Oct. 22, 1968 J. GROSS ETAL 3,406,553

CLAMPING AND STICKING GUIDE

Filed April 28, 1966 3 Sheets-Sheet 1

FIG. 1

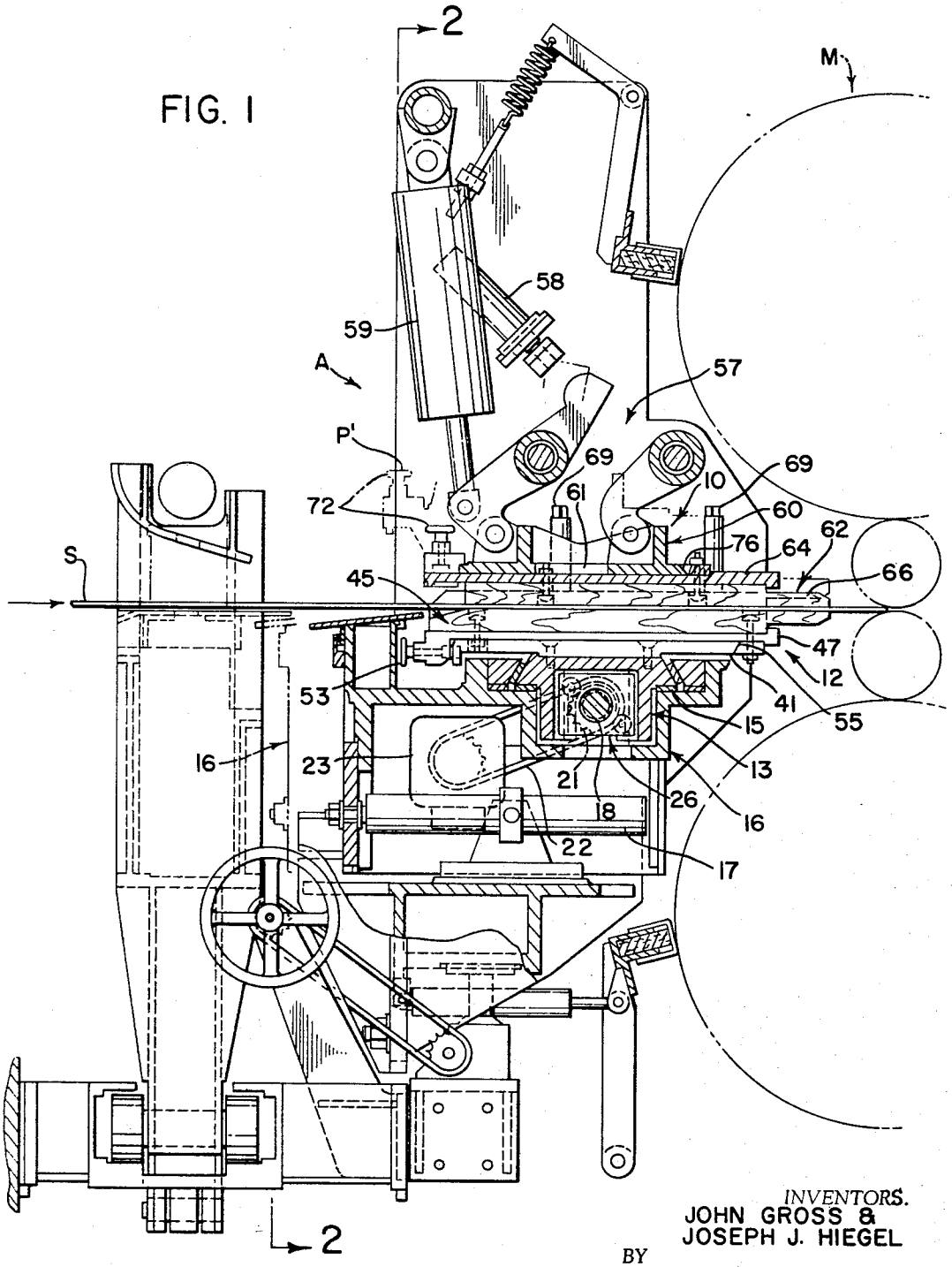

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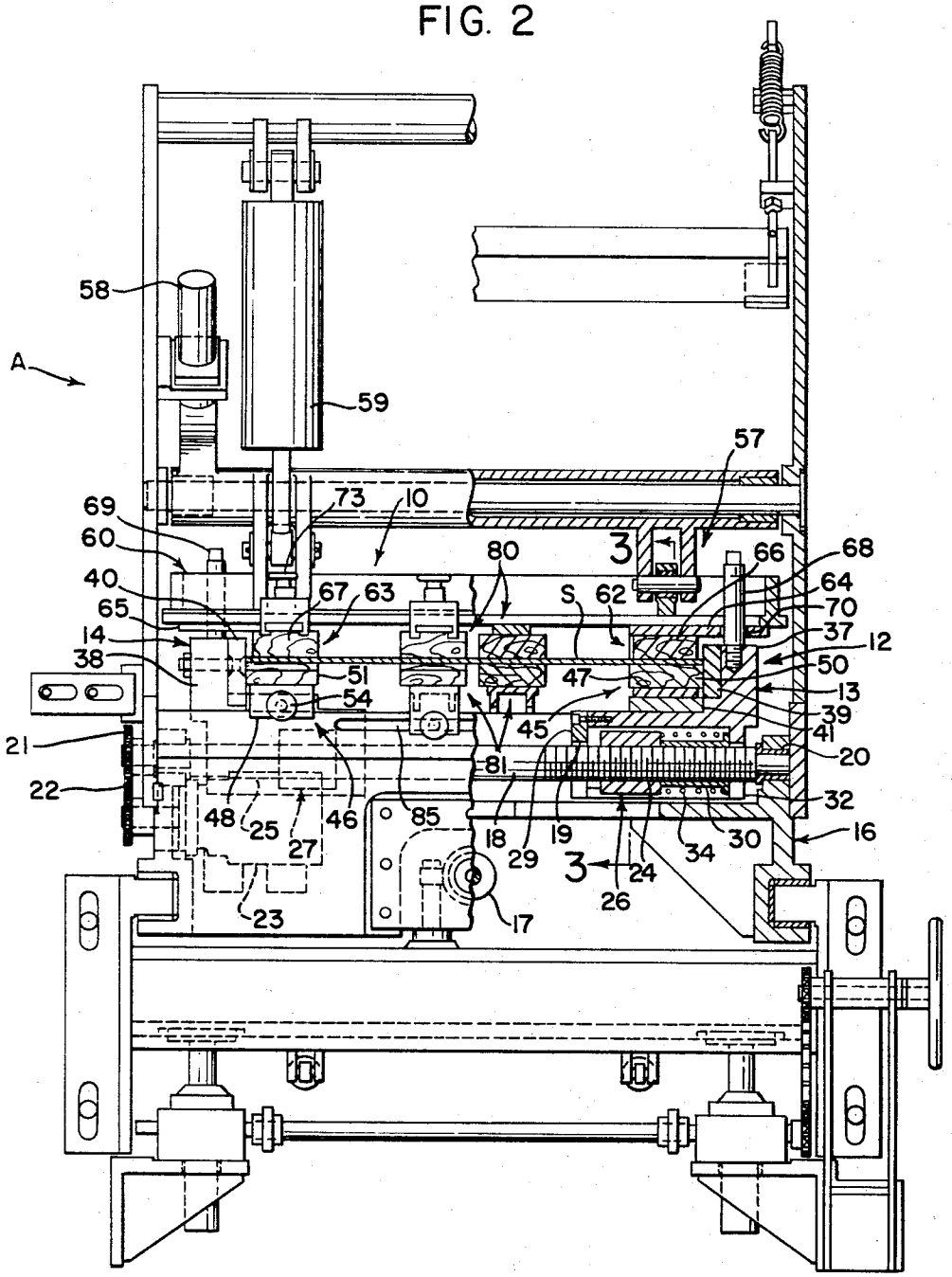
FIG. 2



