April 24, 1951 J. G. MILLER 2,549,918

SHEET METAL HANDLING TOOL

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FIG. 1.

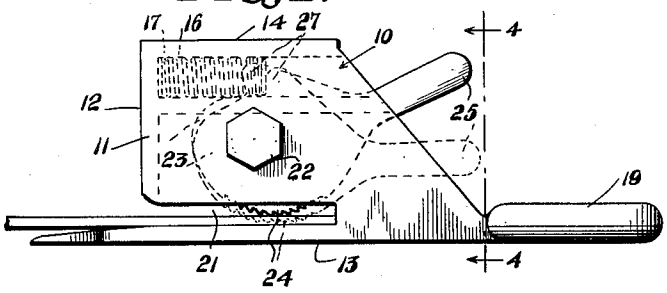


FIG. 4.

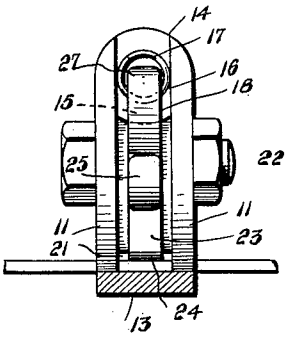
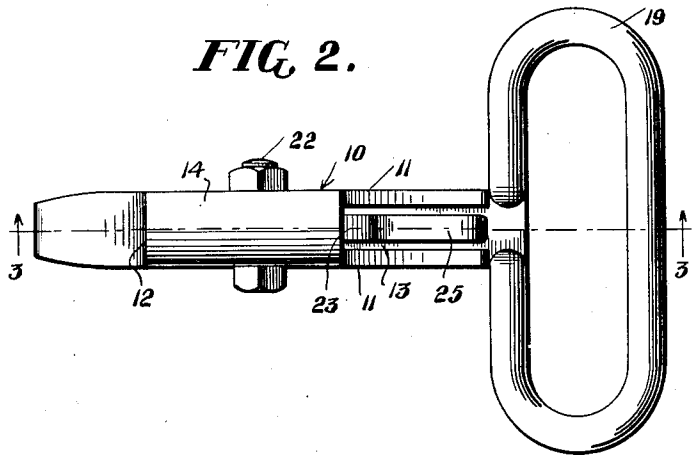


FIG. 2.



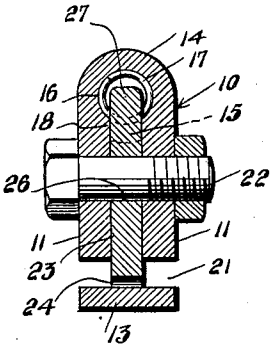


FIG. 5.

FIG. 3.

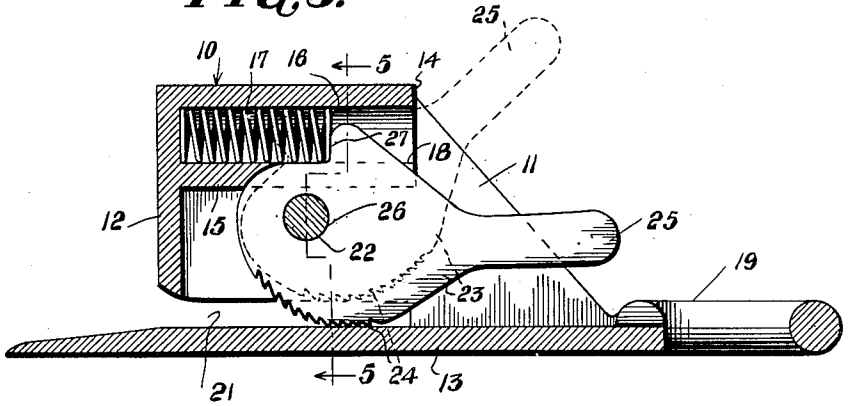


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FIG. 7.

