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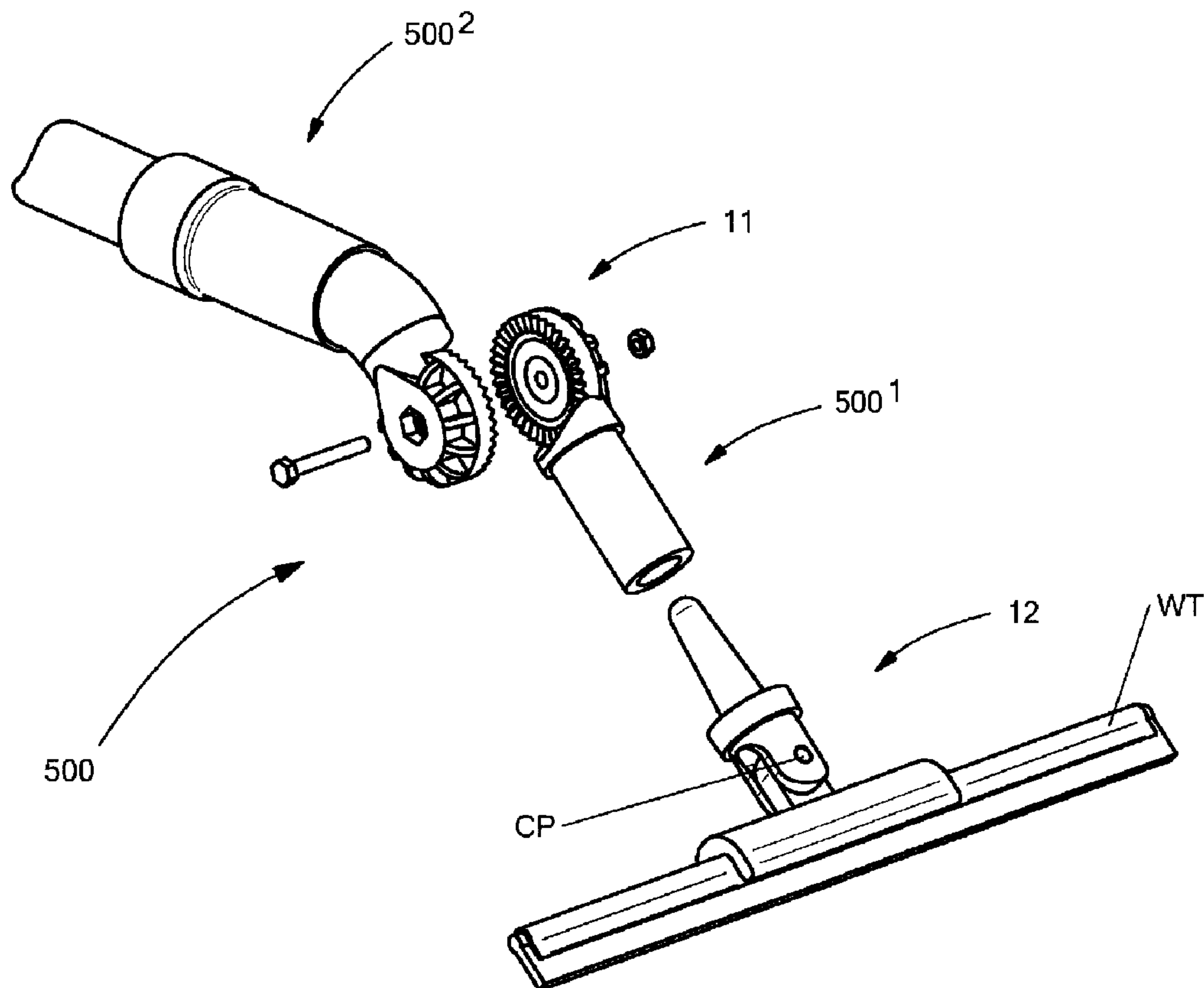
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(54) Titre : INSTRUMENT METTANT EN CONTACT DES SURFACES PLANES TOUT EN EFFECTUANT DES MOUVEMENTS DE TRANSLATION SUR LESDITES SURFACES

(54) Title: IMPLEMENT FOR ENGAGING PLANAR SURFACES WHILE EFFECTING TRANSLATION MOVEMENTS ON THOSE SURFACES



(57) **Abrégé/Abstract:**

The implement has a head interconnected to a handle. The head has a projecting insertion element which extends backwardly. The handle includes a front and back zones; longitudinal axis of the front zone intersects longitudinal axis of the back zone. The

(57) **Abrégé(suite)/Abstract(continued):**

front zone incorporates an internally engaging, frontally open channel, which complementarily conform to the shape and size of the projection insertion element, so as to admit and snugly capture the projection insertion element. The head has a front end portion for engaging and detachably securing a working tool, for example, a wiping blade for window cleaning or a paint brush. The projecting insertion element has the shape of a spindle, a shape similar to a truncated cone or is cylindrical. The internally engaging, frontally open channel is adaptable to fit to the projecting insertion element.

**TITLE: IMPLEMENT FOR ENGAGING PLANAR SURFACES WHILE EFFECTING
TRANSLATION MOVEMENTS ON THOSE SURFACES**

ABSTRACT

The implement has a head interconnected to a handle. The head has a projecting insertion element which extends backwardly. The handle includes a front and back zones; longitudinal axis of the front zone intersects longitudinal axis of the back zone. The front zone incorporates an internally engaging, frontally open channel, which complementarily conform to the shape and size of the projection insertion element, so as to admit and snugly capture the projection insertion element. The head has a front end portion for engaging and detachably securing a working tool, for example, a wiping blade for window cleaning or a paint brush. The projecting insertion element has the shape of a spindle, a shape similar to a truncated cone or is cylindrical. The internally engaging, frontally open channel is adaptable to fit to the projecting insertion element.

TITLE: IMPLEMENT FOR ENGAGING PLANAR SURFACES WHILE EFFECTING TRANSLATION MOVEMENTS ON THOSE SURFACES

I. BACKGROUND OF THE INVENTION

1. Definition of the Invention

The present invention refers, in general, to window washing and like devices and, more particularly, to an implement for engaging planar surfaces while effecting translation movements on those surfaces.

2. Description of the State of Art

Window cleaners are usually contracted and endeavor to perform the cleaning process in a rapid manner. Working tools usually require release, replace and securement and, thus, it is important for those operations that the tools are so devised that they require minimal dexterity and physical challenge.

It has been found that the wiping blades (squeegees) will most effectively wipe a surface clean if they are maintained at an optimal angle relative to the working surface. Failure to swipe the surface at an optimal angle will lead to streaking and visibly unsatisfactory results. In order to comfortably handle the squeegee and maintain the wiping blade at a convenient angle, squeegees are typically constructed with the blade mounted at only one pre-established angle relative to the handle.

Attempts have being made to solve the foregoing expectation and requirement.

For example, United States Patent No. 7,000,282, granted Feb. 21, 2006 to Cox, et al. for a “Spring-biased pivoting squeegee” describes a tool provided with a head pivotally attached to a handle. The head is movable between a rest position, in which the head is angularly displaced from the handle, and a biased position in which the head, handle, and a wiping blade are in linear relation. In the biased position, the wiping blade is maintained at an optimum angle for cleaning a glass surface even with the handle held generally perpendicular to the glass. A spring is fully contained in the head and biases the head toward the rest position. A tension adjustment knob in the head permits adjustment of the spring to a tension level according to the ergonomic requirements of a user. In a second embodiment of the invention an improved locking mechanism comprises a pivoting lock lever held against a top wall of a recess in the head of the squeegee by a retainer. The lock is movable between locked and released positions. In the locked position, stop surfaces on the lock lever abut with upward facing ledges of side plates on the forward portion of a main handle body to lock the head in the biased position. Two springs have forward projections which rest in downwardly biased engagement on a spring pull nut. The spring pull nut is adjustable by turning an adjustment knob to modify the tension on the springs.

The main disadvantage of the above disclosed spring-biased pivoting squeegee resides in its relative high complexity for this type of implements. Hence, it is difficult for this implement to preserve, with the minimum cost of operation, its operation capacity during the stipulated service life.

Another example is United States Patent No. 5,930,863, granted Aug. 31, 1999 to Samuelsson for a “Quick release squeegee”. That patent discloses a squeegee comprising a squeegee body including a forwardly projecting stationary jaw device formed with a rearward portion, an

intermediate portion, and a forward extremity configured with a first clamp element. A floating jaw co-extensive with the stationary jaw is formed with a rearward section, a medial section, and a forward end is formed with a second clamp element confronting the first clamp element. The floating jaw and the stationary jaw device cooperate to form a lever retraction cavity. The floating jaw is formed on one side of the cavity with an elongated notch. A fulcrum pin connects one of the portions to one of the sections to form a fulcrum linkage for pivoting of the floating jaw relative to the stationary jaw device from a release position to a clamping position. A lever mounted on one end to one of the sections other than the section forming the fulcrum linkage is received in the cavity and rotatable from a clamping position nested in the cavity outwardly through the notch to an extended release position. A cam section on one end of the lever is interposed between the stationary jaw device and floating jaw. When the lever is rotated from the clamping position to the release position, it rotates the second clamp element away from the first clamp element.

The above disclosed quick release squeegee constitutes a complicated implement incorporating many parts with special configurations. This raises the costs of manufacture which has a direct impact on the economic aspect of window cleaning operations. Moreover, reliability and service life are affected.

II. SUMMARY OF THE INVENTION

In view of the above state of the art, the applicant concluded that there is a need for an improved implement for engaging planar surfaces while effecting translation movements on those surfaces.

The present invention is the result of years of observation and tests made by the applicant who is directly involved in the field of the invention.

Thus, a first objective of the present invention is to develop a versatile implement for engaging planar surfaces while effecting translation movements on those surfaces, which implement is adaptable to be used in combination with a variety of working tools that can be easily incorporated into or detach from the implement.

A second objective of the present invention is to develop a implement as the above one, wherein the angle between a working tool and its handle can be conveniently and rapidly adjusted to adequately perform the windows' cleaning or alike operations.

A third objective of the present invention is to develop a implement, as the previous ones, which provides enhanced reliability and extended service life.

Broadly stating, according to the present invention an implement for engaging planar surfaces while effecting translation movements on those surfaces, comprises an implement for engaging planar surfaces while effecting translation movements on those surfaces, comprising a head and a handle interconnected to the head. The head is provided with a projecting insertion element, which extends centrally and backwardly. The handle includes a front zone and a back zone; a longitudinal axis of said front zone intersects a longitudinal axis of the back zone. The front

zone incorporates an internally engaging, frontally open channel, shaped to complementarily conform to the shape and size of the projection insertion element, so as to admit and snugly capture, with a light-press fit, the projection insertion element. The head is provided with a front end portion adapted to engage and detachably secure a working tool, such as, for example, a wiping blade for window cleaning or a paint brush.

In one aspect of the present invention, the projecting insertion element is formed by a truncated shaped segment, resulted from a cone having an apex removed by an intersecting plane, parallel to a base of the cone. The apex is replaced by a dome shaped segment having a lateral surface defined by an inclination equal to that of the truncated shaped segment. The internally engaging, frontally open channel incorporates a blind elongated hole having a shape adapted for engaging and snugly capturing the projection insertion element. The longitudinal axis **X** of the handle is bent approximately at midway of its length.

In another aspect of the present invention, the projecting insertion element is shaped as a splined shaft of conventional type that extends centrally and backwards from the head. The handle comprises a front zone and a back zone and there is an angle between longitudinal axis of front zone and longitudinal axis of back zone.

