March 10, 1936. F. M. WHYTE 2,033,216

SHEARS

Filed Feb. 20, 1935

Fig. 1.

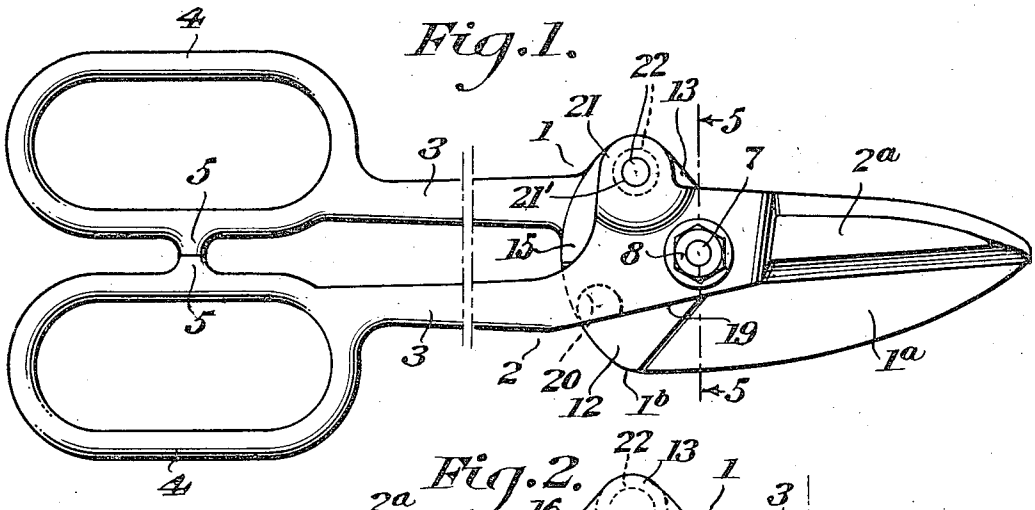


Fig. 2.

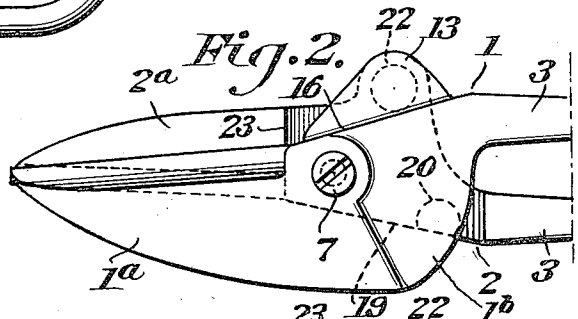


Fig. 3.

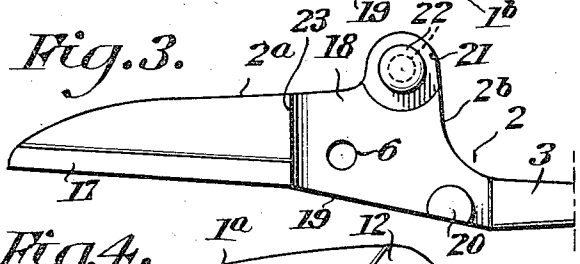


Fig. 4.

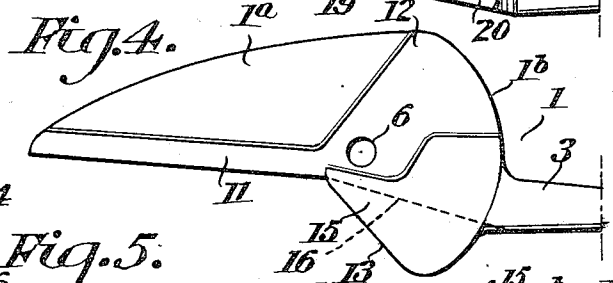


Fig. 5.

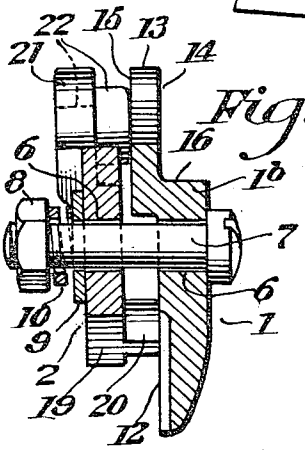
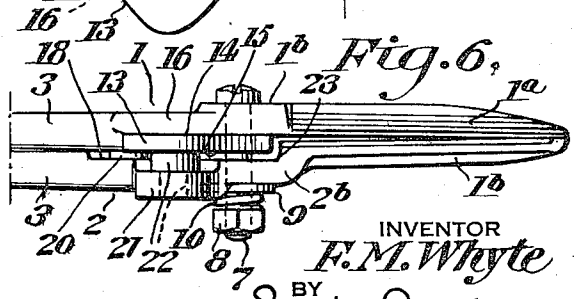


Fig. 6.



INVENTOR
F. M. Whyte
BY
Dane & Davis
ATTORNEYS

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SHEARS

Frederick M. Whyte, Tarrytown, N. Y.

