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(54) **SAW DEVICE AND SAW BLADE UNIT THEREFOR**

SÄGEVORRICHTUNG UND SÄGEBLATT DAFÜR

SCIE ET LAME ASSOCIEE

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Description

Technical Field of the Invention

[0001] In a first aspect, this invention relates to a saw device including a driving shaft that is rotatable around a geometrical central axis, said shaft having a plurality of inter-parallel saw blades, which are co-rotatively connected to a sleeve that is detachably located on a front, cantilever part of the driving shaft, which sleeve in turn is co-rotatively connected to the driving shaft and on which there are, on one hand, spacing elements between adjacent saw blades, and, on the other hand, means for holding the saw blades and the spacing elements at positions fixed axially along the sleeve, thereby forming an assembly that may be separately mounted on and demounted from said shaft part.

[0002] Within modern saw milling, normally two saw devices of the above-mentioned type are used, that co-operate as a pair in a machine, in order to jointly form a saw that among professionals is denominated a double-shafted blade saw. In that case, one saw device is located above and somewhat displaced in relation to the other one, the two saw blade assemblies of the devices sawing into the passing saw object, normally a trunk block, into part-sections from above as well as from below, thus forming through cuts that separate different timber pieces, such as boards or boarding. An important advantage of the type of saw devices in question is that the saw blades may be set upon the appurtenant sleeve in a state distanced from the saw machine, whereby the driving shafts of the machine may be equipped with ready-set units. *Inter alia*, this involves that the shut-down times for resetting are reduced to a minimum.

Prior Art

[0003] EP 0 543 789 discloses an example of a saw device of the general type as presented in the introduction. In this document is shown (without being further described) a device having a sleeve being demountably arranged on a driving shaft and having a plurality of saw blades that are internally separated by means of spacing elements in the form of rings. Furthermore, on the outside of each outer saw blade is provided a cutter. The cutters and the blades are fastened by means of outer rings, the whole set of saw blades, cutters and rings being fixed between a stop flange at one end of the sleeve and a tightenable nut at the opposed end of the sleeve. The sleeve and the appurtenant details are fixed upon the cantilever part of the driving shaft by means of a screw that is tightened in an axial, threaded hole in the driving shaft *per se*.

[0004] However, a drawback of the saw device that is schematically illustrated in EP 0 543 789 is that the blade-carrying sleeve quite simply has a cylindrical inner surface that is intended to cooperate by a snug fit with a cylindrical envelope surface on the cantilever part

of the driving shaft. The requirement of a snug fit involves difficulties on one hand in so far as the measure tolerances at manufacture not always become optimal, and on the other hand in so far as the mounting of the sleeve on the shaft as well as the demounting of the sleeve from the same become laborious and time-consuming. Therefore, during practical operation it is difficult to uphold a good centration of the sleeve relative to the geometrical axis of rotation; something that in turn may lead to unbalance and vibrations in the saw blades. Uttermost, this results in production disturbances and a deteriorated yield from the timber raw material.

Objects and Characteristics of the Invention

[0005] The present invention aims at removing the above-mentioned problems of the previously known technique and in a first aspect creating an improved saw device. Therefore, a primary object of the invention is to provide a saw device, whose blade-carrying sleeve is reliably centered relative to the geometrical axis of rotation of the driving shaft and fixed in a play-free condition upon the driving shaft without the operator having to take any complicated measures in connection with a resetting. It is also an object to provide a saw device whose sleeve and saw blades may be mounted and demounted in a simple, quick and smooth way. Moreover, the invention aims at providing a device the blade-carrying sleeve of which may be mounted and demounted on several occasions without causing any wear damages on the driving shaft *per se*; all this in order to guarantee a good useful life thereof.

[0006] According to the invention, at least the primary object is obtained by the features defined in the characterizing clause of claim 1. Advantageous embodiments of the saw device according to the invention are further defined in the dependent claims.

[0007] In a second aspect, the invention also aims at creating a saw blade unit and a saw blade of a new type. The features of these are given in claims 6 to 9.

Brief Description of the Appended Drawings

[0008] In the drawings

- Fig. 1 is a machine in which are included two saw devices according to the invention, the one saw device being shown with a saw blade unit mounted on the appurtenant driving shaft, while the other one is shown with the saw blade unit being demounted from the driving shaft,
- Fig. 2 is an enlarged, partly cut-exploded view showing on one hand a front part of the driving shaft, and on the other hand said saw blade unit being separated from the driving shaft,
- Fig. 3 is a longitudinal section showing the saw blade unit mounted on the driving shaft,

Fig. 4 is a side view of an individual saw blade, and
 Fig. 5 is a cut exploded view showing different saw blades and spacing elements separated from a sleeve included in the saw blade unit.

Detailed Description of a Preferred Embodiment of the Invention

[0009] The machine shown in Fig. 1 comprises two driving shafts 1 which are separately rotatable around geometrical axes of rotation designated A, of which shafts one is visible and designated 1. The shafts are mounted in bearings in two bearing housings 2 mounted in a stand generally designated 3. The driving shafts 1 are rotatable by means of suitable driving sources 4, e. g., electric motors and suitable gears. On a front cantilever part of each shaft is mounted a detachable unit 5 which, besides a carrying sleeve 6 (see Fig. 2), comprises a set of circular saw blades 7, whose number according to the example amounts to five. One saw blade unit 5 is mounted above the other one, the two units moreover being displaced laterally (perpendicularly to the plane of the drawing) relative to each other, so that the lower peripheral portions on the upper blades may be located somewhat underneath the level of the upper peripheral portions of the lower blades. Furthermore, it should be pointed out that the blades are inter-parallel, cooperating pairs of blades in the upper and lower units being located in a common vertical plane. This involves that a saw object passing between the driving shafts (perpendicularly to the plane of the drawing), e.g., a trunk block, may be imparted with board-separating through saw cuts extending vertically.

