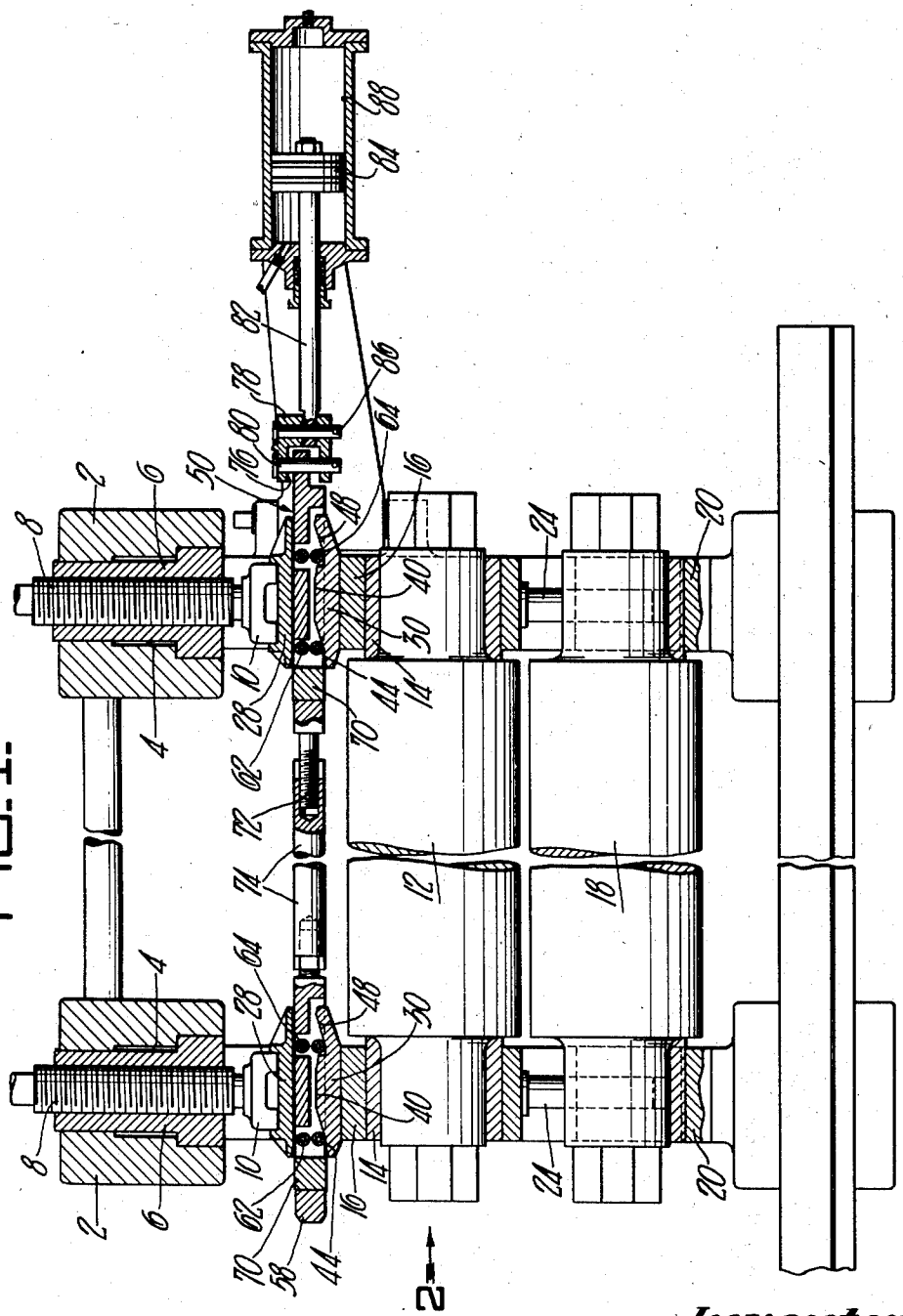
Oct. 10, 1950 A. F. KRITSCHER 2,525,687

SEPARATION DEVICE FOR ROLLING MILLS

Filed April 10, 1946 4 Sheets-Sheet 1

FIG. 1.



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SEPARATION DEVICE FOR ROLLING MILLS

Filed April 10, 1946 4 Sheets-Sheet 2

FIG. 2.

