Nov. 9, 1943. B. SCHUBERT 2,333,892

SHEAR

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Fig. 2

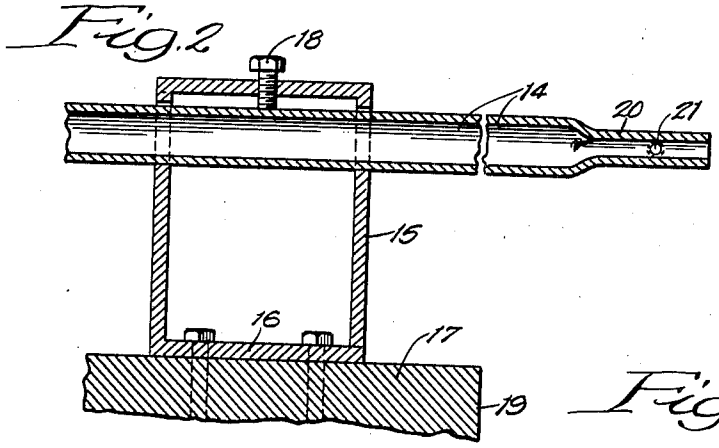


Fig. 1

Fig. 3

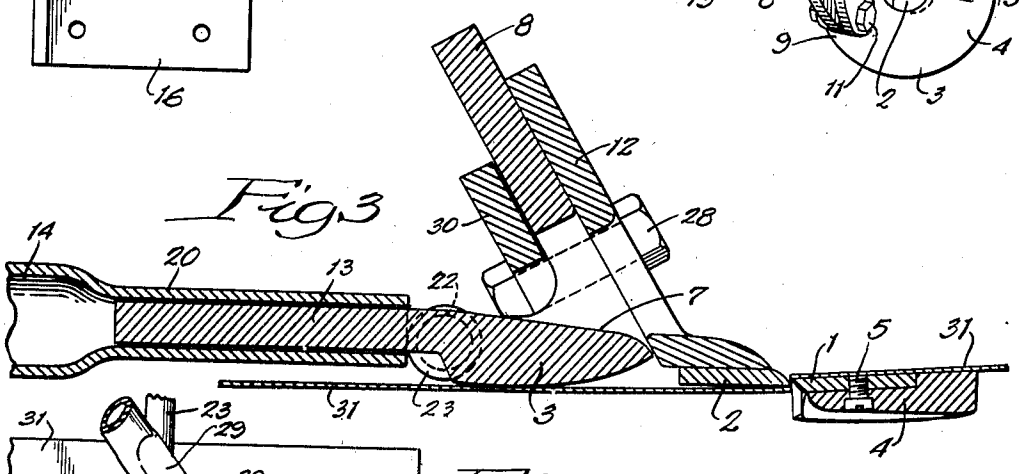
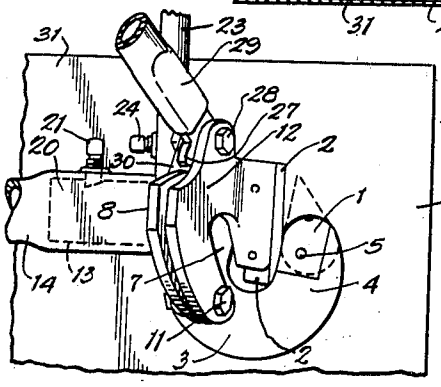


