

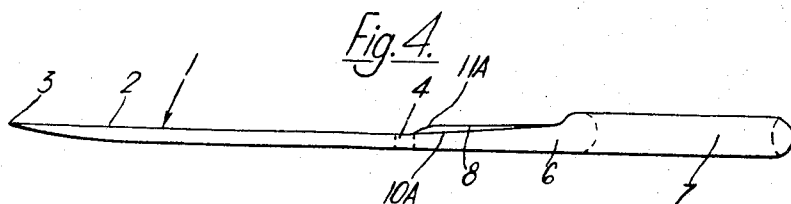
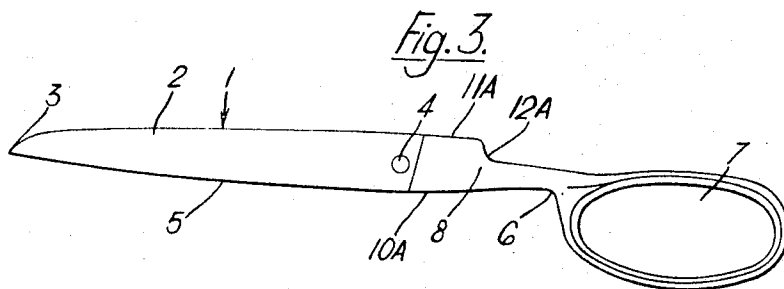
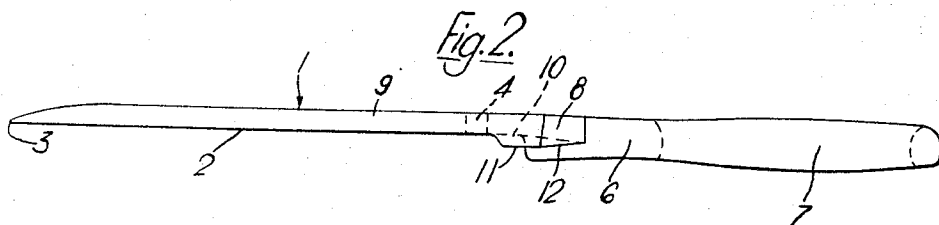
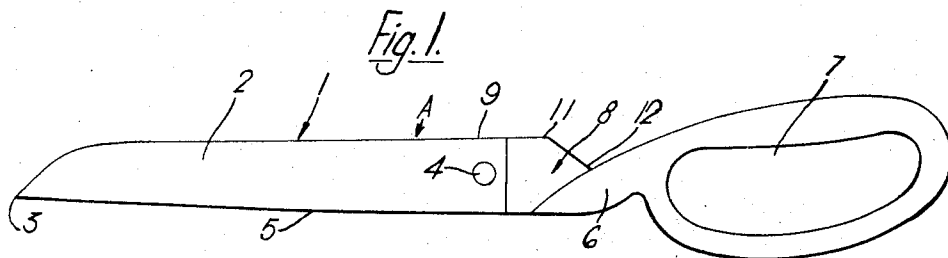
April 9, 1968

A. C. USBORNE
SCISSORS AND SHEARS

3,376,641

Filed Jan. 17, 1966

3 Sheets-Sheet 1



Inventor

Audrey Charles Osborne

By

Watson, Cole, Grundle & Watson
Attorneys

April 9, 1968

A. C. USBORNE
SCISSORS AND SHEARS

3,376,641

Filed Jan. 17, 1966

3 Sheets-Sheet 2

Fig. 5.

