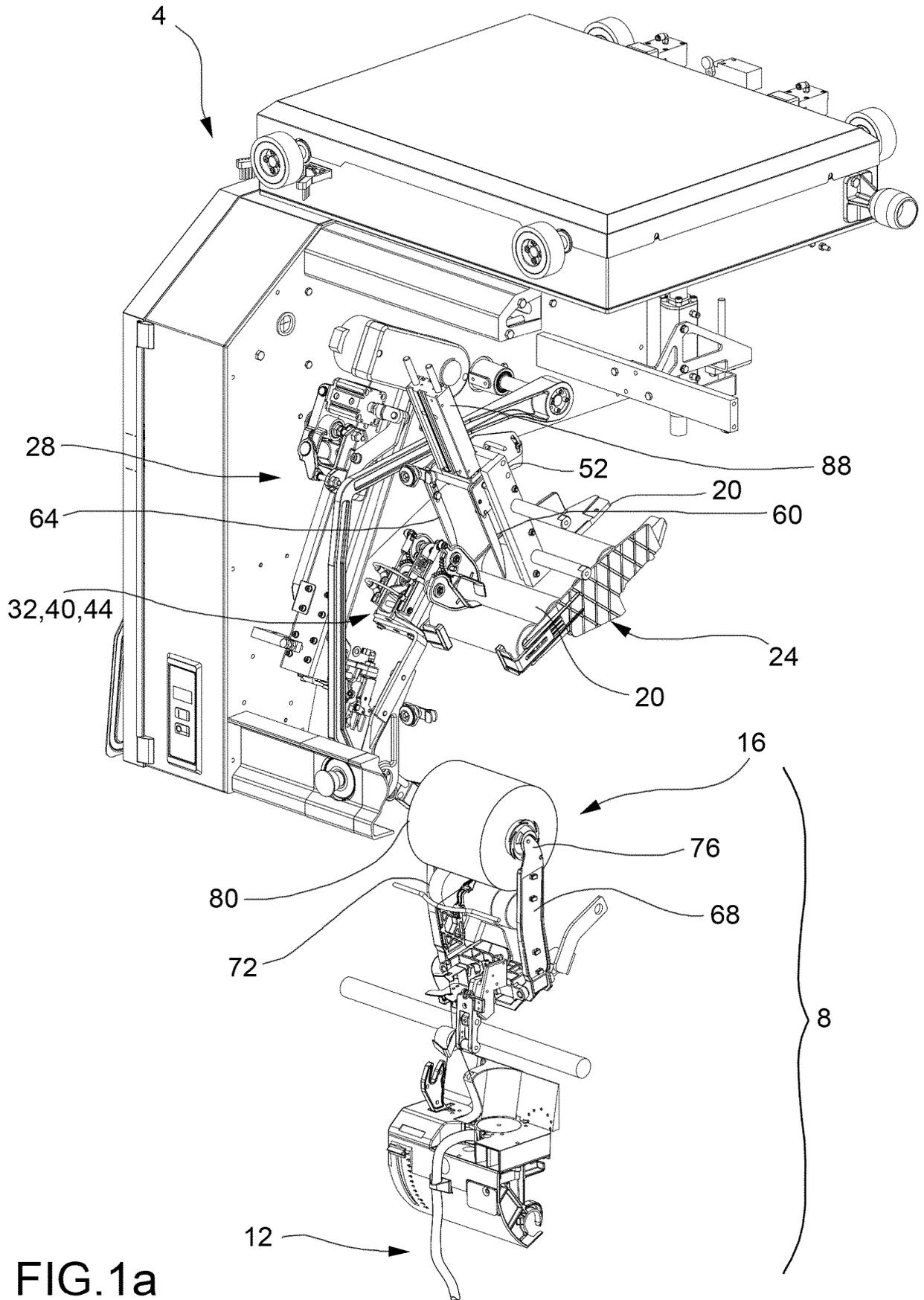


FIG.1a

