

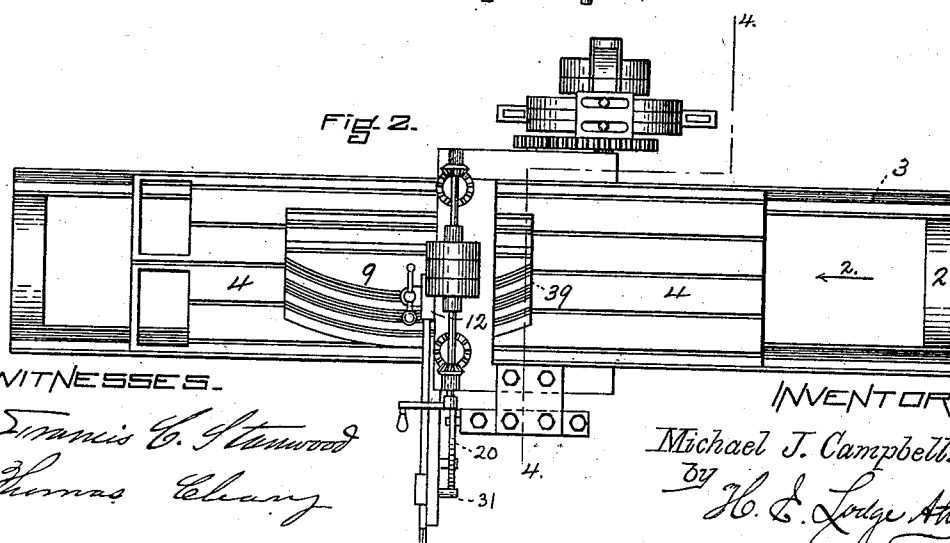
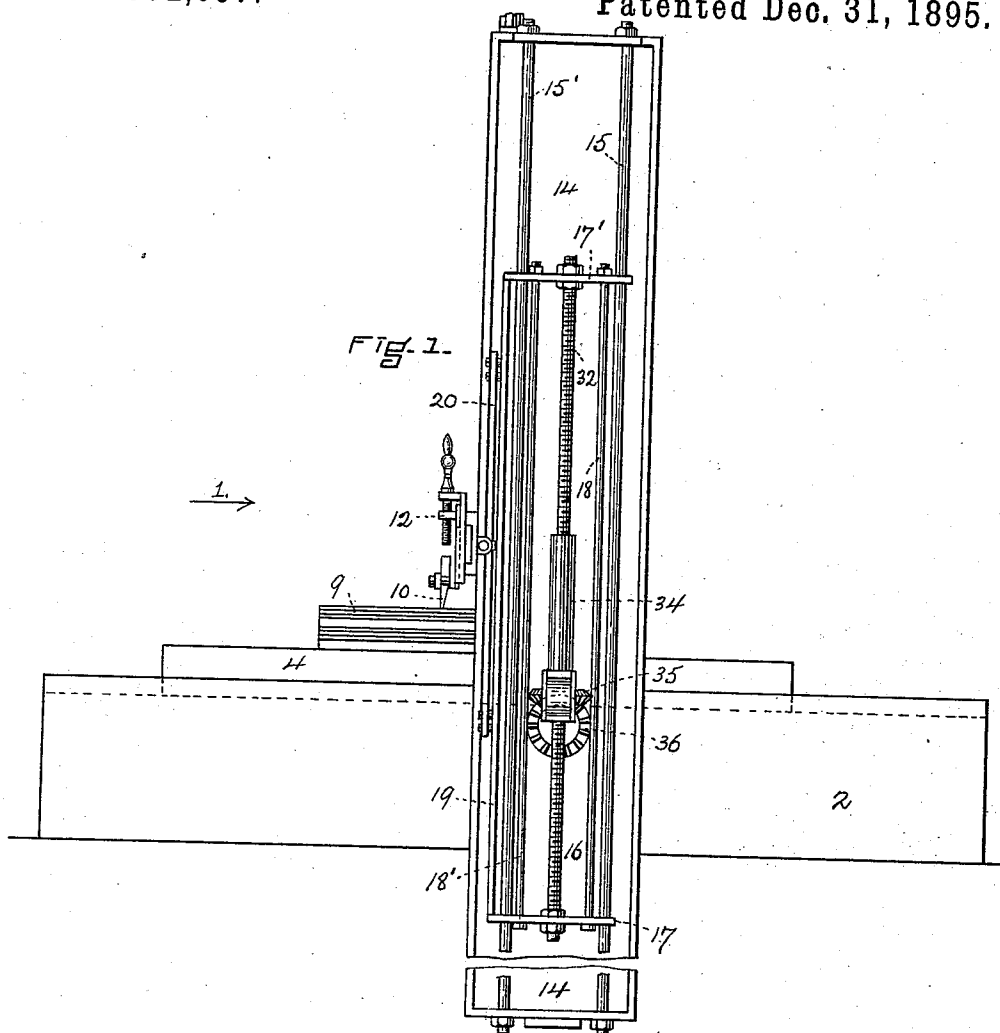
(No Model.)

