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(54) REEL SIDE YARN SUCTION NOZZLE AND WINDING MACHINE PROVIDED WITH SAID REEL SIDE YARN SUCTION NOZZLE

SPULENSEITIGE FADENSAUGDÜSE UND SPULMASCHINE, DIE MIT DIESER SPULENSEITIGEN FADENSAUGDÜSE VERSEHEN IST

BUSE D'ASPIRATION DE FIL CÔTÉ BOBINE ET MACHINE DE BOBINAGE DOTÉE DE LADITE BUSE D'ASPIRATION DE FIL CÔTÉ BOBINE

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Description

FIELD OF APPLICATION

[0001] The present invention relates to a reel side yarn suction nozzle and to a winding machine provided with said reel side yarn suction nozzle.

STATE OF THE ART

[0002] It should be noted that the term thread or single thread or continuous thread refers to a single filament or continuous filament (for example in the case of silk, artificial or synthetic fibres), while the term yarn refers to a group of fibrils of varying lengths that are paralleled and joined together by twisting. Hereinafter, one or the other term will be used indifferently, it being understood that the applications of the present invention are not limited to one or the other type.

[0003] As is known, in automatic winding machines the yarn produced by the spinning machine and wound into bobbins is unwound by special unravelling means, subjected to quality control by a sensor (yarn cleaner) and rewound by special winding means (cylinder) to form a reel. In particular, if during the winding of the bobbin yarn the characteristic parameters of the yarn are not acceptable, the yarn cleaner interrupts the winding by cutting the yarn, thus generating two ends, respectively bobbin side and reel side. This is followed by the joining cycle, the aim of which is to remove the defect from the reel and to intercept the two ends so as to position them inside the yarn joiner, which recreates the continuity of the yarn before resuming the winding process.

[0004] The interception of the free yarn ends is carried out by two dedicated suction nozzles (usually called bobbin side yarn nozzle and reel side yarn nozzle) connected to a device that generates the necessary vacuum to achieve the flow conditions required to pick up the two yarns. In particular, after the yarn has been cut by the yarn cleaner, the winding cylinder, which normally rotates the reel so as to allow the yarn to be wound onto the reel, reverses its rotation in order to bring the free end in the direction of the reel and thus allow the reel side yarn nozzle to suck it in.

[0005] In this context, the issue of having to pick up the reel side yarn end arises. Picking up the yarn end is, in fact, particularly problematic, since very often the yarn tends to adhere with extreme ease to the surface of the reel or to twist following the cut made by the yarn cleaner, crossing with other loops or arranging itself in a configuration not optimal for suction by the suction nozzle.

[0006] The use of a reel side yarn nozzle which, when connected to a suitable suction device, generates an air flow that favours the lifting of the yarn end in adherence to the surface of the reel is known. Typically, the input section of such a suction nozzle has a suitably shaped and tapered geometry such as to achieve at local level a high-speed flow along the entire width of the reel, meas-

ured parallel to the axis of rotation of the tube on which the reel is wound.

[0007] Often, however, the winding unit has to repeat the suction cycle several times due to failure to pick up the yarn end, thus decreasing the efficiency of the unit itself and therefore the productivity of the entire machine.

[0008] Another known technique is the use of special combs, positioned inside the suction nozzle, in direct proximity to the input section thereof, which favour the retention and therefore the gripping of the yarn end.

[0009] Compared to the nozzle without combs, this solution generally guarantees greater efficiency, but also typically requires operating at a greater distance from the reel in order to prevent so-called "loose loops", i.e. false yarn ends consisting of winding loops that have loosened due to imperfect adherence to the surface of the reel, from being sucked in together with the yarn end. Solutions according to prior art are disclosed, for example, by EP 2574580 A2 and JP H0451476 U.

PRESENTATION OF THE INVENTION

[0010] The need is therefore felt to resolve the drawbacks and limitations mentioned with reference to the prior art.

[0011] Such requirement is achieved by a winder according to claim 1,

DESCRIPTION OF THE DRAWINGS

[0012] Further characteristics and advantages of the present invention will be more clearly comprehensible from the description given below of its preferred and non-limiting embodiments, wherein:

figure 1 shows a perspective view of a reel side yarn suction nozzle according to one embodiment of the present invention;

figure 2 shows a perspective view of the enlarged detail II shown in figure 1;

figure 3 shows a schematic side view of a winding machine comprising a reel side yarn suction nozzle according to one embodiment of the present invention, during an initial phase of reel formation;

figure 4 shows the enlarged detail IV shown in figure 3;

figure 5 shows a schematic side view of a winding machine comprising a reel side yarn suction nozzle according to one embodiment of the present invention, during a final phase of reel formation;

figure 6 represents the enlarged detail VI shown in figure 5.

[0013] The elements or parts of elements common to the embodiments described below will be indicated using the same reference numerals.

