United States Patent [19]

Students

[11] **3,834,022**

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[54] **LOW-PROFILE FLOATING BLADE SCISSORS OR SHEARS**

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

[22] Filed: **July 12, 1973**

[21] Appl. No.: **378,522**

[52] **U.S. Cl.** **30/261,** 30/267

[51] **Int. Cl.** **B26b 13/00**

[58] **Field of Search** 30/248, 254, 260, 266, 30/268, 269, 267, 270, 261

[56] **References Cited**

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Primary Examiner—Al Lawrence Smith
Assistant Examiner—M. Joyce

[57] **ABSTRACT**

Scissors or shears having a first blade which is integral or rigidly connected to a handle, a second blade, a separate second handle, and low profile, extremely compact means for connecting the second blade to the second handle and for maintaining the first and second blades in proper cutting relationship, comprising a torsion spring mounted in a biasing bushing made of a material of a low coefficient of friction, the torsion spring being operable to impart a "dive action" to the second blade when the blades are moved to the cutting position.

8 Claims, 12 Drawing Figures

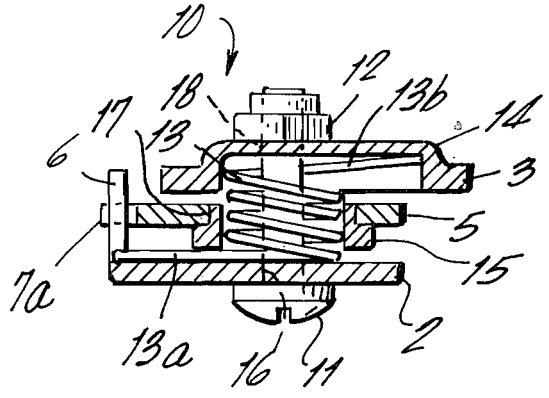


FIG. 1

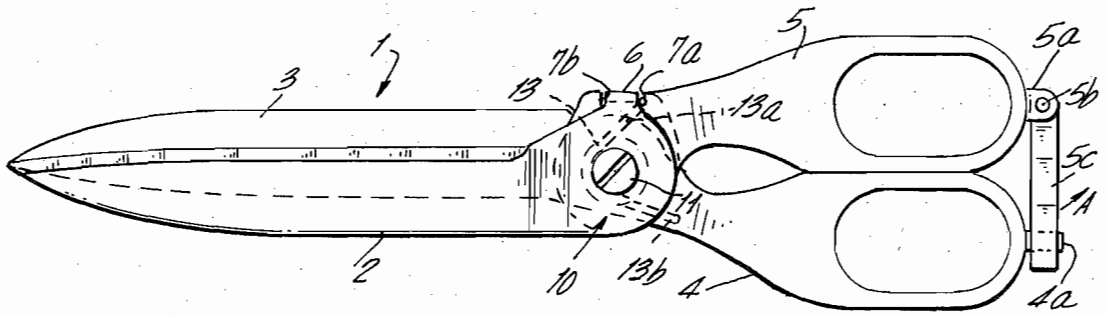


FIG. 2

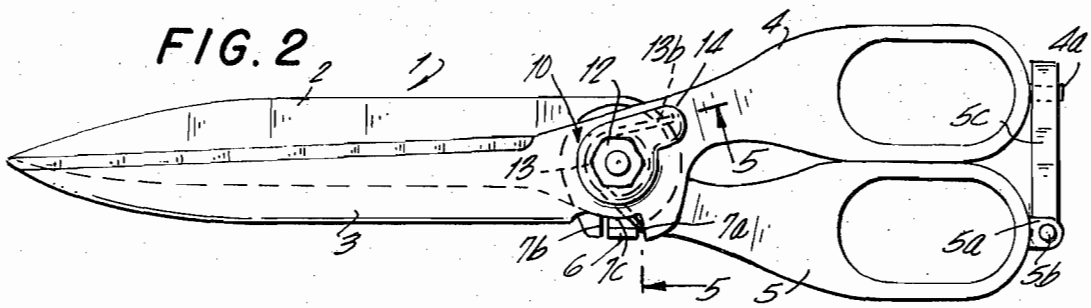
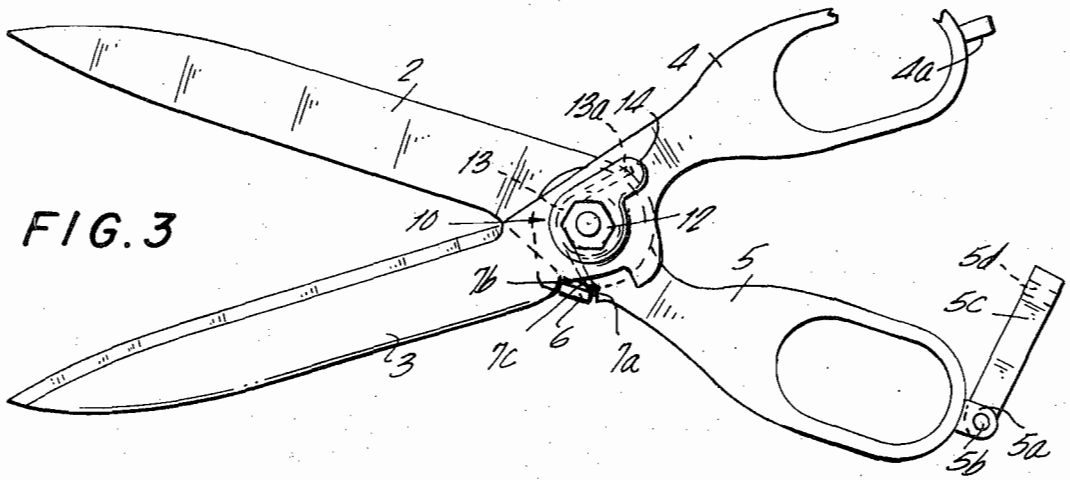


