Oct. 10, 1961 C. CASTELLI 3,003,236

CUTTER

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Fig. 1.

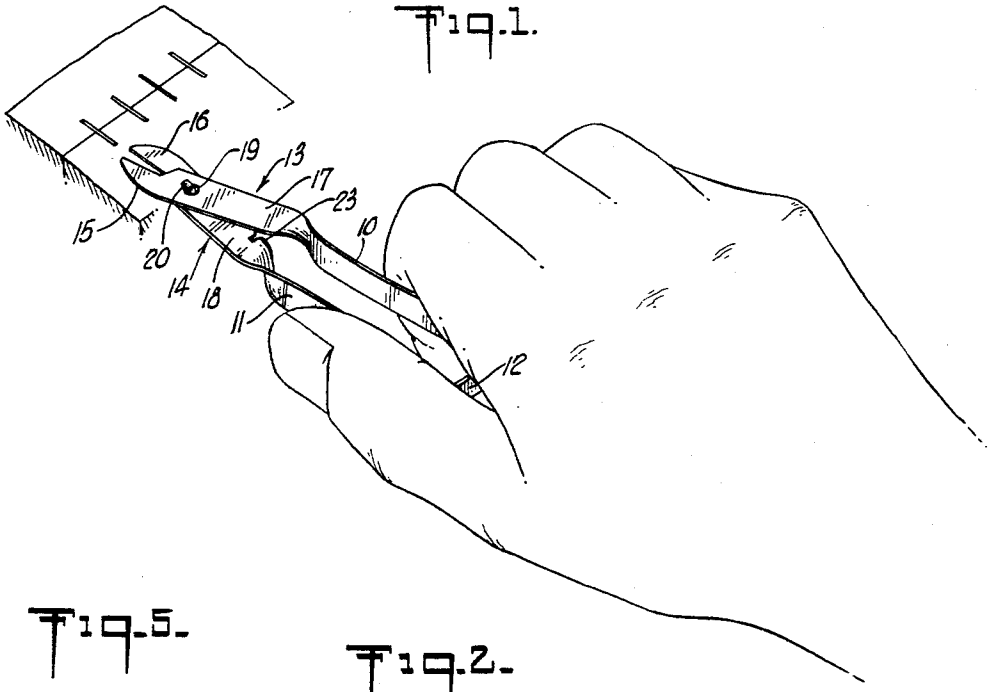

Fig. 5.

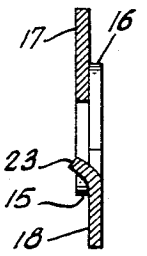

Fig. 2.

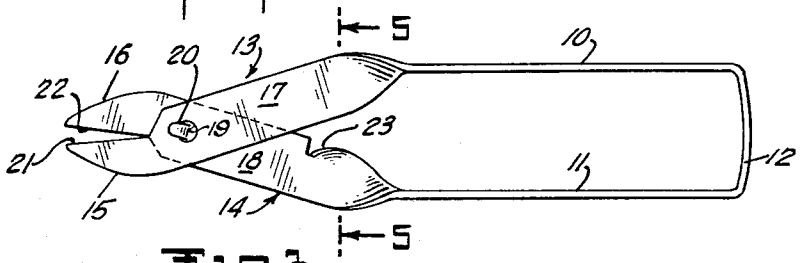

Fig. 3.

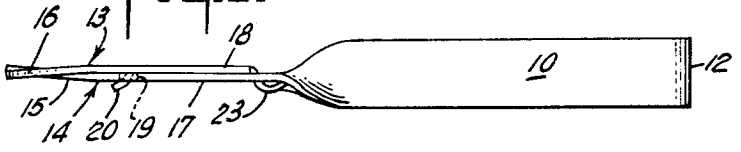

Fig. 6

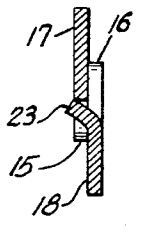

Fig. 4.

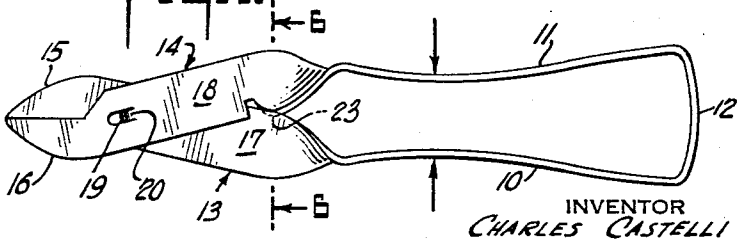

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Fig. 8.

