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(54) LAP WINDING DEVICE WITH AN AUXILIARY BELT FOR A TEXTILE MACHINE

SCHLAUFENWICKLUNGSVORRICHTUNG MIT EINEM HILFSGURT FÜR EINE TEXTILMASCHINE

DISPOSITIF D'ENROULEMENT DE NAPPE COMPORTANT UNE COURROIE AUXILIAIRE POUR
UNE MACHINE TEXTILE

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Description

[0001] The present invention relates to a lap-winding device for machines processing fibre webs, such as a lap-winder.

[0002] A fibre processing system envisages processing of the fibre, usually starting from fibre flocks, to obtain a yarn.

[0003] The system is composed of numerous machines; in particular, the carding machines enable a fibre web to be produced.

[0004] In a lap-winder, positioned downstream of the carding machines, a plurality of webs are wound and joined together, to form a web, wound on a tube to form a lap.

[0005] One embodiment of a lap-winding device is described in EP-A1-1464739 and WO2010/070608 (a document under Article 54 (3) EPC), in the name of the Applicant. Further examples are described in EP 160165 and US 3134553.

[0006] The laps are then sent to the combing machines and the web produced by these starting from the laps is sent to the lap-winders, roving frames and spinning frames, for the formation of webs, reels of roving and yarn respectively.

[0007] It is extremely important to produce regular laps without fraying.

[0008] However, the laps are formed, in the devices of the known art, by remaining in contact under pressure with two calenders rotating at high speed. The lap, formed by winding a soft web, especially near the point of initial contact with the primary calender, tends to form a thickening, caused by the resistance of the web being wound against the surface of the first calender. This phenomenon is known in the field as "thickening".

[0009] The purpose of the present invention is to make a lap-winding device, in particular for a lap-winder, able to overcome or limit the problem of formation of the thickening.

[0010] Such purpose is achieved by a lap-winding device made according to claim 1. The dependent claims describe embodiment variations.

[0011] The characteristics and advantages of the lap-winding device according to the present invention will be evident from the description given below.

[0012] The attached figures 1 to 6 show lap-winding systems which are not part of the invention. The attached figures 7 and 8 show diagrams of a lap-winding system according to the present invention, according to different embodiments.

[0013] According to the invention, a machine for processing fibre webs or a lap, such as a lap-winder, comprises a lap-winding device 1.

[0014] The device 1 has an input area 2 for the input of a web W, coming from machinery upstream of the device 1, for example from winding and joining equipment of the lap-winder.

[0015] The device 1 comprises an input group 4 for

receipt of the incoming web W in an input direction IN and deviation of the direction of advancement, positioned in the input area 2.

[0016] For example, the input group 4 comprises an input cylinder 6, generally motorised, and at least one input roller, generally idler, positioned around the input cylinder 6 to engage the web W. For example, three input rollers are provided 8a, 8b, 8c, around the input cylinder 6 and act in conjunction with it to drag the web W. Moreover, the input group 4 comprises an alignment roller 12, which the web W passes over before continuing towards a forming area 20 of a lap L.

[0017] According to a preferred embodiment (figures 7 and 8), the input group 4 comprises a pair of output cylinders 12a, 12b, at least one of which motorised, pressure coupled for the transit of the web W between them.

[0018] The lap L is formed by the web W wound around a tube T perforated on the surface.

[0019] The device 1 comprises, in addition, a pair of calenders, for example motorised, preferably with a fixed rotation axis, for the formation of the lap L. When the formation cycle of the lap is started, the tube T rests on the two calenders, in contact with the surface of the same in respective contact areas.

[0020] In particular, the device 1 comprises a primary calender 22, rotating around an axis 22', which the tube T, when this is resting on the primary calender 22, forms a primary contact axis 22a with; the primary calender has a primary diameter Dp; the primary diameter Dp defines a primary cylindrical surface 22b of the primary calender 22.

[0021] The web W, coming out of the alignment roller 12 or from the pair of output cylinders 12a, 12b, is directed towards the primary contact axis 22a.

[0022] In the same way, the device 1 comprises a secondary calender 24, rotating around an axis 24', which the tube T, when this is resting on the secondary calender 24, forms a secondary contact axis 24a with; the secondary calender has a secondary diameter Ds; the secondary diameter Ds defines a secondary cylindrical surface 24b of the secondary calender 24.

[0023] When the lap forming cycle is started, the web W, reaching the secondary contact axis 24a with its tip for the first time, already has a section wound onto the tube T, in that the winding began at the primary contact axis 22a.

[0024] According to one embodiment (figure 1), the primary contact axis 22a is misaligned between the primary calender 22 and the tube T in relation to the alignment roller 12, and, specifically, is rearward of it.

[0025] From a geometric point of view, between the rotation axis 22' of the primary calender 22 and the axis T' of the tube T, a primary reference plane I' is defined; the primary reference plane I' intersects the primary contact axis 22a; an initial web plane Wi is also defined, tangent to the alignment roller 12 and passing through the primary contact axis 22a.

[0026] Given the previous definitions, the primary con-

tact axis 22a between the primary calender 22 and the tube T is misaligned in relation to the alignment roller 12 in the sense that the initial web plane Wi is inclined in relation to the primary reference plane I', in other words is not orthogonal to it.

[0027] According to a further embodiment, the primary contact axis 22a between the primary calender 22 and the tube T is rearward of the alignment roller 12 in the sense that the initial web plane Wi forms an acute angle with the primary reference plane I' on the side of the tube T, or in other words an obtuse angle on the side of the primary calender 22. That is to say, the initial web plane Wi intersects the tube T.

[0028] According to yet a further embodiment, the initial web plane Wi forms an angle with the primary reference plane I', of 0° to 89°, for example 45° to 85°, for example 55° to 75°, preferably 60° to 65°.

[0029] Advantageously, such arrangement makes it possible to wind the web onto the tube T or to the lap being formed in a joining area upstream of the primary contact axis 22a. It has been found that such aspect considerably facilitates the formation cycle, significantly limiting the thickening phenomenon, since the web is already wound and joined to the lap when it reaches the area of the primary contact axis 22a, where it encounters strong pressure from the calender.

[0030] According to one embodiment variation, by moving the primary contact plane 22a further back from the alignment roller 12, the initial web plane Wi forms a negative angle with the primary reference plane I'. For example, the initial web plane Wi forms an angle with the primary reference plane I' of -15° to 0°, for example of -5°.

[0031] The forming area 20 is asymmetric, in that the primary diameter Dp of the primary calender 22 is a different length from the secondary diameter Ds of the secondary calender (figures 3, 7 or 8), or the distancing of the web being formed from the calendars is not symmetrical but inclines towards the secondary calender (figure 2).

[0032] Advantageously, such characteristics make it possible to distribute the excess pressure in the primary and secondary contact areas asymmetrically, facilitating formation of the lap.

[0033] From a geometric point of view, a calender axes plane A' is defined as the plane containing the two axes 22', 24' of the two calendars 22, 24; a reference plane I' is defined as the plane containing the rotation axis 22' of the primary calender 22 and the axis T' of the tube T; the reference plane I'' is defined as the plane containing the rotation axis 24' of the secondary calender 24 and the axis T' of the tube T; the median plane M is defined as the plane bisecting the angle 22'-T'-24'.

