Sept. 5, 1933. T. W. ALLSWORTH 1,925,915

SHEET GUIDE AND SCRAP DUMPER

Filed Nov. 15, 1928

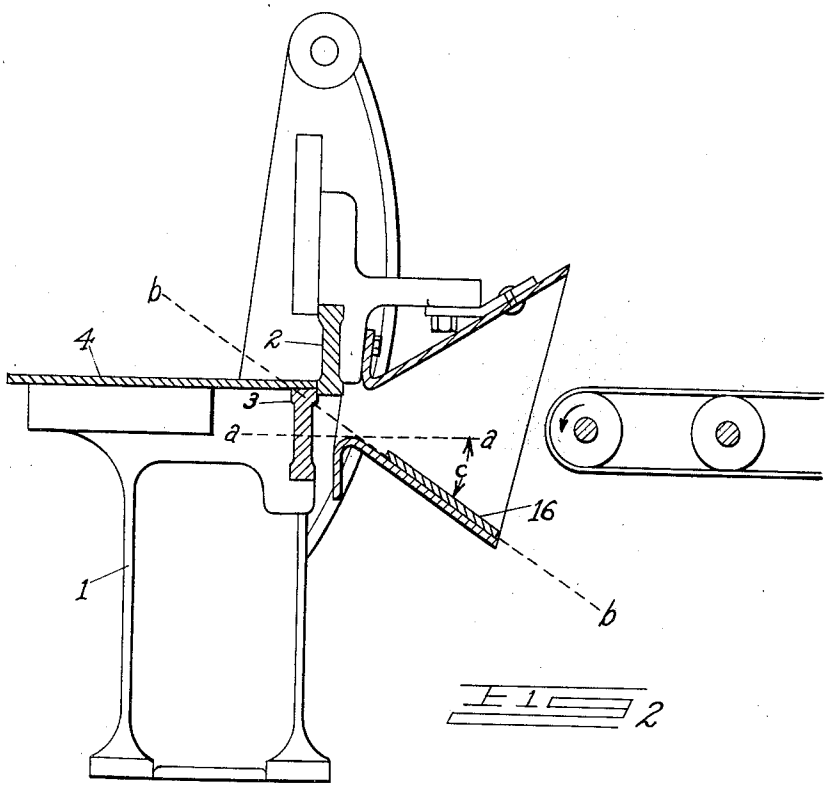


FIG 2

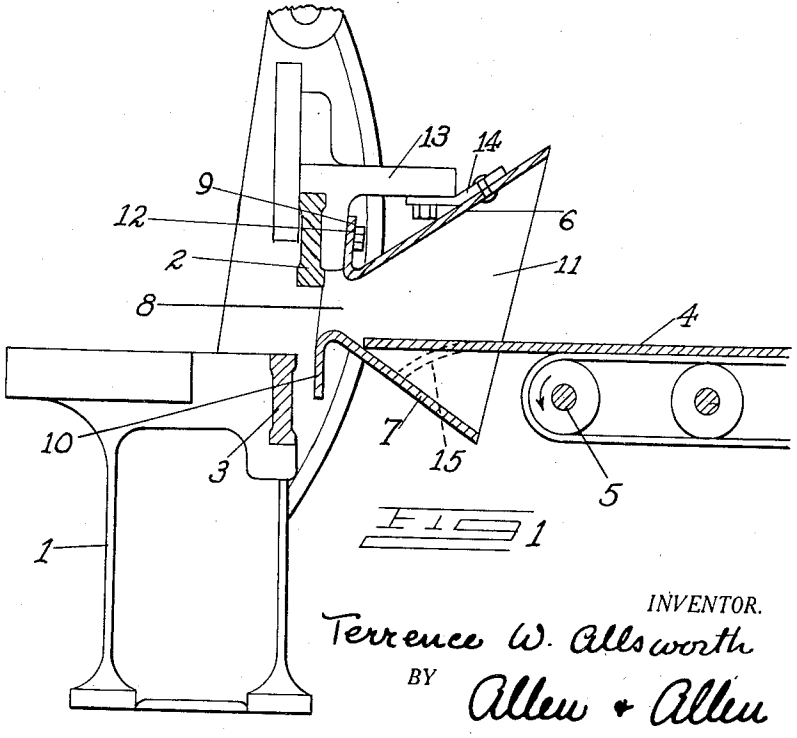


FIG 1

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Patented Sept. 5, 1933 1,925,915

