

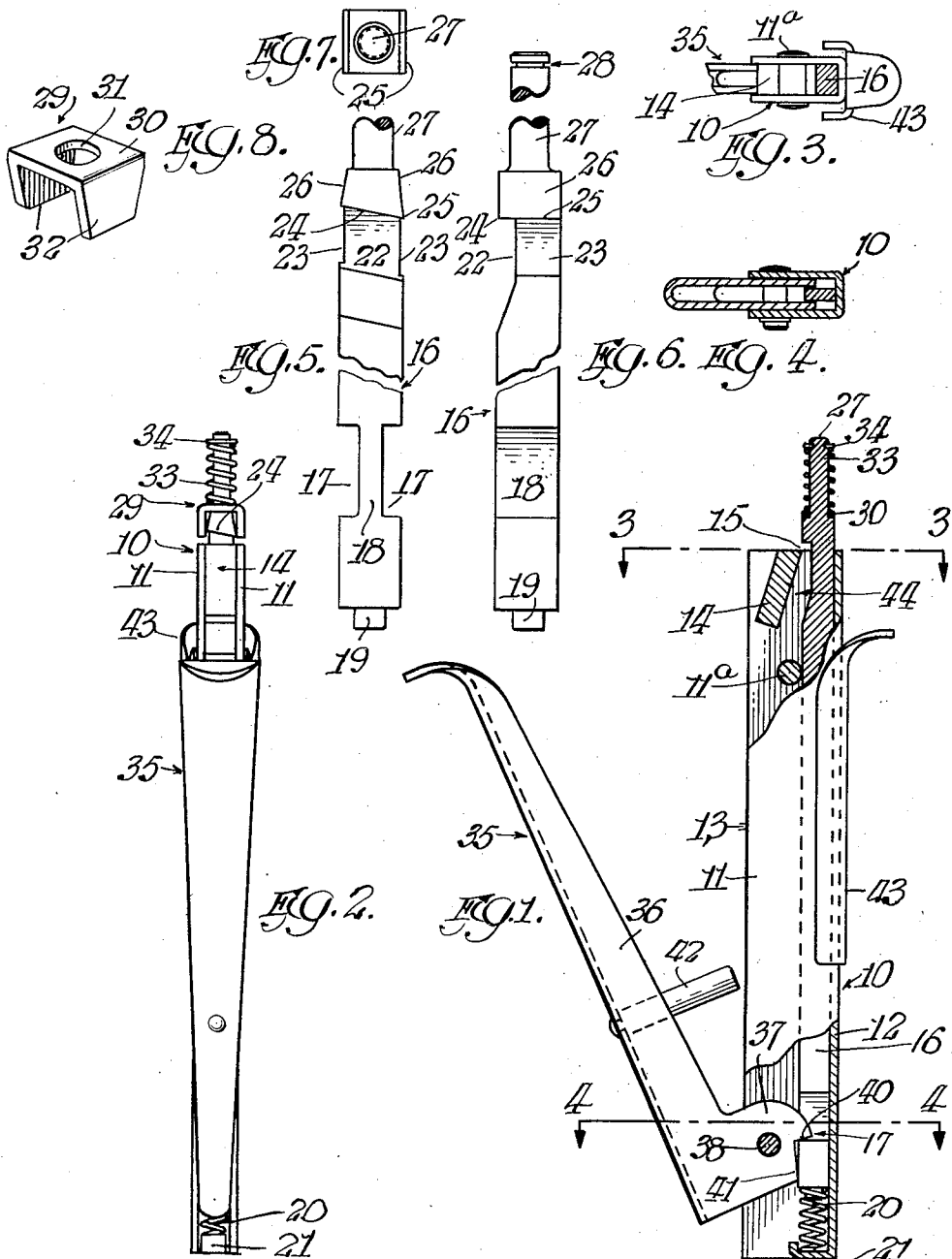
Feb. 20, 1951

A. F. ADEL

2,542,103

NIBBLING TOOL

Filed Jan. 19, 1949



Inventor
A. F. Adel
by Arthur W. Nelsons
Atty

UNITED STATES PATENT OFFICE

2,542,103

NIBBLING TOOL

Alf F. Adel, Chicago, Ill.

Application January 19, 1949, Serial No. 71,753

8 Claims. (Cl. 30—241)

1

This invention relates to improvements in nibbling tools and it consists of the matters hereinafter described and more particularly pointed out in the appended claims.

One of the objects of the present invention is to provide a simple and efficient tool, which may be held in and operated by one hand, for enlarging or changing the shape of a previously formed opening or for making a recess in a margin of a piece of sheet material, by cutting away chips from the periphery of said opening or from said margin.

