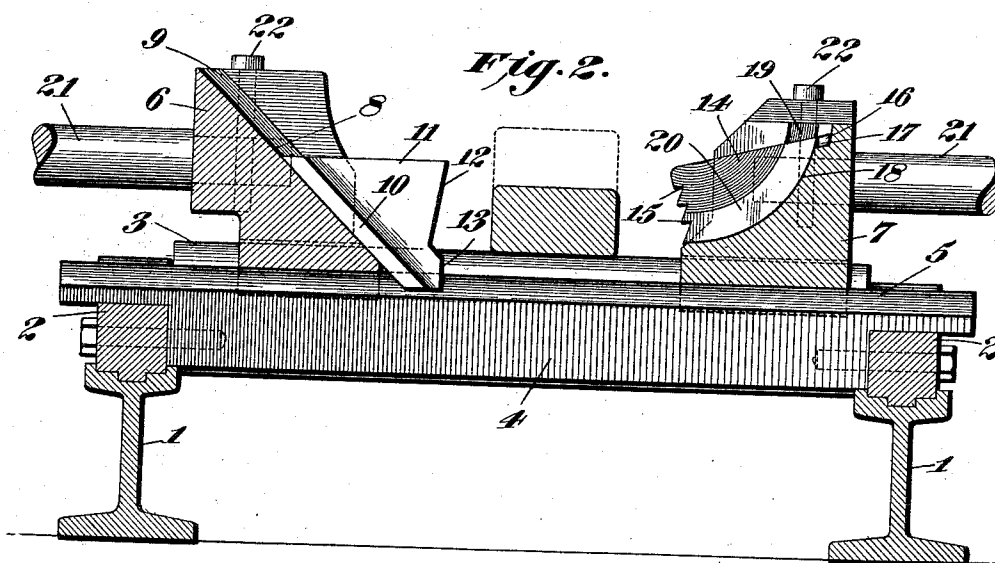
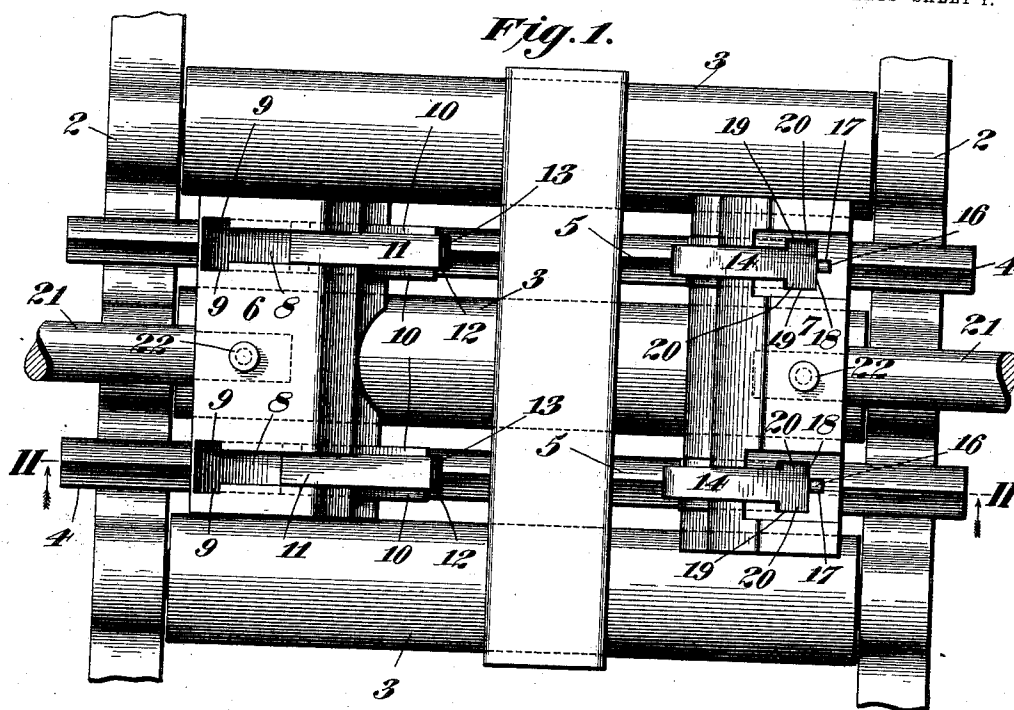


H. R. GEER.
ROLLING MILL APPLIANCE.
APPLICATION FILED NOV. 10, 1910.

1,019,315.

