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

(11) EP 2 975 166 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
20.01.2016 Bulletin 2016/03

(51) Int Cl.:
D04C 7/00 *(2006.01)*

(21) Application number: **15275172.3**

(22) Date of filing: **13.07.2015**

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

(30) Priority: **14.07.2014 GB 201412502**
25.03.2015 GB 201505044

(71) Applicant: **Crayola, LLC**
Easton, Pennsylvania 18044-0431 (US)

(72) Inventors:
- **Morris, Oliver**
  London, Greater London SW15 SDE (GB)
- **Laguatan, Roseld V**
  Easton, PA 18044 (US)
- **Allen, James**
  Easton, PA 18044 (US)

(74) Representative: **Corbyn, David Jonathan**
Bailey Walsh & Co LLP
1 York Place
Leeds, LS1 2DR (GB)

(54) THREADING APPARATUS

(57) There is provided an apparatus for forming at least one threaded member. The apparatus includes a rotatable member, at least one holding member protruding from the rotating member, the at least one holding member having at least one spool and/or the like of a threaded material located thereon. The at least one holding member is offset to the axis of rotation of the rotating member such that upon rotation of said rotating member, the threaded material is wrapped around an article provided with the apparatus.

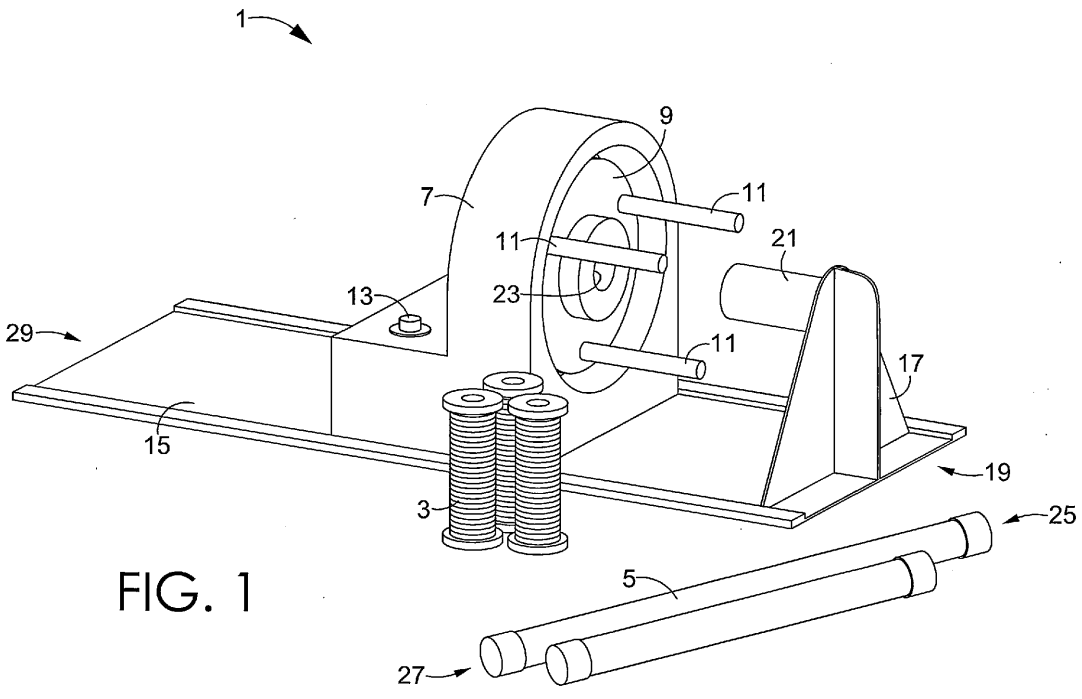

FIG. 1

EP 2 975 166 A2

Description

[0001] The invention to which this application relates is a threading apparatus.

[0002] Although the following description refers to a children's toy in the form of a thread-wrapping machine and a means for colouring threaded material, the person skilled in the art will appreciate that the present invention could also be used for other threading and/or winding purposes.

[0003] Children's toys enabling the user to thread and/or lace a plurality of articles together to form bracelets/anklets/ necklaces and/or the like have been known for some time. They can be provided in various forms, for example, some are provided with a single piece of thread, lace etc. on which charms and other decorative articles are threaded, creating a custom necklace, bracelet or anklet. Alternatively, a user may wish to create a customized bracelet, often termed a "friendship bracelet". This may involve intertwining a number of different threads about each other in order to create a more intricate design. Charms and other decorative articles may be added again in order to further customize the bracelet. Often, the children constructing jewellery items such as these will do so with their hands, and the process can be quite time consuming.

[0004] It is therefore an aim of the present invention to provide an apparatus for creating various threaded articles that overcomes the aforementioned problems.

[0005] It is a further aim of the present invention to provide a method of thread-wrapping to create a threaded article overcoming the problems associated with the prior art.

[0006] According to a first aspect of the invention there is provided an apparatus for forming at least one threaded member, said apparatus including: a rotatable member; at least one holding member protruding from said rotating member; said at least one holding member having at least one spool and/or the like of a threaded material located thereon, wherein said at least one holding member is offset to the axis of rotation of the rotating member such that upon rotation of said rotating member, the said threaded material is wrapped around an article provided with the apparatus.

[0007] Typically the article is substantially mounted along the axis of rotation of the rotatable member.

[0008] In one embodiment the rotatable member is mounted for rotation in a housing and the housing includes means to allow the powered or manual movement of the rotatable member.

[0009] In one embodiment the rotatable member has two or more holding members which are spaced apart. In one embodiment each of the holding members is offset from the axis of rotation and each is capable of receiving a spool or the like thereon.

[0010] In one embodiment, said apparatus is provided with a base portion. Typically, a support portion is provided on said base portion. Further typically, said article may be located on said support portion.

[0011] In one embodiment, said housing is movable on said base portion. Typically, said housing is movable relative to a support portion located on said base portion. Further typically, said support portion is fixed relative to said base portion.

[0012] In one embodiment, said housing is provided integral with said base portion and movable thereon with respect to the support portion.

[0013] In one embodiment, said housing is detachably attached to a base portion.

[0014] In one embodiment, said rotating member is provided with an aperture located therein. Typically, said aperture is located in a substantially central position on said rotating member. Further typically, said aperture is sized to receive said article.

[0015] In one embodiment, said article, located on said support portion, is received through said aperture upon movement of said housing along said base portion and towards said support portion.

[0016] In one embodiment, rotation of said rotating member is actuated by activation means. Typically, said activation means are in the form of switch means.

[0017] In one embodiment, rotation of said rotating member rotates said holding members about said article.

[0018] In one embodiment, three or more holding members are provided on said rotating member.

[0019] In one embodiment, said article is provided as a tubular member, having first and second ends. Typically, a first end of said article is detachably attached to a support portion.

[0020] In one embodiment, said two or more holding members, each having at least one spool and/or the like of a threaded material located thereon are located radially outward of a centrally located aperture on said rotating member. Typically, a first end of said threaded material is attached to a first end of said article. Further typically, a first end of threaded material of each spool and/or the like of threaded material on each holding member is attached to a first end of said article.

[0021] In one embodiment, said rotating member rotates said two or more holding members and, hence said spools and/or the like of threaded material about said article, causing two or more strands of threaded material to simultaneously wrap about said article.

[0022] In one embodiment, rotation of said rotating member continues until said article is wrapped in threaded material to an extent selected by the user.

[0023] In one embodiment, cover means are provided on said apparatus. Typically, said cover means acts as a protective guard against rotating components of the apparatus. Further typically, said cover means includes an aperture located substantially opposite an aperture on said rotating member. Yet further typically, said article is sized to be received through each of said apertures.

[0024] In one embodiment, wrapping of said threaded material about said article occurs within said cover means.

[0025] In one embodiment, said cover means is provided as a substantially transparent casing.

[0026] In one embodiment, two or more guide means are provided on said rotating member, associated with said two or more holding members. Typically, said guide means are provided with an aperture located therein. Further typically, said threaded material associated with each of said two or more holding members is received through the aperture located on the associated guide means.

[0027] In one embodiment, said article is located on a support portion. Typically, said support portion is separate from said apparatus.

[0028] In one embodiment, said support portion includes a first face and a second, opposing face.

[0029] In one embodiment, there is located a plate member on said first face of said support portion. Typically said plate member is rotatable with respect to the support portion. Further typically, said plate member is detachably attachable to said two or more holding members. Yet further typically, rotation of said plate member is actuated by rotation of said rotating member.

[0030] In one embodiment, said plate member includes an aperture located thereon. Typically, said aperture is located centrally of said plate member. Further typically, said aperture is sized to receive threaded material.

[0031] In one embodiment, said support portion includes an aperture located thereon. Typically, said aperture is located substantially in line with the aperture located on said plate member. Further typically, said aperture is sized to receive threaded material.

[0032] In one embodiment, said article is located on said second face of said support portion. Typically, said article is detachably attached to said second face.

[0033] In one embodiment, said article is rotatable with respect to said support portion. Typically, rotation of said article is actuated by rotation of said rotating member. Further typically, said article rotates at a slower angular velocity than that of said rotating member.

[0034] In one embodiment, guide means are located on said second face of said support portion. Typically, said guide means are provided with an aperture located therein.

[0035] In one embodiment, a first end of two or more spools of threaded material, located on said two or more holding members, are fed, in series, through associated guide means, through apertures located on said plate member and said support portion, through guide means located on said second face of said support portion, and attached to a first end of said article.

[0036] In one embodiment, rotation of said rotating member causes the threaded material of the two or more spools to intertwine. Typically, said threaded material is subsequently wrapped about said article. Further typically, said threaded material, wrapped about said article, comprises two or more individual strands of threaded material, creating a composite thread. Yet further typically, said composite thread is removable from said article.

[0037] In one embodiment, means for changing the colour of the thread may be included with said apparatus. Typically, said means is provided to alter the pigment of one or more strands of said threaded material. Further typically, said means is provided to dye said one or more strands of threaded material prior to wrapping said thread material about said article.