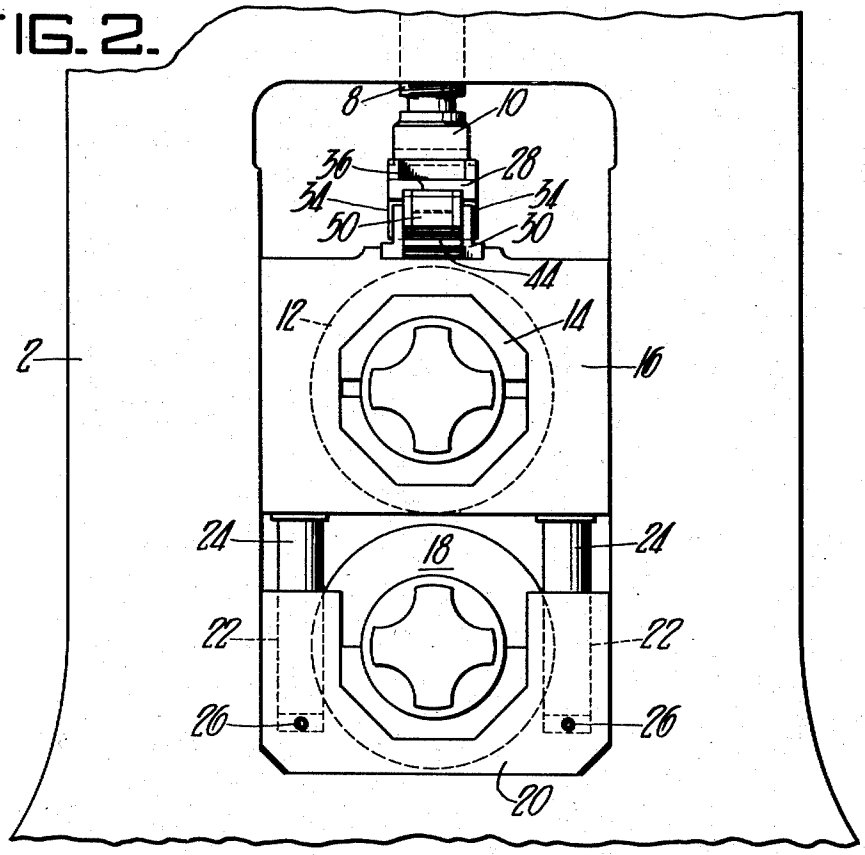


FIG. 5.

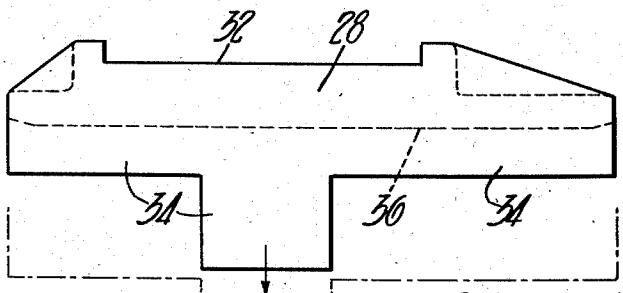
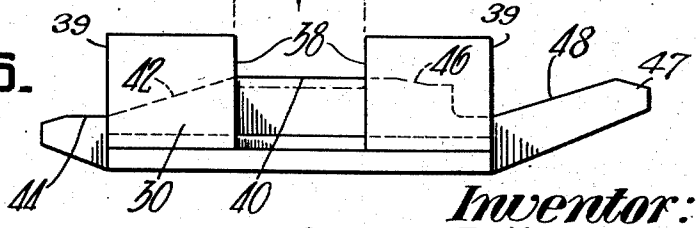


FIG. 6.



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SEPARATION DEVICE FOR ROLLING MILLS

