



# UNITED STATES PATENT OFFICE

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## PINKING SHEARS

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This invention relates to new and useful improvements in hand cutting tools, and more particularly it pertains to hand shears of the type disclosed in our pending application, filed February 5, 1931, Serial No. 513,734, of which this application is a continuation in part.

It is the object of the present invention to provide a pair of hand shears which will cut "zig-zag" edges on pieces of material and which are particularly adapted to form sample swatches.

We are aware that devices purporting to perform the aforementioned function have heretofore been devised, but to the best of our knowledge, and by actual experiment with such devices with which we are familiar, this result has not been satisfactorily obtainable by any device of the shears or scissors type prior to the device herein illustrated.

While the invention has been herein illustrated as constructed to provide a "zig-zag" edge, it is to be understood that the invention is not to be limited to this specific type of edge and that other edges of irregular form may be cut by tools constructed in accordance with the present invention.

With the above and other objects in view, reference is had to the accompanying drawing, wherein:

Figure 1 is a view in side elevation of a pair of shears constructed in accordance with the present invention, the shears being shown in closed position,

Figure 2 is a plan view of the shears taken at right angles to Figure 1,

Figure 3 is a detail sectional view taken on the line 3—3 of Figure 1,

Figure 4 is a plan view of one of a pair of cutting elements constructed in accordance with the present invention and illustrating said element in one of the early stages of its development,

Figure 5 is a transverse sectional view taken on the line 5—5 of Figure 4 and on a slightly enlarged scale, and;

Figure 6 is a transverse sectional view on an enlarged scale of one of the cutting elements after the same has been completely formed.

Referring again to the drawing, and specifically to Figures 1 to 3 inclusive thereof, a shears constructed in accordance with the present invention comprises two jaw members 15 each of which is provided with a handle or gripping portion 16. These jaw members 15 are pivotally connected together as at 17 to operate about an axis 17' in the manner of an ordinary pair of cutting shears. If desired, a spring or similar

resilient member 18 may be employed to insure proper co-action of the cutting edge which will be hereinafter described.

As best illustrated in Figures 3 and 4, each of the jaw members 15 carries a cutting element designated 19, and these cutting elements 19 have coating cutting edges which will be specifically hereinafter described. The cutting elements 19 are preferably removably secured to their respective jaw members 15, and for this purpose screws or the like 20 passing through the cutting elements 19 and having threaded engagement with recesses in the jaws 15 may be employed.

It will be noted that the cutting elements 19 are of relatively thin and narrow elongated formation, and when secured to their respective jaw members, extend longitudinally thereof in parallelism with the longitudinal axis of the jaw member, and slightly overhang the same as designated at 21 in Figure 3.

In the present embodiment of the invention, these cutting elements 19 are formed with a cutting edge which will produce the "zig-zag" cut, and in constructing a pair of cutting elements 19 to produce this result, the said cutting elements are each provided along one edge with a "zig-zag" or serrated cutting edge such as designated at 23 in Figure 4. The serrations are formed preferably by a milling operation as described in a copending application, filed March 17, 1932, Serial Number 599,452, and the serrations are each undercut. These "zig-zag" edges of the two cutting elements 19 are complementary and when placed together will engage each other substantially throughout the entire serrated edge of the cutting elements.

After the cutting elements 19 have thus been made, short arcuate faces 20 are formed on the sides of the teeth. This may be done by lapping operation only or first by a shearing operation and then by a lapping operation and if the latter is used a pivoted or rotary lapping tool is employed. In either event, at the end of the lapping operation the arc shaped faces of one cutting element will be exactly complementary to the corresponding arc shaped faces of the other element and as the blades are operated in the lapping machine, the corresponding complementary arc shaped faces will have a wiping closely engaging contact.

If the faces are first sheared and then lapped both the shearing and lapping operations will take place about the same center which will have a definite relation to, but will not coincide exactly

with the operating center when the two cutting elements are mounted on the jaws of the shears, as will be pointed out below.

During the lapping operation or during both the shearing and lapping operations, the two cutting elements are not radially disposed with respect to the center about which they are lapped or both sheared and lapped but are off-set a suitable distance therefrom. After the arc shaped faces have thus been formed on a portion of the relatively narrow serrated and undercut edges of the cutting elements, these edges will be left with receding or undercut portions which recede from the bottom of the arc shaped faces 20. These receding or undercut portions permit of free clearance of the cutting edges as the short or narrow arc shaped faces pass out of engagement with one another during a cutting operation, this being very important to insure a clear cutting or shearing action of the tool.