The front zone incorporates an internally engaging, frontally open elongated orifice, shaped to complementarily conform to the splined shaft and for admitting and capturing the latter with with a tight contact. The splined shaft and the internally engaging, frontally open elongated orifice are dimensioned and manufactured adequately with to allow an easy attachment and prevent an accidental detachment of splined shaft.

In yet another aspect of the present invention, the projecting insertion element is shaped as a

cylindrical shaft that extends centrally and backwards from the head. The handle comprises a front zone and a back zone. There is an angle between the longitudinal axis of the front zone and the longitudinal axis of the back zone. The front zone incorporates an internally engaging, frontally open, elongated canal, cylindrically shaped to complementarily conform to the cylindrical shaft. A gap is provided between the internally engaging, frontally open, elongated canal and the cylindrical shaft.

Use is made of a locking mechanism which enables the cylindrical shaft to be immobilized in the handle.

Another aspect of the present invention resides in a use of a coupling interposed between the front zone and the back zone of the handle. Each of the two mentioned zones constitutes an elongated, separate component. Thus, there is no fixed, pre-established angle at an intersection of the longitudinal axis of the front zone with the longitudinal axis of the back zone. The coupling is used for adapting the handle to specific operational requirements, achievable by changing relative positions of the front and back zones, i.e. a fixed angle between the former and the latter is established.

The coupling is of twin disk type, which comprises one disk extending from the back of front zone and an opposed (mirror image) disk extending from the front of back zone. The internal surfaces of the disk and the opposed disk are provided with V- toothed projections alternating with grooves. The disk and the opposed disk are each centrally traversed by an opening. The resulted openings are coaxial.

A bolt and a nut are used to interlock the disk with the opposed disk in a convenient position, after V- toothed projections of one disk have already penetrated the facing grooves of the other disk.

Yet another aspect of the present invention resides in the use of a knuckle joint having a connecting pin perpendicular to the longitudinal axis of any head and pivotally joining a working tool with a front part of any head. Thus, the working tool is enabled to pivot in a plane tangent to a planar surface contacted by the working tool.

III. BRIEF DESCRIPTION OF THE DRAWINGS

Although the characteristic features of the invention will be particularly pointed out in the claims, the invention itself and the manner in which it may be made and used may be better understood by referring to the following description and accompanying drawings. Like reference numerals refer to like parts throughout the several views of the drawings in which:

FIGURE 1 (Prior Art) depicts a known and commonly used implement, belonging to the same category as the present invention;

FIGURE 2 (Prior Art) is a vertical cross section extending along the longitudinal axis of symmetry of the handle illustrated in FIG. 1 and continuing along the adjacent head;

FIGURE 3 (Prior Art) illustrates the implement shown in FIGS. 1 and 2 (Prior Art) when provided with a knuckle which interconnects a handle with a working tool, so that the latter can pivot with respect to the former, but is inseparable from it;

FIGURE 4 is a front elevation view of a basic embodiment of the present invention, wherein the inventive concept - a head detachably interconnected with a handle - is shown;

FIGURE 5 is a vertical cross section extending along the longitudinal axis of symmetry of the handle illustrated in FIG. 4 and continuing along the adjacent head; a projecting insertion element extends centrally and backwards from the head; the handle comprises a front zone incorporating an internally engaging, frontally open channel, exposed to the exterior and shaped to complementarily conform to the shape and size of the projecting insertion and for admitting and snugly capturing the latter with a light-press fit;

FIGURE 6 is a perspective view of a head incorporating an insertion element having a shape of a truncated cone shaped segment, resulted from a cone having its apex removed by an intersecting plane, parallel to the base of the cone; the removed apex is replaced by a dome shaped segment having a lateral surface defined in general by the same inclination as that of the truncated cone shaped segment;

FIGURE 7 is a front elevation view of the head with the projecting insertion element, shown in perspective in FIG. 6;

FIGURE 8 is a vertical cross section extending along the longitudinal axis of symmetry of the insertion element, incorporated into the head and continuing along the head itself; the head incorporates a working tool and a blade;

FIGURE 9 is a vertical cross section extending along the longitudinal axis of symmetry of a handle including an internally engaging, frontally open channel; the latter comprises a blind

elongated hole having a shape adapted for engaging the projecting insertion element (illustrated in FIGS. 6, 7 and 8) and snugly capturing it with a light-press fit;

FIGURE 10 is a perspective, exploded view of an embodiment of the present invention, wherein use is made of a projecting insertion element, shaped as a splined shaft of conventional type, which extends centrally and backwards from the head;

FIGURE 11 is a vertical cross section extending along the longitudinal axis of symmetry of a handle that includes an internally engaging, frontally open channel; the latter comprises a blind elongated hole having a shape adapted for engaging the projecting insertion element /splined shaft/ (illustrated in FIG. 10) and snugly capturing it with a light-press fit;

FIGURE 12 depicts a transversal cross section of the projection insertion element, shaped as a splined shaft (see FIG. 10);

FIGURE 12 A depicts a transversal cross section of the internally engaging, frontally open channel adaptable for engaging the splined shaft shown in FIGS. 10 and 12;

FIGURE 13 is perspective, exploded view of an embodiment of the present invention, wherein use is made of a projecting insertion element, shaped as a cylindrical shaft that extends centrally and backwards from a head;

FIGURE 14 is a vertical cross section extending along the longitudinal axis of symmetry of the handle shown on FIG. 13; that handle includes an internally engaging, frontally open channel; the latter comprises a blind elongated hole having a shape of a hollow cylinder adapted for

engaging the cylindrical projecting insertion element (illustrated in FIG. 13) and snugly capturing it with a light-press fit;

FIGURE 15 is a longitudinal cross section taken along a connection of cylindrical shaft (see FIG. 13) inserted into blind elongated hole having the shape of a hollow cylinder; via a locking nut, the cylindrical shaft is immobilized in the hollow cylinder;

FIGURE 16 illustrates a variant of the invention, applicable to all the foregoing embodiments; it resides in the use of a coupling interposed between a front zone and a back zone of a handle, each of the two mentioned zones constituting an elongated, separate component; no fixed, pre-established angle at an intersection of the longitudinal axis of the front zone with longitudinal axis of back zone; the coupling is used for adapting the handle to specific operational requirements, achievable by changing relative positions of front and back zones, i.e. a fixed angle between the former and the latter is established; and

FIGURE 17 illustrates another variant of the invention, applicable to all the foregoing embodiments, without the previous variant or together with it; it resides in the use of a knuckle joint having a connecting pin perpendicular to the longitudinal axis of any aforementioned heads and pivotally joining a working tool with a front part of any head; thus, a working tool is enabled to pivot in a plane tangent to a planar surface contacted by working tool.

IV. DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIGS. 1, 2 and 3, there are shown two exemplary embodiments of the prior art, as largely known and used on the market, which embodiments, as the applicant considers, will emphasize the salient difference between his invention and the related state of the prior art.

FIGS. 1 and 2 depict an implement. The implement, identified by reference number **10**, comprises a handle **100** and a head **110** forwardly extending from handle **100**. In the described and shown embodiment, handle **100** and head **110** form a unitary part. In the forthcoming embodiment, handle **100** and head **110** constitute distinct parts, pivotally, but not detachably interconnected.

A wiping blade **120** is transversely and detachably secured to a front end portion of handle **100**.

Referring to another prior art embodiment illustrated in FIG. 3, an implement **10'** incorporates a knuckle joint **130** having two parallel projections **132** secured to a front end of handle **140** and a flat jaw **134** intercalated between the two parallel projections **132** and secured to head **150**. Each of the two parallel projections **132** and flat jaw **134** are traversed by an eye **136**, the resulting eyes **136** being coaxial. A pin **138** perpendicular to longitudinal axis of symmetry of handle **140** is inserted throughout all eyes **136**, thus allowing a head **150** to pivot in one plane only, the latter being parallel to planar surfaces contacted by wiping blade **120**.

As shown in FIGS. 1 to 3, the longitudinal axis **X** of handle (**100**, **140**) is bent approximately at midway of its length.

As can be seen from the above embodiments, handle (**100**, **140**) is firmly or pivotally, but not detachably, connected to head (**110**, **150**). Thus, the former and the latter form an inseparable

unit, employable only for one type of operation and size, for example window cleaning, paint etc.

Broadly describing with reference to FIGS. 4 through 9, a first embodiment of the present invention concerning an implement for engaging planar surfaces while effecting translation movements on those surfaces, generally identified by reference number **20**, comprises a head **200** detachably interconnected with a handle **300**.

A projecting insertion element **220** extends centrally and backwards from head **200**. Handle **300** comprises a front zone **300¹** and a back zone **300²**. Front zone **300¹** incorporates an internally engaging, frontally open channel **320**, exposed to the exterior and shaped to complementarily conform to a shape and size of projecting insertion element **220** and for admitting and snugly capturing the latter with a light-press fit.

Head **200** extends, centrally and frontally, into a working tool **WT**. In the case of window cleaning, working tool **WT** is provided with a wiping blade **WP** which is detachably and transversally secured to a front end portion of working tool **WT**.

One can envisage the use of other working tools, such as, for example, a paint brush tool instead of depicted working tool **WT** with wiping blade **WP**. All of the working tools, intended to be used with the present implement for engaging planar surfaces while effecting translation movements on those surfaces, are, respectively, structurally integral with head **200**. Thus, one handle **300** can be used with a variety of heads **200**.

As can be seen from FIGS. 4 through 9, there is an angle between longitudinal axis (not shown) of front zone **300¹** and longitudinal axis (not shown) of back zone **300²**.

Describing now in detail the above broadly described first embodiment of the present invention, projecting insertion element **220** comprises a truncated cone shaped segment **230**, resulted from a cone having its apex removed by an intersecting plane, parallel to the base of the cone. The removed apex is replaced by a dome shaped segment **240** having a lateral surface defined in general by the same inclination as that of the truncated cone shaped segment **230**.

Internally engaging, frontally open channel **320** comprises a blind elongated hole **330** having a shape adapted for engaging projecting insertion element **220** and snugly capturing it with a light-press fit. As stated before, the latter comprises a hollow, truncated cone shaped segment **230** which extends into hollow, dome shaped segment **240**.

Back zone **300**² of handle **300** incorporates internally a blind opening **340** which terminates into a threaded portion **350**. A handle extension pole (not shown) is adapted to be inserted into blind opening **340** and fastened to threaded portion **350**.

A second embodiment of an implement for engaging planar surfaces while effecting translation movements on those surfaces, described with reference to FIGS. **10** to **12A**, generally identified by reference number **40**, comprises a head **400** detachably interconnected with a handle **500**.

Head **400** and handle **500** constitute separate parts.

A wiping blade **WP** is detachably and transversally secured to a front end portion of head **400** via working tool **WT**.

A projecting insertion element **420**, shaped as a splined shaft **430** of conventional type, extends centrally and backwards from head **400**.

Handle **500** comprises a front zone **500¹** and a back zone **500²**.

As can be seen from FIGS. **10** and **11**, there is an angle between longitudinal axis of front zone **500¹** and longitudinal axis of back zone **500²**.

Front zone **500¹** incorporates an internally engaging, frontally open elongated orifice **520**, shaped to complementarily conform to splined shaft **430** and for admitting and capturing the latter with a tight contact. Splined shaft **430** and internally engaging, frontally open elongated orifice **520** are adequately dimensioned and manufactured to allow an easy attachment and prevent an accidental detachment of splined shaft **430**.

Splined shaft **430** is formed by projections **440** longitudinally extending and equally spaced circumferentially on it; internally engaging, frontally open elongated orifice **520** is formed by recesses **530**, also equally spaced circumferentially on it.

As in the first disclosed embodiment, back zone **500²** of handle **500** incorporates internally an elongated blind opening **540** which terminates into a threaded portion **550**. A handle extension pole (not shown), provided with a threaded end, is adapted to be inserted into elongated blind opening **540** and fastened to its threaded portion **550**.

