

[54] PIVOT ARRANGEMENT

[72] Inventor: Richard R. Wiss, Short Hills, N.J.

[73] Assignee: J. Wiss & Sons Co., Newark, N.J.

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Primary Examiner—Robert C. Riordon

Assistant Examiner—J. C. Peters

Attorney—Sparrow & Sparrow

- [52] U.S. Cl.30/267, 30/268
- [51] Int. Cl.B26b 13/00
- [58] Field of Search.....30/266, 267, 268, 269, 270, 30/254

[57] ABSTRACT

Improved pivot arrangement in scissors, shears snips and the like tools, the tool having an internally threaded pivot bushing or tubular shaft located at the pivot point of the blades, the bushing having an enlarged head at one end and a reduced forward portion provided with two oppositely disposed flat sides. A metal spring-type washer coated with a material having a low friction coefficient is disposed between one of the blades, through which the bushing projects, and the enlarged head of the bushing. The other blade is provided with an opening with opposed flats accommodating the reduced portion of the bushing. A locking screw having an enlarged head engages the internal threads of the bushing for adjusting the tightness between the blades; there being provided an antifriction washer between the locking screw head and the said other blade.

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12 Claims, 15 Drawing Figures

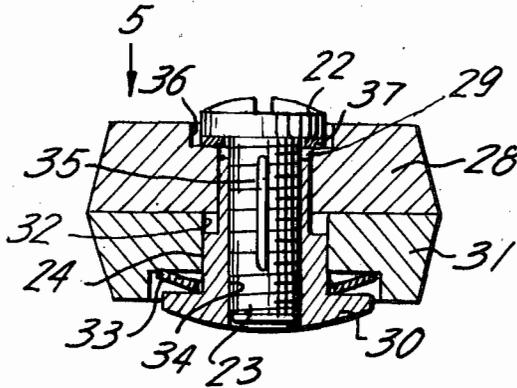


FIG. 1

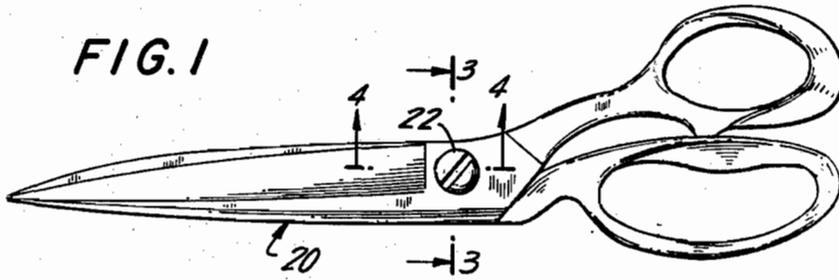


FIG. 3

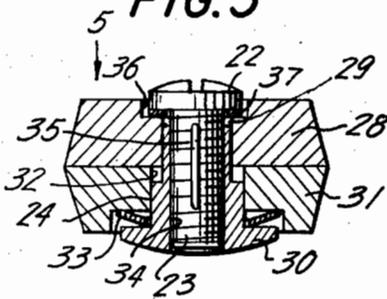


FIG. 4

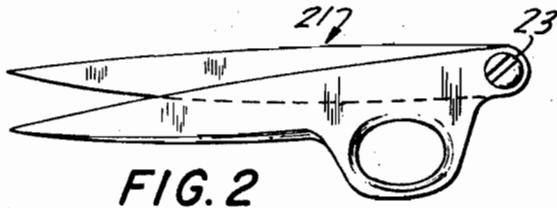
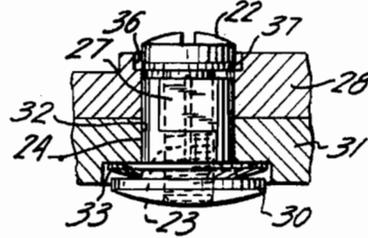