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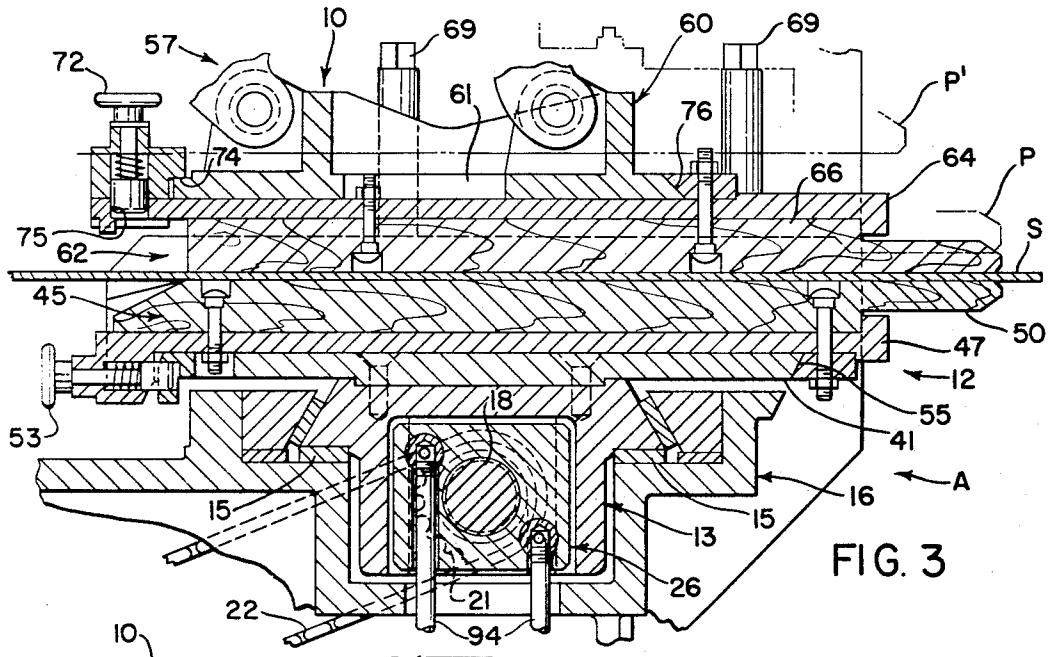

FIG. 3

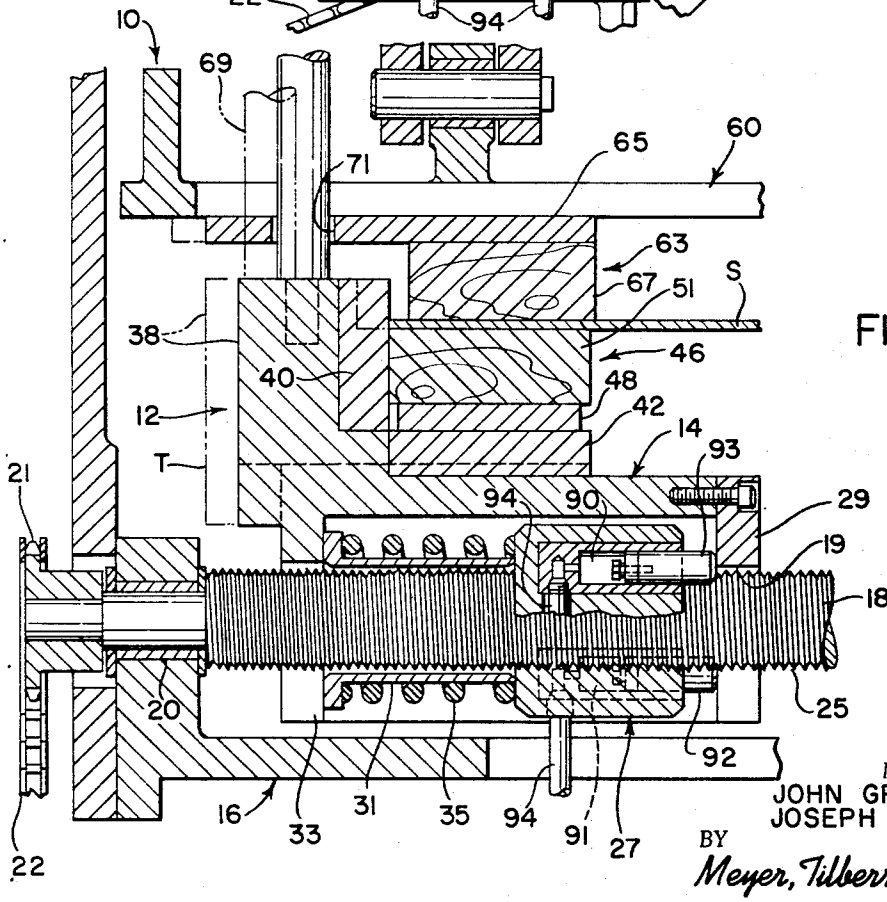

FIG. 4

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CLAMPING AND STICKING GUIDE

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5 Claims. (Cl. 72—252)