A third embodiment of an implement for engaging planar surfaces while effecting translation movements on those surfaces, described with reference to FIGS. 13 to 15, is generally identified by reference number **60**, comprises a head **600** detachably interconnected with a handle **700**. Head **600** and handle **700** constitute separate parts.

A wiping blade **WP** is detachably and transversally secured to a front end portion of head **600** via a working tool **WT**.

A projecting insertion element **620**, shaped as a cylindrical shaft **630**, extends centrally and backwards from head **600**.

Handle **700** comprises a front zone **700¹** and a back zone **700²**.

As can be seen from FIG. 14, there is an angle between longitudinal axis of front zone **700¹** and longitudinal axis of back zone **700²**.

Front zone **700¹** incorporates an internally engaging, frontally open, elongated canal **720**, cylindrically shaped to complementarily conform to cylindrical shaft **630**. A gap **G** is provided between internally engaging, frontally open, elongated canal **720** and cylindrical shaft **630**.

Front zone **700¹** is provided externally at its forward extremity with a threaded portion **730** and ends internally, at the same forward extremity, with a chamfered surface **740**.

Use is made of a locking nut **800** provided internally with a threaded zone **820** and externally with serrations **830**. Internally, at its end opposite its entrance, locking nut **800** terminates with a bevel contact surface **840**. A clearance **C** is established between an innermost diameter of locking nut **800** and an outer diameter of projecting insertion element **620**, shaped as a cylindrical shaft **630**.

A plastic, split bushing **900** is close-fit mounted on cylindrical shaft **630**. Plastic, split bushing **900** has one internal diameter **d¹** corresponding to cylindrical shaft **630** and two external diameters **d²** and **d³**; **d³** is relatively larger than **d²**. A first segment **F¹**, delimited by internal

diameter **d¹** and external diameter **d²** is close-fit mounted on cylindrical shaft **630** and slidably inserted into internally engaging, frontally open, elongated canal **720**. A second segment **F²**, at a transition **T** from first segment **F¹** to second segment **F²**, is provided with a first tapped shoulder **BS¹** held against chamfered surface **740**, internally located at the forward extremity of front zone **700¹**. Second segment **F²** incorporates oppositely first tapped shoulder **BS¹** a second tapped shoulder **BS²** abutting against bevel contact surface **840**.

When locking nut **800** is tightened on threaded portion **730**, located at the forward extremity of front zone **700¹**, plastic split bushing **900** is compressed against cylindrical shaft **630**. Thus, cylindrical shaft **630** is immobilized in handle **700**.

As in the first and second disclosed embodiments, back zone **700²** of handle **700** incorporates internally an elongated blind opening **740** which terminates into a threaded portion **750**. A handle extension pole (not shown), provided with a threaded end, is adapted to be inserted into elongated blind opening **740** and fastened to its threaded portion **750**.

A variant (see FIG. 16) applicable to the above three embodiments is disclosed. An application used in combination with the first embodiment is considered exemplary for the other variants.

The variant resides in the use of a coupling **11** interposed between front zone **500¹** and back zone **500²** of handle **500**, each of the two mentioned zones constituting an elongated, separate component. Thus, there is no fixed, pre-established angle at an intersection of longitudinal axis (not shown) of front zone **500¹** with longitudinal (not shown) axis of back zone **500²**. Coupling **11** is used for adapting handle **500** to specific operational requirements, achievable by changing

relative positions of front and back zones **500¹** and **500²**, i.e. a fixed angle between the former and the latter is established.

Coupling **11** is of twin disk type, comprising one disk **115** extending from the back of front zone **500¹** and an opposed (mirror image) disk **125** extending from the front of back zone **500²**. Internal surfaces of disk **115** and opposed disk **125** are provided with V- toothed projections **135** alternating with grooves **145**. Disk **115** and opposed disk **125** are each centrally traversed by an opening **155**. The resulted openings **155** are coaxial.

A bolt **165** and a nut **175** are used to interlock disk **115** with opposed disk **125** in a convenient position, after V- toothed projections **135** of one disk **115(125)** have already penetrated facing grooves **145** of the other disk **125(115)**.

A second variant, first applicable to the three embodiments as initially disclosed and second applicable to the embodiments already incorporating the first variant is envisaged.

To exemplify the application of the second variant, the first embodiment incorporating both variants is depicted (see FIG. 17) and summarily disclosed in the forthcoming paragraph:

The variant resides in the use of a knuckle joint **12** having a connecting pin **CP** perpendicular to the longitudinal axis of any head **200, 400 or 600** and pivotally joining a working tool **WT** with a front part of any head **200, 400 or 600**. Thus, working tool **WT** is enabled to pivot in a plane tangent to a planar surface contacted by working tool **WT**.

What is claimed is:

Claim 1. An implement for engaging planar surfaces while effecting translation movements on those surfaces, comprising

- a head: and

- handle interconnected to said head: said head being provided with

- a projecting insertion element extending centrally and backwardly: said handle including

- a front zone and a back zone, a longitudinal axis of said front zone intersecting a longitudinal axis of said back zone, said front zone incorporating an internally engaging, frontally open channel, shaped to complementarily conform to the shape and size of said projection insertion element, so as to admit and snugly capture, with a light-press fit, said projection insertion element: and

said head being provided with a front end portion adapted to engage and detachably secure a working tool for windows cleaning or a paint brush.

Claim 2. The implement for engaging planar surfaces while effecting translation movements on those surfaces, as defined in claim 1, wherein said projecting insertion element extending centrally and backwardly is formed by a truncated shaped segment, resulted from a cone having an apex removed by an intersecting plane, parallel to a base of said cone.

said apex being replaced by a dome shaped segment having a lateral surface defined by an inclination equal to that of said truncated shaped segment and wherein said internally engaging frontally open channel incorporates a blind elongated hole having a shape adapted for engaging and snugly capturing said projection insertion element.

Claim 3. The implement for engaging planar surfaces while effecting translation movements on those surfaces, as defined in claim 1, wherein said projecting insertion element extending centrally and backwardly is a splined shaft and wherein said internally engaging, frontally open channel incorporates a blind elongated hole shaped to complementarily conform to said splined shaft and for admitting and snugly capturing said splined shaft with a tight contact.

Claim 4. The implement for engaging planar surfaces while effecting translation movements on those surfaces, as defined in claim 1, wherein said projecting insertion is a cylindrical shaft element extending centrally and backwardly from said head and wherein said front zone of said handle incorporates an internally engaging, frontally open, elongated canal, cylindrically shaped to complementarily conform to said cylindrical shaft, said first zone being provided externally at its forward extremity with a threaded portion and ends internally, at the same forward extremity, with a chamfered surface; a locking nut being provided internally with a threaded zone and externally with serrations; also internally, at one end opposite an entrance, said locking nut terminating with a bevel contact, a clearance being established between an innermost

diameter of said locking nut and an outer diameter of said projecting insertion element; a plastic split bushing being close-fit mounted on said cylindrical shaft; said plastic split bushing having one internal diameter corresponding to said cylindrical shaft and two external diameters; a first segment of said plastic, split bushing being delimited by said internal diameter and one of said two external diameters is close-fit mounted on said cylindrical shaft and slidably inserted into said internally engaging, frontally open, elongated canal; a second segment of said plastic, split bushing, located at a transition from said first segment to said second segment being provided with a first tapped shoulder held against said chamfered surface, internally located at the forward extremity of said front zone, said second segment incorporating oppositely said first tapped shoulder a second tapped shoulder abutting against said bevel contact surface;

whereby, when said locking nut is tightened on said threaded portion, located at a forward extremity of said front zone, said plastic split bushing is compressed against said cylindrical shaft and, as a result, said cylindrical shaft is immobilized in said handle.

Claim 5. The implement as in any one of claims 1 to 4, further comprising a coupling interposed between said front zone and said back zone of said handle, each of said front and back zones constituting an elongated, separate component, no fixed angle at an intersection of a longitudinal axis of said front zone and a longitudinal axis of said back zone being pre-established, said coupling being used for adapting said handle to specific operational requirements, achievable by changing relative positions of said front and said back zones, so that a fixed angle between said front and said back zones is achieved;

said coupling being of twin disk type comprises one disk extending from a back of said front zone and an opposed mirror image disk extending from a front of said back zone, internal surfaces of said disk and of said opposed disk being provided with V- toothed projections alternating with grooves; said disk and said opposed disk being centrally traversed by an opening, a bolt and a nut are used to interlock positionally said disk with said opposed disk, after said V- toothed projections of said disk have already penetrated said grooves of said other disk.

Claim 6. The implement as in any one of claims 1 to 4, further comprising a knuckle joint for pivotally joining said working tool with a frontal part of said head, said knuckle joint including a connecting pin perpendicular to said longitudinal axis of said head, so that said working tool is enabled, during use, to pivot in a plane tangent to a planar surface contacted by said working tool.

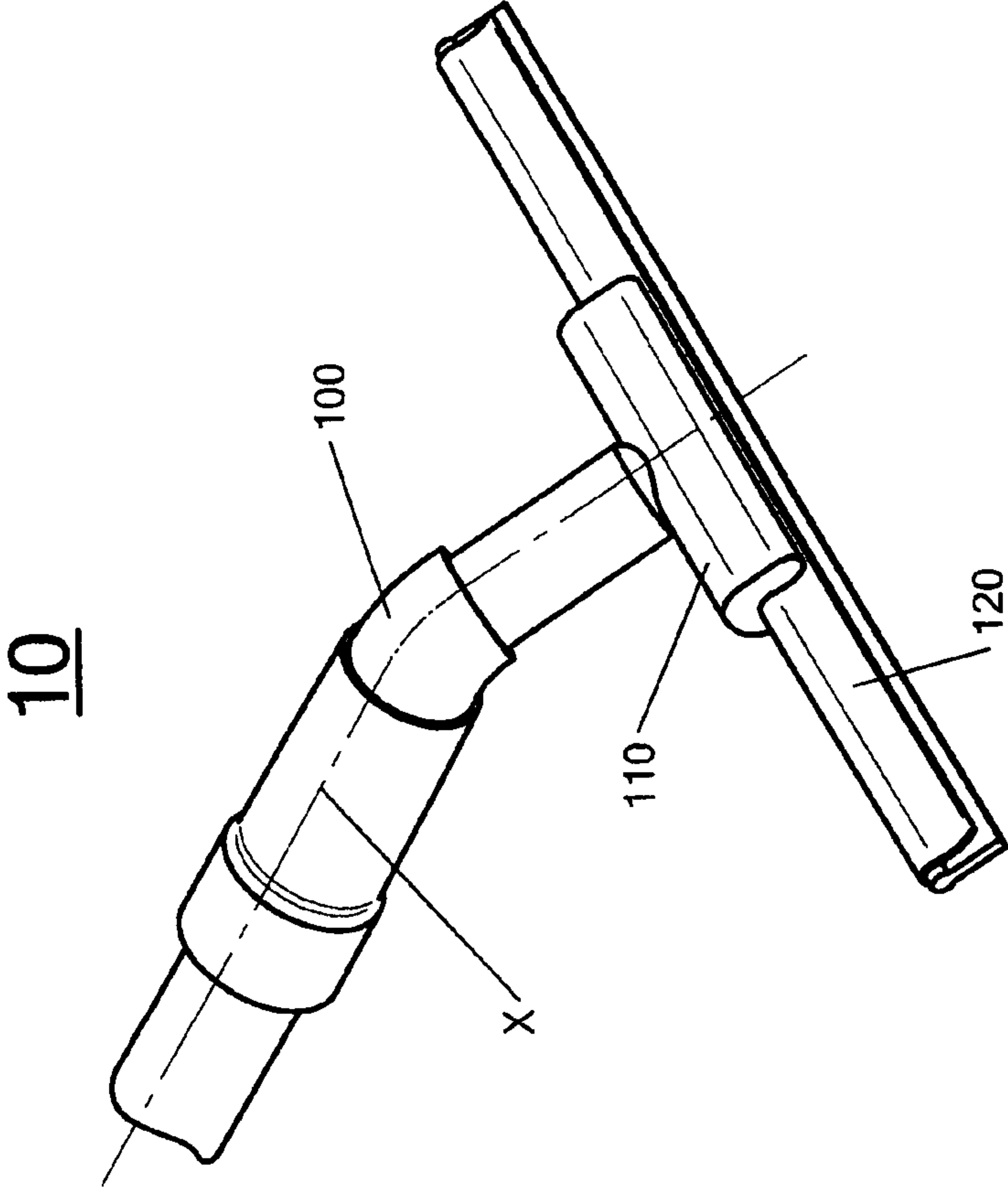


FIG. 1 (Prior Art)