[0010] Reference is now made to Fig. 2 to 5 which in detail illustrate an individual saw device according to the invention. The driving shaft 1 comprises on one hand a comparatively study rear part 8 that is mounted in bearings in the appurtenant bearing housing in the machine, and on the other hand a front cantilever part 9 that is more slender than the part 8. A tapering transition portion between the shaft parts 8, 9 is designated 10. The shaft part 9 is delimited by a rear cylindrical surface and a long, somewhat tapering surface which at its front transposes into a pronouncedly conical surface 11, which in turn transposes into a reduced section 12 of cylindrical shape. In turn, the reduced section 12 transposes via a transversal ringshaped shoulder surface into an outer end section 12' having a smallest diameter. A gable surface, being perpendicular relative to the axis of rotation, on the end section 12' is designated 13.

[0011] The sleeve 6 has a cylindrical basic shape and has at its rear end an internal cone surface 14 that widens in a direction rearwardly. An analogous front cone surface 15 widens in a direction forwardly. This cone surface is provided on a thickened portion of the sleeve designated 16. More specifically, this thickened portion 16 is formed on the inside of the sleeve. At its rear end, this cone surface 15 transposes into a cylindrical sur-

face 17, whose diameter substantially coincides with the outer diameter of the reduced section 12 of the shaft part 9. At its back, the cylinder surface 17 transposes into a generally rotation-symmetrical surface 18 that comprises on one hand a conical surface and on the other hand a cylindrical or possibly a slightly conical surface. The envelope surface 19 of the sleeve 6 has a cylindrical basic shape.

[0012] At its rear end, the sleeve 6 has an outwardly directed flange 20 that carries a sealing ring 21. At the front end of the sleeve, a number of threaded holes 22 are recessed for equally many screws 23, by means of which a clamping ring 24 may be fastened in a direction towards the end surface of the sleeve. As may be most clearly seen in Fig. 5, the clamping ring 24 has the purpose of fixing the saw blades 7 and a number of rings 25 on the sleeve 6. Of these rings, four serve as spacing elements between the five saw blades, while the two rings on the outside of each outer saw blade mainly have the purpose of clamping each outer saw blade against the adjacent inner spacing ring. It should be observed that the planar shoulder surface 26 of the clamping ring 24 is only borne against by a corresponding, planar bearing surface 26' on the front ring 25, i.e., without coming in contact with the sleeve 6 *per se*. This involves that the clamping ring 24, when tightening the screws 23, attends to a distinct clamping of the saw blades and the rings 25 against the rear stop flange 20 of the sleeve. A co-rotative connection between the sleeve 6 and the driving shaft 1 may be attended to in different ways. For instance, in the rear end of the sleeve may be provided a number of peripherically separated seats (not shown) for the accomodation of equally many male elements (not shown) on the driving shaft. It should also be mentioned that ring-shaped carriers having cutters (not shown) may be provided between the outside of the two outer saw blades and the outermost rings 25.

[0013] It is obvious for the skilled man that the details shown in Fig. 5 together form a separate unit that may be mounted on and separated from the shaft part 9. Then a variable number of saw blades may be applied on the sleeve at an internal distance that may be varied by the use of differently wide rings 25. In other words, the saw blades may be set on the sleeve in a separate operation, separated from the machine.

[0014] In Fig. 2, reference numeral 27 designates a conical ring which has an external cone surface 28 which in a mounted state tapers off in a direction rearwards. This conical ring 27 cooperates with a nut 29 that has an internal thread (lacking a reference numeral) for the application on an external thread (lacking a reference numeral) on a central cylinder-shaped carrier body 30. In this carrier body 30 there are a suitable number (e.g., four) of holes 31 for screws 32 (see Fig. 3), by means of which the carrier body may be fixed on the gable surface 13 of the shaft part 9, more precisely by tightening the screws in a corresponding number of axial threaded holes in the shaft part 9. In practice, the conical

ring is slitted by a transversal slit, to be able to yield when being wedged up.

[0015] A special slit-ring designated 33 is provided outside the external, thinnest end section 12' of the shaft part.

[0016] Furthermore, in Fig. 2 is shown how a further ring 34 is provided in connection to the transition portion 10 of the driving shaft. This ring 34 bears against a transversal bearing surface 35 on the transition portion 10 and has a conical surface 36 that tapers off in a direction forwards. *Per se*, it is feasible to shape the cone surface 36 directly on the driving shaft as such, but it is preferred to use the special ring 34 that may be replaced after wearing out. Thus, also the ring 34 constitutes a wear ring. Equally to the conical ring 27, the ring 34 may be slitted by a transversal slit.

[0017] Reference is now particularly made to Fig. 3 which shows the device according to the invention in an assembled and mounted state. In this state, the rear cone surface 14 of the sleeve 6 bears against the cone surface 36 of the ring 34. Moreover, the cone surface 28 on the conical ring 27 is laid against the front cone surface 15 on the inside of the sleeve. Further, the cylindrical inner surface of the conical ring 27 bears against the outside of the slit-ring 33, which in turn is mounted snugly on the shaft section 12'.