[0034] From further geometrical constructions (figure 2) it has been verified that the axis T' of the tube, during formation of the lap, moves on a plane of the centres T'' which, given the asymmetry, does not coincide with the median plane M.

[0035] According to a variation not according to the

invention in which the primary diameter Dp is greater than the secondary diameter Ds (figure 2), the plane of the centres T'' is inclined, in the forming area 20, so as to be closer to the primary calender 22 in relation to the median plane M.

[0036] It is believed that the increase in over pressure in the primary contact area 22a derives from this.

[0037] The primary diameter Dp is according to the invention less than the secondary diameter Ds (figures 3, 4, 6, 7 and 8), and, in particular, the ratio of the primary diameter Dp of the primary calender 22 and the secondary diameter Ds of the secondary calender 24 is 0.1 to 0.4, preferably 0.15 to 0.3, preferably equal to 0.23 or 0.27.

[0038] In such an embodiment, the plane of the centres T'' is inclined, in the forming area 20, so as to be further from the primary calender 22 in relation to the median plane M. It is believed that the reduction in over pressure in the primary contact area 22a derives from this.

[0039] According to one embodiment, the plane of the centres T'' forms, with the median plane M, an angle of 5° to 20°, preferably 10° to 15°, preferably equal to 12° or 13° or 14° on the side of the secondary calender.

[0040] The device 1 comprises an auxiliary belt 40 which forms a closed circuit and is at least partially wound on the primary calender 22, remaining in contact with the tube T and then with the lap being formed (figures 7 and 8).

[0041] In such embodiments, the device 1 comprises a pair of return rollers 50a, 50b, positioned rearwards of the primary calender 22, on the side opposite the forming area 20.

[0042] The auxiliary belt 40 winds onto the primary calender 22 and onto the two return rollers 50a, 50b, forming the closed circuit.

[0043] The lap-winding device 1 comprises a mobile guide 30, for example rotatable, in the form of a plate, which the web W moves on.

[0044] According to one embodiment, the mobile guide 30 is positioned downstream of a pair of output cylinders 12a, 12b and upstream of the primary calender 22 (figures 7 and 8).

[0045] Preferably, moreover, the device 1 comprises a fixed guide 60, for example in the form of a plate, positioned between the input cylinder 6 and the pair of output cylinders 12a, 12b.

[0046] According to a further embodiment, the mobile guide 30 is positioned downstream of the alignment roller 12 and upstream of the primary calender 22, which the web W moves on (figures 3, 4 and 6).

[0047] The guide 30 is movable from an active position, in which it guides the web W especially when starting the formation cycle, towards the tube T, to a rest position, in which it is distanced from the primary calender, so as not to interfere with the lap being formed.

[0048] According to a further embodiment (figure 4), the lap-winding device 1 has the primary contact axis 22a between the primary calender 22 and the tube T rear-

wards of the alignment roller 12 and the asymmetric forming area 20, as well as the mobile guide 30.

[0049] Preferably, moreover, the device 1 comprises suction means 32, joined to the mobile guide 30, to hold the web W, especially during the initial phase of the formation cycle.

[0050] According to a further embodiment, at least some of the components of the device 1 in contact with the web W in the forming area 20 of the lap comprise air current evacuation means.

[0051] For example, the primary calender 22, which is in contact with the web W in the forming area 20, has a surface provided with holes (figure 5), from which the currents of air forming in the forming area of the lap, can escape, to reduce their disturbing effect on the web.

[0052] According to a further example, air aspiration devices are provided in the forming area 20 to aspirate the currents of air formed.

[0053] According to yet a further example, the mobile guide 30, at least near the forming area 20, has holes for the escape of currents of air (figure 6).

[0054] In yet a further variation, the lap-winding device 1 comprises said evacuation devices, the asymmetric forming area and the rearward primary contact area.

[0055] The device 1 comprises, in addition, guide means for guiding the lap being formed on the tube.

[0056] For example, said guide means comprise a carriage comprising a pair of plates, positioned distanced along the rotation axis of the calenders 22, 24, so as to define an area between them.

[0057] The tube T, still without the web wound around it, when formation of the lap is started, rests on the two calenders 22, 24 and is positioned between the plates of the guide means.

[0058] The carriage comprises, in addition, first movement devices, connected to the plates, for the movement of the same in a direction of formation, for example coinciding with the direction tangent to the two calenders 22, 24.

[0059] For example, said movement devices are pneumatic.

[0060] During normal functioning of the lap-winding device 1, in an initial configuration of formation of the lap, the tube T rests on the calenders 22, 24, without the web W.

[0061] As the invention provides an auxiliary belt 40 wound on a section of the primary calender 22, the tube T is in contact with the auxiliary belt 40 at said section in contact with the surface of the primary calender 22.

[0062] The carriage is in a retracted limit position, and the two plates are at the axial ends of the tube T, containing it.

[0063] During normal functioning of the lap-winding device 1, the calenders 22, 24 are placed in rotation, the web W is fed to the input group 4 and deviated towards the tube T.

[0064] The rotation of the tube T and of the calenders 22, 24, assisted if necessary by the negative pressure

generated inside the perforated tube T, permits winding of the web W onto the tube T.

[0065] In an intermediate formation configuration, the lap is pressed by the carriage onto the two calenders 22, 24 in rotation and fed with the web W.

[0066] The carriage is in an intermediate position, in which the plates are translated along the direction of formation, distanced from the rotation axes of the calenders 22, 24 by a greater distance than in the initial formation configuration.

[0067] In a final formation configuration, the lap has the desired maximum volume, the carriage is in the forward limit position, that is the axes of the plates are at the maximum distance from the rotation axes of the calenders.

[0068] According to yet a further embodiment, the device 1 comprises tube centring devices, for example comprising a pair of truncated cone-shaped inserts, attached centrally to the plates of the carriage, suitable for being inserted in the tube T, so as to centre its position, at least upon starting of the formation cycle of the lap.

[0069] Innovatively, the lap-winding device according to the present invention makes it possible to eliminate or reduce thickening during the formation of the lap.

[0070] Advantageously, moreover, the device makes it possible to use high rotation speeds for the formation of the lap, while maintaining high quality standards.

[0071] It is clear that a person skilled in the art may make modifications to the lap-winding device described above so as to satisfy contingent requirements.

[0072] According to one embodiment variation, the primary calender is idler.

[0073] According to a further variation, the primary calender is motorised.

[0074] According to yet a further variation, the secondary calender is motorised independently of the primary calender.