[0038] In a further aspect of the present invention, there is provided an apparatus for forming at least one threaded member about an article, said apparatus including: a rotating member; two or more holding members protruding from said rotating member; said two or more holding members each having at least one spool and/or the like of a threaded material located thereon, wherein upon rotation of said rotating member, two or more strands of threaded material associated with the two or more holding members simultaneously wrap around said article.

[0039] In one embodiment, said article, having said two or more strands of threaded material wrapped thereabout, forms at least a part of an item of jewellery, children's jewellery and/or the like.

[0040] In yet a further aspect of the present invention there is provided an apparatus for forming at least one threaded member, said apparatus including: a rotating member; two or more holding members protruding from said rotating member; said two or more holding members each having at least one spool and/or the like of a threaded material located thereon, wherein upon rotation of said rotating member, two or more strands of threaded material associated with the two or more holding members simultaneously wrap about each other and subsequently around said article.

[0041] In one embodiment, said threaded member is a composite of two or more strands of threaded material. Typically, said threaded member can be removed from said article to form an item of jewellery, children's jewellery and/or the like.

[0042] In one embodiment, two or more guide means are provided on said rotating member, associated with said two or more holding members. Typically, said guide means are provided with an aperture located therein. Further typically, said threaded material associated with each of said two or more holding members is received through the aperture located on the associated guide means.

[0043] In yet a further aspect of the present invention there is provided a method of forming at least one threaded member about an article, said method including the steps of: providing an apparatus including a rotating member, providing at least one holding member protruding from said rotating member; providing on said at least one holding member at least one spool and/or the like of a threaded material located thereon; connecting the end of the threaded material to a first end of said article; rotating said rotating member such that said threaded material wraps around said article.

[0044] In yet a further aspect of the present invention there is provided a method of forming at least one threaded member, said method including the steps of: providing an apparatus including a rotating member; two or more holding members protruding from said rotating member, said two or more holding members each having at least one spool and/or the like of a threaded material located thereon, guide means associated with each of said two or more holding members; feeding ends of two or more strands of threaded material associated with the two or more holding members through apertures located on said guide means and connecting the same to a first end of an article, said article located on a support portion attachable to said apparatus; attaching said support portion to said apparatus, and wherein upon rotation of said rotating member, said strands of threaded material associated with the two or more holding members simultaneously wrap about each other and subsequently around said article, forming a threaded member that is a composite of two or more strands of threaded material.

[0045] In another aspect of the present invention there is provided an apparatus for colouring threaded material, said apparatus including: a drive member configured to rotate at least one spool; a primary thread guide comprising a passage configured to guide a threaded material as the threaded material is wound onto the at least one spool; the primary thread guide further comprising a receptacle adapted to receive a marking device, and wherein the receptacle is configured to dispose a colorant-delivering portion of the marking device against the threaded material.

[0046] In one embodiment, said at least one spool is in the form of at least one take-up spool.

[0047] In one embodiment, the primary thread guide is movably mounted on a primary guide support member. Typically, said primary thread guide is movable between a location nearer a first end of the take-up spool and a location nearer a second end of the take-up spool.

[0048] In one embodiment, the apparatus includes a pay-out support member, said pay-out support member rotatably supporting at least one pay-out spool.

[0049] In one embodiment, the apparatus further includes a pay-out thread guide, which guides the thread material toward the primary thread guide as the thread material is unwound from the pay-out spool.

[0050] In one embodiment, the apparatus further comprises a housing having a face. Typically, the drive member, the primary guide support member, the pay-out support member, and the pay-out thread guide protrude from the face of the housing. Further typically, the face is removable from the housing.

[0051] In one embodiment, cover means are affixed to the housing. Typically, the cover means at least partially encases the drive member, the primary guide support member, the primary thread guide, the pay-out support member and the pay-out thread guide. Further typically, the cover means is positioned as a protective guard against rotating components of the apparatus. Yet further typically, said cover means is at least partially transparent.

[0052] In one embodiment, a portion of the cover means forms an aperture positioned such that the aperture accepts the marking device when the marking device is inserted into the receptacle of the primary thread guide. Typically, the aperture is sized to permit movement of the marking device with respect to the primary guide support member when the primary thread guide moves longitudinally with respect to the take-up spool.

[0053] In one embodiment, at least a portion of the primary thread guide extends beyond the cover means. Typically, said portion comprises a notch, catch and/or the like that engages an edge of the cover means.

[0054] In one embodiment, the receptacle adapted to receive a marking device forms at least part of a colouring assembly.

[0055] In one embodiment, the colouring assembly includes a colorant applicator holding portion. Typically, said colorant applicator holding portion receives a colorant applicator. In one embodiment, the colouring assembly further includes a passage configured to receive a thread and to dispose the thread against the colorant applicator as the thread is wound onto the at least one take-up spool. Typically, the colouring assembly is positioned to direct thread drawn through the passage towards a portion of the at least one take-up spool.

[0056] In one embodiment, a support member is provided to movably support the colouring assembly, such that movement of the colouring assembly changes the portion of the take-up spool toward which the thread is directed.

[0057] In a further aspect of the present invention, there is provided an apparatus for colouring threaded material, said apparatus including: a pay-out support member configured to support a pay-out spool; a drive member configured to rotate a take-up spool; and a colouring assembly, said colouring assembly comprising a colorant applicator holding portion configured to receive a colorant applicator, and a passage configured to receive a thread and to dispose the thread against the colorant applicator as the thread is wound onto the take-up spool, wherein the colouring assembly is positioned to direct the thread drawn through the passage toward a portion of the take-up spool.

[0058] In a further aspect of the present invention, there is provided a method for colouring a thread material, said method including the steps of: positioning a take-up spool on a holding member that protrudes from a rotatable member that is mounted in a housing; positioning a pay-out spool comprising the thread material on a pay-out support member; feeding the thread material around a payout thread guide and through a passage in a primary thread guide, wherein the payout thread guide is configured to guide the thread material toward the primary thread guide as the thread material is unwound from the payout spool, and wherein the primary thread guide is positioned to direct the thread material toward a portion

of the take-up spool as the thread material is unwound from the payout spool and wound onto the take-up spool, wherein the primary thread guide comprises a receptacle adapted to receive a marking device, and wherein the passage in the primary thread guide is configured to dispose the thread material against a colorant delivering portion of the marking device; attaching the thread material to the take-up spool; positioning the marking device in the receptacle; rotating the rotatable member, wherein the thread material is drawn through the passage in the primary thread guide and wound onto the take-up spool, wherein the thread material is coloured by the colorant delivering portion of the marking device as the thread material is drawn through the passage.

[0059] In one embodiment, the method further includes moving the primary thread guide along an axis of a primary guide support member that movably supports the primary thread guide, wherein the movement of the primary thread guide changes the portion of the take-up spool toward which the thread material is directed.

[0060] In one embodiment, the method further includes affixing a cover to the housing, the cover at least partially encasing the holding member, the primary guide support member, the primary thread guide, the pay-out support member, and the pay-out thread guide, and wherein the cover is positioned as a protective guard between a user and one or more moving components of the apparatus.

[0061] Embodiments of the present invention will now be described with reference to the accompanying figures, wherein:

Figure 1 illustrates an apparatus in accordance with an embodiment of the present invention.

Figure 2 illustrates an apparatus with spools of threaded material affixed thereto, in accordance with another embodiment of the present invention.

Figure 3 illustrates an apparatus with spools of threaded material and an article affixed thereto, in accordance with another embodiment of the present invention.

Figure 4 illustrates an apparatus having a cover means in accordance with an embodiment of the present invention.

Figure 5 illustrates an apparatus and support portion in accordance with an embodiment of the present invention.

Figure 6 illustrates an apparatus and support portion with threaded material fed therethrough, in accordance with an embodiment of the present invention.

Figure 7 illustrates a close-up view of an apparatus in accordance with an embodiment of the present invention.

Figure 8 illustrates a close-up view of a support portion of an apparatus in accordance with an embodiment of the present invention.

Figure 9 illustrates an apparatus and support portion connected and in use, in accordance with an embodiment of the present invention.

Figure 10 illustrates an exemplary apparatus for colouring a threaded material in accordance with an embodiment of the invention.

Figure 11 illustrates an enlarged portion of an exemplary apparatus for colouring a threaded material in accordance with an embodiment of the invention.

Figure 12 illustrates an enlarged cross sectional view of exemplary thread guide in accordance with an embodiment of the invention.

Figure 13 illustrates an exemplary apparatus for colouring a threaded material in accordance with an embodiment of the invention.

Figure 14 illustrates an exemplary apparatus for colouring a threaded material in accordance with an embodiment of the invention.

[0062] Referring firstly to Figures 1-3, there is provided an apparatus in the form of a thread-wrapping machine (1) provided to enable thread from a number of spools (3) to be simultaneously wrapped about an article (5). The thread-wrapping machine (1) includes a housing (7) in which there is located a rotating member in the form of a disc (9). In this embodiment the disc (9) has a number of holding members in the form of spool holding bars (11) protruding outwardly therefrom, on which the spools (3) may be placed. Although the present example illustrates three holding bars (11) on the disc (9), the skilled person will appreciate that this number may vary depending on the specifications of the thread wrapping machine. Rotation of the disc (9) is activated by switch (13) located on the housing (7) of the apparatus (1). The housing (7) of the apparatus (1) is located on a base (15) and is movable therealong relative to a supporting portion (17), located at an end (19) of the base (15), which is fixed in position on the base (15). A support bar (21) is provided on the supporting portion (17), protruding outwardly therefrom toward the housing (7). A central hole (23) is formed in the rotating disc (9) and extends through the housing (7) of the apparatus (1). The hole (23) is located substantially in line with the support bar (21).