Fig. 4



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Fig. 5

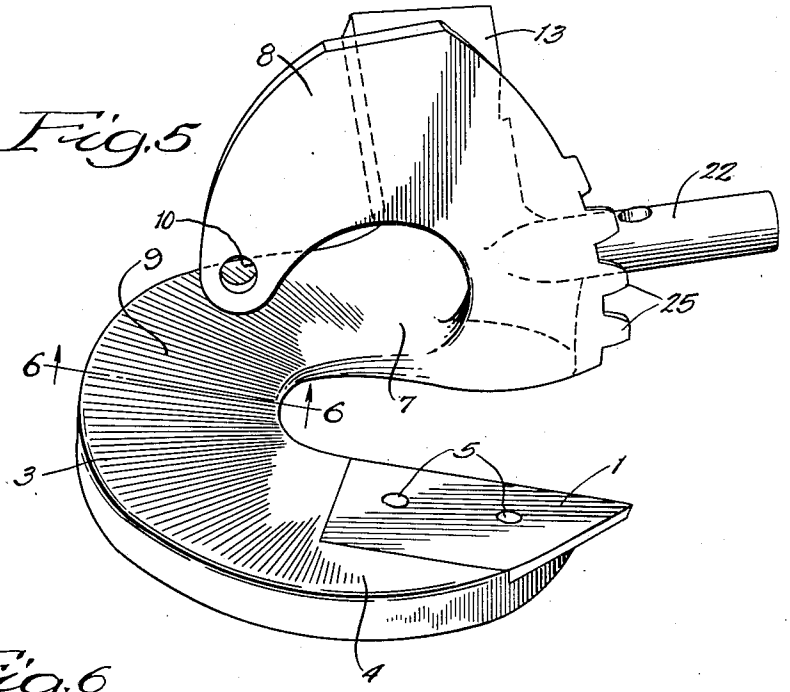


Fig. 6

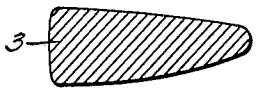
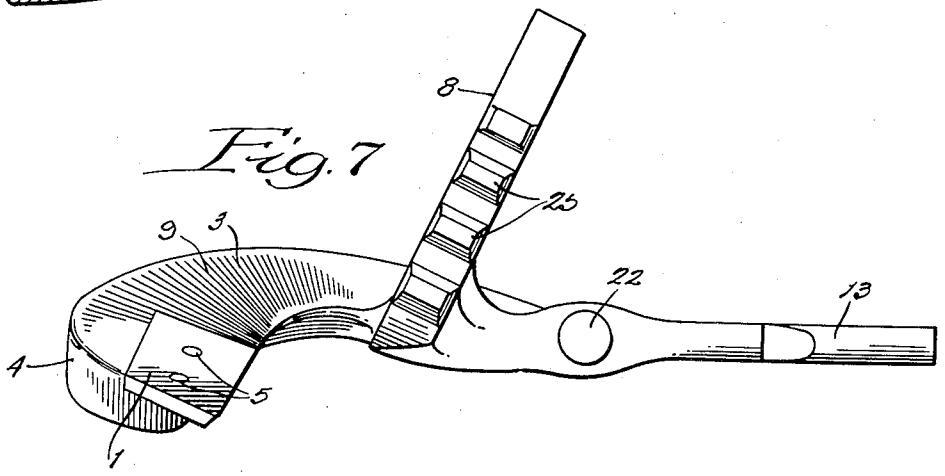


Fig. 7



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UNITED STATES PATENT OFFICE

2,333,892

SHEAR

Baltasar Schubert, Chicago, Ill.

Application April 24, 1942, Serial No. 440,311

5 Claims. (Cl. 164—41)

This invention relates to shears for cutting metal and other sheet materials and particularly such as are capable of cutting along curved lines by swinging the shear or the work as the operation proceeds.

The main objects of this invention are to provide an improved form of a multiple-purpose shear wherein the cutting blades are of such form and so disposed as to offer a minimum of obstruction to the facility of the shear to follow curved and angular lines; to provide a shear of this kind that may be rigidly supported for convenience in the handling of light work that is fed to the shear; to provide a shear of this kind that can be readily adapted to being guided on a piece of heavy work lying on a floor or table; and to provide a shear which can be pulled along instead of being pushed during its cutting operation, thus avoiding any situation in which the point of cutting is obstructed from view of the operator.

A further object of the invention is to provide an improved form of blade-carrying arm or bed particularly adapted for making cuts within the area of a sheet without starting at a marginal edge of the sheet.

A specific embodiment of this invention is shown in the accompanying drawings in which:

Figure 1 is a top plan of a multiple-purpose shear designed for use either in a fixed location as by attachment to a work bench or as a tool that is manipulated by the hands of the operator with respect to a sheet lying on the floor.

Fig. 2 is a sectional detail taken on the line 2—2 of Fig. 1, showing an appropriate structure for a bracket for mounting the device on a workbench.

Fig. 3 is a section taken on the line 3—3 of Fig. 1.