Patented Mar. 5, 1912.

2 SHEETS—SHEET 1.



WITNESSES,

Elmer Seavey
Robert A. Beers

INVENTOR.

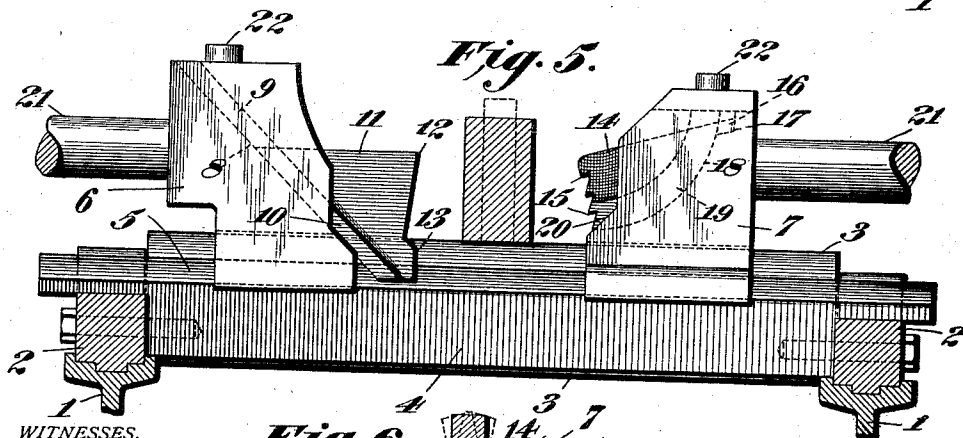
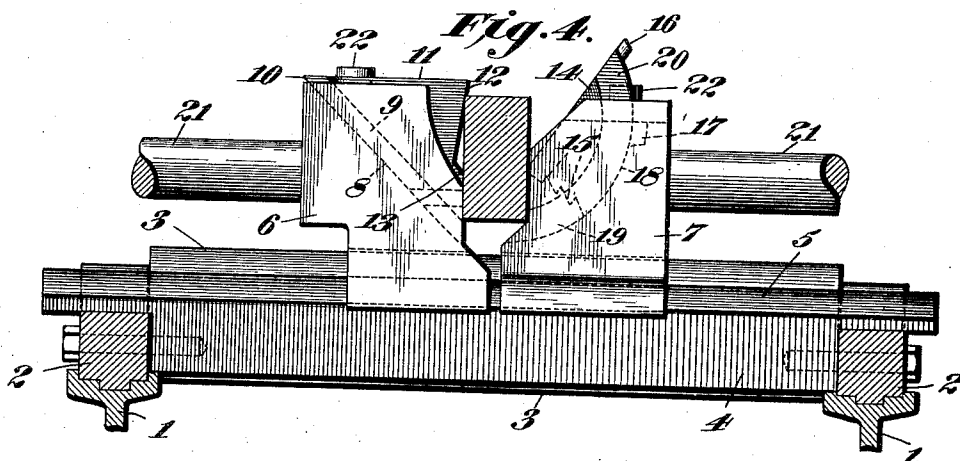
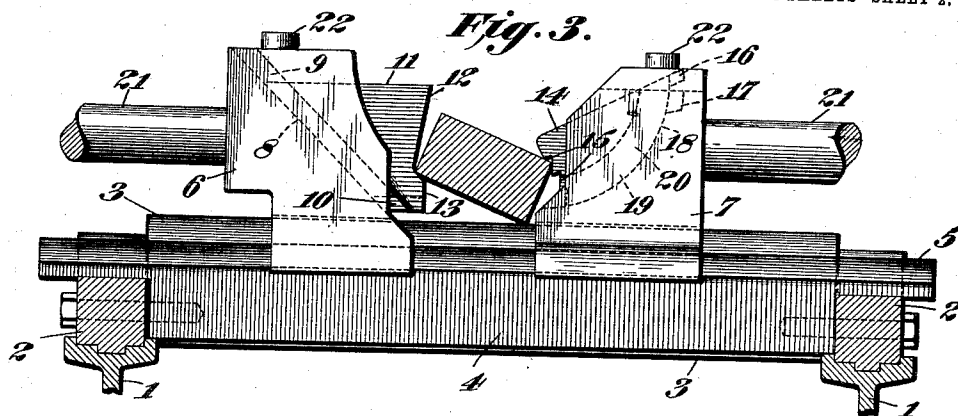
Harry R. Geer
by Geo. E. Thackray
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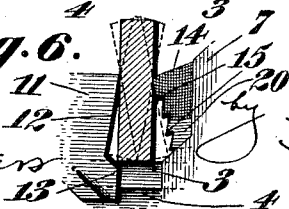
2 SHEETS—SHEET 2.



