Sept. 1, 1953 H. D. PAXSON 2,650,637

APPARATUS FOR STRAIGHTENING SHEET METAL

Filed Aug. 2, 1950 2 Sheets-Sheet 1

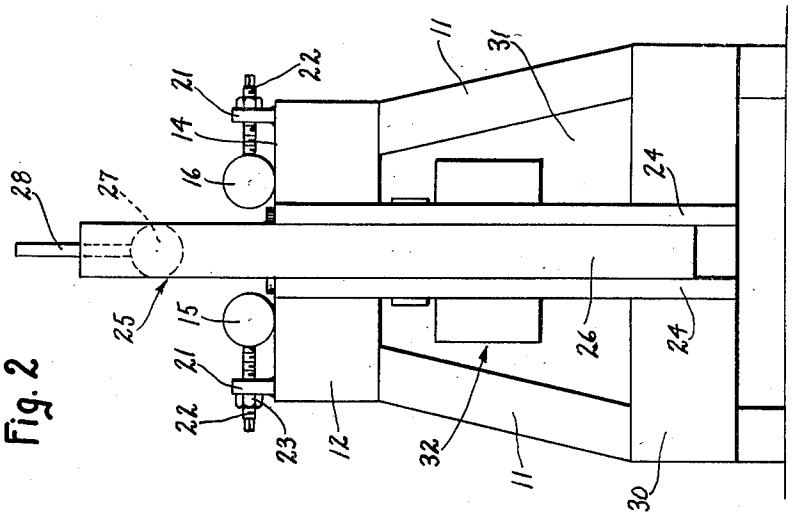


Fig. 2

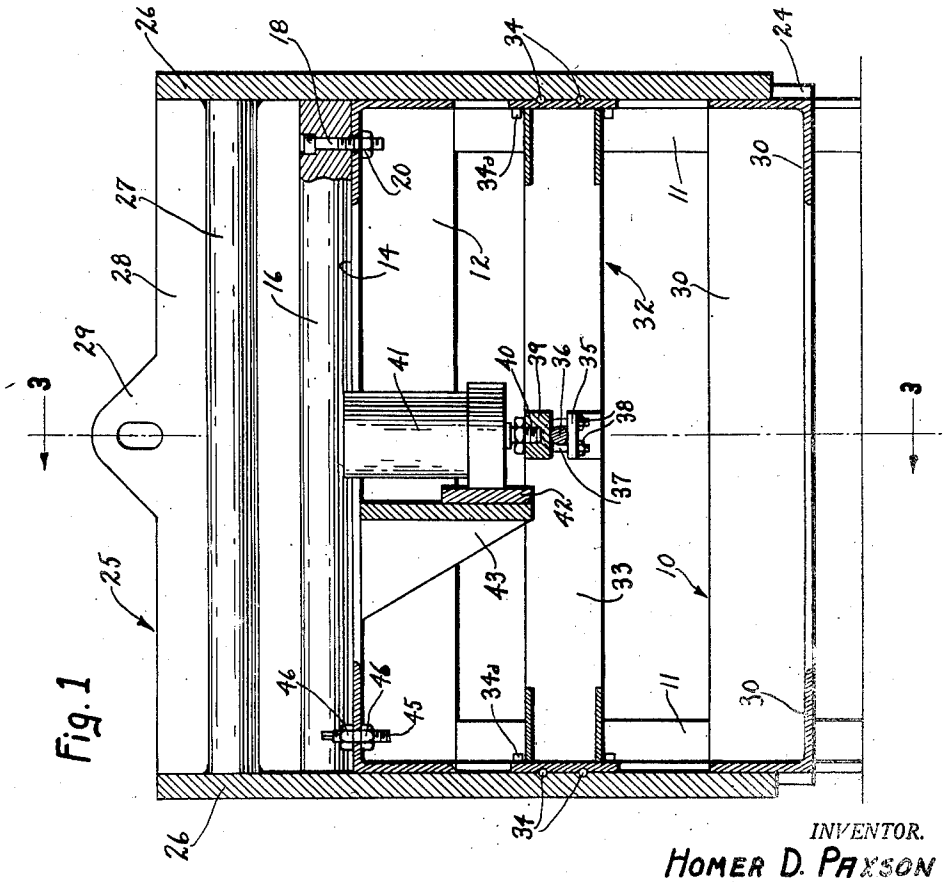


Fig. 1

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APPARATUS FOR STRAIGHTENING SHEET METAL