[0018] The mounting as such of a ready-set saw blade unit 5 on the shaft part 9 is performed in the following way. In the operative state of the machine, the externally threaded carrier body 30 is steadily mounted on the free end of the shaft part 9, more precisely by means of the screws 32. Then the carrier body holds the slit-ring 33, which in this condition constitutes an integrated part of the driving shaft *per se*. However, when the saw blade unit 5 arrives to the machine, both the conical ring 27 and the nut 29 are removed from the driving shaft. In a first step, the sleeve 6 is slipped onto the shaft part and moved to a rear end position, in which the conical surface 14 is set against the cone surface 36. In the next step, the conical ring 27 is inserted between the cone surface 15 and the slit-ring 33, whereafter the nut 29 is tightened on the external thread of the carrier body 30. Thereby, the ring 27 is wedged up between the sleeve 6 and the driving shaft in order to jointly with the cooperating cone surfaces 14, 36 on one hand center the sleeve relative to the geometrical axis of rotation A, and on the other hand firmly fix the sleeve in a play-free condition.

[0019] As may be clearly seen in Fig. 3, the rotation-symmetrical (conical and cylindrical) surface 18 that extends along the major part of the length of the sleeve, has a diameter that throughout is at least somewhat larger than the diameter of the corresponding rotation-symmetrical surface on the shaft part 9. In this way, a ring-shaped gap 37 is formed between the inside of the sleeve and the outside of the shaft part 9. By the existence of this gap, the mounting and demounting of the sleeve on the driving shaft is considerably facilitated.

Thus, during a major part of its motion along the shaft part 9, the sleeve may be moved without the inside of the sleeve coming into contact with the outside of the shaft part. Only when the cone surface 14 approaches the cone surface 36, the cylinder surface 17 comes into contact with the reduced section 12. In practice, the fitting between the cylinder surface 17 and the envelope surface on the section 12 may be rather narrow, without for this reason being extremely fine. Of this reason, the fitting does not represent any important resistance against the slipping of the sleeve onto the shaft part. However, when the conical ring 27 and the nut 29 are applied, after the sleeve having been mounted on the shaft part 9, then the sleeve will be fixed in a position that is exactly centered relative to the geometrical axis of rotation A and in which the saw blades 7 are fixed without any gaps and extend at an angle of exactly 90° to the axis of rotation A.

[0020] The demounting of the saw blade unit 5 from the driving shaft is realized by the simple measure of untightening the nut 29 and removing the conical ring 27, whereafter the unit may be pulled off from the driving shaft.

[0021] The saw blade unit that is illustrated in Fig. 5 is characterized not only by the above-mentioned new features of the sleeve as such, but also by the new features of the individual saw blade 7 that is illustrated in Fig. 4. In a way known *per se*, this saw blade has a center hole 38 and a peripheral rim of saw teeth 40. It is characteristic for the saw blade of the invention, that a plurality of inter-separated protrusions 39 are formed in connection with the hole 38, i.e., at the hole edge surface of the blade. These protrusions 39 cooperate with a number of tangentially separated grooves (not shown) extending axially on the outside of the sleeve 6. When the blades are slipped onto the sleeve, the blades are guided in these grooves, whereby a co-rotative joint is guaranteed between the saw blade and the sleeve. It is also feasible to form such protrusions on the inside of each ring 25 in order to guarantee that the rings will not rotate around the sleeve during operation, although also other solutions to this problem are possible.

[0022] In the region between the center hole 38 and the outer tooth-rim 40 are a number of recesses for the mounting of cutting machining elements (not shown) that have the purpose of fine-trimming a saw cut accomplished by the teeth. According to the example in Fig. 4, three such recesses are provided.

[0023] A further advantage of the invention, besides the above-mentioned freedom from play and the centering possibility, is that the thread on the driving shaft required for the tightening nut 29, is provided on a carrier body 30 that is detachably connected with the driving shaft, more specifically via the screw joint 32. By this solution, the carrier body 30 may be made either in a left-handed embodiment or in a right-handed embodiment, whereby the nut may be reliably secured on the driving shaft, independently of the direction of rotation

of the latter, i.e., independently of whether the blade set unit is mounted on the upper or lower shaft in the machine according to Fig. 1.

Claims

1. A saw device including a driving shaft (1) that is rotatable about a geometrical axis of rotation (A), said shaft having a plurality of inter-parallel saw blades (7), which are co-rotatively connected to a sleeve (6) that is detachably located on a front cantilever part (9) of the driving shaft, which sleeve in turn is co-rotatively connected to the driving shaft, and on which there are, on one hand, spacing elements (25) between adjacent saw blades, and, on the other hand, means (20, 24) for holding the saw blades and the spacing elements at positions fixed axially along the sleeve, thereby forming an assembly that may be separately mounted on and demounted from said shaft part (9), **characterized in that** the sleeve (6) has, on one hand, a rear internal cone surface (14) that widens in a rearward direction and is applied against an external cone surface (36) on or in connection to the driving shaft, said external cone surface (36) tapering in a forward direction, and on the other hand a front internal cone surface (15) that widens in a rearward direction and is laid against an external cone surface (28) on a centering conical ring (27), said external cone surface (28) tapering in a rearward direction, said conical ring (27) being axially tightenable by means of a clamping means (29) that is directly or indirectly connected to the driving shaft.
2. Saw device according to claim 1, **characterized in that** the clamping device (29) is connected to the driving shaft via a thread-joint.
3. Saw device according to claim 2, **characterized in that** the clamping device consists of a nut (29) bearing against the conical ring, the internal thread of said nut being engaged with an external thread on a central cylinder-shaped carrier body (30) that is detachably connected with the front end of the driving shaft via a screw joint (32).
4. Saw device according to claim 3, **characterized in that** the carrier body (30) is applied against a substantially cylindrical slit-ring (33) that encompasses a front thin end section (12') of the driving shaft, the conical ring (27) being arranged outside the slit-ring (33).
5. Saw device according to any one of the preceding claims, **characterized in that** the front cone surface (15) of the sleeve (6) is formed on a thickened portion

(16) of the sleeve and transposes into a rotation-symmetrical internal surface (17) of a smallest diameter that cooperates with an equally rotation-symmetrical external surface on a reduced section (12) of the driving shaft, the part of the shaft that extends between the reduced section (12) and the area of the rear end of the sleeve having an outer diameter that is throughout smaller than the inner diameter of the corresponding part of the sleeve, whereby a ring-shaped gap (37) is formed between the inside of the sleeve and the outside of the driving shaft in order to facilitate the mounting and demounting, respectively, of the sleeve.