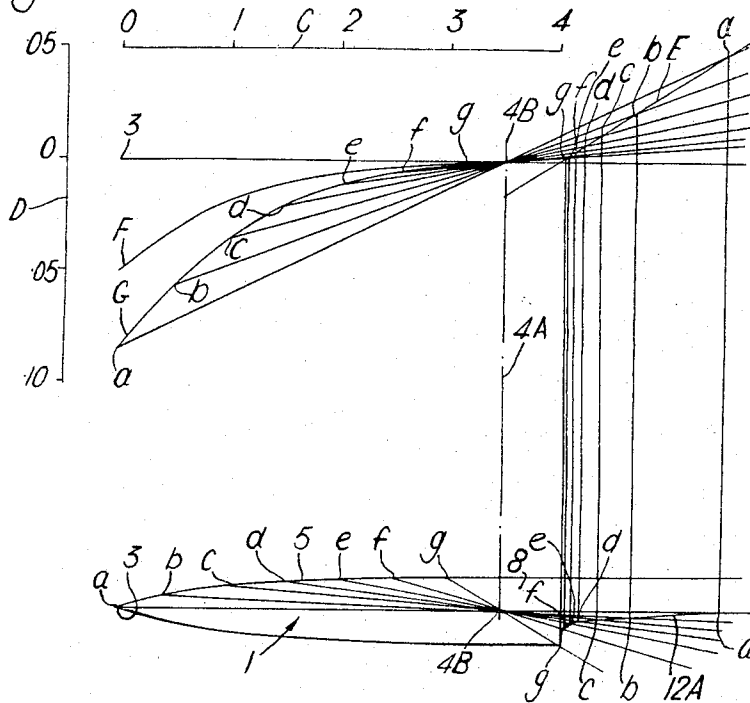
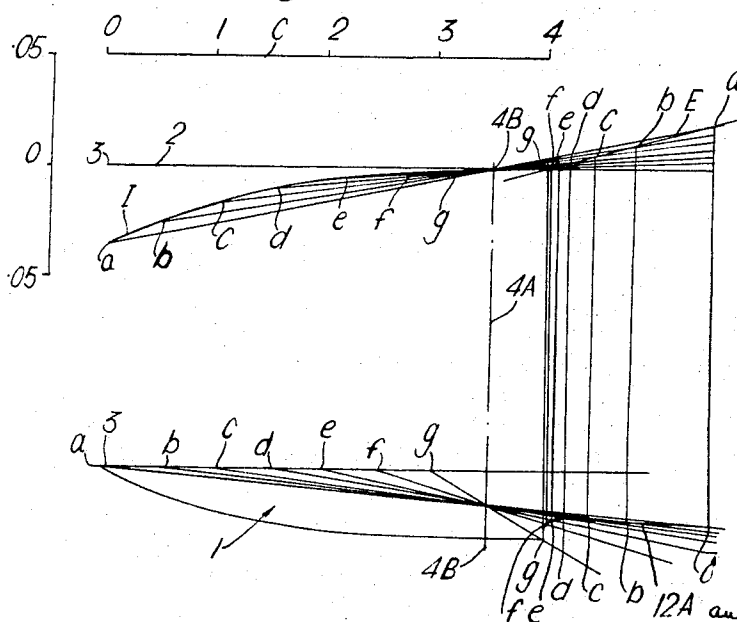


Fig. 9.



