

[54] SHEAR

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[56]

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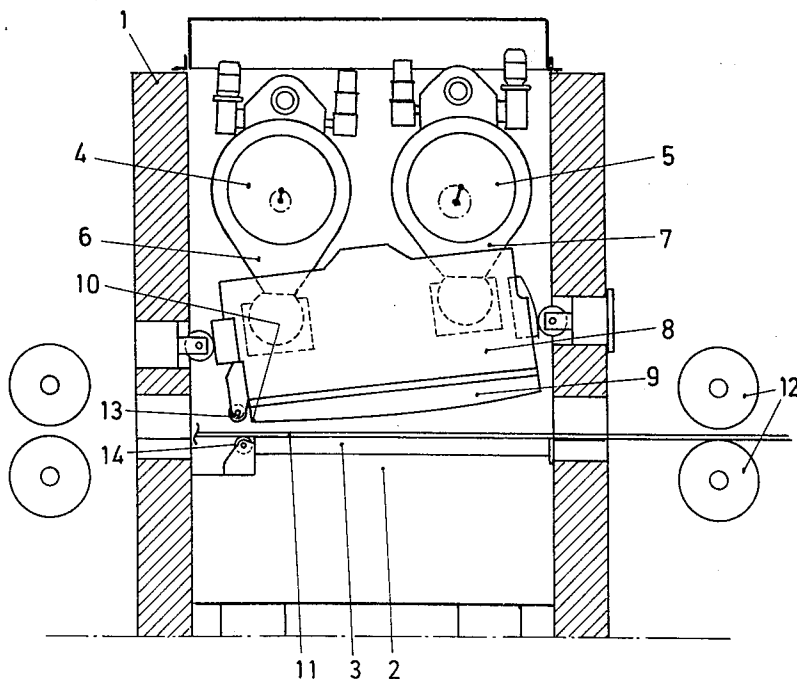
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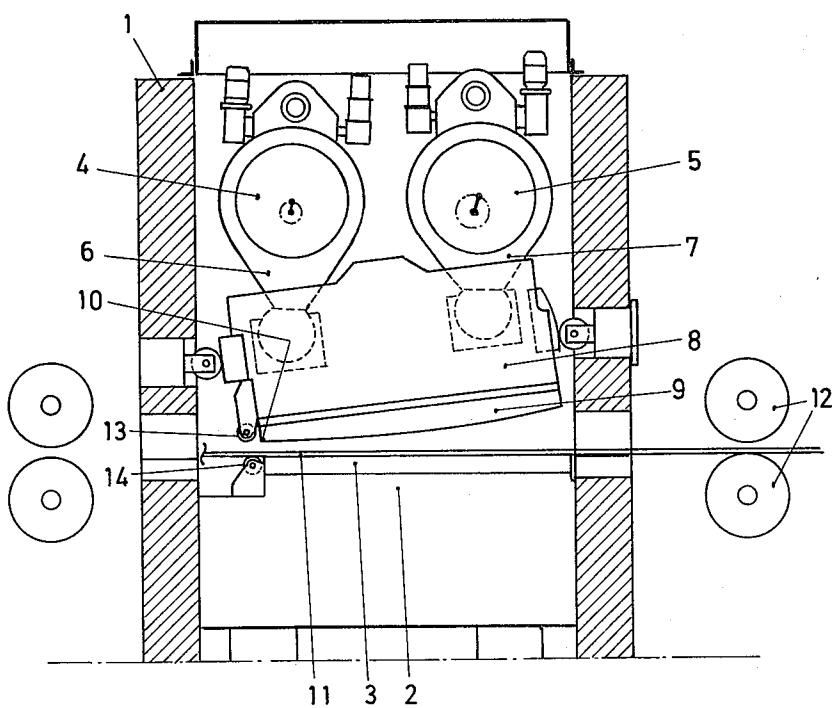
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ABSTRACT

Slitting shears for rolled metal sheet with a bow-shaped upper cutting knife executing a roll-cut movement and a stationary straight lower cutting knife, the upper cutting knife is related to the lower cutting knife in a manner corresponding to different sheet metal thicknesses and is adjustable to different depths of penetration.