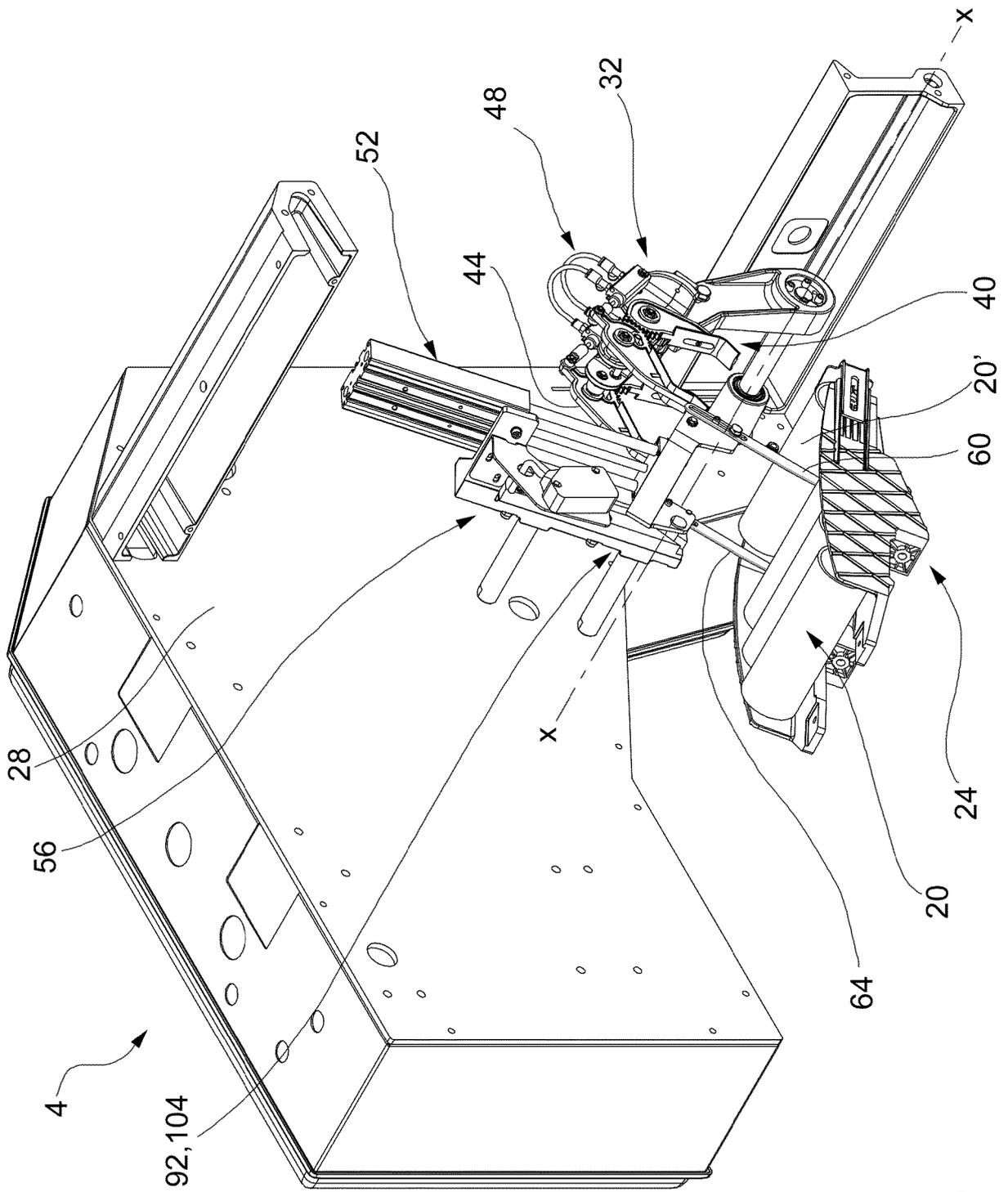


FIG.1b