UNITED STATES PATENT OFFICE

1,925,915

SHEET GUIDE AND SCRAP DUMPER

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Application November 15, 1928
Serial No. 319,637

3 Claims. (Cl. 164—48)

Broadly my object is to provide a satisfactory mechanism for feeding sheet metal through shears or like machines, and my invention, while useful elsewhere, has a particular application to the double cut-off shears used to sever at one operation both ends of iron or steel sheets. In shearing a sheet on both ends at the same time, it is necessary to lead it through one of the shears from the back. This means that it must be led through an opening approximately two inches wide at one end, which, with rapidly moving stock, represents a serious problem. Further, it is not uncommon for a sheet to be bowed badly, or to have one end turned upward or downward. Such a sheet must be well guided to get it past the knives. Hitherto there has been no very satisfactory means for the purpose, and special handling has usually been necessary for bowed sheets. It is my object to provide means for feeding a sheet quickly and positively through the shear knives, in spite of irregularities and buckles in the sheet itself.

It is another object of my invention to provide feeding means which do not interfere with the operation of the knives, or require independent adjustment, or operating means distinct from those means which actuate the shears itself.

It is still another object of my invention to provide means for getting rid of, or dumping, the cut off ends or scrap at the finish of the shearing stroke.

These and ancillary objects of my invention which will be apparent to one skilled in the art upon reading these specifications, I accomplish by that certain construction and arrangement of parts of which I shall now describe a preferred embodiment, reference being had to the drawing which accompanies these specifications.

In the drawing:

Figure 1 illustrates my mechanism acting as a guide during the feeding of a sheet.

Figure 2 illustrates its operation as a scrap dumper at the end of the shearing stroke.

The drawing is semi-diagrammatic in its nature, and I have omitted such details of well known mechanisms as are not necessary to the full understanding of my invention and form no part of it. I have indicated broadly a shear 1, with upper knife 2, and lower knife 3. A sheet 4 which may be carried toward the shear by the conveyor 5, must be fed through the space between the knives when they are apart between strokes as is shown in Figure 1. It is a characteristic of my invention that my sheet guiding mechanism is attached to and moves with the movable shear element, and preferably the knife or immediate kink support.

Guiding means comprise generally members converging toward the shear opening and adapted to conduct a sheet thereto whether it tends to ride out of the way either upwardly or downwardly. In commercial shears the lower knife is fixed and the upper one moves vertically. In the shearing operation it is impossible to have a bottom guide fixed with relation to the stationary knife. That part of the guide which is nearest the knife must be above it when the shears are open so as to secure free entry of the sheet. But the movable head descends below the stationary knife, and the sheared end or scrap will fulcrum upon the guide edge, giving trouble. Thus it has been necessary in the past to rely upon imperfect guiding means.

To correct this disadvantage, the bottom guide assembly at least must be mounted so as to be moved out of the way downwardly when the upper knife descends. I provide a bottom guide assembly which is rigidly connected with the top guide assembly, the whole being mounted upon the upper knife assembly so as to move therewith. By standard means known to the builders of shears, the top knife stops at the upper end of the stroke at a fixed distance from the lower knife, so that, once adjusted, my guiding means is always in correct guiding position at the start of the stroke. When the sheet has been fed between the knives, then the guiding means may move with the knife without detriment, it being only necessary to provide that the upper guide portion does not strike the scrap end of the stock before the cut has been made.