Inventor
Andrew Charles
Usborne

By
Watson, Coe, Grundle & Watson
Attorneys

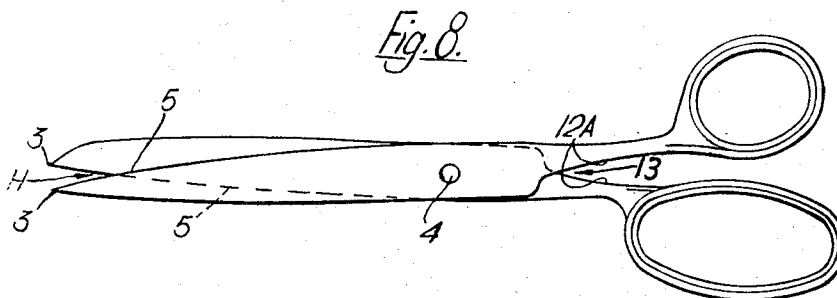
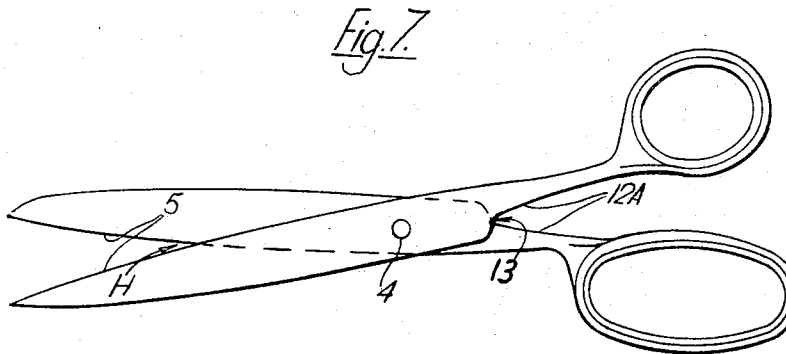
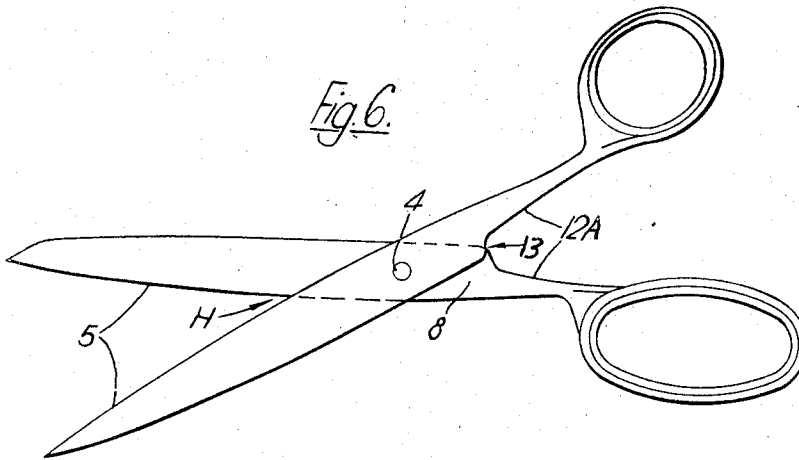
April 9, 1968

A. C. USBORNE
SCISSORS AND SHEARS

3,376,641

Filed Jan. 17, 1966

3 Sheets-Sheet 3



Inventor
Andrew Charles USBORNE
By
Watson, Cole, Grindle & Watson
Attorneys

1

3,376,641

SCISSORS AND SHEARS

Andrew C. Osborne, 88 Carsick Hill Road,
Sheffield 10, England

Filed Jan. 17, 1966, Ser. No. 521,012

3 Claims. (Cl. 30-266)

ABSTRACT OF THE DISCLOSURE

A pair of scissors or shears comprises a pivoted pair of handled blades having flat opposing faces and cooperating cutting edges, each blade providing, on its inner face on the handle side of the pivot, a shoulder having a surface lying at an inclination to the plane of the inner face and rising in the direction away from the respective cutting edge, and/or in the direction away from the pivot and toward the handle, to ensure proper engagement of the two cutting edges as they move toward parallel positions.

This invention relates to scissors and shears.

A pair of scissors or shears will only cut efficiently if there is only point contact between the edges of the two blades on the blade side of the pivot, at all cutting positions of the blades from fully open to fully closed. To achieve the progressive condition of point contact during the closing of the blades, the usual construction involves hollow grinding of the inside face of each blade and also both a twisting of the blades and a lengthwise bowing of the blades. The hollow grinding of a blade that is both twisted and bowed necessitates a controlled variation of the position of the blade throughout its lengthwise traverse across the cutting face of the grinding wheel by which the hollow grinding is effected, the manner of control being peculiar to each particular size and type of blade to be ground.

The object of the invention is to provide an efficient construction of scissors and shears by which this complicated twisting and bowing are avoided, as also the hollow grinding of the inside faces.

According to the present invention, a pair of scissors or shears comprises two blades with flat inside faces, there being a shoulder protruding from each face at the same distance as each other from the handle side of the pivot, with the face of each shoulder oblique transversely of the blade and rising in the direction away from the cutting edge, and a pivot serving to hold the shoulder faces in mutual contact as well as to bring the cutting edges into point contact at all cutting positions of the blades from fully open to fully closed.

The two blades are at all such positions in contact at two positions along each, one position being at a point that is the point-contact intersection of their cutting edges (at a distance from the pivot that progressively increases as the blades move from fully open to fully closed); and the other position being where contact is made between their two shoulders (relatively close to the pivot). Between the two positions of contact, the blades are constrained by the holding action of the pivot against their outside faces.

