May 23, 1950 H. D. PAXSON 2,508,534

MATERIAL WORKING MACHINE

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FIG. 1.

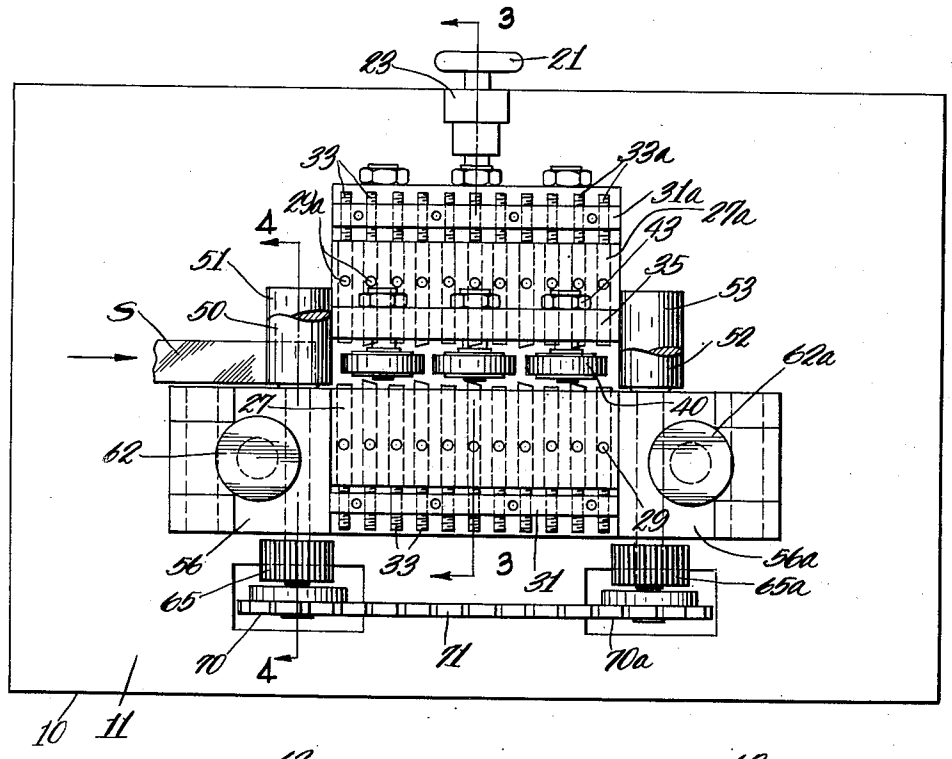
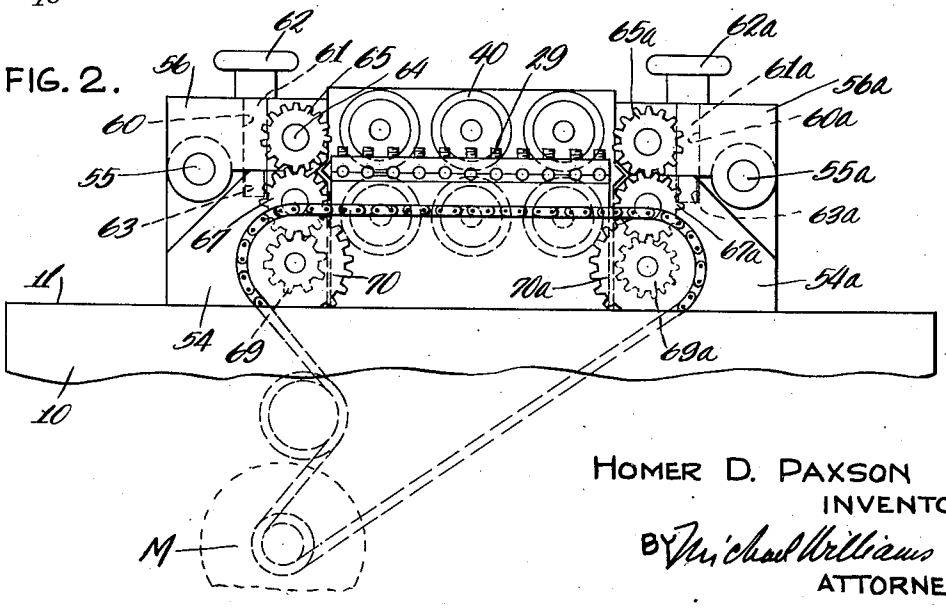


FIG. 2.