FIG. 2

FIG. 6

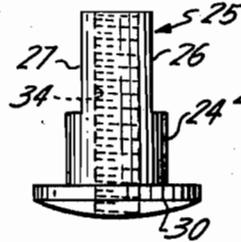


FIG. 7

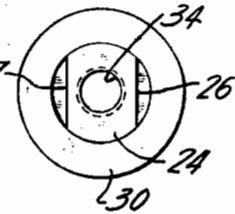


FIG. 5

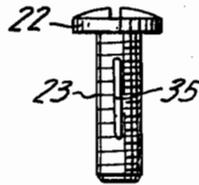
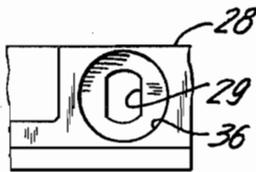


FIG. 8



FIG. 9

FIG. 10

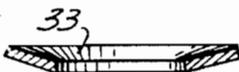


FIG. 11



INVENTOR.
RICHARD R. WISS

BY

SPARROW AND SPARROW
ATTORNEYS

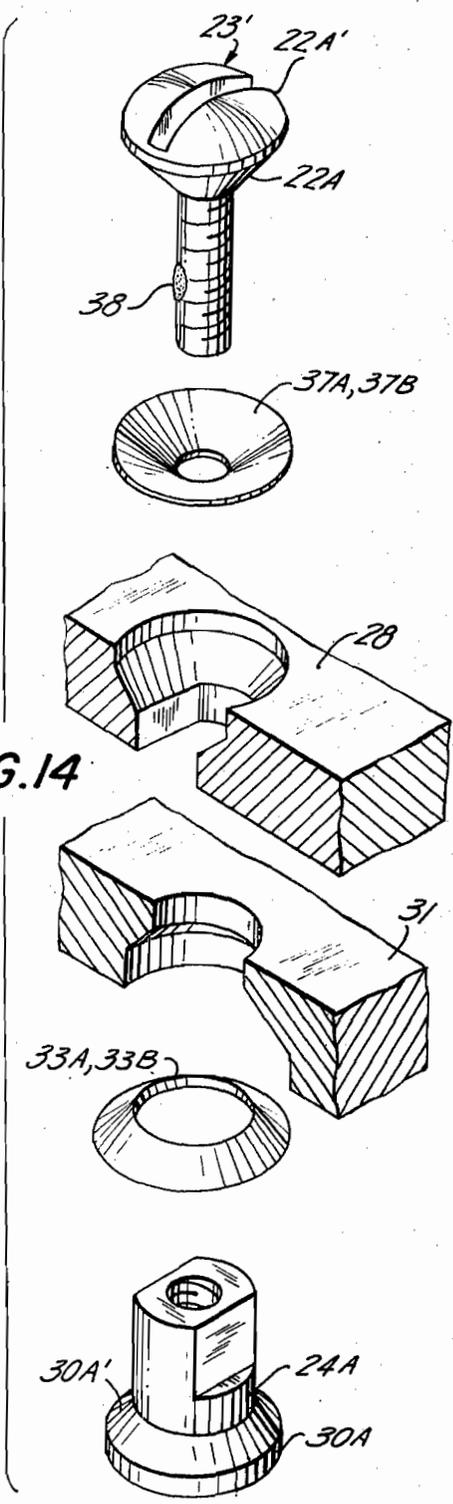


FIG. 14

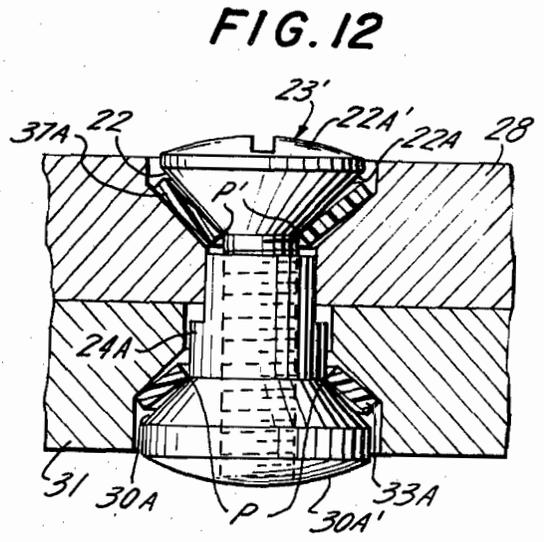


FIG. 12

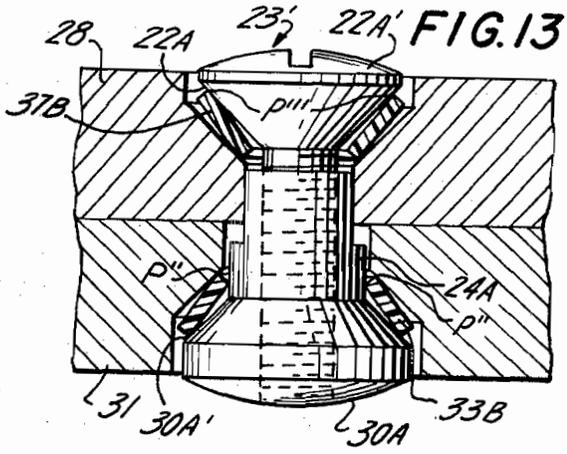


FIG. 13

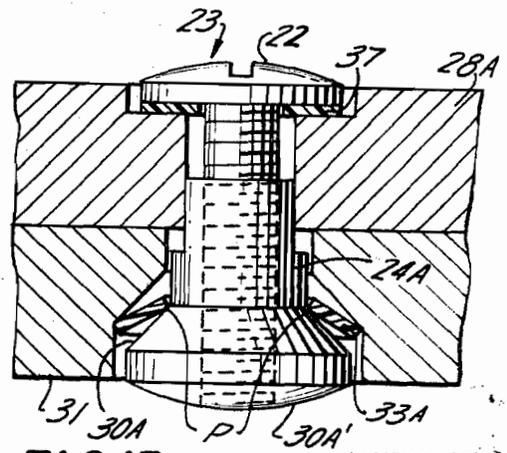


FIG. 15

INVENTOR:
 RICHARD R. WISS
 BY
 SPARROW AND SPARROW
 ATTORNEYS

PIVOT ARRANGEMENT

BACKGROUND OF THE INVENTION

The invention relates to scissors, shears, snips and the like and particularly to an improved pivot arrangement for these tools. Pivot arrangements in scissors, shears and the like cutting tools are generally known wherein a bushing or tubular shaft is provided with an inside thread and a locking screw fitting in this thread for tightening the blades of the scissors or shears together. It is also known that a portion of the bushing is anchored in one way or the other in one of the two blades of the shears so that the bushing may rotate with the respective blade, whereas the head of the locking screw which does not rotate relative to the other blade rubs on the surface of the other blade. This results in either undesirable loosening or tightening of the screw after a relative short time of use. It has been found that the diameter of the head of the bushing and also the diameter of the screw in heretofore known shears is too small, and even the application of washers under the heads does not improve the condition. It is known that a certain "play" between the blade and the bushing anchored therein is inevitable for manufacturing reasons. This play is also susceptible of contributing to the loosening of the screw. Other constructions are known