Filed April 10, 1946 4 Sheets-Sheet 3

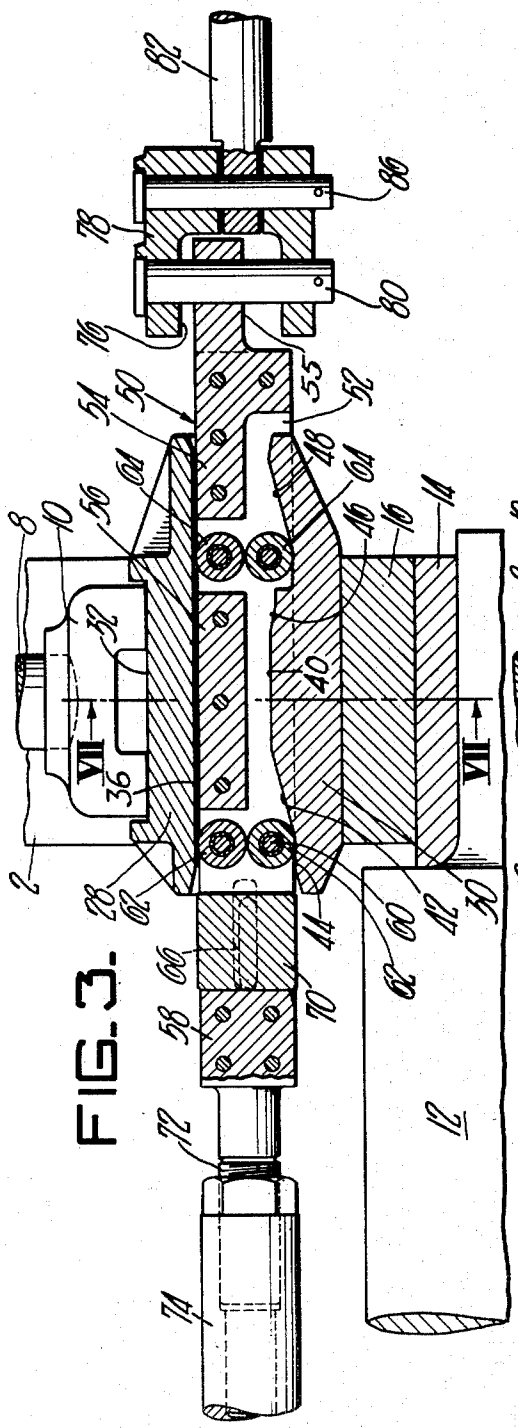


FIG. 3.

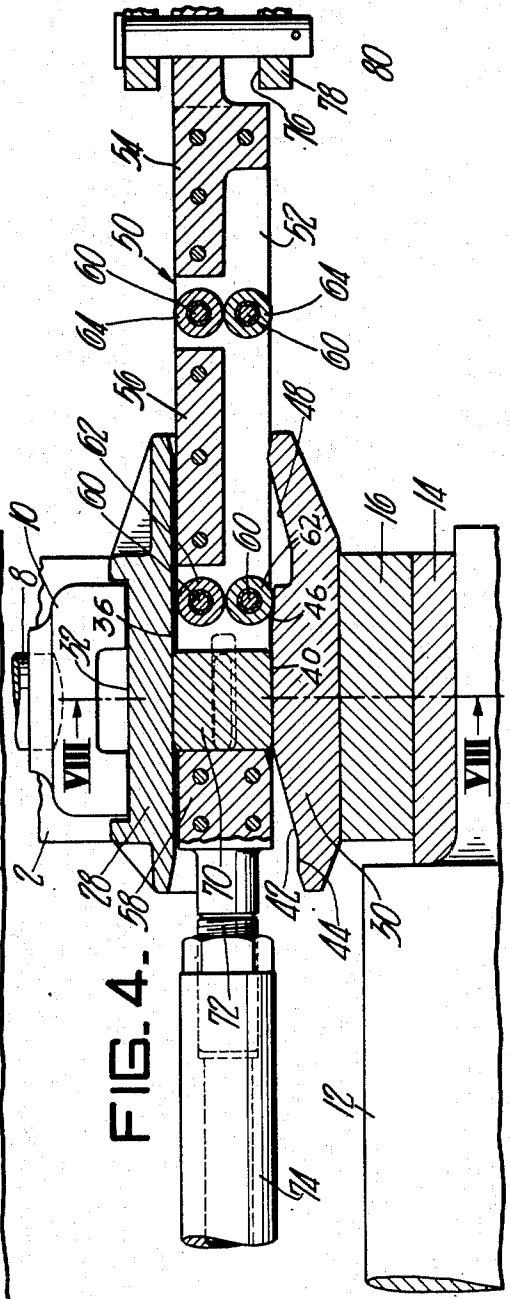


FIG. 4.

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Oct. 10, 1950 A. F. KRITSCHER 2,525,687

SEPARATION DEVICE FOR ROLLING MILLS

Filed April 10, 1946 4 Sheets-Sheet 4

FIG. 7.