6. A saw blade unit for a saw device according to any one of the preceding claims, comprising a sleeve (6) and a plurality of saw blades (7) that are co-rotatively connectible to the sleeve and provided to be kept apart by means of spacing elements (25), the sleeve having means (20, 24) for holding the saw blades and the spacing elements in positions that are axially fixable along the sleeve, **characterized in that** the sleeve has, on one hand, a rear internal cone surface (14) that widens in a rearward direction, and, on the other hand, a front internal cone surface (15) that widens in a forward direction.
7. Saw blade unit according to claim 6, **characterized in that** the sleeve (6) on its outside has a plurality of tangentially separated, axially extending grooves for the accommodation of a number of protrusions (39) provided in connection with a center hole (38) in each saw blade, said protrusions having the purpose of guaranteeing a co-rotative connection between the saw blade and the sleeve.
8. Saw blade for a saw blade unit according to claim 6 or 7, comprising a peripheral rim of teeth and a center hole (38), **characterized in that** a number of separated protrusions (39) for engagement with a number of tangentially separated, axially extending grooves in the envelope surface of the sleeve (6) are provided in the vicinity of the center hole (38).
9. Saw blade according to claim 8, **characterized in that** in a region between the center hole (38) and the tooth rim (40) there are a number of recesses (41) for cutting machining elements that have the purpose of fine-trimming a saw cut accomplished by the teeth.

Patentansprüche

1. Sägevorrichtung, aufweisend eine Antriebswelle (1), die um eine geometrische Drehachse (A) drehbar ist, wobei die Welle mehrere in Bezug aufeinander

ander parallele Sägeblätter (7) aufweist, die gemeinsam drehbar mit einer Buchse (6) verbunden sind, die auf einem vorderen freitragenden Teil (9) der Antriebswelle lösbar angeordnet ist, wobei die Buchse ihrerseits mit der antreibenden Welle zur gemeinsamen Drehung verbunden ist, und wobei auf der Buchse einerseits Abstandhalterelemente (25) zwischen benachbarten Sägeblättern und andererseits eine Einrichtung (20, 24) zum Halten der Sägeblätter und der Abstandhalterelemente in Positionen vorgesehen sind, die entlang der Buchse axial festliegen, wodurch ein Aufbau gebildet ist, der getrennt auf dem Wellenteil (9) angebracht, und von diesem abnehmbar ist; **dadurch gekennzeichnet, dass** die Buchse (6) einerseits eine hintere interne Konusfläche (14) aufweist, die in Rückwärtsrichtung aufweitet und an einer externen Konusfläche (36) auf oder in Verbindung mit der Antriebswelle anliegt, wobei die externe Konusfläche (36) in Vorwärtsrichtung aufweitet, und andererseits eine vordere interne Konusfläche (15), die in Rückwärtsrichtung aufweitet und an einer externen Konusfläche (28) eines konischen Zentrierrings (27) anliegt, wobei die externe Konusfläche (28) in Rückwärtsrichtung aufweitet, wobei der konusförmige Ring (27) mittels einer Klemmeinrichtung (29) axial festziehbar ist, die direkt oder indirekt mit der Antriebswelle verbunden ist.

2. Sägevorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Klemmeinrichtung (29) mit der Antriebswelle über eine Gewindeverbindung verbunden ist.
3. Sägevorrichtung nach Anspruch 2, **dadurch gekennzeichnet, dass** die Klemmeinrichtung aus einer Mutter (29) besteht, die an dem Konusring anliegt, wobei das Innengewinde der Mutter sich im Eingriff mit einem Außengewinde auf einem zentralen zylinderförmigen Tragkörper (30) befindet, der mit dem Vorderende der Antriebswelle über eine Schraubverbindung (32) lösbar verbunden ist.
4. Sägevorrichtung nach Anspruch 3, **dadurch gekennzeichnet, dass** der Tragkörper (30) an einem im wesentlichen zylindrischen Schlitzring (33) zur Anlage gebracht ist, der einen vorderen dünnen Endabschnitt (12') der Antriebswelle umschließt, wobei der konusförmige Ring (27) außerhalb des Schlitzrings (33) zu liegen kommt.
5. Sägevorrichtung nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** die vordere Konusfläche (15) um die Buchse (6) auf einem verdickten Abschnitt (16) der Buchse gebildet ist, und in eine rotationssymmetrische Innenfläche (17) minimalen Durchmessers übergeht, die mit einer ebenfalls rotationssymmetrischen Außenfläche

verringerten Querschnitts (12) der Antriebswelle zusammenwirkt, wobei derjenige Teil der Welle, der sich zwischen dem verringerten Querschnitt (12) und dem Bereich des hinteren Endes der Buchse erstreckt, einen Außendurchmesser aufweist, der durchgehend kleiner ist als derjenige des Innendurchmessers des entsprechenden Teils der Buchse, wodurch ein ringförmiger Spalt (37) zwischen der Innenseite der Buchse und der Außenseite der Antriebswelle gebildet ist, um das Anbringen bzw. Abnehmen der Buchse zu erleichtern.