Another object of the invention is to provide a tool of this kind which is easy to manipulate with rapidity without tiring the operator's hand and which clears itself of chips so that it will not be clogged thereby and become hard to operate.

A further object of the invention is to provide a tool of this kind that includes an inexpensive but strong and rigid frame, which has a good "feel" in the hand of the operator and which carries a member so mounted therein, for actuating the movable cutter bar, as to afford a maximum of leverage and whereby much thicker material may be operated upon than with tools heretofore made for a similar purpose.

Again it is an object of the invention to provide in a tool of this kind, a novel movable cutter bar, which affords an easy cutting as well as a clearing of the chips produced in the operation of the tool.

The above mentioned objects of the invention, as well as others, along with the advantages thereof, will more fully appear as the specification proceeds.

In the drawing:

Fig. 1 is a view partly in side elevation and partly in longitudinal section of a nibbling tool embodying the preferred form of the invention.

Fig. 2 is a view in front elevation of the tool appearing in Fig. 1.

Fig. 3 is a horizontal detail sectional view through a part of the tool, as taken on the line 3—3 of Fig. 1.

Fig. 4 is another horizontal detail sectional view through a part of the tool as taken on the line 4—4 of Fig. 1.

Fig. 5 is a view in front elevation of the movable cutter bar of the tool, on a scale larger than that of Fig. 1.

Fig. 6 is a view in side elevation of the cutter bar of Fig. 5.

Fig. 7 is a top plan view of the cutter bar appearing in Figs. 5 and 6.

2

Fig. 8 is a perspective view of a chip stripper embodied in the tool on a scale enlarged over that of Figs. 1 and 2.

The improved tool in its preferred form includes among the parts thereof an elongated frame member 10 made from a strip of sheet metal bent upon itself to provide a pair of spaced side walls 11—11 and a back 12, joining like edges of said sides so that said frame member has a relatively deep channel cross section and is open at its front which is indicated at 13 in Fig. 1.

Between and suitably fixed to the upper end of the side walls 11—11 of the frame, is a fixed cutter bar 14 that inclines upwardly and rearwardly toward the top end of said side walls to form a stationary cutting edge 15, spaced about midway between the front and the back of the frame.

16 indicates the movable cutter bar of the tool and which best appears in Figs. 5 and 6. It is made of a piece of squared stock of a length approximating that of the frame and has a width and thickness corresponding to the distance between the side walls of the frame so as to fit therebetween and engage against the back 12. The front face of this cutter bar is disposed substantially in the plane of the cutting edge 15 and a rivet 11a passes through the side walls 11—11 of the frame at one side of the cutter bar 16. This rivet assists in so holding the cutter bar in position and permits longitudinal sliding movement of the cutter bar in the frame.

In opposite sides of the cutter bar 16, toward the bottom end thereof, are recesses 17 which leave a central web portion 18 in this part of the bar. At the bottom extremity of the bar is a stud 19 adapted for engagement by one end of a coiled expansion spring 20 (see Fig. 1) the other end of which engages a ledge 21 turned inwardly from the lower end of the back. This spring normally urges the cutter bar 16 upwardly to its normal position, between nibbling strokes of the same.

The upper portion of the cutter bar has parts removed from the front and sides thereof to form chip clearance recesses 22 and 23—23 respectively which best appear in Figs. 5 and 6. The upper edge 24 of the recess 22 is inclined and constitutes the front cutting edge of the bar, which coacts, in a nibbling operation, with the cutting edge 15 before mentioned. The upper edge 25 of the recesses 23—23 extends at a right angle to the side faces of the bar and coact with the sides of the frame as a cutting edge which produces the end cuts of the chips produced in the operation of the tool. The side faces 26—26 of

that portion of the bar above the edges 25—25 taper inwardly and upwardly to the extremity of the bar, as best appears in Fig. 5. Rising centrally from said extremity is a stud 27 that has an annular groove 28 at the top, as appears in Fig. 6.

Operatively engaged upon the upper end of the bar 16 is a chip stripper 29 that best appears in perspective in Fig. 8, on the scale of Figs. 5 and 6. This stripper has a top 30 in which is a hole 31 for the passage of the stud 27 therethrough. Depending from each side of said top is a chip engaging arm 32 and these arms are so spaced apart as to engage the side cutting edges 25—25. A spring 33 is engaged upon the stud 27 and bears at one end upon the top of the stripper and bears at the other end against an annular member 34 engaged in the groove 28 in the stud 27. This spring normally urges the top of the stripper into engagement with the top end of the bar but said spring will permit said stripper to yield upwardly as the side arms 32 thereof engage the top edges of the side walls 11 of the frame 10 in a nibbling operation.