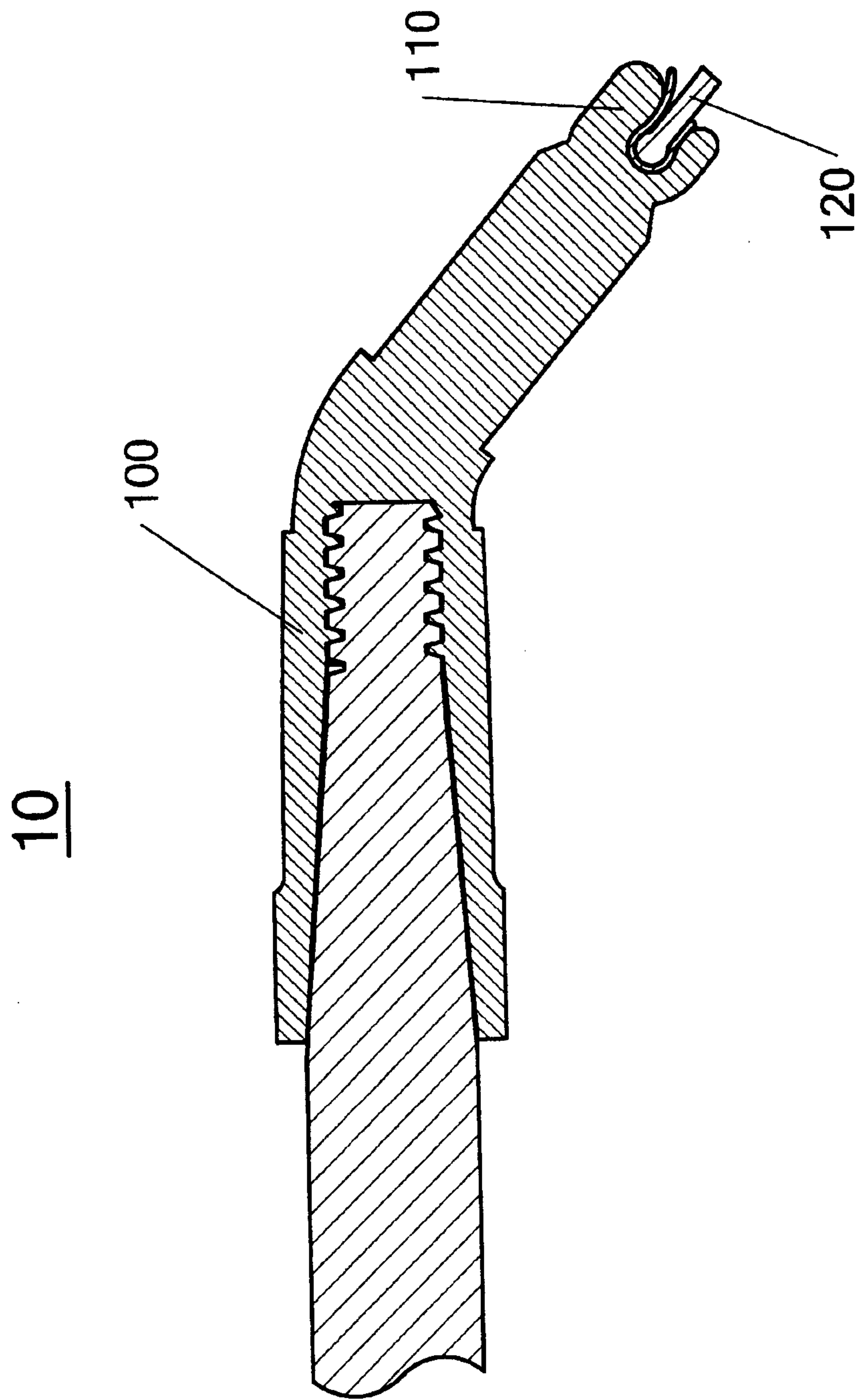


FIG. 2 (Prior Art)

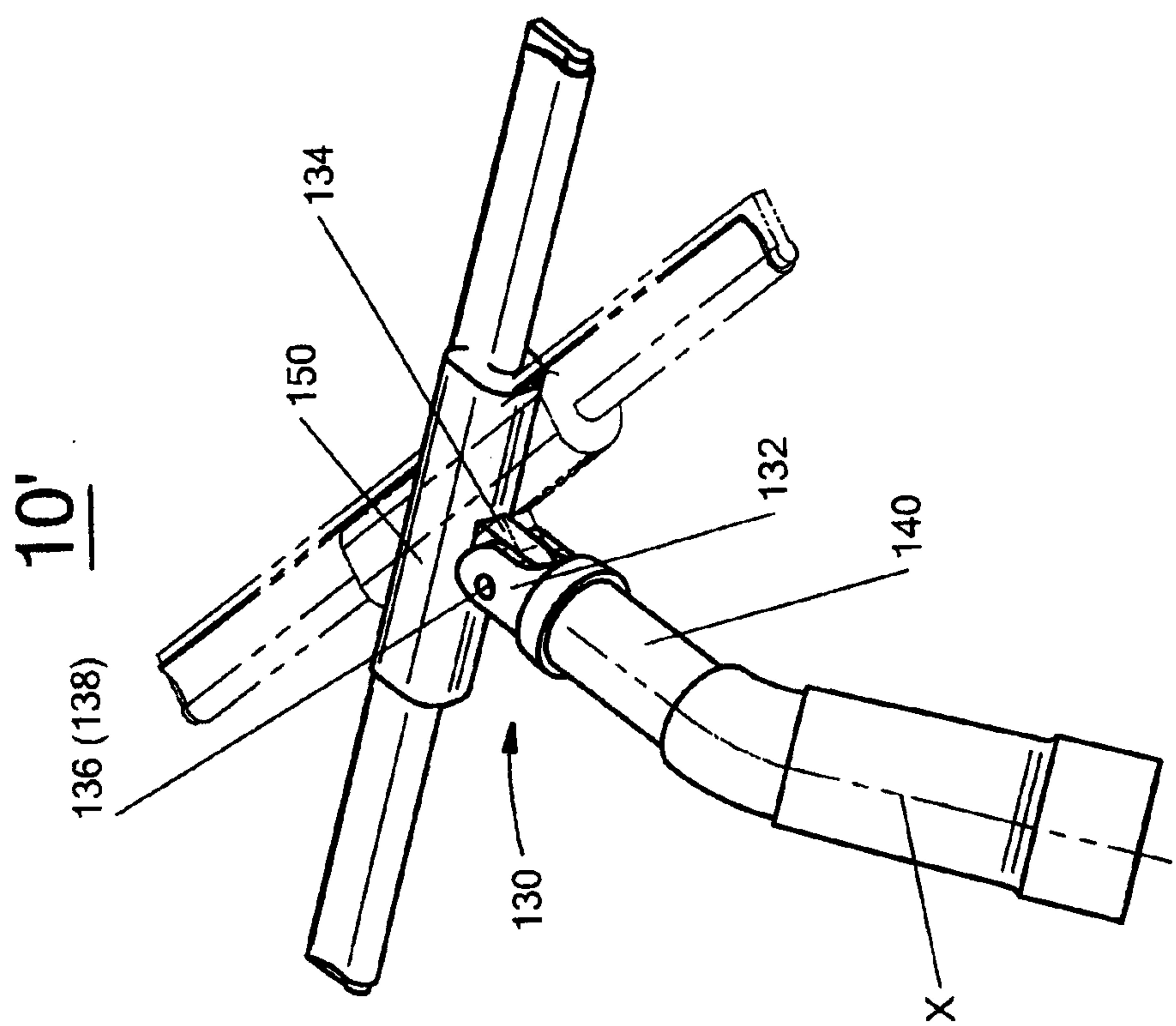


FIG. 3 (Prior Art)