6. Sägeblatteinheit für eine Sägevorrichtung nach einem der vorangehenden Ansprüche, aufweisend eine Buchse (6) und mehrere Sägeblätter (7), die mit der Buchse zur gemeinsamen Drehung verbindbar und dazu ausgelegt sind, mittels Abstandhalterelementen (25) auf Abstand gehalten zu werden, wobei die Buchse eine Einrichtung (20, 24) zum Halten der Sägeblätter und der Abstandhalterelemente in Positionen aufweist, die entlang der Buchse axial festlegbar sind, **dadurch gekennzeichnet, dass** die Buchse einerseits eine hintere interne Konusfläche (14) aufweist, die in Rückwärtsrichtung aufweitet, und andererseits eine vordere interne Konusfläche (15), die in Vorwärtsrichtung aufweitet.
7. Sägeblatteinheit nach Anspruch 6, **dadurch gekennzeichnet, dass** die Buchse (6) auf ihrer Außenseite mehrere tangential getrennte, sich axial erstreckende Nuten zur Aufnahme einer Anzahl von Vorsprüngen (39) aufweist, die in Verbindung mit einem zentralen Loch (38) in jedem Sägeblatt vorgesehen sind, wobei die Vorsprünge dazu dienen, eine gemeinsam drehbare Verbindung zwischen dem Sägeblatt und der Buchse zu gewährleisten.
8. Sägeblatt für eine Sägeblatteinheit nach Anspruch 6 oder 7, aufweisend einen Zahnumfangsrand und ein zentrales Loch (38), **dadurch gekennzeichnet, dass** eine Anzahl von getrennten Vorsprüngen (39) zum Eingriff mit einer Anzahl von tangential getrennten, sich axial erstreckenden Nuten in der Umfangsfläche der Buchse (6) im Bereich des zentralen Lochs (38) vorgesehen ist.
9. Sägeblatt nach Anspruch 8, **dadurch gekennzeichnet, dass** in einem Bereich zwischen dem zentralen Loch (38) und dem Zahnrand (40) eine Anzahl von Eintiefungen (41) für Schneidverarbeitungselemente vorgesehen ist, die dazu ausgelegt sind, einen Sägeschnitt, der durch die Zähne ausgeführt ist, fein zuzurichten.

Revendications

1. Appareil de sciage incluant un arbre (1) d'entraîne-

- ment qui est mobile en rotation autour d'un axe géométrique de rotation (A), ledit arbre comportant plusieurs lames (7) de scie mutuellement parallèles, qui sont en prise pour rotation conjointe avec une douille (6) qui est placée de manière amovible sur une partie avant en porte-à-faux (9) de l'arbre d'entraînement, laquelle douille est, à son tour, en prise pour rotation conjointe avec l'arbre d'entraînement, et sur laquelle on trouve, d'une part, des éléments (25) d'espacement entre des lames de scie adjacentes et, d'autre part, des moyens (20, 24) destinés à maintenir les lames de scie et les éléments d'espacement à des positions fixes axialement le long de la douille, formant ainsi un ensemble que l'on peut monter et démonter séparément de ladite partie (9) d'arbre, **caractérisée en ce que** la douille (6) comporte, d'une part, une surface arrière interne conique (14) qui va en s'élargissant dans une direction vers l'arrière et qui est appliquée, contre une surface extérieure conique (36), audit arbre d'entraînement, ou en prise avec celui-ci, ladite surface extérieure conique (36) allant en s'effilant dans une direction vers l'avant et, d'autre part, une surface avant intérieure conique (15) qui va en s'élargissant dans une direction vers l'arrière et qui est disposée contre une surface extérieure conique (28) sur une bague conique (27) de centrage, ladite surface conique extérieure (28) allant en s'effilant dans une direction vers l'arrière, ladite bague conique (27) pouvant être serrée axialement à l'aide d'un moyen (29) de serrage qui est en prise directement ou indirectement avec l'arbre d'entraînement.
2. Appareil selon la revendication 1, **caractérisé en ce que** le dispositif (29) de serrage est en prise avec l'arbre d'entraînement via un raccord fileté.
 3. Appareil selon la revendication 2, **caractérisé en ce que** le dispositif de serrage est constitué d'un écrou (29) s'appuyant contre la bague conique, le filet intérieur dudit écrou engageant un filet extérieur situé sur un corps porteur central en forme de cylindre (30) qui est relié de manière amovible à l'extrémité de l'arbre d'entraînement via un raccord à vis (32).
 4. Appareil selon la revendication 3, **caractérisé en ce que** le corps porteur (30) est appliqué contre une bague à fente sensiblement cylindrique (33) qui confine une section mince (12') d'extrémité avant de l'arbre d'entraînement, la bague conique (27) étant agencée à l'extérieur de la bague à fente (33).
 5. Appareil l'une quelconque des revendications précédentes, **caractérisé en ce que** la surface avant conique (15) de la douille (6) est formée sur une partie épaissie (16) de la douille et se transforme en une surface intérieure (17) de rotation symétrique d'un diamètre minimal qui coopère avec une surface extérieure égale de rotation symétrique située sur une section réduite (12) de l'arbre d'entraînement, la partie de l'arbre qui s'étend entre la section réduite (12) et la zone de l'extrémité arrière de la douille ayant un diamètre extérieur qui est, sur toute sa longueur, plus petit que le diamètre intérieur de la partie correspondante de la douille, grâce à quoi un espace de forme annulaire est formé entre l'intérieur de la douille et l'extérieur de l'arbre d'entraînement dans le but de faciliter, respectivement, le montage et le démontage de la douille.
 6. Module de lames de scie d'un appareil selon l'une quelconque des revendications précédentes, comprenant une douille (6) et une pluralité de lames (7) de scie qui peuvent être mises en prise pour rotation conjointe avec la douille et qui sont prévues pour être maintenues espacées au moyen d'éléments (25) d'espacement, la douille comportant des moyens (20, 24) destinés à maintenir les lames de scie et les éléments d'espacement à des positions qui peuvent être fixées axialement le long de la douille, **caractérisé en ce que** la douille comporte, d'une part, une surface arrière intérieure conique (14) qui va en s'élargissant dans une direction vers l'arrière et, d'autre part, une surface avant intérieure conique (15) qui va en s'élargissant dans une direction vers l'avant.
 7. Module de lames de scie selon la revendication 6, **caractérisé en ce que** la douille (6) comporte, sur sa partie extérieure, une pluralité de rainures s'étendant axialement, séparées de manière tangentielle, destinées à la réception d'un certain nombre de saillies (39) réalisées en liaison avec un trou central (38) dans chaque lame de scie, lesdites saillies ayant pour rôle de garantir une prise de rotation conjointe entre la lame de scie et la douille.
 8. Lame de scie pour un module de lames de scie selon la revendication 6 ou 7, comprenant une couronne périphérique de dents et un trou central (38), **caractérisée en ce qu'un** certain nombre de saillies distinctes (39) destinées à engager avec un certain nombre de rainures s'étendant axialement et séparées de manière tangentielle de la surface d'enveloppe de la douille (6), est réalisé à proximité du trou central (38).
 9. Lame de scie selon la revendication 8, **caractérisée en ce qu'un** certain nombre d'évidements (41) destinés à des éléments d'usinage de coupe qui ont pour rôle d'ébarber finement une coupe de sciage effectuée par les dents est réalisé dans une région qui se trouve entre le trou central (38) et la couronne dentée (40).

