May 6, 1952 L. P. GLICK ET AL 2,595,841

HAND NOTCHING TOOL

Filed Sept. 27, 1948

Fig. 1

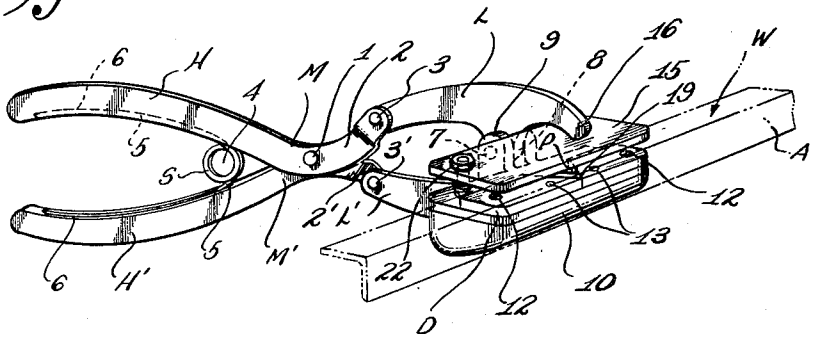



Fig. 2

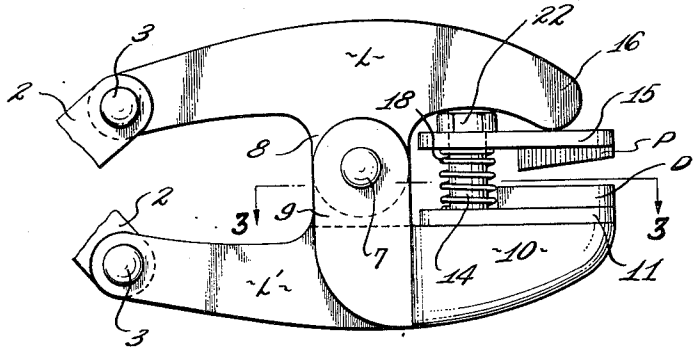
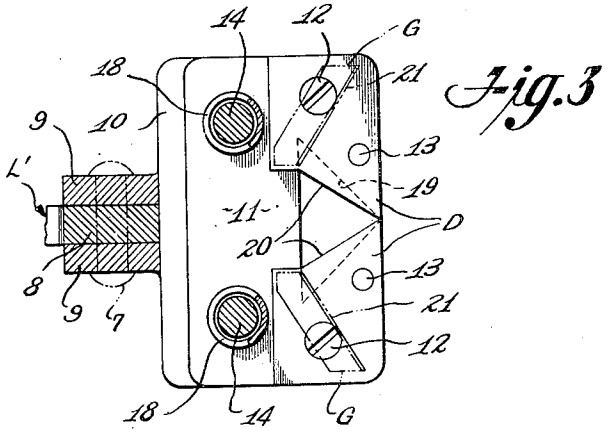



Fig. 3

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## HAND NOTCHING TOOL

Leslie P. Glick and Frank E. Norman, Los Angeles, Calif., assignors, by direct and mesne assignments, of twenty-five per cent to Al Nu Delman, seven per cent to Edna Nu Delman, eight and one-half per cent to Robert N. Gold, six and one-half per cent to Guy O'K. Evans, all of Los Angeles, and three per cent to Herman N. Elbaum, North Hollywood, Calif.

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8 Claims. (Cl. 30—229)

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This invention relates to and has for an object the provision of a novel and effective hand operated tool for cutting and notching molding and other metal sections of varied cross sectional contour, and especially adaptable for mitering such sections so that they may be bent around right angular corners of furniture, walls, or the like, or otherwise cut at appropriate angles to correspond to and closely fit the contours of surfaces to which they are applied.

