(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 336 028 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
20.06.2018 Bulletin 2018/25

(51) Int Cl.:
B65H 67/04 *(2006.01)* ***B65H 67/06*** *(2006.01)*

(21) Application number: **17206699.5**

(22) Date of filing: **12.12.2017**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD TN

(30) Priority: **19.12.2016 IT 201600127912**

(71) Applicant: **Savio Macchine Tessili S.p.A.**
33170 Pordenone (IT)

(72) Inventors:
- **KUESTERS, Gerard**
  I-33170 PORDENONE (IT)
- **COLUSSI, Vittorio**
  I-33170 PORDENONE (IT)
- **ANTONIEL, Maurizio**
  I-33170 PORDENONE (IT)

(74) Representative: **Mitola, Marco**
Jacobacci & Partners S.p.A.
Via Berchet 9
35131 Padova (IT)

(54) OPEN-END TYPE SPINNING APPARATUS AND METHOD FOR UNLOADING A PACKAGE FROM AN OPEN-END-TYPE SPINNING APPARATUS

(57) An open-end-type spinning apparatus (4) comprising a first series (28) of open-end spinning heads (8), each provided with a forming position (32) for the holding of a forming package (24)'), and an unloading position (36) of a formed package (24") having a predetermined length, the unloading position (36) separated from the forming position (32), a second series (40) of open-end spinning heads (8), each provided with a forming position (32) for the holding of a conical package (24'), and an unloading position (36) of said formed package (24"), separated from the forming position (32), a package unloading belt (44) interposed between the first and second series (28,40) of spinning heads (8), extending along a longitudinal direction (X-X), in position contiguous to the unloading positions (36) of the formed packages (24"). Advantageously open-end spinning heads (8) of the first and second series (28,40) are provided with an intermediate holding position (48), between each forming position (32) and each unloading position (36), and respective retention means (52) to selectively block, in said intermediate holding position (48), the formed package (24"), regulating the passage thereof to the subsequent unloading position (36).

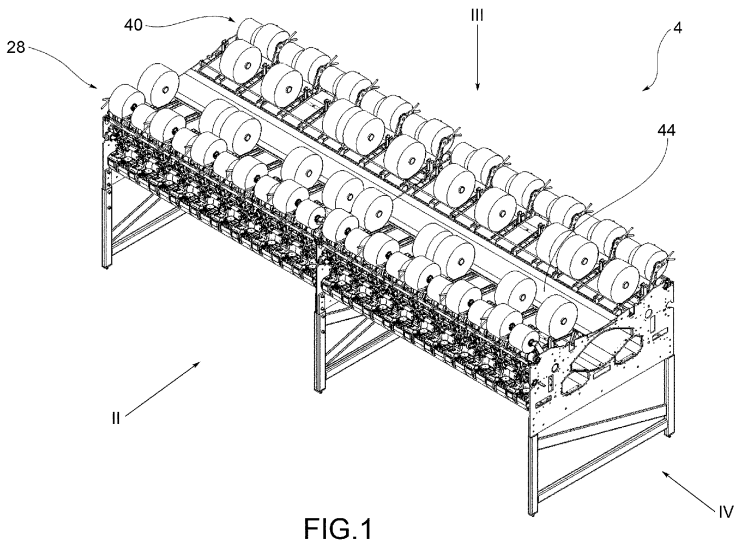

FIG.1

EP 3 336 028 A1

Description

SCOPE

[0001] The present invention relates to an open-end-type spinning apparatus and the method for unloading a package from an open-end-type spinning apparatus.

PRIOR ART

[0002] As is known, in automatic open-end-type spinning apparatuses, the current and universally adopted technique involves setting a predefined length (generally selectable by PC), possibly also differentiated in different sectors of the apparatus (faces or sections) and possibly also for the single head. Upon reaching the length or set diameter, the spinning process is interrupted by stopping the belt feed to the card, and hence the package is lifted so as not to be pulled in rotation by the cylinder, and an intervention request signal is sent to the spinner's patrol trolley. The trolley, positioned on the head that requires the intervention, opens the package holder arm, unloads the package onto a special package unloading belt, arranged adjacent to the head, and positions on the arm an empty tube on which the yarn produced by the spinner will be wrapped.

PRESENTATION OF THE INVENTION

[0003] The known solutions described above have disadvantages and limitations due essentially to the fact that the doffing cycle of the package is constrained to the package unloading step.

[0004] In effect, in known solutions, the doffing procedure may not start if the package unloading belt is full: this is because the package that should be doffed could hit another previously unloaded package that is already on the belt.

[0005] Doffing cannot be achieved even if the unloading belt is in motion: in effect, the newly doffed package arrives rolling in an orthogonal direction with respect to the direction in which the belt runs. This sudden change of direction could overturn the package, causing problems for the correct transport of the packages; moreover, the position that the package being unloaded should occupy could be occupied by a package in transit.

[0006] To overcome these limitations, for example, it is known to make redundant package unloading belts, employing two of them, one for each side of the apparatus, comprising a plurality of spooling heads. In this way, for example, yarn lots are differentiated on each side of the apparatus.

[0007] However, such solution is expensive and does not resolve the problem, since the problem of the constraint between the package doffing and the package unloading step persists on each side of the apparatus.

[0008] The need is therefore perceived to resolve the drawbacks and limitations cited with reference to the known art.

[0009] Such requirement is satisfied by an open-end-type spinning apparatus according to claim 1 and by a method for unloading a package from an open-end-type spinning apparatus according to claim 14.

DESCRIPTION OF THE DRAWINGS

[0010] 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:

figure 1 is a perspective view of an open-end-type spinning apparatus according to the present invention;
figure 2 is a perspective view of the detail II of figure 1;
figure 3 is a plan view of the apparatus of figure 1, from the side of the arrow III of figure 1;
figure 4 is a side view of the apparatus of figure 1, from the side of the arrow IV of figure 1;
- figure 5 shows the enlarged detail V of figure 4.

