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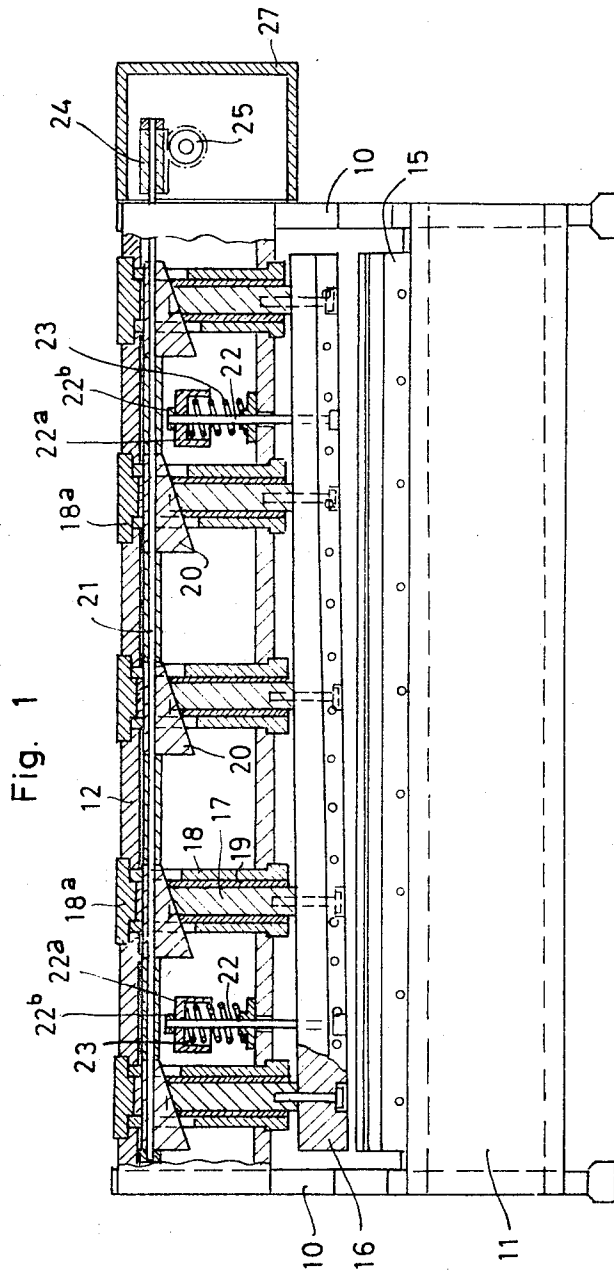
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3,269,246

RECIPROCAL CAM DRIVE FOR SHEET METAL SHEARS

Filed Jan. 7, 1965

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 2

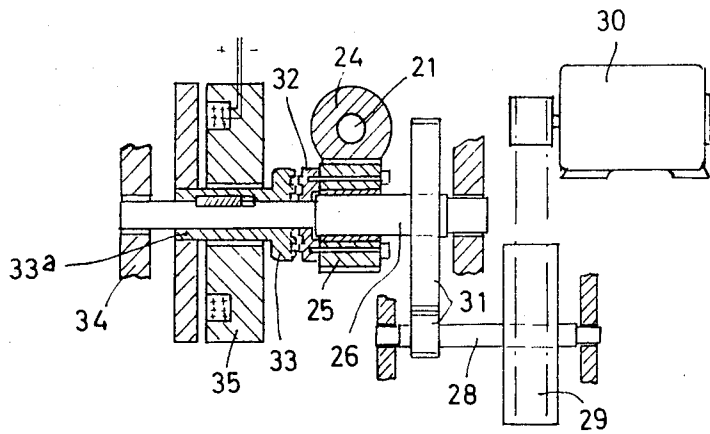
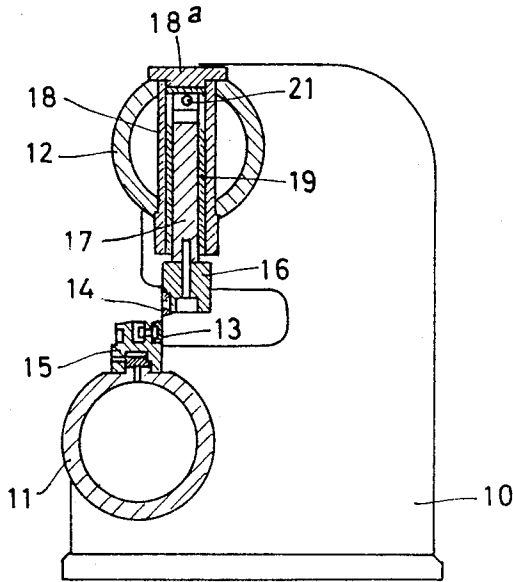