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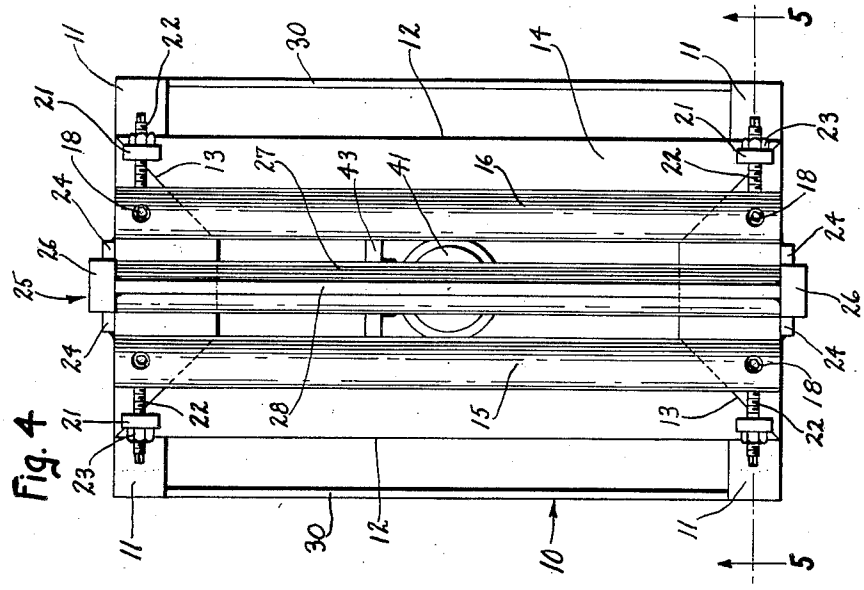


Fig. 4

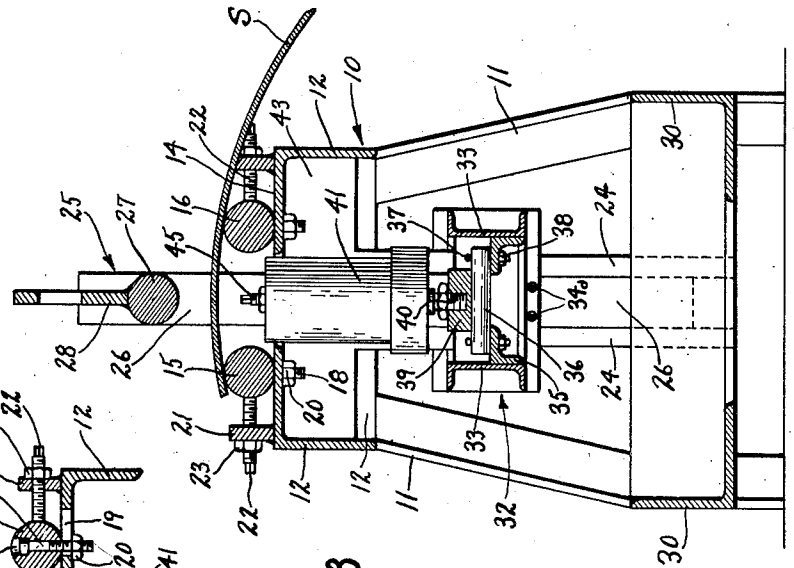


Fig. 3

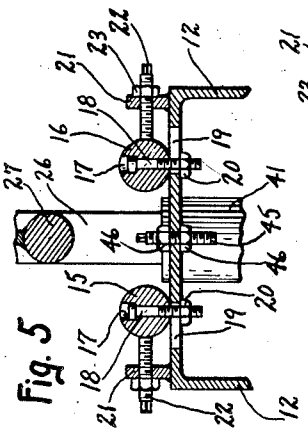


Fig. 5

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Patented Sept. 1, 1953

2,650,637

UNITED STATES PATENT OFFICE

2,650,637

APPARATUS FOR STRAIGHTENING SHEET METAL

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Application August 2, 1950, Serial No. 177,186

3 Claims. (Cl. 153—48)

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My invention relates to apparatus for straightening sheet metal and the principal object of my invention is to provide new and improved apparatus of this character.

Particularly in the use of coiled sheet metal, it is often difficult to effect proper disposition of the starting end of sheet metal with respect to a processing machine, such as a slitter, leveller, rolling apparatus and the like, and frequently such curved starting end was straightened by hand with a sledge. Such practice, it will be appreciated required the time of workmen and therefore was expensive.

My invention provides apparatus which effectively straightens sheet metal and is particularly useful in straightening the starting end of a coil of sheet metal. When used to straighten the starting end of a coil, the apparatus may be left in position after the straightening operation without affecting feed of sheet from the coil, or it may be easily and readily removed to a position away from the coil.