It has been the custom when adapting shaped metal sections to surfaces to cut one or more of the sides, as for example, the horizontal side of a right angular section, as by means of a hacksaw, to an extent where the inner end of the kerf will be approximately flush with the outer surface of the joined flange. Thus, when cut on a miter the section may be bent at right angles with the cut edges in abutment. At other times, it is desirable to cut a side or sides of a section at an acute or an obtuse, or yet on a curve or straight transverse line. In any and all of such cases the cut is more or less irregular and rough and requires smoothing by a file before use thereof.

It is, therefore, an object of this invention to provide a portable hand operated tool of light weight and sufficient power and embodying a punch and die set which is readily applicable to a shaped section for cutting the webs or flanges at selected angles or curves or for forming apertures of desired size and contour therein, without the necessity for the use of accessory saws, files, or other agents for affording smoothly cut edges.

Other objects will appear as the detailed description of the structure and operation of our invention progresses, reference being had to the accompanying drawing in which:

Fig. 1 is a perspective view of a preferred form of tool embodying our improvements;

Fig. 2 is an enlarged side elevation of the tool head; and

Fig. 3 is a sectional plan of the head on line 3—3 of Fig. 2.

Briefly described, a tool of our invention includes a pair of members M and M' hinged together—scissorslike—at 1, which similar handles H and H' extended rearwardly and shorter arms 2 and 2' extended forwardly from the hinge 1, respectively. The head of the tool includes a link L hinged at 3 to arm 2 of member M and a link L' hinged at 3' to arms 2' of member M'. A spring S is mounted on and between members M and M' and has a central loop

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4 with legs 5, 5 in grooves 6, 6 of handle sections H and H' and bearing against the handle sections so as to urge them apart.

Links L and L' are hinged together at 7 by means of a pin extended through lugs 8 and 9 extended inwardly from the links, respectively. Only one lug 8 may be provided on one of the links while a pair of lugs 9 are formed on the other link, with the single lug nested between the pair of lugs 9, if desired. The hinge pins 1 and 7 are in a common plane bisecting the angle between the handles H and H' and that between the links L and L'.

Link L' has a base 10 with a flat upper surface adapted to receive and hold a die plate 11 bearing one or more dies D and secured to the base by screws 12 and pilot pins 13. Plate 11 carries a pair of transversely spaced upright posts 14, 14 on which a punch plate 15 is slidable under the influence of a cam arm 16, springs 18 on said posts being compressible between die plate 11 and punch plate 15 and serving to normally urge the punch P away from die D.

It will be seen from the drawings that the plate 11, pins 13, dies, posts 14 and punch 15, constitute a die set. Securement of the set to the base 10 by means of the screws 12 engaging the plate 11, permits removal and replacement of the set as a unit without disturbing the relation of the elements of the set. In this manner the tool may be used as a universal punch, the punch and die sets being readily exchangeable to conform with the requirements of any particular type of work on hand.

As shown in full lines in Fig. 3, plate 11 may have an aperture 19 therein corresponding to or different from the contour of punch P or of a size larger than the punch if desired, and through which the cuttings are discharged from the head. Preferably we employ a pair of similar dies D disposed as shown on opposite sides of the aperture 19 with their cutting edges 20 either flush with or inwardly of corresponding edges of aperture 19 and in all cases with the cutting edges 20, 20 meeting at the apex of the triangle so that when positioned on a section, as at A in Fig. 1, a V-cut will be made at each operation of the tool. It will be further noted by reference to Figs. 1 and 3, that the apex of the opening between the dies is flush with the front surface of the dies and their carrier plate 11. From this construction it will be apparent that a cut may be formed in a strip of material to the full extent of the location of the die set above and below such material. In other words, there is no projecting

portion beyond the apex of the cut and thus the head may receive the entire flange of a strip and perform a cut extending inwardly to the full extent of the flange. This arrangement also permits accurate location of the tool, by sight, so that the apex of the cut may coincide with a predetermined location. Of course, the cutting edges of the punch correspond to the edges 20 of the dies so that when a flat section of the work A is between the punch and the die the material will be cut. To make a V-cut the tool is held with the apex of the angle between cutting edges 20, 20 inwardly of the outer edge of the material, and the completed cut will be open at the edge of the cut material. If an aperture of any desired contour is desired it may be formed by a single die D of appropriate contour or a combination of the pair of dies.