The transverse obliquity of the shoulders ensures that the inside faces of the blades are mutually oblique behind any point of contact of the cutting edges, thus providing clearance or relief of one blade from the other behind its cutting edge.

With the blades fully closed, their inside faces are separated by a distance that varies progressively from a position adjacent to the shoulders and then progressively back to nil at the point of contact of the cutting edges at the tip end of the blades, the blades being interme-

2

diately caused to assume a maximum flexed condition that bows one away from the other. With the blades fully open, their inside faces are separated by a greater amount at a position adjacent to the shoulders, because the shoulders are now in contact at positions of maximum rise from the flat inside faces, and the separation diminishes progressively from this position to nil at the point of contact of the cutting edges, now at its nearest approach to the pivot, the blades having minimum or negligible flexing over the short length to the point of contact of the cutting edges. At any intermediate position of the blades, their separation at a position adjacent to the shoulders equals the effective total rise of the two shoulders at their corresponding intermediate relative positions then assumed, and the separation diminishes progressively from this amount to nil at the intermediate point of contact of the cutting edges, the blades assuming an intermediate amount of flexing.

In all positions of the blades, there is a constant amount of separation between them at the actual pivot. This amount can be adjusted, by appropriately tightening and locking the pivot, to produce a suitable pressure at all positions of point contact between the cutting edges, the ideal condition being uniformity of pressure at all points of contact of the cutting edges at all positions of the blades. The progressively increasing flexing enforced on the blades as they move from fully open position towards fully closed position assists in reaching a near approach to this condition, as can be ensured by appropriate formation of the shoulders. Thus, in spite of the inside faces of the blades being formed perfectly flat, their assumption of a slightly flexed form, with a separation from each other that is gradual at the contact position of the cutting edges, not only ensures point contact between the cutting edges but a contact under a pressure automatically made substantially uniform, in spite of varying distance from the pivot.

The shoulders may have flat faces, to facilitate manufacture, but this is not essential. What is essential is that the points of one shoulder that make corresponding contact with points of the other shoulder should lie in, or close to, a plane rising obliquely to the plane of the inside face of the blade, and transversely away from the cutting edge, for the previously indicated purpose of providing relief behind the point of cutting contact.

Shoulders with transversely oblique flat faces make mutual area contact in all relative positions of opening. It is, however, preferable for each shoulder to have also an obliquity that rises from the plane of the inside face in the direction of the handle. In this case there is mutual line contact between the shoulder, and this is beneficial in providing a counteraction between the shoulders appropriate to the flexing enforced on the blades and the attainment of a near approach to the indicated ideal condition of uniform pressure between the cutting edges at all times.

It is, however, still further advantageous, when each shoulder has a compound inclination arising from transverse obliquity and lengthwise obliquity, to control the blade positions at all stages between fully open and fully closed by providing the shank of each blade, over a length embracing the shoulder, with a back edge shaped such that progressive contact is made between the two shaped edges, and each such contact is always in a substantially straight line that intersects the pivot axis and the corresponding point of contact between the cutting edges of the blades. As will be shown graphically below, the correct shaping of the back edges can be readily determined for any size of implement, whether the blades have straight cutting edges or blades that have convexly curved edges, the convexity being towards each other.

Although not so simple to form as a flat-faced shoulder,

3

the shoulder may have a non-planar surface, making line contact with the corresponding surface of the other shoulder, with advantage in achieving a very close approach to uniformity of pressure between the cutting edges at all times.

Since the inside faces of the blades are flat, they may be readily ground on a surface grinder to a high finish, for the production of good cutting edges by appropriately grinding the edges of the blades. The faces of the shoulders may likewise be readily ground on a surface grinder, with the blades jugged to present the shoulder faces at the appropriate angle to the inside faces, including the case where the shoulder faces are at a composite angle resulting from a transverse rise and a rise in the direction of the handle end. To minimise the height of the shoulders, their rise preferably starts from approximately the plane of the inside face of the blade at its cutting edge side. The shaped back edges of the blade shanks referred to above may be approximated in the forging of the blades, and then accurately finished in any appropriate way, as by form milling or grinding.