Claims

1. Device (1) of a fibre processing machine for the formation of a lap (L) by winding a web (W) on a tube (T), said device comprising:

- a forming area (20) in which the web (W) is wound onto the tube (T) and where the lap is positioned from an initial lap-forming configuration to a final lap-forming configuration;
- a primary calender (22), having a primary diameter (Dp) and rotating around a rotation axis (22') to form the lap (L);
- a secondary calender (24), having a secondary diameter (Ds) greater than the primary diameter (Dp) and rotating around a rotation axis (24') to form the lap (L), said calenders (22,24) supporting the lap (L) being formed from the initial configuration to the final configuration;

- an auxiliary belt (40) which forms a closed circuit around the primary calender, said belt (40) being, in the vicinity of the forming area (20), in contact with the lap being formed from the initial configuration to the final configuration; 5
 - an input group (4) to receive the web (W) coming from machines upstream of the device and to deviate the web (W) towards the forming area (20) between the calenders (22,24); 10
 - at least one return roller (50a, 50b) positioned rearwards of the primary calender (22) in relation to the forming area (20), which the belt (40) wraps around to form the closed circuit; and 15
 - a plate (30), supporting the web (W) in movement towards the forming area (20), said plate (30) being movable from an active position, in which it guides the web (W) towards the tube (T) when starting the formation cycle of the lap (L), to a rest position, in which it is distanced from the primary calender (22), so as not to interfere with the lap (L) being formed. 20
2. Device according to claim 1, wherein the input group (4) comprises at least a pair of output cylinders (12a,12b) pressure coupled to each other, through which the web (W) passes and the plate (30) is positioned downstream of the pair of output cylinders (12a,12b). 25
 3. Device according to claim 2, comprising a fixed guide (60) positioned between an input cylinder (6) of the input group (4) and the pair of output cylinders (12a, 12b). 30
 4. Device according to claim 1, wherein the input group (4) comprises an alignment roller (12), which the web (W) passes over before continuing towards the forming area (20). 35
 5. Device according to any one of the previous claims, comprising suction means (32), joined to the plate (30), to hold the web (W) during the initial phase of the formation cycle of the lap (L). 40
 6. Device according to any one of the previous claims, wherein the surface of the primary calender (22) is provided with holes from which currents of air can escape. 45
 7. Device according to any one of the claims 1 to 4 or 6, wherein the plate (30) has holes for the escape of currents of air. 50
 8. Device according to any one of the previous claims, comprising air aspiration devices in the forming area (20) to aspirate currents of air. 55
 9. Device according to any one of the previous claims,

comprising guide means for guiding the lap (L) being formed, wherein said guide means comprise a carriage having a pair of plates, positioned distanced along the rotation axis of the calenders (22,24).

10. Device according to claim 9, comprising tube centring devices, comprising a pair of truncated cone-shaped inserts, respectively attached centrally to the plates of the carriage, suitable for being inserted in the tube (T), so as to centre its position, at least upon starting of the formation cycle of the lap (L).
11. Device according to any one of the previous claims, wherein the primary calender (22) or the secondary calender (24) is motorized, the other calender being then idler.
12. Device according to any of the claims 1 to 10, wherein the primary calender (22) and the secondary calender (24) are independently motorised.
13. Lap-winder comprising a device (1) for the formation of a lap (L) according to any one of the previous claims.

Patentansprüche

1. Vorrichtung (1) einer Faserverarbeitungsmaschine zur Bildung einer Wickelung (L) durch Aufwickeln eines Gewebes (W) auf einem Rohr (T), umfassend:
 - einen Formgebungsbereich (20), in dem das Gewebe (W) auf das Rohr (T) gewickelt wird und in dem die Wickelung aus einer anfänglichen wicklungsformenden Konfiguration in eine finale wicklungsformende Konfiguration gebracht wird;
 - einen Primärkalender (22), der einen Primärdurchmesser (Dp) aufweist und sich um eine Rotationsachse (22') dreht, um die Wickelung (L) zu bilden;
 - einen Sekundärkalender (24), der einen Sekundärdurchmesser (Ds) aufweist, der größer als der Primärdurchmesser (Dp) ist, und sich um eine Drehachse (24') dreht, um die Wickelung (L) zu bilden, wobei die Kalender (22, 24) die Wickelung (L) stützen, die von der anfänglichen wicklungsformenden Konfiguration zur finalen wicklungsformenden Konfiguration geformt wird;
 - einen Hilfsgurt (40), der einen geschlossenen Kreis um den Primärkalender bildet, wobei der Hilfsgurt (40) in der Nähe des Formgebungsbereichs (29) mit der Wickelung in Kontakt steht, die von der anfänglichen wicklungsformenden Konfiguration zur finalen wicklungsformenden Konfiguration geformt wird;

- eine Zuführgruppe (4), um das Gewebe (W) aufzunehmen, das aus der Vorrichtung vorgeschalteten Maschinen kommt, und um das Gewebe (W) zu dem Formgebungsbereich (20) zwischen den Kalandern (22, 24) abzuleiten; 5
- wenigstens eine Rücklaufrolle (50a, 50b), die im Verhältnis zum Formgebungsbereich (20) rückwärtig des Primärkalanders (22) angeordnet ist, um den der Hilfsgurt (40) herumgewickelt ist, um den geschlossenen Kreis zu bilden; und 10
- eine Platte (30), die das Gewebe (W) in Bewegung zu dem Formgebungsbereich (20) abstützt, wobei die Platte (30) von einer aktiven Position, in der sie das Gewebe (W) zu dem Rohr (T) führt, wenn der Formgebungszyklus der Wickelung (L) beginnt, in eine Ruheposition bewegbar ist, in der sie von dem Primärkalanders (22) derart beabstandet ist, dass sie die sich formende Wickelung (L) nicht behindert. 15
2. Vorrichtung gemäß Anspruch 1, wobei die Zuführgruppe (4) wenigstens zwei ein Paar bildende Ausgangszylinder (12a, 12b) umfasst, die druckbeaufschlagt miteinander gekuppelt sind und durch die das Gewebe (W) hindurch läuft, und wobei die Platte (30) den zwei ein Paar bildenden Ausgabezylindern (12a, 12b) nachgeschaltet ist. 20
3. Vorrichtung gemäß Anspruch 2, umfassend eine ortsfeste Führung (60), die zwischen einem Zuführzylinder (6) der Zuführgruppe (4) und den zwei ein Paar bildenden Ausgabezylindern (12a, 12b) angeordnet ist. 25
4. Vorrichtung gemäß Anspruch 1, wobei die Zuführgruppe (4) eine Ausrichtungsrolle (12) umfasst, über die das Gewebe (W) läuft, bevor es zu dem Formgebungsbereich (20) weiterläuft. 30
5. Vorrichtung gemäß einem der vorangehenden Ansprüche, umfassend Saugmittel (32), die mit der Platte (30) verbunden sind, um das Gewebe (W) während der Anfangsphase des Formgebungszyklus der Wickelung (L) zu halten. 35
6. Vorrichtung gemäß einem der vorangehenden Ansprüche, wobei die Oberfläche des Primärkalanders (22) mit Löchern versehen ist, aus denen Luftströme entweichen können. 40
7. Vorrichtung gemäß einem der Ansprüche 1 bis 4 oder 6, wobei die Platte (30) Löcher zum Entweichen von Luftströmen aufweist. 45
8. Vorrichtung gemäß einem der vorangehenden Ansprüche, umfassend Luftsaugvorrichtungen in dem Formgebungsbereich (20), um Luftströme anzusaugen. 50
9. Vorrichtung gemäß einem der vorangehenden Ansprüche, umfassend Führungsmittel zum Führen der sich bildenden Wickelung (L), wobei die Führungsmittel einen Schlitten umfassen, der zwei ein Paar bildende Platten aufweist, die beabstandet entlang der Drehachse der Kalanders (22, 24) angeordnet sind. 55
10. Vorrichtung gemäß Anspruch 9, umfassend Rohrzentriervorrichtungen, die ein Paar kegelstumpfförmige Einsätze umfassen, die jeweils zentral zu den Platten des Schlittens angebracht sind und zum Einführen ins Rohr (T) geeignet sind, so dass sie dessen Position wenigstens am Anfang des Formgebungszyklus der Wickelung (L) zentrieren.
11. Vorrichtung gemäß einem der vorangehenden Ansprüche, wobei der Primärkalanders (22) oder der Sekundärkalanders (24) motorisch angetrieben und der andere Kalanders dann eine Spannrolle ist.
12. Vorrichtung gemäß einem der Ansprüche 1 bis 10, wobei der Primärkalanders (22) und der Sekundärkalanders (24) unabhängig voneinander motorisch angetrieben sind.
13. Wickelungsvorrichtung umfassend eine Vorrichtung (1) zum Formen einer Wickelung (L) gemäß einem der vorangehenden Ansprüche.