[0063] A first end (25) of the article (5) about which thread is to be wrapped is attached to the support bar (21). The article (5) has a maximum radius sized to fit through the hole (23) in the housing (7) and once located on the support bar (21), a second end (27) of the article (5) extends through the hole (23), allowing the housing

(7) to move back and forth along the base (15) with the article (5) sliding through the hole (23). With the spools (3) located on their respective holding bars (11), the ends of each strand of thread are taken and attached to the first end (25) of the article (5), with the housing (7) located in close proximity to the supporting portion (17) initially. Once the thread ends are attached to the article (5), the switch (13) is activated, causing the disc (9), and consequently the holding bars (11) and spools (3), to rotate about the article (5). During rotation, thread is unwound from the spools (3) forming a layer of multiple strands of thread simultaneously wrapped about the article (5). As the article (5) is wrapped with thread, the housing (7) is moved gradually away from the supporting portion (17) along the base, thereby exposing more of the article (5) to be wrapped. The spools (3) of thread may be provided in various colours, resulting in a varying range of colours and/or patterns of thread wrapped about the article (5). Once the article (5) has been wrapped / covered in thread to a sufficient degree or to a user's satisfaction, rotation of the disc (9) is ceased via the switch (13), the housing (7) moved to a distal end (29) of the base away from the supporting portion (17), thereby allowing the article (5), now wrapped in multiple strands of thread, to be removed from the support bar (21).

[0064] The article (5) may subsequently be used as an item of novelty / children's jewellery, or as an accessory / attachment to an item of children's jewellery.

[0065] While the housing (7) of the thread-wrapping machine (1) is movable along the base portion (15) with respect to the supporting portion (17), it may also be detachably attached thereto, allowing a user to remove the housing (7) for maintenance, repair, or even use without the need for the base or supporting portions (15, 17).

[0066] Figure 4 illustrates an alternative embodiment of the thread-wrapping machine (401), which includes a protective cover (431) located thereon. The cover (431) encases the holding bars (411) and, hence, the spools (403) thereby preventing any fast-moving parts from becoming detached from the apparatus while moving and causing injury to a user. In order for an article to be wrapped when the apparatus (401) is presented in this form, the cover (431) includes a hole (433) located in its face opposite the central hole (423) of the housing (407). In this embodiment, a user holds the article (not shown) as it passes through the holes (433, 423) and is wrapped in thread. The cover (431) is also provided as a transparent body, enabling the user to view the progress of the thread-wrapping action.

[0067] Referring now to Figures 5-9, there is provided the housing (7) of the thread-wrapping machine (1) depicted in Figures 1-3. However, in this particular embodiment, the main body has been detached from the base portion (15). Guide means (535) are affixed to the rotating disc (9), each of which is associated with a corresponding holding bar (11), and located radially between each holding bar (11) and the central hole (23). Each guide means (535) has a guide hole (537) through which thread from each pool (3) is fed. Such a feature allows the individual thread strands to be combined and, upon rotation of the disc (9), intertwined, thereby creating a composite thread made from two, three or potentially more individual strands of thread.

[0068] An alternative supporting portion (517) is provided, which includes two faces. On the first face (539) there is located a plate (541), which is rotatable with respect to the supporting portion (517). The plate (541) can be attached to the holding bars (11) of the housing (7) or spools (3) located thereon. Such an attachment provides a connection between the supporting portion (517) and the housing (7) of the apparatus (1), such that upon rotation of the disc (9), the plate (541) is caused to rotate at the same angular velocity. The plate (541) includes a hole (543) located centrally thereon and in line with the hole (23) of the rotating disc (9) and a further hole (545) located on the supporting portion (517) extending through its first face to a second, opposing face (547). The holes (543, 545) are sized to allow strands of thread to pass therethrough. An alternative article (505) is located on the second face (547) of the supporting portion (517). The article (505) may be detachably attached to the supporting portion and, while attached, is rotatable with respect to the sporting portion (517). Rotation of the article (505) is actuated by rotation of the disc (9) and, consequently, the plate (541). However, the article (505) is arranged to rotate at a slower angular velocity than that of the disc (9) and the plate (541). Additional guide means (549) is provided on the second face (547) of the supporting portion (517) having a guide hole (551) located therein. The guide means (549) allows thread, which has been fed through guide holes (537) and subsequently holes (543, 545) in the plate (541) and supporting portion (517), to be fed through its guide hole (551) and finally attached to a first end (525) of the article (505). As the switch (13) is activated and the disc (9) rotates, the strands of thread from each spool (3) begin to intertwine with one another and are slowly fed onto and wrap around the article (505), creating a composite thread formed from multiple individual strands of thread. In theory, if several lengths of composite thread are formed, these can be put through the same process as the spools (3) of individual thread, thereby creating a secondary composite thread, and so on. Once wrapping of the thread about the article (505) is complete, the composite thread may be removed and used as an item of children's jewellery, such as a necklace, bracelet, friendship bracelet, anklet and/or the like.

[0069] Additionally, dying apparatus such as a marker (not shown) may be affixed to the apparatus and arranged so as to colour and/or recolour one or more of the strands of thread as they unwind from their respective spools. This feature may be added to alter the colour of a particular thread prior to it being intertwined with other thread strands and/or being wrapped about the article. For example, a user may affix a spool of white thread and wish to colour it prior to wrapping. This can be

achieved by the provision of an appropriately coloured marker located in position on the apparatus. Several locations for markers may be provided so a user can, if they choose, colour each spool of thread that is place on the holding bars of the thread-wrapping machine.

[0070] Referring now to Figure 10, an exemplary apparatus for colouring a threaded material is depicted, and is generally referred to as apparatus 1000. Apparatus 1000 is but one example of a suitable apparatus, and is not intended to suggest any limitation as to the scope of use or functionality of embodiments of the invention. Neither should apparatus 1000 be interpreted as having any dependency or requirement relating to any single component or combination of components illustrated therein.

[0071] In one embodiment, apparatus 1000 includes a housing 1010 that includes or encloses a rotatable member (not shown), and which includes a drive (not shown) that rotates the rotatable member. The drive may be powered, such as by electricity, a windup mechanism, and so forth, or may be manually driven such as by a knob, crank, or lever, among others. Apparatus 1000 also includes a holding member 1012 that protrudes from the rotatable member, which is configured to receive a take-up spool 1014. In an embodiment, holding member 1012 includes a longitudinal shaft having a cross section that matches a cross section of a hole in the centre of take-up spool 1014, such that the spool rotates with holding member 1012. In another embodiment, holding member 1012 utilizes a gripping portion (not shown) that removably engages an end of take-up spool 1014. Non-limiting examples of the gripping portion include a circular recess, prongs, jaws, magnetic couplings, and so forth.

[0072] Apparatus 1000 also includes a primary thread guide 1016 that includes a passage 1018 through which the threaded material (not shown) is drawn as the threaded material is wound onto take-up spool 1014, and which directs the threaded material toward take-up spool 1014, according to one embodiment of the invention. Primary thread guide 1016 also includes a receptacle 1020 that is configured to receive and hold a colorant applicator or marker, such as a felt-tipped marker. Passage 1018 is positioned such that the threaded material is held against the marking portion (e.g., the tip) of the inserted marker as the threaded material is drawn through passage 1018. In the exemplary embodiment of Figure 10, primary thread guide 1016 is mounted on a primary guide support member 1022. In an embodiment, primary guide support member 1022 includes a shaft 1038 on which primary thread guide 1016 is movably mounted, such that primary thread guide 1016 is slidable back and forth along the shaft 1038 of primary guide support member 1022. The movement of primary thread guide 1016 causes the threaded material to be directed to different portions along take-up spool 1014. For example, moving primary thread guide 1016 back and forth causes the threaded material to be wound more evenly on take-up spool 1014. Primary thread guide 1016 may also be affixed to a movable member of primary guide support member 1022, such that the movable member enables primary thread guide 1016 to be moved.

[0073] Apparatus 1000 also includes a pay-out support member 1024 configured to rotatably support a pay-out spool (not shown) that holds the threaded material to be coloured. In an embodiment, pay-out support member 1024 includes a fixed shaft on which the pay-out spool rotates freely. In another embodiment, the shaft of pay-out support member 1024 may be rotatable, such that the shaft and pay-out spool rotate together. In another embodiment, pay-out support member 1024 utilizes a rotatable gripping portion that removably engages an end of the pay-out spool. Examples of a gripping portion include, but are not limited to, a circular recess, prongs, jaws, magnetic couplings, and so forth. Apparatus 1000 also includes a pay-out thread guide 1026 configured to guide the threaded material toward primary thread guide 1016 as the threaded material is unwound from the pay-out spool.

[0074] Apparatus 1000 also includes a cover 1028 attached to the housing, which at least partially encases or covers holding member 1012, primary guide support member 1022, primary thread guide 1016, pay-out support member 1024, and/or pay-out thread guide 1026. Cover 1028 is generally positioned between a user and the moving components of apparatus 1000 and serves as a protective shield. Cover 1028 may be at least partially transparent. A portion of cover 1028 forms an aperture 1030 positioned above primary thread guide 1016 such that a marker (not shown) may pass through aperture 1030 when inserted into receptacle 1020 of primary thread guide 1016. In an embodiment, the dimensions of aperture 1030 are such that the perimeter of aperture 1030 does not interfere with movement of the marker, which moves with primary thread guide 1016. In an embodiment, the dimensions of aperture 1030 are such that the perimeter of aperture 1030 limits movement of the marker and primary thread guide 1016 within a range that corresponds to the central winding portion of take-up spool 1014. This ensures that primary thread guide 1016 cannot be moved far enough in either direction to guide the threaded material off the end of take-up spool 1014. In an embodiment, movement of primary thread guide 1016 corresponds to manual movement of the marker by the user holding the marker, including moving the marker back and forth as the thread is wound onto take-up spool 1014. In an embodiment, the movement of primary thread guide 1016 is automatic. In another embodiment, a portion 1032 of primary thread guide 1016 extends beyond cover 1028 and may be used as a handle by the user to move primary thread guide 1016 with respect to primary guide support member 1022. As depicted in FIG. 10, portion 1032 of primary thread guide 1016 extends beneath a lower edge 1034 of cover 1028 and includes a notch 1036 that engages the lower edge 1034 of cover 1028.

[0075] Referring now to Figure 11, an enlarged portion of an embodiment of apparatus 1000 is depicted and is

generally referred to as apparatus portion 1100. Apparatus portion 1100 is but one example of a suitable portion of apparatus 1000, and is not intended to suggest any limitation as to the scope of use or functionality of embodiments of the invention. Neither should apparatus portion 1100 be interpreted as having any dependency or requirement relating to any single component or combination of components illustrated therein.