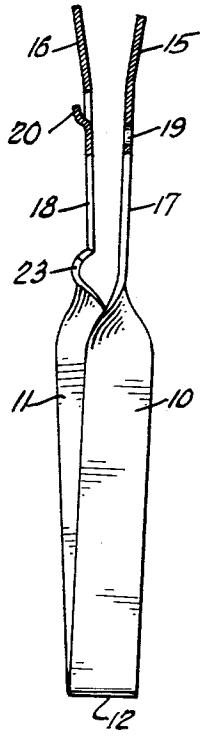


Fig. 9.

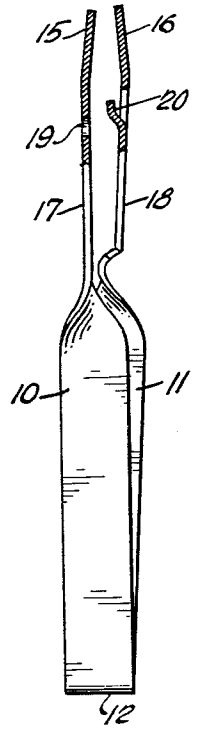


Fig. 7.

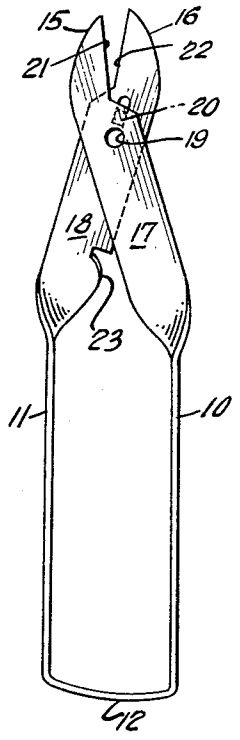


Fig. 10.

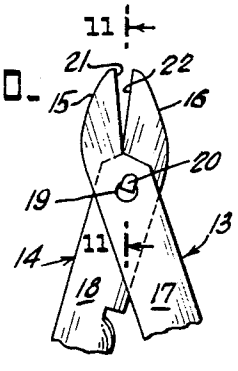
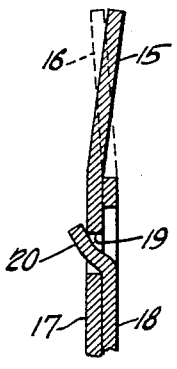


Fig. 11.



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3,003,236

CUTTER

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8 Claims. (Cl. 30—224)

This invention relates to a pair of scissors and more particularly to one capable of being made so economically as to warrant its disposal after but a single use.

The necessity for sterilizing surgical instruments in hospitals and doctors' offices and the high cost thereof because of time and personnel involved has emphasized the desirability for equipment that may be sterilized at the manufacturer's plant and packaged, removed from its sterile package at the site of use and then disposed of immediately after use. A pair of scissors incorporating the instant invention, because of its simplicity and economy of manufacture, may be used, say, in removing suture stitches without fear of infection and then disposed of when suture removal has been completed.

In the preferred form of the present invention, a pair of scissors is made from a single piece of resilient strip metal stock which is bent to form a pair of spaced finger grip sections, preferably in parallel face to face relation, and with an integral section connecting them together as a unit at one end. At their other ends, the spaced finger grip sections terminate each in a blade member twisted about its longitudinal center line at right angles to the finger grip section with which it is associated and the blade members angled toward each other. Each blade member has a shank section and a blade section. The blade members are held together in face to face engagement by an ear struck up from the shank of one blade member and which passes through a hole presented in the shank of the other member so as to provide a pivotal connection about which the blade members may be moved to effect shearing action of the blade sections. The construction of the scissors is such that in the normal position of the parts the scissor blades are biased by the resiliency of the metal stock to an open position ready to cut. The blade sections are bent slightly toward each other facewise at their ends so that shearing action between the blade sections as they move from open to closed position is assured. The scissors are operated by pressing the finger grip sections toward each other against the resiliency of the parts pivotally to move the blade sections together and effect the shearing action. Release of pressure on the finger grip sections causes the resiliency of the parts to open the blade sections, ready for the next shearing operation. Movement of the blade sections toward each other is limited by means of a stop struck up from the metal adjacent the inner edge of one of the blade shanks and which is in position to be engaged by the opposed inner edge of the other blade shank when the finger grip sections are moved to effect the shearing action.