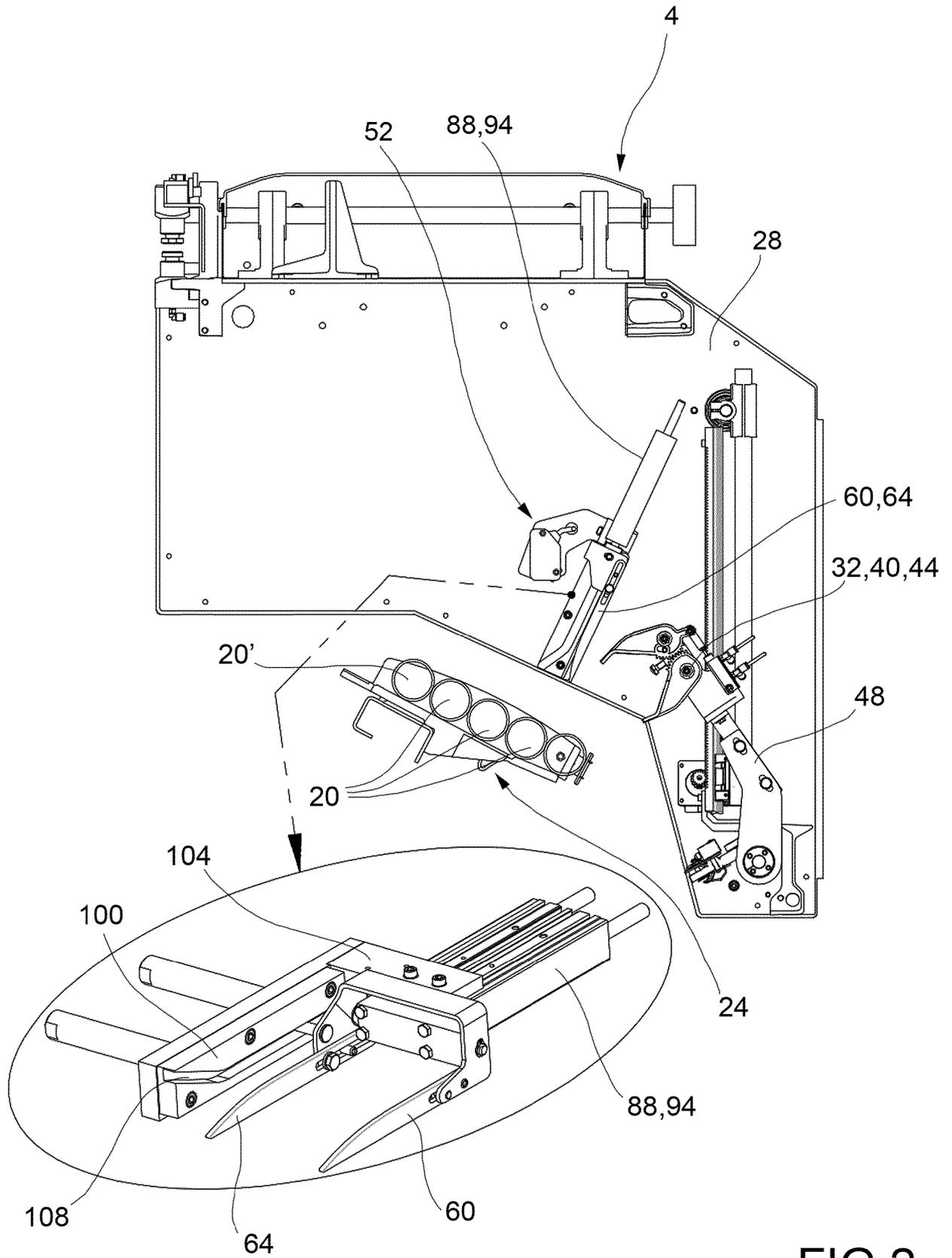


FIG.2

