

[54] **ADJUSTABLE GUIDE FOR A MOVING SHEET**

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[52] U.S. Cl. .... **226/199**

[51] Int. Cl. .... **B65h 23/04**

[58] Field of Search ..... 226/196, 199; 242/76, 157 R

3,289,908 12/1966 Engle.....226/199 X

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[57] **ABSTRACT**

A device for guiding a metal sheet or strip during its movement in which the sheet is maintained in a slot which is formed by a stationary plate and two adjustable notched guide bars. At least one of the bars is movable toward and away from another bar using a fine-adjustment moving arrangement, while maintaining a substantially parallel relationship between the bars.

**4 Claims, 3 Drawing Figures**

[56] **References Cited**  
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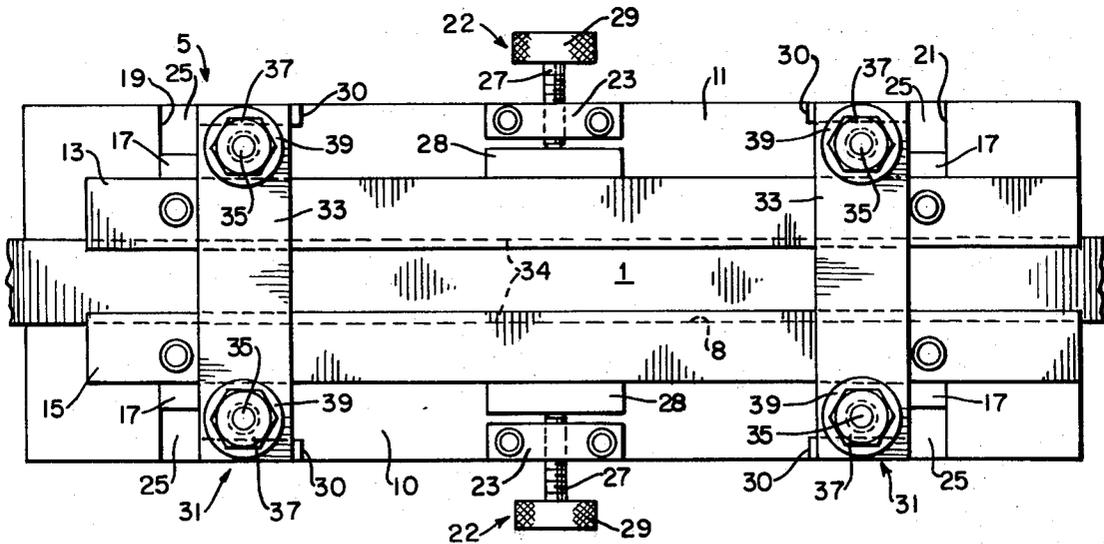


