Nov. 20, 1945. F. T. NEALE 2,389,531

SHEAR

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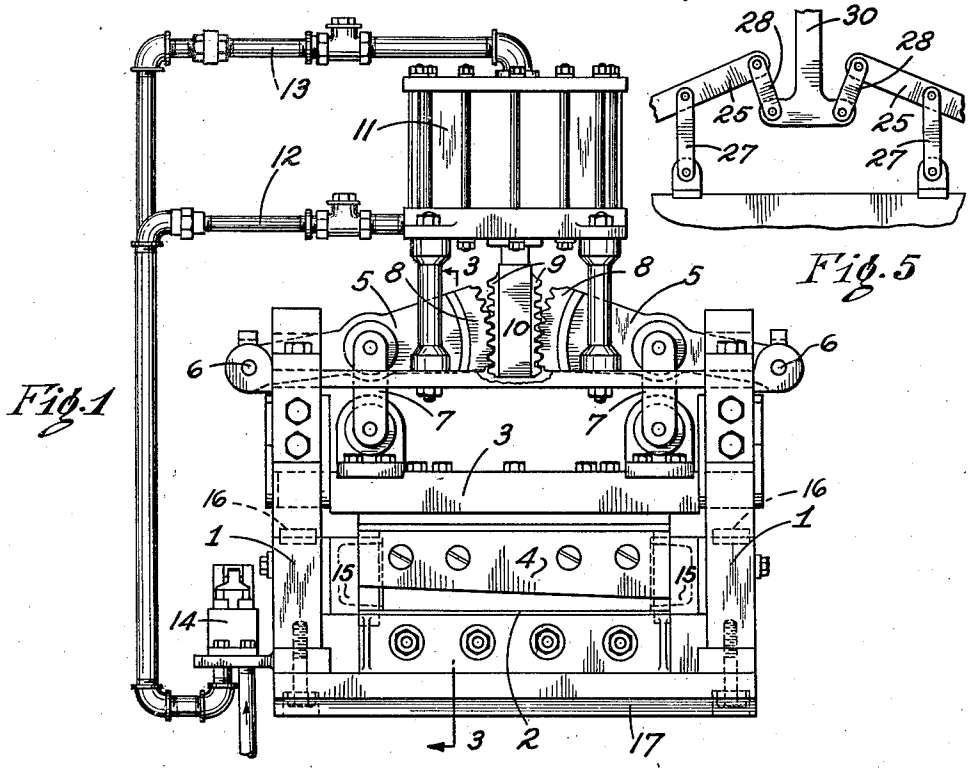


Fig. 1

Fig. 5

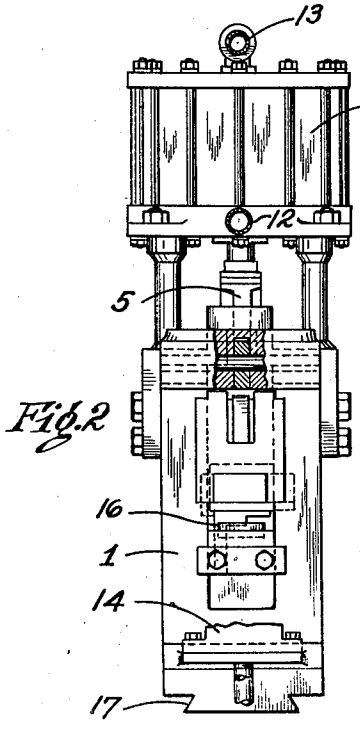


Fig. 2

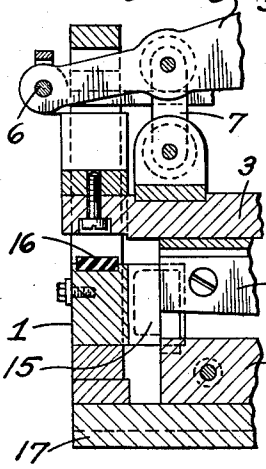


Fig. 4

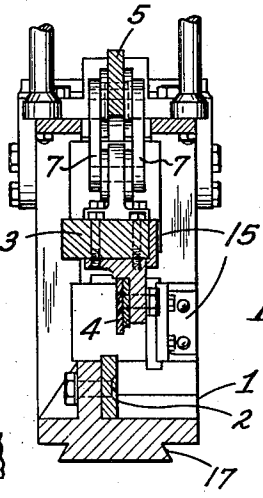


Fig. 3

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SHEAR

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Application June 15, 1944, Serial No. 540,477

6 Claims. (Cl. 164—56)

This invention relates generally to shears for cutting sheet material and the like and is particularly concerned with a shear having new and improved blade actuating means.

In the drawing accompanying and forming a part of this specification,

Figure 1 is a side elevational view, partly broken away, of one form of device embodying the present invention;

Figure 2 is an end elevational view of the apparatus in Fig. 1;

Figure 3 is a cross-sectional view taken on line 3—3 of Fig. 1;

Figure 4 is a fragmentary, vertical sectional view of parts of the frame, slide and one lever of Figs. 1 to 3; and,

Figure 5 is a fragmentary elevational view of a modified form of slide actuating mechanism embodying the present invention.

The apparatus illustrated in the figures includes a frame 1 with a stationary shear knife 2 fixed thereto, a movable slide 3 carrying a shear knife 4. Two similar levers 5 are attached at their remote ends by pivot pins 6 to frame 1 and are pivotally connected at points between their ends to slide 3 by links 7. The adjacent ends of levers 5 are provided with gear segments 8 which are simultaneously engageable with racks 9 carried by a reciprocable rod 10 which extends into an air-operated cylinder 11 and is attached to a piston (not shown) within the cylinder. Fluid pressure lines 12 and 13 lead from opposite ends of cylinder 11 to a valve 14 which serves to control the flow of fluid under pressure thru lines 12 and 13, as desired, to actuate the piston in cylinder 11 and thereby reciprocate rod 10.