20

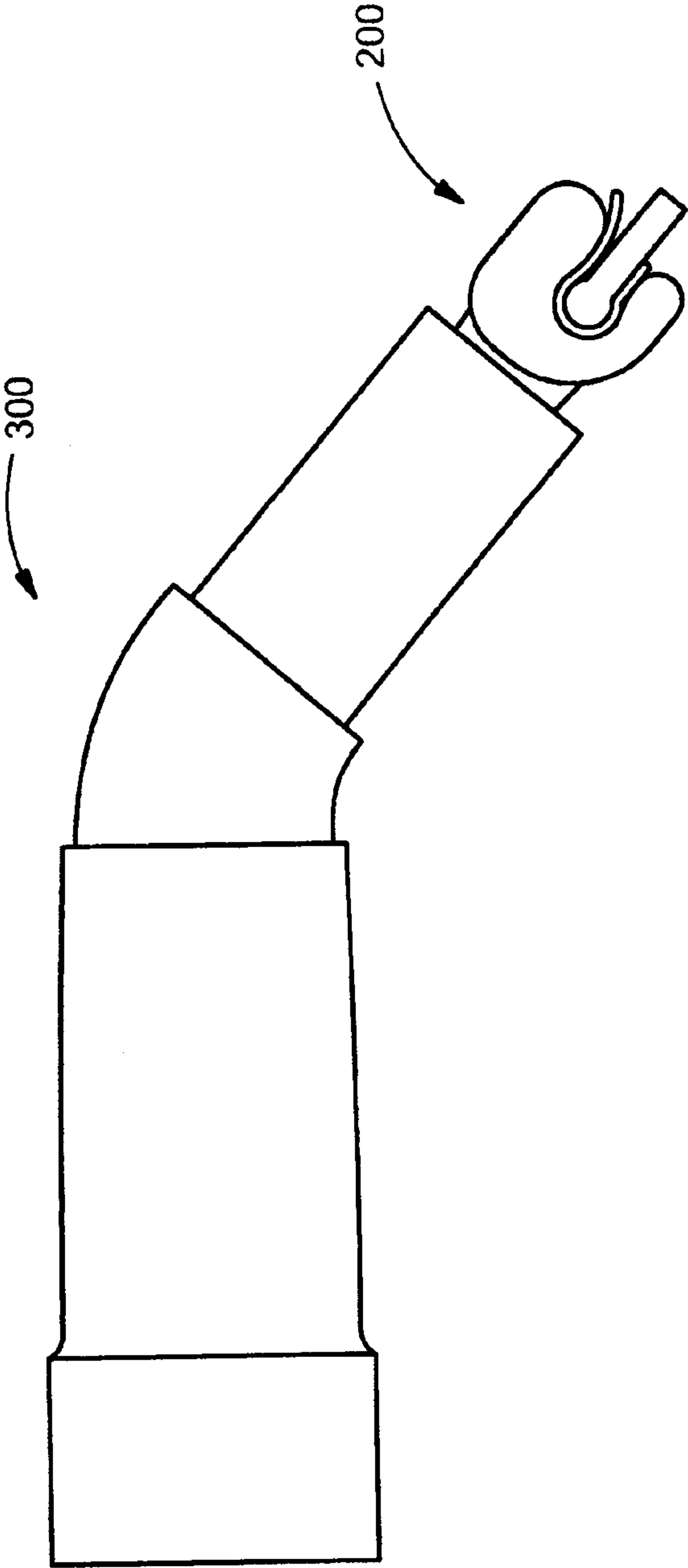


FIG. 4

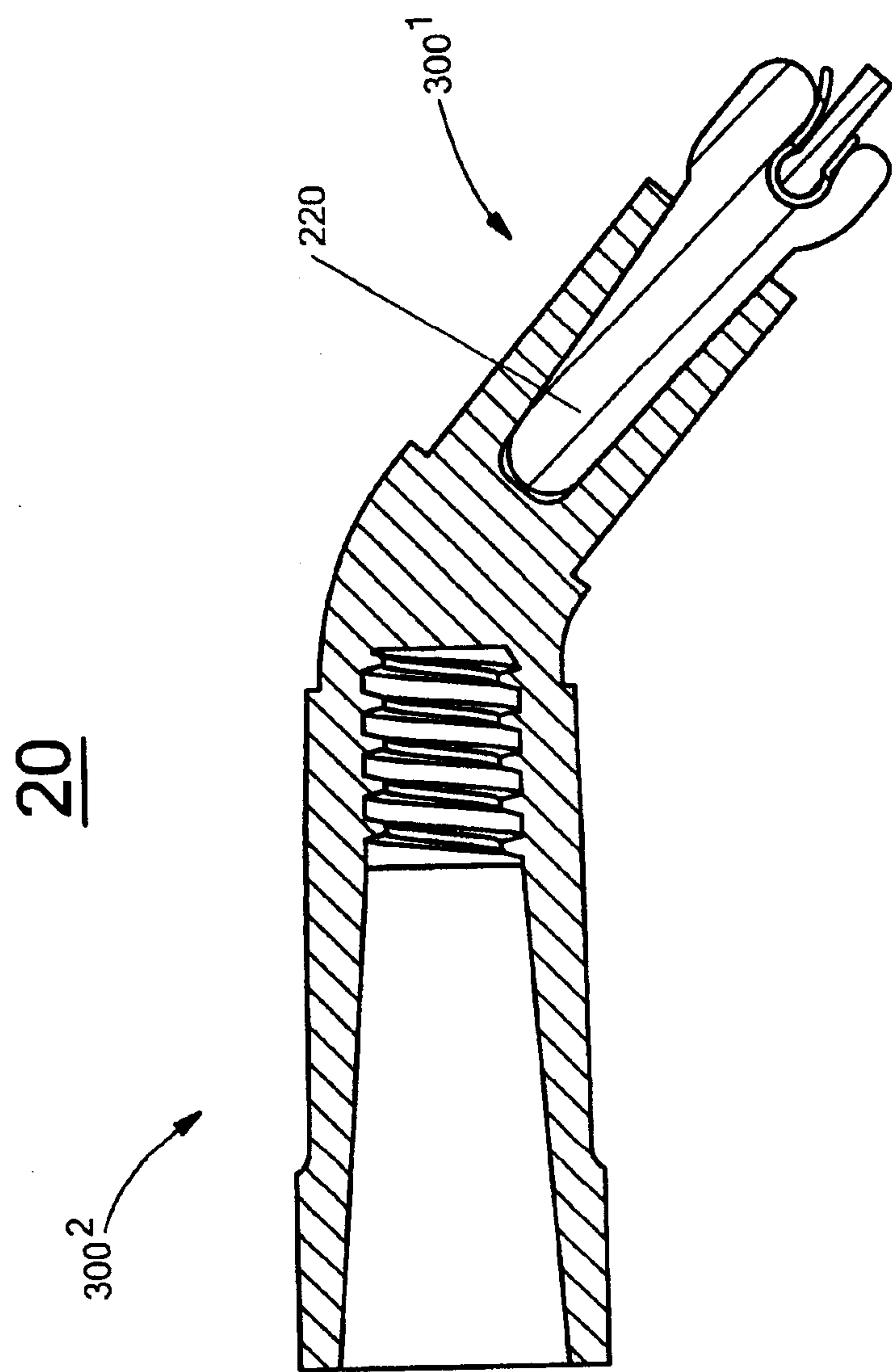


FIG. 5

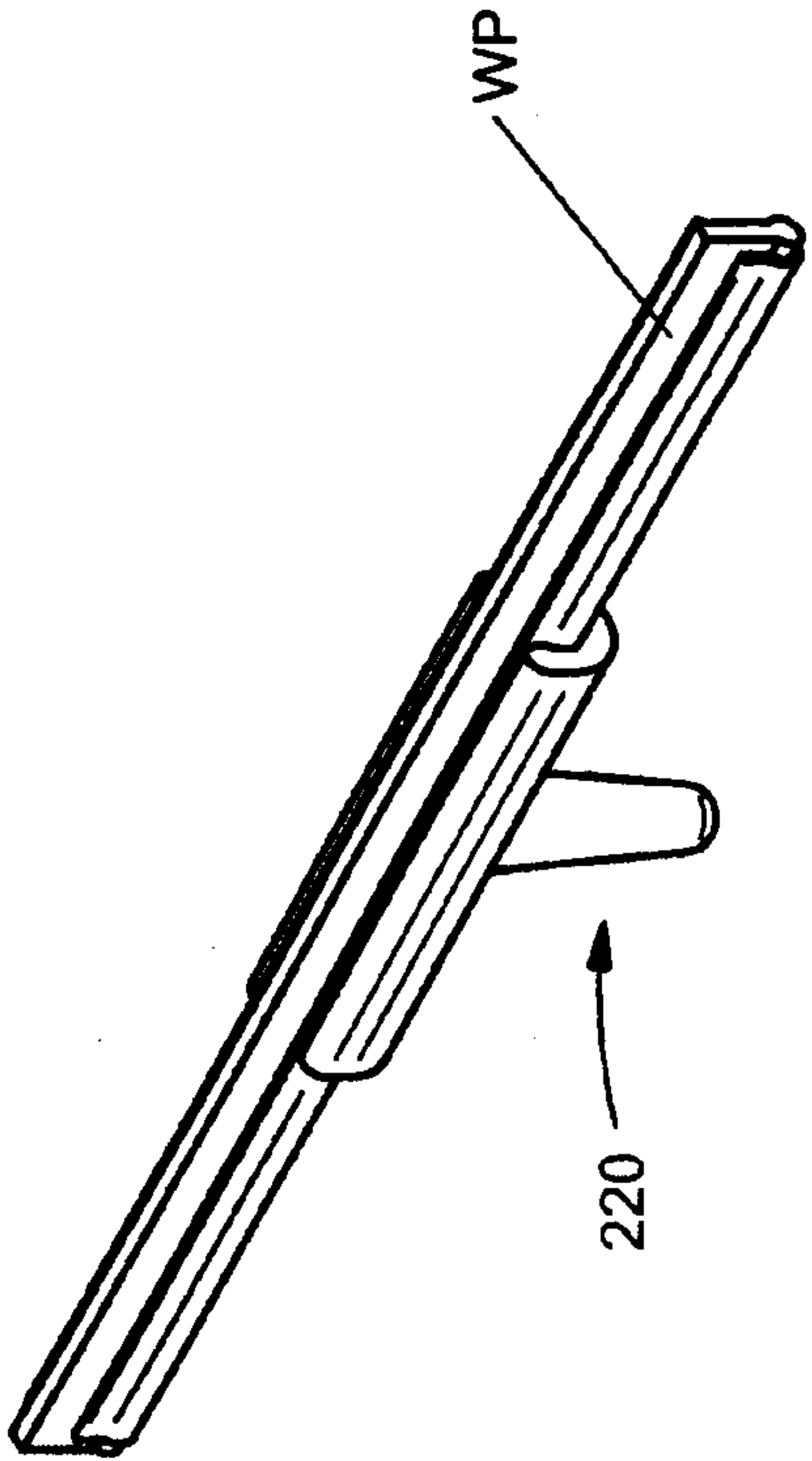


FIG. 6

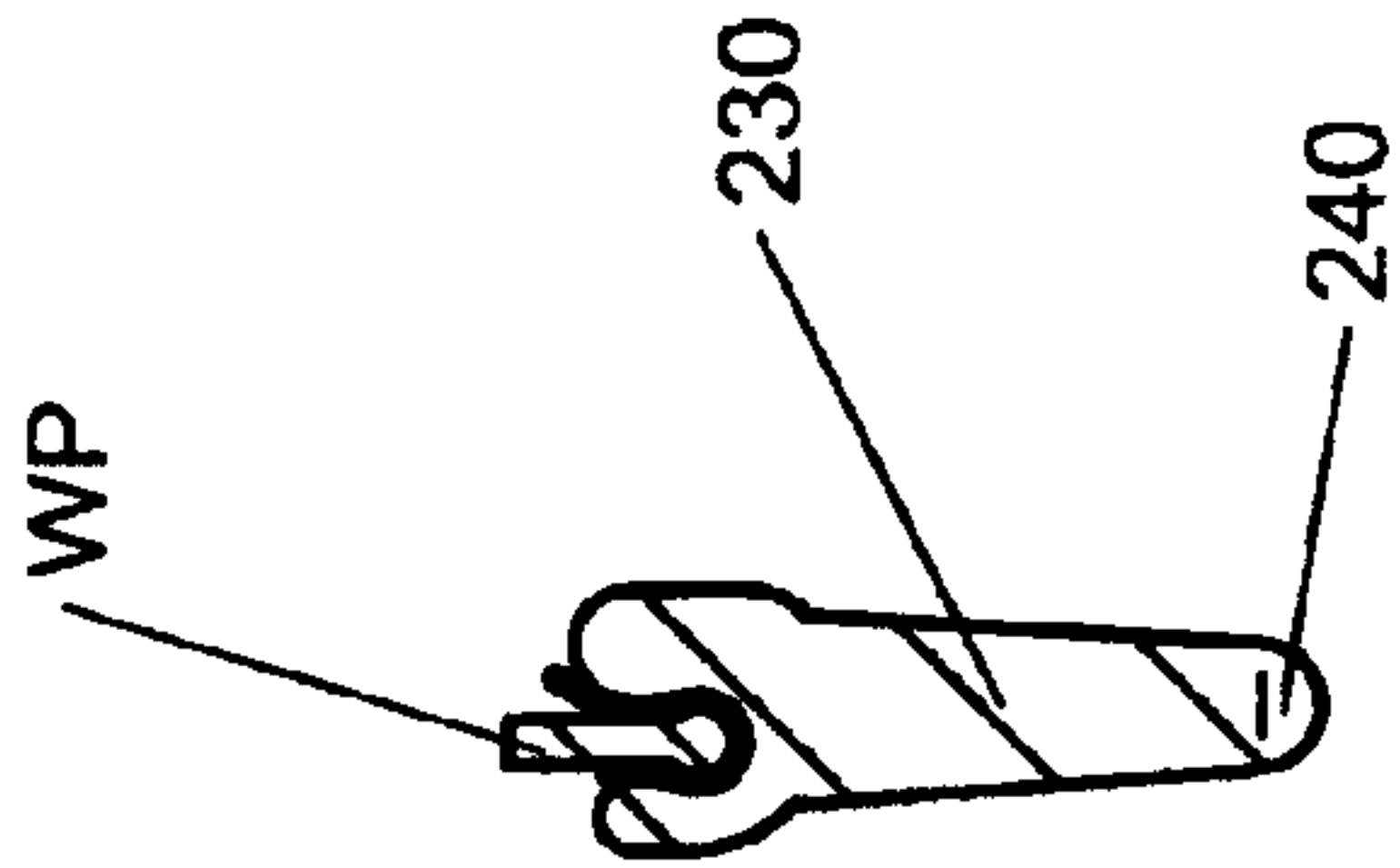


