G. A. ENSIGN.

MULTIPLE COPYING LATHE.

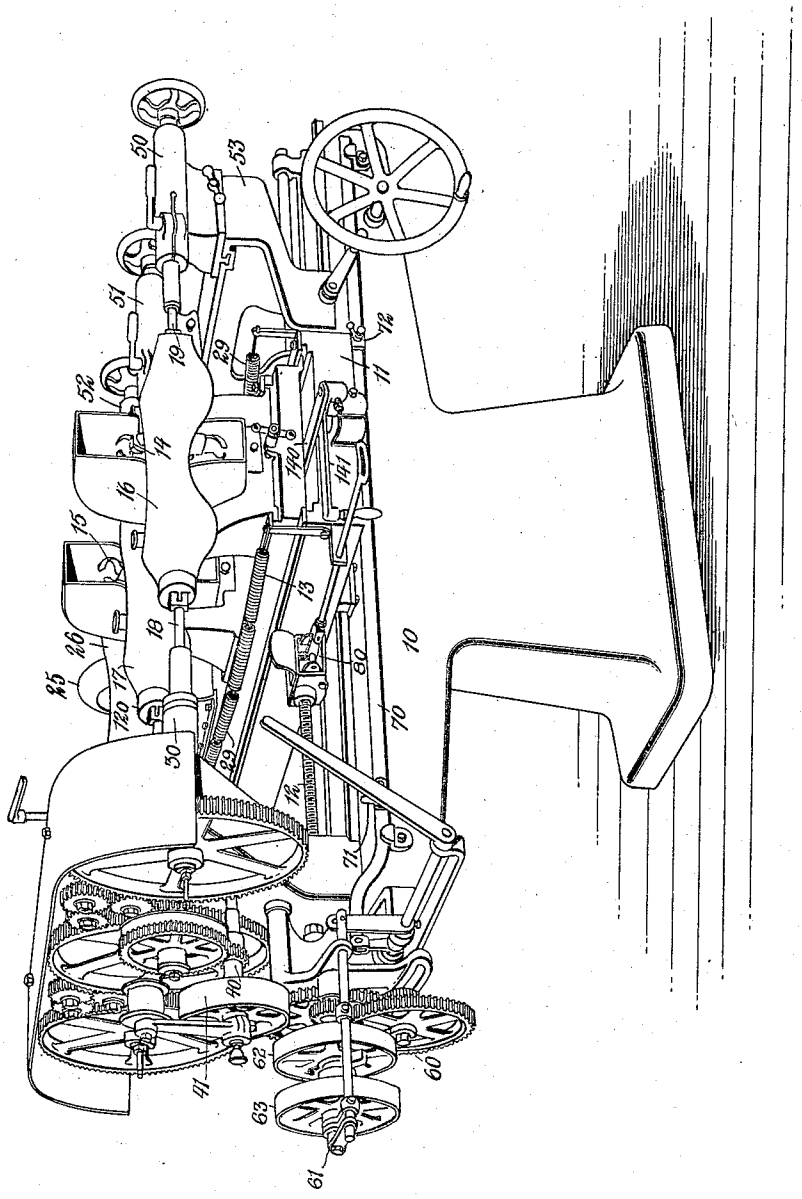
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1,277,203.

Patented Aug. 27, 1918.

4 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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4 SHEETS—SHEET 2.