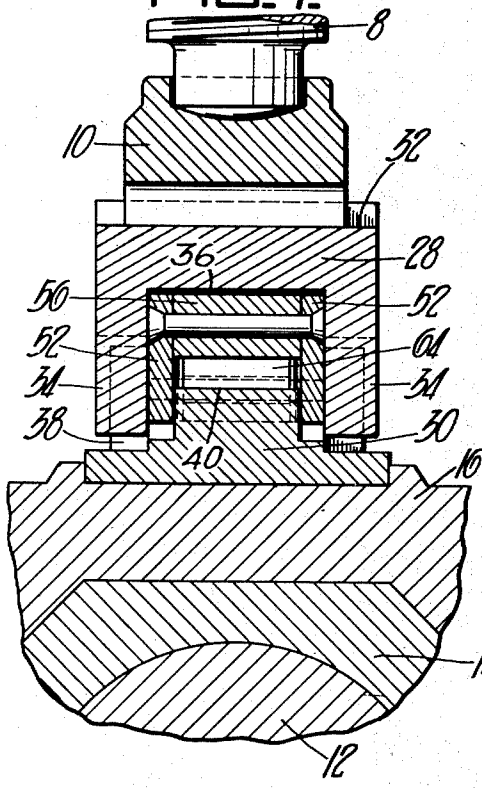


FIG. 8.

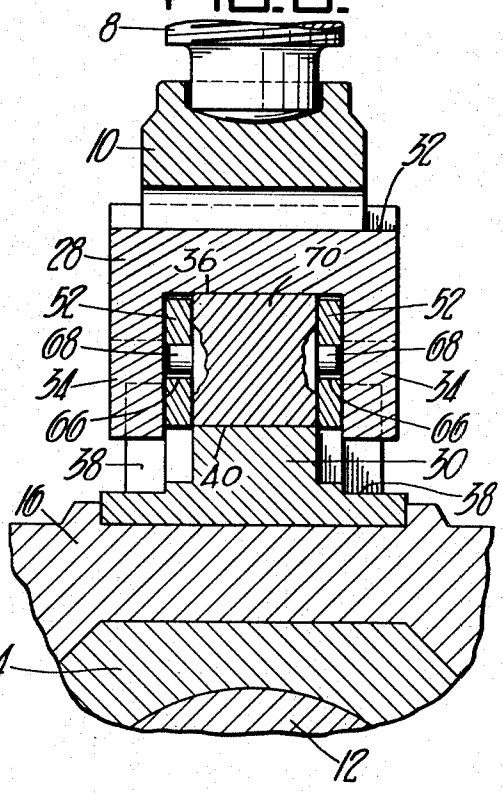


FIG. 9.

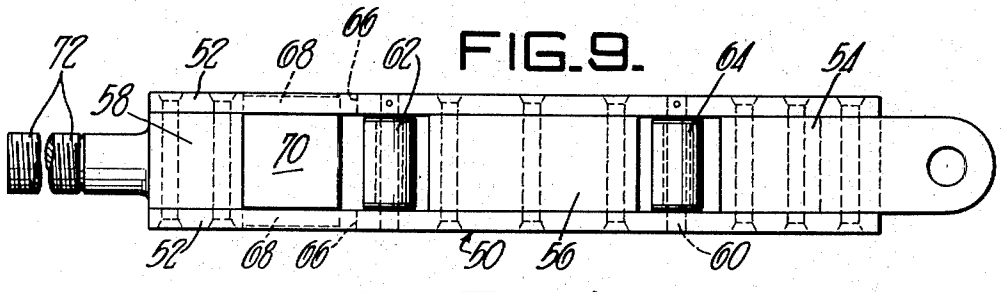
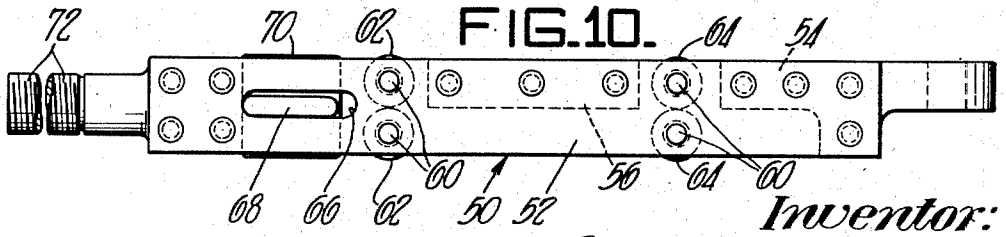


FIG. 10.