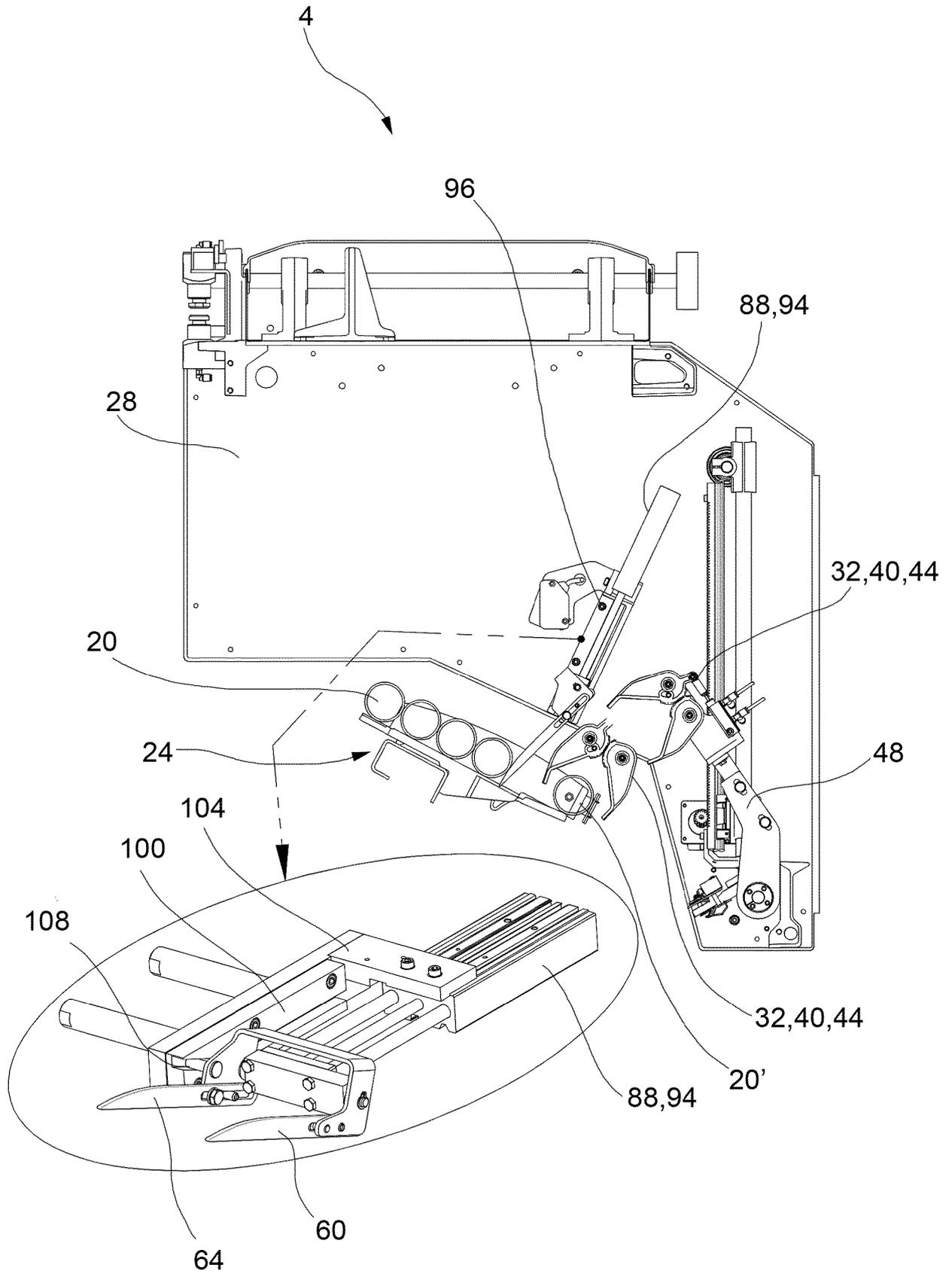


FIG.3

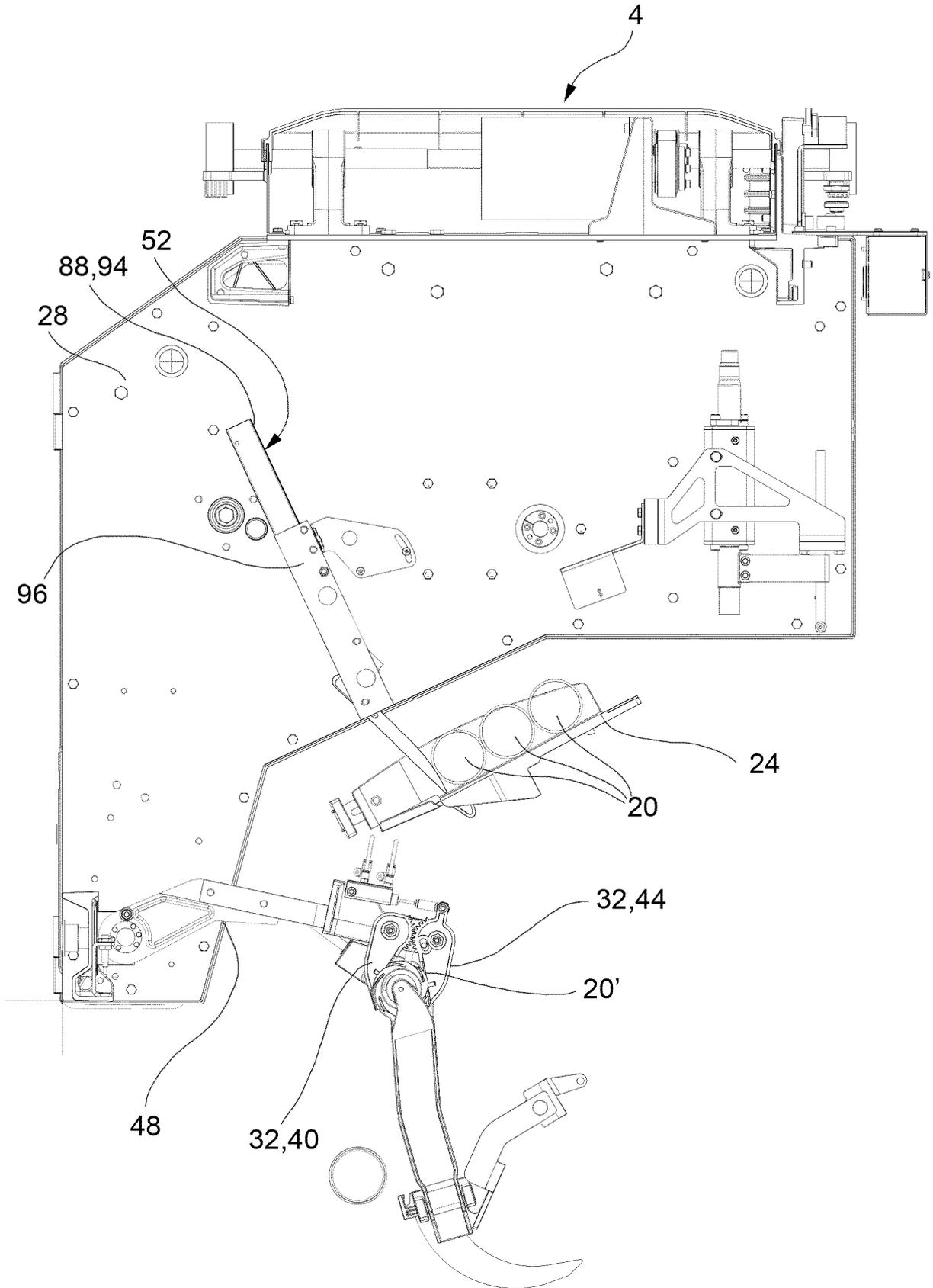