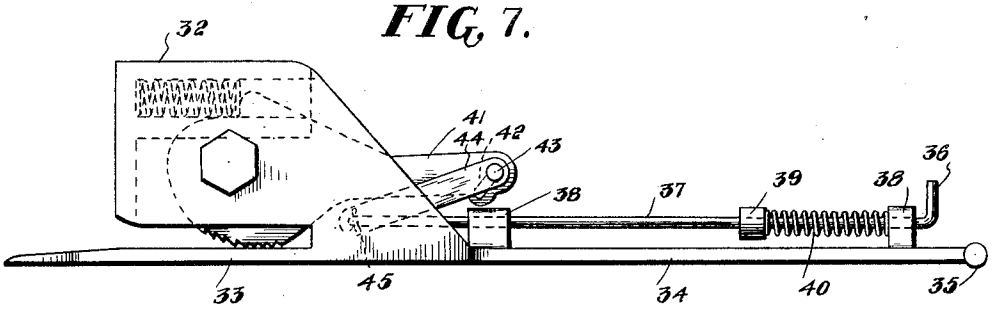


FIG. 8.

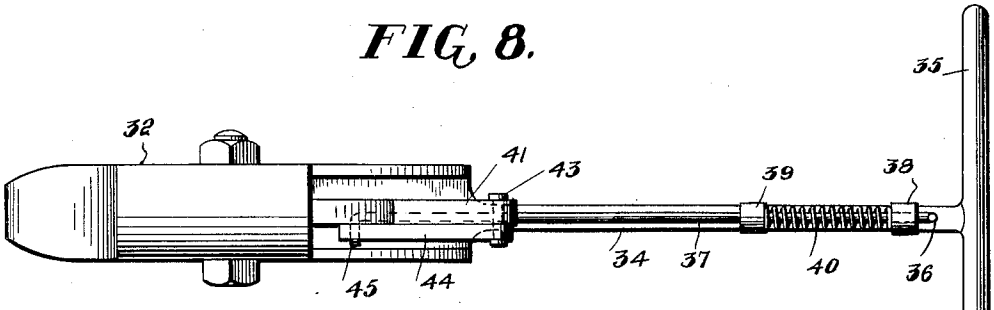


FIG. 9.

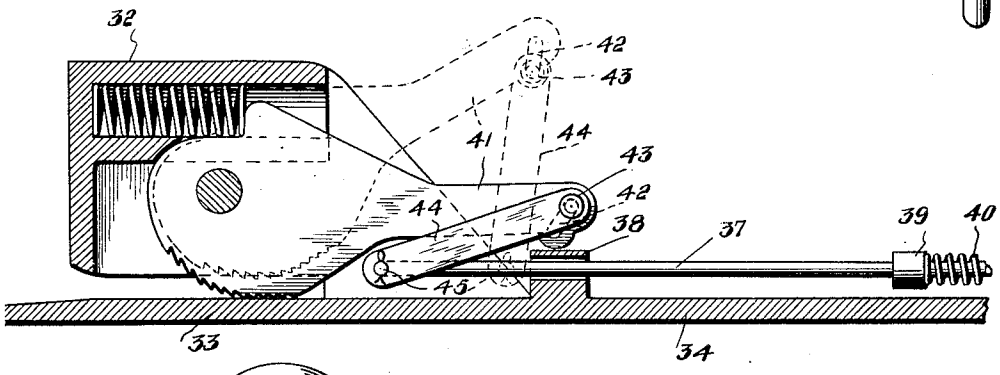
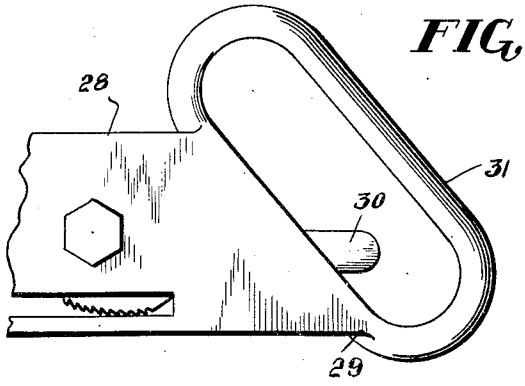


FIG. 6.