Associated with the open front 13 of the frame is a lever 35 preferably made of die formed sheet metal and which includes a relatively long power arm 36 and a short load arm 37, the lever being mounted at a point between the two arms upon a pivot rivet 38 (see Fig. 1) connecting the bottom end portions of the two sides 11—11 of the frame together. At least the lower end of the lever is bifurcated so that the two sides thereof straddle the web 18 of the cutter bar and at the inner end of each of the two sides of the load arm are recesses that provide right angled shoulders 40 and 41 respectively, which best appear in Fig. 1. The shoulders 40 each engage the bottom edge of the associated recess 17 in the cutter bar 16 and the shoulders 41 of both load arms engage the front face of the cutter bar 16 below said recesses to function as a stop for the outward swinging movement of the lever as a whole.

The lever arm 36 carries a stud 42 for engagement with the bar 16 to limit the swinging movement of the lever arm 36 toward the open front of the frame and whereby the fingers of the operator cannot be pinched between the frame and the lever in a nibbling operation of the tool.

On the upper portion of the back 12 of the frame is provided a strip of U-shaped metal 43, the upper end of which is flared rearwardly to overhang the crotch of the hand between the thumb and index finger when the tool is gripped in one hand for a nibbling operation.

As is obvious from Fig. 1, the back of the fixed cutter bar 14 and the front face of the bar 16 at the recess 22, flare downwardly and this provides a throat or passageway 44 for a free discharge of the chips formed in a nibbling operation, as the cutting edge 24 passes the cutting edge 15. It is pointed out, at this time, that as the cutter bar 16 moves downwardly in a cutting operation, one end of the edge 24 first coacts with the edge 15 and then successive portions of the edge 24 sweep across the edge 15 so that said edges coact to produce a true shearing action on the sheet material being operated upon.

Assume that a hole in a piece of sheet metal is to be enlarged or changed in shape. Said hole is first provided by drilling the sheet metal to a diameter to permit the passage of the upper part of the bar 16 therethrough, until the metal engages with the top end of the frame. At this

time, the cutting edge 24 of the bar is disposed slightly above the sheet metal. By grasping the tool, with the crotch of the hand engaged with the strip 43 and with the fingers engaged with the power arm 36 of the lever 35, the latter is swung toward the frame clockwise as in Fig. 1. In the movement of the lever, the load arm 37 thereof swings downwardly and due to the engagement of the shoulders 40 thereof with the bottom edges of the recesses 17, the cutter bar 16 is moved longitudinally downward in the nibbling stroke. In this downward movement of the bar, the cutting edges 15 and 24, along with the cutting edge 25 coact to cut away a chip from the sheet metal, having a width that equals the width and depth of the cutting edge 24 and this chip discharges downwardly through the passageway 44 between the bars 14 and 16. Also in this downward movement of the bar 16 the stripper 29 moves relatively toward the part 34 thereby compressing the spring 33 until the stud 42 on the lever arm 36 engages the bar 16 which acts as a stop for the lever.

When the grip on the lever is released, the spring 20 returns the bar 16 and lever 35 to normal position for another nibbling stroke of the cutter bar and the spring 33 returns the stripper 29 to normal position and in such movement strips the removed metal chip should it adhere to the cutter bar.

The tool may also be used in producing a recess in a margin of the sheet metal. To do so the tool is moved toward the edge of the sheet metal with the top end of the frame engaged with the under side thereof and, at which time, the edge of the sheet metal will be engaged with the face of the recess 22 and a marginal part will be overhung by the cutting edge 24. By alternately swinging the lever arm 36 toward the frame and then releasing the same, successive nibbling strokes are produced for the bar 16 so that chips are nibbled or cut from said sheet metal.

The tool is of a simple, inexpensive, though strong construction and operates easily and efficiently for its intended purpose.

While in describing this invention, I have referred in detail to the form, arrangement and construction of the parts of which the tool is made, the same is to be considered only in the illustrative sense, and therefore, I do not wish to be limited thereto except as may be specifically set forth in the appended claims.

I claim as my invention:

1. A hand operable nibbling tool embodying therein an elongated frame having spaced walls and open along one side, means at one end of the frame and supported from said walls and there providing a stationary cutting edge extending between said walls, a cutter bar mounted in said frame between said spaced walls for guided longitudinal nibbling and return strokes from and back to a normal position, means carried by said cutter bar and providing a movable cutting edge for cooperating with said stationary cutting edge in the nibbling stroke of said bar, a lever pivotally mounted on the frame and having a portion disposed between the walls of the frame and directly engaged with a part on the cutter bar for imparting the nibbling stroke thereto when said lever is swung toward the open side of the frame, and means carried by said frame and disposed between the walls thereof for imparting the return stroke to said cutter bar back to normal position after a nibbling stroke.