It is occasionally desirable to trim the ends of shaped sections or bars and the tool herein shown may be adapted for such purposes by the employment of guides G one or a pair of which may be mounted on the die or dies D and held by screws 12 or otherwise at desired angles relative to the cutting edge or edges 20 of the die or dies D. In such event the section of material is laid on the die G with an edge against an edge or side 21 of the guide and its end overlying aperture 19 and a cutting edge 20 of a die G.

Each cutting operation is accomplished after first positioning the tool on a section of material to be cut, or vice versa, then applying hand pressure to handles H and H', thereby causing cam arm 16 to forcibly engage and depress punch P through plate 15 and pierce or cut the material. When pressure on handles H and H' is relieved the springs 18 and S (either one or both) urge the punch to retracted position in readiness for a succeeding operation.

The pilot pins 13 serve to hold the die plate 11 and dies in operating position and the punch P instead of being carried by link L is merely operated by link L' inasmuch as the punch and die are elements of the same unit and the movement of the punch relative to the dies is guided by posts 14, thereby assuring perfect mating of the punch and die. The punch may be formed so as to obtain a maximum benefit from shearing action and a smooth cut.

Essentially, this invention comprehends the provision of a portable hand operated tool embodying a pair of operating members hinged together, a punch and die set carried by one of the members and a punch actuating element connected with the other operating member for moving the punch into operative relationship with the die.

In effect, the handles H and H' together with the spring S constitute one unit of the tool, the head inclusive of the links L and L' include another unit, and the punch and die set P—D, a third unit. In this connection it may be noted that the tail portions of the head constitute the attaching means for the handles while the member L' and the head serves as a common support for both the die and the punch, the punch being slidably mounted on the die so that it will move in a straight line as the set is opened and closed, the actuator member L being detached from the punch supporting plate 15 and merely engaging said plate frictionally as the handles are contracted. It will be noted that in the pivotal movement of the actuator member L its cam arm 16 has a rocking motion over the top surface of the punch plate 15. There is thus no artificial limitation in its free movement and friction in operating movements is reduced to a minimum. Furthermore, since the end of the arm 16 is rounded the movement of the plate in response to pivotal movement of L diminishes as movement of the punch towards the dies progresses so that a greater leverage is applicable as the punch and dies bite into the work. The presence of both springs 18 and S is optional. Either one of said springs may suffice but in all probability the springs 18 are preferable because the tension thereof serves to separate the punch and die and could not fail to similarly expand the handles H and H'. If necessary, the posts 14 may be provided with nuts 22 above the plate 15 if desired. Or, if cap screws are used for posts, the heads of such screws may occupy the positions of the nuts 22 while the screws are threaded into the die plate 11.

We claim:

1. In a device of the character set forth, a pair of coaxially pivoted operating handles, a pair of activating links separately pivoted to said handles, a removable and replaceable die set mounted on one of the links and including a die, and a punch yieldably mounted relative to said die, said other link including a cam arm extending over and normally in sliding contact with the punch whereby pivotal movement of the handles will impart pivotal movement of the links and cause said cam arm to rock on the punch while cutting a piece of work held between the punch and the die.

2. A hand operated notching tool comprising: a first member and a second member pivotally connected intermediate their extremities, handles pivotally connected rearwardly of said first and second members and additionally pivoted to the rear portions of said first and second members, respectively, a die stationarily mounted on the forward portion of said first member, posts extended upwardly from said die, and a punch slidable on said posts into and from operative engagement with said die, said punch having a portion underlying and adapted to be engaged by the forward portion of said second member when said handles are contracted so as to cut a piece of work when the work is held between the die and the punch.