Revendications

1. Dispositif (1) d'une machine de traitement de fibre pour la formation d'une nappe (L) en enroulant un voile (W) sur un tube (T), ledit dispositif comprenant:
- une zone de formation (20) dans laquelle le voile (W) est enroulé sur le tube (T) et où la nappe est positionnée d'une configuration de formation de nappe initiale à une configuration de formation de nappe finale;
 - une calandre primaire (22), possédant un diamètre primaire (Dp) et tournant autour d'un axe de rotation (22') pour former la nappe (L);
 - une calandre secondaire (24), possédant un diamètre secondaire (Ds) supérieur au diamètre primaire (Dp) et tournant autour d'un axe de rotation (24') pour former la nappe (L), lesdites calendres (22, 24) supportant la nappe (L) en train d'être formée de la configuration initiale à la configuration finale;
 - une courroie auxiliaire (40) qui forme un circuit fermé autour de la calandre primaire, ladite courroie (40) étant, dans le voisinage de la zone de formation (20), en contact avec la nappe en train d'être formée de la configuration initiale à la con-

- figuration finale;
- un groupe d'entrée (4) pour recevoir le voile (W) provenant de machines en amont du dispositif et pour dévier le voile (W) vers la zone de formation (20) entre les calandres (22, 24);
 - au moins un rouleau de retour (50a, 50b) positionné vers l'arrière de la calandre primaire (22) par rapport à la zone de formation (20), autour duquel la courroie (40) s'enroule pour former le circuit fermé; et
 - une plaque (30), supportant le voile (W) en mouvement vers la zone de formation (20), ladite plaque (30) étant mobile d'une position active, dans laquelle elle guide le voile (W) vers le tube (T) lors du commencement du cycle de formation de la nappe (L), à une position de repos, dans laquelle elle est éloignée de la calandre primaire (22), afin de ne pas gêner la nappe (L) en train d'être formée.
2. Dispositif selon la revendication 1, dans lequel le groupe d'entrée (4) comprend au moins une paire de cylindres de sortie (12a, 12b) accouplés par pression l'un à l'autre, à travers lesquels le voile (W) passe et la plaque (30) est positionnée en aval de la paire de cylindres de sortie (12a, 12b).
 3. Dispositif selon la revendication 2, comprenant un guidage fixe (60) positionné entre un cylindre d'entrée (6) du groupe d'entrée (4) et la paire de cylindres de sortie (12a, 12b).
 4. Dispositif selon la revendication 1, dans lequel le groupe d'entrée (4) comprend un rouleau d'alignement (12), sur lequel le voile (W) passe avant de continuer vers la zone de formation (20).
 5. Dispositif selon une quelconque des revendications précédentes, comprenant des moyens d'aspiration (32), joints à la plaque (30), pour retenir le voile (W) durant la phase initiale du cycle de formation de la nappe (L).
 6. Dispositif selon une quelconque des revendications précédentes, dans lequel la surface de la calandre primaire (22) est pourvue de trous à partir desquels des courants d'air peuvent sortir.
 7. Dispositif selon une quelconque des revendications 1 à 4 ou 6, dans lequel la plaque (30) comporte des trous pour la sortie de courants d'air.
 8. Dispositif selon une quelconque des revendications précédentes, comprenant des dispositifs d'aspiration d'air dans la zone de formation (20) pour aspirer des courants d'air.
 9. Dispositif selon une quelconque des revendications
- précédentes, comprenant des moyens de guidage pour guider la nappe (L) en train d'être formée, dans lequel lesdits moyens de guidage comprennent un chariot possédant une paire de plaques, positionnées de façon éloignée le long de l'axe de rotation des calandres (22, 24).
10. Dispositif selon la revendication 9, comprenant des dispositifs de centrage de tube, comprenant une paire de pièces rapportées en forme de cône tronqué, respectivement fixées de façon centrale aux plaques du chariot, appropriées pour être insérées dans le tube (T), afin de centrer sa position, au moins lors du commencement du cycle de formation de la nappe (L).
 11. Dispositif selon une quelconque des revendications précédentes, dans lequel la calandre primaire (22) ou la calandre secondaire (24) est motorisée, l'autre calandre étant alors libre.
 12. Dispositif selon une quelconque des revendications 1 à 10, dans lequel la calandre primaire (22) et la calandre secondaire (24) sont indépendamment motorisées.
 13. Enrouleuse de nappe comprenant un dispositif (1) pour la formation d'une nappe (L) selon une quelconque des revendications précédentes.