[0011] The elements or parts of elements in common between the embodiments described hereinafter will be indicated at the same numerical references.

DETAILED DESCRIPTION

[0012] 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.

[0013] In particular, the open-end-type spinning apparatus 4 comprises a plurality of open-end-type spinning heads 8 each comprising an open-end spinning unit 12 and a package winding unit 16, wherein each package winding unit 16 winds on a tube 20 a package 24 of yarn obtained from an underlying spinning unit 12. In other words, the spinning unit 12 produces yarn which is then wound by a corresponding winding unit 16 on a tube 20 to form a package 24 having a predetermined yarn length.

[0014] In particular, the open-end-type spinning apparatus 4 comprises a first series 28 of open-end spinning heads 8, each provided with a forming position 32 for holding a forming package 24', and an unloading position 36 of a formed package 24" , separated from the forming position 32.

[0015] The unloading position 36 is a position adjacent to the forming position 32 at which the formed package 24" is substantially removed or ejected from the spinning head 8, i.e. it leaves the spinning head 8.

[0016] "Forming package" 24' means a package which has not yet reached the predetermined length and which continues to wind yarn produced by the respective spinning unit 12. "Formed package" 24" means a package which has reached the predetermined length and which may therefore be unloaded from the respective spinning

head 8.

[0017] The passage or displacement of the package 24 from the forming position 32 to the unloading position for its replacement with a new empty tube 20 on which to wrap a new yarn is called doffing.

[0018] The open-end-type spinning apparatus 4 further comprises a second series 40 of open-end spinning heads 8, each provided with a forming position 32 for the holding of a forming package 24', and an unloading position 36 of said formed package 24" , separate from the forming position.

[0019] Between the first and second series 28, 40 of spinning heads 8, a package unloading belt 44 is provided extending along a longitudinal direction X-X, in a position adjacent to the unloading positions 36 of the formed packages 24".

[0020] Preferably, the first and second series 28,40 of spinning heads 8 are arranged in rows or faces parallel to each other, along the longitudinal direction X-X, and are spaced from each other by means of said package unloading belt 44.

[0021] For example, said package unloading belt 44 has a width L substantially less than a diameter D of said formed packages 24" and slides to the inside of a transit channel of the formed packages 24" , having a slightly greater width than the diameter D of said formed packages 24".

[0022] Advantageously, open-end spinning heads 8 of the first and second series 28,40 are provided with an intermediate holding position 48, between each forming position 32 and each unloading position 36, and respective retention means 52 to selectively block, in said intermediate holding position 48, the formed package 24" , regulating the passage thereof to the subsequent unloading position 36. In other words, the retention means 52, once activated, are able to block the formed package 24" in the intermediate holding position 48, and once deactivated allow the passage of the package 24" from the intermediate holding position 48 to the unloading position 36.

[0023] According to one possible embodiment, the retaining means 52 comprise a bar 56 configured to move from a retracted position, wherein it does not interfere with the formed package 24", to an extracted position, wherein it blocks the formed package 24" in said intermediate holding position 48.

[0024] For example (figure 5), the bar 56 is operatively connected to an actuating cam 60. In general, it is possible to adopt several different retention means 52, all suitable to block the rotation of the formed package 24" between the intermediate holding position 48 and the unloading position 36.

[0025] For example, said retention means 52 may comprise rocker or lever systems.

[0026] According to a possible embodiment, a single bar 56 is operatively associated with each series 28,40 of spinning heads for the simultaneous retention of the formed packages 24" in the respective intermediate holding positions 48.

[0027] According to a further embodiment, the open-end-type spinning apparatus 4 comprises a plurality of retention means 52, associated with one or more spinning heads 8, operable independently of each other, within the same series 28,40 of spinning heads 8 or on different series 28,40 of spinning heads 8.

[0028] The route which the packages 24 must complete from the forming position 32 to the unloading position 36, passing through the intermediate holding position 48, is preferably facilitated by the provision of chutes 64 in correspondence with said series 28,40. In particular, the chutes 64 connect said forming positions 32, the intermediate holding position 48 and the unloading position 36 are arranged along a transverse direction T-T, preferably perpendicular to said longitudinal direction X-X.

[0029] Preferably, said chutes 64 are inclined downwardly, passing from the forming positions 32 towards the package unloading belt 44, so as to facilitate the unloading of the packages 24 and to connect with the latter.

[0030] Such inclination of the chutes 64 must be appropriately established so as not to cause the packages to move too fast or too slow, thus avoiding the risk that some packages, by rubbing on the edges of the chute 64, may stop along the inclined plane.

[0031] Preferably, the open-end-type spinning apparatus comprises at least one control unit programmed to oversee the operation of the entire apparatus, coordinating the operation of the various spinning heads 8.

[0032] In particular, said control unit is programmed to:

- monitor the forming step of the package 24' around a relative tube 20, in said forming position 32,
- activate the actuator means for pushing the formed package to roll on the unloading chute 64 as far as the intermediate holding position 48, after completing formation of the package 24" ,
- activate in advance or simultaneously the retention means 52 to block the formed package in said intermediate holding position 48, preventing it from reaching the package unloading belt 44,
- load a new, empty tube 20 in the forming position 32 to start forming a new package 24'.

[0033] According to one embodiment, the control unit is programmed to simultaneously block several formed packages 24" of a same series 28,40 of open-end spinning heads 8, by means of the holding means 52.

[0034] Moreover, the control unit is programmed so as to reach a predetermined number of formed packages 24" on a same series 28,40; the formed packages 24" are released from the respective intermediate holding positions 48, allowing them to simultaneously roll as far as the package unloading belt 44 positioned centrally with respect to the apparatus 4. In this way, it is possible to unload all the formed packages 24" (in a predetermined number) of a specific series 28,40 in unison: in other words, one side or series 28,40 of the apparatus 4

is unloaded at a time.

[0035] In this way there is no risk of collision between the formed packages 24" since the formed packages 24" in a same series 28,40 are already offset in position from each other along the longitudinal direction X-X and therefore may freely reach the package unloading belt 44.