[0076] Apparatus portion 1100 includes holding member 1012, take-up spool 1014, primary thread guide 1016, primary guide support member 1022, pay-out support member 1024, and pay-out thread guide 1026, which are described above with regard to Figure 10. Also depicted is a pay-out spool 1110 rotatably supported by pay-out support member 1024. Pay-out spool 1110 is wound with a thread 1120 to be coloured. Thread 1120 passes around pay-out thread guide 1026, passes through passage 1018 in primary thread guide 1016, and is wound onto take-up spool 1014, according to one embodiment.

[0077] As depicted, a marker 1130 is inserted into receptacle 1020 of primary thread guide 1016. As described above with regard to Figure 10, passage 1018 is positioned such that thread 1120 is held against the marking portion (e.g., the tip and/or nib) of marker 1130. In an embodiment, as take-up spool 1014 rotates in a clockwise direction with respect to a central axis of the holding member 1012, thread 1120 is unwound from pay-out spool 1110 in a clockwise direction with respect to a central axis of pay-out support member 1024, is drawn through passage 1018 in primary thread guide 1016, and is wound onto take-up spool 1014. Additionally, based on positioning of a marker 1130 within the receptacle 1020, thread 1120 is drawn through passage 1018 and colorant from the marking portion of marker 1130 is deposited onto the thread. For example, a saturated nib of the marker 1130 may contact and/or engage at least a portion of the thread 1120 passing through passage 1018, to provide a coloured thread 1122.

[0078] In an embodiment, apparatus portion 1100 does not include housing 1010 described above with regard to Figure 10. Instead, the components of apparatus portion 1100 may be coupled to at least a portion of housing 7 that is usable with an embodiment of the thread wrapping machine as illustrated in Figures. 1-9 and discussed in detail in the Applicant's co-pending British patent application no. 1412502.5. In an embodiment, disc 9 and the attached fixtures are removable from housing 7, and apparatus portion 1100 is configured to be removably affixed to housing 7 in place of disc 9. The rotatable member (described above with regard to Figure 10) and/or holding member 1012 may then be rotated directly or indirectly by a drive within housing 7. In an embodiment, a portion of housing 7 adjacent to disc 9 is removable, such that the portion of housing 7 and disc 9 are removed together, and the partial housing affixed to apparatus portion 1100 is configured to removably attach to housing 7 in place of the removed portion of housing 7.

[0079] Referring now to Figure 12, a cross-sectional view of an embodiment of primary thread guide 1016 is depicted, and is generally referred to as cross-sectional view 1200. Primary thread guide 1016 is but one example of a suitable primary thread guide, and is not intended to suggest any limitation as to the scope of use or functionality of embodiments of the invention. Neither should primary thread guide 1016 be interpreted as having any dependency or requirement relating to any single component or combination of components illustrated therein.

[0080] As described above with regard to Figure 10, in an embodiment primary thread guide 1016 is mounted on a primary guide support member 1022 which includes a shaft 1038 on which primary thread guide 1016 is movably mounted, such that primary thread guide 1016 is slidable back and forth along a longitudinal axis of the shaft 1038 of primary guide support member 1022. In an embodiment, the shaft 1038 of primary guide support member 1022 has a cross-sectional shape that matches a cross-sectional shape of an opening 1124 in primary thread guide 1016, such that primary thread guide 1016 is maintained in an upright position, or in a non-rotating position, as primary thread guide 1016 slides along an axis of primary guide support member 1022. In an embodiment, the cross section of primary guide support member 1022 approximates a "plus sign" as depicted in Figure 12. As such, the external surface of the primary support guide 1022 may correspond to an internal surface of the opening 1124 in the primary thread guide 1016, which restricts rotation of the primary thread guide 1016 and maintains alignment between the thread 1120 and the receptacle 1020. The cross-section of primary guide support member 1022 may also have other shapes corresponding to an internal surface of the opening 1124.

[0081] Cross-sectional view 1200 also depicts marker 1130 that is inserted into receptacle 1020, contacting at least a portion of thread 1120 to provide coloured thread 1122. As depicted, thread 1024 passes through passage 1018 and is disposed against a marking portion 1210 of marker 1130. Marker 1130 and/or marking portion 1210 may be any portion of a marking device configured to deliver a colouring solution and/or apply a colour to the thread 1120, such as a broad line Crayola® marker from Easton, PA. In one aspect, a colouring solution within a marker reservoir is directed onto the thread 1120 based on contacting the marker nib 1210. Examples of a colouring solution include a fabric marker solution, a permanent marker solution, ink, dye, and so forth. As thread 1024 is drawn through passage 1018 it is coloured by marking portion 1210 to provide coloured thread 1122.

[0082] Referring now to Figure 13, an exemplary embodiment of apparatus 1000 is depicted with pay-out spool 1110, thread 1120, and marker 1130. The depicted embodiment is but one example of a suitable apparatus, and is not intended to suggest any limitation as to the scope of use or functionality of embodiments of the invention. Neither should the depicted embodiment be interpreted as having any dependency or requirement relating to any single component or combination of com-

ponents illustrated therein.

[0083] As depicted, primary thread guide 1016 is located near the distal end of primary guide support member 1022. As take-up spool 1014 rotates, thread 1120 is unwound from pay-out spool 1110, passes around pay-out thread guide 1026, and is drawn through passage 1018 in primary thread guide 1016, where it is coloured by marker 1130. The resultant coloured thread 1122 is wound onto the distal end of take-up spool 1014, corresponding to the position of primary thread guide 1016 along the central axis of the primary guide support member 1022.

[0084] Referring now to Figure 14, an embodiment of apparatus 1000 is depicted with pay-out spool 1110, thread 1120, and marker 1130. As described above, thread 1120 is coloured by marker 1130 as it is drawn through passage 1018 in primary thread guide 1016. Figure 14 depicts primary thread guide 1016 as moved to the proximal end of primary guide support member 1022 during the winding of coloured thread 1122 onto take-up spool 1014. Accordingly, the movement of primary thread guide 1016 causes coloured thread 1122 to be wound evenly along take-up spool 1014. In an embodiment, primary thread guide 1016 is moved manually, while take-up spool 1014 is mechanically or automatically rotated during colouring.

Claims

1. Apparatus for forming at least one threaded member, said apparatus including:

   a rotatable member;
   at least one holding member protruding from said rotating member;
   said at least one holding member having at least one spool and/or the like of a threaded material located thereon, wherein said at least one holding member is offset to the axis of rotation of the rotating member such that upon rotation of said rotating member, the said threaded material is wrapped around an article provided with the apparatus.

2. Apparatus according to claim 1, wherein the article is substantially mounted along the axis of rotation of the rotatable member.

3. Apparatus according to claim 1, wherein the rotatable member is mounted for rotation in a housing and the housing includes means to allow the powered or manual movement of the rotatable member.

4. Apparatus according to claim 1, wherein said apparatus is provided with a base portion, wherein said housing is movable on said base portion relative to a support portion located on said base portion.

5. Apparatus according to claim 1, wherein said rotating member is provided with an aperture located therein, wherein said aperture is located in a substantially central position on said rotating member and is sized to receive said article.

6. Apparatus according to claim 5, wherein said article is located on a support portion and is received through said aperture upon movement of said housing along a base portion and towards said support portion.

7. Apparatus according to claim 1, wherein rotation of said rotating member rotates said holding member about said article.

8. Apparatus according to claim 1, wherein said article is provided as a tubular member, having first and second ends, the first end of said article being detachably attached to a support portion.

9. Apparatus according to claim 1, wherein two or more holding members, each having at least one spool and/or the like of a threaded material located thereon are located radially outward of a centrally located aperture on said rotating member, and wherein a first end of said threaded material is attached to a first end of said article.

10. Apparatus according to claim 9, wherein said rotatable member rotates said two or more holding members and, hence said spools and/or the like of threaded material about said article, causing two or more strands of threaded material to simultaneously wrap about said article.

11. Method of forming at least one threaded member, said method including the steps of:

    providing an apparatus including a rotating member, two or more holding members protruding from said rotating member, said two or more holding members each having at least one spool and/or the like of a threaded material located thereon, guide means associated with each of said two or more holding members;
    feeding ends of two or more strands of threaded material associated with the two or more holding members through apertures located on said guide means and connecting the same to a first end of an article,
    said article located on a support portion attachable to said apparatus;
    attaching said support portion to said apparatus; and

    wherein upon rotation of said rotating member, said strands of threaded material associated with the two

or more holding members simultaneously wrap about each other and subsequently around said article, forming a threaded member that is a composite of two or more strands of threaded material.

12. Method according to claim 11, wherein said support portion includes a first face and a second, opposing face, wherein said article is detachably attached to said second face of said support portion.

13. Method according to claim 12, further including a step of rotating a plate member with respect to the support portion, wherein said plate member is located on said first face of said support portion, wherein said plate member is detachably attachable to two or more holding members on said rotatable member wherein rotation of said plate member is actuated by rotation of said rotatable member.

14. Method according to claim 13, wherein said plate member includes an aperture located thereon, said aperture being located centrally of said plate member and sized to receive threaded material.

15. Methods according to claim 29, further including a step of rotating said article with respect to said support portion, wherein rotation of said article is actuated by rotation of said rotatable member, wherein said article rotates at a slower angular velocity than that of said rotatable member.