DETAILED DESCRIPTION

[0014] With reference to the aforementioned figures, reference numeral 4 globally denotes a reel side yarn suction nozzle.

[0015] Generally, said reel side yarn suction nozzle 4 is applied to a winding machine 8 comprising at least one winding unit having a reel 12 in formation.

[0016] The reel 12 in formation is obtained by winding the yarn around a relative tube 16, in a known manner.

[0017] As seen in the introduction, the yarn produced and wound into bobbins is unwound by means of special unravelling means, subjected to quality control by a sensor (yarn cleaner) and rewound by special winding means (cylinder 20) to form the reel 12. If, during the winding of the bobbin yarn the characteristic parameters of the yarn are not acceptable, the yarn cleaner interrupts the winding by cutting the yarn thus generating two ends, respectively the bobbin side yarn end (not illustrated) and reel side yarn end 24. In order to restore the continuity of the yarn, it is first necessary to recover the yarn ends and then join them using a special yarn-joiner.

[0018] The reel side yarn end 24 is intercepted by the reel side yarn suction nozzle 4 comprising an arm 28 movable from at least one rest position to at least one working or suction position. In the rest position, the arm 28 is in a distanced position or in any case not close to the reel 12, while in the working position the arm 28 is juxtaposed with the reel 12 in order to be able to intercept the reel side yarn end 24.

[0019] The winding machine 8 is provided with drive means (not illustrated) for controlling the juxtaposition and distancing of the arm 28 with respect to the winding machine 12 in formation, as further described below.

[0020] The arm 28 is fluidically connected to a suction source (not shown) to create a flow of suction air having a propagation direction X-X.

[0021] The arm 28 terminates with a suction slit 32 having a rectilinear configuration elongated along a transverse direction T-T.

[0022] The suction slit 32, with respect to a cross-section plane perpendicular to a first axis of rotation of the associable reel R1 and to a second axis of rotation R2 of the movable arm 28, has an upper lip 36 and a lower lip 40.

[0023] It should be noted that the upper lip 36 is in a higher position, i.e., further to the side and facing the reel 12, when the arm 28 is brought into the working position. In the resting condition, the arm 28 may be rotated so as to reverse the positions of the lips.

[0024] According to a possible embodiment, said upper lip 36 is set back from said lower lip 40, with respect to a propagation direction X-X of the suction air flow through the suction slit to the reel.

[0025] Preferably, the suction slit 32 has a transverse extension L, measured parallel to the transverse direction T-T, which is greater than or equal to the transverse extension of the reel 12, measured parallel to the axis of

rotation of the reel R1.

[0026] According to the present invention said suction slit 32 is provided with a deflector 44 and a comb 48.

5 **[0027]** It should be noted that the deflector 44 and the comb 48 are present together on the reel side yarn suction nozzle 4.

[0028] Their co-presence certainly leads to a synergistic effect in terms of improved gripping capacity of the reel side yarn end 24.

10 **[0029]** Preferably, the deflector 44 is oriented so as to induce a pinch of the air flow generated between the associated reel 12 and the suction slit 32, accelerating the air current and thereby facilitating the gripping of the free end of the yarn on the reel side 24.

15 **[0030]** According to one embodiment, the deflector 44 and the comb 48 are arranged at the upper lip 36 of the suction slit 32.

[0031] According to one embodiment, the deflector 44 and the comb 48 are arranged on opposite sides with respect to the upper lip 36; in particular, the deflector 44 faces opposite the lower lip 40, i.e., upwards when the arm 28 is in the working position, and the comb 48 faces the lower lip 40, i.e., downwards, when the arm 28 is in the working position.

25 **[0032]** According to a possible embodiment, the deflector 44 and the comb 48 are arranged substantially aligned and adjacent to each other.

[0033] According to one embodiment, the deflector 44 comprises a plate 56 having side ends provided with chamfered walls 60, i.e. inclined at an angle β) of between 20° and 40°, preferably 30°, with respect to said transverse direction T-T.

30 **[0034]** For example, said chamfered walls 60 are connected with a connecting radius R of between 1 and 5 mm, preferably 3 mm, such as to prevent tangles of yarn ends at the deflector.

[0035] The comb 48 comprises a roughened surface 64 so as to more easily retain the false yarn ends of the reel 12 before they enter the suction slit 32, so as to allow only the free yarn end to be intercepted by the comb 48.

40 **[0036]** For example, the comb 48 comprises a roughened surface 64 obtained by a surface roughening treatment, such as plasma treatment, at a portion of the comb 48 opposite the suction slit 32 and facing the reel 12.

45 **[0037]** According to one embodiment, the roughened surface 64 of the comb 48 has a roughness Ra of between 3 μm and 20 μm .

[0038] According to one embodiment, the roughened surface 64 has an isotropic roughness profile; in other words, no preferred direction of extension of the roughness grooves can be identified, as is the case, for example, with parallel or cross knurling.