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FIG. 3.

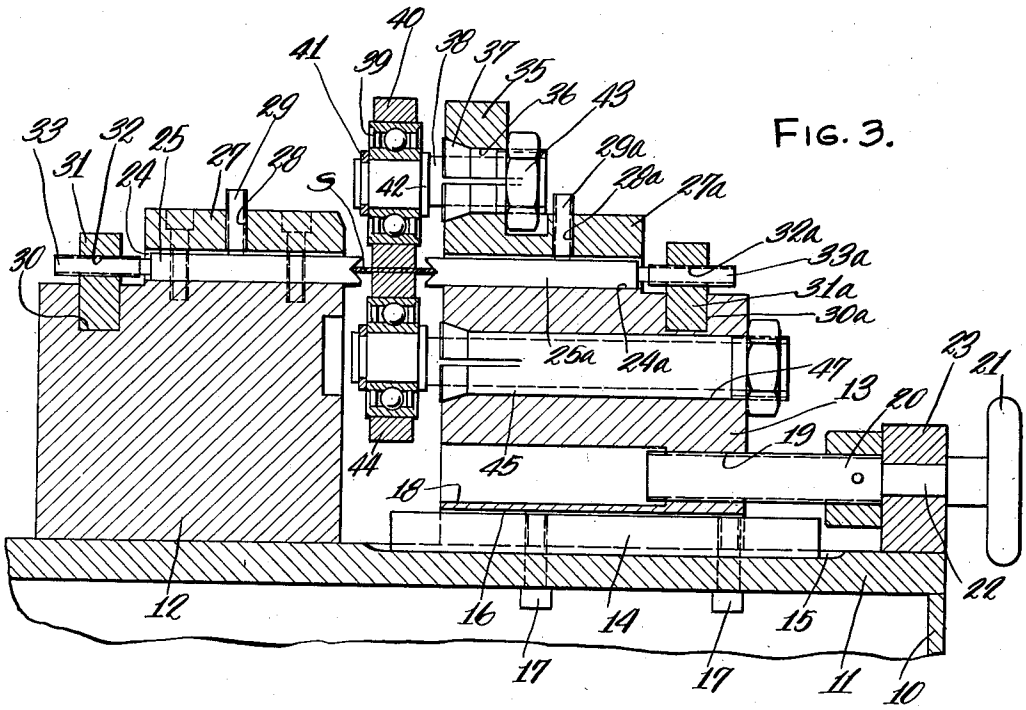
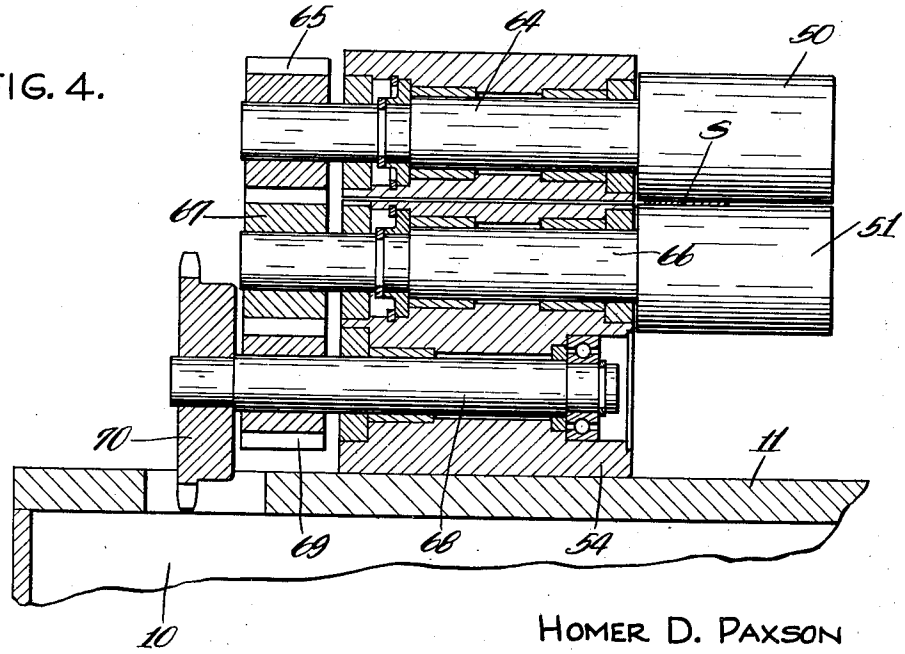


FIG. 4.