In the drawings accompanying this specification and forming a part of this application, there is shown, for purposes of illustration, an embodiment which my invention may assume, and in these drawings:

Figure 1 is a central longitudinal sectional view taken through apparatus embodying my invention, parts being shown in elevation.

Figure 2 is an end elevational view of the apparatus shown in Figure 1,

Figure 3 is a transverse sectional view corresponding generally to the line 3—3 of Figure 1,

Figure 4 is a top plan view of the apparatus, and

Figure 5 is a fragmentary sectional view corresponding generally to the line 5—5 of Figure 4.

Referring to the drawings, the embodiment herein disclosed comprises a supporting frame 10 which may be of any suitable construction. As herein shown, the frame 10 comprises four legs 11 which are tied together at their top ends by means of longitudinally and transversely extending angles 12 which are preferably welded to the legs 11 and welded to each other along miter joints 13. The upper flanges of the angles form a supporting surface 14.

Mounted on the supporting surface are two elongated bars 15 and 16 which preferably have rounded surfaces directed upwardly for engagement with the under side of a sheet S. For all practical purposes, the bars 15 and 16 may be round in cross-section. Each end of each bar is formed with a counter-bored transverse aperture

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17 for receiving a bolt 18 (see especially Figure 5). Each of the bolts 18 passes through a respective elongated slot 19 formed in the supporting surface 14, a nut 20 being applied to each bolt 18 for the purpose of holding the bars 15 and 16 in selected adjusted position in a direction toward and away from each other.

Ears 21 may be welded to the supporting surface 14 in position adjoining the ends of the bars 15 and 16, each ear receiving a screw 22 which is adapted to back-up a respective end of a bar. A lock nut 23 may be threaded on each screw 22 for the purpose of holding such screw in adjusted position.

Opposite ends of the frame 10 are provided with spaced-apart gibs 24 which provide guides for slide means 25. The slide means comprises a pair of upright members 26, each slidably arranged within gibs 24 at respective ends of the frame 10. The upper ends of the members 26 are tied together by a transversely extending bar 27 which, as herein shown, has opposite ends welded to respective members 26. The bar 27 preferably has a rounded surface directed downwardly for engagement with the upper side of the sheet S. For all practical purposes, the bar 27 may be of round cross-section as shown. A web 28 is connected, preferably by welding, to the upper surface of the bar 27 and to the adjoining surfaces of the members 26 to strengthen the slide means at the upper end. An apertured tab 29 may be provided at the midpoint of the web 28 for the purpose of providing ready engagement with the hook of a hoisting mechanism.

The lower ends of the legs 11 of the frame 10 are tied together by angles 30, and intermediate the angles 12 and 30 a space 31 is provided whereby the lower ends of the members 26 may be tied together so that the slide means may be moved upward or downward in the gibs 24 without having interfering engagement with the frame 10.

As herein shown, a box-like fabricated structure 32 is employed to tie together the lower ends of the members 26, such structure including a pair of spaced-apart channels 33 (see Figure 3). The fabricated structure 32 has removable connection with respective members 26, such connection being herein shown as accomplished by means of dowel-like keys 34 and cap screws 34a.

Inwardly directed angles 35 (see Figure 3) are welded to respective channels 33, such angles forming a ledge support for a cross-rod 36. U-bolts 37 encircle the ends of the rod 36 and are secured to the angles 35 by nuts 38. A block

39 is welded to the upper surface of the rod 36 and screw-threadedly receives the end of a piston rod 40 which works out of a cylinder 41. The cylinder is carried by a plate 42 which is secured to a bracket 43 supported from the frame 10.

As fluid under pressure is admitted to the cylinder 41 to force the piston rod 40 outwardly, the slide means 25 is moved in a downward direction so that the bar 27 approaches the bars 15 and 16. When the piston rod 40 is moved in the opposite direction, the bar 27 will be moved away from the bars 15 and 16.

In use, my improved apparatus may easily be moved in the line of feed of the sheet S by means of a hoisting mechanism engaged with the apertured tab 29. Fluid is admitted to the cylinder 41 to move the bar 27 upwardly and away from the bars 15 and 16 to provide a gap through which the start of the sheet may be threaded and disposed as shown in Figure 3.