A better understanding of the invention may be had from the following description read in conjunction with the accompanying drawings, wherein:

FIG. 1 is a perspective view of a pair of scissors incorporating the invention and illustrating its mode of operation;

FIG. 2 is a top plan view of the scissors shown in FIG. 1;

FIG. 3 is an edge view of the scissors shown in FIG. 2 looking down on the parts;

FIG. 4 is a bottom plan view of the scissors shown in FIG. 1, but showing the parts in position after the blade sections have been moved to closed position;

FIG. 5 is a sectional view on line 5—5 of FIG. 2;

FIG. 6 is a sectional view on line 6—6 of FIG. 4, but

with the parts reversed edge for edge to make the section correspond to that in FIG. 5;

FIG. 7 is a plan view similar to FIG. 2, but showing the scissor parts prior to assembly;

FIG. 8 is an edge view of the scissor parts shown in FIG. 7 looking from the right and showing the parts in the normal unstressed positions they would assume prior to assembly;

FIG. 9 is a view similar to FIG. 8 but with the parts moved relatively against the resiliency of the material to introduce the biasing effect that acts to hold the blade members together facewise after assembly of the parts;

FIG. 10 is a plan view of the blade and shank sections only of the scissors after assembly; and

FIG. 11 is a sectional view on line 11—11 of Fig. 10.

While the scissors may be made of any suitable material, strip steel, hard rolled and cold rolled is preferred so as to provide appropriate resiliency and hardness in the cutting edges without tempering. The scissors are made from a single piece only of the resilient strip material and are quite devoid of separate parts such as pivot pins or the like (FIGS. 1 to 6 inclusive). The strip material is bent transversely at spaced positions to form a pair of finger grip sections **10** and **11** preferably parallel and opposed to each other face to face. The finger grip sections are held together at one end in their spaced relation by an integral interconnecting portion **12** of the strip material located between the bends. At a distance from the interconnecting portion **12** such as will comfortably accommodate the thumb on the outer face of one of the finger grip sections and the first and second fingers of the same hand on the outer face of the other of the finger grip sections so that the parts may be readily squeezed together, the strip material is twisted facewise about the longitudinal axes of the material to a position at right angles to the faces of the finger grip sections to present a pair of blade members **13** and **14**. Also at the region of twist, the blade members are bent to angle toward and across each other. In consequence, in the scissors as assembled, blade members **13** and **14** as a result of this bending and twisting operation, are located in face to face engagement while the finger grip sections remain in their normal positions of spaced parallelism.

The blade members are pivoted together somewhat inwardly from their ends so as to present blade sections **15** and **16** outboard of the pivot point and shank sections **17** and **18** inboard of the pivot point and between the pivot point and the locations where the blade members and their respective finger grip sections merge. In accordance with that feature of the preferred embodiment of the invention, which requires that there be no separate parts, one blade member is provided with a small hole **19** and the other member, at approximately the same location except as hereinafter pointed out, with an ear **20** struck up from the opposed face of the adjacent blade member and which slopes toward the ends of the blades. When the parts are assembled, the ear **20** on the one blade member extends through the hole **19** in the other blade member so as to prevent separation of the blade members and provide means on which they can fulcrum relatively to each other.

The blade sections **15**, **16** present opposed cutting edges **21**, **22** which meet at the base of the blade sections, from whence in the normal position of the parts the cutting edges flare outwardly to provide an opening large enough to accommodate the thickness of the material to be cut by the scissors. To this end the blade members are recessed in their inner edges (the outer edges insofar as the blade shanks are concerned) sufficiently to give the desired opening at the ends of the blade sections and to bring the base of the blades as near to the pivot point as good design will permit, bearing in mind the strength fac-

tor that must be built into blade sections beyond the pivot point. The back edges of the blade sections curve smoothly from the blade ends to the shanks so that each blade section in effect presents a tapering nose that facilitates its insertion beneath the material to be cut, as for instance a suture stitch.

As may be clearly observed in FIG. 3, each blade section bends facewise toward the other blade section so that in effect the cutting edges **21**, **22** cross one another in the normal open position of the parts. Accordingly, the cutting edges of the blade sections will grind one against the other when the blade sections are moved to closed position in the act of cutting. This shearing action is augmented by the fact that the pivot device normally holds the blade members sufficiently close to insure the grinding action and also by the fact that the blade sections are biased together by the resiliency of the material of which the scissors are made.