WITNESSES,

Elmer Seavey
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Fig. 6.



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UNITED STATES PATENT OFFICE.

HARRY R. GEER, OF JOHNSTOWN, PENNSYLVANIA.

ROLLING-MILL APPLIANCE.

1,019,315.

Specification of Letters Patent.

Patented Mar. 5, 1912.

Application filed November 10, 1910. Serial No. 591,591.

To all whom it may concern:

Be it known that I, HARRY R. GEER, a citizen of the United States, residing in the city of Johnstown, in the county of Cambria and State of Pennsylvania, have invented certain new and useful Improvements in Rolling-Mill Appliances; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to a device or appliance for the so-called "manipulation" of ingots, billets, slabs, rods or similar articles, in connection with their movement through the passes of a rolling-mill, preferably provided with feed-tables, and has for its object the positive mechanical handling of various shapes, of any size, section or length, either for turning the same on their sides, or for laterally shifting them in order that they may enter the successive passes in the required position.

Although my appliance may be used to mechanically manipulate bars or rods of various sections, I will, for sake of conciseness and clearness of description, describe and illustrate my invention in connection with what are known as blooming-mill or slab-mill shapes, such as ingots, blooms, billets and slabs, which are substantially rectangular in cross section, and in order to avoid useless repetition herein, I will refer to the ingot, bloom, billet, slab, rod, bar or other shape, as a "bar," with the understanding, however, that any section may be handled by my device.

While my appliance can operate on all sizes, it is especially adapted for "manipulating" the smaller squares or flats, as it has always been difficult with present means, to turn sections of this description, for the reason they will either assume a horizontal position, or will only be partially turned, so that hand wrenches have heretofore been employed to throw them in the desired vertical position.

In my invention I obtain the required movements of the bar by means of movable jaws mounted to work in slide-ways in the head-blocks in such a way as to enable the toe of one set of the movable jaws to engage under one corner edge and to raise that side of the bar, while the opposite set of jaws will engage the diagonally opposite corner edge

of the bar, gripping and holding it against upward movement, but allowing said corner edge to move downwardly when rotating, while the head-blocks are brought together, thus positively giving the bar a quarter-turn.

Having thus given this general description of my invention, I will now, in order to make same more clear, refer to the accompanying drawings forming part of this specification and in which similar characters refer to corresponding parts.

Figure 1 is a top plan view of my appliance and a portion of a roller feed-table showing my mechanism ready to operate upon a bar. Fig. 2 is a transverse vertical section taken on the line II—II of Fig. 1. Fig. 3 is a side elevation of my improved manipulator showing a rectangular bar in the act of being turned. Fig. 4 is a side elevation of my manipulator, after the bar has been given a quarter-turn and held between the head-blocks. Fig. 5 is a side elevation of my manipulator after the bar has been turned and the head-blocks have been retracted showing the bar resting on the roller feed-table ready to be passed through the rolls. Fig. 6 is a fragmentary detail view showing in full lines, a flat bar which has just been turned on edge. The full lines show the section and position of the end of the bar which is about to enter a corresponding pass in the rolls, while the dotted lines indicate sections at other locations showing a twist in the bar as is quite usual and sometimes unavoidable in hot rolling bars of the kinds in question.