[0039] According to a possible embodiment, the roughened surface 64 extends along the entire transverse width of the comb 48, parallel to the transverse direction T-T, so as to cover the entire transverse extension of the reel 12.

55 **[0040]** According to a possible embodiment, the wind-

ing machine 8 is provided with a processing and control unit (not illustrated) operatively connected to said drive means and programmed so that, during the suction phase of the reel side yarn end 24, the drive means bring the deflector 44 to a distance d from the lateral surface 52 of the reel 12 of between 1 mm and 5 mm, preferably 3 mm.

[0041] The control of the arm position 28 by the processing and control unit may take place, for example, with the aid of an optical encoder. The diameter of the reel 12 in formation being known, it is possible to manage the positioning of the reel side yarn suction nozzle 4 with respect to the reel 12 so as to ensure a predetermined distance d of the deflector 44 from the lateral surface 52 of the reel 12.

[0042] As may be appreciated from the description, the treatment method described above makes it possible to overcome the drawbacks of the prior art.

[0043] First of all, the main advantages of the invention, appreciable especially in the case of particularly "slippery" yarns (such as, for example, viscose, polyester, blends) and/or fine count yarns, are as follows:

reduction of the winding cycle time due to the shorter suction time needed to catch the yarn end;
consequent increase in head efficiency and therefore in the productivity of the winder;
increase in the quality of the yarn wound on the reel associated with a reduction in the number of cases in which the reel windings are disturbed;
reduction of the possibility of single head alarms due mainly to loose loops tangled together due to repeated attempts to pick up the yarn end;
consequently fewer stoppages in production processes following winding (warping, knitting, etc.) linked to the formation quality of the reel.

[0044] It is to be noted that both the deflector and the comb contribute to resolving the technical problem of the present invention, since they improve the catching efficiency of the reel side yarn end.

[0045] In fact, the deflector improves the suction capacity of the nozzle, while the rough surface of the comb makes it easier to retain the suctioned false yarn ends of the reel before they enter the suction slit, so that only the free yarn end can be intercepted by the comb.

[0046] The two elements, i.e. the deflector and the comb, cooperate synergistically with each other since the increase in the suction capacity of the suction slit enables the rough surface to better retain the false yarn ends.

[0047] A person skilled in the art may make numerous modifications and variations to the solutions described above so as to satisfy contingent and specific requirements.

[0048] The scope of protection of the present invention is defined by the following claims.

Claims

1. A reel side yarn suction nozzle (4) comprising:
 - an arm (28) movable from at least one rest position to at least one working or suction position, the arm (28) being fluidly connected to a suction source to create a suction airflow,
 - the arm (28) terminating with a suction slit (32) having a rectilinear configuration elongated along a transverse direction (T-T), the suction slit (32), with respect to a cross-section plane perpendicular to a first axis of rotation (R1) of the associable reel (12) and to a second axis of rotation (R2) of the movable arm (28), has an upper lip (36) and a lower lip (40),
 - **characterized in that** said suction slit (32) is provided with a deflector (44) and a comb (48),
 - wherein the deflector (44) is oriented so as to induce a pinch of the air flow generated between the associated reel (12) and the suction slit (32), accelerating the air current and thereby facilitating the gripping of the free end of the yarn on the reel side (24),
 - wherein said comb (48) comprises a roughened surface (64) .
2. The reel side yarn suction nozzle (4) according to claim 1, wherein said deflector (44) and said comb (48) are arranged at the upper lip (36) of the suction slit (32).
3. The reel side yarn suction nozzle (4) according to claim 1 or 2, wherein the deflector (44) and the comb (48) are arranged on opposite sides of the upper lip (36), the deflector (44) facing opposite the lower lip (40) and the comb (48) facing the lower lip (40).
4. The reel side yarn suction nozzle (4) according to any of the claims from 1 to 3, wherein the deflector (44) and the comb (48) are arranged substantially aligned and adjacent with each other.
5. The reel side yarn suction nozzle (4) according to any of the claims from 1 to 4, wherein said upper lip (36) is set back from said lower lip (40), with respect to a propagation direction (X-X) of the suction air flow through the suction slit (32).
6. The reel side yarn suction nozzle (4) according to any of the claims from 1 to 5, wherein the deflector (44) comprises a plate having side ends provided with chamfered walls (60), i.e. inclined at an angle (β) of between 20° and 40°, preferably 30°, with respect to said transverse direction (T-T).
7. The reel side yarn suction nozzle (4) according to claim 6, wherein said chamfered walls (60) are con-

nected with a connecting radius R of between 1 and 5 mm, preferably 3 mm, such as to prevent tangles of yarn ends at the deflector (44).