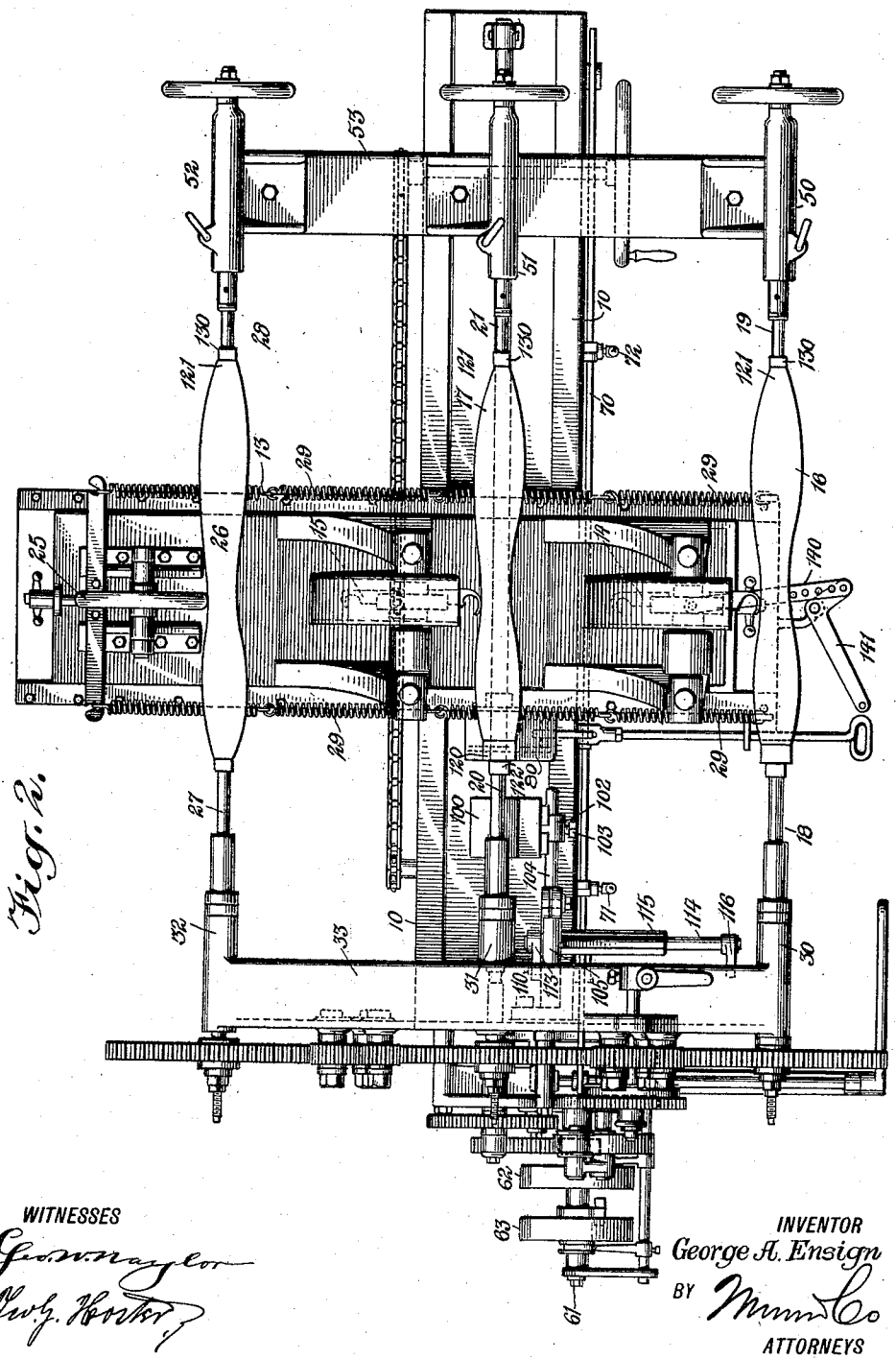


Fig. 2.

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4 SHEETS—SHEET 3.