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UNITED STATES PATENT OFFICE

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SHEET METAL HANDLING TOOL

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Application June 26, 1945, Serial No. 601,623

3 Claims. (Cl. 294—104)

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This invention relates to material handling devices and pertains particularly to devices of a character to be carried in the hand for gripping and handling certain types of material.

In the handling of sheet metal particularly where such material is piled in stacks, considerable difficulty is experienced in lifting and removing the individual sheets from the stack and this operation is also attended by considerable danger to the workman as severely cut hands frequently result even though such sheets are handled with heavy gloves. At the present time a general practice is for the workman to separate the top sheet by the use of a screw-driver or similar implement so that the edge of the sheet may be grasped by the hand or use may be made of pliers to grip the sheet but this procedure is slow and may also result in damaging the metal sheet.

The present invention has for its primary object to provide a novel conveniently handled device by which a workman may easily and quickly raise the edge of a top sheet of sheet metal from a stack and simultaneously engage the edge of the sheet in a gripper of which a handle forms a part and which the workman grasps thereby making it possible for the workman to raise the edge of the sheet and secure a hold upon it without having to touch the sheet with his hands.

Another object of the invention is to provide a device having a camming gripper associated with a separating blade whereby when such blade is slipped under a metal sheet, the sheet will slide under the camming gripper between the gripper and the blade and will be securely held so that the sheet may be lifted and carried easily and without danger to the workman or possibility of damaging the sheet.

Another object is to provide a device for handling metal sheets, metal cylinders or other bodies of sheet metal, which may be constructed to have the handle portion disposed in any one of several different positions depending upon the character of the material being handled, and so designed that it may be made strong and durable without at the same time having excessive weight or size.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawing forming a part of the specification, with the understanding, however, that the invention may be changed or modified so long as such changes or modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

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In the drawings:

Figure 1 is a view in side elevation of an embodiment of a tool constructed in accordance with the present invention.

Figure 2 is a view in top plan of the tool.

Figure 3 is a sectional view taken substantially on the line 3—3 of Figure 2.

Figure 4 is a sectional view taken on the line 4—4 of Figure 1.

Figure 5 is a sectional view taken substantially on the line 5—5 of Figure 3.

Figure 6 is a view in side elevation of the rear portion of another embodiment of the tool.

Figure 7 is a view in side elevation of still another embodiment of the tool.

Figure 8 is a view in top plan of the embodiment of Figure 7.

Figure 9 is a view in longitudinal section on an enlarged scale through a portion of the structure of Figure 7.

Referring now more particularly to the drawings wherein like numerals of reference designate corresponding parts throughout the several views the numeral 10 generally designates the body of the sheet metal gripping and handling tool. This body is in the form of a box or housing, having the spaced side walls 11, the front wall 12 and the bottom wall 13.

The top wall of the housing may be transversely rounded as indicated at 14 or formed in any other suitable manner and within the housing means is provided, in the form of the longitudinally extending metal bodies or strips 15 carried by the opposite side walls 11, for cooperation with the top wall 14 to form a longitudinally extending cylindrical chamber 16 in which is housed a compression spring 17. The parts 15 which combine to form the lower part of the spring cylinder, are spaced apart upon the longitudinal center of the housing to form a jaw guide 18.

The side walls 11 of the housing are preferably of greater length at the lower or bottom edges than at the top so that the body of the tool tapers off toward the rear end.

Secured to the rear end of the bottom wall 13 and to the adjacent portions of the side walls, is the hand grip 19 which is here shown as being in the form of a ring or loop through which the fingers of the hand may be passed so that a firm grip can be maintained upon the tool.