FIG.4

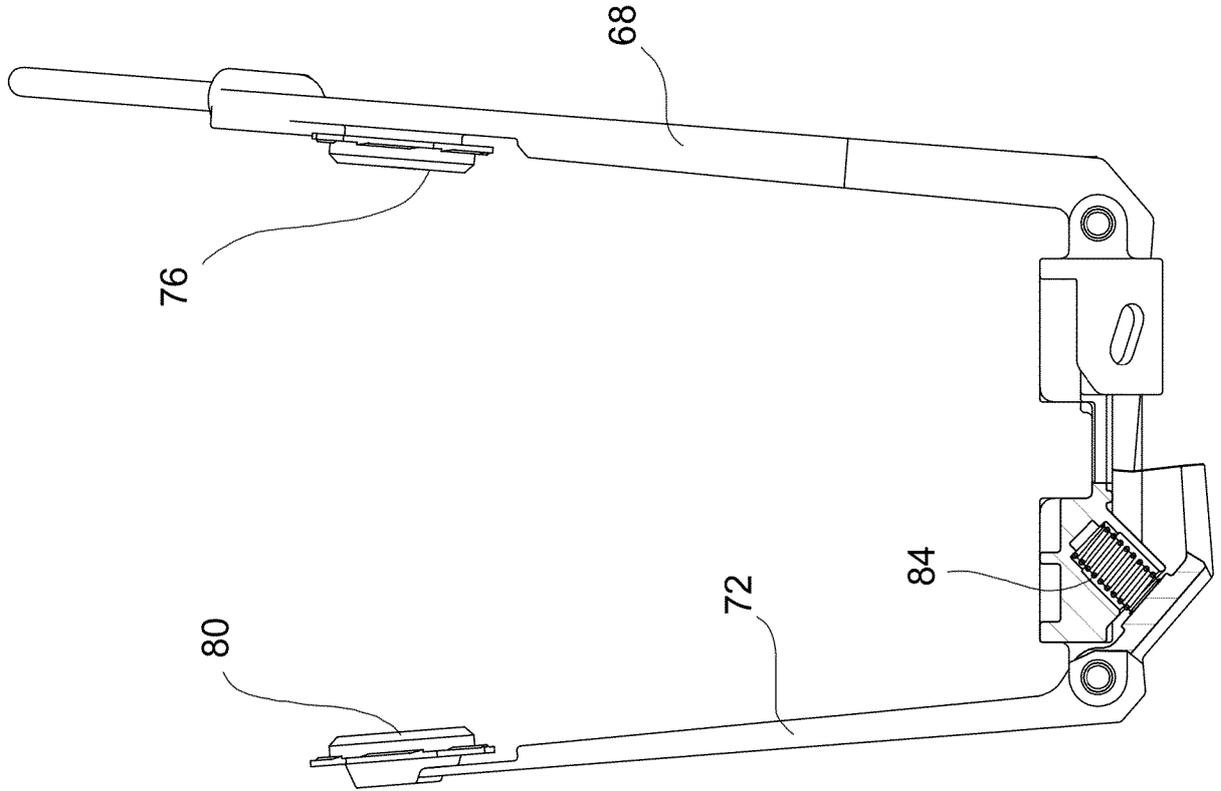