FIG. 1

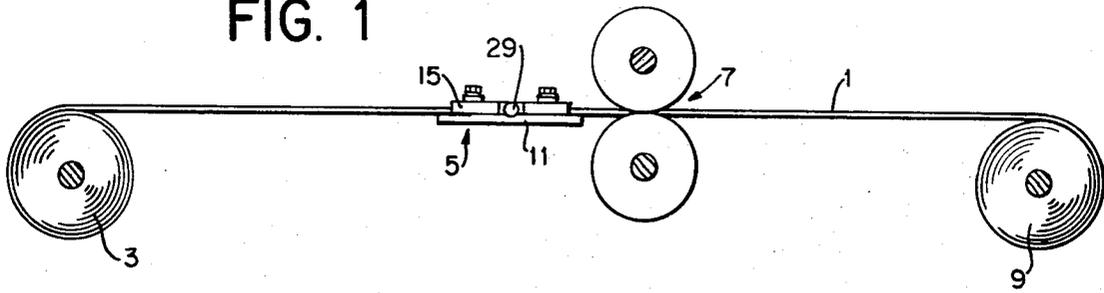


FIG. 2

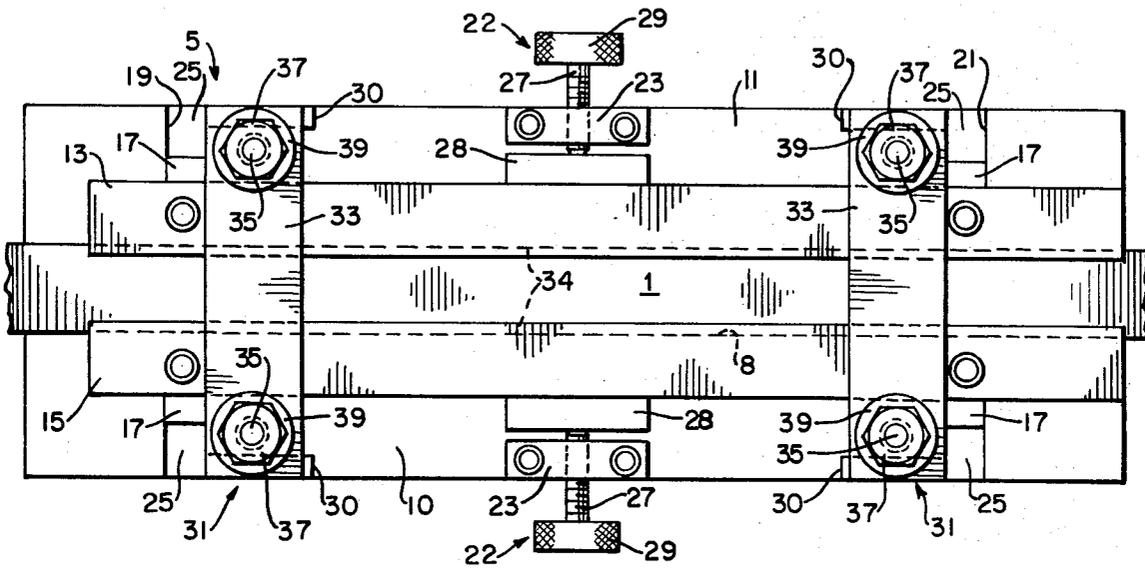
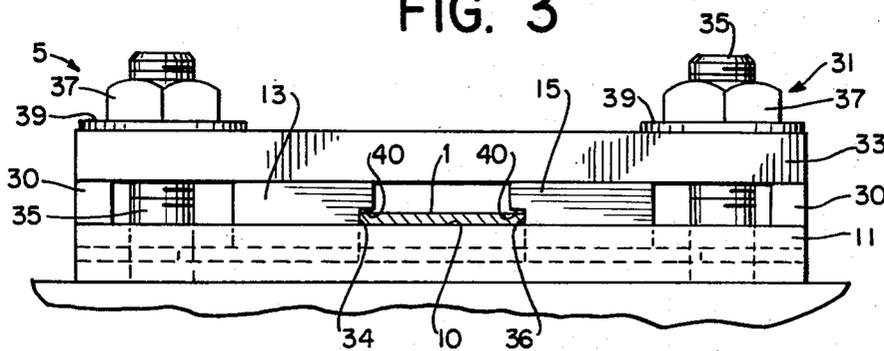


FIG. 3



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## ADJUSTABLE GUIDE FOR A MOVING SHEET

## BACKGROUND OF THE INVENTION

Metal guide devices for guiding moving sheets, including strips, have been used in industry for many years. Adjustable elements for contacting the edge surface of the sheet have been used but means for positioning the sheet and the edge-contacting elements have not been satisfactory for the viewpoint of ease of operation and, in particular, the prior devices have not provided sufficient accuracy for many industrial applications.

Moving strips in some operations are required to be precisely controlled to permit a forming or machining operation to be performed on a particular area of the strip as it moves. Accuracy requirements of less than a few thousandths of an inch are not uncommon. Prior guide apparatus has provided adjustable means for engaging the edge surfaces of the strip but have failed to provide a means which have the required precision. Roller devices used have not been accurate due to variations in the radii of rolling elements and the tolerance of bearings employed. Many prior guide means have also failed to guide the upper and lower wide surfaces of the moving strip in cooperation with edge surface guide means to provide complete and accurate control of the strip.