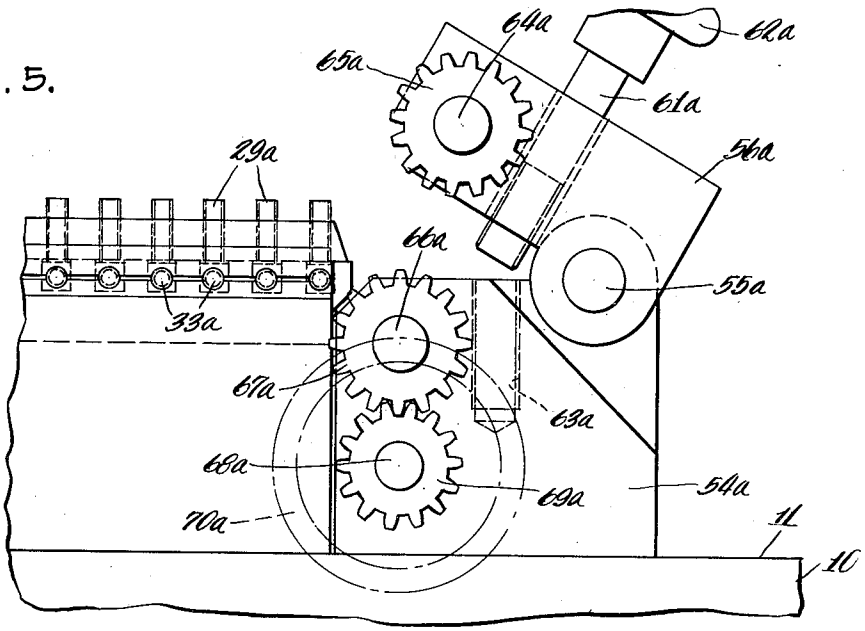
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FIG. 5.



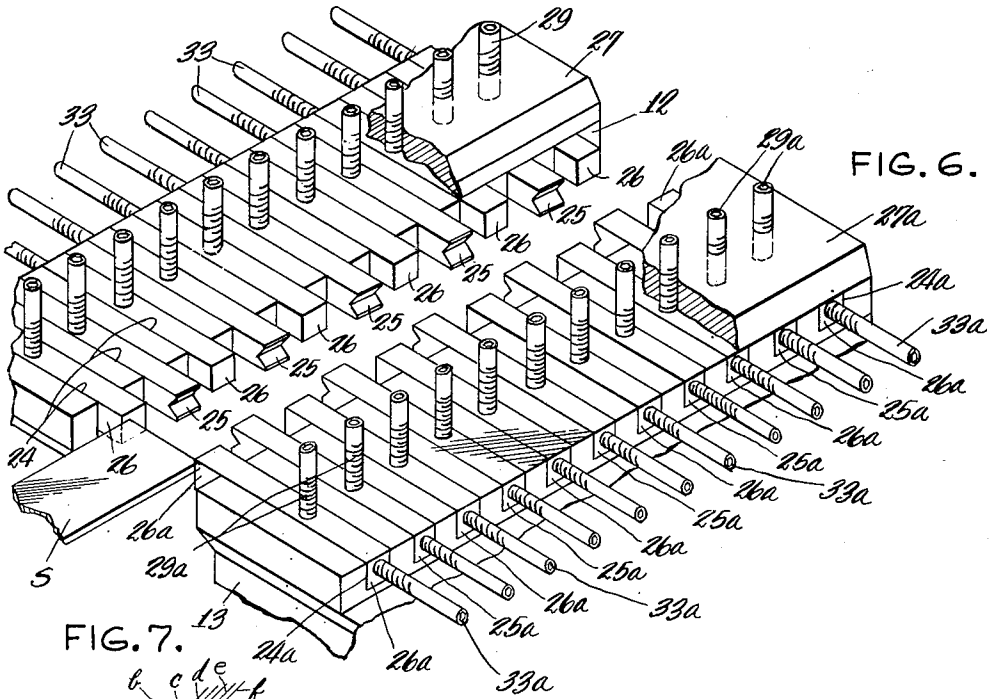
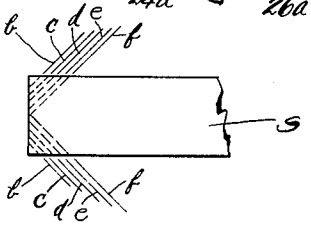


FIG. 6.