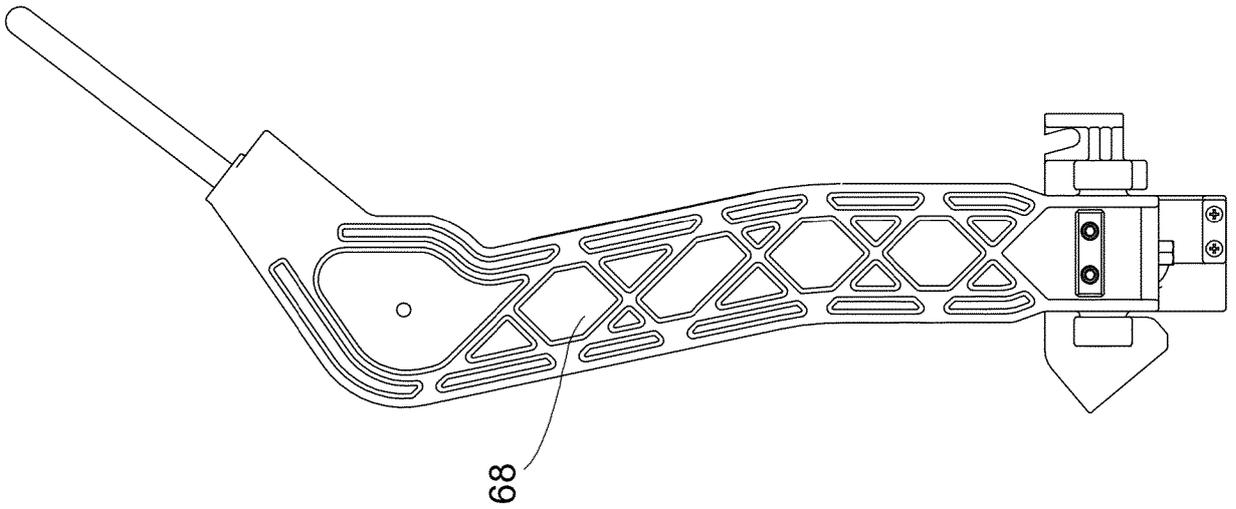