ABSTRACT OF THE DISCLOSURE

A strip clamping and guiding apparatus of the type having opposed platens at least one of which is movable relative to the other to grip a strip positioned therebetween. The apparatus includes strip edge guide members mounted on at least one of the platens and provided with first power means for traversing the members tranversely of the platen for engaging and laterally controlling strip of varying widths. Additionally, second power means are provided for selectively giving the strip edge guide members rapid short stroke gripping or ungripping movements irrespective and independent of the position of the gripping members and without regard to energization or deenergization of the first power means.

This invention pertains to the art of feeding and guiding metal strip to work rolls of a rolling mill stand and particularly concerns apparatus which is sometimes referred to as an entry sticker guide.

Various devices have been employed heretofore to guide metal strip through a rolling mill and these guides essentially comprise a plurality of members arranged to maintain the position of the strip laterally and vertically with respect to the work rolls of the mill. To this purpose, top and bottom platens of some form are employed in association with side guides, the platens being adapted to restrict vertical movement of the strip as it passes through the mill with the side members serving to provide lateral alignment of the strip. Inasmuch as the guide is usually permanently mounted on the mill stand housing, it is necessary to separate the upper and lower platens to provide clearance when threading the strip through the first stand of the rolling mill. The platens clamp onto the end of the strip and move forwardly to stick the leading end into the rolls, otherwise they are spaced a few inches apart while the strip is being run except for again clamping the strip to maintain tension and prevent excessive undulations when the trailing end of the strip passes through the rolls.

Heretofore, entry sticker guides in general use included a lower platen having removable wooden facing strips laid side by side, an upper movable platen having removable wooden facing strips similarly arranged and cooperating therewith, a linkage for moving the upper platen into and out of engagement with the lower platen, an hydraulic cylinder for operating the linkage, means for adjusting the height of the lower platen and an hydraulic cylinder for moving the apparatus as a whole into and out of operating position with respect to the mill with which it is associated.

The wooden facing strips are subjected to wear due to the sliding of the metal strip between the upper and lower platens. As a result, the facing strips are so secured that they may be readily inserted and removed when the occasion demands. Replacing all of the strips from time to time due to wear, however, is rather time consuming and requires the storage of a large quantity of replacement parts for this purpose.

Another problem with prior art entry sticker guides has been in making the width adjustments necessary to accommodate various metal strip widths. At the present time, the side guides on the upper and lower platens are adjusted for strip width by one of two methods; first, one or more of the wooden strips which cover the distance between the side guides is removed and spacers are placed behind the side guides to reduce the width, or second, one or more of the strips is removed and a power screw attached to the side guides is used to move them closer together. A reverse procedure is used when it is desired to increase the distance to handle wider strip. These methods are time consuming. Moreover, with every change in strip width it is necessary to find the right combination of wooden strips to get the proper width adjustment. This requires a large stock of various width facing strips.

It is the purpose of the present invention to provide an entry sticker guide, the upper and lower platens of which can be rapidly refitted with new facing strips when necessary and the width of which is quickly adjustable to accommodate maximum and minimum widths of strip without the necessity of adding or removing numerous facing strips.

In accordance with the invention, entry sticker guide upper and lower platens are closable on metal strip adapted to move continuously therebetween. One of the platens comprises a pair of side guides between which the strip passes. The side guides are movable in unison toward and away from each other transversely with respect to the direction of strip travel. A pair of side facing strips adjacent each strip edge is movable laterally with each side guide and is closable on the marginal edge of the strip when the platens are in the closed position. And at least one other pair of facing strips is provided intermediate the side facing strips being sufficiently laterally and vertically movable to provide vertical control at the strip center whereby adjustments for strip width can be made by traversing the side guides in conjunction with the facing strips and strip control is provided without filling the entire platen space with additional facing strips.

Further in accordance with the invention, a quick opening and closing mechanism is provided for each side guide, the arrangement of which permits rapid movement thereof a predetermined distance in a direction perpendicular to the strip edges which movement is superimposed on the slower traversing movement of the side guides.

The principal object of the invention is to provide an entry sticker guide, the upper and lower platens of which are capable of providing lateral and vertical strip control with respect to a rolling mill associated therewith.