FIG. 7.



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Patented May 23, 1950 2,508,534

UNITED STATES PATENT OFFICE

2,508,534

MATERIAL WORKING MACHINE

Homer D. Paxson, Salem, Ohio

Application November 2, 1946, Serial No. 707,397

5 Claims. (Cl. 90—24)

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My invention relates to material working machines, more particularly to a machine for forming the edge or edges of a strip, and the principal object of my invention is to provide new and improved machines of this character.

The invention provides a machine which is ideally suited to trim or form edges of sheet metal to any desired size or cross-sectional contour. Further, the machine provided by my invention is less costly to manufacture, is adjustable and changeable to provide for variance in the formation of the sheet edge, and is composed of mechanism that is readily accessible for maintenance, testing, or inspection work.

In the drawings accompanying this application, and forming a part of this specification, there is shown, for purposes of illustration, an embodiment which the invention may assume, and in these drawings:

Figure 1 is a plan view of a machine disclosing an embodiment of the invention,

Figure 2 is a fragmentary side elevational view of the machine shown in Figure 1,

Figure 3 is an enlarged fragmentary vertical sectional view corresponding generally to the line 3—3 of Figure 1,

Figure 4 is a fragmentary vertical sectional view corresponding generally to the line 4—4 of Figure 1,

Figure 5 is an enlarged fragmentary side elevational view of the machine, showing certain parts in an open position,

Figure 6 is a generally schematic perspective view illustrating arrangement of the forming mechanism, and

Figure 7 is an enlarged fragmentary view of a sheet, showing one type of edge which may be formed.

The machine herein shown to disclose the invention comprises a base 10 having a top supporting surface 11. Carried by the top surface 11 is a pair of tool supports 12 and 13. The tool support 12 is securely fixed to the top surface, in any suitable manner, as for instance by bolts. The tool support 13 is slidable along the top surface, in a direction toward and away from the tool support 12. Preferably, a key 14 (see Figure 3), held in a way 15 formed in the top surface 11, is slidably received in a keyway 16 formed in the tool support 13, to hold the tool support to predetermined movement. The key is preferably held to position in the way 15, by means of bolts 17.

The tool support 13 is formed with a transverse aperture 18, threaded as at 19, to receive the

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screw-threaded shank 20 of a hand wheel 21. The hand wheel construction includes a reduced diameter portion 22 journalled in a bracket 23 rigidly carried by the top surface 11. The reduced portion forms shoulders engageable with the side surfaces of the bracket 23, so that the hand wheel construction is held longitudinally stationary and rotation of the hand wheel causes the shank 20 to thread in the aperture 19 and move the tool support 13 toward or away from the support 12, depending upon the direction of rotation of the hand wheel 21.

The tool support 12 is provided in its upper surface with a series of grooves 24, each for receiving either a cutter 25 or a gauge block 26. In the present case, it is preferred to start with a gauge block 26 (see Figure 6) and then alternate cutters 25 with gauge blocks 26, and ending with a gauge block 25, this progression being along the line of movement of the sheet S.

As best seen in Figure 3, the grooves 24 are of a height slightly greater than the depth of the cutters 25 (and of the gauge blocks 26) and a plate 27, spanning all grooves 24, is bolted to the top surface of the tool support 12. In effect, this construction provides individual openings through which a respective cutter or gauge block may slide. In line with each groove 24, the plate 27 is provided with a screw-threaded aperture 28 for receiving a set screw 29. The set screws 29 hold respective cutters or gauge blocks in tight engagement with the bottom of the respective grooves 24, and thus hold the cutters and gauge blocks in horizontal alignment.

The tool support 12 is formed with an elongated groove 30 extending transversely with respect to the grooves 24, for the purpose of receiving a back-up block 31. The block 31 is provided with screw-threaded apertures 32 generally in axial alignment with the grooves 24, each aperture receiving a back-up screw 33 having one end adapted to back up a cutter or gauge block.