FIG. 3



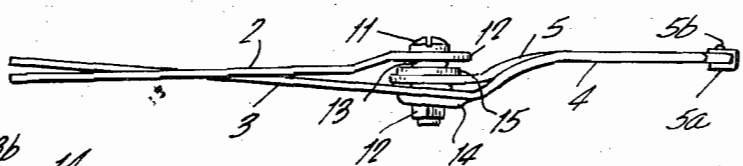


FIG. 4

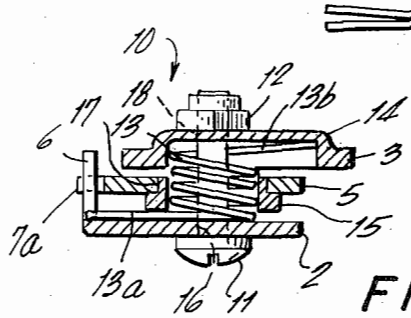


FIG. 5

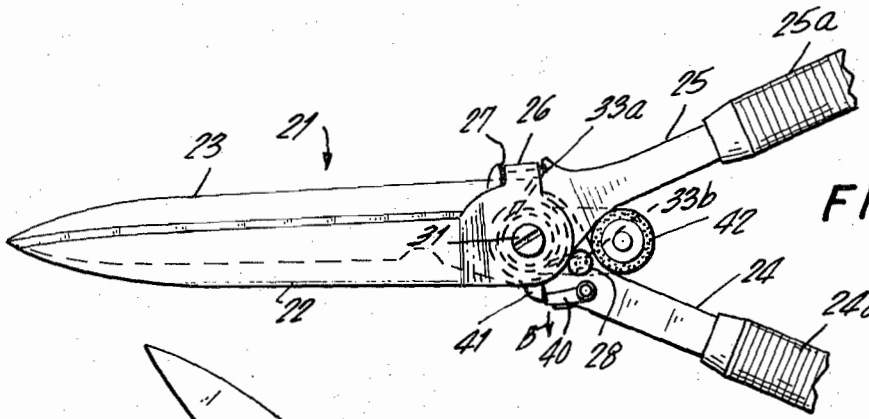


FIG. 6

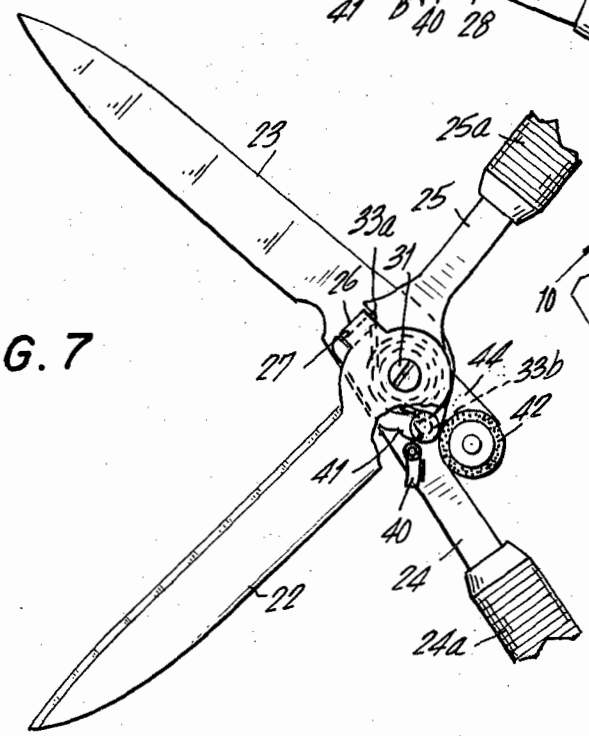