8. The reel side yarn suction nozzle (4) according to any of the claims from 1 to 7, wherein said comb (48) comprises a roughened surface (64) obtained by means of a surface roughening treatment, at a portion of the comb (48) opposite the suction slit (32) and facing the reel (12) .
9. The reel side yarn suction nozzle (4) according to claim 8, wherein the roughened surface (64) of the comb (48) has a roughness Ra between 3 μm and 20 μm .
10. The reel side yarn suction nozzle (4) according to any of the claims from 8 to 9, wherein said roughened surface (64) has an isotropic roughness profile.
11. The reel side yarn suction nozzle (4) according to any of the claims from 8 to 10, wherein the roughened surface (64) extends along the entire transverse width of the comb (48), parallel to the transverse direction (T-T) .
12. A winding machine (8) comprising at least one winding unit having a reel (12) in formation and a reel side yarn suction nozzle(4) according to any of the claims from 1 to 11, and drive means for controlling the juxtaposition and distancing of the reel side yarn suction nozzle (4) with respect to the reel (12) in formation, wherein the winding machine (8) is provided with a processing and control unit operatively connected to said drive means and programmed so that, when suctioning the reel side yarn end (24), the drive means bring the deflector (44) to a distance d from the lateral surface (52) of the reel (12) of between 1 mm and 5 mm, preferably 3 mm.

Patentansprüche

1. Spulen- bzw. Rollenseitige Garnansaugdüse (4), umfassend:
 - einen Arm (28), der aus zumindest einer Ruheposition in zumindest eine Arbeits- oder Saugposition bewegbar ist, wobei der Arm (28) fluidisch mit einer Saugquelle verbunden ist, um einen Saugluftstrom zu erzeugen,
 - wobei der Arm (28) mit einem Saugschlitz (32) endet, der eine geradlinige Konfiguration aufweist, die entlang einer Querrichtung (T-T) verlängert bzw. länglich ist, wobei der Saugschlitz (32) in Bezug auf eine Querschnittsebene senkrecht zu einer ersten Drehachse (R1) der zuzugehörigen Spule bzw. Rolle

(12) und zu einer zweiten Drehachse (R2) des beweglichen Arms (28) eine obere Lippe (36) und eine untere Lippe (40) aufweist,

- **dadurch gekennzeichnet, dass** der Saugschlitz (32) mit einem Deflektor (44) und einem Kamm (48) versehen ist,
 - wobei der Deflektor (44) so ausgerichtet ist, dass er eine Einschnürung des zwischen der zugeordneten Spule (12) und dem Saugschlitz (32) erzeugten Luftstroms (32) induziert bzw. bewirkt, wodurch der Luftstrom beschleunigt wird und somit das Greifen des freien Endes des Garns auf der Spulenseite (24) erleichtert wird,
 - wobei der Kamm (48) eine aufgeraute Fläche bzw. Oberfläche (64) umfasst.
2. Spulenseitige Garnansaugdüse (4) nach Anspruch 1, wobei der Deflektor (44) und der Kamm (48) an der oberen Lippe (36) des Saugschlitzes (32) angeordnet sind.
 3. Spulenseitige Garnansaugdüse (4) nach Anspruch 1 oder 2, wobei der Deflektor (44) und der Kamm (48) auf gegenüberliegenden bzw. entgegengesetzten Seiten der oberen Lippe (36) angeordnet sind, wobei der Deflektor (44) gegenüberliegend bzw. entgegengesetzt zu der unteren Lippe (40) gewandt ist bzw. von dieser abgewandt ist und der Kamm (48) der unteren Lippe (40) zugewandt ist.
 4. Spulenseitige Garnansaugdüse (4) nach einem der Ansprüche 1 bis 3, wobei der Deflektor (44) und der Kamm (48) im Wesentlichen ausgerichtet und angrenzend bzw. benachbart zueinander angeordnet sind.
 5. Spulenseitige Garnansaugdüse (4) nach einem der Ansprüche 1 bis 4, wobei die obere Lippe (36) von der unteren Lippe (40) in Bezug auf eine Ausbreitungsrichtung (X-X) des Saugluftstroms durch den Saugschlitz (32) zurückgesetzt ist.
 6. Spulenseitige Garnansaugdüse (4) nach einem der Ansprüche 1 bis 5, wobei der Deflektor (44) eine Platte mit Seitenenden umfasst, die mit abgeschrägten Wänden (60) versehen sind, d. h. in Bezug auf die Querrichtung (T-T) in einem Winkel (β) zwischen 20° und 40°, vorzugsweise 30°, geneigt sind.
 7. Spulenseitige Garnansaugdüse (4) nach Anspruch 6, wobei die abgeschrägten Wände (60) mit einem Verbindungsradius R zwischen 1 und 5 mm, vorzugsweise 3 mm, verbunden sind, um Verwicklungen von Garnenden an dem Deflektor (44) zu verhindern.
 8. Spulenseitige Garnansaugdüse (4) nach einem der Ansprüche 1 bis 7, wobei der Kamm (48) eine auf-