5

6

2. A hand operable nibbling tool embodying therein an elongated frame having spaced walls and open along one side, means at one end of the body and supported from said walls and there providing a stationary cutting edge extending between said walls, a cutter bar mounted in said frame between said walls for guided longitudinal nibbling and return strokes from and back to a normal position, means carried by said bar and providing a movable cutting edge for cooperating with said stationary cutting edge in the nibbling stroke of said bar, said bar having recesses in opposite sides thereof, a lever pivotally mounted on the frame and including a power arm and a load arm, the latter arm being formed to engage in said recesses for imparting the nibbling stroke to the cutter bar when said power arm of the lever is swung toward said frame, and means carried by said frame and disposed between the walls thereof and engaged with said cutter bar for imparting the return stroke to said bar back to normal position after a nibbling stroke.

3. A hand operable nibbler embodying therein an elongated frame of a channel cross section and including laterally spaced sides joined together at the back and open at the front, means extending between said sides providing a stationary cutting edge at the top of said frame, a cutter bar member in said frame and having guided engagement with said sides and back for longitudinal nibbling and return strokes from and back to a normal position, means carried by said bar member and providing a movable cutting edge for cooperating with said stationary edge in the nibbling stroke of the bar member, a lever member including a relatively short load arm disposed between said sides of the bottom of the frame and a longer lever arm outside the open front of the frame, means for pivotally connecting the load arm of said lever to the sides of the frame, means carried by said bar member and operatively engaged by the load arm of the lever member for imparting the nibbling stroke to said bar member when said bar member is swung toward the open front of the frame, and means carried by said frame between the sides thereof and engaged with one of said members for imparting the return stroke to said bar member to said normal position after a nibbling operation.

4. A hand operable nibbler embodying therein, an elongated frame, a stationary cutting edge at one end of the frame, a cutter bar member mounted on said frame for guided longitudinal nibbling and return movement from and back to a normal position, means providing a cutting edge on said cutter bar member and spaced outwardly from said stationary cutting edge when said cutter bar member is in said normal position, means carried by said frame and engaged with the other end of said cutter bar member for imparting the nibbling and the return strokes to said cutter bar member, and a stripper device mounted on and capable of a yielding guided movement longitudinally of the cutter bar member, toward and away from the cutting edge thereon.

5. In a hand operable nibbler including an elongated frame having spaced sides, a closed back and an open front, a bar fixed between said

sides at the top end of the frame and forming a transverse stationary cutting edge between said closed back and said open front of the frame, a cutter bar disposed in said frame between said closed back and said stationary cutting edge and longitudinally movable from a normal position therein in the nibbling stroke of the cutter bar, said cutter bar having a longitudinal portion of its front cut away to form a cutting edge for cooperation with and normally disposed above said stationary cutting edge, said cut away portion of said cutter bar and said first mentioned bar coacting to form outwardly and downwardly flaring passageway for chips produced in a nibbling operation.

6. In a hand operable nibbler including an elongated frame having spaced sides, a closed back and an open front, a bar fixed between said sides at the top end of the frame and forming a transverse stationary cutting edge between said closed back and said open front of the frame, a cutter bar disposed in said frame between said closed back and said stationary cutting edge and longitudinally movable from a normal position in the nibbling stroke of the cutter bar, said movable cutter bar being formed towards its upper end with recessed portions providing a front cutting edge and side cutting edges, the side portions of the bar above the side cutting edges tapering upwardly and inwardly toward the top extremity, a stud rising from said extremity, a chip stripper disposed upon said stud and including side arms operatively associated with the said side portions of the bar above said side cutting edges, and yielding means carried by said stud and engaged with said strip chipper.

7. In a nibbler, a cutter bar comprising an elongated member having a recess in the front portion thereof and a recess in each side portion thereof, said recesses each being defined at the top by a cutting edge, those portions of the member above the recesses in the sides thereof tapering upwardly and inwardly from the cutting edges defined by said last mentioned recesses.

8. In a nibbler, a cutter bar comprising an elongated member having a recess in the front portion thereof and a recess in each side portion thereof, said recesses each being defined at the top by a cutting edge, those portions of the member above the recesses in the sides thereof tapering upwardly and inwardly from the cutting edges defined by said last mentioned recesses, the cutting edges at the top of the recess in the front of said member, extending at an angle less than a right angle to the length of said member.

ALF F. ADEL.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,114,753	Waner	Apr. 19, 1938

FOREIGN PATENTS

Number	Country	Date
12,723	Great Britain	May 11, 1905