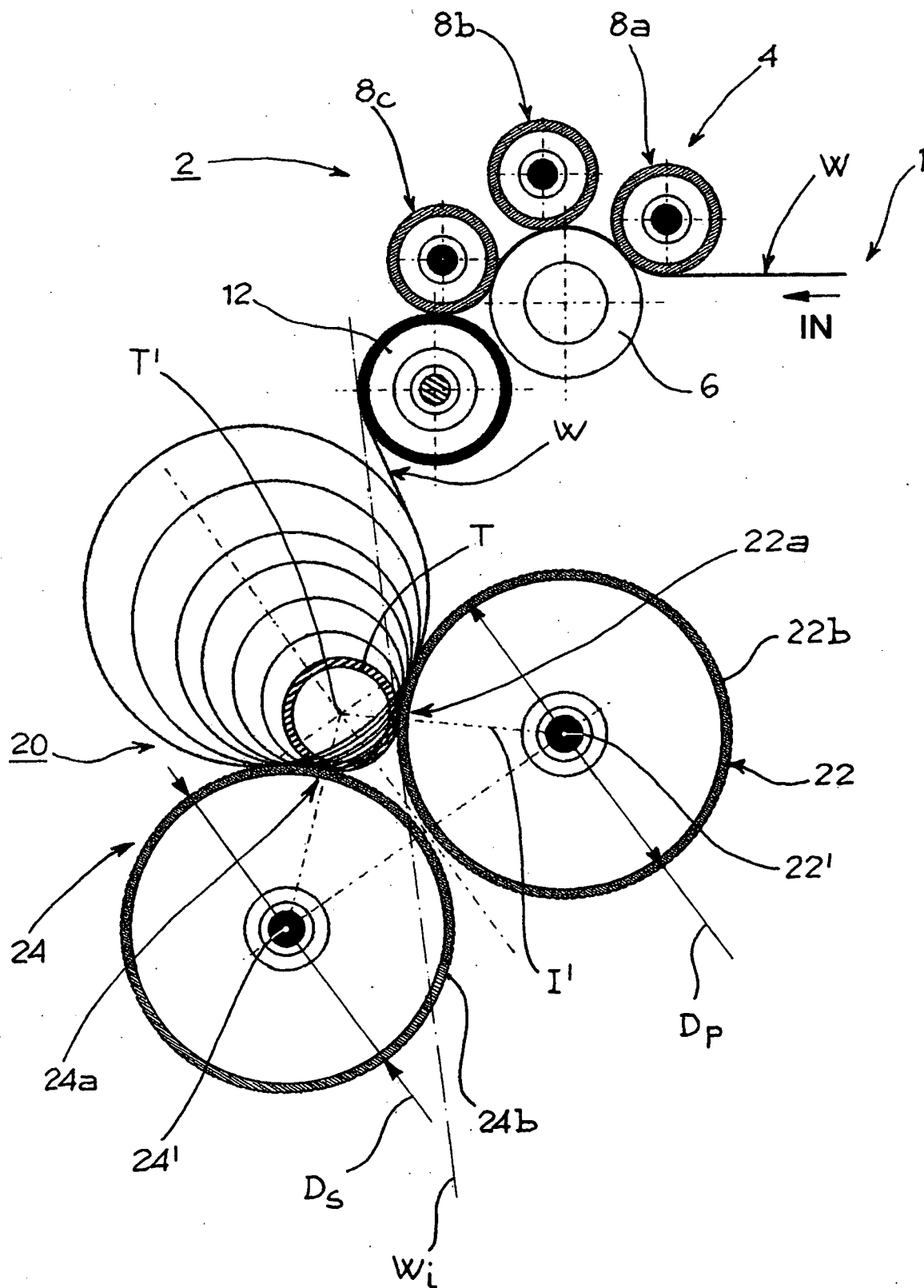


Fig. 1

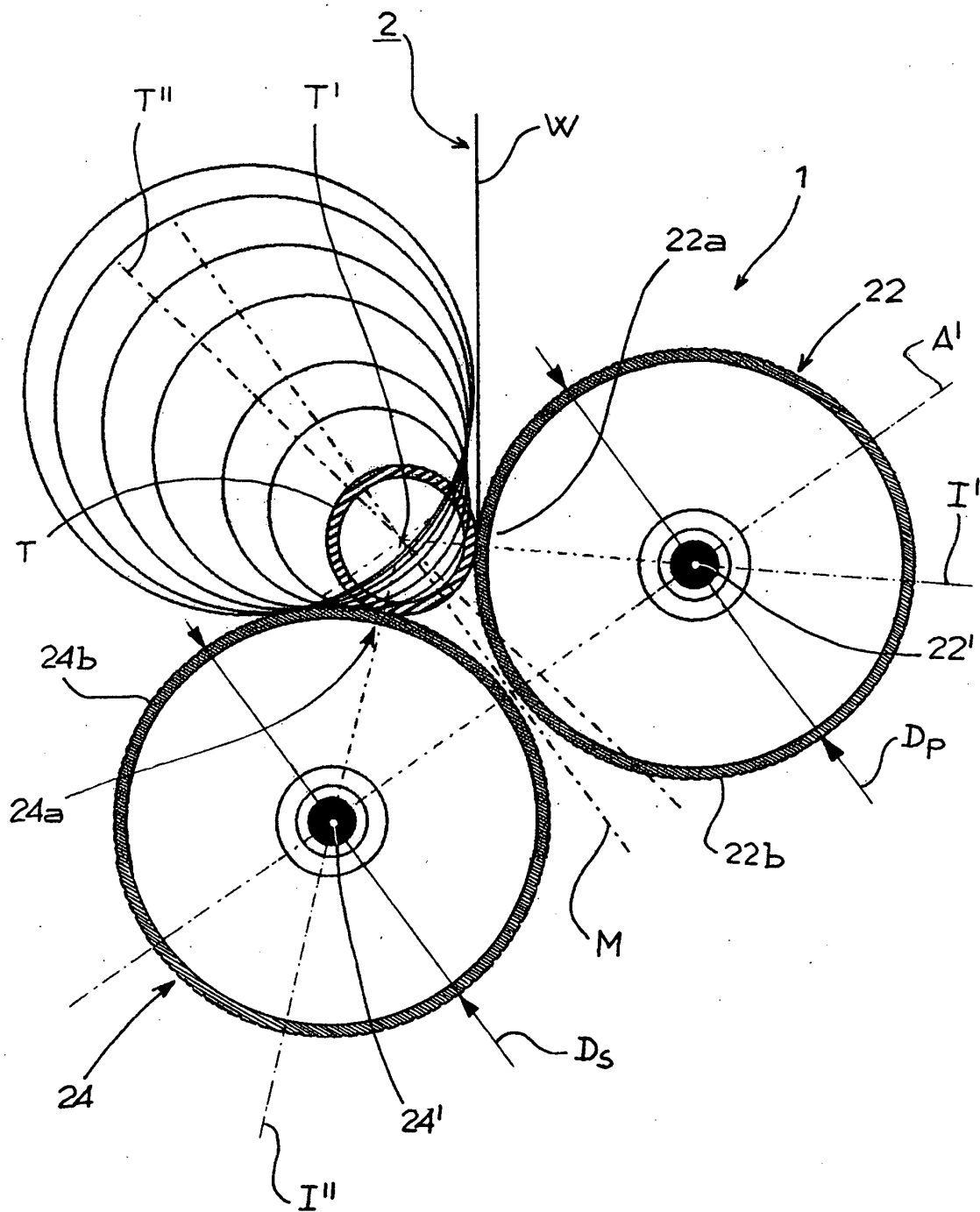