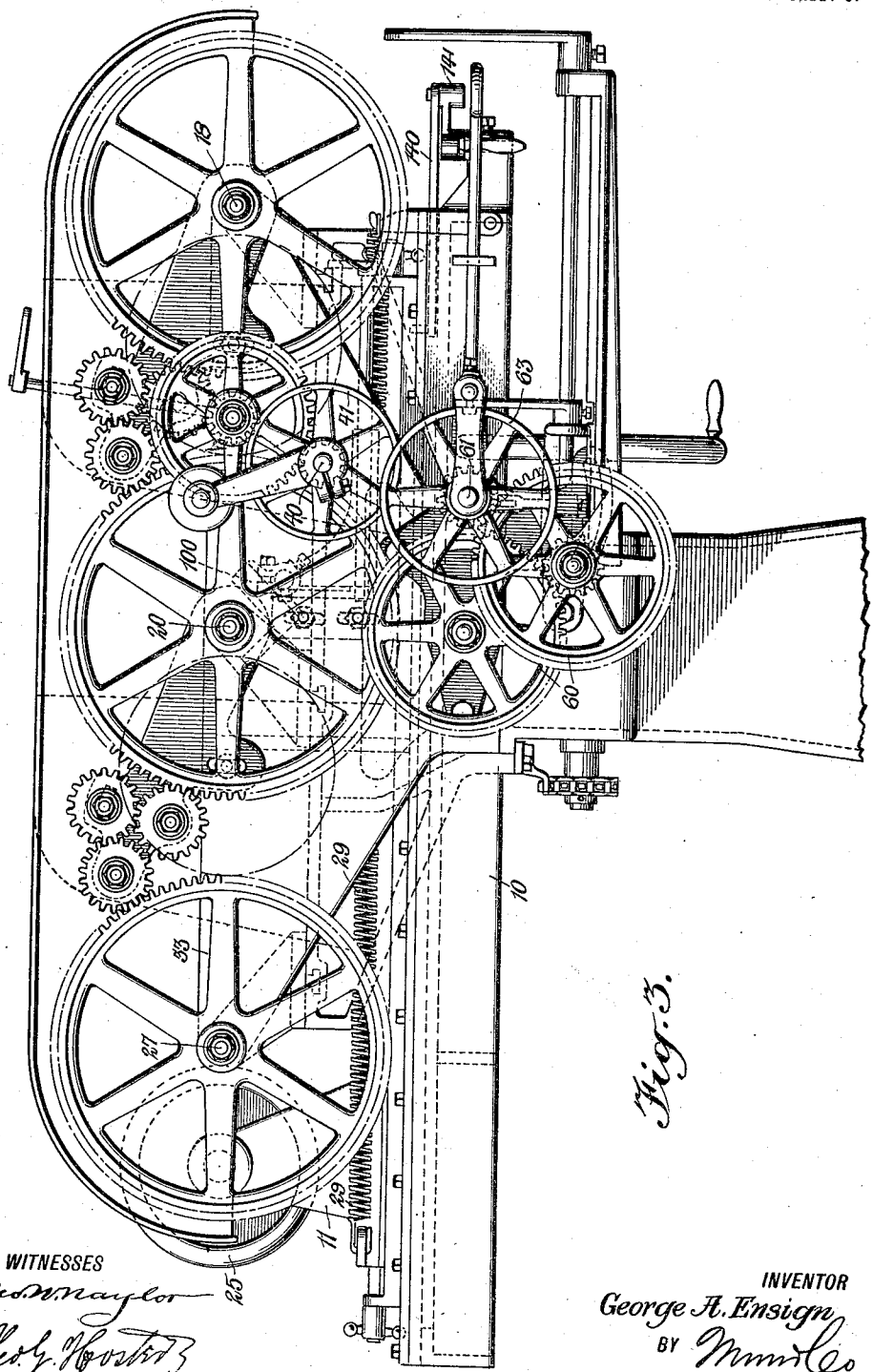


Fig. 3.