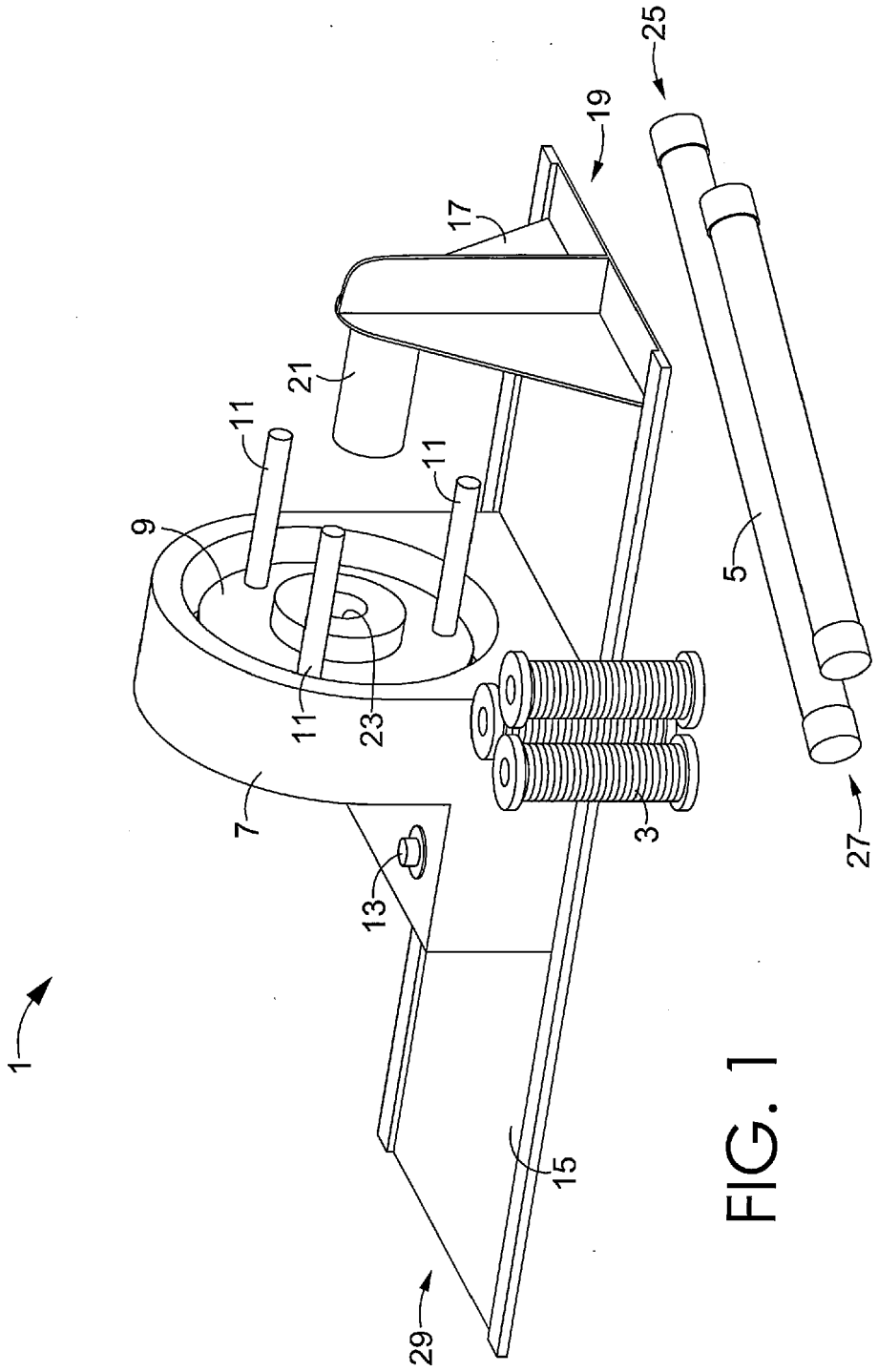

FIG. 1

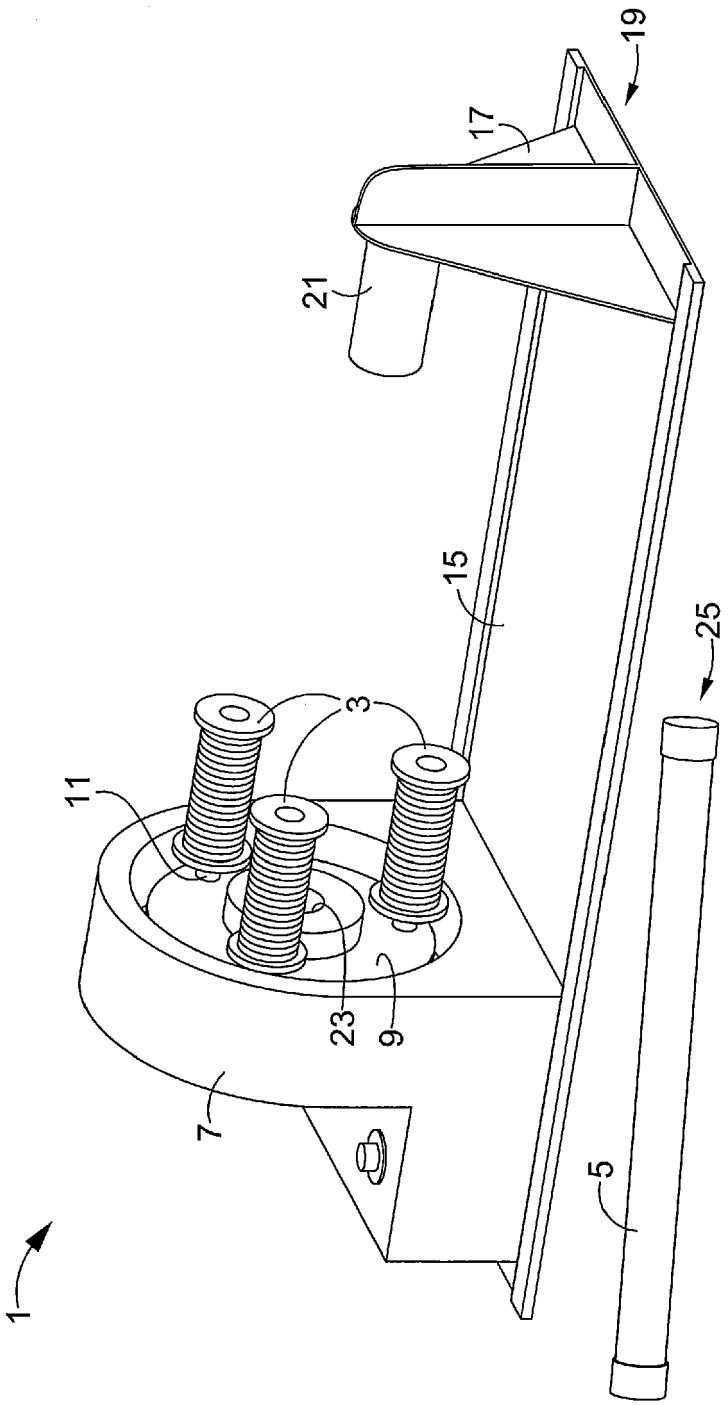

FIG. 2

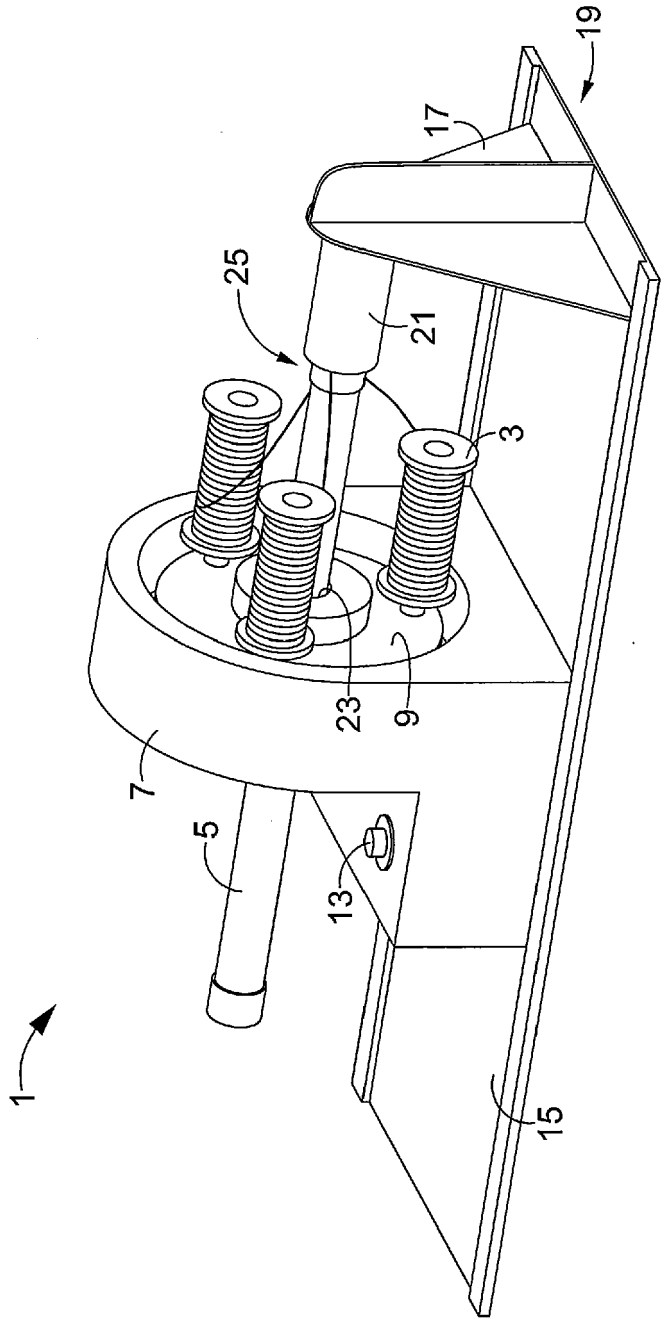

FIG. 3

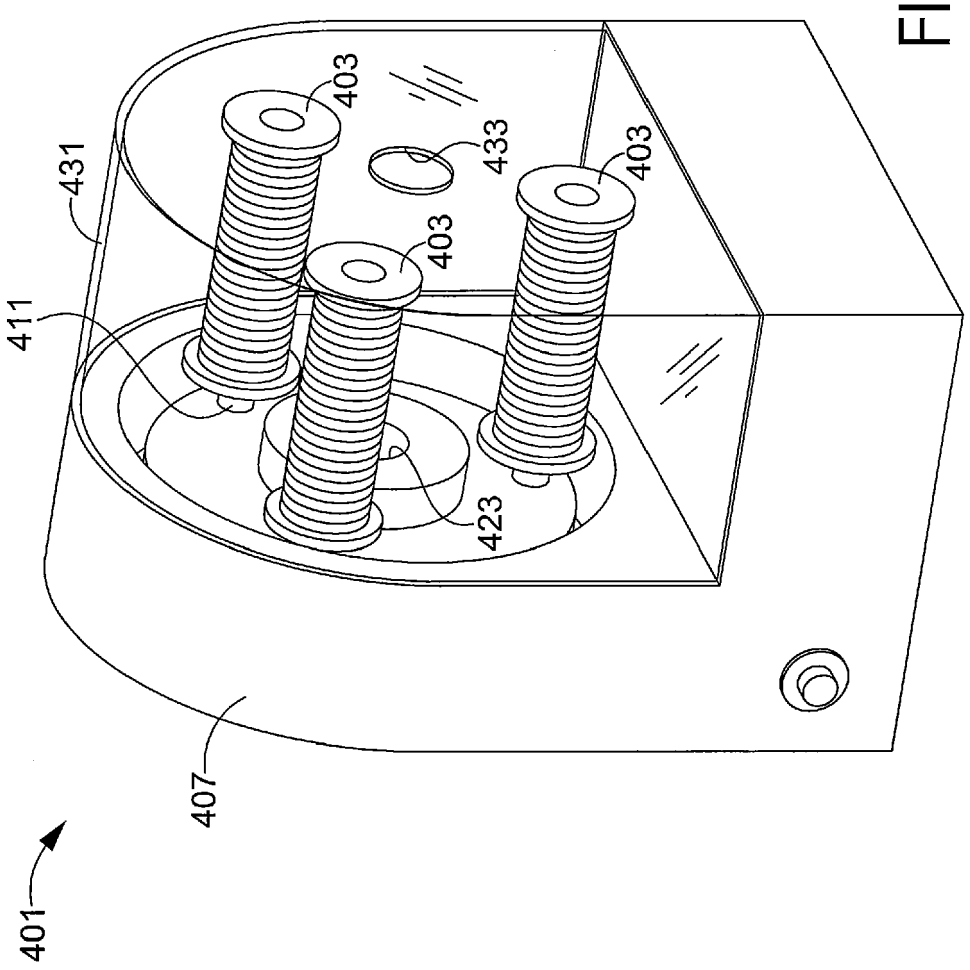

FIG. 4

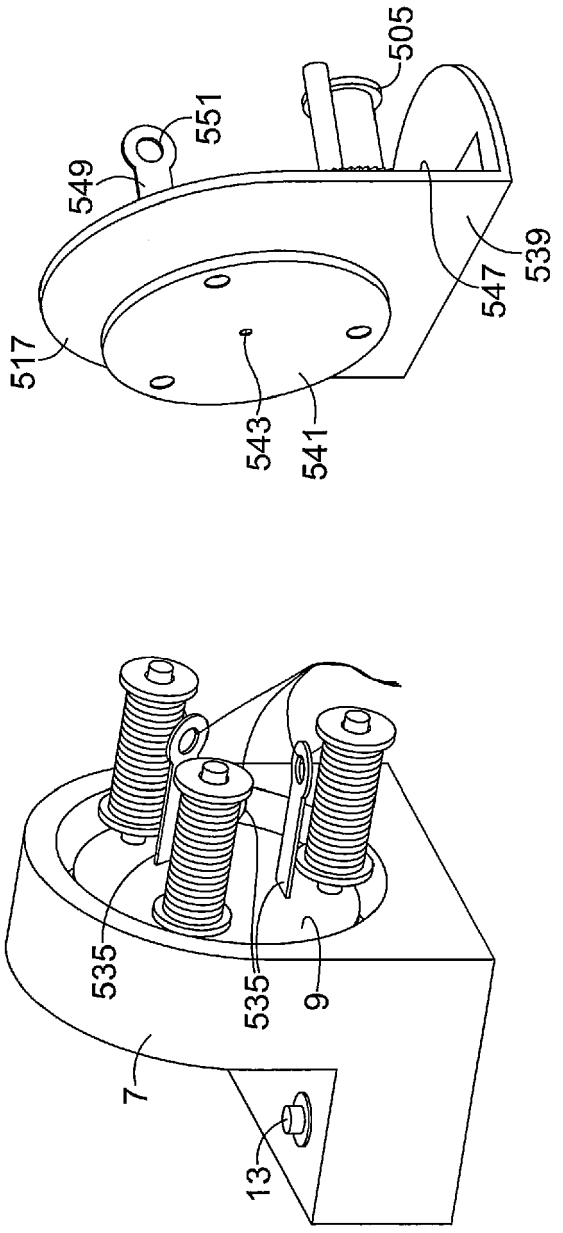