## SUMMARY OF THE INVENTION

Broadly, the present invention is a device for guiding and controlling a moving sheet of material comprising a frame having a guide surface area, track means on the frame and two-elongated guide bars positioned perpendicular to the track means and adjacent the surface area in a substantially parallel relationship to one another and having track-engageable means for engaging said track means to permit one guide bar to be moved toward and away from the other guide bar using fine-adjustment guide bar moving means. Each guide bar includes a notch comprised of guide surfaces, one of which guides the sheet edge while the other guides the wide surface of the sheet.

It is a feature of the invention that after the guide bar is moved it is clamped to the frame to prevent movement and resulting misalignment during operation.

## BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings,

FIG. 1 shows a rolling operation in which the device of the invention is used;

FIG. 2 is a plan view of the device and

FIG. 3 is an end elevational view of the device.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

In FIG. 1 sheet or strip 1 is drawn from supply roll 3 through guide device 5, through forming roller set 7 and then to take up roll 9. Guide device 5 may be used to guide any type of sheet material; however, it is particularly applicable for guiding metal strips during operations requiring the accurate feeding and alignment such as rolling, welding and machining operations.

Turning to FIGS. 2 and 3, guide device 5 includes stationary frame plate 11 which is secured to a frame, stand or other stationary object. The strip 1 is guided and controlled by planar surface 10 of plate 11 and by two elongated substantially parallel guide bars 13 and 15. These three elements (plate 11 and bars 13 and 15) form an elongated enclosure or slot 8 through which strip 1 passes. Guide bars 13 and 15 are movable toward and away from one another using four guide blocks 17 secured to the bars and adapted (by size and shape) to reciprocate in track grooves 19 and 21. Grooves 19 and 21 are preferably formed by cutting away material in plate 11 across its entire width but grooves of lesser length may be used. Alternatively, other track means, such as rails, may be used provided they are dimensioned not to interfere with the movement of strip 1. Blocks 17 are secured to bars 13 and 15 using fasteners 20 or, if desired, they may be integrally formed as part of the bars.

Bars 13 and 15 are maintained substantially parallel through the close tolerances between blocks 17 and grooves 19 and 21. Blocks 17 slide in the grooves as the bars are moved by fine-adjustment arrangements 22, each of which includes a stationary mounting member 23 secured to plate 11 which member receives a threaded stem 27. A handle 29 is secured to the outside end of stem 27 and the other end of stem 27 turns freely against the side of an alignment block 28. An alignment block 28 is secured to each bar 13 and 15. Since each guide bar has a fine-adjustment arrangement, one bar may be adjusted independently of the other.

After bars 13 and 15 have been placed in the position required to guide a strip having a certain width, bars 13 and 15 with blocks 17 positioned thereunder are clamped down against the surface 10 of plate 11 to prevent the bars from being moved by strip 1 as it moves through the guide. Clamping is accomplished using clamp units 31 which comprise cross pieces 33, bolts 35 and nuts 37 and washers 39. Each bolt 35 has one end secured to plate 11 for permanent engagement therein while the upper end of the bolt receives a nut 37. Cross pieces 33 are sufficiently deformable so that as the cross pieces are moved down they first engage the upper surfaces of bars 13 and 15 and as movement of their ends continues they come to rest on levelers 30 which project above surface 10 of plate 11 a distance slightly less than that of bars 13 and 15. Since levelers 30 preferably project above surface 10 only a few thousandths of an inch less than bars 13 and 15, steel cross pieces 33 have been found to permit the desired deformation.

Levelers 30 function to prevent inadvertent tilting of cross pieces 30 that would occur if a nut 37 were tightened down substantially more on one end than the other. When levelers 30 are not used, a cross piece may be tilted or misaligned by the operator tightening down one end to the extent that later tightening on the other end results in the bar under that end being improperly clamped and subject to movement by the strip.