The cutting elements 19 are preferably so mounted upon the jaws of a shears that when they are secured in place the center of operation of the jaws designated 17' does not coincide with the center about which the arc shaped faces were lapped or sheared and lapped but on the other hand the faces or seats 40 of the jaws on which the cutting elements rest are so located that the cutting elements 19 will be off-set a slightly greater amount from the operating center 17' than they were from the lapping or shearing and lapping center. This causes the arc shaped faces 20 of one cutting element to become slightly eccentric with respect to the co-operating or corresponding arc shaped faces of the other cutting element. That is to say, though the corresponding arc shaped faces of the two elements were concentric at the end of the lapping operation, in the finished shears they are slightly eccentric. When the shearing elements are tightened on the jaws they are thus so positioned that substantially only the edges of the arc shaped faces of the two shearing elements contact with each other during the cutting operation, thereby causing the cutting edges to clear each other even more rapidly than they would have cleared by reason of the undercutting extending from the bottom of the arc shaped faces as already described. This slight eccentricity of the arc shaped faces due to the small off-setting when the shearing elements are mounted in final position on the jaws, therefore enhances the good clean cutting action obtained by virtue of the undercutting.

The extent of this additional off-setting is not in all cases uniform but in any event it is slight compared with the offsetting which exists when the cutting elements are being lapped or both sheared and lapped. In shears which we have produced exactly the same as herein illustrated the off-set which the shearing elements had during the lapping or both shearing and lapping operations was about one quarter ( $\frac{1}{4}$ ) of one inch from the center of rotation during these operations whereas in the finished shears each shearing element is off-set and additional amount equal to approximately one sixty fourth ( $\frac{1}{64}$ ) of one inch. It will be understood that the two shearing elements will be each off-set the same amount but in opposite directions from the operating center 17', the total amount of off-set of each jaw being indicated by the line A—A in Figure 1.

From the foregoing, it is apparent that the present invention provides a new and novel

pinking shears which is highly effective in its construction and operation, and in which as has been demonstrated in actual hand shears constructed in accordance with this invention, it is highly practical and will effectively cut the thinnest of materials, an operation of which such devices of the prior art with which we are familiar are incapable of performing.

While the invention has been herein illustrated in a preferred form, it is to be understood that the invention is not to be limited to the specific construction or details herein illustrated and that it may be practiced in other forms without departing from the spirit thereof.

Having thus described the invention, what is claimed as new and what is desired to secure by Letters-Patent of the United States, is:

1. Pinking shears with pivoted blades having serrations with opposed complementary curved faces eccentrically disposed with respect to the pivotal center of the shears so as to provide contacting shearing edges.

2. Pinking shears having pivoted blades with serrated cutting portions, the serrations of both blades having opposed arc-shaped surfaces, the surfaces of each blade having a common center displaced with reference to the center of the surfaces of the other blade.

3. Pinking shears with pivoted blades having serrated cutting portions with opposed arc-shaped faces, the center of curvature of the faces of a blade being non-coincident with the pivotal center of the shears.

4. Pinking shears comprising two pivoted blades having serrated cutting portions, the serrations of each blade having arc shaped faces with a center of curvature displaced with reference to the pivotal center of the shears.

5. Pinking shears comprising two pivoted blades having serrated cutting portions with arc shaped complementary surfaces, the center of curvature of the arc-shaped surfaces of the two blades being offset on opposite sides of the pivotal center of the shears.

6. Pinking shears comprising a pair of pivoted jaws each having a cutting portion, a row of serrations located to one side of a line extending radially from the pivotal axis of the jaws lengthwise of the jaws.

7. Pinking shears comprising a pair of pivoted jaws having shearing portions consisting of serrations which project inwardly from the adjacent faces of the jaws, the serrations of each jaw being on one side of a radial line extending from the pivotal center centrally of the jaws.

8. A shearing tool comprising a pair of jaws pivotally attached together, and a shearing blade carried by each of said jaws, said shearing blades comprising relatively thin and narrow members having cutting edges, and cooperating undercut portions receding from a point remote from said cutting edges as and for the purpose described.

9. A pinking shears comprising a pair of jaws pivotally attached together, a shearing blade carried by each of said jaws, said shearing blades each comprising a relatively thin and narrow member, a serrated cutting edge on each of said shearing blades, and an undercut face receding from a point remote from each serrated cutting edge.

10. A pinking shears comprising a pair of jaws pivotally attached together, and a shearing edge for each of said jaws, each of said shearing edges comprising a serrated cutting edge, a rela-

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tively short face extending from said cutting edges, and an undercut face receding from each of said first mentioned faces.

5 11. A pinking shears comprising a pair of pivotally attached jaws, and a cutting blade extending longitudinally of each of said jaws, said cutting blades having interengaging serrated side edges and curved faces in a vertical plane of the serrations, and being relatively thin whereby they pass clear of each other after the completion of a cutting operation.

10 12. A pinking shears comprising a pair of pivoted blades having interengaging serrated side edges having curved faces in a vertical plane of the serrations said blades being relatively thin or narrow whereby they pass clear of each other after the completion of a cutting operation.

13. A pair of scissors or shears comprising pivoted blades, lips projecting from said blades into cooperable relationship, notched cutting edges on corresponding portions of each of said lips, said notches being disposed in predetermined relationship to each other.

14. Pinking shears comprising a pair of pivotally connected blades, a relatively thin and narrow flange extending along the inner edge of each of said blades, each of said flanges projecting at substantially right angles from its respective blade, and a plurality of serrations formed in the flange of each of said jaws and extending entirely through the flange.

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