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Patented Oct. 10, 1950

2,525,687

UNITED STATES PATENT OFFICE

2,525,687

SEPARATION DEVICE FOR ROLLING MILLS

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Application April 10, 1946, Serial No. 660,922

2 Claims. (Cl. 80—56)

1

This invention relates to a separation device for a rolling mill and more particularly to such a device for use with the upper roll of a tube rolling mill. In rolling tubes in a plug mill the upper roll is raised to permit the workpiece to be stripped off the bar and returned to the entering side of the mill after each pass over the plug. Prior to my invention, this was accomplished by withdrawing a wedge which was located between the top chock and the mill screw, thus permitting the roll counterbalance to raise the roll. After the workpiece was returned to the entering side of the mill, the wedge was moved back into position between the chock and mill screw by means of an air cylinder, thus forcing the roll down into rolling position. Due to the shock load and the resilient nature of the operating medium, it is difficult to hold the wedge accurately in place, thus causing gage variations in the workpiece.

It is an object of my invention to provide a roll separation device which does not have any wedge contact surfaces during the rolling operation.

This and other objects will be more apparent after referring to the following specification and attached drawings, in which:

Figure 1 is a front elevation, partly in cross-section, of my separation device in place on a roll stand;

Figure 2 is a side elevation taken in the direction of arrow 2 in Figure 1;

Figure 3 is an enlarged sectional view showing the separation device in retracted position;

Figure 4 is a view similar to Figure 3, but showing the separation device in operative position;

Figure 5 is a side elevation of the top guide;

Figure 6 is a side elevation of the bottom guide;

Figure 7 is a sectional view taken on the line VII—VII of Figure 3;

Figure 8 is a sectional view taken on the line VIII—VIII of Figure 4;

Figure 9 is a plan view of the carriage of my device; and

Figure 10 is a side elevation of the carriage of Figure 9.

Referring more particularly to the drawings the reference numeral 2 indicates the housing of a rolling mill having spaced apart openings 4 therein. Each of the openings has a nut 6 secured therein for receiving a screw 8. The bottom of the screw 8 rests in a bearing 10, this providing the usual screwdown mechanism. The top roll 12 of the rolling mill is journalled in spaced apart bearings 14 which are carried by

2

the spaced apart top chocks 16, which in turn are mounted for sliding vertical movement in the housing 2. The bottom roll 18 is mounted in the bottom chocks 20, each of which is provided with a pair of cylinders 22. Fastened to each of the top chocks 16 are a pair of pistons 24 which extend downwardly into the cylinders 22. Fluid introduced through conduit 26 into the bottom of the cylinders 22 hold the top roll 12 against the pressure of the screwdown, thus acting as a counterbalance for the roll. The mechanism so far described is that commonly used in plug mills.

Between the screwdown and top chock 16 at each end of the roll are located interlocking guides 28 and 30. The top guide 28 has an opening 32 at the top thereof which fits over the bottom of bearing 10 and is secured thereto in any suitable manner. Flanges 34 extend downwardly from the main portion of the guide 28. A guiding surface 36 which is normal to the axis of the screw 8 is located between the flanges 34. Portions of the flanges 34 extend downwardly into openings 38 between spaced apart flanges 39 of the bottom guide 30 which is fastened to the top surface of the chock 16 in any suitable manner. The bottom guide 30 has a central portion 40 which is parallel to the top guiding surface 36. A portion 42 merges with the portion 40 and slopes away therefrom to a substantially horizontal portion 44. A second sloping portion 46 merges with the parallel portion 40 on the outer side thereof and slopes away toward the chock 16 at an angle less than that of portion 42. A third sloping portion 48, which is parallel to the sloping portion 42 is provided on the outer end of the lower guide 30 and merges with a sloping portion 47 parallel to portion 46.