[0036] According to one embodiment, the control unit is programmed so that once all the formed packages 24" of a series 28,40 are positioned on the package unloading belt 44, the same starts moving and brings all the formed packages 24" , or only a predetermined number of them, towards one end of the apparatus 4 from where the formed packages are unloaded.

[0037] Preferably, the control unit is programmed in such a way that, by releasing the intermediate holding positions 48, the retention means 52 are placed in an active position so as to block a new package 24" in the intermediate holding position 48.

[0038] Preferably, the control unit is programmed so that, when the package unloading belt 44 is moving, the retention means 52 remain in the activation position and their deactivation is inhibited to prevent the formed packages 24" from going past the intermediate holding position 48 and being sent to the package unloading belt 44.

[0039] In effect, if the formed packages 24" are to roll on the package unloading belt 44 while the same is moving, poor positioning of the same packages may occur, which would eventually pile up and become jammed.

[0040] The control unit is programmed so that the forming packages, 24', which during the unloading step of the formed packages 24" from the intermediate holding position should reach a given length, are made to remain in the forming position for a given number of meters of yarn, to then be stopped and unloaded into the intermediate holding position against the retention means 52, which in the meantime will be reactivated.

[0041] Moreover, the control unit is programmed in such a way that the package unloading belt 44, arranged centrally with respect to the apparatus 4, makes at least one complete half turn before beginning the package unloading step. In this way, the control unit ensures that all the formed packages 24" have been unloaded and ensures that it is in an empty belt condition.

[0042] The operation of an open-end-type spinning apparatus according to the present invention will now be described.

[0043] In particular, the apparatus according to the present invention allows a method to be obtained for unloading a package comprising the steps of:

- monitoring the step of forming a package 24' around a relative tube 20, in the forming position 32,
- activating the actuator means for pushing the formed package 24" to roll on the unloading chute 64 as far as the intermediate holding position 48, after completing the formation of the package 24" ,
- activating in advance or simultaneously the retention means 52 to block the formed package 24" in said intermediate holding position 48, preventing it from reaching the package unloading belt 44,
- loading a new, empty tube 20 in the forming position 32 of a new package to start making a new forming package 24'.

[0044] Preferably, the step is provided to simultaneously block several formed packages 24" of a same series 28,40 of open-end spinning heads 8 using the retention means 52.

[0045] It is to be noted that the single spinning head 8 knows when a package 24" produced therefrom has been unloaded and also when the formation of a new forming package 24' has started again: in effect, it is from that moment that the counting of the length begins. Therefore, the control unit, which manages all the spinning units 12, knows how many packages 24" have been deposited in the intermediate holding position 48.

[0046] Upon reaching a predetermined number of formed packages 24" on the same series 28,40, the formed packages 24" are released from the respective intermediate holding positions 48, allowing them to simultaneously roll as far as the package unloading belt 44 positioned centrally with respect to the apparatus 4.

[0047] Obviously, the predetermined number of formed packages 24" arranged in the intermediate holding position 48 on a given series 28,40 will be less than or equal to the total number of spinning heads 8 of the same series.

[0048] Once all the formed packages 24" of a series 28, 40 are positioned on the package unloading belt 44, the same starts moving and brings all the formed packages, or only a part of them, towards one end of the apparatus from which the packages 24" are unloaded from the apparatus 4.

[0049] Once the intermediate holding positions 48 are free, the retention means 52 is placed in the active position so as to block a new formed package 24" in the intermediate holding position 48.

[0050] When the bar 56 is in place, approval is given for the movement of the package unloading belt 44, which begins to move until the first formed package 24" is intercepted by a corresponding photocell placed immediately before the end of the package unloading belt, and stops the movement thereof.

[0051] The formed package 24" is removed from the package unloading belt 44 and then from the action radius of the photocell, and the package unloading belt 44 advances again until the next formed package 24" is intercepted by the photocell which stops the package unloading belt 44.

[0052] This operation is repeated until all the formed packages 24" on the package unloading belt 44 are unloaded.

[0053] When the package unloading belt 44 is moving, the retention means 52 remain in the activation position and their deactivation is inhibited to prevent the formed packages 24" from going past the intermediate holding

position 48 and being sent to the same package unloading belt 44.

[0054] Any forming packages 24', which during the unloading step of the packages from the intermediate holding position 48 reach the required length, are made to continue in the forming position for a given number of meters of yarn, to then be stopped and unloaded in the intermediate holding position 48 against the retention means 52, which in the meantime will be reactivated.

[0055] Once a translation has been completed, the package unloading belt 44, equipped with a system for recognizing the position thereof (for example a slot on the belt and its relative photocell), enables the possibility of starting a cycle by lowering the package stop bar 56 on one of the two series 28,40.

[0056] It should be noted that the new unloading cycle may be activated on each of the two series 28,40, i.e. the two faces of the apparatus 4: alternating therefore is not necessary, since the apparatus with faces or series 28,40 is independent, and thus able to work different counts with very different package formation times, the number of predefined packages for the start of the cycle may also occur several times in succession on the same face or series 28,40.

[0057] As may be appreciated from the foregoing, the open-end-type spinning apparatus and the method for unloading a package from an open-end-type spinning apparatus according to the invention allow the drawbacks presented in the prior art to be overcome.

[0058] Advantageously, due to the present invention, it is possible to disengage the doffing cycle with respect to the subsequent package unloading.

[0059] Normally, the doffing procedure may not start if the package unloading belt is full: this is because the package that should be doffed could hit another previously unloaded package that is already on the belt.

[0060] The doffing cannot be completed even if the unloading belt is in movement: as soon as the package is doffed, it rolls in an orthogonal direction with respect to the direction wherein the belt runs, this sudden change of direction could overturn the package causing problems for the correct transport of the packages. Moreover, as seen, the position that the unloaded package should occupy could be occupied by a package in transit.