As previously stated, in the normal position of the parts, the blade sections **15**, **16** are in an open position with their cutting edges **21**, **22** spaced apart at the ends. In operation, the blades are caused to straddle the material to be cut, as for instance a stitch of a suture needing removal, and the finger grip sections pressed toward each other by thumb and first two fingers which may be located, respectively, the thumb in engagement with the outer face of one finger grip section, say **10**, and the fingers in engagement with the outer face of the other finger grip section **11** (FIG. 1). In the act of squeezing, the finger grip sections **10**, **11** are moved toward each other against the resiliency of the material of which the scissors are made (FIGS. 4 and 5) and in doing so the blade sections **15**, **16** close and shear through the material to be cut. Upon release of squeezing pressure exerted by the operator, the resiliency of the material restores the finger grip sections to their normal positions as the blade sections open, ready for the next cutting operation.

In order to prevent the blade sections from moving beyond their normal closed position in the act of cutting, means are provided effectively to limit such movement. In the preferred embodiment, the scissors are provided with a limiting stop **23** made by cutting inwardly from the inner edge of one of the blade shanks and bending that edge of the shank which is nearest the associated finger grip laterally in a direction to facilitate its engagement by the inner edge of the other shank member when the finger grip sections are pressed together (FIGS. 2 to 6).

Certain features are built into the scissors during their formation, not visible to the eye in the completed and assembled scissors, but which greatly promote the facility with which the scissors may be operated. By way of example, assume that the various cutting and twisting operations necessary to make the scissors are accomplished consecutively, which in order would comprise forming one of the blade sections **15** with its cutting edge, stamping the hole **19**, twisting and bending the stock between the blade members **13** and its associated finger grip section **10**, bending the material between the finger grip section and the intermediate connecting part **12**, bending the material between such part and the other finger grip section **11**, again twisting the material to form the second blade member **18**, formng the stop **23**, striking up the ear **20**, and then blanking out of the second blade member **16** as the parts are cut off from a roll of suitable strip material. And it will be understood that during the formation of the blade sections, their curved or bent disposition toward each other will be built into the parts. If punch and die are used to form the blades, application of the punch member, as distinguished from the die, to those faces of the blades that in the assembled tool engage each other during a cutting operation will give the blades an edge which for its normal one use will usually be sharp enough to cut without an additional grinding operation.

The parts as thus formed are illustrated in FIGS. 7 and 8, which show the scissor parts before assembly and with such parts in unstressed condition. Here it will be observed that the blade members **13** and **14** are spaced apart and that the faces of the blade members which are nearest one another are those which after assembly are most remote from each other. It will be observed, too, that the terminal ends of the blades are not in exact alignment but rather that the blade member **14** having the struck up pivot ear **20** is located with its terminal end extending beyond the end of the corresponding blade member **13**, and further that such ear and the hole designed to accommodate it are not in registry.

In assembling the part, the finger grip sections **10**, **11** are moved edgewise from the positions shown in FIG. 8 to the positions shown in FIG. 9 against the resiliency of the material, so that the positions of the blade members are interchanged. The finger grip sections are then moved relatively endwise until the pivot ear **20** registers with the pivot hole **19** whereupon the ear is inserted through the hole to complete assembly of the parts. When the finger grip sections **10**, **11** are released after assembly, the parts tend to move back to the positions shown in FIG. 8, but are restrained from so doing by those parts which cooperate to form the pivotal connection. The parts are thus biased lengthwise to a position in which the ear will not itself become disengaged from the hole, and also to a position in which the cutting edges assure the shearing action.

From what has been said, it is apparent that practice of the invention results in a very economical pair of scissors that may be readily packed in a sealed envelope for sterilization and sterility maintained until the package is opened preparatory say to a suture removal operation. The scissors thereafter may be disposed of to prevent spread of contamination.

The invention as been described in connection with one embodiment thereof but many modifications thereof are included within its spirit. The invention, therefore, is to be limited only by the scope of the appended claims.

What is claimed is:

1. A pair of scissors formed of a single piece of resilient material shaped to form spaced finger grip sections integrally connected together, said finger grip sections terminating each in a blade member having a blade section and a shank section, and means including an integral part of said material pivotally securing said blade sections together whereby a squeezing force, exerted on the finger grip sections against the resiliency of said material, acts to close the blades to exert a shearing action and release of said squeezing force acts to open the blades under the influence of said resiliency.

2. A pair of scissors formed of a single piece of resilient material shaped to form spaced finger grip sections connected integrally together and terminating each in a blade member having a blade section and a shank section, and means including an integral part of said material pivotally securing said blade sections together face to face, said spaced finger grip sections presenting portions thereof disposed substantially at right angles to said face to face blade sections whereby exertion of a squeezing force against said portions of the finger grip sections and against the resiliency of the material acts to pivot said blades in a closing direction to effect a shearing action and said resiliency causes said blades to pivot in an opening direction upon release of said squeezing force.