FIG. 5

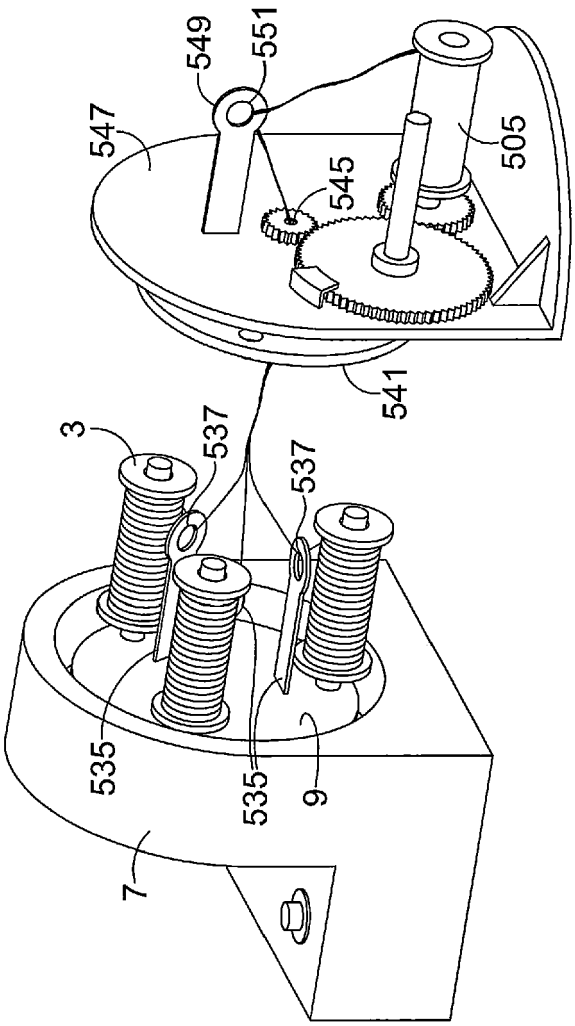

FIG. 6

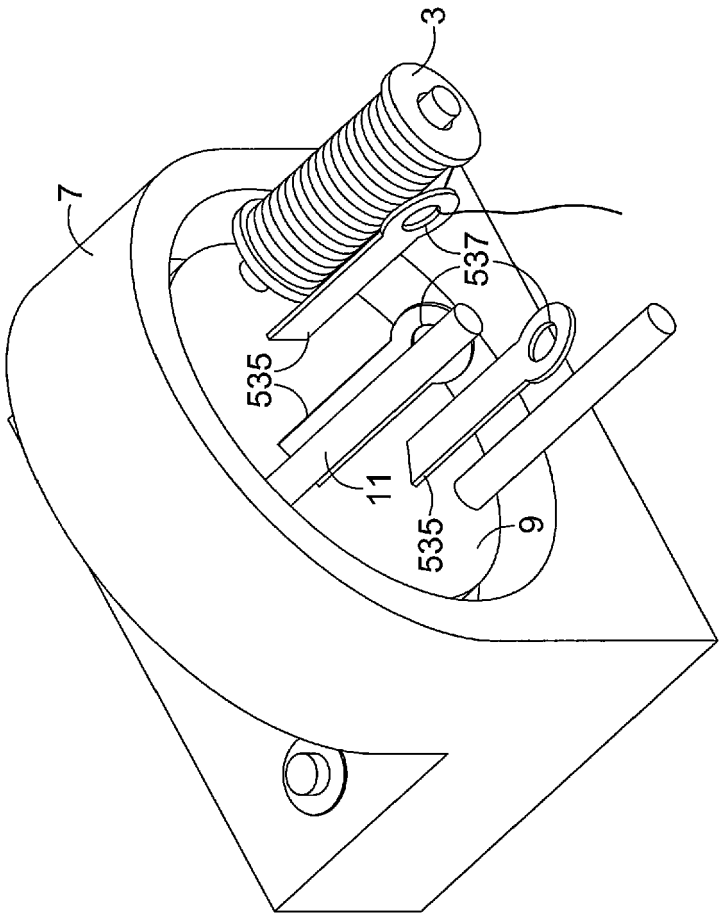

FIG. 7

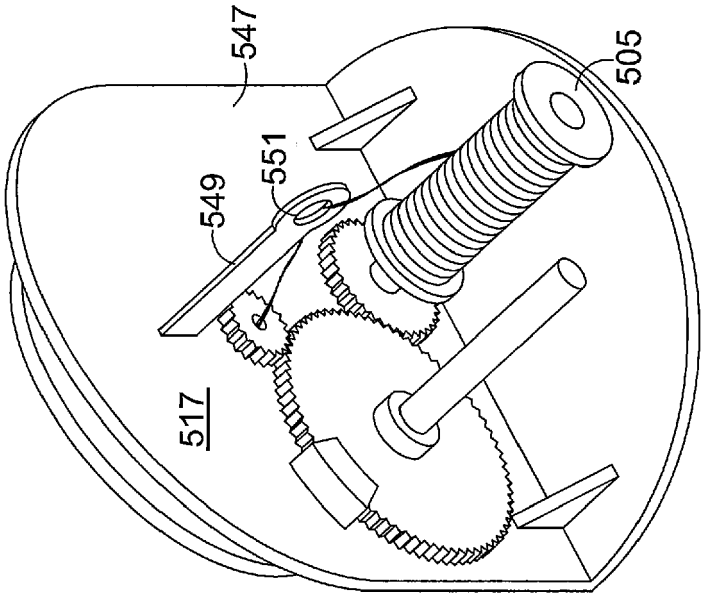

FIG. 8

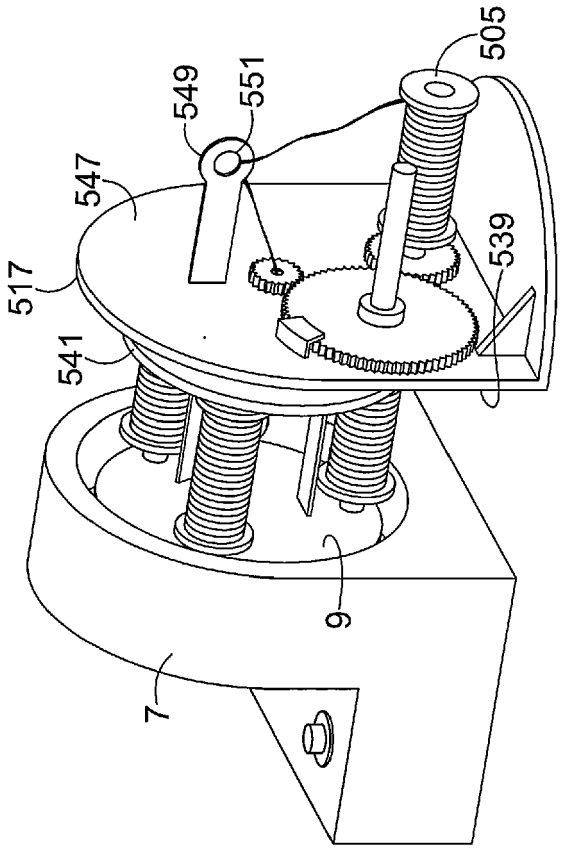

FIG. 9