The invention will now be further described with reference to the accompanying drawings, in which:

FIGURE 1 is a plan view, seen from the inside face, of a flat straight-edged blade formed with a shoulder;

FIGURE 2 is a view of the blade taken in the direction A of FIGURE 1;

FIGURES 3 and 4 correspond to FIGURES 1 and 2 but show a flat convexly-edge blade formed with a shoulder and a shank with a shaped back edge;

FIGURE 5 is a diagram to show how the shaped back edge of the shank of the convexly-edge blade of FIGURES 3 and 4 is developed;

FIGURES 6, 7 and 8 show scissors with blades as FIGURES 3 and 4 in positions varying from nearly fully open to nearly fully closed; and

FIGURE 9 is a diagram corresponding to that of FIGURE 5 but showing the development of a shaped back for a straight-edged blade.

In FIGURES 1 and 2, a scissors blade 1 has a flat inside face 2 extending from the tip 3 to just beyond a pivot hole 4 and formed with a cutting edge 5. Immediately beyond the hole 4, in the part of the complete blade that includes the shank 6 leading to the bow 7 is a shoulder 8, transversely oblique from the cutting edge 5 to the back 9. At the cutting edge side, the shoulder 8 starts at 10 flush (or substantially so) with the flat inside face 2 and rises transversely progressively from the plane of that face to its side 11 in line with the back 9, the back 9 then being cut back at 12 to the shank 6. Consequently, the flat inside face 2 is transversely oblique with respect to the plane of the shoulder 8. When two such blades are assembled on a pivot inserted through their pivot holes 4, and the pivot is tightened and locked, in the closed positions of the blades the shoulders 8 fit together in complementary manner, with the "low" part 10 of one alongside the "high" part 11 of the other. As the blades are moved towards fully open position, the inclined faces of the shoulders 8 ride one up the other and impart a transverse twisting action that causes the flat inside faces 2 to flex by progressively greater amounts along their length to the progressively moving point of contact of their edges 5.

In FIGURES 3 and 4, the shoulder 8 is elongated in the direction of the bow, and merged into the shank 6. The shoulder 8 has a compound inclination, as shown by the edge 10A of its face seen in FIGURE 4 as starting flush with the flat inside face 2 and the edge 11A in line with the back 9. In addition, the shoulder has a shaped back edge 12A, the form of which is developed as shown in FIGURE 5, which relates to a blade with a curved cutting edge 5, as is seen to be the case in FIGURE 3.

The lower part of FIGURE 5 shows to actual scale a blade 1 with a curved edge 5 (as seen from the outside face of the blade, i.e., corresponding to an underneath

4

view of FIGURE 3) together with its shoulder 8 having a shaped back edge 12A, the axis of the pivot hole 4 of FIGURE 3 being represented by the line 4A. The upper part of FIGURE 5 is to the same horizontal scale as the lower part (Scale C), but is much exaggerated vertically (Scale D) to show the relation between the flexing of the blade 1 and the formation of the shoulder 8 and its shaped back edge 12A, as viewed in the direction of the plane of the unflexed flat inside face 2. The angle of the shoulder is shown by the line E, between which and the shaped back edge 12A there is a relationship that depends on the desired flexing of the blade in use. The fact that the cutting edge 5 is convex has a bearing on the amount of flexing to be enforced on the blade to achieve the near approximation to uniform pressure at all cutting positions. The effect of the curvature of the edge 5 is shown by the curve F. The total effect is shown by the curve G, obtained by assuming that progressively a load of the value of the desired uniform pressure is applied at points along the blade, which then deflects, as a cantilever, increasingly towards the tip 3. From the various points *a . . . g* on the curve G, straight lines drawn through the intersection 4B (upper part of FIGURE 5) of the pivot axis 4A with the plane of the inside face 2 meet the shoulder line E in corresponding points, and the intersections of these lines with the line E as projected from the upper part of FIGURE 5 to the lower part define the formation of the shaped back 12A by their intersections with the straight lines as seen correspondingly passing through 4B viewed in the lower part of FIGURE 5, as shown by the corresponding designations *a . . . g* both for the intersections with the line E and the resultant points along the back 12A. The form of the back edge 12A thus depends on the form adopted for the "angle" E of the shoulder. It follows that the "angle" E need not be depicted by a straight line. It could, for instance, be "hollowed" as seen in the upper part of FIGURE 5, with the effect of spreading the first few points from *g* along the edge 12A. This corresponds to the previously indicated case of a shoulder the face of which is not flat, yet results in line contact between itself and the similar mating shoulder.