- geraute Fläche bzw. Oberfläche (64) umfasst, die durch eine Flächen- bzw. Oberflächenaufrauungsbehandlung erhalten wird, und zwar an einem Abschnitt des Kamms (48), der dem Saugschlitz (32) gegenüberliegt bzw. entgegengesetzt ist und der Spule (12) zugewandt ist.
9. Spulenseitige Garnansaugdüse (4) nach Anspruch 8, wobei die aufgeraute Oberfläche (64) des Kamms (48) eine Rauheit Ra zwischen 3 μm und 20 μm aufweist.
10. Spulenseitige Garnansaugdüse (4) nach einem der Ansprüche 8 bis 9, wobei die aufgeraute Oberfläche (64) ein isotropes Rauheitsprofil aufweist.
11. Spulenseitige Garnansaugdüse (4) nach einem der Ansprüche 8 bis 10, wobei sich die aufgeraute Oberfläche (64) entlang der gesamten Querbreite des Kamms (48) parallel zu der Querrichtung (T-T) erstreckt.
12. Wickelmaschine (8), umfassend zumindest eine Wickeleinheit mit einer in Bildung befindlichen Spule bzw. Rolle (12) und einer spulenseitigen Garnansaugdüse (4) nach einem der Ansprüche 1 bis 11, sowie Antriebsmittel zum Steuern bzw. Regeln der Nebeneinanderstellung und der Distanzierung bzw. des Abstands der spulenseitigen Garnansaugdüse (4) in Bezug auf die in Bildung befindliche Spule (12), wobei die Wickelmaschine (8) mit einer Verarbeitungs- und Steuer- bzw. Regeleinheit versehen ist, die operativ mit den Antriebsmitteln verbunden und so programmiert ist, dass beim Ansaugen des spulenseitigen Garnendes (24) die Antriebsmittel den Deflektor (44) auf einen Abstand d von der lateralen Fläche bzw. Oberfläche (52) der Spule (12) von zwischen 1 mm und 5 mm, vorzugsweise 3 mm, bringen.
- et une lèvre inférieure (40),
- **caractérisée en ce que** ladite fente d'aspiration (32) est dotée d'un déflecteur (44) et d'un peigne (48),
- dans laquelle le déflecteur (44) est orienté de façon à induire un pincement de l'écoulement d'air généré entre la bobine associée (12) et la fente d'aspiration (32), accélérant le courant d'air et facilitant ainsi la préhension de l'extrémité libre du fil sur le côté bobine (24),
- dans laquelle ledit peigne (48) comprend une surface rugosifiée (64).
2. Buse d'aspiration de fil côté bobine (4) selon la revendication 1, dans laquelle ledit déflecteur (44) et ledit peigne (48) sont agencés au niveau de la lèvre supérieure (36) de la fente d'aspiration (32).
3. Buse d'aspiration de fil côté bobine (4) selon la revendication 1 ou 2, dans laquelle le déflecteur (44) et le peigne (48) sont agencés sur des côtés opposés de la lèvre supérieure (36), le déflecteur (44) étant orienté à l'opposé de la lèvre inférieure (40) et le peigne (48) étant tourné vers la lèvre inférieure (40).
4. Buse d'aspiration de fil côté bobine (4) selon l'une quelconque des revendications 1 à 3, dans laquelle le déflecteur (44) et le peigne (48) sont agencés sensiblement alignés l'un avec l'autre et adjacents l'un à l'autre.
5. Buse d'aspiration de fil côté bobine (4) selon l'une quelconque des revendications 1 à 4, dans laquelle ladite lèvre supérieure (36) est située en retrait par rapport à ladite lèvre inférieure (40), par rapport à une direction de propagation (X-X) de l'écoulement d'air d'aspiration à travers la fente d'aspiration (32).
6. Buse d'aspiration de fil côté bobine (4) selon l'une quelconque des revendications 1 à 5, dans laquelle le déflecteur (44) comprend une plaque ayant des extrémités latérales dotées de parois chanfreinées (60), c'est-à-dire inclinées selon un angle (β) compris entre 20° et 40°, de préférence de 30°, par rapport à ladite direction transversale (T-T).
7. Buse d'aspiration de fil côté bobine (4) selon la revendication 6, dans laquelle lesdites parois chanfreinées (60) sont reliées avec un rayon de liaison R compris entre 1 et 5 mm, de préférence de 3 mm, de façon à empêcher des enchevêtrements d'extrémités de fil au niveau du déflecteur (44).
8. Buse d'aspiration de fil côté bobine (4) selon l'une quelconque des revendications 1 à 7, dans laquelle ledit peigne (48) comprend une surface rugosifiée (64) obtenue au moyen d'un traitement de rugosification de surface, au niveau d'une partie du peigne

Revendications

1. Buse d'aspiration de fil côté bobine (4) comprenant :
- un bras (28) mobile d'au moins une position de repos à au moins une position de travail ou d'aspiration, le bras (28) étant en communication fluïdique avec une source d'aspiration pour créer un écoulement d'air d'aspiration,
 - le bras (28) se terminant par une fente d'aspiration (32) ayant une configuration rectiligne allongée le long d'une direction transversale (T-T), la fente d'aspiration (32), par rapport à un plan de coupe transversale perpendiculaire à un premier axe de rotation (R1) de la bobine associée (12) et à un deuxième axe de rotation (R2) du bras mobile (28), a une lèvre supérieure (36)

(48) opposée à la fente d'aspiration (32) et tournée vers la bobine (12).