Another object is to provide an entry sticker guide of the type referred to in which the side guides are traversable into contact with the opposite edges of the strip without encountering interference from intervening platen facing strips.

Another object is to provide an entry sticker guide wherein the lateral adjustment for strip width is made by varying the side guides in relation to one or more independently, laterally adjustable facing strips providing vertical control for the strip center.

A further object of the invention is to provide quick closing and opening side guides permitting rapid engagement and release of the strip edges.

Other objectives of the invention will become apparent in the description of the preferred embodiment thereof which is set forth herein below. In the description of the drawings:

FIGURE 1 is a partially sectioned side elevational view of a preferred embodiment of the invention shown mounted opposite work rolls of the first stand of a 4-high rolling mill;

FIGURE 2 is a partially offset cross-sectional view taken generally along line 2—2 of FIGURE 1;

FIGURE 3 is a fragmentary side elevational view showing the upper and lower platen area of the entry sticker guide taken along line 3—3 of FIGURE 2; and

FIGURE 4 is a fragmentary view of the side guide quick opening and closing mechanism.

Referring now to the drawings wherein the showings are merely for the purpose of illustrating the invention and not for the purpose of limiting same, FIGURE 1 shows an entry sticker guide A inserting the leading end of a strip S into a mill M. The guide A is of a type similar to that shown in U.S. Patent No. 2,890,609 issued June 16, 1959, to the assignee of the present invention. For the most part, the arrangement and operation of the entry sticker guide A is closely similar to that described in the aforementioned patent, for which reason the description of the present invention will eliminate details which can be obtained by reference to that patent, which details form no part of this invention.

Referring now to FIGURES 2 and 3, the entry sticker guide A is shown to include an upper platen **10** and a lower platen **12** between which the strip S is adapted to travel in the direction indicated by the arrow (FIGURE 1). The lower platen **12** includes right and left traversing blocks **13, 14**, each of which is capable of movement transversely to the direction of strip travel in guideways **15**. Each block **13, 14** is mounted on a frame **16** adapted to shift longitudinally toward and away from the mill M by means of an hydraulic motor **17** (FIGURE 1). A screw **18** passes through a bore **19** of each traversing block **13, 14** and is journaled at the opposite ends in bearings **20** mounted in the frame **16**. The screw **18** is driven by means of a sprocket **21**, chain **22** and a drive motor **23**, and has right and left hand threaded portions **24, 25** upon which drive nuts **26, 27** are threaded. As shown in FIGURES 2 and 4, each drive nut **26, 27** is situated between a side plate **28, 29** of each traversing block **13, 14**, and a sleeve **30, 31** which is secured in radially spaced surrounding relationship to the screw **18**. Surrounding each sleeve **30, 31** is a coil spring **34, 35** acting between the drive nut **26, 27** and opposite side plate **32, 33**, the function of which will be described hereinafter.

Referring particularly to FIGURE 2, each traversing block **13, 14** includes a vertical side portion **37, 38** holding side guide plates **39, 40** against which the edges of a strip S abut. A guide frame plate **41, 42** is fastened onto the top of each traversing block **13, 14**. Mounted on each guide frame plate **41, 42** is a facing strip assembly **45, 46**, each of which includes a board frame **47, 48** to which is secured a wooden facing strip **50, 51** upon which marginal edge portions of the strip S slide. Each facing strip assembly **45, 46** has a release knob **53, 54** (FIGURE 3) at the rearward end thereof removably securing it to the guide frame plate **41, 42** in cooperation with a transverse guideway **55** at the forward end.

The upper platen **10** is movable upwardly relative to the lower platen **12** to the dotted line position P by means of a pickup assembly **57** (FIGURE 1). An hydraulic cylinder **58** is activated to raise the upper platen a few inches to position P which is the normal vertical strip control position. A fully raised position P′ is available for the upper platen **10** due to the coaction of pickup assembly **57** and hydraulic cylinders **58, 59** where the upper platen is elevated upwardly and rearwardly to permit strip threading. Secured to the pickup assembly **57** is an upper platen guide frame **60** which has a traversely extending opening **61**. At each side of the upper platen guide frame **60** is secured a facing strip assembly **62, 63**, each of which includes a board frame **64, 65** upon which is secured a wooden facing strip **66, 67** which is adapted to slidably engage the upper marginal edge portions of the strip S opposite the lower wooden facing strips **50, 51**. Vertical pins **68, 69** extend upwardly from the side guide portions **37, 38** of each traversing block **13, 14** and pass through holes **70, 71** in the upper platen guide frames **64, 65** so that the upper facing strips **66, 67** are connected for lateral movement in unison with the lower facing strips **50, 51**. Each of the upper facing strip assemblies **62, 63** also includes a release knob and block assembly **72, 73** (FIGURE 3), each of which comprises a shoulder **74** and a longitudinal slot **75** adapted to receive the rearward end of each frame **64, 65** and in cooperation with the shoulder **74** and transverse guideway **76**, removably holds the facing strip assembly **62, 63** onto the upper platen guide frame **60** while permitting lateral movement along guideway **76** as will be described.