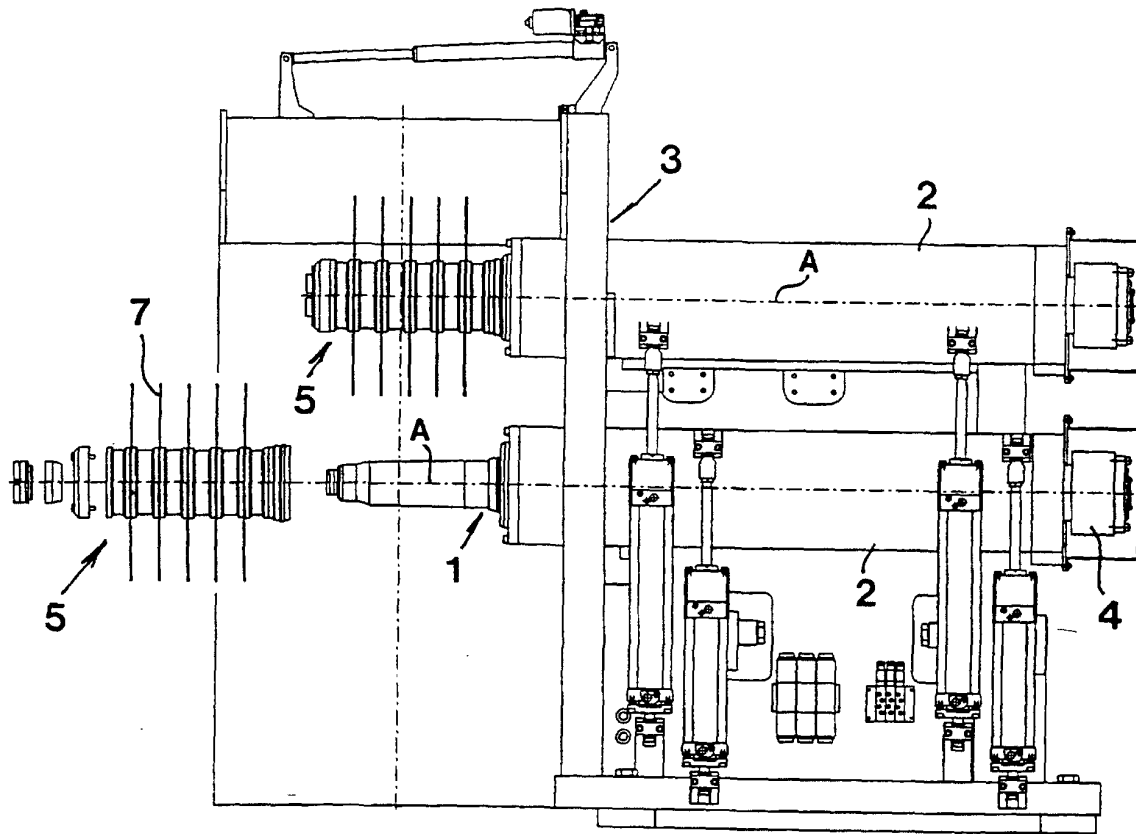


Fig 1

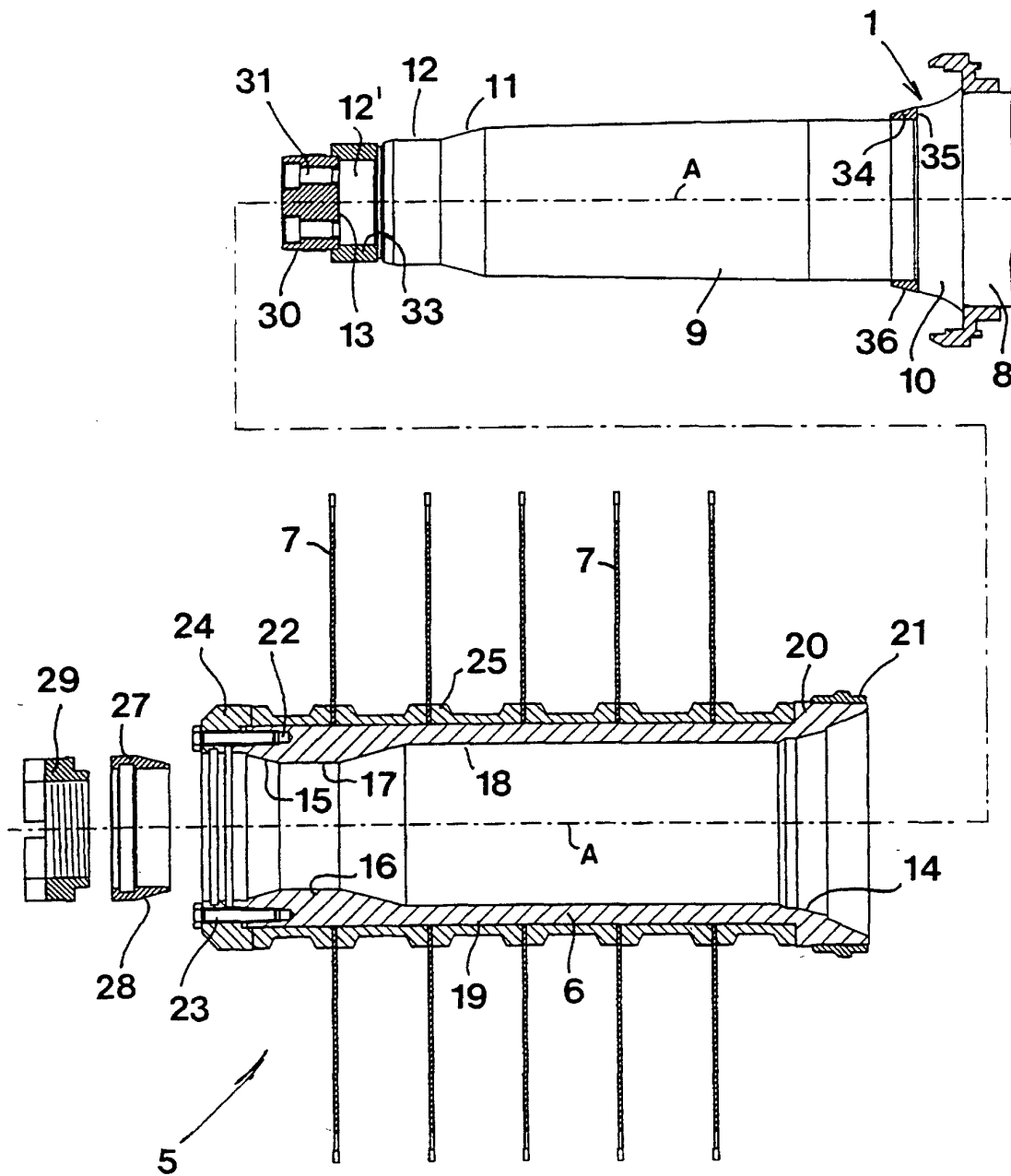