9. Buse d'aspiration de fil côté bobine (4) selon la revendication 8, dans laquelle la surface rugosifiée (64) du peigne (48) a une rugosité Ra comprise entre 3 μm et 20 μm . 5
10. Buse d'aspiration de fil côté bobine (4) selon l'une quelconque des revendications 8 à 9, dans laquelle ladite surface rugosifiée (64) a un profil de rugosité isotrope. 10
11. Buse d'aspiration de fil côté bobine (4) selon l'une quelconque des revendications 8 à 10, dans laquelle la surface rugosifiée (64) s'étend sur toute la largeur transversale du peigne (48), parallèlement à la direction transversale (T-T). 15
12. Machine à bobiner (8) comprenant au moins une unité de bobinage ayant une bobine (12) en formation et une buse d'aspiration de fil côté bobine (4) selon l'une quelconque des revendications 1 à 11, et des moyens d'entraînement pour commander la juxtaposition et l'espacement de la buse d'aspiration de fil côté bobine (4) par rapport à la bobine (12) en formation, dans laquelle la machine à bobiner (8) est dotée d'une unité de traitement et de commande reliée de façon fonctionnelle auxdits moyens d'entraînement et programmée de sorte que, lors de l'aspiration de l'extrémité de fil côté bobinage (24), les moyens d'entraînement amènent le déflecteur (44) à une distance d par rapport à la surface latérale (52) de la bobine (12) comprise entre 1 mm et 5 mm, de préférence de 3 mm. 20
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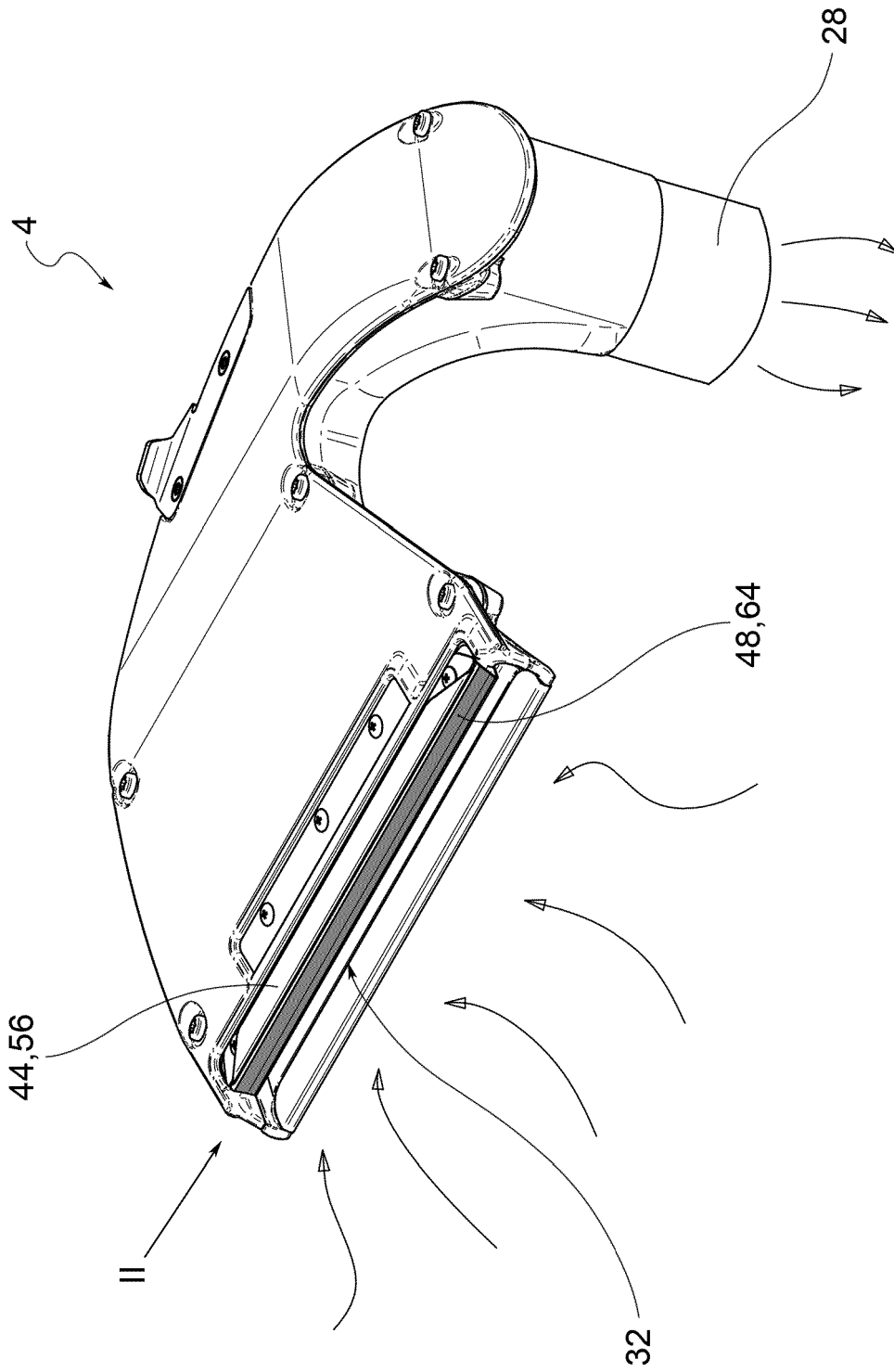