By reason of the inclined faces of my manipulator jaws, and the wider space thereby attained between the lower portions thereof, I may readily handle bars although twisted, and present the entering ends thereof in proper relation to the pass in the rolls, thereby facilitating and making possible the rolling operation.

Referring now to the various characters of reference upon the drawings, 1 designates a suitable bed-frame upon which are mounted the bearings or journal-boxes 2 and in said bearings are journaled a plurality of transversely disposed rollers 3. On either side of one of the rollers are mounted the two transverse guideways 4 having their opposite ends supported by the bed-frame and secured thereto. The upper edges of the guideways are beveled as at 5, and upon these beveled edges the head-blocks 6 and 7

are adapted to slide. On the face of the head-block 6 are the slide-ways 8 slanting at an angle and having the undercut portions 9 in which slide the shoulders 10 of the lifting jaws 11. These jaws 11 are of substantially triangular form in side elevation, having a slightly overhanging face 12, at the bottom of which is a toe 13, beveled on its upper edge to engage the lower corner of the bar when the head-block is advanced. The jaws 11 when not operating to tilt a bar, normally rest with their lower surfaces in sliding contact with the beveled surfaces 5 of the transverse guideways 4, each of said jaws having a triangular notch in the bottom thereof to correspond with the beveled surface of said guideways. This construction thereby limits the downward and forward movement of said jaws.

By moving the head-block 6 inwardly, the sliding jaw 11 contacts with the bar and the continuance of said movement causes the beveled toe 13 of said jaw to engage the lower corner of said bar, whereupon the jaw 11 slides diagonally upward, thus turning said bar, as the diagonally opposite corner of same is held by the teeth 15 of the opposite jaw 14.

The sliding jaws 14 have teeth 15 for engaging the bar, and are also provided with stops 16 which engage the notches 17 in order to limit the downward and forward movement of the jaws. These jaws 14 play freely in the slideways 18 of the head-blocks 7, preferably describing the arc of a curve in their movement. The slide-ways 18 have curved undercuts 19 for the reception of the shoulders 20 of the sliding jaws 14, made to conform with the arc of the curved undercut slide-ways.

The operation of my device is as follows:—Assuming that the bar is in the position shown in Figs. 1 and 2, the head-blocks 6 and 7 are pushed toward each other by any suitable mechanism, as by means of hydraulic cylinders (not shown) having pistons or plungers attached to the rods 21, which rods are secured to the head blocks 6 and 7 by means of the pins 22, in such a manner as to give the head-blocks a reciprocating movement when the pistons are actuated backward or forward. As the head-blocks are pushed toward each other, the projecting faces 12 of the sliding jaws 11 come in contact with the corresponding surface of the bar, and the toes 13 extend under and engage the lower corner edge of the bar, while the teeth 15 on the sliding jaws 14 come in contact with the upper corner edge of the opposite surface of the bar. As the head-blocks 6 and 7 continue to approach each other, the sliding jaws 11 are raised by forcing the inclined faces of the head-block 6 inwardly under the correspondingly rear-inclined-surfaces of the jaws 11 and the toes