FIG. 7

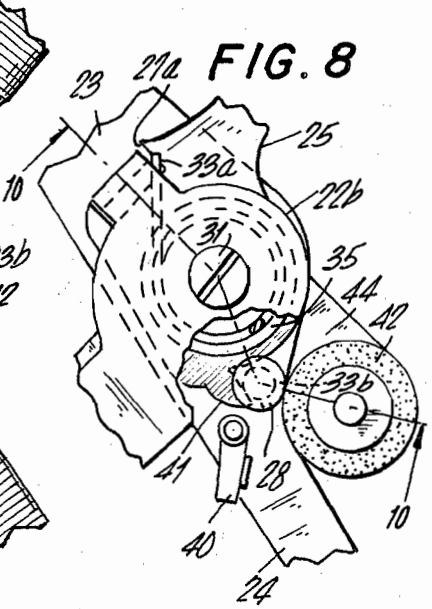


FIG. 8

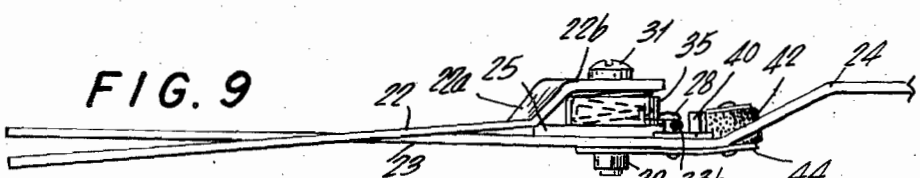


FIG. 9

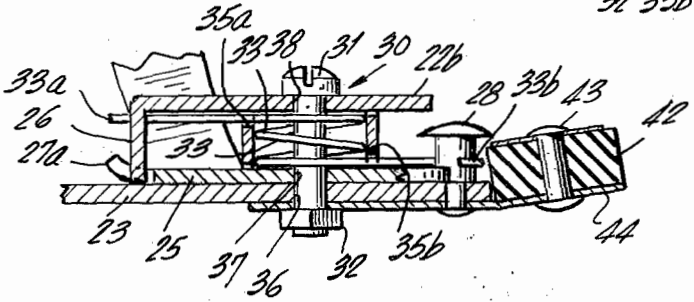
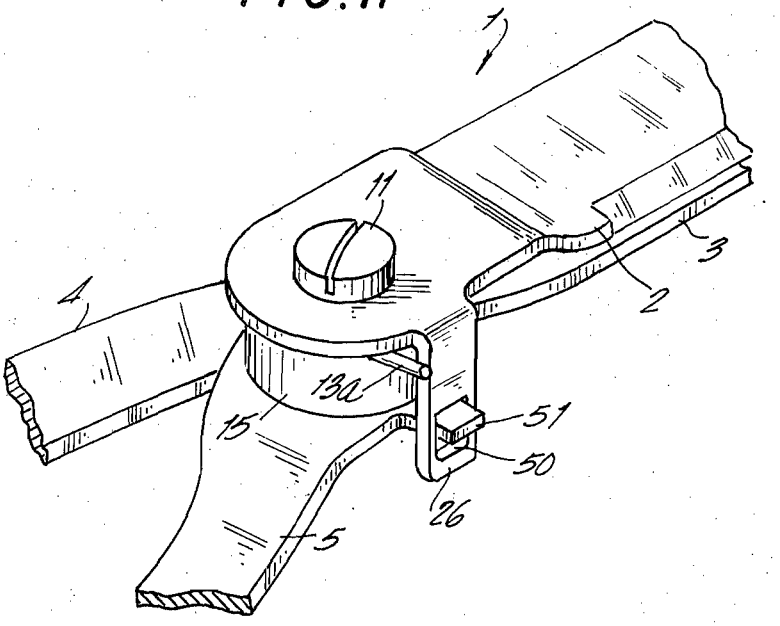