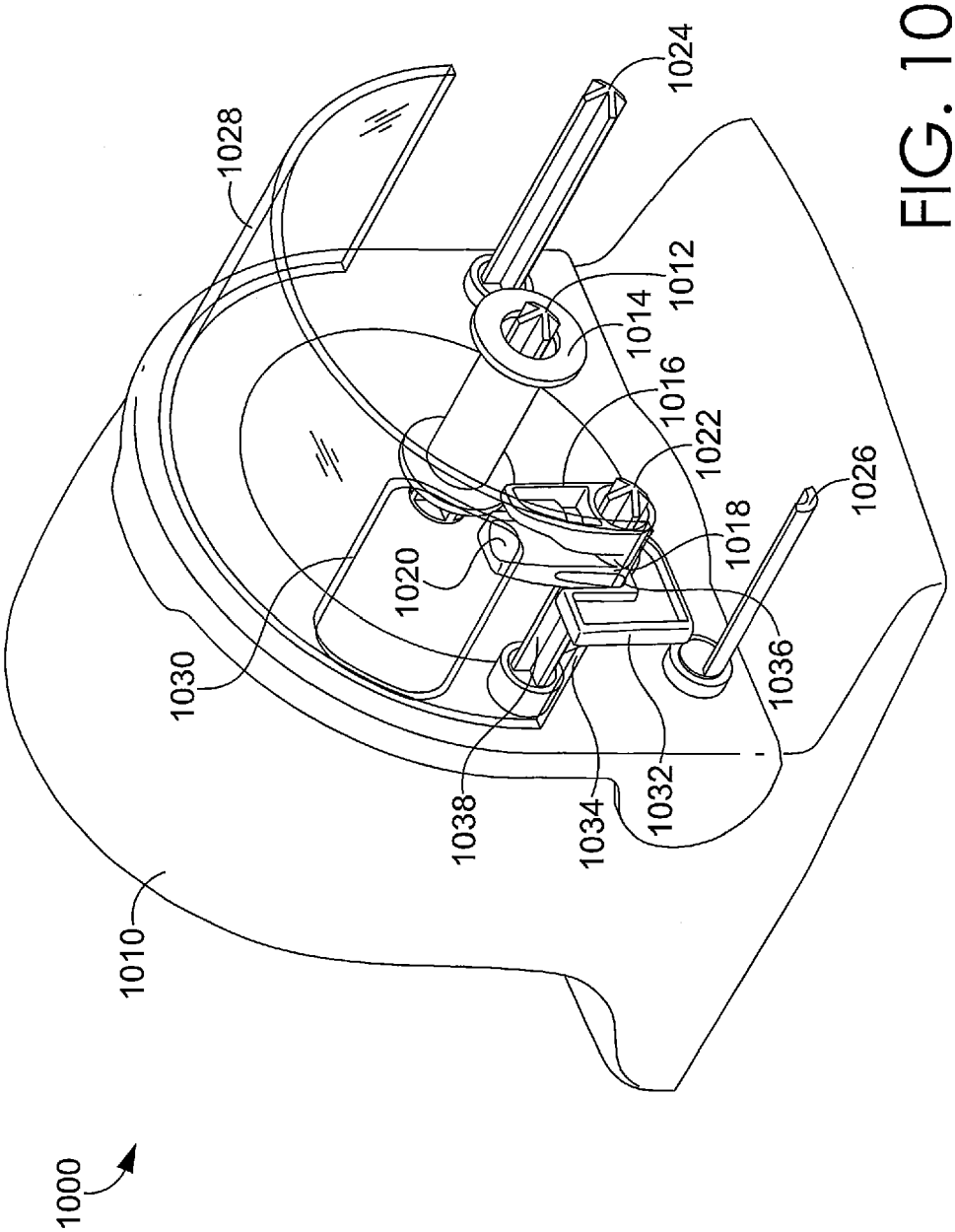
1000
1010
1012
1014
1016
1018
1020
1022
1024
1026
1028
1030
1032
1034
1036
1038

FIG. 10

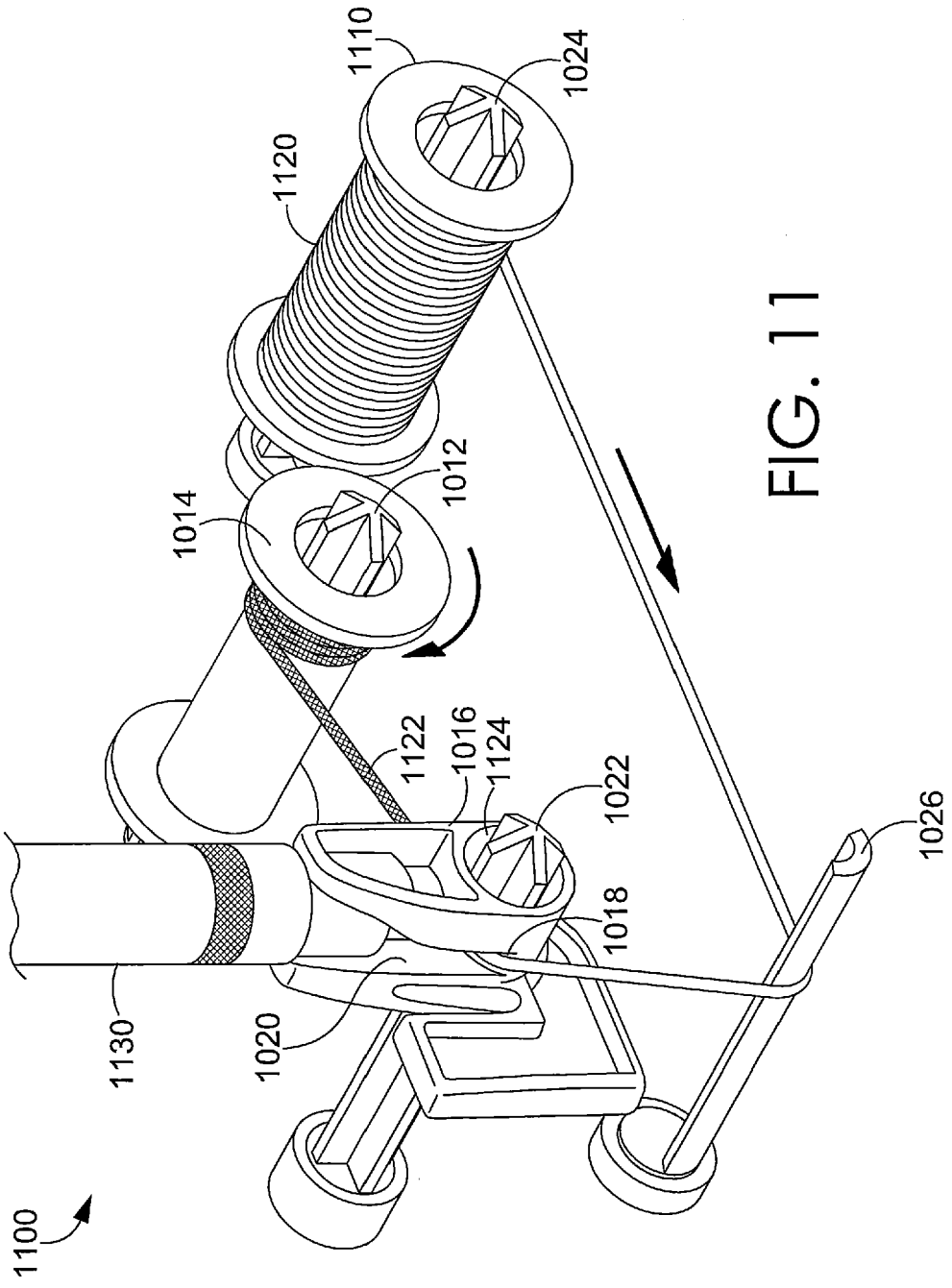
1110
1024
1120
1012
1014
1122
1016
1124
1022
1026
1018
1130
1020
1100