wherein the head of the bushing has a tapered shoulder with a thrust washer placed on this shoulder. This has the potential danger that the thrust washer may be squeezed or extruded when a transverse pressure is exerted on the bushing in the case of trimmers. These disadvantages and problems of the known devices are overcome by the present invention.

SUMMARY

The invention consists in such novel features, construction, arrangements, combination of parts and improvement as may be shown and described in connection with the device herein disclosed by way of example only and as illustrative of a preferred embodiment. The basic concept of the invention is to reduce the friction between the rotating members of the tools and to improve the pivot arrangement of the prior art in such manner that the head of the locking screw rotates with the blade against which it abuts so that there is no relative motion between the head and the surface of the blade. The head of the screw is enlarged and a washer with a low coefficient of friction is disposed under the head, specifically in such manner that the washer is not extruded from contact by excessive transverse pressure, thus minimizing the friction when the screw is tightened and when an inevitable small motion of the anchored bushing in the blade takes place. The head of the bushing is also enlarged for reducing the specific pressure between the head and the blade and for providing space for a spring washer which is coated with a material having a low coefficient of friction.

Objects and advantages of the invention will be set forth in part hereafter and in part will be obvious herefrom or may be learned by practicing the invention, the same being realized and attained by means of the instrumentality and combination pointed out in the appended claims.

It is an object of the invention to provide a novel pivot arrangement for shears, snips and the like tools.