FIG.1

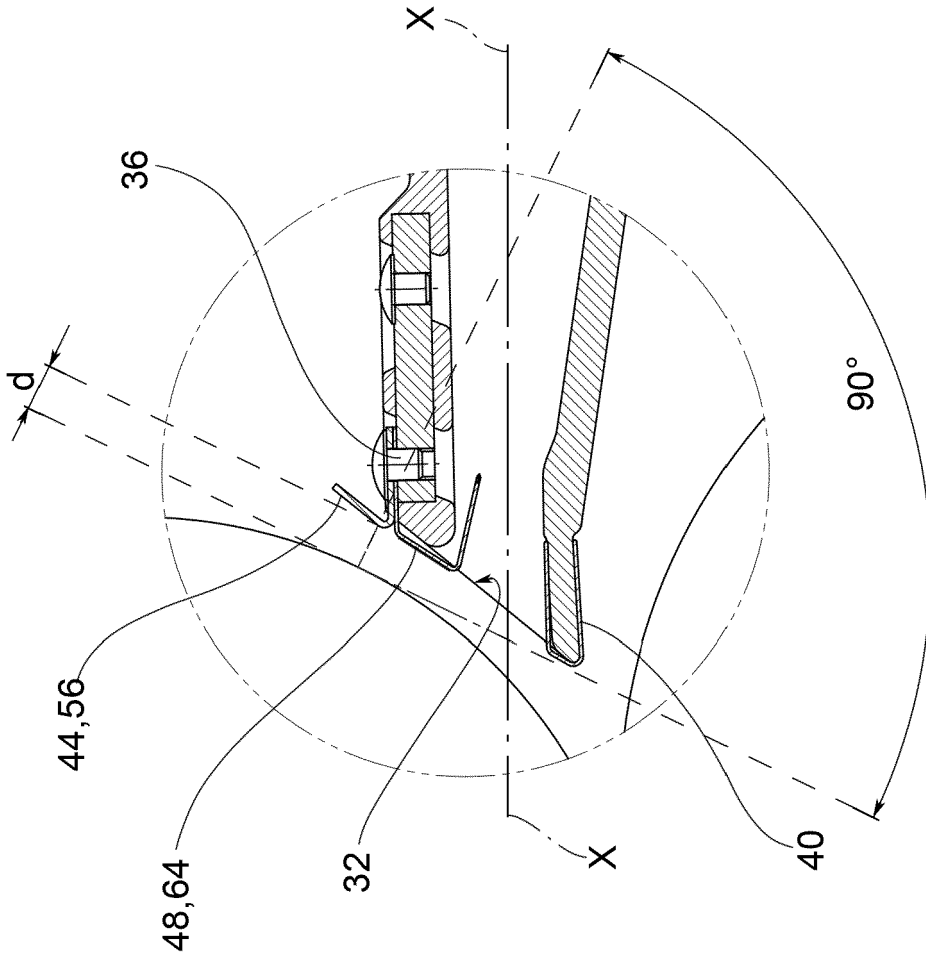


FIG.4

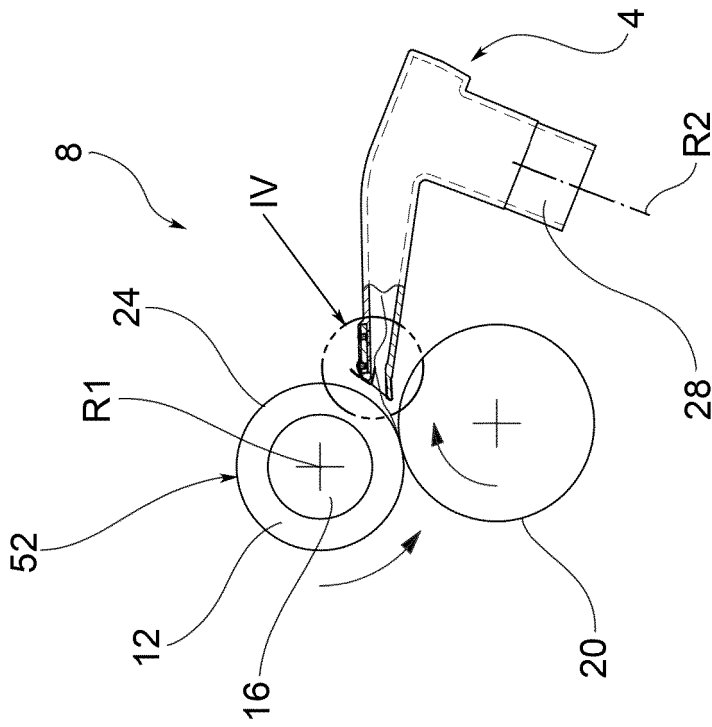


FIG.3