Connected carriages 50 are provided for reciprocating movement in the guides 28 and 30. Each of the carriages 50 consists of two side bars 52 which are fastened together and held in spaced apart relationship by separators 54, 56 and 58. Pins 60 extend between bars 52 and rotatably support two pairs of rollers 62 and 64. The distance between rollers 62 and 64 is equal to the distance between corresponding portions of sloping portions 42 and 48. The bars 52 are provided with openings 66 adjacent the rollers 62 for receiving lugs 68 of a sliding block 70. The separators 58 have a bolt extension 72 thereon which are connected by means of an adjustable member 74. One of the separators 54 has an extension 55 thereon which is received

between the bifurcations 76 of a crosshead 78 and is fastened thereto by means of the pin 80. The crosshead 78 is fastened to a piston rod 82 of a piston 84 by means of a pin 86. The piston 84 is slidably received in the cylinder 88.

The operation of the device is as follows:

When it is desired to withdraw the carriages 50 from between the guides 28 and 30, fluid is introduced into the right end of cylinder 88. This moves the carriage from the position shown in Figure 4 to the position shown in Figure 3 with the rollers 62 passing from surface 46 over portion 40 to the bottom of portion 42. At the same time rollers 64 move to the bottom of portion 48. This moves the sliding block 70 from between the parallel portions of the guides 28 and 30 to a position inwardly of the guides, thus providing space which permits the fluid in cylinders 22 to raise the upper chock 16. After the workpiece is returned to the mill entrance, fluid is introduced to the left end of cylinder 88 to move the carriage outwardly to the position shown in Figure 4. In this movement the rollers 62 and 64 ride upwardly on surfaces 42 and 48, respectively, forcing the top roll 12 downwardly into working position. Continued movement carries the rollers 62 over the surface 40 to the sloping surface 46, in which position the sliding block 70 is located between the parallel surfaces of the top and bottom guides 28 and 30. The height of block 70 is slightly less than the overall height of the rollers 62 and 64 so that it does not contact the guides until the rollers pass down the inclined surfaces 46 and 47. As the rollers 62 and 64 pass down the inclined surfaces 46 and 47 the load is removed from the rollers and taken by the block 70. In some instances the rollers 62 and 64 may be omitted, in which case there will be sliding contact between the guide and carriage instead of rolling contact. From the foregoing it is seen that the pressure is applied to the roll 12 through surfaces which are normal to the direction of the pressure so that the roll is held accurately in place.

While one embodiment of my invention has been shown and described it will be apparent that other adaptations and modifications may be made without departing from the scope of the following claims.

I claim:

1. A roll adjustment device for use between the roll screwdown and roll chock of a rolling mill which device comprises spaced apart guide surfaces between the screwdown and chock, a portion on one of said guide surfaces being normal to the axis of the screwdown, a portion on the other of said guide surfaces being parallel to the said portion of the first guide surface, a portion on said second guide surface merging with the said parallel portion and sloping away from the first guide surface, a second sloping portion merging with the said parallel portion on the side thereof opposite the first sloping portion and extending away from the first guide surface, a carriage mounted for movement between said guide surfaces, a pair of rollers mounted on said carriage, a block mounted on said carriage adjacent the rollers, the height of the block being slightly less than the overall height of the pair of rollers, and means for reciprocating said carriage between said guide surfaces whereby the pair of rollers moves from the remote part of the first sloping portion to the second sloping portion in which position the block rests between the parallel portions of the guide surfaces.

2. A roll adjustment device for use between the roll screwdown and roll chock of a rolling mill which device comprises spaced apart guide surfaces between the screwdown and chock, a portion on one of said guide surfaces being normal to the axis of the screwdown, a portion on the other of said guide surfaces being parallel to the said portion of the first guide surface, a portion on said second guide surface merging with the said parallel portion and sloping away from the first guide surface, a second sloping portion merging with the said parallel portion on the side thereof opposite the first sloping portion and extending away from the first guide surface, a third sloping portion parallel to the first sloping portion on the outer end of the last named guide surface, a carriage mounted for movement between said guide surfaces, spaced apart pairs of rollers mounted on said carriage, the distance between the rotating axes of said pairs of rollers being equal to the distance between corresponding points on the first and third sloping portions of the guide surface, a block mounted on the inner end of said carriage, the height of the block being slightly less than the overall height of each pair of rollers, and means for reciprocating said carriage between said guide surfaces whereby the inner pair of rollers move from the remote part of the first sloping portion to the second sloping portion in which position the block rests between the parallel portions of the guide surfaces.

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