I provide an upper guiding means 6 and a lower guiding means 7. These may be of any suitable construction; but I prefer to make them of metal plates with a smooth interior guiding surface. The guides 6 and 7 converge to form a sheet feeding opening 8 of suitable width for the shear. They may be reversely bent as at 9 and 10 to provide attachment surfaces, as well as rounded shoulders at the feed opening. The lower guide is rigidly connected with the upper guide so as to move therewith, preferably by side plates 11; and the lower guide may be offset from the upper toward the fixed shear knife as shown.

The whole assembly is rigidly mounted upon the upper knife or the upper knife head. Conveniently a bolt 12 may fasten the attachment portion 9 direct to the shear knife or head at

the low end thereof. The upper part of the upper guide may be held to an arm 13 on the head, by means of a bracket 14. Where the movable knife is tilted, the guide assembly at the high end may be held by a bracket and arm alone, or by such other means as will be within the knowledge of a mechanic to provide.

The guide assembly is so adjusted that when the movable knife 2 has reached its upward limit of motion, the lower guide is in position to feed a sheet above the fixed knife,—i. e. its inner shoulder will be above the knife edge; while the upper guide is similarly adjusted to feed a sheet beneath the lowest point of the movable knife. Since the path of movement of the shear knives is fixed, the guide assembly will always be in proper feeding position at the end of the shearing stroke cycle. When a sheet is fed through the feeding opening 8 to the desired position, the shear knife 2 descends to cut it. But the guide assembly moves downward with it so that the scrap cannot fulcrum against the inner shoulder of the lower guide when the upper knife strikes it.

In Figure 2, I have indicated by dotted lines the horizontal plane *a*—*a* and the plane of the lower guide plate 7, *b*—*b*. The angle *c* between these two planes must be less than 45 degrees. This is because the incoming sheet 4 (Figure 1) may be turned down at the end so badly as at 15 that it will not otherwise feed. If the angle *c* were greater than 45° and the incoming sheet bent downwardly so badly as to lie at approximately 45° to the horizontal the guide would not feed the sheet through the opening, but would rather tend to turn it back beneath. Similarly the upper guide should lie at an angle less than 45° to the horizontal.

But it is my purpose to cause my lower guide to act as a scrap dumper, since the scrap must be removed therefrom before it may satisfactorily guide another sheet. Hence my lower guide will have a minimum allowable angularity with the horizontal as well as the maximum just described. The guide must not be less than the minimum angle of repose of scrap thereon, respecting the horizontal; and I have found an angle of not less than 35° to be safe for this purpose. It allows the scrap 16 (Fig. 2) sheared from the sheet 4, to slide off the guide. Of course the guide angle may, if desired, be increased, up nearly to 45° if desired; but a smaller angularity is to be preferred, if greater than the angle of repose of scrap, because it insures better feeding.

Modifications of my construction, clearly within the scope of my invention, will be within the capabilities of one skilled in the art to produce. Having described a preferred embodiment, what I claim as new and desire to secure by Letters Patent, is:—

1. In a sheet guide and scrap dumper for movable shears, an upper guide arranged slantwise to guide a sheet downward, and a lower guide arranged slantwise to guide a sheet upward, means connecting said guides together whereby their inner ends are caused to define a sheet opening, a movable shear knife assembly and means connecting said assembled guides to the movable shear knife assembly of the shear, said lower guide lying at an angle with the horizontal greater than the angle of repose of scrap thereon.

2. In a sheet guide and scrap dumper for shears comprising a stationary knife and an upper movable knife, a lower guide lying at an angle with the horizontal greater than the angle of repose of scrap thereon, and means to move said lower guide with the movable knife of said shear.

3. In a guide for guiding material between shear knives, guide elements mounted to move in unison with the movement which one of said knives has toward and away from another one of said knives, said elements being so positioned relatively to each other and to the knife with which they move, that they will guide the material between the separated knives but will be displaced into a freely scrap-receiving and scrap-discharging position relative to the brought-together knives.

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