13, which project under the bar, raise that side of the same, while the teeth 15 on the jaws 14 engaging the upper corner edge of the opposite surface of the bar, hold it against upward movement but allow it to move downwardly, as will be clearly seen by referring to Fig. 3. As the bar is turned the teeth 15 of the sliding jaw 14 keep in contact with the corner or surface of the bar and thus prevent it from lifting, thereby aiding the turning movement, as said jaw will slide diagonally upward by the pressure of the bar against it, and when said pressure is released or reduced, the jaw slides diagonally downward by gravity. My sliding jaw 14 is provided with curved shoulders 20 mounted in the curved undercuts 19, the curves being shown as circular, and the center of the circles of which the curves form parts is in a substantially vertical position above the teeth 15, when the jaw 14 is in its lower position. This construction is therefore such, that if the teeth 15 be subjected to an upward lifting pressure, this would merely have a tendency to move the jaw 14 toward the center of the circle and as it cannot move in this way, on account of the construction of the curved shoulders and corresponding undercuts it will thereby successfully resist such pressure. This, therefore, has the effect of holding one corner and one side of the bar from lifting, while the other side is beginning to be lifted, and not until after this is accomplished will the continuation of the rotation of the bar then move the jaw 14 diagonally upward along the circumference of the circle. In other words the jaw 14 is so constructed and arranged as to resist lifting motion at the time when needed, to start the turning of the bar and directly afterward the jaw 14 will yield and move in a diagonally upward direction to permit the continuation of the rotation. In this operation the jaw 14 will also act upon the side or corner of the bar by the force of gravity, which helps to hold the bar from lifting, and to a certain extent aids in rotating it, all as will be clearly understood on referring to the drawings and further descriptions herein. The angle of inclination of that portion of the slideway 18 in which the jaw 14 is moving, will determine whether the teeth 15 will merely hold the bar from lifting, or said teeth may follow the corner of the bar in its downward movement, thereby giving further aid in turning it. I wish it understood that I may modify the angle of inclination of the slideways to correspond with the action desired by the jaws moving therein. As the head-blocks continue to approach each other, the bar will be positively turned a quarter of a revolution, and if sufficient force is used, it may be slightly raised from the feed-table, assuming the position illustrated in Fig. 4. The head-blocks

are then retracted and the bar will rest on the feed-table, as shown in Fig. 5, ready to enter one of the passes between the rolls.

It is found in practice that rectangular, and particularly flat bars, may become twisted in rolling. It is therefore often the case when said bars are turned, in order to enter the next pass of the rolls, that the entering end of the bar is out of alinement with the roll pass when the ordinary means are used for handling the same. It is then necessary to give the bar a further partial turn, either to the right, or to the left, by means of wrenches, bars or other devices, in the hands of the rolling mill workmen, and this is very difficult and laborious with the larger sizes. My appliance will obviate this difficulty as shown particularly in Fig. 6. In this figure the location of the roll pass is indicated by the cross section of the bar in full lines, whereas the sections of the bar at other locations, either twisted to the right or left, are as shown by dotted lines.

By reason of the overhanging faces of my jaws, which thereby provide a considerably wider opening at the bottom than at the top thereof, the bar may be turned to any required angle by gripping the bar between the upper portions of the opposing jaws, or by supporting the bar between said jaws, which are apart a distance slightly greater than the thickness of the bar, as may be necessary, and then moving one or both of said jaws to the right or left, as desired, thereby tipping the bar until the entering end assumes the correct position for its movement into the pass of the rolls, this tipping being accomplished with the aid of the frictional contact of the lower portion of the bar resting on the table which thereby prevents said bar from moving bodily laterally while the upper portion is moved as described to partially tilt the same. In making this movement the lower edge of the bar preferably rests upon the feed-table or rollers, and the upper portion of same is thus easily tipped to the right or to the left, as desired. In this connection it should be understood that my appliances are, either of necessity, or preferably, located at certain distances from the rolls, and this is similarly the case if other manipulating apparatus or workmen with hand tools are used, as there is no room nor opportunity for handling the very end of the entering bar for obvious reasons. If, therefore, the bar is twisted between my appliance and the roll pass, it can be righted for entering as just described.

I wish it understood that I may use in connection with a rolling mill feed-table, or the like, one or more of the manipulators described herein, and each of said manipulators may be composed of a pair of oppositely disposed head-blocks, in each of

which are mounted one or two, or more sliding jaws, all as may be necessary or expedient. My manipulator is also adapted to move a bar bodily sidewise, without rotating same, when so desired to register with a roll pass, or for other reasons, by pushing said bar with one of my head-blocks or jaws, or in the reverse direction by pushing it with the other head-block, or its jaw, or by maintaining the pressures between the opposing head-blocks and jaws and moving both of said head-blocks laterally in the same direction to the extent needed, as may be readily understood.