In FIGURE 6, a pair of scissors having curved cutting edges 5 is seen in nearly fully open position, when the contact 13 between the shaped back edges 12A is in the neighbourhood of *g* and *f* of FIGURE 5, the blades then being little flexed, since the contact point H is relatively close to the pivot position at 4. In FIGURE 7, the blades being approximately half closed, the contact 13 between the back edges 12A has moved along the edges away from the pivot position, when the blades have been increasingly flexed over the longer distance now existing to the contact point H. In FIGURE 8, the blades being nearly fully closed, and the contact point H being near the tips 3, the contact 13 between the back edges 12A has approached the limiting position *a* of FIGURE 5.

FIGURE 9 shows, similarly to FIGURE 5, the development of the shaped back edge 12A in the case of a straight cutting edge, where the contact between the edges of two mating blades has itself no effect on contact height, the total effect resulting from blade flexing being shown by the curve I.

The effect of shaping the back edges 12A in the manner above described may also be achieved by relieving the face of each shoulder behind the back edge of the shoulder. This brings about line contact between the shoulders at all positions of the blades.

As a variant of, or addition to the shoulder formations above described, the faces of the shoulders may remain plane until close to the cutting edge sides of the blades, and then turn slightly upward from such plane, so as to increase the separation of the inside faces from each other at the position adjacent to the shoulders. By this increased separation at the handle side of the pivot when the blades are approaching their closed position, the blades are given

5

a flexing such as to counteract the tendency for the contact pressure to diminish as the point of contact becomes more remote from the pivot.

What I claim is:

1. A pair of scissors or shears comprising two handled blades, and a pivot passing through holes formed in the blades, the blades having flat inside faces with a cutting edge on each extending in the opposite direction to the handle from the pivot location, and there being shoulders protruding one from each inside face at the same distance as each other from the handle side of the pivot and having mutually-contacting faces oblique transversely of the blades and rising away from the respective cutting edges, the pivot means serving to hold the shoulder faces in their mutual contact as well as to maintain point contact between the cutting edges at all cutting positions of the blades from fully open to fully closed.

2. A pair of scissors or shears comprising two handled blades, and a pivot passing through holes formed in the blades, the blades having flat inside faces with a cutting edge on each extending in the opposite direction to the handle from the pivot location, and there being shoulders protruding one from each inside face at the same distance as each other from the handle side of the pivot and having mutually-contacting faces oblique transversely of the blades and rising away from the respective cutting edges, and also rising in the direction away from the pivot towards the handles, the pivot means serving to hold the shoulder faces in their mutual contact as well as to maintain point contact between the cutting edges at all cutting positions of the blades from fully open to fully closed.

3. A pair of scissors or shears comprising two handled

6

blades, and a pivot passing through holes formed in the blades, the blades having flat inside faces with a cutting edge on each extending in the opposite direction to the handle from the pivot location, and there being shoulders protruding one from each inside face at the same distance as each other from the handle side of the pivot and having mutually-contacting faces oblique transversely of the blades and rising away from the respective cutting edges, the pivot means serving to hold the shoulder faces in their mutual contact as well as to maintain point contact between the cutting edges at all cutting positions of the blades from fully open to fully closed, and a shank on each blade, each shank being provided, over a length embracing the shoulder, with a back edge shaped such that progressive contact is made between the two shaped edges, and each such contact is always in a substantially straight line that intersects the pivot axis and the corresponding point of contact between the cutting edges of the blades.

References Cited

UNITED STATES PATENTS

222,672	12/1879	Conover	30—266
865,918	9/1907	Ladd	30—266
1,956,588	5/1934	Parker et al.	30—266 X

FOREIGN PATENTS

84,015	7/1957	Denmark.
--------	--------	----------

OTHELL M. SIMPSON, *Primary Examiner*.

J. C. PETERS, *Assistant Examiner*.