Fig. 4 is a top view showing the shear in relation to a sheet of metal in which the cutting operation is commenced by inserting the nose of the lower shear blade through a small hole in the sheet remote from the marginal edges thereof.

Fig. 5 is a perspective view of the member that serves as a bed plate and as a supporting frame for the operating mechanism.

Fig. 6 is a section taken on the line 6—6 of Fig. 5.

Fig. 7 is an elevation of the member shown in Fig. 5 showing the same as viewed from the right of Fig. 5.

For the purpose of illustration, the design of the shear shown in the drawings is one that is appropriate for hand-power operation but it will be apparent that certain features of novelty, such as the peculiar relation of the cutting blades with respect to their supporting devices is equally applicable to the use of mechanical power.

In the form shown in the drawings, the device is designed for cutting a horizontally disposed sheet of metal and comprises a lower cutter blade 1 and an upper cutter blade 2 that cooperate for shearing the material. The bottom blade 1 is carried by a helicoidally warped U-shaped bed member 3 which has a free side arm 4 that is tapered to a point and recessed to receive the lower hard steel blade 1 which is fastened by machine screws 5. The fixed or body side arm 7 of this U-shaped bed is rigidly and integrally connected to an upwardly and rearwardly curved gooseneck frame 8 which overhangs the bosom portion 9 of the U-shaped bed 3 and is apertured at 10 to receive the fulcrum bolt 11 on which is mounted the lever 12 that carries the upper cutter blade 2. This lever is of U-shape to provide a depending tongue 12.1 for supporting the blade and to conform with the inside vertical contour of the gooseneck 8 so as to permit of maximum sweep of the sheet over the bed 3 and blade 2.

The novel helicoidally warped upper surface of the bed member 3 and the wedge-like sectional contour of this bed which tapers inwardly to a thin edge at the inner margin of the throat defined by the U-shaped contour of the bed, as well as the complete freedom of the pointed free arm 4 of the U-shaped bed from any obstruction either above or below the bed, has greatly enhanced the extent of permissible relative turning of the sheet that is being worked upon with respect to the cutting edges of the blades. Likewise, the tilting of the gooseneck and of the axis of the fulcrum bolt 11 so that the cut is made at an angle to the plane of the upper surface of the lower blade 1 also contributes substantially to the same end.

The bed member 3 is provided with a horizontally extending lug 13 which is located remote from the cutter blade 1 and on the other side arm of the U-shaped bed adjacent the base of the gooseneck. This lug 13 provides a means for rigidly mounting the device at the end of a beam or arm 14 which is horizontally disposed and rigidly attached to a bracket 15 provided with flanges 16, which may be bolted to a bench or other rigid structure 17.

A set screw 18 locks the arm 14 in any desired position of adjustment with respect to the front edge 19 of the bench. The arm 14 may be provided with a socket 20 for receiving the lug 13

and a set screw 21 for locking the lug in the socket.

The bed member 3 is also provided with a second lug 22 to which is attached a lever arm 23 which is similarly socketed and provided with a set screw 24 for securing it to its lug.

In the form shown the gooseneck or frame arm 8 is provided with a sector of gear teeth 25 disposed in an arc concentric with the fulcrum apertures 10 and shaped to mesh with a pinion sector 27 that is journaled on a bolt 28 carried by the lever 12. The pinion 27 is rigidly mounted on a lever arm 29 which provides the power for this hand-operated tool.

A link 30 connects the bolts 11 and 28 on the side of the gooseneck 8 that is away from the lever 12 and thus balances the strain on the bolts 11 and 28.

In operation, when the device is mounted on a bench by means of the bracket 15 and arm 14, it is located a considerable distance away from the bench and thus affords great freedom of movement in manipulating a large sheet of material during the cutting operation. Such a sheet of material is shown at 31 in Figs. 3 and 4 and it will be seen that this location permits great freedom of manipulating the material as does also the fact, as is illustrated in Fig. 3, that none of the supporting framework interferes with the free passage of the work sheet 31 through a wide area below the bed plate 3.