Directing attention again to FIG. 3, a notch 34 in each of bars 13 and 15 is formed by guide surface 36 substantially parallel to the edge of strip 1 and by guide surface 40 which forms substantially a right angle with surface 36.

Preferably the guide device is set up and adjusted with strip 1 threaded through slot 8 as shown in FIG. 2. Bars 13 and 15 are moved against the sides of strip 1 or spaced from the sides by a selected distance. Handles 29 may be calibrated to indicate to the operator the relationship between one rotation of the handle and the resulting movement of the bar. If desired one of the guide bars may be permanently mounted in a fixed position and the other bar moved toward and away from the fixed bar.

Guide bars with notches 34 of varying dimensions may be substituted in the device of this invention to accommodate sheets of differing thickness. Since the wide surfaces of strip 1 are guided by surface 10 and surfaces 40, the spacing between them may be varied depending on the thickness of the strip and the requirements of control of the strip in the vertical direction.

We claim:

1. A device for guiding and controlling an elongated metal sheet of material during its movement comprising

- a. frame means having a planar guide surface portion;
- b. track means on the frame means;
- c. two substantially parallel spaced-apart guide bar elements positioned on the frame means;
- d. at least one such bar element including spaced-apart track engaging means for relative movement with and guiding by the track means such that the bar is held in a selected orientation from which it is not moved by action of the moving metal sheet;
- e. each bar element in turn including notched guide means comprising
  - i. a first sheet guide surface positioned to contact a wide surface of the sheet, and
  - ii. a second sheet guide surface positioned adjacent the first surface for guiding an edge surface of the sheet;
- f. fine-adjustment moving means for moving at least one of such bars independently of the other bar along said track means; and
- g. clamping means for clamping the movable bar element at a plurality of locations,

whereby the planar surface portion and the notched guide means of the guide bar elements are positionable to accomplish guiding of the sheet during its movement.

4. A device for guiding and controlling a sheet of

material during its movement comprising

2. The device of claim 1 having in addition clamping means for clamping the guide bar elements against the frame means after selected positioning of a bar.

3. A device for guiding and controlling a sheet metal material during its movement comprising

- a. a frame plate having a planar guide surface portion;
  - b. at least two spaced-apart grooves in the frame plate;
  - c. two substantially-parallel guide bar elements, each of said elements in turn comprising an elongated bar, a longitudinal notch therein, and a guide block secure to each end portion of the bar which blocks are adapted to engage with and reciprocate in a groove;
  - d. fine-adjustment moving means for independently moving the bar elements in such reciprocating manner to position the notches adjacent the sheet to be guided; and
  - e. clamping means for clamping the bar elements against the frame plate after such bars have been adjustably moved.
- a. a frame plate having a planar guide surface portion;
  - b. at least two spaced-apart grooves in the frame plate;
  - c. two substantially parallel guide bar elements, each of said elements in turn comprising an elongated bar, a longitudinal notch therein, and a guide block secure to each end portion of the bar which blocks are adapted to engage with and reciprocate in a groove;
  - d. fine-adjustment moving means for independently moving the bar elements in such reciprocating manner to position the notches adjacent the sheet to be guided; and
  - e. clamping means for clamping the bar elements against the frame plate after such bars have been adjustably moved, said clamping means including at least one deformable clamp element positioned to engage each of the bar elements and pressure means for urging the clamp element against the bars which bars are in turn urged against the frame plate and in which the device has clamp stop means for stopping the clamp element after it has been urged against the bars a selected distance.

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UNITED STATES PATENT OFFICE  
CERTIFICATE OF CORRECTION

Patent No. 3,692,223 Dated September 19, 1972

Inventor(s) Roger E. Laigle and Antone F. Rakich

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the grant only,

Column 3, delete line 48

Column 4, delete line 1

Column 4, after line 23, insert:

--4. A device for guiding and contrpelling a sheet of material during its movement comprising--

Signed and sealed this 20th day of November 1973.

(SEAL)

Attest:

EDWARD M. FLETCHER, JR.  
Attesting Officer

RENE D. TEGTMEYER  
Acting Commissioner of Patents