As provided by the invention, one or more pairs of additional facing strip assemblies **80, 81** (FIGURE 2) are shiftably secured respectively to the upper platen guide frame **60** and to frame **16** in lateral slot **85**. These facing strip assemblies **80, 81** cooperate to provide vertical control for the center region of the strip S.

As a further aspect of the invention, each right and left hand traversing block **13, 14** is provided with a quick opening and closing movement with respect to the edges of strip S. Referring particularly to FIGURE 4 and the traversing block **14**, it can be seen that the drive nut **27** incorporates a pair of hydraulic cylinders **90, 91** having plungers **92, 93** which move outwardly under the influence of hydraulic pressure from line **94** against the end plate **29** so as to move the traversing block **14** sideways a predetermined amount indicated by the displacement from the dotted line position T to the position shown where the side guide **40** contacts the edge of strip S. The spring **35** works in opposition to the plungers **92, 93** and biases the traversing block **14** toward the position T, releasing the edges of strip S while at the same time returning plungers **92, 93** to the fully retracted position as pressure is exhausted through line **94**.

In operation, when it is desired to make an adjustment for a change in strip width, the platens **10, 12** are separated to release the friction between the guide frame **60** and facing strip assemblies **62, 63** and the right and left hand side guides **39, 40** are traversed to within the reach of quick closing plungers **92, 93** from the edges of strip S. The total width of the lower facing strip assemblies **45, 46, 81** and their counterparts **62, 63, 80** in the upper platen **10** is such as to permit the side guides **39, 40** to be traversed toward each other in sufficient amount to contact the edge of the minimum wide strip before interference is encountered between the wooden facing strips. A quick release of the side guides **39, 40** is obtained by virtue of each spring **34, 35** forcing the traversing blocks **13, 14** to the position T when the hydraulic pressure is exhausted from cylinders **90, 91** in drive nuts **26, 27**.

In accordance with the invention therefore, the strip can receive adequate vertical and lateral control without filling the entire platen space with facing strips as in the prior art and the distance between the side guides **39, 40** can be varied quickly from any position without the necessity of adding or removing additional facing strips of various sizes to make up the distance required by the change in strip width.

Having now described a preferred embodiment of the invention, it will be appreciated by those skilled in the art that certain further modifications may be made without departing from the invention as defined in the appended claims except insofar as limited by the prior art.

We claim:

1. In a strip clamping and guiding apparatus of the type having a pair of opposed platens at least one of which is movable relative to the other to grip a strip positioned therebetween, and strip edge guide members mounted on at least one of the platens and provided with first power means for selectively traversing the edge guide members transversely of the platen for engaging and controlling strip of varying widths, the improvement comprising second power means for selectively giving at least one of the edge guide members rapid short stroke strip gripping and ungripping movement irrespective and independent of its position transversely of the platen and without regard to energization or deenergization of said first power means.

2. The improvement as defined in claim **1** wherein said second power means includes means for providing a resilient biasing force to said edge guide members in

at least one direction of their short stroke gripping and ungripping movements.

3. The improvement as defined in claim 1 wherein said second power means includes spring means and fluid piston means arranged to act in opposed relationship.

4. The improvement as defined in claim 1 wherein said first power means includes a rotatable screw member drivingly connected between said edge guide members, and said second power means includes means including fluid pistons interposed between said rotatable screw and each of said side guide members.

5. The improvement as defined in claim 1 wherein said first power means includes a rotatable screw member drivingly connected through non-rotatable nut members with said side guide members and wherein said

second power means includes fluid piston means positioned between said nut members and said edge guide members.

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