FIG. 10

FIG. 11



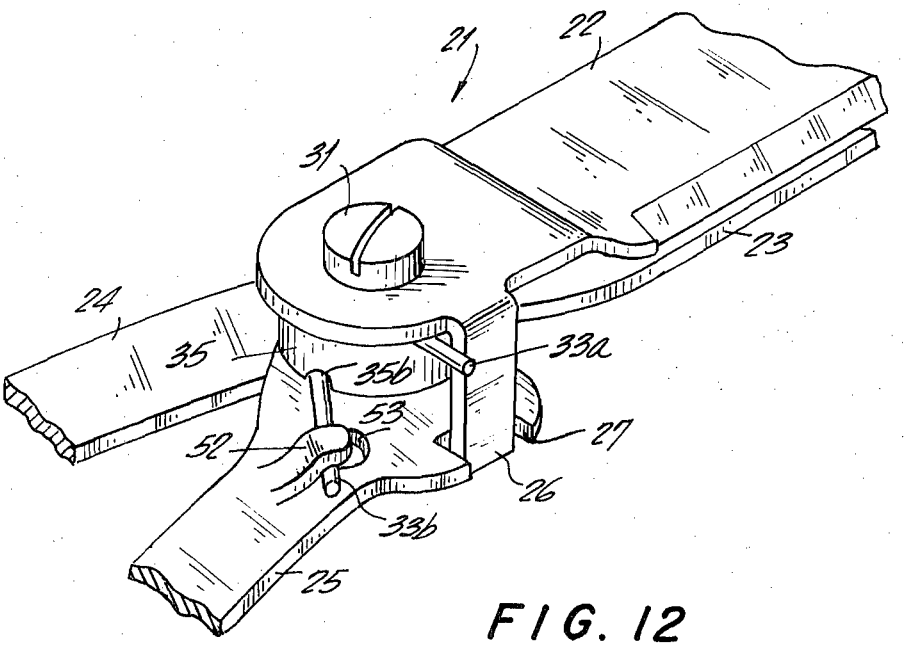


FIG. 12

LOW-PROFILE FLOATING BLADE SCISSORS OR SHEARS

DETAILED DESCRIPTION OF THE INVENTION

The present invention relates generally to scissors and shears, and more particularly to improvements relating to the structure of these scissors and shears.

In conventional scissors and shears, each of the pair of cutting blades is generally integral with a handle, or else the handle is rigidly connected to the blades, such as by attachment to a tang longitudinally extending from the cutting blade. In order that the blades may properly cut, it is necessary to bow the blades so that, when opened and viewed from the side, the top blade extends generally downwardly and the bottom blade extends generally upwardly. The bowing operation is difficult, if at all possible, fully to automate, and generally involves hand labor, which is both expensive and time consuming.

In the art of grass-cutting shears, the use of a stationary blade with an integral or rigidly connected handle and a movable blade which is actuated by a separate handle is known, the movable blade being biased by spring force toward the fixed blade during the shearing movement of the movable blade. Such prior art grass-cutting shears are represented by U.S. Pat. No. 3,064,350, issued Nov. 20, 1962 to R. J. Wertepny, Sr. et al, U.S. Pat. No. 3,064,351, issued Nov. 20, 1962 to Ferenc Kuchta et al, and U.S. Pat. No. 3,296,697, issued Jan. 10, 1967 to Lars Hedstrom. These grass-cutting shears employ a floating blade mechanism which is quite bulky and thereby unsuitable for use in scissors and shears which have a low profile. In addition, the mechanism by which the movable blade "floats" and is urged into cutting relationship with the stationary blade is complex, relying on complicated linkages and/or pull rods.