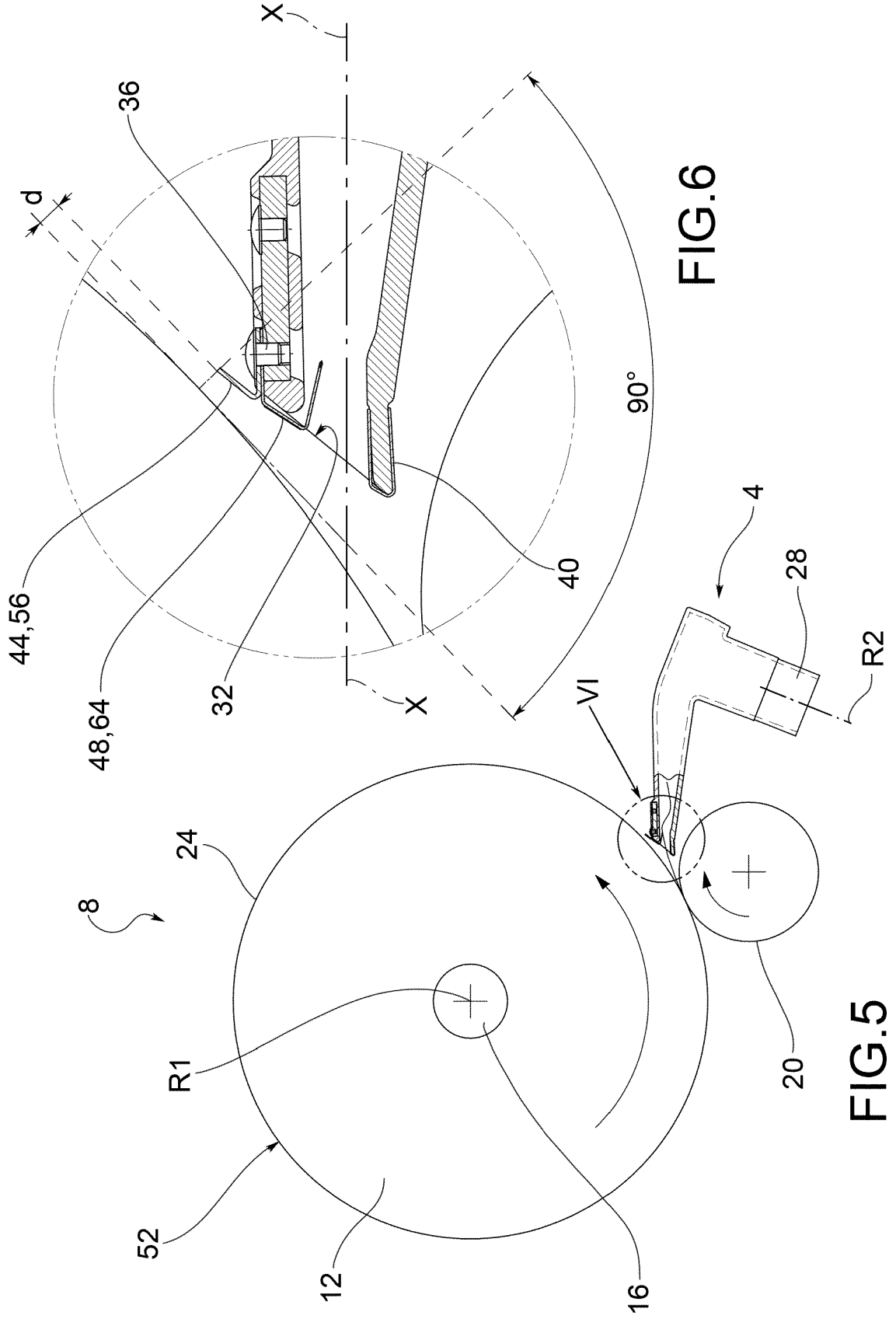


FIG.6

FIG.5

REFERENCES CITED IN THE DESCRIPTION

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