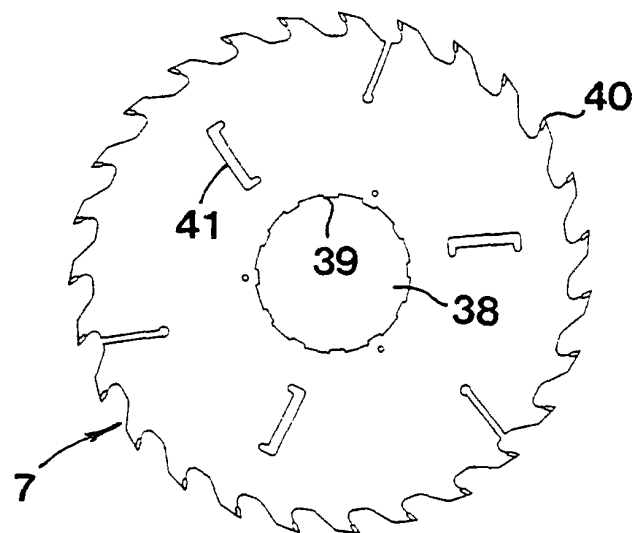
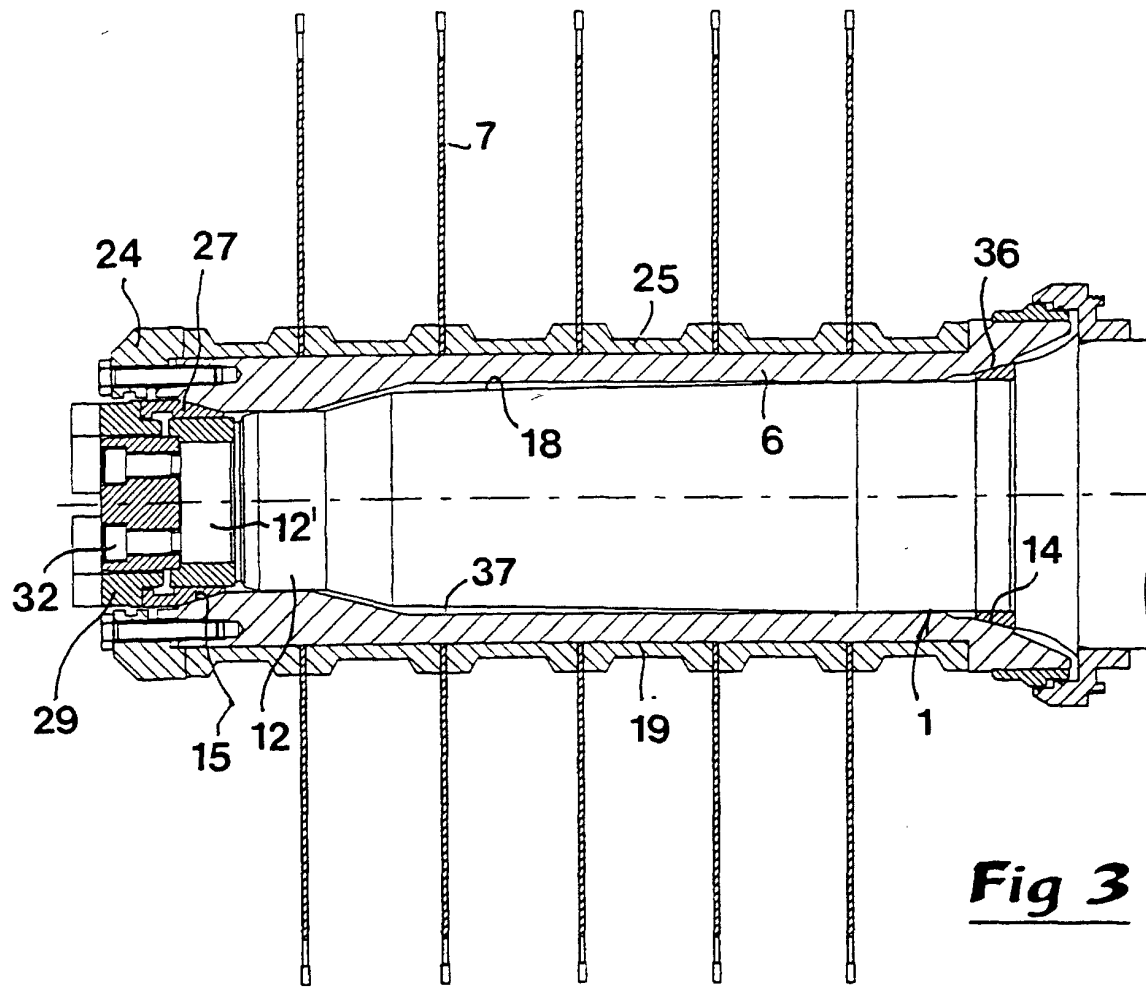