The primary object of the present invention resides in the development and production of low-cost scissors and shears which, among other features, includes features normally found only in higher priced scissors and shears.

A further object of the present invention is to provide scissors and shears having a floating blade, but which is of low profile.

A further object of the present invention is to provide scissors and shears wherein the floating blade mechanism is of simple construction and which comprises a minimum of parts.

A further object of the present invention is to provide scissors and shears that do not exhibit excessive tilting in the sideways direction during the cutting operation.

A still further object of the present invention is to provide scissors and shears that can be easily and economically manufactured and readily disassembled for sharpening.

These objects are accomplished by the provision in the present invention of scissors or shears having a first blade which is integral or rigidly connected to a handle, a second blade, a separate second handle, and low profile, extremely compact means for connecting the second blade to the second handle and for maintaining the first and second blades in proper cutting relationship. This means comprises a torsion spring mounted in a biasing bushing made of a material of a low coefficient of friction, the torsion spring being operable to impart a "dive action" to the second blade when the blades are moved to the cutting position. That is, if the scissors or shears is disposed with the two blades substantially in a horizontal plane, with the second blade on top, the torsion spring means rotates the second blade during the cutting action downwardly and inwardly with respect to the bottom, first blade.

Various further and more specific purposes, features and advantages will clearly appear from the detailed description given below, taken in connection with the accompanying drawings, which form part of the specification and illustrate merely by way of example embodiments of the device of the invention.

The invention consists in the novel parts, construction arrangements, combinations and improvements as may be shown and described in connection with the scissors and shears herein disclosed by way of example only and as illustrative of preferred embodiments.

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 several figures of the drawing, in which:

FIG. **1** is a top plan view of a scissors according to the present invention, with the blades being shown in the closed position;

FIG. **2** is a bottom plan view of the scissors of FIG. **1**, with the blades being shown in the closed position;

FIG. **3** is a bottom plan view of the scissors of FIG. **1**, with the blades being shown in the open position;

FIG. **4** is a side elevational view of the scissors of FIG. **1**, with the blades being shown in the open position;

FIG. **5** is a section of the scissors of FIG. **2** taken along line **5—5**, with the parts being slightly enlarged;

FIG. **6** is a top plan view of a shears according to the invention, with the blades in the closed position;

FIG. **7** is a top plan view of the shears of FIG. **6**, with the blades being in the open position;

FIG. **8** is a detail view of a portion of the structure of FIG. **7**, with the parts being enlarged for ease of identification;

FIG. **9** is a side elevation of the shears of FIG. **6**, with the blades being open;

FIG. **10** is a cross-section along the line **10—10** of FIG. **8**;

FIG. **11** is a perspective view of an alternative embodiment of the invention; and

FIG. **12** is a perspective view of a further embodiment of the invention.

FIGS. **1** through **5** illustrate a scissors according to the present invention. With reference to FIG. **1**, the scissors **1** has a top blade **2** and a bottom blade **3**. Blade **3** is integral with handle **4**, whereas blade **2** is linked to handle **5** by means of lug **6** fitting into the slot formed by walls **7***a*, **7***b* and **7***c* (FIG. **2**) in handle **5**.

To retain the scissors **1** in the closed position, handle **4** has a projection **4***a* which fits into slot **5***d* of the locking member **5***c*, which is pivotally mounted on projection **5***a* by means of pivot **5***b*. The locking member **5***c* may be made of any suitable material, such as metal or a molded plastic. The scissors is unlocked by moving locking member **5***c* in the direction of arrow A (FIG. **1**).

FIG. 5 shows the details of the pivot assembly 10 which imparts the dive action to the floating blade 2. Pivot assembly 10 comprises a bolt 11 which is secured by nut 12. Torsion spring 13 encircles bolt 11 with end 13*a* bearing against lug 6 and end 13*b* bearing against a recess 14 (FIGS. 2 and 5) in blade 3. A bushing 15 surrounds spring 13 and fits into a hole 17 in handle 5. The bolt 11 passes through hole 16 in blade 2 and hole 18 in the recess 14 of blade 3. By tightening or loosening the nut 12, the tension in torsion spring 13 can be adjusted, and the entire scissors 1 can be readily disassembled merely by removing nut 12 from bolt 11.