[0061] Another advantage of the present invention is provided in the fact that a single package unloading belt may be used, while keeping separate the different lots of yarn produced on each side of the spinning apparatus.

[0062] Therefore, due to the present invention, in the management of the unloading sequence carried out by the control unit, the package unloading belt will not risk being loaded with side-by-side packages and may be emptied without problems.

[0063] Furthermore, the risk of carrying different types of packages to the end of the belt to the unloading position, with the possibility of mixing different yarns and creating serious damage to the subsequent steps of use of the yarns, is avoided.

[0064] The apparatus of the present invention is also economical to produce and to manage.

[0065] It is also extremely versatile since it does not require the alternation of unloading of the packages from the different series or faces of the apparatus: it is possible to repeatedly unload the packages coming from the same series, for example because the two series work yarns with significantly different counts, which require very different spinning times.

[0066] A person skilled in the art, in the object of satisfying contingent and specific requirements, may make numerous modifications and variations to the open-end-type spinning apparatus and to the methods of unloading a package from an open-end-type spinning apparatus described above, 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

   - a first series (28) of open-end spinning heads (8), each provided with a forming position (32) for the holding of a forming package (24'), and an unloading position (36) of a formed package (24") having a predetermined length, the unloading position (36) being separate from the forming position (32),
   - a second series (40) of open-end spinning heads (8), each provided with a forming position (32) for the holding of a forming package (24'), and an unloading position (36) of said formed package (24") separate from the forming position (32),
   - a package unloading belt (44) positioned between the first and second series (28,40) of spinning heads (8), extending in a longitudinal direction (X-X), in a position adjacent to the unloading positions (36) of the formed packages (24")
   - wherein the open-end spinning heads (8) of the first and second series (28,40) are provided with an intermediate holding position (48), between each forming position (32) and each unloading position (36), and respective retention means (52) to selectively block, in said intermediate holding position (48), the formed package (24"), regulating the passage thereof to the subsequent unloading position (36).

2. Open-end-type spinning apparatus (4) according to claim 1, wherein the series (28,40) of spinning heads (8) are on rows or faces parallel to each other in the longitudinal direction (X-X), and are spaced by said package unloading belt (44).

3. Open-end-type spinning apparatus (4) according to claim 1 or 2, wherein the package unloading belt (44)

has a width (L) substantially less than a diameter (D) of said formed packages (24") and slides inside a transit channel of the formed packages (24"), having a slightly greater width than the diameter (D) of said formed packages (24").

4. Open-end-type spinning apparatus (4) according to any of the preceding claims, wherein said retention means (52) comprise a bar (56) configured to switch from a retracted position, wherein it does not interfere with the formed package (24"), to an extracted position in which it blocks the formed package (24") in said intermediate holding position (48).

5. Open-end-type spinning apparatus (4) according to claim 4, wherein the bar (56) is operatively connected to an actuating cam (60).

6. Open-end-type spinning apparatus (4) according to any of the preceding claims, wherein said retention means (52) comprise rocker arm or lever systems.

7. Open-end-type spinning apparatus (4) according to the claims 4, 5 or 6, wherein each series (28,40) of spinning heads (8) is operatively associated to a single bar (56) for the simultaneous retention of the formed packages (24") in their respective intermediate holding positions (48).

8. Open-end-type spinning apparatus (4) according to any of the claims from 1 to 6, wherein the apparatus comprises a plurality of retention means (52), associated with one or more spinning heads (8), operable independently of each other, within the same series (28,40) of spinning heads (8) or on different series (28,40) of spinning heads (8).

9. Open-end-type spinning apparatus (4) according to any of the preceding claims, wherein the series (28,40) of spinning heads (8) comprise respective chutes (64) which connect said forming positions (32), intermediate holding positions (48) and unloading positions (36), said chutes (64) being arranged in a transverse direction (T-T), perpendicular to said longitudinal direction (X-X), wherein said chutes (64) are tilted downwards, passing from the forming positions (32) towards the package unloading belt (44), so as to facilitate the unloading of the formed packages (24") and connect with the latter.

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

- monitor the forming step of the forming package (24') around a relative tube (20), in said forming position (32),
- activate actuator means for pushing the formed package (24") to roll on the unloading chute (64) as far as the intermediate holding position (48), after completing formation of the package,
- activate in advance or simultaneously the retention means (52) to block the formed package (24") in said intermediate holding position (48), preventing it from reaching the package unloading belt (44),
- load a new, empty tube (20) in the forming position (32) to start making a new forming package (24'). wherein
- upon reaching a predetermined number of formed packages (24") on the same series (28,40), the formed packages (24") are released from the respective intermediate holding positions (48), allowing them to simultaneously roll as far as the package unloading belt (44) positioned centrally with respect to the apparatus (4).

11. Open-end-type spinning apparatus (4) according to any of the preceding claims, comprising a control unit programmed so that when the package unloading belt (44) is moving, the retention means (52) remain in the activation position and their deactivation is inhibited to prevent the formed packages (24") from going past the intermediate holding position (48) and being sent to the package unloading belt (44).

12. Open-end-type spinning apparatus (4) according to any of the preceding claims, comprising a control unit programmed so that the forming packages (24') which during the unloading step of the formed packages (24") from the intermediate holding position (48) should reach a given length, are made to continue in the forming position for a given number of meters of yarn, to then be stopped and unloaded into the intermediate holding position (48) against the previously reactivated retention means (52).

13. Open-end-type spinning apparatus (4) according to any of the preceding claims, comprising a control unit programmed so that the package unloading belt (44), placed centrally with respect to the apparatus (4), is made to make at least one complete half turn from the start of the package unloading step.

14. Method of unloading a package from an open-end-type spinning apparatus (4) according to any of the preceding claims, comprising the steps of:

- monitoring the forming step of the package in formation (24') around a relative tube (20), in the forming position (32),
- activating the actuator means for pushing the formed package (24") to roll on the unloading chute (64) as far as the intermediate holding position (48), after completing formation of the

package (24),
- activating in advance or simultaneously the retention means (52) to block the formed package (24") in said intermediate holding position (48), preventing it from reaching the package unloading belt (44),
- loading a new, empty tube (20) in the forming position (32) to start a new forming package (24').