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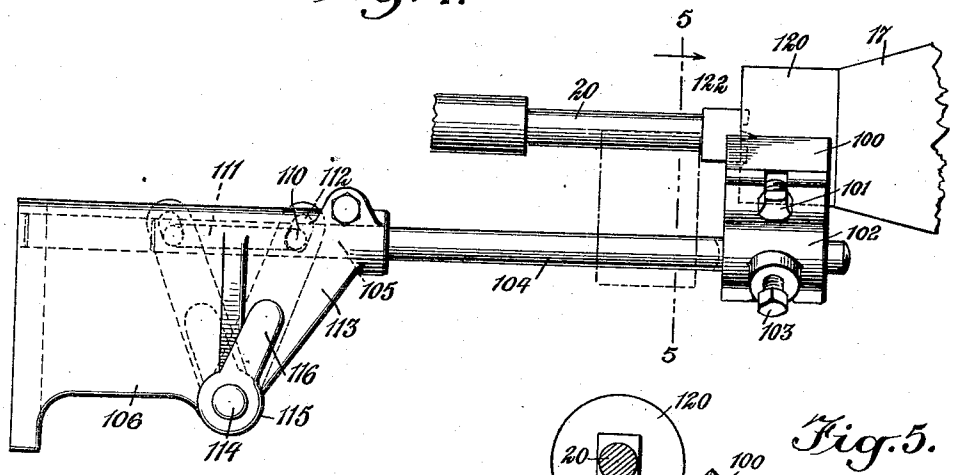
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4 SHEETS—SHEET 4.

Fig. 4.



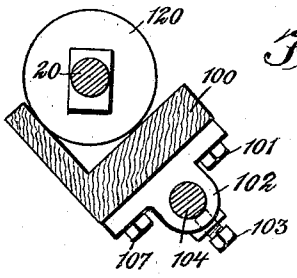
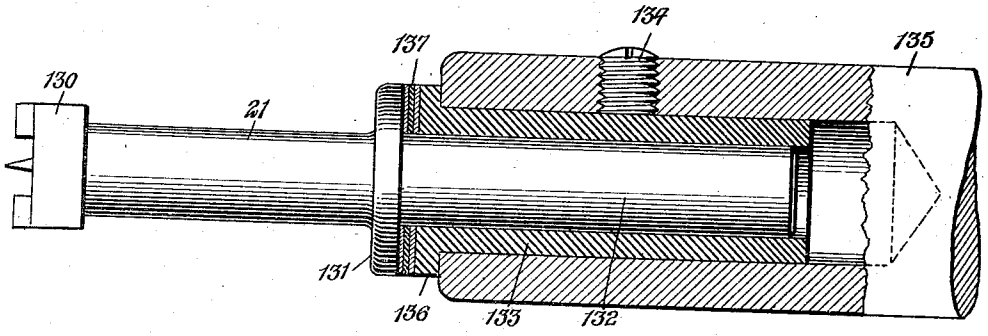


Fig. 5.

Fig. 6.



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UNITED STATES PATENT OFFICE.

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MULTIPLE-COPYING LATHE.

1,277,203. Specification of Letters Patent. Patented Aug. 27, 1918.

Appication filed December 26, 1917. Serial No. 208,840.

To all whom it may concern:

Be it known that I, GEORGE A. ENSIGN, a citizen of the United States, and a resident of Defiance, in the county of Defiance and State of Ohio, have invented a new and Improved Multiple-Copying Lathe, of which the following is a full, clear, and exact description.

The invention relates to copying lathes such as shown and described in the Letters Patent of the United States, No. 723,044, granted to Charles Seymour on March 17, 1903.

The object of the present invention is to provide a new and improved copying lathe more especially designed for turning gun stocks, shoe lasts and other articles of regular or irregular form, and arranged to permit of producing, at least, two like articles at one operation of the machine thus increasing the output thereof. Another object is to permit the operator to accurately and quickly center one end of the remotest piece of work relative to its headstock spindle.

With these and other objects in view, the invention consists of certain novel features of construction as hereinafter shown and described and then specifically pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a perspective view of the multiple copying lathe;

Fig. 2 is a plan view of the same;

Fig. 3 is an elevation of the left hand end of the multiple copying lathe;

Fig. 4 is an enlarged front view of the centering device for the work to be engaged with the rearmost work-carrying headstock spindle;

Fig. 5 is a cross section of the same on the line 5—5 of Fig. 4; and

Fig. 6 is an enlarged sectional side elevation of one of the revoluble tailstock centers.