As can be seen from FIGS. 1–5, the scissors of the present invention is compact and has the necessary low profile so as not to interfere with the maneuverability required of a scissors. This maneuverability is of the utmost importance in scissors, and is valuable as well in shears, grass shears and hedge shears.

It is also readily seen that the pivot assembly 10 comprises a minimum of parts and is extremely compact. The bushing 15 functions to seat spring 13 and acts as a friction surface for the spring 13. Bushing 15 also acts to limit the "tilt" of blade 2 when the scissors encounters resistance to cutting. That is, bushing 15 prevents the blades 2, 3 from twisting out of the proper relationship and thus "cutting in." Bushing 15 thus provides positive assurance that a correct relationship between the blades 2, 3 will be maintained even when very large external forces are applied to the blades. In a preferred embodiment of the invention, bushing 15 limits the tilt of the blades to about 5°. Bushing 15 may be made from any material of a low coefficient of friction, such as the polymers of fluorinated hydrocarbons, or polyethylene or the like.

Torsion spring 13 in cooperation with bushing 15 acts to translate horizontal pressure on the blades 2, 3 into vertical side pressure. The end 13a of torsion spring 13 acts against lug 6 to push the blade 2 down and into cutting relationship with blade 3. Torsion spring 13, as illustrated in FIGS. 1–5, also acts to urge the scissors to the open position.

FIGS. 6 through 10 illustrate a hedge shears according to the present invention.

The hedge shears 21 has cooperating blades 22 and 23, with blade 23 being integral with handle 24. Handle 25 is connected to blade 22 by means of the lug 26 fitting into the slot 27 formed in handle 25. Hand grips 24*a* and 25*a* are fitted onto handles 24 and 25, respectively.

The pivot assembly 30 shown in detail in FIG. 10 is essentially the same as pivot assembly 10 shown in FIG. 5 for the scissors, except that modifications are made to accommodate the use of the device as a shears. Thus, pivot assembly 30 comprises a bolt 31 and a nut 32. Around the bolt 31 is a torsion spring 33 which is placed within bushing 35. Bushing 35 is similar to bushing 15 of FIG. 5 and is also made of a low friction material. End 33*a* of spring 33 emerges out of hole or slot 35*a* in bushing 35, and end 33*b* emerges out of hole or slot 35*b*. The end 33b is wrapped around post 28 (FIG. 5) which is in turn secured to handle 24. The bolt 31 passes through hole 38 in the blade 22, hole 37 in the handle 25 and then through hole 36 in the blade 23. As may be seen clearly in FIGS. 8 and 10, the end 33*a* of the torsion spring 33 is adjacent wall 27*a* of the slot 27 and bears against the lug 26 of the top blade 22.

To accommodate the bushing 35 and torsion spring 33, blade 22 has an upwardly sloping portion 22*a* (FIG. 9) terminating in a horizontal portion 22*b*. Since hedge shears need not have as low a profile as scissors, the spring end 33*a* is not recessed into horizontal portion 22*b*; in smaller shears, the recess may be desirable.

As in the case of the scissors 1 (FIGS. 1–5), the shears 21 may be disassembled by removing nut 32 from bolt 31, and the tension of the spring 33 may be adjusted by tightening or loosening the nut 32.

The shears 21 may be retained in the closed position shown in FIG. 6 by means of the lever 40 engaging the projection 41 on handle 25. The shears are opened by moving lever 40 in the direction of arrow B (FIG. 6), with torsion spring 33 acting to urge the shears 21 to the open position shown in FIG. 7. A resilient bumper 42 is mounted by means of post 43 on extension 44 and rivet 45 to handle 24.

As in the case of the pivot assembly 10 in scissors 1, the pivot assembly 30 in shears 21 is of compact size and simple construction. The torsion spring 31 cooperates with the bushing 35 and the lug 26 to rotate the blade 22 downwardly into cutting position with blade 23 as the blades are closed. The bushing 35 prevents the blades from twisting out of the proper relationship and thus "cutting in."

The lug and slot construction used in the scissors 1 and shears 21 allows for the necessary relative movement between the blade 2 or 22 and the handle 5 or 25 in two planes to permit the "dive" action.

FIGS. 11 and 12 show two alternative means of linking the movable blade 2 or 22 to its associated handle.

Thus, in FIG. 11, the lug 6 of scissors 1 has an oversized slot 50 into which a projection 51 on handle 5 extends. The slot 50 must be oversized to accommodate the "dive action" of blade 2 in two planes during the cutting operation.