Fig. 2

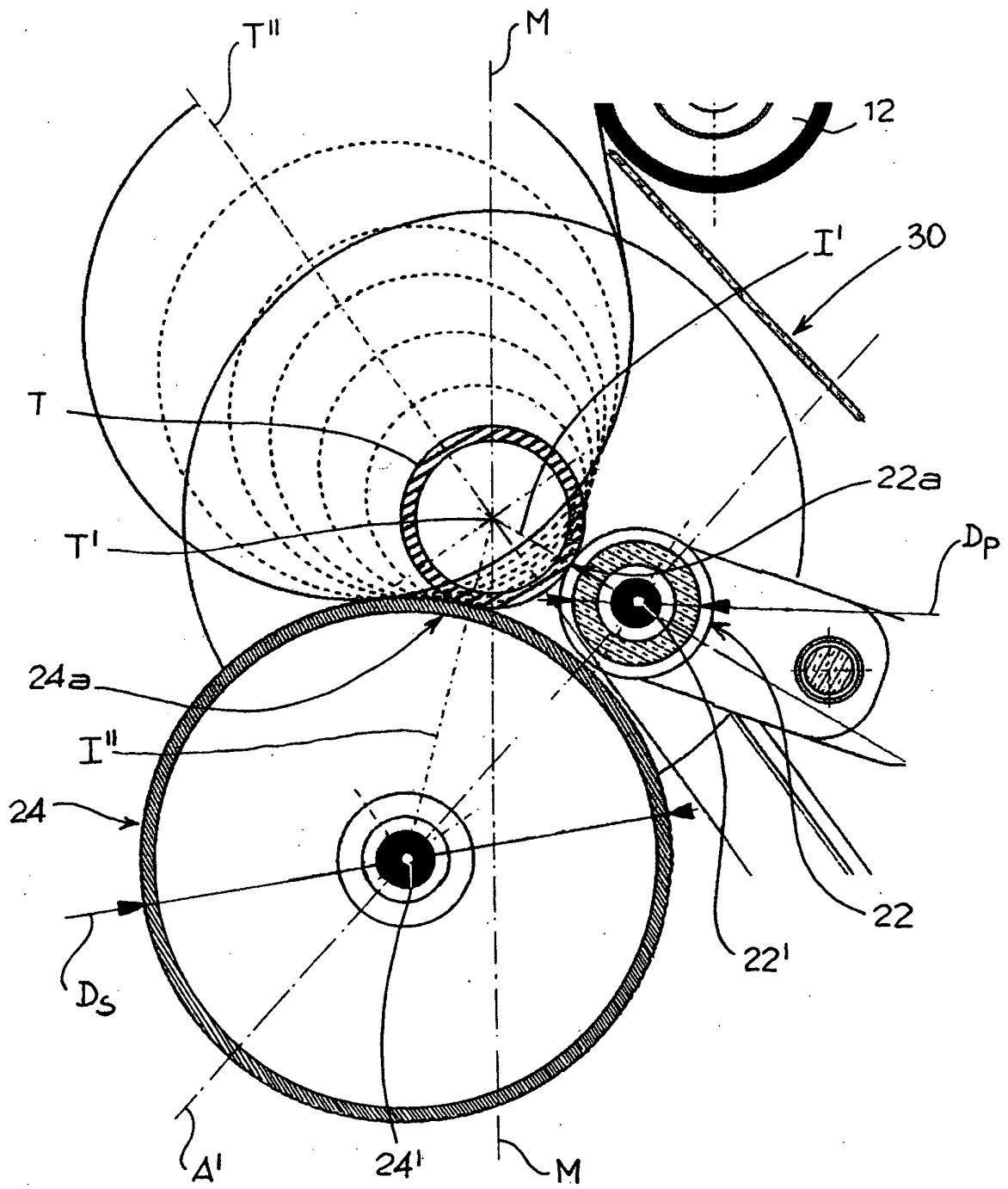
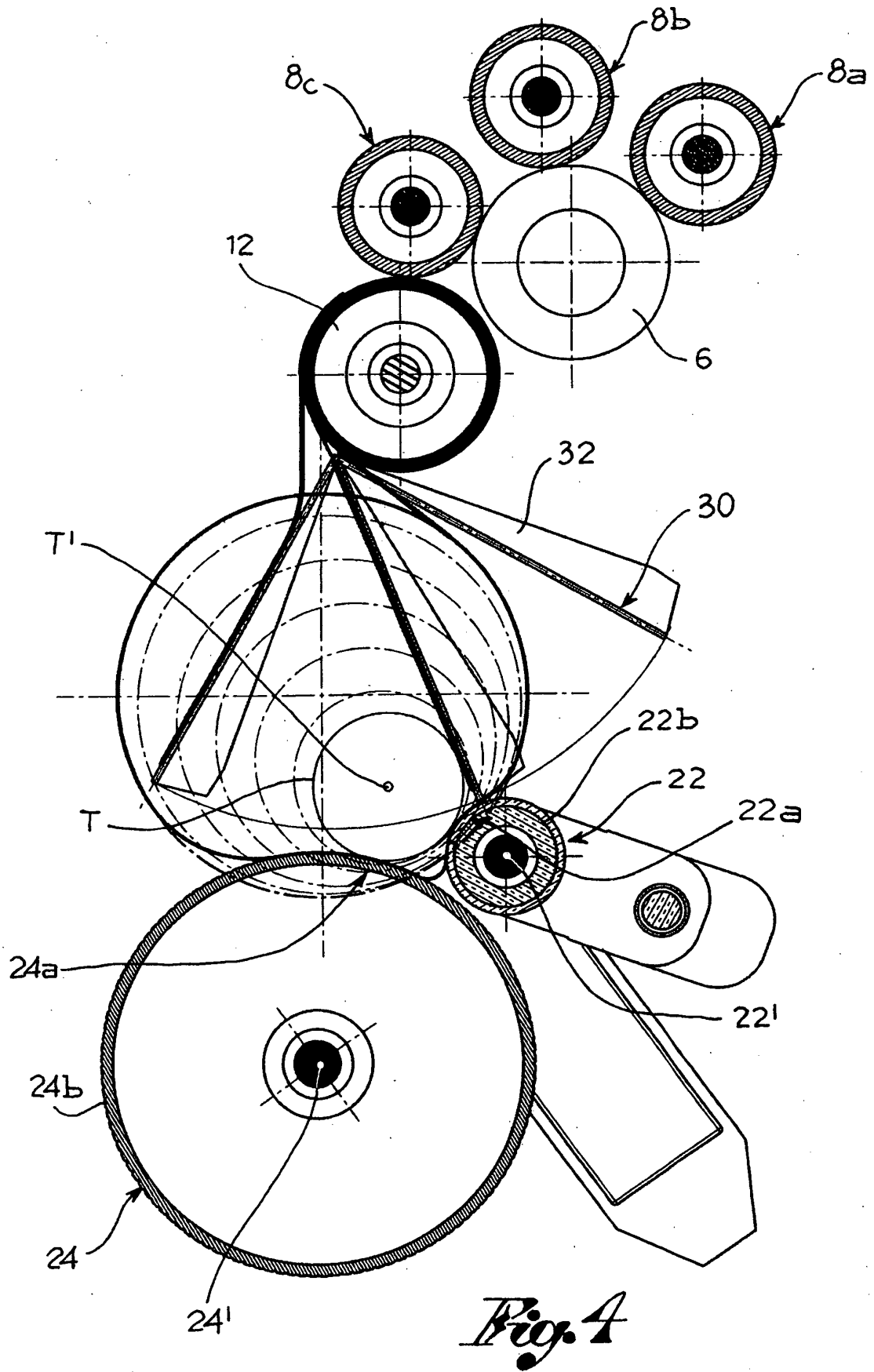