15. Method of unloading a package from an open-end-type spinning apparatus (4) according to claim 14, comprising the step of simultaneously blocking several formed packages (24") of a same series (28,40) of open-end spinning heads (8), using the retention means (52).

16. Method of unloading a package from an open-end-type spinning apparatus (4) according to claim 14 or 15, wherein upon reaching a predetermined number of formed packages (24") on the same series (28,40), the formed packages (24") are released from the respective intermediate holding positions (48), allowing them to simultaneously roll as far as the package unloading belt (44) positioned centrally with respect to the apparatus (4).

17. Method of unloading a package from an open-end-type spinning apparatus (4) according to any of the claims from 14 to 16 wherein, once all the formed packages (24") of a series (28,40) are positioned on the package unloading belt (44), this starts moving and brings all the formed packages (24"), or only part of them towards one end of the apparatus (4) from where the formed packages are unloaded (24") from the apparatus (4).

18. Method of unloading a package from an open-end-type spinning apparatus (4) according to any of the claims from 14 to 17, wherein once the intermediate holding stations (48) have been emptied, the retention means (52) move into the active position so as to block in the intermediate holding position (48) a new formed package (24").

19. Method of unloading a package from an open-end-type spinning apparatus (4) according to any of the claims from 14 to 18, wherein when the package unloading belt (44) is moving, the retention means (52) remain in the activation position and deactivation is inhibited to prevent the formed packages (24") from going past the intermediate holding position (48) and being sent to the package unloading belt (44).

20. Method of unloading a package from an open-end-type spinning apparatus (4) according to any of the claims from 14 to 19, wherein the forming packages (24') which during the unloading step of the formed packages (24") from the intermediate holding position (48) should reach a given length, are made to continue in the forming position (32) for a given number of meters of yarn, to then be stopped and unloaded into the intermediate holding position (48) against the previously reactivated retention means (52).