The multiple copying lathe is mounted on a suitably constructed bed 10 on which is held to slide longitudinally a carriage 11 moved forward and backward by the usual feed screw 12. On the carriage 11 is mounted to slide transversely a crosshead 13 on which are journaled a plurality of cutter heads 14 and 15, of which the cutter head 14 is arranged in front of the cutter head 15, and the cutter heads 14 and 15 are adapted to act on the pieces of work 16 and 17, of which the piece of work 16 is held on a headstock spindle 18 and a tailstock center 19, and the piece of work 17 is held on a headstock spindle 20 and a tailstock center 21.

On the rear of the crosshead 13 is journaled a pattern contact 25 in the form of a wheel in contact with a pattern 26 held on a headstock spindle 27 and a tailstock center 28. Springs 29 connect the carriage 11 with the crosshead 13 to hold the pattern contact 25 in contact at all times with the revolving pattern 26. The headstock spindles 18, 20 and 27 are journaled in suitable bearings 30, 31 and 32 arranged on a headstock 33 mounted on the main frame 10. The headstock spindles 18, 20 and 27 are rotated in unison by a suitable gearing connected with the main shaft 40 carrying a pulley 41 connected by belt with other machinery to continually rotate the main driving shaft which by the gearing rotates the headstock spindles 18, 20 and 27 in unison and with them the pieces of work 16 and 17 and the pattern 26. The tailstock centers 19, 21 and 28 are mounted to rotate in suitable bearings 50, 51 and 52 arranged on a tailstock 53 held longitudinally adjustable on the bed 10 of the machine.

In order to impart the desired forward and backward motion to the carriage 11 by the feed screw 12 it is necessary to rotate the latter alternately in opposite directions and for this purpose the feed screw 12 is connected by a suitable changeable gearing 60 with a driving shaft 61 carrying loose pulleys 62, 63 connected by belts with suitable machinery for rotating the pulleys in opposite directions, and the said pulleys are adapted to be engaged by the usual clutch mechanisms controlled by a shifting rod 70 provided with the usual adjustable stops 71, 72 adapted to be engaged by the sides of the carriage 11 so that the latter moves alternately in contact with the stops 71 and 72 to shift the rod 70 whereby one friction clutch is moved in engagement with the corresponding pulley 62 or 63 while the other friction clutch is moved out of engagement and vice versa. Thus the main driving

shaft 61 is alternately rotated in opposite directions and a similar movement is given to the feed screw 12 to move the carriage 11 forward and backward on the bed 10. The carriage 11 is provided with a sectional nut device 80 of usual construction for connecting the carriage 11 with the feed screw 12 or for disconnecting the carriage from the said feed screw whenever it is desired to run the carriage forward or backward by hand. This hand-feeding device for the carriage 11 is of usual construction so that further description of the same is not deemed necessary.

When the machine is running, the pieces of work 16 and 17 and the pattern 26 are rotated, and the pattern contact 25 is in contact with the pattern 26 thus positioning the cutter heads 14 and 15 correspondingly relative to the pieces of work 16 and 17 to fashion the latter according to the pattern 26. It is understood that the carriage 11 is moved alternately to the right or to the left so that the pattern contact 25 is caused to travel lengthwise of the pattern and the cutter heads 14 and 15 to travel in a similar direction relative to their pieces of work 16 and 17 to shape the same from end to end according to the pattern 26.