FIG.5



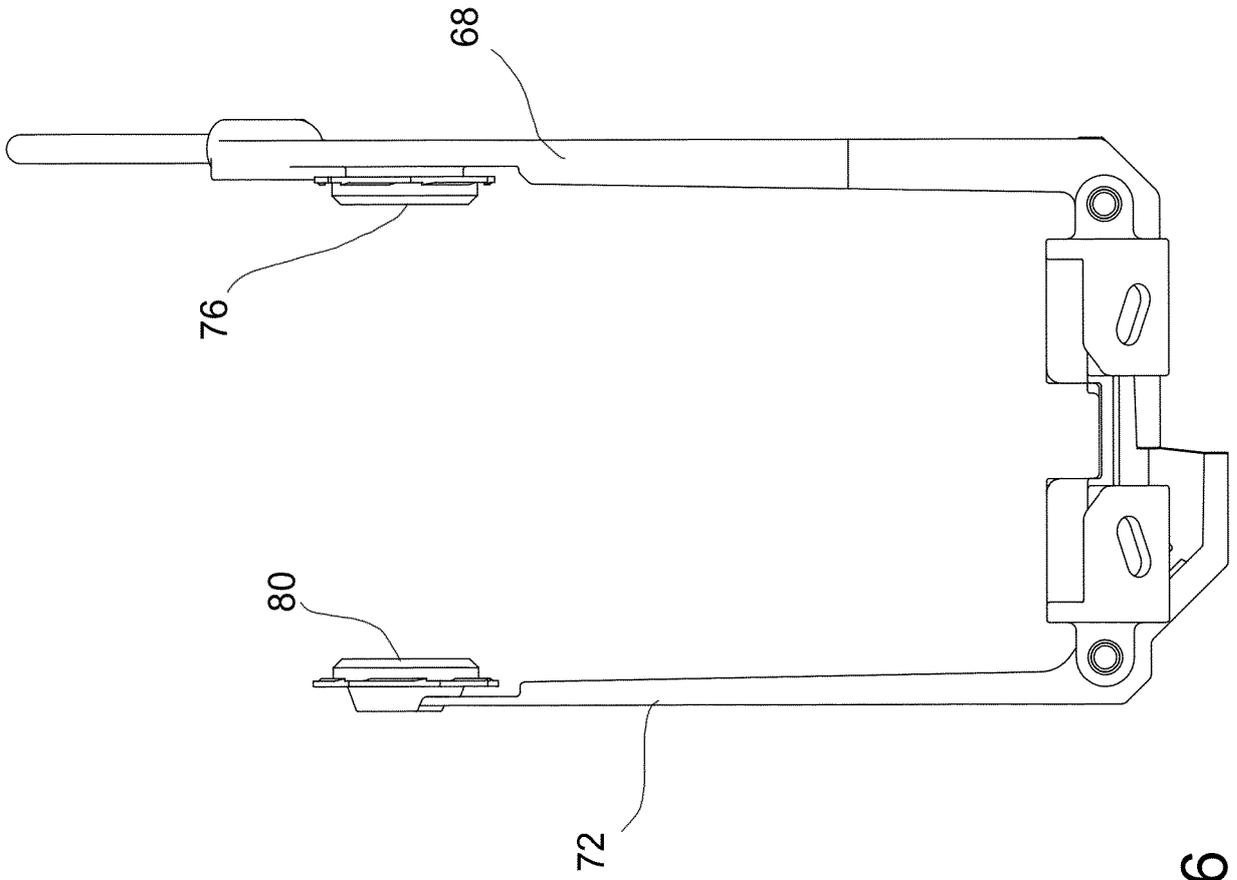
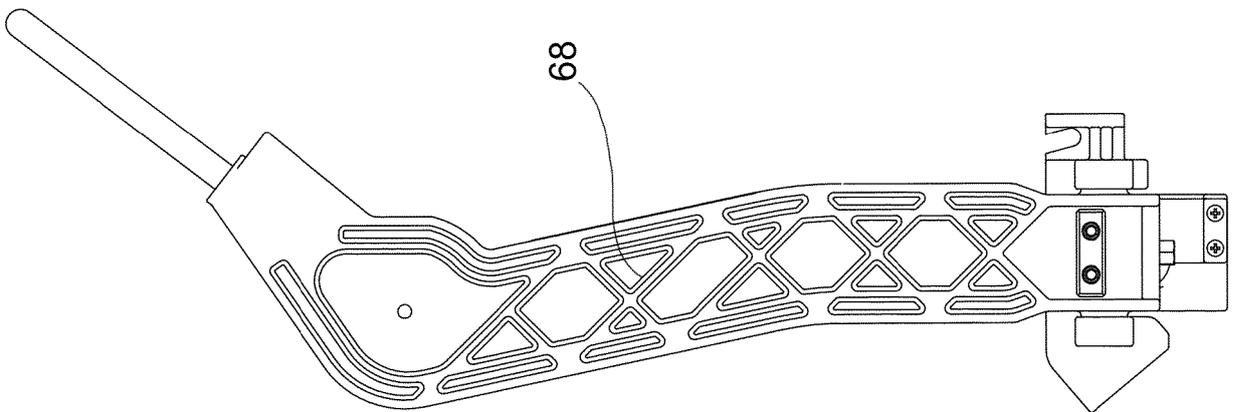


FIG.6



**REFERENCES CITED IN THE DESCRIPTION**

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