FIG. 8

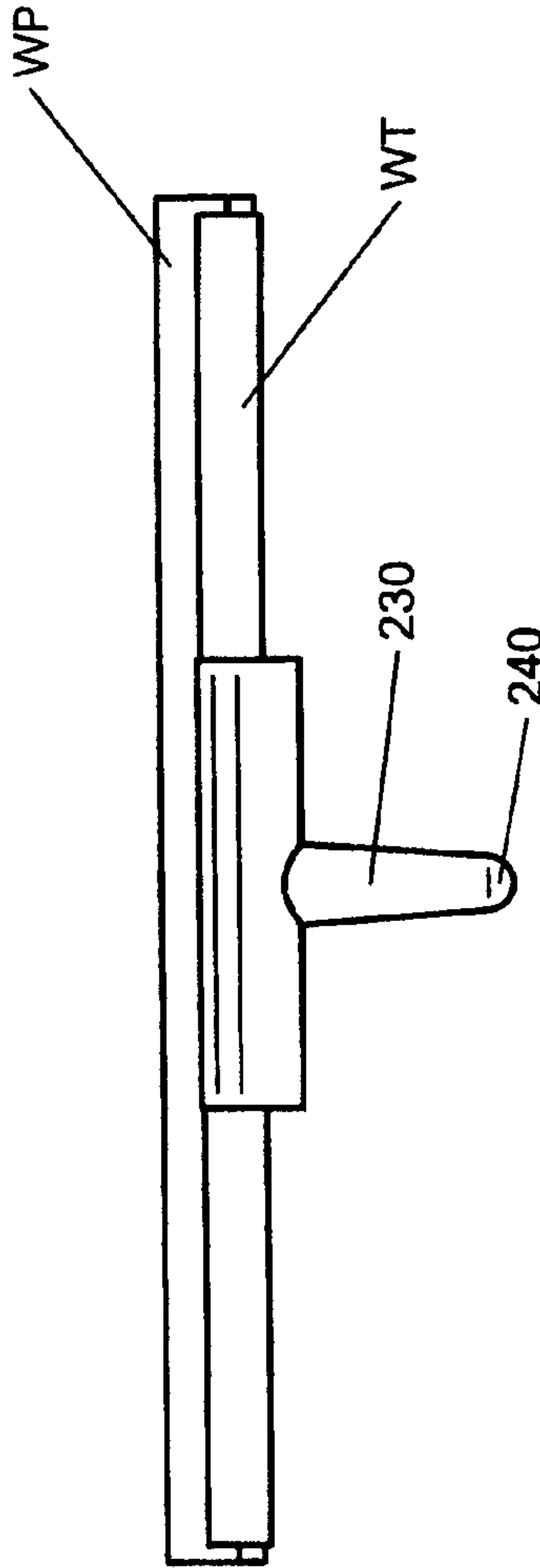


FIG. 7

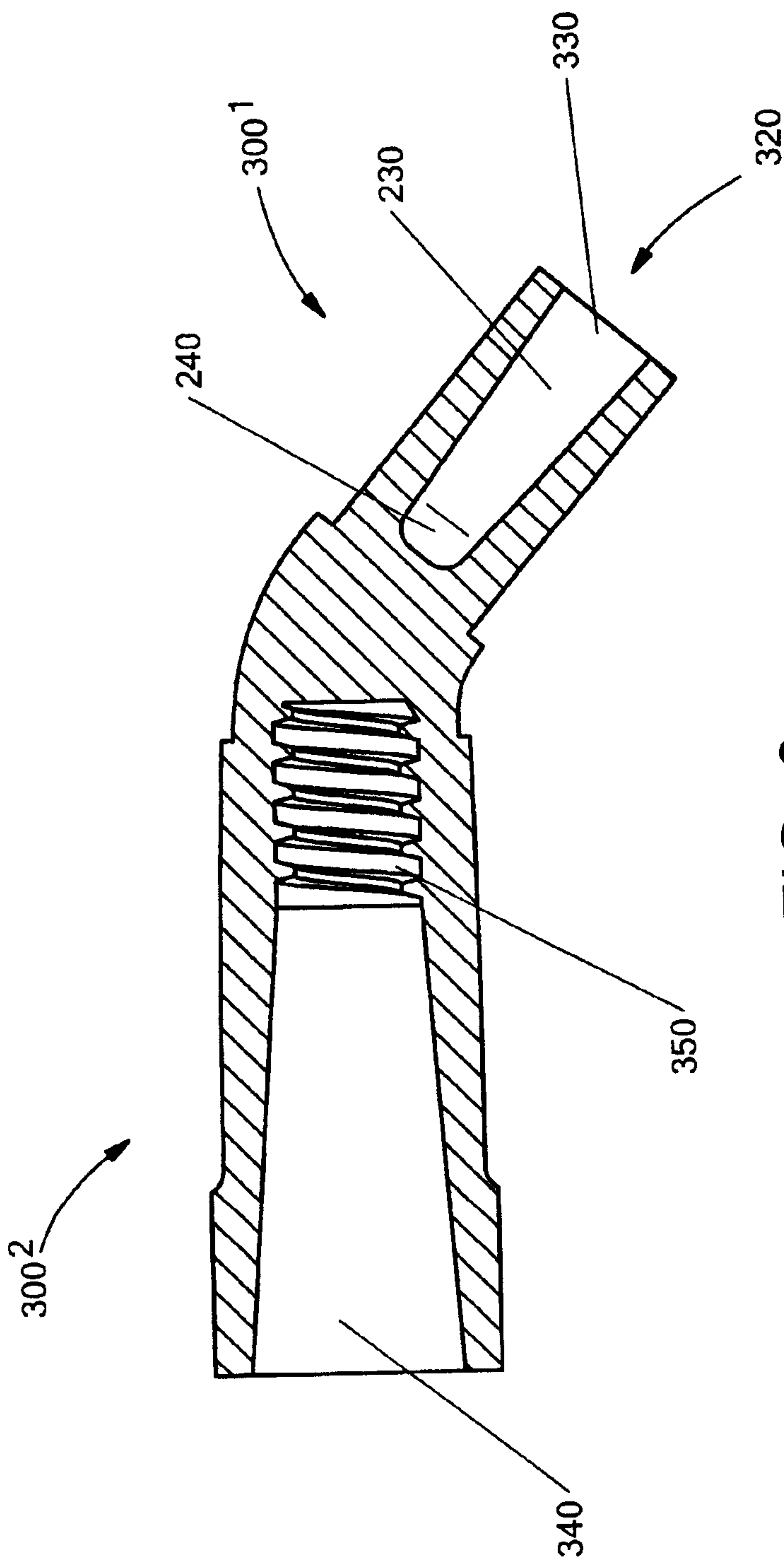


FIG. 9

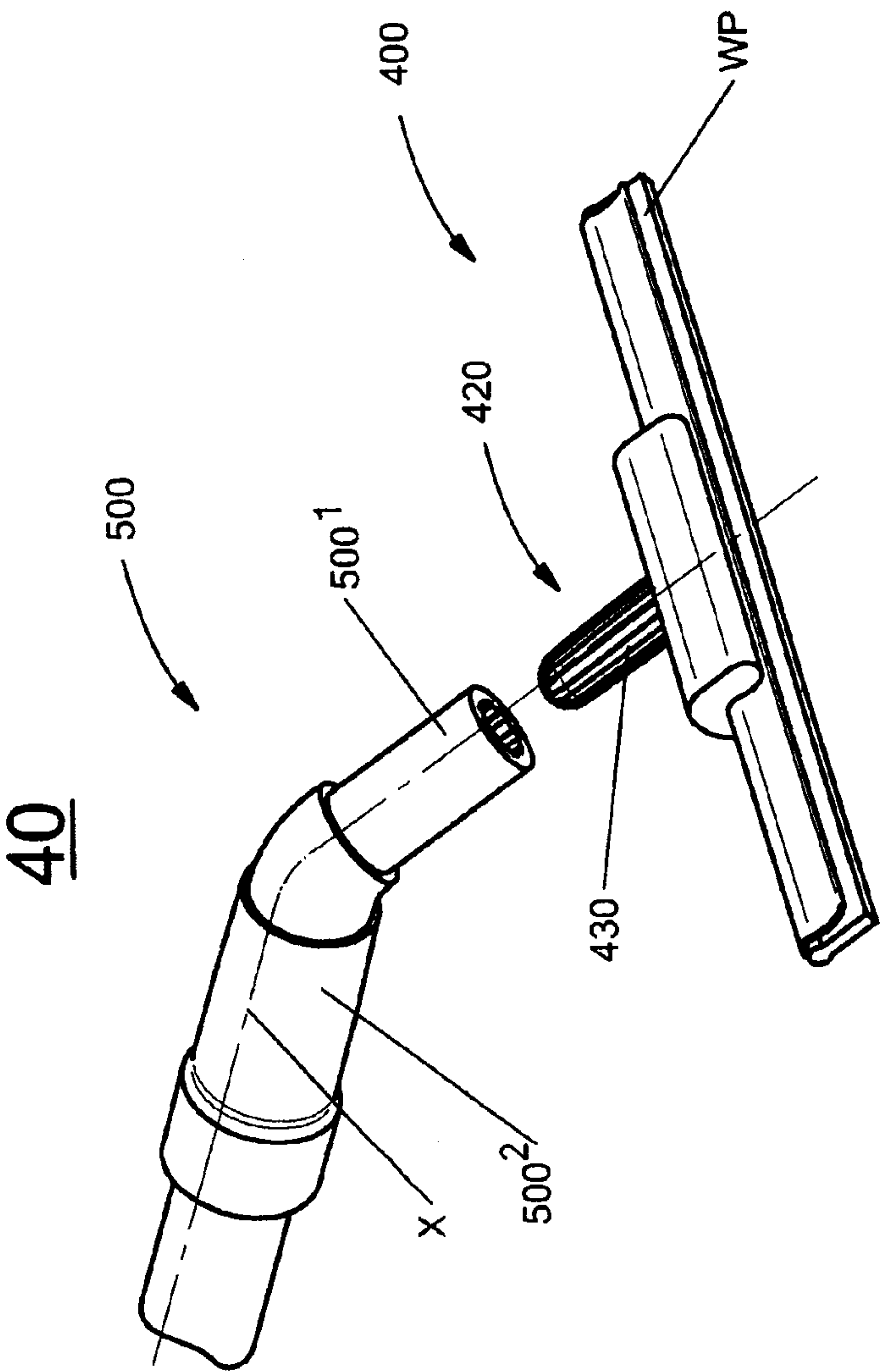


FIG. 10