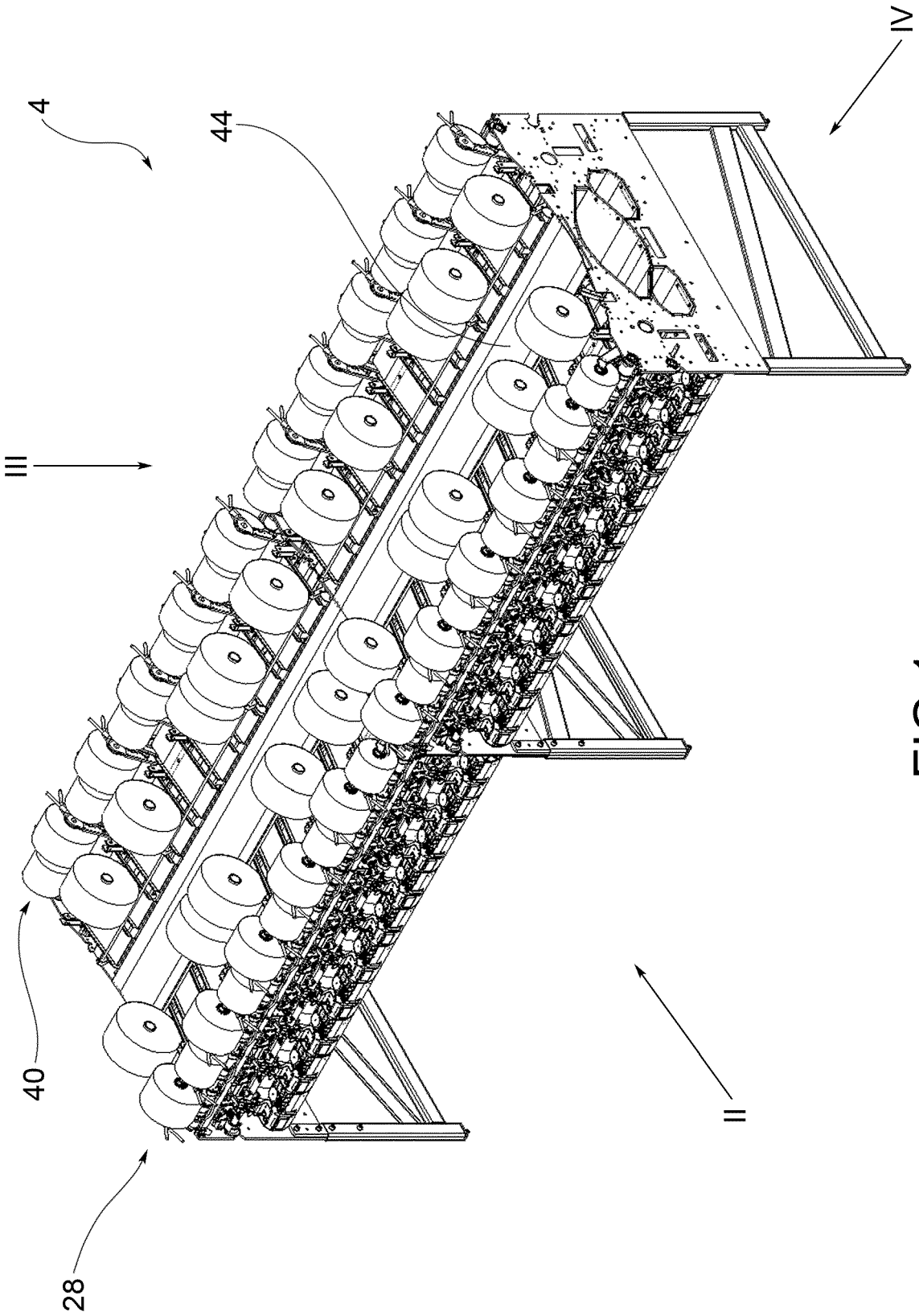

FIG.1

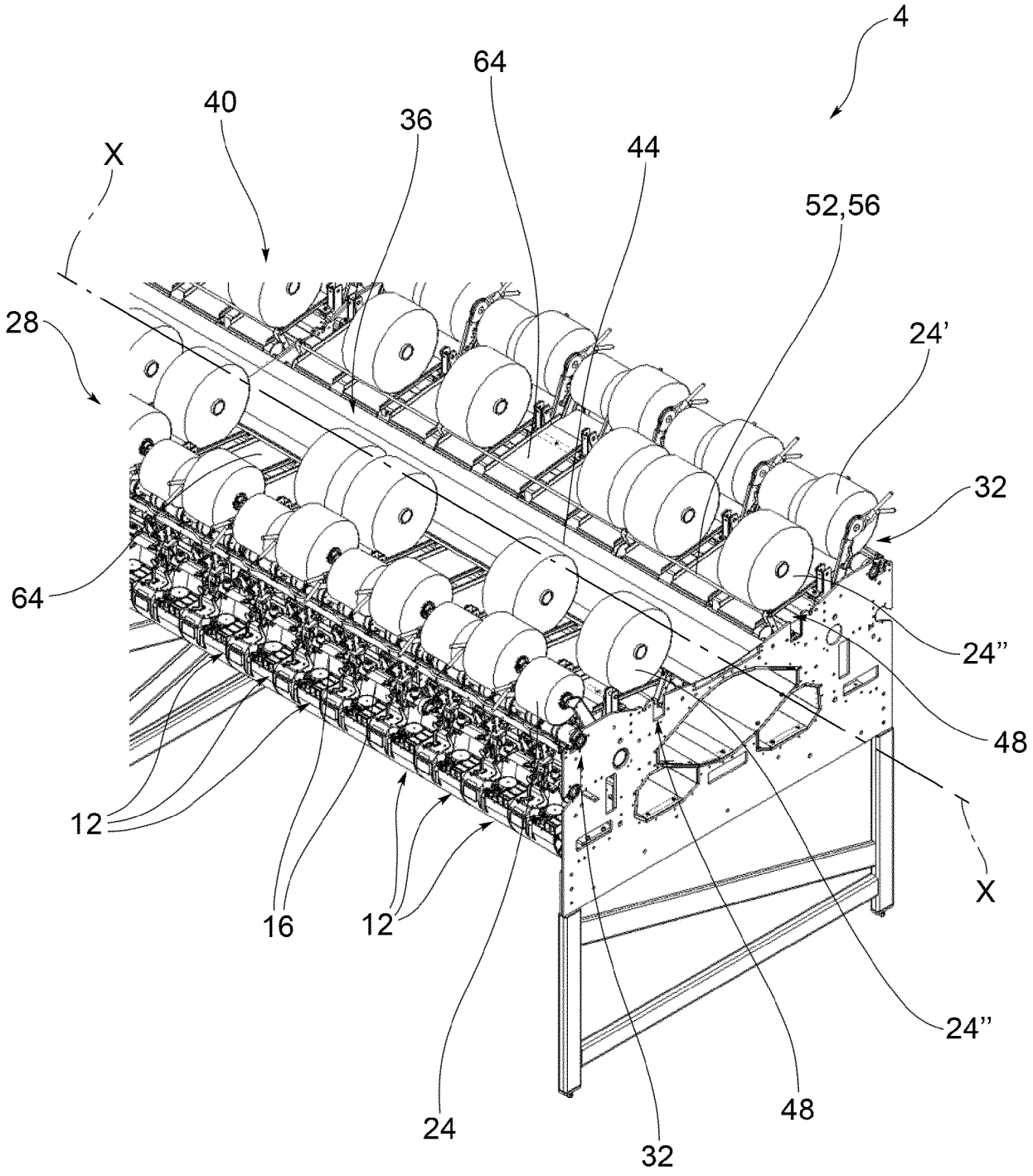

FIG.2

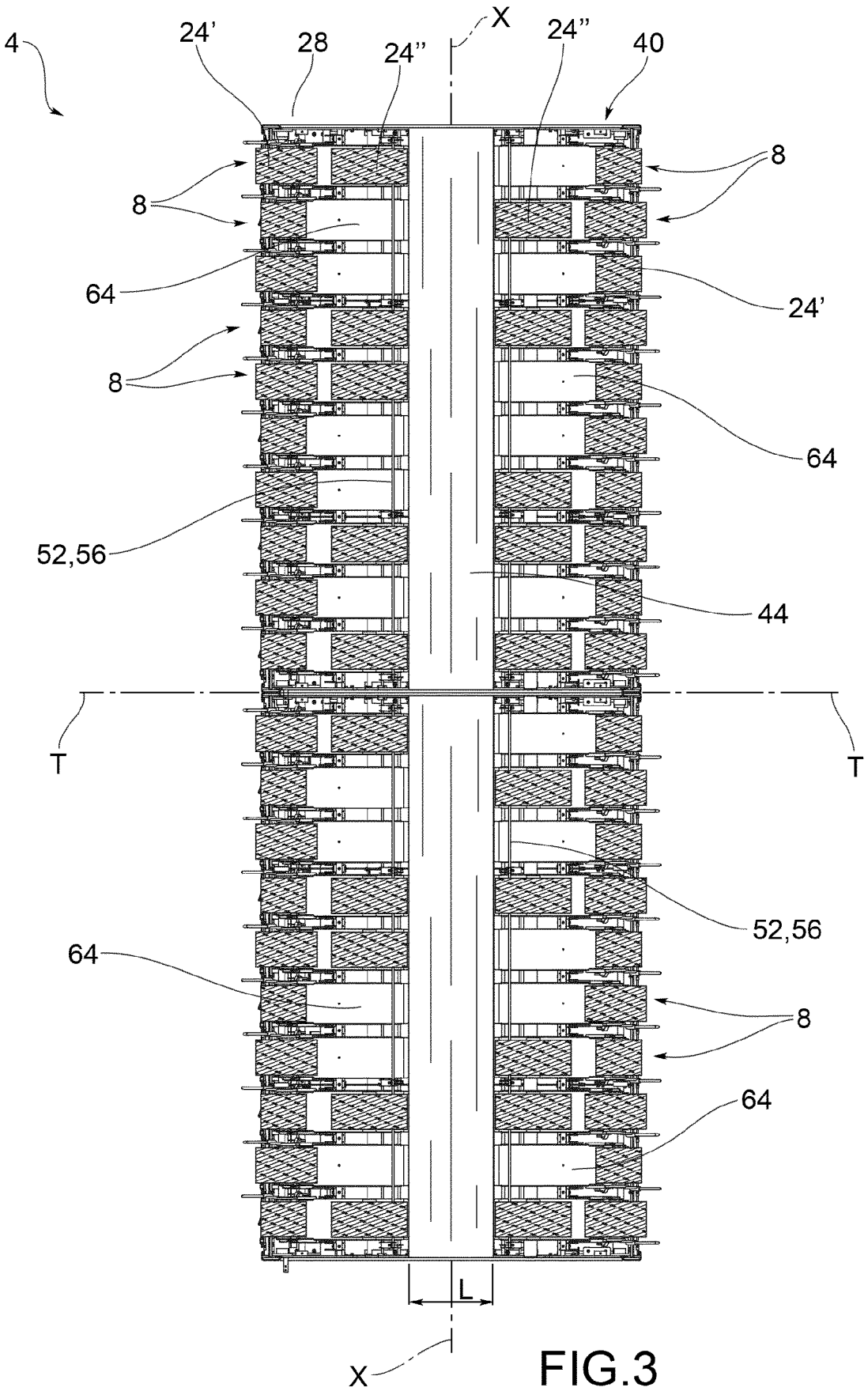

FIG.3

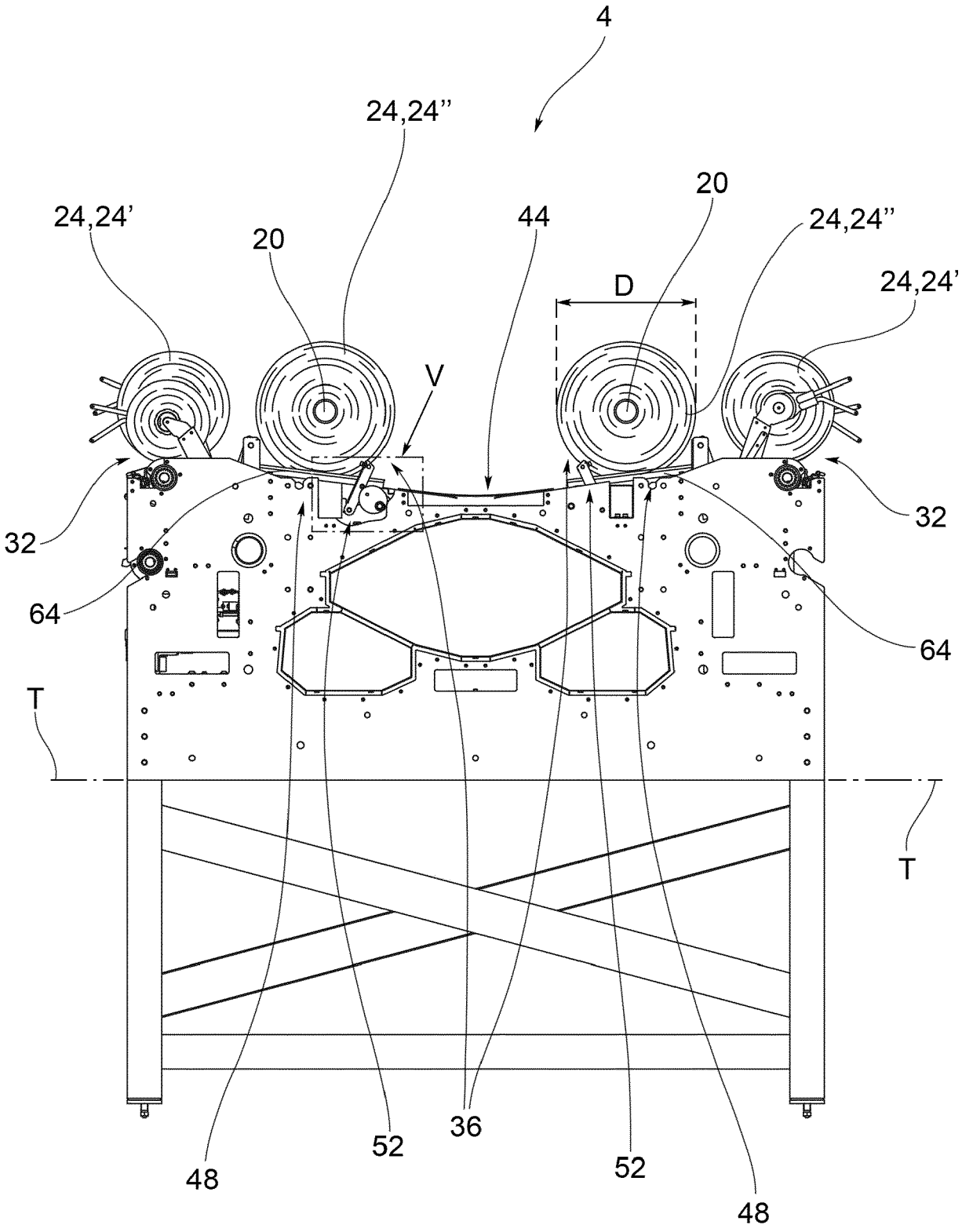

FIG.4

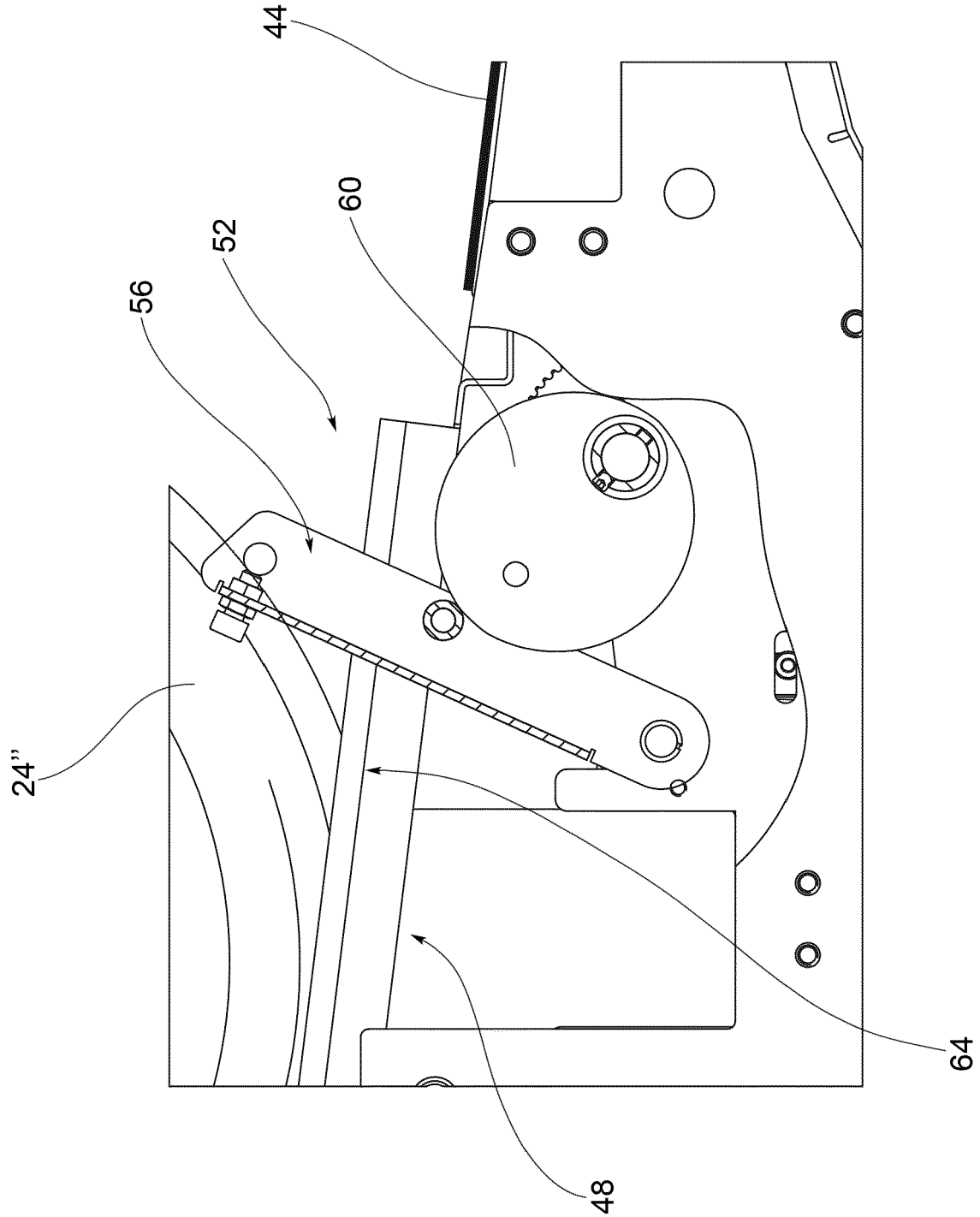

FIG.5

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 17 20 6699

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 10 2014 107508 A1 (RIETER INGOLSTADT GMBH [DE]) 3 December 2015 (2015-12-03) * paragraphs [0007], [0009] - [0016], [0027] - [0029]; figure 1 *	1-20	INV. B65H67/04 B65H67/06
X	DE 40 37 094 A1 (ELITEX SP [CS]) 4 July 1991 (1991-07-04) * column 2, line 36 - column 3, line 63; figures 1,5,6 * * column 4, line 60 - column 6, line 22 *	1-6, 8-11, 14-19	
