This invention relates to opposed side trim shears. With such shears, where the opposite sides of a plate are to be cut simultaneously, it is necessary to draw the blades of the shears away from the cut edges of the plate on the return stroke of the shear. This is referred to as backing-off of the blades.

The present invention provides a shear having a pair of blade holders adapted to carry a pair of cooperating blades, drive means for reciprocating a first of the blade holders towards and away from the other blade holder in a pivotally mounted guide to effect a shear, and a backing-off device comprising a substantially horizontal link pivotedly coupled between the guide and a part of the shear frame and having an intermediate pivot point, and mechanical means for pivoting the link at its intermediate point at the end of the cutting stroke. The horizontal linkage is held in a fixed position during the cutting stroke of the shear. By this means, during the cutting stroke the movable blade travels in a perfectly straight vertical line, and when the linkage pivots at the end of the cutting stroke the withdrawal away from the plate is rapid.

Preferably the backing-off device comprises a linkage including a first substantially horizontal link having one end pivotally coupled to the guide and the other end pivotally coupled to one end of a second substantially horizontal link which has its other end pivotally coupled to the shear frame, and means coupled between the blade drive and the pivot between the links, movable relative to the links during the cutting stroke and arranged to engage the links at the end of the cutting stroke to displace the centre pivot point.

Material to be cut is preferably fed to the pair of opposed side shears on an entry roller table and removed from the shears on an exit roll table. Another aspect of the invention provides that the entry and exit roller tables are line shaft driven, the entry table having an automatic control for the drive to meter material into the shear.
On each side of the shear is located a mechanical back-off device in the form of a toggle mechanism, only one of which will be described, best seen in FIGURE 3. A horizontal link 57 has one end 58 connected to the guide 37 for pivotal movement about a horizontal axis 60, and has its other end 61 pivotally mounted on a pin 62 having a horizontal axis 63; a second horizontal link 64 has one end 65 pivotally carried on the pin 62 and its other end 66 pivotally mounted on a pin 67 having a horizontal axis 68, the pin 67 being an eccentric on the end of a shaft mounted for rotation in the frame 31. By shifting the position of axis 68, the horizontal separation of blades 34 and 35 can be adjusted. A motor is connected to the shaft carrying the pin 67 to automatically fit the eccentric to a position corresponding to a predetermined blade separation. Also coupled to the pin 62 is a toggle 70 carried on the piston rod 71 of a cylinder 72 pivotally mounted on a pin 73 fixed to the frame 31. The piston and cylinder assembly 72 is pressurized to apply a downward bias to the links 57 and 64, maintaining them in their substantially horizontal position by means of a stop 69 under the toggle 70. The piston rod 71 passes through a clearance hole in the stop 69, which is fixed to the frame 31. A link 74 has its upper end 75 pivotally mounted on a pin 76 eccentrically carried on the end of the crank shaft 46, and its lower end 77 is formed with a slot 78 in which the pin 62 is received. The slot 78 is arranged so that during the downward stroke of the blade the link 74 moves in such a way that no force is exerted on the pin 62 and therefore there is no movement of the links 57 and 64. At the end of the cutting stroke, the bottom end 80 of the slot 78 contacts the bottom of the pin 62. On further rotation of the shaft 46, the link 74 lifts the pin 62 against the pressure of the cylinder 72, thereby causing the links 57 and 64 to pivot. Since the end 66 of link 64 is fixed, the end 58 of link 57 is drawn towards the shear, thus pulling the lower end of the guide towards the frame 31. Since the guide 37 is pivoted at axis 40, the guide 37 rotates, and the blade 35 carried in the blade holder 36 is drawn away from the sheared edge; this back-off of the blade away from the sheared edge being extremely rapid.

On further rotation of the shaft 46, the pin 62 reaches the top of its lift, and thereafter the pin 62 is returned to its original position by the cylinder 72 being controlled by link 74. When the toggle 70 is lowered on to the stop 69, the links 57 and 64 are again substantially straight, and the cutting stroke then begins.

A heel blade 81 cuts each sheared piece of plate off, and allows the scrap to fall onto the conveyor 30.

In accordance with the provisions of the patent statutes, we have explained the principle and operation of our invention and have illustrated and described what we consider to represent the best embodiment thereof. However, we desire to have it understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

What is claimed is:

1. A shear including a frame and a pair of blade holders adapted to carry a pair of cooperating blades, a guide for carrying said first blade holder in a manner to permit relative movement therebetween, means supported by said frame for carrying said guide in a manner to restrict movement of the guide to only a pivotal movement and in a direction towards and away from the sheared edge of the material,

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4. Drive means for reciprocating said first blade holder towards and away from the other blade holder to effect a shear;

a back-off device comprising a substantially horizontal linkage pivotally coupled between the guide and a part of the shear frame and having an intermediate pivot point, and mechanical means for pivoting the linkage at its intermediate point at the end of the shearing stroke.

2. A shear having a frame which receives a pair of blade holders adapted to carry a pair of cooperating blades;

a drive means for reciprocating a first of the blade holders towards and away from the other blade holder to urge a pivotally mounted guide to effect a shear;

a back-off device comprising a substantially horizontal linkage pivotally coupled between the guide and a part of the shear frame and having an intermediate pivot point; and mechanical means including a further link coupled between the linkage and the drive means and arranged to move freely relative to the linkage during the cutting stroke to displace the intermediate pivot point.

3. A shear according to claim 2 in which the further link is connected to the linkage by a pin and slot coupling.

A shear according to claim 2 in which the drive means includes a shaft to which the first blade holder is eccentrically connected, and the further link is also eccentrically connected to the shaft.

5. A shear according to claim 2 including retaining means for holding the linkage horizontal during the cutting stroke.

6. A shear according to claim 5 in which the retaining means are hydraulic and act, in the opposite direction to the action of the mechanical means on the linkage to urge the intermediate point of the linkage against a stop.

7. A shear according to claim 2 in which the linkage is arranged to maintain a blade in the first blade holder substantially vertical during the whole cutting stroke.

8. A shear according to claim 2 in which the pivotal coupling between the linkage and the part of the shear frame is adjustable to vary the horizontal separation of the shear blades.

9. A shear according to claim 8 in which the end of the linkage coupled to the shear frame part is eccentrically mounted on a shaft arranged to be driven automatically to assume a position corresponding to a predetermined blade separation.

10. A pair of side trimming shears according to claim 2 in combination with line shaft driven entry and exit roller tables, the entry table having an automatic control for the drive to meter material into the shear.

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