While I have shown and described my invention in considerable detail, I do not wish to be limited to the exact construction specified, but may apply to other uses than stated herein, and may use such substitutions, modifications, equivalents or alterations thereof, as fall within the scope of my invention, and set forth in the claims.

What I claim as new and desire to secure by Letters Patent is:

1. In a manipulator, a work receiving table, means mounted thereon for lifting one side of a bar and means for positively preventing the opposite side thereof from lifting, thereby rotating the same.

2. In a manipulator, a work receiving table, head-blocks mounted thereon, means movably carried by the head-blocks for lifting one side of a bar and means for positively preventing the opposite side thereof from lifting, thereby rotating the same.

3. In a manipulator for rolling-mills, a feed-table, and a plurality of means mounted thereon, acting to lift one side of the bar and a plurality of means to positively prevent the opposite side thereof from lifting, thereby rotating the same.

4. In a manipulator, a feed-table, guideways mounted thereon, head-blocks slidably mounted upon said guideways and means movably carried by the head-block on one side for lifting one side of a bar and means carried by the head-block on the opposite side of the bar for preventing said opposite side from lifting, thereby rotating the same.

5. In a manipulator, a feed-table, guideways mounted thereon, head-blocks slidably mounted upon said guideways, and sliding jaws carried by the head-blocks for lifting one side of a bar and for gripping and preventing the opposite side from lifting, thereby rotating the same.

6. In a manipulator, a feed-table, guideways mounted between the rollers, head-blocks slidably mounted upon said guideways, a sliding jaw carried by one of the head-blocks adapted to lift one side of the bar, and a sliding jaw carried by the opposite head-block for gripping and preventing the opposite side of the bar from lifting, thereby rotating the same.

7. In a manipulator, a feed-table, transverse guideways mounted thereon, head-blocks slidably mounted upon said guideways, sliding jaws carried by one of the head-blocks, said sliding jaws having each a projecting toe which slides under the bar for lifting that side of the same; and toothed sliding jaws carried by the opposite head-block for gripping and preventing the other side of the bar from lifting, thereby rotating the same.

8. In a manipulator, a feed-table, guideways mounted thereon, head-blocks slidably mounted upon said guideways, and a sliding jaw of substantially triangular form carried by one of the head-blocks, said sliding jaw having a projecting toe, adapted to pass under the bar for lifting one side of the same, the opposing head-block having a sliding jaw provided with a toothed face for gripping and preventing the opposite side of the bar from lifting.

9. In a manipulator, a reciprocative head-block having mounted thereon, a diagonally slidable jaw provided with a plain face and a projecting toe at the base thereof, and an oppositely disposed reciprocative head-block provided with an arcuately slidable jaw having a toothed face.

10. In a manipulator, a reciprocative head-block having mounted thereon, a diagonally slidable jaw provided with a plain overhanging face and a projecting toe near the base thereof, and an oppositely disposed reciprocative head-block provided with an arcuately slidable jaw having a toothed overhanging face, whereby a bar may be rotated, more or less as required, by the co-operative pressure and movement of said head-blocks and jaws.

11. A manipulator comprising guideways, having head-blocks slidably mounted thereon, one of said head-blocks having an inclined way in which is slidably mounted a substantially triangular jaw provided with an overhanging face, and a toe at the bottom of said face adapted to engage and raise the lower corner edge of a bar; and an oppositely disposed slidable head-block carrying a sliding jaw having a toothed face for preventing the opposite side of the bar from lifting.