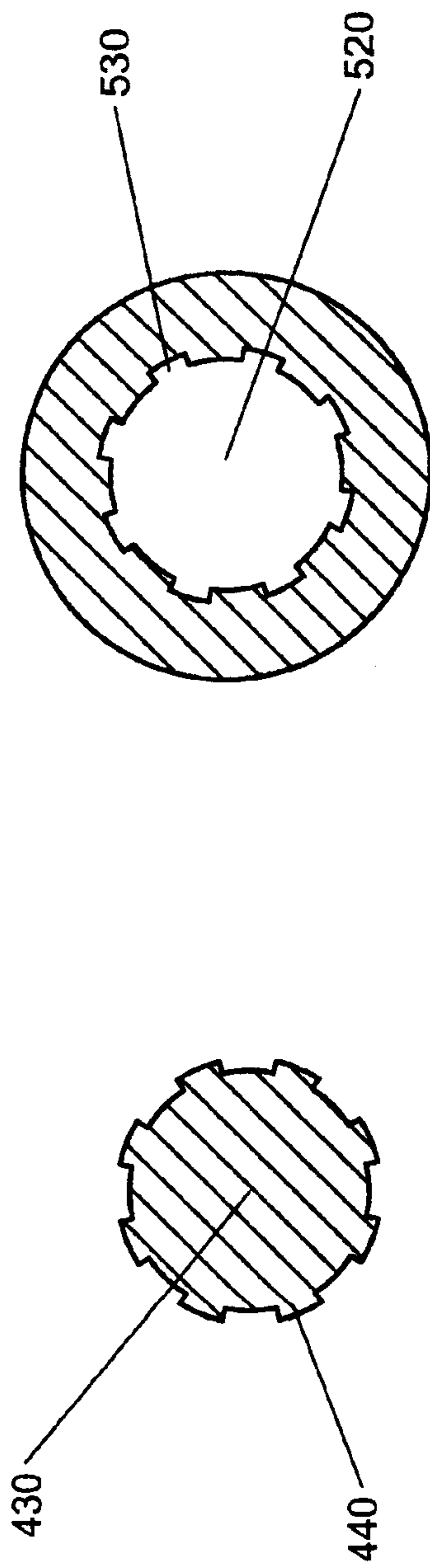
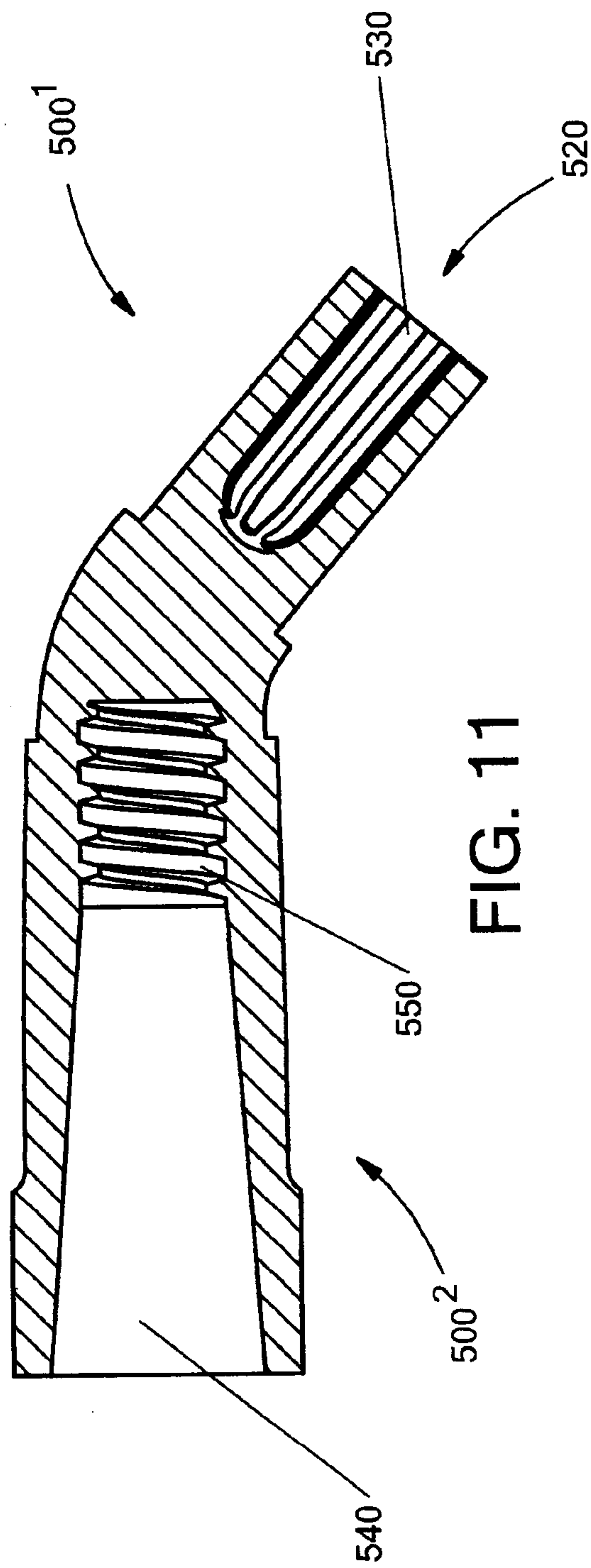


FIG. 12A

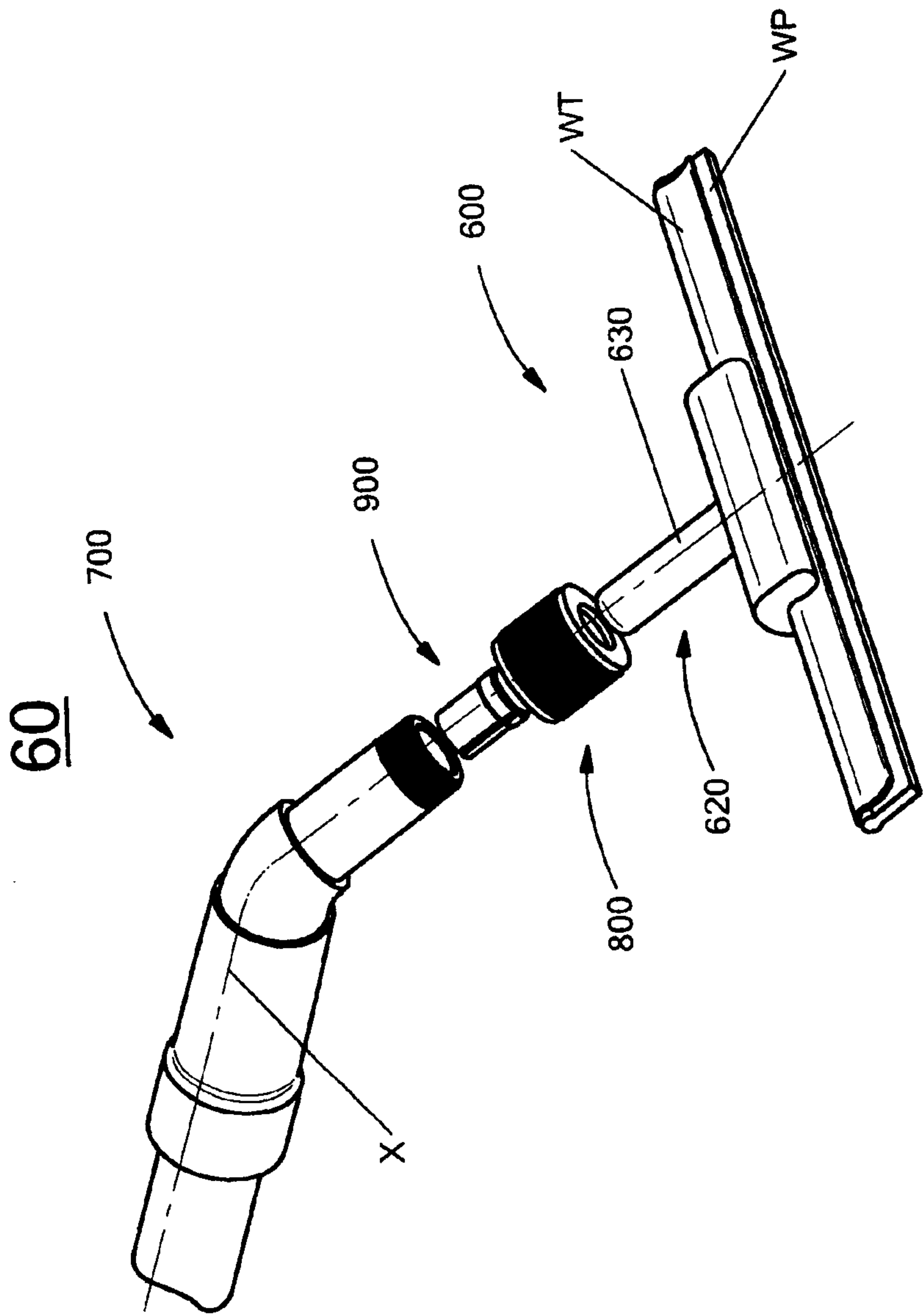
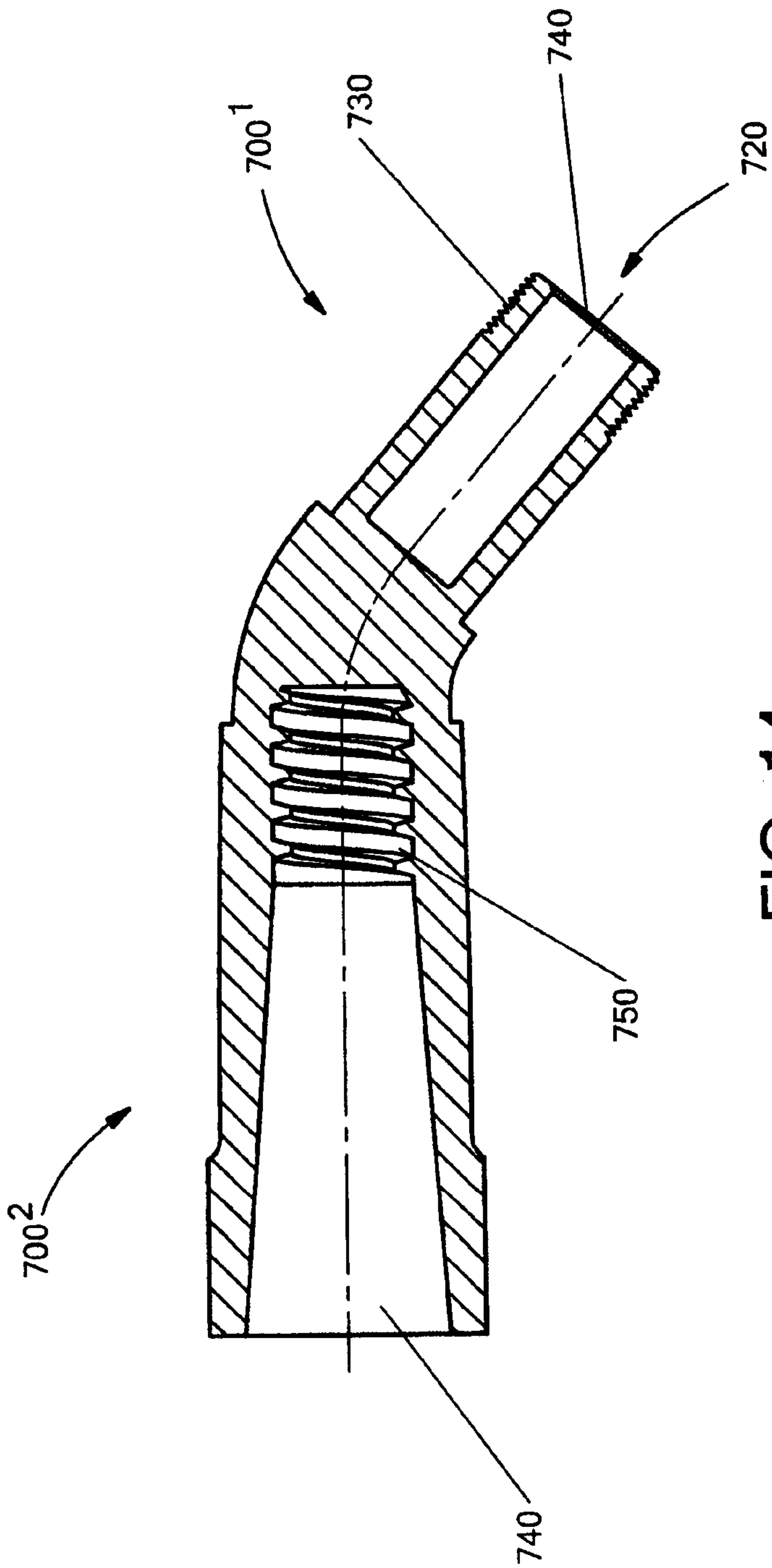