The tool support 13 is likewise provided with means for supporting cutters and gauge blocks, parts similar to those previously described being given similar numbers but supplemented with the suffix "*a*."

In the particular embodiment herein disclosed, it was required to form a side edge of the sheet S with an angular formation, as indicated in Figure 7. Accordingly, the cutters 25 are arranged along the line of travel of the sheet so as to successively make progressively inwardly extending cuts along the edges of the sheets, as indicated by the lines

b, *c*, *d*, *e* and *f*, in the case where five cutters are used.

The progressive cutting action may be provided for by either having progressively greater cutting angle on the cutter faces, or by having the cutting angle on all faces alike, and progressively extending the cutters toward the sheet edge, as herein shown. In either event, the gauge blocks, at the entrance and exit for the sheet and between adjoining cutters, provide a constant guide for the sheet, so as to prevent the sheet from crowding the cutters along one edge and receding from the cutters along the opposite edge.

It will be appreciated that, if desired, only one edge of the sheet may be formed, in which case the cutters along the opposite edge are omitted, the gauge blocks guiding such opposite edge during movement of the sheet. Regardless of whether one or both edges of the sheet are formed, it will be clear that my invention provides means whereby the sheet may be rapidly fed through the machine, and the edge or edges quickly and easily formed. Further, edges of various widths of sheets may be formed to the same edge contour, without changing position of the cutters in their individual holders, simply by proper adjustment of the hand wheel **21**.

To insure that the edge or edges of the sheet are properly formed, means are provided to prevent buckling of the sheet S as it passes through the series of cutters. The means herein shown comprise rollers engaging the sheet on opposite flat surfaces.

Referring particularly to Figures 1 and 3, the plate **27***a* is formed with an upstanding leg **35** provided with apertures **36** (three in this case) each aperture having a conical portion, as best seen in Figure 3. Each aperture is adapted to receive a collet **37** having a split, conical head and a threaded shank, the conical head fitting within the conical portion of the recess. Each collet receives a stub shaft **38** which provides support for a bearing **39** carrying a roller **40**. A split washer **41** forms an abutment between which and a shoulder **42** formed on the shaft **38**, is held the bearing **39**. After the shaft **38** and its roller have been moved to desired adjusted position, a nut **43**, threaded on the shank of the collet, pulls the head of the collet into the conical portion of the aperture **36**, to clamp the shaft **38** in position. The shaft **38** is preferably formed with an eccentric portion, as best seen in Figure 3, so that the distance between the upper and lower rolls may be adjusted merely by loosening the nut **43**, rotating the shaft **38** within the collet **37**, and again tightening the nut **43**.

A lower roller **44** is also held by a collet construction similar to that already described, the collet **45** in this case fitting in an elongated aperture **47** formed in the tool holder **13**.

Feed rolls for the sheet S are provided both at the entrance and exit of the machine, so that in starting a sheet, the sheet will be positively fed through the rollers, and in finishing a run, the end of the sheet will be positively pulled through the rollers.

The entrance feed rolls **50**, **51**, and the exit feed rolls **52**, **53** are of similar construction, and only the entrance feed rolls **50**, **51** will therefore be described in detail.

Referring particularly to Figure 4, the roll **51** is journalled in a bearing carried by a housing **54** which is securely fixed to the top supporting surface **11** of the base **10**, as by means of bolts. The housing **54** carries a pivot shaft **55** on which is

carried a housing **56** which carries a bearing for the roll **50**. Thus, the housing **56** carrying the roll **50** may be swung about the shaft **55** to move the roll **50** away from the roll **51**.

The housing **56** is formed with an aperture **60**, through which passes the shank **61** of a screw stud which is formed with a shoulder-forming head **62**. The housing **54** is provided with a screw-threaded recess **63** for receiving the shank **61**, so that the housing **56** may be held against movement away from the housing **54**, and adjustment of the distance between the feed rolls **50**, **51** is readily effected.

The shaft **64** carrying the roll **50** has a spur gear **65** fixed thereto, and the shaft **66** carrying the roll **51** has a spur gear **67** fixed thereto, the gears **65** and **67** being in meshing relationship. The housing **54** has bearings for a shaft **68** which carries a spur gear **69** meshing with the gear **67**, and the extremity of the shaft **68** carries a sprocket wheel **70**.