Fig. 3



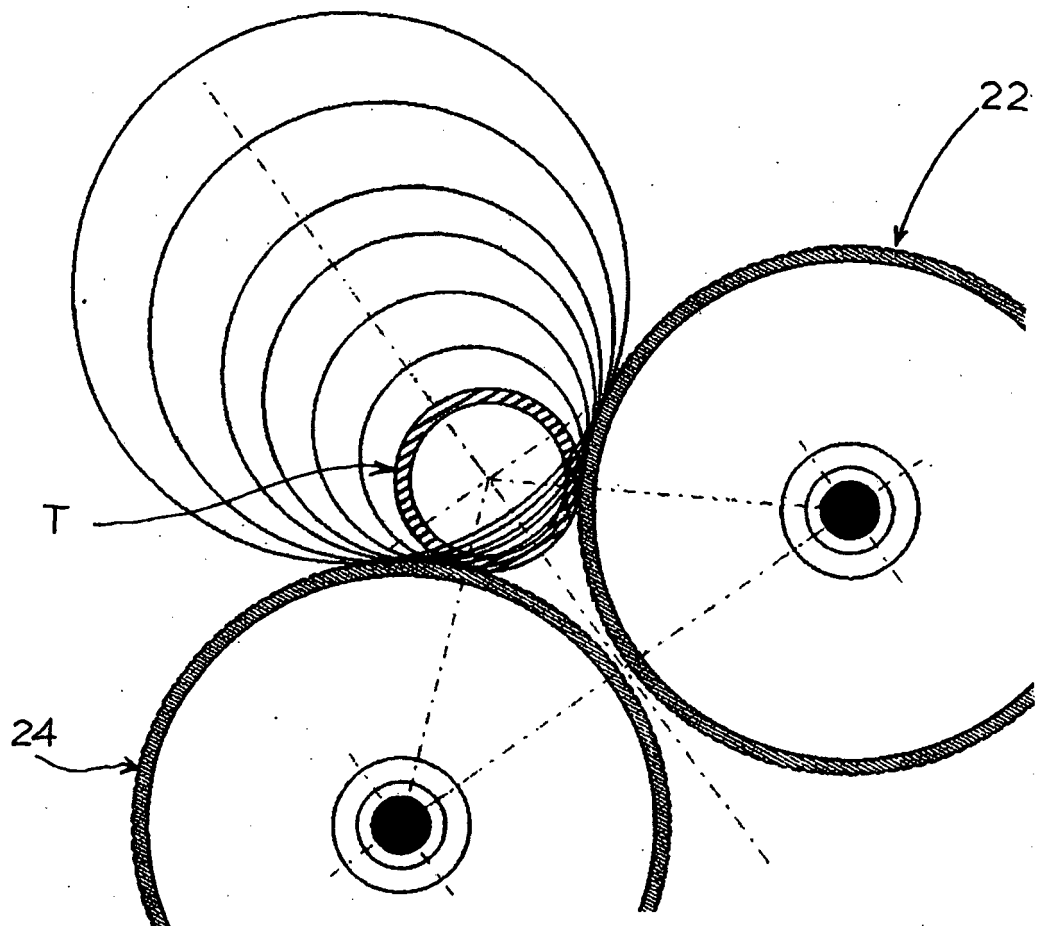


Fig. 5

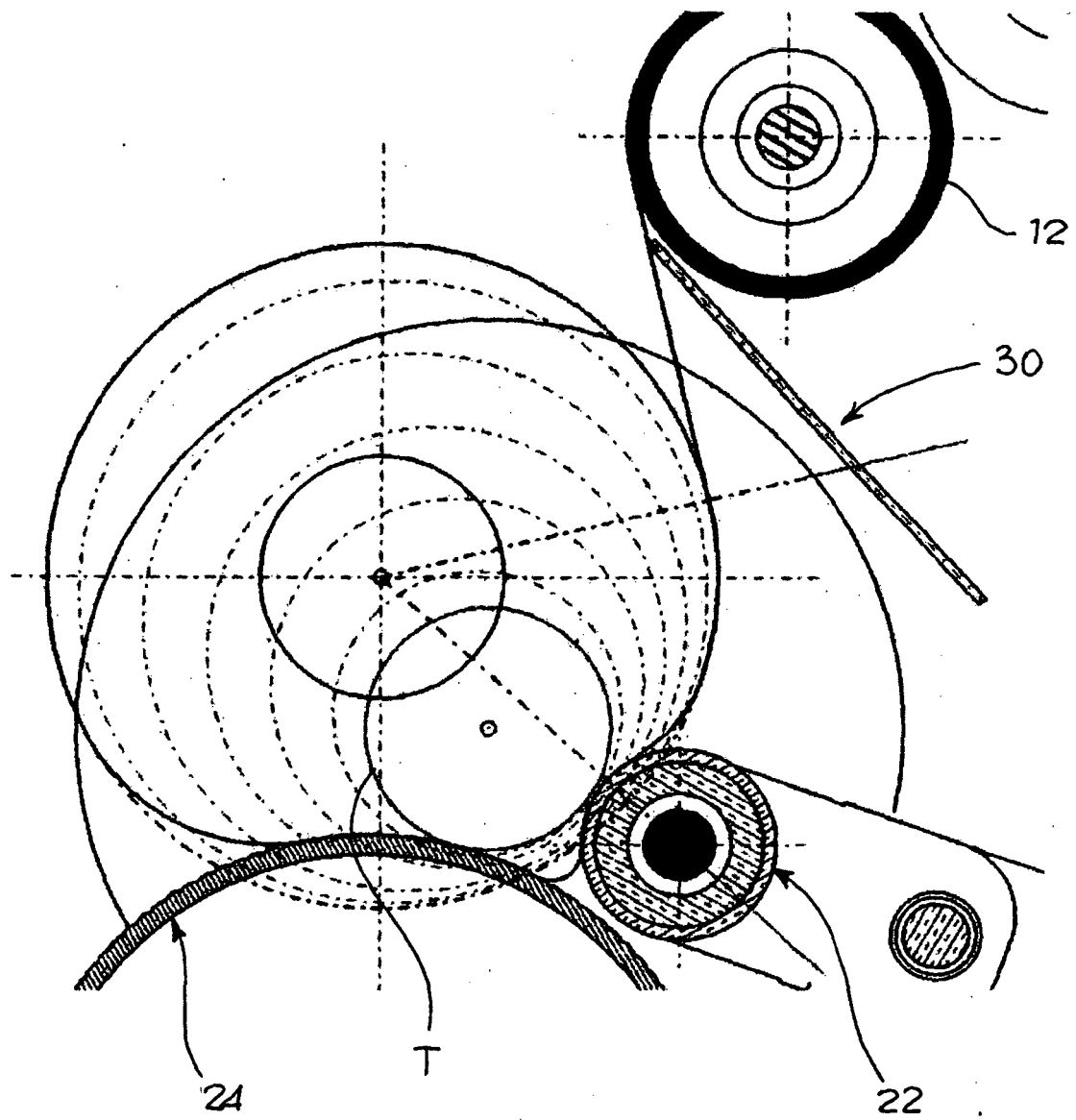
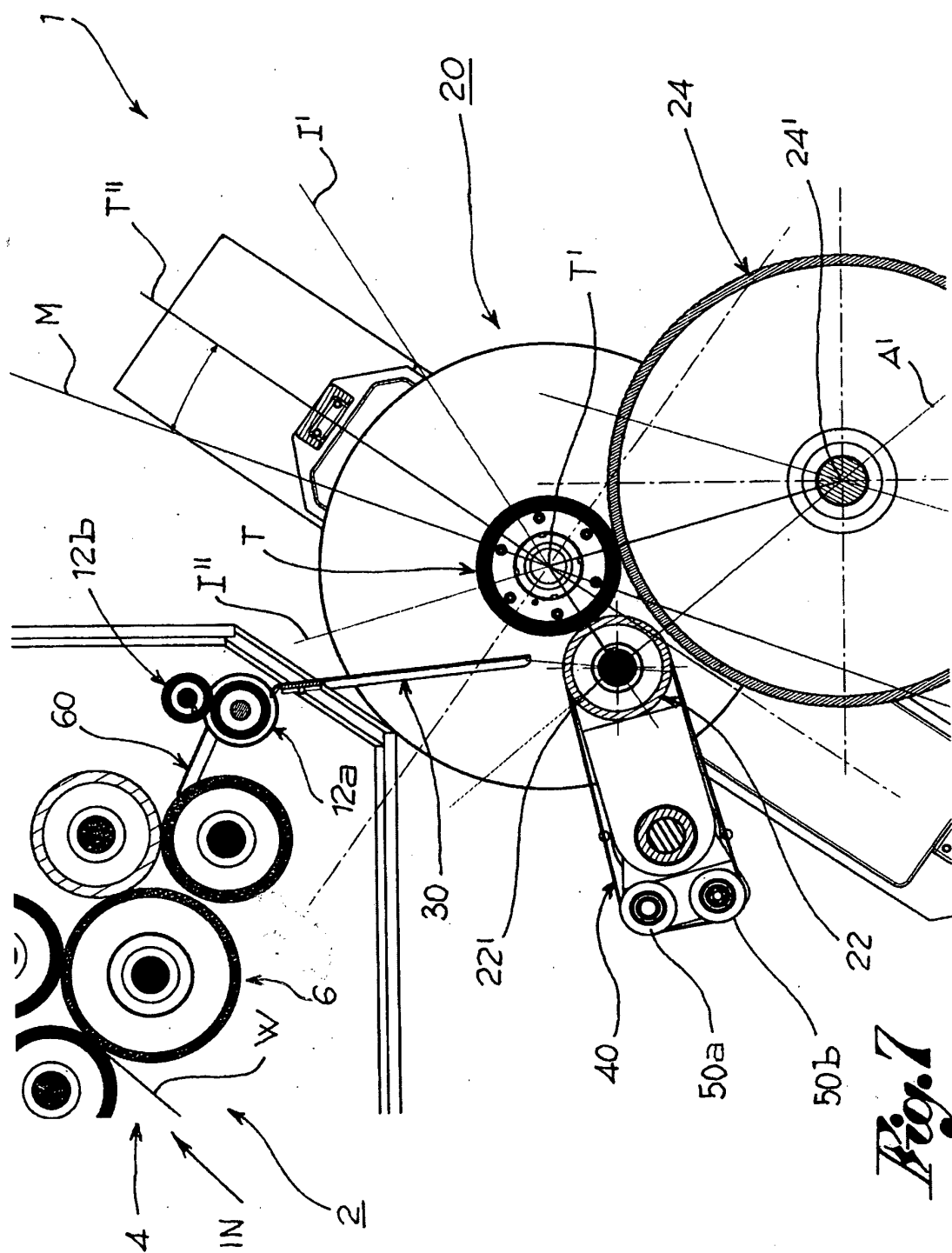