The bottom wall 13 is extended a substantial distance beyond the front end or front wall 12 of the housing and is gradually reduced in thick-

ness and also slightly reduced in width to form the relatively sharp blade 20 designed for easy introduction or insertion between two steel sheets of a stack of sheet metal material.

The front and side walls 12 and 11 respectively are cut out along a plane paralleling the blade and in the plane of the top surface of the blade to form the slot 21. This slot extends through the major extent of the length of the housing 10 as shown and is of the necessary width to receive sheet metal of the thickness or gage which the tool is designed to handle.

Extending transversely through the housing, through the side walls 11, is a pivot pin or bolt 22 and disposed within the housing and having the pivot bolt 22 passing therethrough, is a jaw 23 which has the eccentric toothed camming edge or face 24 which, upon oscillation of the jaw upon the pivot bolt, moves into close proximity to or contact with, and away from, the top surface of the bottom wall 13 in the area covered by the metal plate extended into the slot 21 as shown in Figure 3. In other words, the pivot 22 is so positioned that the eccentric face 24 of the clamping jaw will be disposed forwardly of the closed or rear end of the slot 21 so that any sheet of material introduced into the slot will be frictionally engaged between the top surface of the blade or, in other words, the top of the wall 13, and the toothed edge face of the jaw.

The rear end of the housing is open and the jaw 23 has formed integral therewith the actuating arm 25 which extends through the open rear end portion of the housing to a position relative to the handle 19, where it may be readily engaged by the user of the tool to affect desired oscillation of the jaw.

As shown in Figure 3, the portion of the jaw lying above the opening 26, through which the pivot bolt 22 passes, extendings into the spring guide 16 and the portion extending into the guide is formed to provide a stop shoulder 27 against which one end of the spring 17 bears. This stop shoulder faces the front end of the tool and the spring is interposed between the shoulder and the front wall 12 so that the action of the spring is to oscillate the gripping jaw in a direction to move the jaw face 24 toward or in contact with the opposing bottom wall 13.

From the foregoing it will be readily apparent that since the jaw face is normally in contact with the inner surface of the bottom wall 13 which constitutes a fixed jaw, when the point of the blade 20 is introduced between a metal sheet lying upon the top of a stack, and the next underlying sheet, the edge of such top sheet will be forced into the slot 21 between the fixed and movable jaws and will be immediately engaged and held against withdrawal from the slot. The user of the tool may then readily lift the sheet or slide it from the stack and where large sheets are employed requiring the services of two handlers, one at each of opposite sides of the large sheet, such sheet may be easily picked up by the handlers, through the medium of the gripping tools, and shifted to the desired new location.

While there has been illustrated an embodiment of the invention wherein the handle loop 19 is disposed transversely of the tool in the plane of the blade 20 it will be readily apparent that this handle loop may be disposed perpendicular to such plane if desired or it may be disposed as shown in Figure 6 to extend obliquely of the length of the blade in a plane perpendicular to the top surface of the blade so that one side of the loop may enter the top of the housing as indicated at 28 while the lower part of the loop, as indicated at 29, may enter the lower tapered end portion of the housing. In this form of construction the lever portion of the jaw, here designated 30, extends into the handle loop, such handle loop being designated 31, so that the actuation of the jaw may be conveniently made by the use of a finger of the hand grasping the handle.

A heavier model of the tool may be provided for handling the heavier gage sheet metal or sheet steel wherein, as shown in Figures 7 to 9, the rear portion of the jaw housing, designated 32, has formed as an integral extension of the bottom wall 33, the relatively long rearwardly extending arm 34 which at its rear end joins the transversely extending handle 35. Adjacent to the handle 35 there is pivotally mounted the jaw control lever or handle 36 which is joined to the actuating or pull rod 37, which is mounted upon the arm 34 and retained in position thereon by the guides 38.