3 Claims, 1 Drawing Figure





## BACKGROUND OF THE INVENTION

In slitting shears the sheet metal to be cut is moved parallel to the longitudinal direction of the cutting edges, and is moved in a stroke over the lower cutting edge table by means of so-called drivers. The upper cutting edge which is driven, for example, by a crank shaft is lowered directly after each transport stroke of the sheet metal and separates the sheet metal with one rocking movement longitudinally over a section of predetermined length. At the end of the cut, the upper cutting edge runs out of the sheet metal in a manner corresponding to the knife radius, so that the end of the cutting edge cannot touch or damage the sheet metal surface. At the end of each cut, the sheet metal is transported further by the drivers in one stroke corresponding to the cutting length and, thereafter, the next cut takes place. The cutting operation of the slitting shears continues without interruption with constant crank shaft revolutions until the sheet metal is cut longitudinally along its entire length.

Experience has shown that, during one shear cut, the sheet metal becomes completely separated after the upper knife edge penetrates half. Due to this experience, it is customary to provide the upper knife edge with an adjusting device by which a knife split adjustment in the vertical direction can be made. By this method, the upper knife edge can be adjusted vertically in such a way that it penetrates approximately one-half the thickness of the sheet metal in every length to be divided. This prevents the separated sheet metal strip on the upper knife side from being pressed to far downwardly and, therefore, bent towards the cut edge.

As mentioned above, since the cutting operation of the slitting shears is executed without interruption and at constant crank shaft revolution, the time interval available for the advance of the sheet metal between two succeeding cuts is relatively short and must be used, therefore, to the fullest extent, if economically-dimensioned drives are to suffice. Therefore, every transport for sheet metal to be cut lengthwise begins immediately at the end of the cutting stroke and ends only at the time that the starting cut end of the upper knife edge has already moved one-half the sheet metal thickness beneath the sheet metal surface, that is immediately before the start of a new cut.

During practical operation, it has been shown that the surface of the sheet metal strip separated by the upper knife edge one-half the sheet metal thickness is pushed beneath the surface of the sheet metal strip positioned on the lower knife table. Depending on the sheet metal thickness and the material strength, the cut-off sheet metal strip springs back again in many cases, so that the surface of both sheet metal strips are again at approximately the same elevation. The upper knife when penetrating for the execution of a longitudinal cut touches, therefore, the sheet metal which is still in motion. This not only scratches the sheet metal surface, but also can damage the upper knife. These and other difficulties experienced with the prior art devices have been obviated in a novel manner by the present invention.

It is, therefore, an outstanding object of the invention to provide a shear which eliminates the disadvantages of the known slitting shears.

Another object of this invention is the provision of shear apparatus which takes measurements which effectively prevent a gliding touch of the sheet metal still in movement because of the starting of a new cutting stroke and penetration of the upper knife.

With these and other objects in view, as will be apparent to those skilled in the art, the invention resides in the combination of parts set forth in the specification and covered by the claims appended hereto.

## SUMMARY OF THE INVENTION

In general, the invention consists of a shear which is operative in such a way that, before the penetration of the upper knife edge on the upper knife carrier, a roller is positioned which extends slightly over the cutting edge of the upper knife edge. The roller is freely supported and is rotatable on the upper knife carrier about an axis extending transversely of the cutting edge of the upper knife. This roller touches the sheet metal before the upper knife and rolls off its surface as long as the sheet metal is still in movement. The roller prevents any sliding movement between the sheet metal and the upper knife, since the upper knife comes in contact with the sheet metal only then when the carrying stroke of the sheet metal is ended.

More specifically, a counter pressure roll is supported on the front end of the lower knife approximately vertically below of the roller positioned on the upper knife carrier. This counter pressure roller extends slightly over the cutting edge of the lower knife edge.