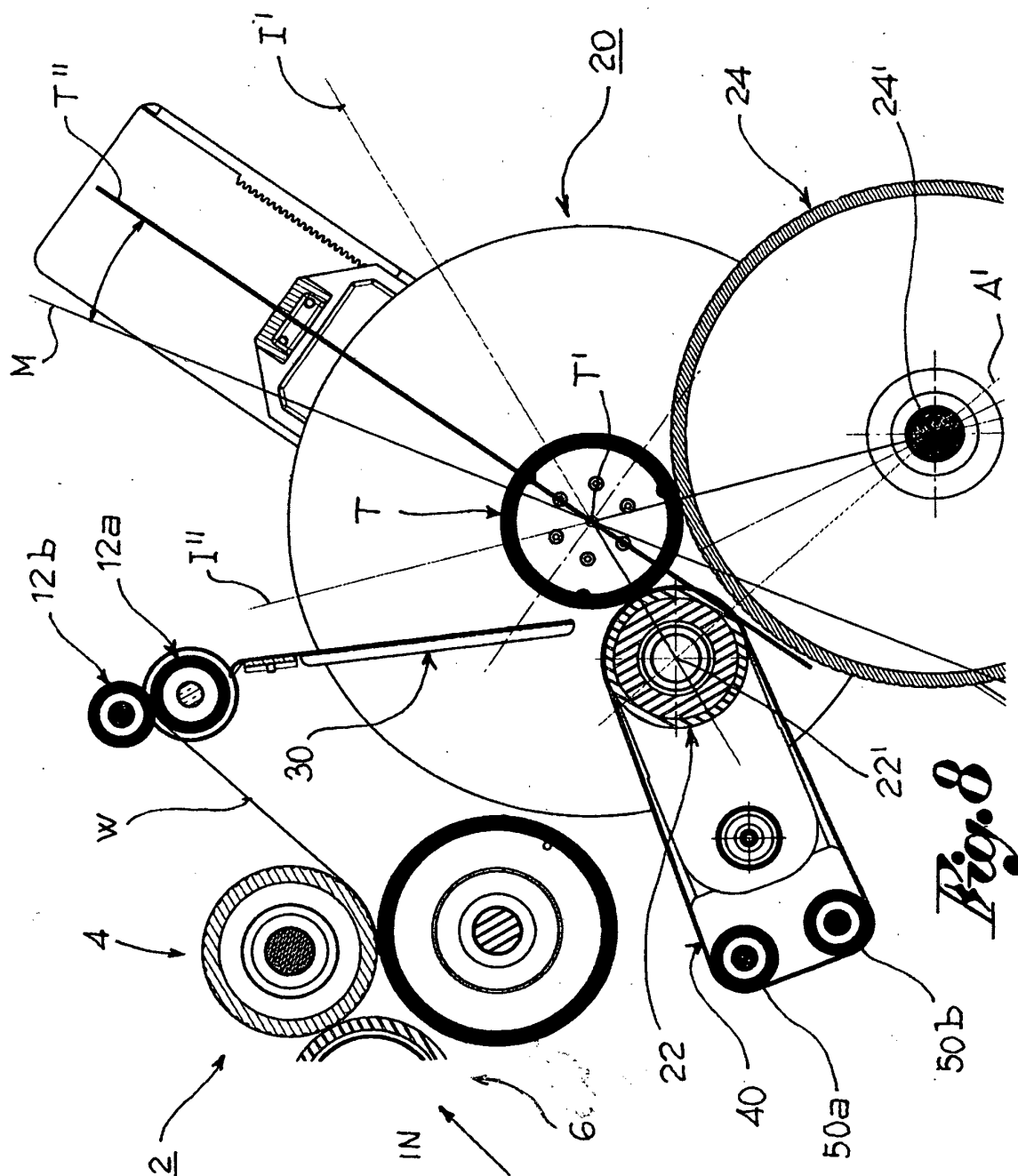


Fig. 6





REFERENCES CITED IN THE DESCRIPTION

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