It is a further object of the invention to provide a pivot bushing with an enlarged head and with a non-extrudable friction reducing member under this head.

Another object of the invention is to provide a non-extrudable friction reducing member under the enlarged head of the bushing of the tool, which provides also a constant pressure force on the blades of the tool.

Various further and more specific purposes, features and advantages will clearly appear from the detailed description given below taken in connection with the accompanying drawing which forms part of this specification and illustrates merely by way of example one embodiment of the device of the invention.

BRIEF DESCRIPTION OF THE DRAWING

In the following description and in the claims, parts will be identified by specific names for convenience, but such names are intended to be as generic in their application to similar parts as the art will permit. Like reference characters denote like parts in the figures of the drawing, in which

FIG. 1 shows typical shears embodying the pivot arrangement;

FIG. 2 shows a thread snip with the pivot arrangement;

FIG. 3 shows a section of the shears shown in FIG. 1, taken along lines 3—3,

FIG. 4 shows a section of the shears shown in FIG. 1, taken along lines 4—4, partly broken away;

FIG. 5 is a plan view of the upper blade of the shears viewed in the direction of arrow 5 in FIG. 3, partly broken away;

FIG. 6 is a side elevation of the pivot bushing;

FIG. 7 is an axial view of the pivot bushing;

FIG. 8 is the side elevation of the locking screw;

FIG. 9 is the axial view of the locking screw;

FIG. 10 is a section of the spring washer;

FIG. 11 is an enlarged section of the spring washer, partly broken away, showing the friction reducing coating thereon;

FIG. 12 is a sectional view similar to FIG. 3, showing a variation of engaging elements of the pivot arrangement;

FIG. 13 is a sectional view similar to FIG. 3, showing a further variation of engaging elements of the pivot arrangement,

FIG. 14 is an exploded view of the elements seen in FIG. 12 or FIG. 13 in association with the blades, the latter being in section, and

FIG. 15 is a view similar to FIG. 5, showing a further variation of engaging elements of the pivot arrangement.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now in more detail to the drawing illustrating preferred embodiments by which the invention may be realized, there is shown in FIG. 1 typical shears 20 and in FIG. 2 a thread snip 21, both of which embody the novel pivot arrangement including the enlarged head 22 of the locking screw 23 illustrated in FIG. 8. The internally threaded pivot bushing or tubular shaft 24 constituting the pivot for the blades of the shears is shown in FIGS. 6 and 7 and has a reduced forward or upper portion 25 provided with two oppositely disposed flat sides 26, 27. The upper blade 28 (FIGS. 3 and 4) has an opening or hole 29 with oppositely disposed flats and into which forward portion 25 fits so that upper blade 28 and pivot bushing 24 will rotate together when the shears are operated. Bushing 24 has a particularly enlarged head 30. The lower blade 31 has a straight bore 32 into which bushing 24 fits rotatably. Bore 32 may be recessed (counterbored or countersunk) for receiving head 30 and for the washer 33 which belongs to the class of metal spring-type washers such as the so-called Belleville springs. Washer 33 is coated with a plastic material 33' which has a low friction coefficient and which can be cured on the spring metal at such a temperature as not to effect the temper of the metal. Examples of such materials may fall under the group of low temperature curing or baking resins, such as polyurethanes, epoxies and fluoro-carbons. An example of fluoro-carbons found most efficient is sold under the trademark "Teflon S." Bushing 24 has a threaded bore 34 into which locking screw 23 with screw head 22 engages tightly so that screw 23 is practically self-locking. Screw 23 may comprise any type screw such as, for examples, Fillister head, oval head, hex head, slotted head, Phillips head or socket head cap screw. In order to improve the self-locking condition, a plastic insert 35 may be provided in screw 23, such as it is commercially available under the trademark "Esllok," or a screw with elastically deformable thread for example disclosed in U. S. Pat. No. 3,195,656, may be used. Screw 23 has an enlarged head 22 which fits into the recess 36 (which may be a countersink or counterbore) of blade 28. A washer 37 consisting of a

material having a low friction coefficient is placed under head 22.