3. A hand operated notching tool comprising: a first member and a second member pivotally connected intermediate their extremities, handles, pivotally connected rearwardly of said first and second members and additionally pivoted to the rear portions of said first and second members, respectively, a die stationarily mounted on the forward portion of said first member, posts extended upwardly from said die, and a punch slidable on said posts into and from operative engagement with said die, said punch having a portion underlying and adapted to be engaged by the forward portion of said second member when said handles are contracted so as to cut a piece of work when the work is held between the die and the punch, and springs borne by said posts and adapted to be compressed by the movement of the punch toward the die, for urging the punch to retracted position.

4. A hand operated notching tool comprising: a first member and a second member pivotally connected intermediate their extremities, handles pivotally connected rearwardly of said first and second members and additionally pivoted to the rear portions of said first and second members, respectively, a die stationarily mounted on

the forward portion of said first member, posts extended upwardly from said die, and a punch slidable on said posts into and from operative engagement with said die, said punch having a portion underlying and adapted to be engaged by the forward portion of said second member when said handles are contracted so as to cut a piece of work when the work is held between the die and the punch, and a main spring held on the pivot of said handles and having legs bearing against inner surfaces of the handles to urge the handles to expanded positions.

5. A hand operated notching tool comprising: a first member and a second member pivotally connected intermediate their extremities, handles pivotally connected rearwardly of said first and second members and additionally pivoted to the rear portions of said first and second members, respectively, a die stationarily mounted on the forward portion of said first member, posts extended upwardly from said die, and a punch slidable on said posts into and from operative engagement with said die, said punch having a portion underlying and adapted to be engaged by the forward portion of said second member when said handles are contracted so as to cut a piece of work when the work is held between the die and the punch, and a main spring held on the pivot of said handles and having legs bearing against inner surfaces of the handles to urge the handles to expanded positions, the forward portion of said second member forming a cam bearing against and adapted to urge the punch into cutting engagement with the work when said handles are contracted against the tension of said main spring.

6. A hand operated notching tool comprising: a first member and a second member pivotally connected intermediate their extremities, handles pivotally connected rearwardly of said first and second members and additionally pivoted to the rear portions of said first and second members, respectively, a die stationarily mounted on the forward portion of said first member, posts extended upwardly from said die, and a punch slidable on said posts into and from operative engagement with said die, said punch having a portion underlying and adapted to be engaged by the forward portion of said second member when said handles are contracted so as to cut a piece of work when the work is held between the die and the punch, the pivots connecting said handles and the pivot connecting said first and second members being substantially alined horizontally with the upper face of said die, whereby the movement of the punch is in a plane at right angles to a line cutting the pivot points of said handles and said first and second members.

7. A hand operated notching tool comprising: a first member and a second member pivotally



connected intermediate their extremities, handles pivotally connected rearwardly of said first and second members and additionally pivoted to the rear portions of said first and second members, respectively, a die stationarily mounted on the forward portion of said first member, posts extended upwardly from said die, and a punch slidable on said posts into and from operative engagement with said die, said punch having a portion underlying and adapted to be engaged by the forward portion of said second member when said handles are contracted so as to cut a piece of work when the work is held between the die and the punch, and a main spring held on the pivot of said handles and having legs bearing against inner surfaces of the handles to urge the handles to expanded positions, said handles being of U cross section with the legs of said main spring confined therein.

8. A hand operated notching tool comprising: a first member and a second member pivotally connected intermediate their extremities, handles pivotally connected rearwardly of said first and second members and additionally pivoted to the rear portions of said first and second members, respectively, a die stationarily mounted on the forward portion of said first member, posts extended upwardly from said die, and a punch slidable on said posts into and from operative engagement with said die, said punch having a portion underlying and adapted to be engaged by the forward portion of said second member when said handles are contracted so as to cut a piece of work when the work is held between the die and the punch, said first member formed with a die support extended laterally in opposite directions to provide a substantially horizontal surface for receiving the die, and for mounting said posts.

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