Fluid is then admitted to the cylinder to force the slide means 25 downwardly. Such action causes the bar 27 to move downwardly and between the bars 15 and 16, downward movement being sufficient to flex the portion of the sheet between the bars 15 and 16 to effect a straightening condition in such portion of the sheet. If necessary, the bar 27 may be brought down on successive portions of the sheet in the event the first downward operation of the bar 27 does not provide sufficient straightening. In the event that side strains are produced by an unevenness of the sheet, or for any other reason, the box-like fabricated structure 32 may rock slightly about the cross-rod 36 so that such strains are not transmitted to the piston and cylinder surfaces.

The supporting surface 14, at each end of the frame 10, carries an adjusting screw 45 backed up on either side of the surface by lock nuts 46. The screws 45 are engaged by the opposite ends of the bar 27 to limit downward movement of this bar. Thus, the screws 45 may be adjusted so as to predetermine the amount of flexing of the sheet on each downward stroke of the bar 27. Further, the bars 15 and 16 may be adjusted toward and away from each other to selectively vary the length of the sheet portion to be flexed. After straightening of the sheet has been accomplished, the bar 27 may be moved to its upward position to provide sufficient gap for the sheet to be fed therethrough during subsequent processing operation. However, if it is desired to remove the apparatus from the line of feed, this may easily be accomplished by hoisting the apparatus to a position away from the line of feed.

In view of the foregoing it will be apparent to those skilled in the art that I have accomplished at least the principal object of my invention and it will also be apparent to those skilled in the art that the embodiment herein described may be variously changed and modified, without departing from the spirit of the invention, and that the invention is capable of uses and had advantages not herein specifically described; hence it will be appreciated that the herein disclosed embodiment is illustrative only, and that my invention is not limited thereto.

I claim:

1. Apparatus for straightening sheet metal, comprising: a frame having an upper supporting surface; a pair of elongated bars carried by said supporting surface, said bars being in spaced-apart relation and providing spaced-apart surfaces engageable with the under side of the sheet; upright gibs of substantial length and carried by opposite ends of said frame; slide means, comprising portions having slide fit with said gibs at respective ends of said frame and portions extending upwardly beyond said supporting surface; another elongated bar secured to and in position between said upwardly extending portions and being movable through connection with said slide means between said spaced-apart bars in a direction toward and away from said spaced-apart bars, said other elongated bar being engageable with the upper side of said sheet and being movable in a direction toward said spaced-apart bars an amount sufficient to flex the sheet; fluid cylinder means, comprising a cylinder secured to said frame and a piston rod; and means providing for rockable connection between said piston rod and said slide means.

2. Apparatus for straightening sheet metal, comprising: a frame having an upper supporting surface; a pair of elongated bars carried by said supporting surface, said bars being in spaced-apart relation and providing spaced-apart surfaces engageable with the under side of the sheet; upright gibs of substantial length and carried by opposite ends of said frame; slide means, comprising portions having slide fit with said gibs at respective ends of said frame and portions extending upwardly beyond said supporting surface; another elongated bar secured to and in position between said upwardly extending portions and being movable through connection with said slide means between said spaced-apart bars in a direction toward and away from said spaced-apart bars, said other elongated bar being engageable with the upper side of said sheet and being movable in a direction toward said spaced-apart bars an amount sufficient to flex the sheet; stop means for limiting movement of said other elongated bar in a direction toward said spaced-apart bars, said stop means comprising a plurality of screw-studs directly engageable with opposite end portions of said other elongated bar; means providing for adjustment of said spaced-apart bars in a direction toward and away from each other; fluid cylinder means, comprising a cylinder secured to said frame and a piston rod; and means providing for rockable connection between said piston rod and said slide means.

3. A metal working machine comprising a frame-like structure fabricated from metal shapes and comprising supporting legs and upper and lower members connecting said legs to form a main frame having opposed sides, each side having an opening defined by adjoining legs and adjoining upper and lower members, aligned upright gibs extending outwardly of each of said sides, said gibs traversing the opening at respective sides of said frame and being secured to respective upper and lower members to increase stability of said frame, a pair of elongated members carried by said frame and extending from an upper surface thereof and being positioned on opposite sides of the alignment of said gibs, and a sub-frame movable relative to said main frame and comprising spaced slide bars, each slidably received within respective gibs and extending upwardly beyond said elongated members, a cross member extending between and secured to upper ends of said slide bars, a tie mem-

ber extending through the openings in the opposed sides of said frame and connecting said slide bars at points spaced from said cross member whereby said sub-frame reenforces said main frame, yet is movable relative thereto, and means for moving said sub-frame whereby said cross member may be moved toward and away from the space between said elongated members for operation on a work-piece supported on the latter.

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