In order to facilitate the centering of the rearmost piece of work 17 relative to its headstock spindle 20, use is made of a V-shaped support 100 (Figs. 2, 4 and 5) arranged below the headstock spindle 20 and adjustably secured by bolts 101 to a bracket 102 adjustably fastened by a set screw 103 to a rod 104 extending below and parallel to the headstock spindle 20. The rod 104 is mounted to slide in a bearing 105 formed on a bracket 106 secured to the headstock 33, and the rod 104 is provided with a pin 110 extending through a slot 111 formed in the rear of the bearing 105. The pin 110 projects into a slot 112 formed in the arm 113 secured to a rock shaft 114 journaled in a bearing 115 forming part of the bracket 106. The forward end of the shaft 114 is provided with a suitable handle 116 within convenient reach of the operator standing at the front of the machine. When it is desired to place a piece of work 17 in position on the headstock spindle 20 and the tailstock center 21 then the latter is retracted in the usual manner and the operator swings the handle 116 from the left to the right to shift the support 100 from the position shown in Fig. 2 to the position shown in Fig. 4, that is, from normal inactive position beyond the inner end of the headstock spindle 20 for the reception of the cylindrical end 120 of the piece of work 17. As the support 100 is in central position relative to the axis of the headstock spindle 20, it is evident that the cylindrical end 120 of the piece of work 17 is in central relation to the headstock spindle 20, as will be readily understood by reference to Figs. 4 and 5. After the end 120 of the piece of work 17 has been placed in engagement with the support 100 then the other end 121 of the piece of work 17 is engaged by the tailstock center 21 whereby the piece of work 17 is shifted from the right to the left and its end 120 is forcibly engaged with the bit 122 at the inner end of the headstock spindle 20. After this has been done, the operator returns the handle 116 to the position shown in Fig. 2 whereby the support 100 is moved out of engagement with the end 120 of the piece of work 17 to allow free subsequent rotation of the latter when the machine is started. It will be noticed that by the use of this self-centering support 100 the operator can conveniently place the end 120 of the piece of work 17 in proper position for engagement with the bit 122 of the headstock spindle 20, and this action is especially desirable as the operator cannot very well reach in and accurately place the end 120 of the piece of work 17 in position relative to the headstock spindle 20 without the aid of the centering support 100.

Each of the tail stock centers 19, 21 and 28 is provided with a bit 130 adapted to engage the corresponding end of the piece of work 16 or 17 or that of the pattern 26, and each tailstock center is provided with a collar 131 and a journal 132 mounted to rotate in a bearing 133 secured by a set screw 134 to the rod 135 slidable in the corresponding bearing 50, 51 or 52 in the usual manner. The bearing 133 is provided at its outer end with a collar 136 abutting against the end and the rod 135, and between this collar 136 and the collar 131 are interposed washers 137 to prevent direct contact between the collars and thus prevent the same from undue wear.

After the pieces of work 16 and 17 have been turned into the desired articles according to the pattern 26, the crosshead 13 is moved rearwardly to disengage the cutter heads 14 and 15 from the work and thus allow convenient removal of the same and the placing of other pieces of work to be next turned in position on the sets of headstock spindles 18, 20 and tailstock centers 19 and 21. In order to impart this rearward movement to the crosshead 13 use is made of a link 140 pivotally connecting the crosshead 13 with a bell crank lever 141 pivoted on the carriage 11 under the control of the operator standing in front of the machine. When the lever 141 is swung from the left to the right the link 140 pushes the crosshead 13 rearwardly against the tension of its spring 29. The lever 141 when in its extreme right hand end is past its central position thus holding the crosshead 13 locked in rearmost position until the lever 141 is again returned

to its left hand position after the new pieces of work 16 have been placed in position on the said headstock spindles 18 and 20 and tailstock centers 19 and 21.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:—

1. In a multiple copying lathe, sets of headstock spindles and tailstock centers arranged one in front of the other and each adapted to carry a piece of work, a V-shaped centering support arranged below the rearmost of the said work-carrying headstock spindles and adapted to support the end of the piece of work to be engaged by the said rearmost headstock spindle, a rod mounted to slide longitudinally of the machine in a bearing on the head stock and carrying the said support, and a rock shaft extending transversely of the machine and provided at its inner end with an arm engaging the said rod and provided at the outer end with a handle under the control of the operator.

2. In a multiple copying lathe, a head stock and a tail stock, the head stock being provided with a bracket having a slotted bearing, sets of spindles and centers carried by the head stocks and each adapted to carry a piece of work, a centering support having a recess in its upper edge and arranged below the rearmost of the said work-carrying spindles and in which the end of the work is adapted to rest, a rod carrying the support and slidably mounted in the bearing of the headstock, said rod being provided with a pin projecting through the slot of the said bearing, and a transverse rock shaft mounted in the bracket and having at its inner end an arm slotted to receive the pin of the rod and provided at its outer end with a handle for operating it.

GEORGE A. ENSIGN.

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