Fig. 3

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**RECIPROCAL CAM DRIVE FOR SHEET  
 METAL SHEARS**

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5 Claims. (Cl. 83—588)

The present invention relates to improvements in sheet-metal shears comprising two lateral columns interconnected by two superposed tubular struts, and two knives or blades adapted to coact for carrying out a horizontal cut and secured to blade-holder beams of which the lower one is rigidly connected to the respective strut, while the upper beam is vertically guided.

The improved shears of the above-mentioned type disclosed by my present invention are characterized in that the upper blade beam is secured to the lower ends of guide pins which are slidable in vertical guides built in the upper one of said struts and of which the upper end portions are tapered or beveled to one and the same side, and that with said beveled end portions coact sliding wedges immovably disposed on a tie rod that is in operative connection with a control assembly and during its working stroke causes said wedges to depress the upper blade beam and the blades secured thereto against the action of tension springs for the purpose of carrying out the cut.

The tubular struts between the side columns suitably are thick-walled steel pipes, in which case also the lateral columns are made of steel plates. For the shears thus may be used a welded steel frame, which affords various advantages over a cast-iron frame. A further advantage resides also in the multiple guiding of the upper blade beam over its entire length.

One form of the invention is shown in the drawing, in which:

FIG. 1 shows the shears partly in elevation and partly in vertical section;

FIG. 2 is a cross-section through the shears; and

FIG. 3 is a vertical section through a control assembly belonging to these shears.

The shears shown in FIGS. 1 and 2 comprise two lateral columns 10 that are interconnected by two superposed struts in the form of thick-walled steel pipes 11, 12. The two columns 10 in their turn are made of steel plates to which are welded the steel tubes 11 and 12. The shears thus are mounted on a steel frame of which the components are weldable to each other, which is not possible in the case of cast-iron frames.

The shears comprise, as is conventional, two knives or blades 13, 14 for carrying out horizontal cuts, which are called lower and upper blade and are secured to a beam-like blade holder 15 and 16 respectively. The lower blade 13 is secured, in a manner known per se, to the respective holder by means of a slot-and-bolt connection, and thus is adjustable. Holder 15 in its turn is connected to the lower steel pipe 11 on the upper side thereof in stationary relation, while the upper holder 16 to which the upper blade 14 is rigidly secured, is secured by means of screws to the lower ends of guide bolts 17 which are slidable in guides built in the upper steel pipe 12. Each of said guides comprises a steel sleeve 18 mounted stationary in the wall of pipe 12, which sleeve is inserted from below into pipe 12 and is closed on top by a cover 18a. The steel sleeves 18 are lined with a bronze bushing 19 in which is disposed the respective guide pin 17. The steel sleeves 18 and their bushings 19 at their upper ends are slotted along their entire length in the direction of the axis of pipe 12. The width of said slots is equal to the thickness of sliding wedges 20 which are disposed immovably on a tie rod 21. To such end the two end sliding wedges

20 are suitably secured to said rod 21, while the remaining sliding wedges are positively located by means of spacer sleeves mounted on rod 21. The carrier pins 17 at their upper ends are tapered or beveled to one and the same side. The sliding wedges 20 coact with these beveled faces, it being understood that the slide faces of the one parts and the others are inclined at angles that correspond to each other.