The frame 1 is provided with conventional guides 15 for the movable knife 4 and with conventional bumpers 16 for the slide 3.

If desired, frame 1 may be made adjustable on a supporting foundation as by providing a dovetailed tongue 17 to cooperate with the correspondingly shaped groove in the foundation.

The operation of the above described device is substantially as follows: Assume that the parts are in the position shown in Fig. 1 and articles such as sheets of steel, paper, cardboard or the like which are to be cut are in position on lower knife 2. Valve 14 is actuated to connect pipe line 13 with a source of fluid under pressure and to open pipe line 12. The fluid pressure entering cylinder 11 thru line 13 forces the piston toward the lower end of the cylinder and moves rod 10 downwardly. As this rod moves down the racks on it progressively engage with the gear teeth on segments 8 on the levers 5 and move the adjacent ends of levers 5 downwardly, thereby pivoting the levers about their pivot pins 6. This downward movement of the levers exerts endwise thrust on links 7 and forces slide 3 downwardly and moves knife 4 thru the article to be cut. After the cutting operation has been completed, valve 14 is actuated to admit fluid under pressure thru pipe line 12 to relieve the pressure from the other end of the cylinder thru line 13. Thereupon the piston moves to the upper end of the cylinder carrying rod 10 with it and restoring levers 5 to the position shown in Fig. 1. As the levers 5 are moved to that upper position they exert endwise pull on links 7 and lift the slide 3.

Compressed air or liquid under pressure may be used as the fluid pressure means for operating the above described device and, if desired, other equivalent means may be substituted for the means above described to reciprocate rod 10.

A modified form of slide actuating mechanism is shown in Fig. 5. Levers 25, corresponding to levers 5, are similarly pivoted to frame 1 and are connected to slide 3 by links 27, corresponding to links 7. At their adjacent ends levers 25 are connected to a reciprocable rod 30, corresponding to rod 10, by downwardly converging links 28. Rod 30 may be reciprocated by the piston and cylinder apparatus of Figs. 1 to 4 or by any mechanical means capable of applying thereto the force necessary to operate the slide and shear blade.

It will be obvious to those skilled in the art that the present invention provides simple, yet quite efficient, blade-operating means for a shear and permits the use of parts which are simple to make, strong and durable in operation, and inexpensive to maintain.

Having thus described my invention so that others skilled in the art may be able to understand and practice the same, I state that what I desire to secure by Letters Patent is defined in what is claimed.

What is claimed is:

1. In a shear comprising a frame having a slideway, a shear blade in fixed position on said frame, a slide in the frame slideway and a shear blade attached to said slide, the combination of a plurality of levers pivotally connected between their ends to said slide, said levers having gear segments on their adjacent ends and being pivoted at their remote ends to said frame, a longitudinal rack engaging the gear segments on said levers, and means to reciprocate said rack and move said levers about their pivot points of at-

tachment to said frame, and thereby to reciprocate said blade carrying slide in the frame slideway.

2. In a shear comprising a frame, a shear blade in fixed position on said frame, a slide in the frame and a shear blade attached to said slide, the combination of a plurality of levers pivotally connected between their ends to said slide, said levers having gear segments on their adjacent end and being pivoted at their remote ends to said frame, a longitudinal rack engaging the gear segments on said levers, and fluid pressure means to reciprocate said rack and move said levers about their pivot points of attachment to said frame, and thereby to reciprocate said slide and its blade relative to said frame.

3. In a shear comprising a frame, a shear blade in fixed position on said frame, a slide in the frame and a shear blade attached to said slide, the combination of a plurality of levers pivotally connected between their ends to said slide, said levers having gear segments on their adjacent ends and being pivoted at their remote ends to said frame, a longitudinal rack engaging the gear segments on said levers, and fluid pressure means to reciprocate said rack and move said levers about their pivot points of attachment to said frame, and thereby to reciprocate said slide and its blade relative to its frame, said means including a cylinder, a piston therein connected to said rack, and valve means for admitting fluid under pressure into said cylinder for reciprocating the piston therein.

4. In a shear comprising a frame having a slideway, a shear blade in fixed position on said frame, a slide in the frame slideway and a shear blade attached to said slide, the combination of a pair of levers disposed above and in the plane of said slide, said levers having gear segments on their adjacent ends and being pivoted at their remote ends to said frame, links pivotally connecting the mid-portions of the levers to said slide, a longitudinal rack engaging the gear segments on said levers, and means to reciprocate said rack longitudinally downward and move said levers downwardly about their pivot points of attachment to said frame and thereby to move the slide in the slideway and its shear blade downwardly relative to said frame toward said fixed blade.

5. In a shear comprising a frame, a shear blade in fixed position on said frame, a slide in the frame and a shear blade attached to said slide, the combination of a plurality of levers pivotally connected at their remote ends to the frame and between their ends to said slide, a longitudinally reciprocable rod positioned between the adjacent ends of said levers, links connecting said rod to said lever ends, and means to reciprocate said rod and actuate said shear blade.

6. In a shear comprising a frame, a shear blade in fixed position on said frame, a slide in the frame and a shear blade attached to said slide, the combination of a plurality of levers pivotally connected at their remote ends to the frame and between their ends to said slide, a longitudinally reciprocable rod positioned between and operatively associated with the adjacent ends of said levers, and means to reciprocate said rod and move said levers about their pivot points of attachment to the frame and thereby actuate said shear blade.

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