One assembly of the pivot is shown in FIGS. 3 and 4. Upper blade 28 and lower blade 31 are tightened together by locking screw 23 in bore 34 of bushing or tubular shaft 24. Flattened portion 25 does not have to be fitted too tightly in slotted hole 29 which may be produced by a simple punching process. But by placing washer 37 under enlarged head 22 of screw 23 the friction between upper surface of upper blade 28 and head 22 is considerably reduced so that the slight relative motion of shaft portion 25 of bushing 24 in slotted hole 29, caused by the tight fit of the former in the latter will not cause screw 22 to loosen up or to tighten itself involuntarily. Obviously the novel pivot arrangement has basically screw 23 rotating together with upper blade 28 so that no relative motion exists between them. The particularly enlarged head 30 of bushing 24 accounts for a lower specific pressure against lower blade 31, resulting in a smaller amount of friction, and spring washer 33 with the low friction material coated thereon placed under head 30 diminishes further the friction. The result of this arrangement is two-fold; a larger total pressure can be applied to the blades for precise cutting of the shears, particularly in the case of trimmers, without rendering the shears too heavy to operate, and to maintain a constant pressure force on the engaging cutting edges of the blades of the shears. Both conditions contribute obviously to less wear of the moving parts over a long period of use of the shears.

The head 22 of screw 23 may be still further enlarged and accordingly recess 36 and antifriction washer 37 may be made larger to accommodate the further enlarged head.

FIG. 13 is a sectional view similar to FIG. 3, showing a variation of engaging elements of the pivot arrangement. In this modification, the angularity of conical or tapered spring washer 33A is designed to cause bearing pressure on the tapered portion 30A of bushing head 30A' to be near the center of the bushing 24A. The bearing pressure area is indicated in FIG. 12 by the character P. The angularity of inverted conical or tapered spring washer 37A is designed to cause bearing pressure on the tapered portion 22A of conical head 22A' of screw 23'. The bearing pressure area is indicated on the screw head 22A at P'.

FIG. 13 is a sectional view similar to FIG. 3, showing a further variation of engaging elements of the pivot arrangement. In this modification, the angularity of conical or tapered spring washer 33B is designed to cause bearing pressure on the tapered portion 30A' of bushing head 30A. The bearing pressure area is indicated in FIG. 13 by the character P''. The angularity of inserted conical or tapered spring washer 37B is designed to cause bearing pressure on the tapered portion 22A of conical head 22A'' of screw 23'. The bearing pressure area is indicated on the screw head 22A'' at P'''.

FIG. 14 is an exploded view of the elements seen in FIG. 12 or FIG. 13 in association with blades 28 and 31. A nylon patch 38 or other suitable torque device is preferably provided on the locking screw 23'.

FIG. 15 shows the use of a tapered head bushing combined with a flat head screw and an engaging flat anti-friction washer. Flat head 22 of screw 23 engages flat anti-friction washer 37. The angularity of conical or tapered spring washer 33A is designed to cause bearing pressure on the tapered portion 30A of bushing head 30A' to be near the center of bushing 24A. The bearing pressure area is indicated at P.

It is obvious to anyone skilled in the art that a combination of a tapered head bushing and a flat head screw or a flat head bushing and tapered screw, and the use of one flat washer and one spring washer are further possibilities within the purview of the invention.

The angular disposition of the washers under the screw heads and under the bushing bodies is such that they still operate as a spring washer, so that dependent upon the angles chosen the pivot can be caused to operate near the periphery of the head, or near the body of the pivot itself, and in both cases still retain utilization of the spring principle.

The use of metal washers coated with a resin having a low friction coefficient under the heads of bushings and screws in both cases prevents extrusion in the tapered head type of product as well as in the flat head type described in FIGS. 1-11. Since extrusion has been one of the principle problems experienced in field use on this product, and since it is well known in trade that plastics are subject to cold flow when under pressure or being worked, the use of low friction resin coated metal washers eliminates this difficulty in the smaller type of pivot with a tapered underside on the bushing, as well as the larger type with the flat surface on the underside of the bushing.

While the invention has been described and illustrated with respect to certain preferred examples which give satisfactory results, it will be understood by those skilled in the art after understanding the principle of the invention, that various other changes and modifications may be made without departing from the spirit of the invention.