Application February 20, 1935, Serial No. 7,310

1 Claim. (Cl. 30—13)

This invention relates more particularly to improvements in shears of the type disclosed in my copending patent application Serial No. 671,811, filed May 19, 1933. In that type of shears the coactive shearing members have mutual bearing contact at three points only in triangular arrangement around the axis of the pivotal connection between said members to obtain effective shearing coaction of the blades.

An important object of the present invention is to provide a satisfactory embodiment of said three-point bearing contact feature in shears for cutting tin or other sheet material and more particularly to provide such an embodiment designed to prevent objectionable spreading and bending of the sheet material as the shears are passed therethrough in the act of cutting it.

Other objects of the invention will appear hereinafter.

In the drawing:

Fig. 1 is a side view of the improved tin shears;

Fig. 2 an opposite side view of the forward portion of the shears;

Fig. 3 an inner face view of one of the blades;

Fig. 4 an inner face view of the other blade;

Fig. 5 an enlarged transverse section on the line 5—5 of Fig. 1; and

Fig. 6 an edge view of the forward portion of the shears.

The shears include companion blade and handle members 1 and 2, pivotally connected. Said members have similar handle portions each with a shank 3 and a handle loop 4. Preferably the handle loops of both members are elongated to facilitate grasping of the loops for use of the shears in either the position shown in Fig. 1 or in an inverted position. Either loop will accommodate either the thumb or the fingers. The loops have opposed stop lugs 5 disposed to abut and limit the closing of the shears. Other stop means, differently located may, however, be employed in lieu of that shown.

The member 1 has a blade portion 1^a and a medial hub portion 1^b. Both are rather wide in the present instance. The member 2 has a blade portion 2^a and a medial hub portion 2^b both, in the present instance, rather narrow in comparison with the corresponding portions of the member 1. The hub portions 1^b and 2^b are overlapped and have registering apertures 6. A pivot bolt 7 extends loosely through said apertures and has a head bearing against the outer face of the member 1, and a nut 8 screwed thereon in a position spaced outward from the outer face of the member 2. A washer 9 encircles the bolt and bears against the outer face of the member 2, and a coiled compression spring 10 is interposed between the nut and washer to hold the members 1 and 2 under compression and maintain the three-point contact therebetween, as will be explained more fully hereinafter. In the present instance the blades are slightly bowed toward each other longitudinally. They may, however, be straight.

At its inner face the blade 1^a has its cutting edge margin 11 raised or in relief and made quite smooth. A portion of the inner face of the hub 1^b may also be in relief, as shown at 12, and lie flush with the cutting margin. It is also flat and smooth and its outer margin, rearward of the pivot, forms a bearing surface for one of the aforesaid three contact points between the members 1 and 2. The hub portion 1^b is integrally formed with an extension or ear 13 extending transversely outward beyond the cutting edge. Said ear is flat and parallel to the plane of the body of the hub 1^b and it is disposed in an inset position. Its outer face 14 is disposed approximately in the plane of the blade marginal surface 11 and its inner face 15 is in relief with reference to the inner face of the hub. The rear edge of the ear and that of the body of the hub are on an arc struck from the pivot aperture 6 as a center. The forward edge of the ear inclines forward and inward toward the cutting edge of the blade. The inner face 15 of the ear is flat and smooth and the margin thereof along said arc forms a bearing surface for another of the aforesaid three bearing contacts. Along the base of the ear the adjacent edge of the body of the hub portion forms a smooth ledge 16. The latter extends along a straight line leading from the inner end of the cutting edge of the blade, rearward past the pivot and the ear and ends at the outer edge of the handle shank 3. The longitudinal line of the ledge is at only a slight angle to the cutting edge and it passes rather close to the pivot.

Referring to the blade and handle member 2, the blade 2^a thereof has the margin 17 of its cutting edge raised or in relief upon the inner face of the blade. Rearward of the cutting edge the inner face of the medial portion of the member 2 is recessed to depress an area 18 of the face and afford clearance for the raised inner surface of the extension 13 on the companion member 1. At one side, the area 18 is bounded by an edge 19 of the medial portion. Said edge extends from the rear end of the cutting edge, rearward along a straight line at a slight angle to the cutting edge

and leading to the outer edge of the shank 3. Said line extends rather closely past the pivot. Within the depressed area 18 the hub 2b has an integral bearing projection 20. The latter is located at a point materially rearward of the pivot aperture 6 and at or adjacent to the edge 19. It makes a wiping bearing contact with the opposed surface 12 on the companion member 1 and thereby establishes one of the aforesaid three points of mutual bearing contact between the members 1 and 2.

The member 2 at its back edge, opposite the edge 19, has a flat, integral ear 21 in opposed relation to the ear 13 on the companion member 1. Said ear 21 is outwardly offset to space its inner face away from the opposed face 15 of the ear 13. It is located at a point intermediate the pivot aperture 6 and the bearing projection 20, longitudinally of the member 2, and has a central aperture 21'. The aperture is spaced transversely outward a material distance from the pivot aperture 6. A bearing element in the form of a stud 22 has a substantially cylindrical head disposed between the opposed ears 13 and 21, and a reduced shank removably fitted in the aperture 21'. The head of the stud makes wiping bearing contact with the opposed face 15 of the ear 13 to establish another of said three points of mutual contact between the members 1 and 2.