Adjacent to one of the guides 38 the rod carries the collar 39 between which and the adjacent guide is a spring 40 which normally urges the rod to move toward the jaw housing 32. The oscillatable jaw which is pivotally mounted in the housing 32 and which, like the jaw 23, has a rearwardly extending arm here designated 41, is provided with a pivot pin slot 42, adjacent to its free end, in which is engaged the pin 43 which is carried at one end of a coupling link 44. The other end of this link extends forwardly into the housing, under the arm 41, when the jaw has been oscillated into close proximity with the fixed jaw portion 33, and is pivotally attached as at 45, to the forward end of the actuating rod 37.

The slot 42 allows for the necessary lost motion of the jaw to permit a sheet of material to be slipped in between the gripping edge or face of the jaw and the fixed jaw and blade forming portion 33 and when it is desired to oscillate the jaw positively in order to release a sheet of material, the spring restrained rod 37 is pulled rearwardly toward the handle 35 thereby straightening out the link 44 to a position where it is substantially perpendicular to the arm 34 and accordingly oscillating the jaw to the necessary extent to open the tool.

The oscillatory movement of the jaw may be controlled or limited by arranging the top edge wall of the housing so that the arm 41 will strike the rear end of such wall although this construction is not essential.

From the foregoing it will be readily apparent that the tool of the present invention provides a simple, easily handled and safe means of lifting and transporting sheet metal material, by means of which the handlers of such material are enabled to perform their duties more quickly and with greater ease than heretofore and without the hazards attendant upon the handling of such sheets by the present methods.

I claim:

1. A sheet material handling tool, comprising a body having a handle arm integral therewith, a fixed gripping jaw forming a part of said body, a movable jaw eccentrically pivotally supported upon the body for movement relative to the fixed jaw, a blade element forming a fixed extension of the fixed jaw and adapted to facilitate the raising of an edge of a sheet of material and its insertion into position between the jaws, an arm forming an integral extension of the movable

jaw, spring means normally urging oscillation of the movable jaw into gripping relation with the fixed jaw, a reciprocable rod supported upon the handle arm, a link connection between an end of the reciprocable rod and the movable jaw arm, and spring means operatively coupled between the rod and the handle arm and urging movement of the rod in a direction to cooperate with the action of the first spring in urging the movable jaw into gripping relation with the fixed jaw.

2. A sheet metal handling tool, comprising a relatively long, relatively flat housing having a longitudinal edge wall extended at one end to form a blade, the housing having a slot formed longitudinally thereof from the end from which the blade extends, through a portion of the length of the housing and in the plane of the top side of the extended wall, to receive an edge of a sheet of material, a handle connected with the opposite end of the housing, the said longitudinal wall constituting a fixed gripping jaw, a movable jaw supported within the housing and extending across the slot for coaction with the fixed jaw, yieldable means within the housing normally urging movement of the movable jaw toward the fixed jaw, and means connected with the movable jaw facilitating its actuation against the action of the movement urging means.

3. In a sheet metal handling tool, a sheet separating blade, a handle of elongated loop form extending crosswise of the rear end of said blade, flanges rising from opposite sides of the rear end portion of said blade and having their rear end edges upwardly and forwardly angled, a wall

connecting the top edges of said flanges forwardly of the angled rear ends thereof, a second wall connecting the front end edges of said flanges and said top wall, the lower edges of the forward portions of said flanges and the like edge of said second wall being spaced above the underlying portion of said blade to receive an edge portion of a sheet therebetween, a cam element pivoted between said flanges below the first wall, serrations formed along the working surface of said cam element, an actuating handle extending rearwardly from said cam and projecting outwardly from between the angled rear ends of said flanges, another wall extending inwardly from said second wall below the first wall to form a recess therebetween a lug formed on said cam element, and a coil spring seated in said recess and bearing against said lug to maintain the cam element in its sheet gripping position.

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