This design prevents the moving sheet metal from pressing too strongly on the lower knife table by lowering the roller along with the upper knife. Therefore, at this location scratches cannot occur.

## BRIEF DESCRIPTION OF THE DRAWING

The character of the invention, however, may be best understood by reference to one of its structural forms, as illustrated by the accompanying drawing, in which:

The single FIGURE of the drawing shows a slitting shear constructed in accordance with the present invention as viewed transversely of the cutting edges of the knives.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

The shear stand 1 is equipped with a conventional stationary lower knife table 2 to which the straight lower knife 3 is fastened. At the top within the shear stand 1 are supported two crank shafts 4 and 5 connected by two connectors 6 and 7 to a knife carrier 8 which carries the bow-shaped upper knife 9 for raising and lowering it.

The crank shafts 4 and 5 and the attached connections 6 and 7 are designed in such a way that the upper knife 9 is operated by each crank shaft turn to execute a cutting stroke in the shape of a rocking or rolling cutting movement. During this operation the end 10 of the upper knife 9 always penetrates first into sheet metal 11 positioned on the lower knife table 2.

The sheet metal 11 is displaced by means of a driver 12 in a stroke which always corresponds to the distance between the ends of the two knives 3 and 8. The sheet metal 11 is still moving when the end 10 of the upper knife 9 penetrates the end portion of the cut created by the previous cutting stroke.

So that no gliding of the movable sheet metal 11 and the upper knife 9 on top of each other may occur during this operation, a roller 13 is positioned ahead of the end 10 of the upper knife 9 on the upper knife carrier 8. This roller is supported to be freely rotatable and has its circumference extending somewhat beyond the cutting edge of the upper knife 9 on upper knife carrier 8. This roller 13 always meets the top of the moving sheet metal 11 before the end 10 of upper knife 9. It presses on the end portion of the previously-created longitudinal dividing cut the separated sheet metal strip on the upper knife side and presses it elastically downwardly while the strip is still running underneath the roller 13. Sliding of the sheet metal 11 and upper knife 9 on top of each other is hereby safely prevented.

To prevent the sheet metal strip from being pressed too hard against the lower knife table 2 and also to prevent scratches, a freely rotatable roller 14 is positioned ahead of the lower knife 3 at the same height as the roller 13. It is located in opposition to it and is displaced toward the lower knife side. The roller 14 has its circumference extending slightly above the cutting edge of the lower knife 3.

This roller 14 acts as a carrier roll for the sheet metal 11 and prevents it from being pressed too hard onto the lower knife table 2 and onto the cutting edge of lower knife 3 by the downwardly-moving roll 13.

In addition, it should be mentioned that the two rollers 13 and 14 do not interfere with each other, because they are displaced transversely of the cutting edges of knives 3 and 9 as seen in direction of their support axes, and mounted in such a way that they are always positioned behind the knife gap.

It is obvious that minor changes may be made in the form and construction of the invention without departing from the material spirit thereof. It is not, however, desired to confine the invention to the exact form herein shown and described, but it is desired to include all such as properly come within the scope claimed.

The invention having been thus described, what is claimed as new and desired to secure by Letters Patent is:

1. Slitting shears for rolled sheet metal, having a bow-shaped upper knife executing a roll-cut movement and having a stationary, straight lower knife, whereby the upper knife in relationship to the lower knife can be pre-adjusted to different sheet metal thicknesses and different penetrations,

characterized by the fact that ahead of the penetration point (10) of the upper knife (9) on the upper knife carrier (8) is positioned a roller (13) which extends slightly beyond the cutting edge of the upper knife (9).

2. Slitting shears as recited in claim 1, characterized by the fact that the roller (13) is mounted to be freely rotatable about an axis directed transversely of the cutting edge of the upper knife (9).

3. Slitting shears as recited in claim 2, characterized by the fact that at the back end of the lower knife (3), somewhat underneath the roller (13) as mounted on the upper knife carrier (8), is positioned a carrier roll (14), which extends slightly beyond the cutting edge of the lower knife (3).

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