When it is desired to work upon heavier sheets than can conveniently be manipulated by the operator in the elevated position of the device when it is connected with the work bench, the shear can be removed from the beam 14 by releasing the set screw 21 and withdrawing the lug 13 and then handling and operating the device as an ordinary hand shear by means of the lever arms 23 and 29.

There is considerable advantage in the manipulation of the tool through the fact that the lever arms 23 and 29 extend forwardly from the cutter blades instead of rearwardly as is customary with shears. This enables the operator to guide the tool by pulling it along by means of the handles 23 and 29 instead of thrusting it along and enables him to clearly see the cutting edge of the upper blade 2 for accurate guiding thereof when cutting along guide lines on the material. By reason of this better visibility, it is possible to employ longer handle arms 23 and 29 and use hand power on heavier material.

When the device is mounted on the work bench, as shown in Fig. 1, the handle 23 is unnecessary and may be removed if it is found to interfere with the work.

One of the principal advantages of this construction is the possibility of inserting one blade into a hole punched in the sheet and cutting along any desired path; thus making it possible to cut holes of any shape in the sheet without having the cuts run to the margin of the sheet which is necessary if inside holes are to be cut by a shear of usual form.

Although but one specific embodiment of the invention is herein shown and described, it will be understood that numerous details of the device shown may be altered or omitted without departing from the spirit of the invention as defined by the following claims.

I claim:

1. A shear comprising upper and lower cutter blades, a horizontally disposed U-shaped bed having one side arm carrying said lower blade, a lever carrying said upper blade, an upwardly and rearwardly arched gooseneck frame member rigid on the other side arm of said bed and carrying a fulcrum for said lever located above and rearward of said blades, and an arm for supporting said bed located on the side arm of said bed that is remote from the side arm that carries said lower blade, said bed supporting arm extending away from said bed in a location generally above the level of the bottom of said bed, whereby no part of the shear is positioned to interfere with the free movement beneath said bed of work material acted upon by said shear.

2. A shear comprising upper and lower cutter blades, a horizontally disposed U-shaped bed having one side arm carrying said lower blade, a lever carrying said upper blade, an upwardly and rearwardly arched gooseneck frame member rigid on the other side arm of said bed and carrying a fulcrum for said lever located above and rearward of said blades, and an arm for supporting said bed located on the side arm of said bed that is remote from said lower blade, said supporting arm extending horizontally away from said bed in a location generally above the level of the bottom of said bed, whereby no part of the shear is positioned to interfere with the free movement beneath said bed of work material acted upon by said shear.

3. A shear comprising upper and lower cutter blades, a U-shaped bed carrying said lower blade, a lever carrying said upper blade and fulcrumed above the bosom of said U-shaped bed, a gooseneck rigid on said bed at a point remote from its blade carrying arm and providing a support for said fulcrum, an operating handle associated with said lever, and a handle rigidly fixed on the side arm of the bed that is remote from its blade-carrying arm, said fixed handle extending generally horizontally from said bed.

4. A shear comprising upper and lower cutter blades, a U-shaped bed carrying said lower blade on one arm of the U, a lever carrying said upper blade and fulcrumed above the bosom of said U-shaped bed, a gooseneck rigid on the other arm of the U of said bed at a point remote from said lower blade and providing a support for said fulcrum, and means providing a pair of cooperating handles respectively associated with said lever and the arm of said bed that is remote from the arm that carries said lower blade, said handles both extending in the general direction that said blades extend away from the bosom part of said U-shaped bed, whereby the blades may be guided in their cutting operation by pulling on said handles.

5. A shear comprising upper and lower cutter blades, a U-shaped bed having one side arm carrying said lower blade, a lever carrying said upper blade and fulcrumed above the bosom of said U-shaped bed, a gooseneck rigid on said bed at a point remote from said bosom and from the side arm of the bed that carries said lower blade and providing a support for said fulcrum overhanging the bosom portion of said bed, and a supporting arm rigid on said bed at a point adjacent said gooseneck and remote from the lower blade carrying side arm and providing the sole support for said bed, said supporting arm being located and shaped to extend generally above the bottom of said bed to provide a substantially unobstructed path for movement of a sheet of work material from the cutter blades across and beyond the bottom of said bed on all sides of the bed.

BALTASAR SCHUBERT.