As shown in FIG. 1, two vertical pins 22 are secured to the end portions of the upper blade holder 16 and extend through apertures in the wall of steel pipe 12 into the latter. On each of said pins 22 is disposed a compression spring 23 of which the upper end is engaged in a cap 22a through which extends the respective pin 22; and on the projecting threaded end portion of pin 22 is screwed a nut 22b. In this way, the two compression springs 23 maintain the upper blade holder 16 in its raised position of rest that permits insertion of a metal sheet between the two blades 13 and 14.

The rod 21 is actuated from a control assembly shown in FIG. 3 and extends through one of the two side cheeks 10 of the machine frame. Rod 21 further carries on its projecting end portion a rack member 24 rigidly secured thereto that is meshing with a gear 25 loosely mounted on an auxiliary shaft 26 that extends at right angles to tie rod 21. Shaft 26 is mounted in a gear box 27 that is secured to the respective side cheek 10 of the machine frame. In box 27 also is mounted an intermediate shaft 28 that carries a flywheel 29 which is rotated from a motor 30 through a belt drive. Such rotation via a reduction gear 31 is transmitted to shaft 26 which thus is continuously rotated when motor 30 is turned on. On shaft 26 is disposed a claw clutch of which one portion 32 is secured to the respective end side of the loosely mounted gear 25, while the other portion 33 with an extended hub member 33a thereof is mounted rotatable with shaft 26 but longitudinally movable thereon. Hub portion 33a on its end portion remote from clutch member 33 carries a magnet disc 34 to which is associated a stationary annular relay magnet 35. When motor 30 is turned on and the winding of magnet 35 temporarily energized, the latter attracts disc 34, but not into contact therewith, whereby claw clutch 32, 33 is engaged. Consequently, auxiliary shaft 26 and gear 25 are rotated correspondingly. Tie rod 21 thereby is moved longitudinally towards gear box 27 to let the sliding wedges 20 act on the guide pins 17 and to depress same, together with the blade holders 16 secured thereto, against the action of the compression springs 23 for carrying out a cut. As soon as this has been done, current supply to the relay-magnet winding is interrupted again so that the two springs 23 return blade holder 16 to its upper starting position, whereby at the same time also tie rod 21 through the action of the guide pins 17 on to the sliding wedges 20 is restored to its original position. For carrying out the next-following cutting operation, the relay-magnet winding is again turned on, and the working cycle described above will be repeated.

What I claim is:

1. In metal-sheet shears comprising two side columns interconnected by tubular struts, two blades coacting for carrying out a horizontal cut, and two beamlike blade holders to which said blades are secured, the lower holder being rigidly secured to the corresponding strut and the upper one being vertically guided, the improvement comprising guide pins to the lower ends of which is secured the upper blade holder, said guide pins being disposed in vertical guides built in the upper strut and being beveled at their upper ends to one and the same side, sliding wedges adapted to coact with the beveled faces, a tie rod on which said wedges are immovably mounted, and control means in operative connection with said tie rod, the latter in the course of its working stroke

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causing said wedges through pressure on the beveled surfaces of said guide pins to depress the upper blade holder and the blade secured thereto against the action of tension springs for the purpose of carrying out the cutting operation.

2. Shears as set forth in claim 1, in which said struts are constituted by thick-walled steel pipes of which the end portions are welded to steel side cheeks.

3. Shears as set forth in claim 2, in which each of the pin guides comprises a steel sleeve provided with a bushing, said sleeve at the top and bottom being mounted in the wall of the upper tubular strut and on its upper end being provided with a slot for the passage of the respective sliding wedge.

4. Shears as set forth in claim 3, in which the upper blade holder is provided with pins extending through the adjacent steel-pipe wall-portion on which are disposed tension springs to maintain said holder in its upper starting position.

5. Shears as set forth in claim 4, in which the tie

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rod on which are arranged the sliding wedges extends through one of the machine side-walls and comprises a rack portion on its projecting end, said rack portion meshing with a gear mounted on an intermediate shaft of the control means, said gear on one of its two side faces being provided with the one half portion of an electromagnetically engageable claw clutch.

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