FIG. 13



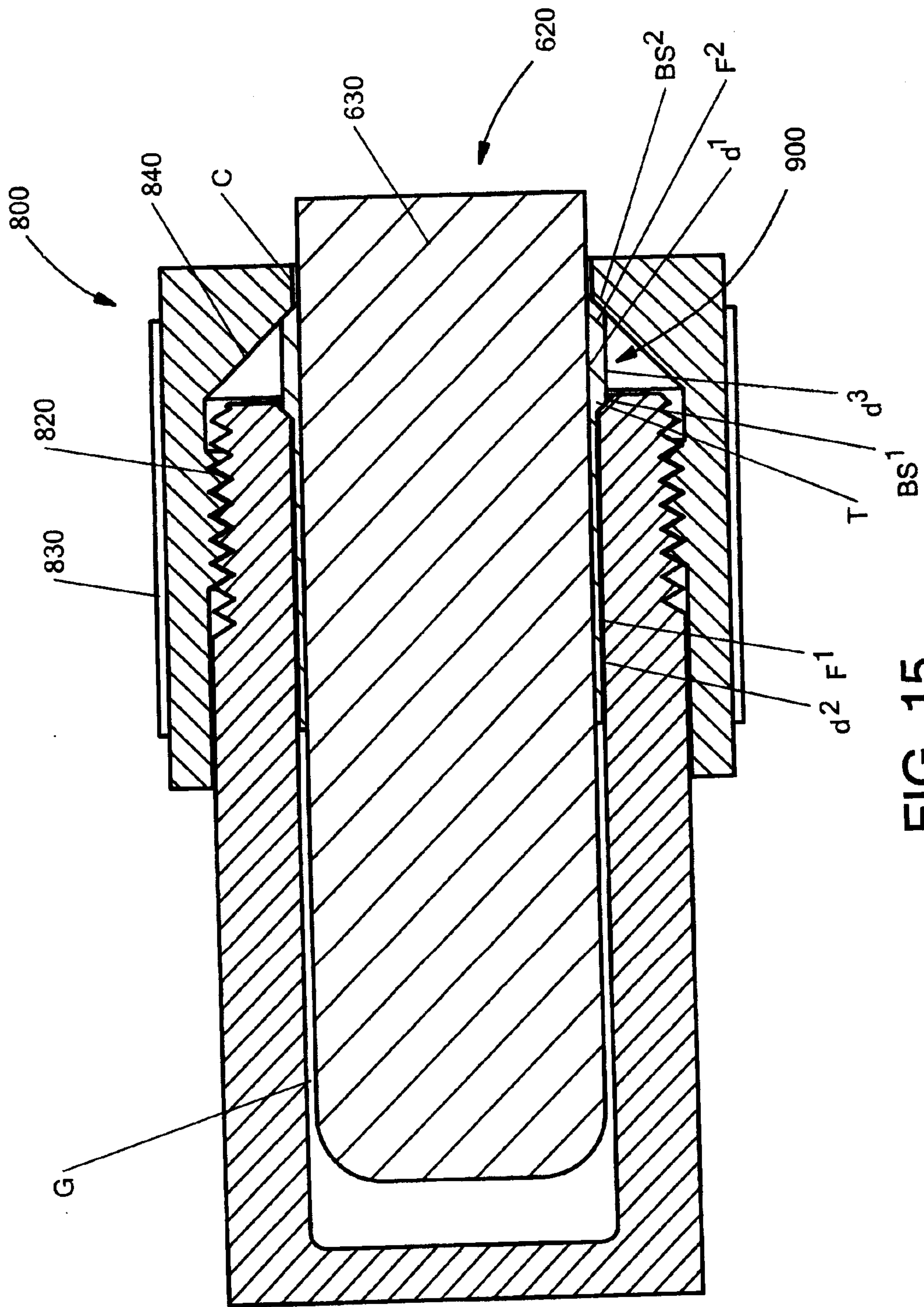


FIG. 15

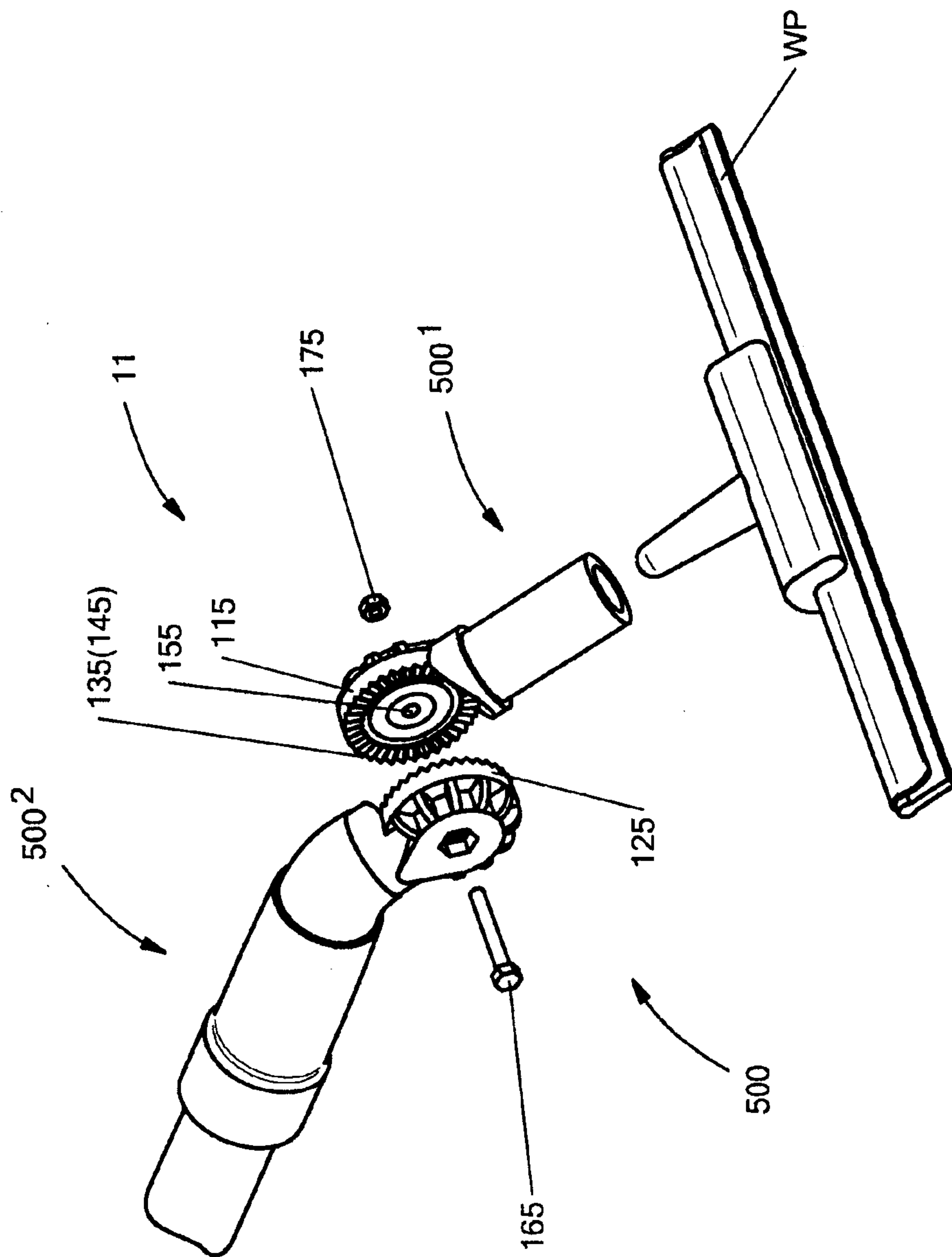


FIG. 16

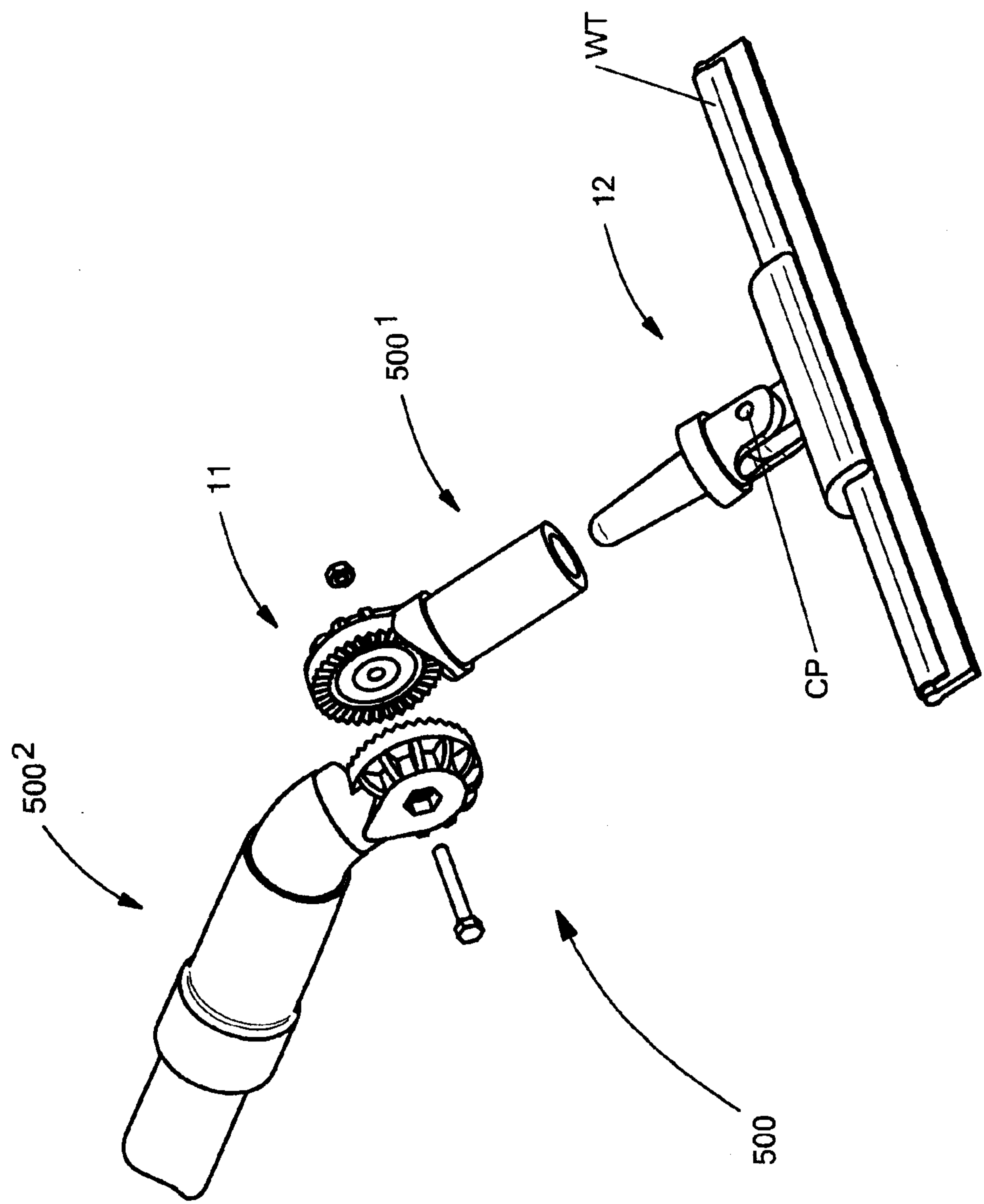


FIG. 17