The feed rolls **52** and **53** are supported and rotated by construction similar to that provided for the rolls **50**, **51**, and similar parts bear the same reference numeral supplemented by the suffix "*a*." A sprocket chain **71** connects the sprocket wheels **70**, **70***a*, so that the pairs of feed rolls **50**, **51** and **52**, **53** are positively driven at the same speed. As best seen in Figure 2, the chain **71** receives power from a sprocket attached to a motor M.

In view of the foregoing, it will be appreciated that, within limitations, sheets of various widths may be easily accommodated by the machine, merely by proper adjustment of the handwheel **21**. Also, sheets of various thicknesses may be accommodated, merely by proper adjustment of the heads **62**, **62***a*. For hand feeding, such as during set-up time, or for checking or inspection purposes, the heads **62**, **62***a* may be rotated to remove the screw-shanks **61**, **61***a* from respective recesses **63**, **63***a*, so that the housing **56**, **56***a* may be swung about their pivots to separate the feed rolls, as seen in Figure 6.

From the foregoing, it will be appreciated by those skilled in the art that I have accomplished at least the principal object of my invention, and it also will be apparent to those skilled in the art that the embodiment herein disclosed may be variously changed and modified, without departing from the spirit of the invention, and that the invention is capable of uses and has advantages not herein specifically described; hence it will be appreciated that the herein disclosed embodiment is illustrative only, and that my invention is not limited thereto.

I claim:

1. In a machine for forming an edge portion of a strip of material, cutter head means in relatively movable relation with said strip and comprising a plurality of cutters having cutting faces extending along the line of relative movement and extending progressively inward of said edge portion so as to make successive cuts along said edge portion, and means disposed between at least certain adjoining cutters, said means being engageable with cut parts of said edge portion for maintaining said strip in predetermined relation with respect to said cutters.

2. In a machine for forming an edge portion of a strip of material moving therethrough, cutter head means comprising a plurality of cutters held stationary with respect to said strip during cutting action, said cutters having cutting faces arranged along the line of travel of said strip and

extending progressively inward of said edge portion so as to make successive cuts along said edge portion, and gauge means disposed between adjoining cutters and adapted to progressively extend inward into slidable engagement with adjoining cut parts of said edge portion for maintaining said strip in predetermined relation with respect to said cutters.

3. In a machine for forming an edge portion of a strip of material moving therethrough, cutter head means comprising a plurality of cutters held stationary with respect to said strip during cutting action, said cutters having cutting faces arranged along the line of travel of said strip and extending progressively inward of said edge portion so as to make successive cuts along said edge portion, gauge means disposed between adjoining cutters and adapted to progressively extend inward into slidable engagement with adjoining cut parts of said edge portion for maintaining said strip in predetermined relation with respect to said cutters, and means providing for adjustment of said cutters and said gauge means in a direction toward and away from said edge portion.

4. In a machine for forming opposite edges of a strip of material passing therethrough, cutter head means comprising spaced opposed sets of gauge blocks and spaced opposed sets of cutters, each set being held stationary with respect to said strip during cutting action, said gauge blocks in each set being disposed between adjoining cutters of each set, and said cutters of each set having cutting faces arranged along the line of travel of said strip and extending progressively inwardly of respective edge of said strip so as to make successive cuts along said respective edges, and said gauge blocks of each set extending progressively inward into sliding engagement with adjoining cut parts of said opposite edges so as to maintain said strip in predetermined gauged relation with said sets of cutters.

5. In a machine for forming opposite edges of a strip of material passing therethrough, cutter head means comprising spaced opposed sets of gauge blocks and spaced opposed sets of cutters, each set being held stationary with respect to said strip during cutting action, said gauge blocks in each set being disposed between adjoining cutters of each set, and said cutters of each set having cutting faces arranged along the line of travel of said strip and extending progressively inwardly of respective edge of said strip so as to make successive cuts along said respective edges, and said gauge blocks of each set extending progressively inward into sliding engagement with adjoining cut parts of said opposite edges so as to maintain said strip in predetermined gauged relation with said sets of cutters, and means engageable with opposite flat surfaces of said strip as it passes relatively to said cutter head means to restrain said strip against buckling.

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