FIG. 12 shows the shears 21 modified to move the end 33*b* of spring 33 from the handle 24 to the handle 25. To accomplish this, a projection 52 is stamped out of the handle 25, leaving aperture 53 in the handle 25. The end 33*b* emerging from slot 35*b* of bushing 35 is placed under the projection 52. In all other respects, the construction is the same as shown in FIGS. 6 through 10. Whereas the shears 21 shown in FIGS. 6 through 10 has a self-opening feature under the operation of the torsion spring 33, the torsion spring 33 in the embodiment shown in FIG. 12 will not open the shears. The embodiment shown in FIG. 12 is also applicable to the scissors 1 shown in FIGS. 1 through 5.

It can immediately be seen that the pivot assembly employed in the present invention comprising the torsion spring and surrounding low-friction bushing eliminates the need for final alignment of the blades in the manufacture of scissors and shears that have a pair of blades that are each integral with or rigidly connected to their associated handles. The torsion spring and bushing co-act to prevent excessive tilting of the blades which would otherwise twist the blades out of cutting relationship and provide the dive action. Furthermore, should the blades become "loose," they may be tightened by the owner without the need for factory or expert adjustment.

While the drawings illustrate a scissors and a hedge shears, it will be immediately apparent that the invention is also operable for other shears, such as grass

shears, merely by use of blades of the desired size. Where extreme compactness is desired, as in the case of a scissors, one blade will have a recess as in the case of the scissors of FIGS. **1** through **5** in order to accommodate the end of the torsion spring. Where the cutting device is somewhat larger, as in the case of a hedge shears, it may not be necessary to recess the spring, and the rear end of one blade may have a pronounced rise to provide a sufficiently elevated heel portion to accommodate the end of the torsion spring.

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 and scope of the invention, and it is intended therefore in the appended claims to cover all such changes and modifications.

What is claimed is:

1. A scissors or shears, comprising

a. a lower cutting blade and a handle therefor rigidly connected to said blade;

b. an upper cutting blade and a handle therefor detachably linked to said blade, said first and second blades being in cooperating cutting relationship, said upper blade handle being beneath said upper blade;

c. a bushing of low friction material between said upper blade handle and said lower blade, said bushing being operable to resist movement of the upper blade about its longitudinal axis;

d. a shaft passing through said bushing, said blades and said upper blade handle, and locking means adjustably securing said shaft to said blades for pivotal movement of said blades about said shaft;

e. linkage means for linking said upper blade to said upper blade handle, said linkage means being operable to pivot said upper blade about said shaft when said upper blade handle is pivoted about said shaft while permitting the cutting edge of said upper blade to move downwardly and inwardly toward the cutting edge of said lower blade, said linkage means including a lug depending from said upper blade in the area of said shaft to a point adjacent said upper blade handle; and

f. torsion spring means around said shaft and within said bushing, said torsion spring means having free ends extending beyond said bushing, one free end contacting said lug and the other free end being secured to one of said handles, said torsion spring means being operable to rotate said upper blade downwardly and inwardly toward said lower blade as the blades are closed.

2. Apparatus according to claim **1,** wherein said linkage means comprises a slot in said lower blade handle into which said lug extends, said slot accommodating movement of said upper blade downwardly and inwardly toward said lower blade.

3. Apparatus according to claim **1,** wherein said linkage means comprises a slot in said lug and a projection extending from said upper blade handle into said slot, said slot accommodating movement of said upper blade downwardly and inwardly toward said lower blade.

4. Apparatus according to claim **1,** wherein said other free end of said torsion spring means is secured to said lower blade handle, and said torsion spring means biases said blades to the open position.

5. Apparatus according to claim **4,** wherein said lower blade has a recess therein and said other free end of said torsion spring means fits into said recess.

6. Apparatus according to claim **1,** wherein said other free end of said torsion spring means is secured to said upper blade handle.

7. Apparatus according to claim **6,** wherein said upper blade handle has a stop thereon, and said other free end of said torsion spring means is secured to said stop.

8. Apparatus according to claim **1,** wherein said shaft is a bolt and said locking means is a nut threaded on the end of said bolt, said nut being removable from said bolt to permit disassembly.

* * * * *