3. A pair of scissors formed of a single piece of resilient material bent transversely to form spaced finger grip sections connected together and movable facewise toward and away from each other, said finger grips sections terminating each in a blade member twisted substantially at right angles to its associated finger grip sec-

tion and having a blade section and a shank section, the blade sections being movable edgewise as the finger grip sections move facewise, and means including an integral part of said piece of resilient material pivotally securing said blade sections together whereby facewise pivotal movement of the finger grip sections in one direction will act to close the blade sections in a shearing action while facewise movement of the finger grip sections in the opposite direction will open the blade sections.

4. A pair of scissors formed of a single strip of resilient sheet material bent transversely to form spaced finger grip sections connected together and movable facewise toward and away from each other, said finger grip sections terminating each in a blade member twisted substantially at right angles to its associated finger grip section and having a blade section and a shank section, the blade sections being movable edgewise as the finger grip sections move facewise, means including an integral part of said sheet material pivotally securing said blade sections together whereby facewise pivotal movement of the finger grip sections in one direction will act to close the blade sections in a shearing action and facewise pivotal movement of the finger grip sections in the opposite direction will open the blade sections, and means on at least one of said blade members acting to limit the closing movement of said blade sections.

5. A pair of scissors formed of a single strip of resilient sheet material bent transversely to form spaced finger grip sections connected together and movable facewise toward and away from each other, said finger grip sections terminating each in a blade member twisted substantially at right angles to its associated finger grip section and having a blade section and a shank section, the blade sections being movable edgewise as the finger grip sections move facewise, and means including an integral part of said sheet material pivotally securing said blade sections together whereby facewise pivotal movement of the finger grip sections in one direction against the resiliency of said material acts to close the blade sections in a shearing action and facewise pivotal movement of the finger grip sections in the opposite direction upon release of said squeezing force causes said resiliency to open the blades, said blade sections having faces angling one toward the other so as thereby to augment the shearing action of the blades.

6. A pair of scissors formed of a single strip of resilient sheet material bent transversely to form spaced finger grip sections connected together and movable facewise toward and away from each other, said finger grip sections terminating each in a blade member twisted substantially at right angles to its associated finger grip section and having a blade section and a shank section, the blade sections being movable edgewise as the finger grip sections move facewise, and means including an integral part of said sheet material pivotally securing said blade sections together whereby facewise pivotal movement of the finger grip sections in one direction against the resiliency of said material acts to close the blade sections

in a shearing action and facewise pivotal movement of the finger grip sections in the opposite direction upon release of said squeezing force causes said resiliency to open the blade sections, said blade sections being resiliently biased toward each other so as thereby to augment the shearing action.

7. A pair of scissors formed of a single strip of resilient sheet material bent transversely to form spaced finger grip sections connected together and movable facewise toward and away from each other, said finger grip sections terminating each in a blade member twisted substantially at right angles to its associated finger grip section and having a blade section and a shank section, the blade sections being movable edgewise as the finger grip sections move facewise, and means including an integral part of said sheet material pivotally securing said blade sections together whereby facewise pivotal movement of the finger grip sections in one direction against the resiliency of said material acts to close the blade sections in a shearing action and facewise pivotal movement of the finger grip sections in the opposite direction upon release of said squeezing force causes said resiliency to open the blade sections, said blade sections having opposed faces angling one toward the other and being biased one toward the other by the resiliency of the material of which the scissors is made.

8. A pair of scissors formed of a single strip of resilient sheet material bent transversely to form spaced finger grip sections connected together and movable facewise toward and away from each other, said finger grip sections terminating each in a blade member twisted substantially at right angles to its associated finger grip section and having a blade section and a shank section, the blade sections being movable edgewise as the finger grip sections move facewise, means including a hole in one of said blade members and an ear integral with and struck up from the other of said blade members and engaging in said hole thereby pivotally to secure said blade sections together whereby facewise pivotal movement of the finger grip sections against the resiliency of said material acts to close the blade sections in a shearing action and facewise pivotal movement of the finger grip sections in the opposite direction upon release of said squeezing force causes said resiliency to open the blades, said blade sections having opposed faces angling one toward the other and being biased by the material's resiliency in a manner to maintain the pivotal connection of the blades and in a direction to augment the shearing action of the blade.

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