Fig 2



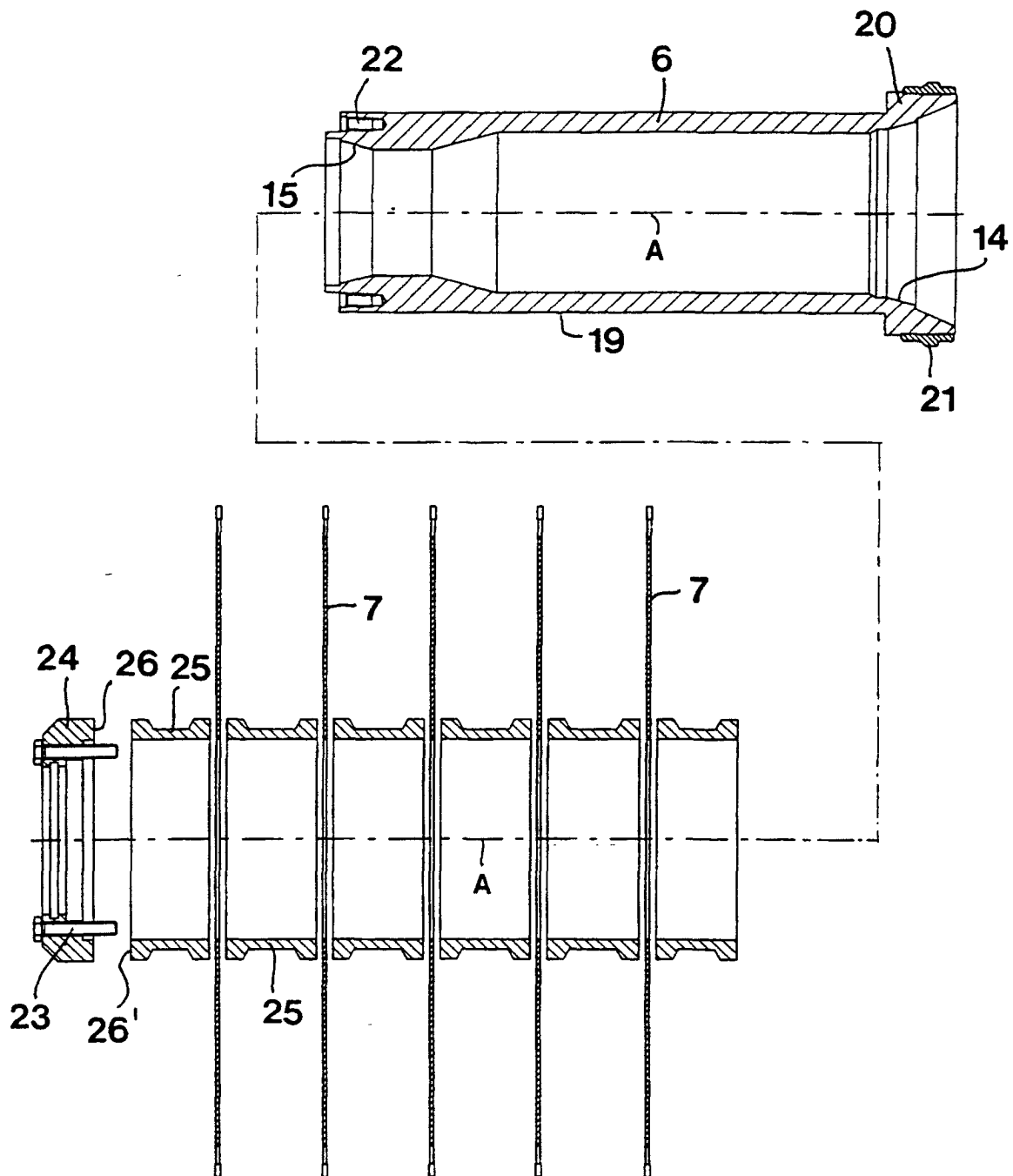


Fig 5