FIG. 11

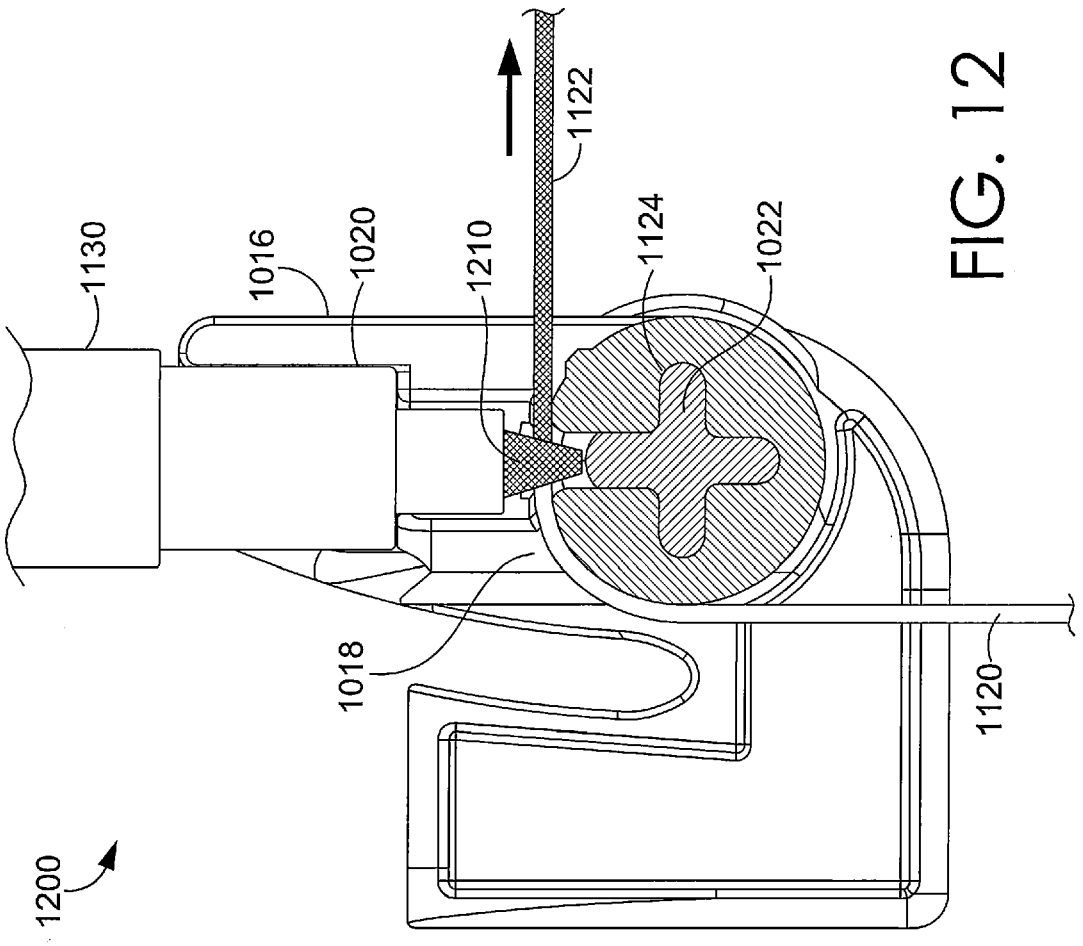

FIG. 12

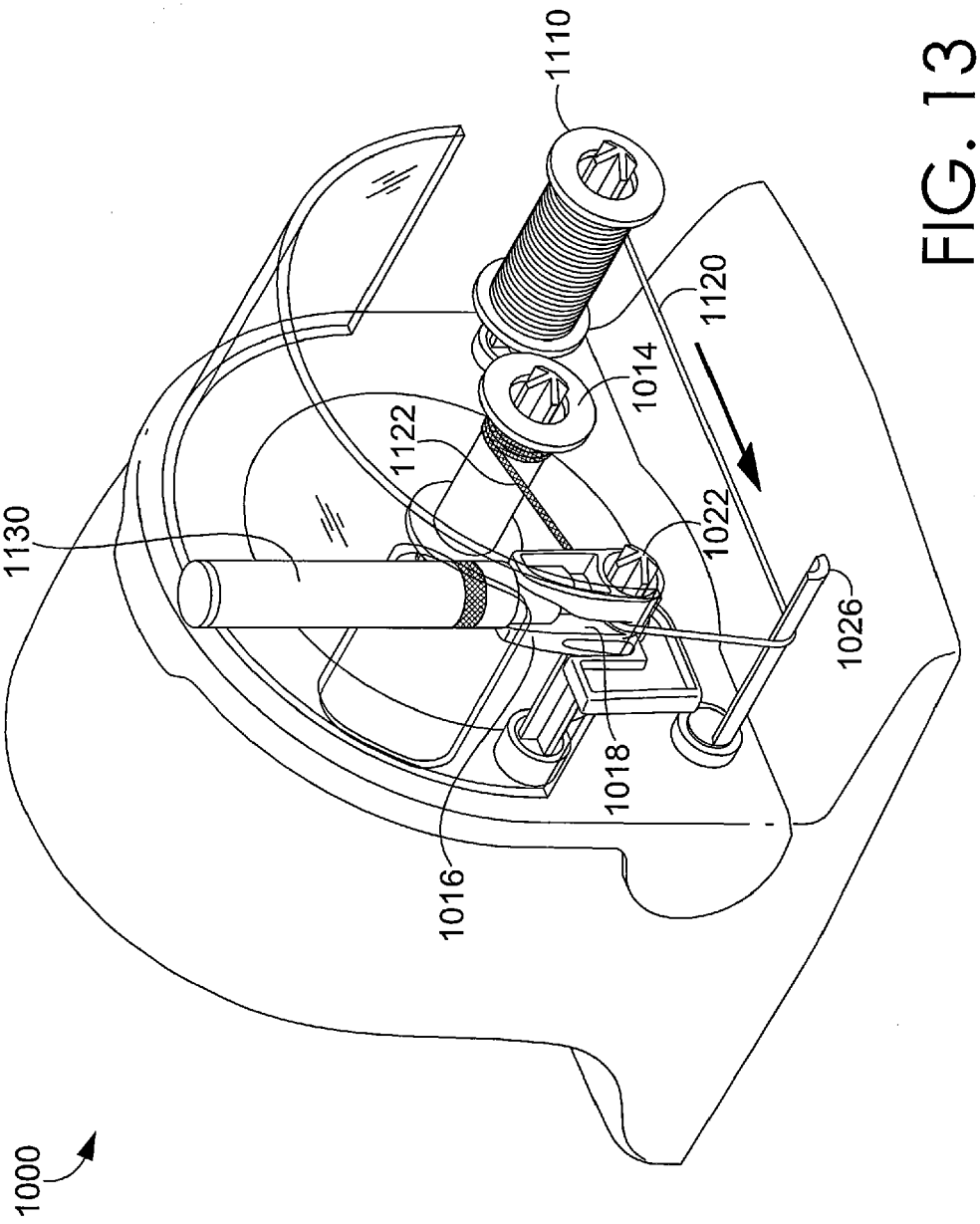

FIG. 13

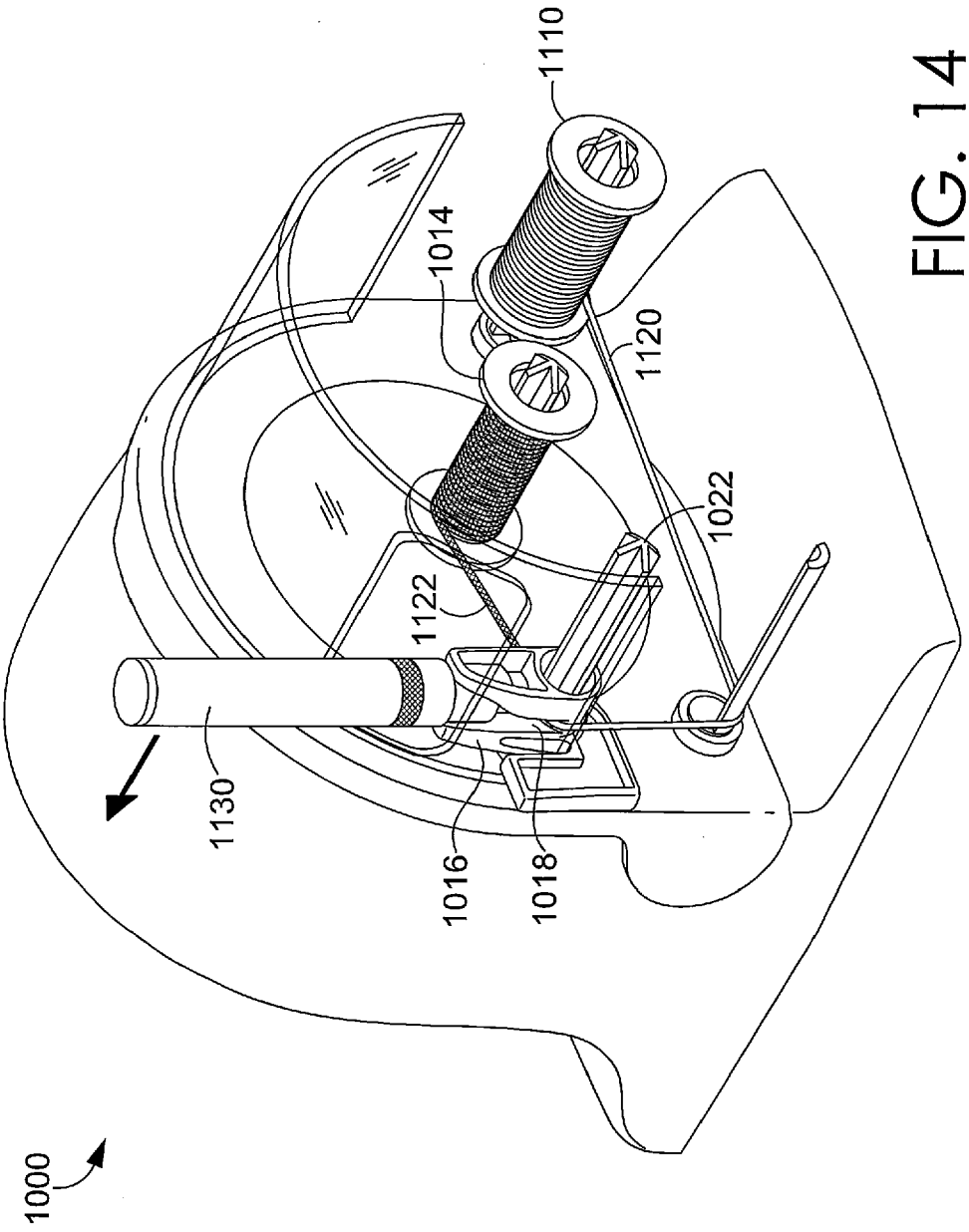

FIG. 14

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- GB 1412502 A **[0078]**