In the assembled shears the pressure exerted by the spring 10 around the pivot compresses the members 1 and 2 toward each other, to press together the blades at a point on the margins of the cutting edges, press the bearing projection 20 against the bearing track surface 12 and press the head of the bearing stud 22 against the bearing track surface 15. Thereby the three points of mutual bearing contact are established, and the contact at the three points is maintained by the spring. One point of contact is at the margins of the cutting edges of the blades and moves inward and outward along said margins as the shears are opened and closed respectively. A second point of contact is determined by the location of the bearing projection 20. It is located in substantial alinement with the cutting edge of blade 2a and is spaced materially rearward of the pivot. The third point of contact is determined by the location of the bearing stud 22, spaced transversely materially outward from the pivot.

The three contact points are in triangular arrangement around the pivot and at all other points on their opposed faces the members 1 and 2 are out of contact. The point of contact at the blade margins coincides always with the shearing point as it advances and recedes along the blades, and the spring pressure maintaining the contact at said point ensures effective shearing coaction of the blades. The shears can be operated easily and effectively by the left hand as well as the right hand. The spring will hold the blades in contact for shearing without effort or care on the part of the user.

To further improve the shearing coaction there is preferably maintained a slight transverse tilt between the blades. As shown in Fig. 5, the depth of the head of the stud 22 is sufficient to hold the member 2 canted slightly with reference to member 1 so that its blade margin 17 will be tilted slightly on the blade margin 11. Should the head wear down in service, the desired degree of tilt may be restored by placing a shim or washer between the shoulder of the stud 22 and the ear 21. The degree of tilt is thus governable at this point of contact but is non-governable at the other two points. By restricting the adjustment to one point confusion in adjustment is avoided.

The desirable three point contact feature in its present embodiment enables the shares to easily cut tin or other sheet material without objectionably spreading apart and bending the sections of the severed material at opposite sides of the shears as the shearing operation progresses through a sheet. The three point contact and tilted blade feature involves an increase in the width of the shears at their medial portions in order to render said feature properly effective. The present invention enables this feature to be employed to full advantage and avoids the necessity of objectionably bending the severed sections of sheet material to pass over the wide hub structure. Fig. 2 shows the acute angle made by the guide ledge 16 on the member 1 and the guide edge 19 on the member 2 and indicates the rather slight degree of divergence the two sections of severed material will have when the shears are closed.

At one side of the shears one section of the sheet is guided by the edge 19 on the member 2 to pass rearward there along closely past the pivot and at only a slight angle to the cutting edge of the blade 2a. This section of the sheet is also guided by the vertical surface 12 on the other member 1. Thus at one side of the shears one section of the severed sheet is guided by both members 1 and 2. At the opposite side of the shears, however, by reason of the peculiar design of the hub member 1a, in which the ear 13 is inset from the body of the hub, the other section of the sheet material is enabled to pass rearward along the guide ledge 16, and it is guided by said ledge and also by the vertical surface 14. The guide ledge 16 and the guide surface 14 are both on the member 1. Hence the section of material at this side of the shears is guided solely by the member 1. Since the ledge 16 is disposed at only a slight angle to the cutting edge of blade 1a and extends between the outwardly spaced bearing contact point and the pivot, and close to the latter, the sheet material is enabled to pass rearward with minimum bending. Thereby injury of the material is prevented and resistance to operation of the shears is reduced.

The structure of the hub portions of the members 1 and 2 also provides them with integral stops to limit the opening movement of the shears. The inclined forward edge of the ear 13 is disposed to abut a transverse shoulder 23 joining the inner surface of the blade 2a and the depressed surface 18 when the shears are opened to the allowable maximum.

What I claim is:

Shears in which coactive blade and handle members have medial portions thereof overlapped and pivotally connected and wherein said members have mutual bearing contact at three points only in triangular arrangement around the pivot axis, with one of said points at the margins of the cutting edges of the blades, another of the points spaced longitudinally rearward from the cutting edge of one of said members and the third point spaced transversely toward the back edge of said member a material distance outward from the pivot axis, characterized in that the other of said members has an edge marginal extension to form part of the bearing contact at said third point and has its outer face inset for the purpose set forth and disposed approximately in the plane of the cut-

ting edge of the member and its inner face in relief from the cutting plane at the inner face of the member and the member has an outer guide ledge along the root of said extension and extending from the cutting edge longitudinally rearward closely past the pivot to guide severed material past the pivot and avoid objectionable bending of the material in order to pass over said third point of contact, and the companion member is recessed at its inner face to afford clearance for said marginal extension and has a back edge extension opposed to said first extension and outwardly offset to provide clearance between said opposed extensions and has a removable contact element between said extensions for wiping bearing contact with the inner face of said first extension to establish said third point of bearing contact.

FREDERICK M. WHYTE.