X	JP H08 143229 A (TOYODA AUTOMATIC LOOM WORKS) 4 June 1996 (1996-06-04) * abstract; figures 1,4-7 *	1-11, 14-20	
A	GB 1 044 677 A (REINERS WALTER) 5 October 1966 (1966-10-05) * figures 1,3,4 *	1-20	
A	EP 0 285 186 A1 (SAVIO SPA [IT]) 5 October 1988 (1988-10-05) * figures 1, 5A, 5B *	1-20	TECHNICAL FIELDS SEARCHED (IPC) B65H
A	US 4 541 578 A (KAWARABASHI TSUKASA [JP] ET AL) 17 September 1985 (1985-09-17) * figures 1,2 *	1-20	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	18 April 2018	Pussemier, Bart

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 17 20 6699

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

18-04-2018

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 102014107508 A1	03-12-2015	NONE	
DE 4037094 A1	04-07-1991	CS 8907479 A2	12-03-1991
		DE 4037094 A1	04-07-1991
JP H08143229 A	04-06-1996	NONE	
GB 1044677 A	05-10-1966	BE 632393 A	18-04-2018
		CH 401782 A	31-10-1965
		DE 1280109 B	10-10-1968
		GB 1044677 A	05-10-1966
EP 0285186 A1	05-10-1988	DE 3866748 D1	23-01-1992
		EP 0285186 A1	05-10-1988
		ES 2028982 T3	16-07-1992
		IT 1202589 B	09-02-1989
		US 5083716 A	28-01-1992
US 4541578 A	17-09-1985	CH 661715 A5	14-08-1987
		DE 3329066 A1	16-02-1984
		FR 2531687 A1	17-02-1984
		IT 1197694 B	06-12-1988
		US 4541578 A	17-09-1985

EPO FORM P0459

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