12. A manipulator comprising a feed-table, guideways mounted between the rollers, head-blocks slidably mounted upon the guideways, one of said head-blocks having an inclined way in which is slidably mounted an overhanging faced triangular-shaped jaw, a toe at the bottom of said overhanging face adapted to engage the lower corner edge for lifting one side of the bar; and an oppositely disposed slidable head-block having a slideway formed on the arc of a curve in which is slidably mounted a jaw having a toothed face for preventing the opposite

side of the bar from lifting, thereby rotating the same.

13. In a manipulator, a feed-table, guideways mounted between the rollers, head-blocks slidably mounted upon the guideways, one of said head-blocks having a plurality of inclined ways in which slide triangular-shaped jaws with overhanging faces and provided with toes at the bottoms of said faces to engage the lower corner of the bar and raise that side of the same when the inclined ways of the head-block are forced inwardly under the triangular-shaped jaws; an oppositely disposed slidable head-block having a plurality of slide ways formed on the arc of a curve, and jaws sliding in the said curved ways, said jaws having toothed faces for gripping and holding the opposite side of the bar, thus rotating the same.

14. In a manipulator, a feed-table, guideways mounted between the rollers, head-blocks slidably mounted upon the guideways, one of said head-blocks having a plurality of inclined ways, and a plurality of triangular-shaped jaws sliding in said inclined ways, toes extending from the lower portions of said jaws and adapted to engage the lower corner edge of a bar and raise that side of the same when the inclined ways of the head-block are forced inwardly under the triangular-shaped jaws aforesaid; an oppositely disposed slidable head-block having a plurality of slide ways formed on the arc of a curve; jaws sliding in the said curved ways and having toothed faces for gripping and depressing the opposite side of the bar, and means for limiting the forward movement of said toothed jaws.

15. In a manipulator, a feed-table, guideways mounted transversely between the rollers, a pair of head-blocks slidably mounted upon the guideways, means carried by one of the head-blocks for raising one side of the bar and means carried by the opposite head-block for gripping and depressing the other side of the bar, thereby positively turning the bar ninety degrees, more or less, as desired.

16. In a manipulator, a feed-table, guideways mounted between the rollers, head-blocks slidably mounted upon the guideways, one of said head-blocks having a plurality of undercut inclined slideways, a plurality of triangular-shaped jaws with outwardly extending shoulders sliding in said undercut inclined slideways, toes extending from the lower portions of said jaws adapted to engage the lower corner edge of the bar and raise that side of the same when the said head-block is forced inwardly under the triangular-shaped jaws; the oppositely disposed head-block having a plurality of undercut slideways formed on the arc of a

curve, jaws having outwardly extending shoulders sliding in the curved undercut slideways, said jaws each having a toothed face for gripping and depressing the opposite side of the bar, and means for limiting the forward movement of said toothed jaws.

17. In a manipulator, a feed-table, guideways mounted transversely between the rollers, a pair of head-blocks slidably mounted opposite each other upon the guideways, one of said head-blocks having a plurality of undercut inclined slideways, a plurality of triangular-shaped jaws normally resting on the guideways to limit the movement of said jaws, said triangular-shaped jaws having outwardly extending shoulders sliding in said undercut inclined slideways, each of said jaws having a toe at its lower portion extending therefrom and adapted to engage the lower corner of a bar and raise that side of the same when the said head-block is forced inwardly under the triangular-shaped jaws aforesaid; the opposite head-block having a plurality of curved slideways

formed on the arc of a curve, sliding jaws working therein, each having an outwardly extending shoulder and an inner face conforming to the arc of the curved undercut slideways, each of said latter named jaws having a toothed face adapted to grip and hold that side of the bar, and a stop for limiting the forward movement of the said latter named jaws.

18. In a manipulator the combination with a work receiving table of a pair of oppositely disposed reciprocative head-blocks provided with overhanging faces forming an opening between them of greater width at the bottom than at the top thereof, whereby a bar resting on said table may be tilted more or less, as desired, by the coöperative action of said reciprocative head-blocks.

In testimony whereof I hereto affix my signature in the presence of two witnesses.

HARRY R. GEER.

Witnesses:

ELMER SEAVEY,
ROBERT A. BEERS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."