What is claimed is:

1. Improved pivot arrangement for scissors, shears, snip and the like tool, said tool having blades and having a pivot bushing and a locking screw engaging said bushing, for tightening said blades; said improved arrangement comprising an enlarged head on said bushing, a metal spring washer under said enlarged head, said washer having a coating consisting of a material having a low friction coefficient, an enlarged head on said locking screw, and a low friction washer under said head of said screw.

2. Improved pivot arrangement according to claim 1, said coating on said metal spring washer substantially consisting of a low temperature curing plastic material.

3. Improved pivot arrangement according to claim 2, said plastic material comprising at least one resin selected from the groups consisting of fluoro-carbons, polyurethanes and epoxies.

4. Improved pivot arrangement according to claim 2, said plastic material comprising "Teflon S."

5. Improved pivot arrangement according to claim 2, said pivot bushing and one of said blades having means for causing said bushing and said one blade to rotate together, and said enlarged head of said bushing having said spring washer placed thereunder being disposed on the other one of said blades.

6. Improved pivot arrangement according to claim 5, said means comprising diametrically opposed flats on said pivot bushing.

7. Improved pivot arrangement according to claim 3, said pivot bushing and one of said blades having means for causing said bushing and said one blade to rotate together, and said enlarged head of said bushing having said spring washer placed thereunder being disposed on the other one of said blades, said means comprising diametrically opposed flats on said shaft.

8. Improved pivot arrangement according to claim 3, said pivot bushing and one of said blades having means for causing said bushing and said one blade to rotate together, and said enlarged head of said bushing having said spring washer placed thereunder being disposed on the other one of said blades in such manner that the angularity of said spring washer causes bearing pressure on said bushing to be selectively positioned adjacent the shaft portion of said pivotal bushing, depending upon the selected angularity of said spring washer to accommodate the pivot requirement of the selected scissor, shear or the like being assembled.

9. Improved pivot arrangement according to claim 4, said pivot bushing and one of said blades having means for causing said bushing and said one blade to rotate together, and said enlarged head of said bushing having said spring washer placed thereunder being disposed on the other one of said blades in such manner that the angularity of said spring washer causes bearing pressure on said bushing to be selectively positioned adjacent the periphery of said head, depending upon the selected angularity of said spring washer to accommodate

the pivot requirement of the selected scissor, shear or the like being assembled.

10. Improved pivot arrangement according to claim 4, said plastic material comprising at least one resin selected from the groups consisting of fluoro-carbons, polyurethanes and epoxies, said pivot bushing and one of said blades having means for causing said bushing and said one blade to rotate together, and said enlarged head of said bushing having said spring washer placed thereunder being disposed on the other one of said blades in such manner that the angularity of said spring washer causes bearing pressure on said bushing to be selectively positioned adjacent the periphery of said head depending upon the selected angularity of said spring washer to accommodate the pivot requirement of the selected scissor, shear or the like being assembled, said enlarged head on said locking screw having a flat under face bearing on said spring washer.

11. Improved pivot arrangement according to claim 2, said plastic material comprising at least one resin selected from the groups consisting of fluoro-carbons, polyurethanes and epoxies, said pivot bushing and one of said blades having means for causing said bushing and said one blade to rotate together, and said enlarged head of said bushing having said spring washer placed thereunder being disposed on the other one of said

blades in such manner that the angularity of said spring washer causes bearing pressure on said bushing to be selectively positioned adjacent the shaft portion of said pivotal bushing, depending upon the selected angularity of said spring washer to accommodate the pivot requirement of the selected scissor, shear or the like being assembled, said enlarged head on said locking screw having a flat under face bearing on said spring washer.

12. Improved pivot arrangement according to claim 2, said plastic material comprising at least one resin selected from the groups consisting of fluoro-carbons, polyurethanes and epoxies, said pivot bushing and one of said blades having means for causing said bushing and said one blade to rotate together, and said enlarged head of said bushing having said spring washer placed thereunder being disposed on the other one of said blades in such manner that the angularity of said spring washer causes bearing pressure on said bushing to be selectively positioned adjacent the periphery of said head, depending upon the selected angularity of said spring washer to accommodate the pivot requirement of the selected scissor, shear or the like being assembled, said enlarged head on said locking screw having a flat under face bearing on said spring washer.

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