M. J. CAMPBELL.
STONE PLANER.

3 Sheets—Sheet 1.

No. 552,097.

Patented Dec. 31, 1895.



WITNESSES.

Francis C. Stanwood
Thomas Chazy

INVENTOR -

Michael J. Campbell.

⁰⁷ H. C. Lodge Atty.

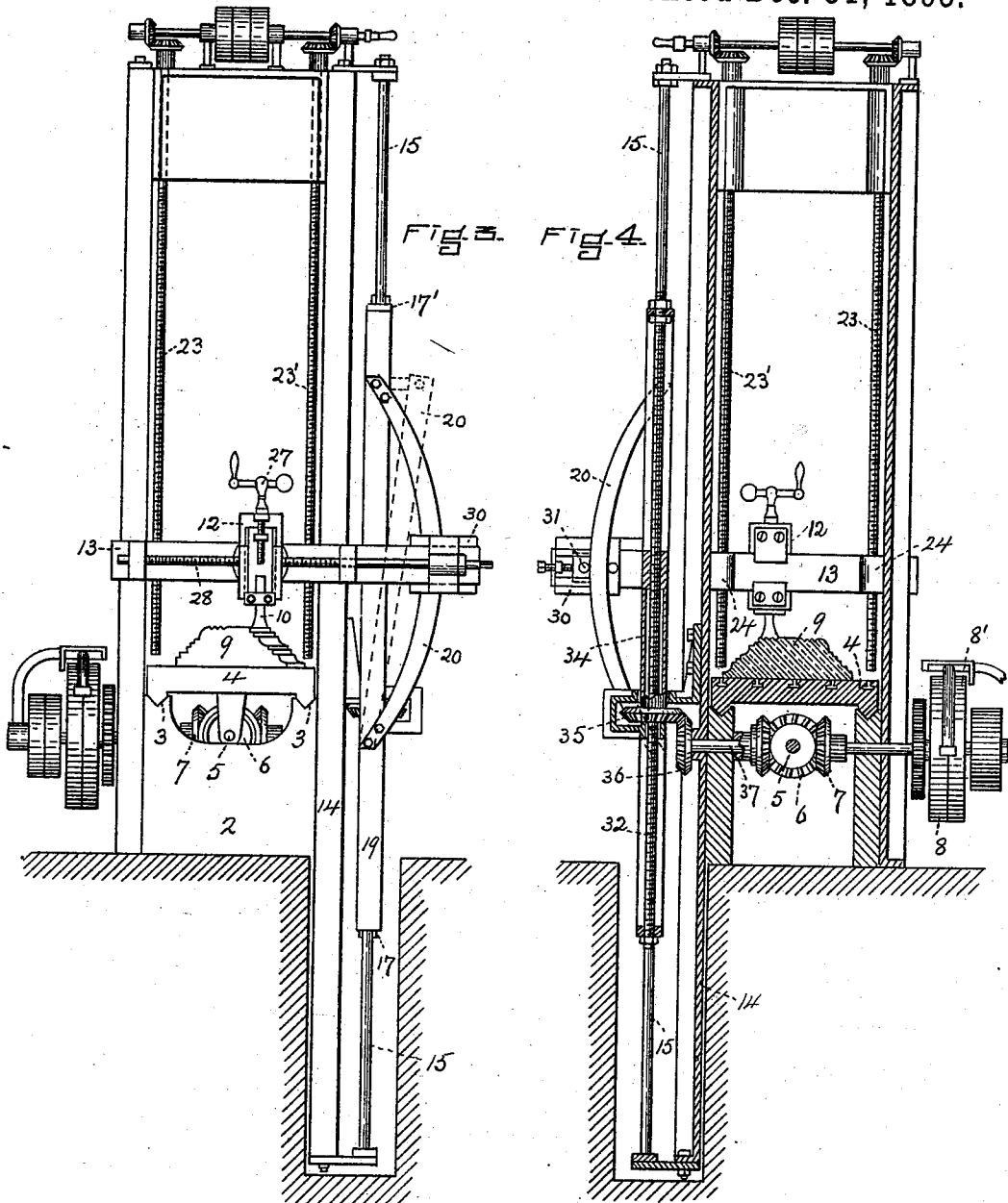
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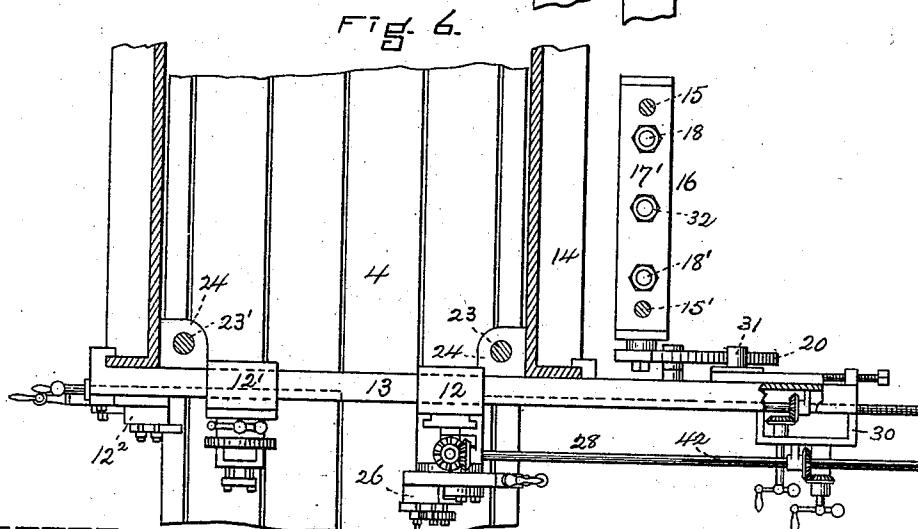
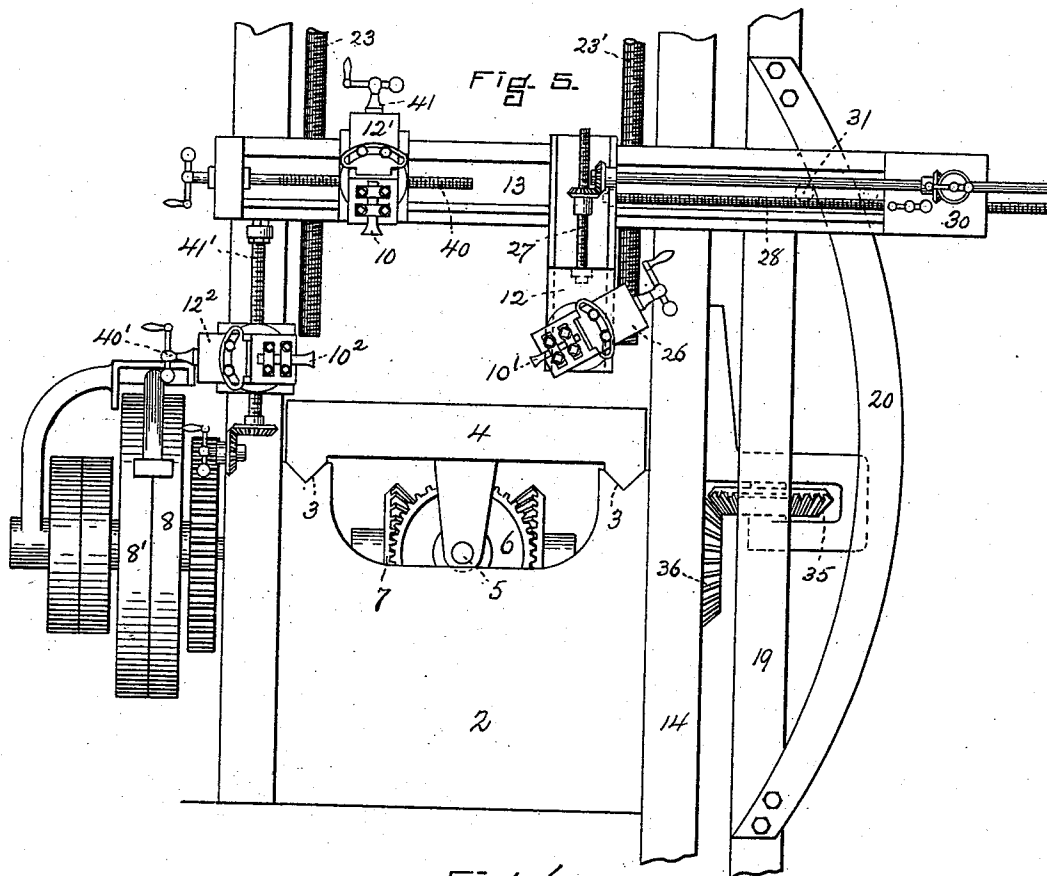
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UNITED STATES PATENT OFFICE.

MICHAEL J. CAMPBELL, OF BOSTON, MASSACHUSETTS.

STONE-PLANER.

SPECIFICATION forming part of Letters Patent No. 552,097, dated December 31, 1895.

Application filed June 29, 1895. Serial No. 554,409. (No model.)

To all whom it may concern:

Be it known that I, MICHAEL J. CAMPBELL, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Stone-Planers; 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, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

This invention relates particularly to apparatus employed in the finishing of stone, and generally styled "stone-planers."

My improvements include mechanism by which a certain style and form of curved work or moldings may be produced automatically and mechanically.

The apparatus herein illustrated includes the elementary features of a "planer," so termed, since it is evident that my invention is applicable for service in working wood, metal or other material equally with stone, the only changes being a variation in the form of the cutting-tool or in the speed of some of the operating parts, dependent upon the quality and nature of the material in process.

The gist of my invention is embodied in mechanism which includes a tool-head adapted to describe a curved path by means of a pattern or guide plate, and in the fact that the curve described by the tool differs from the curve of the pattern, since the path of the tool is the resultant of two motions, inasmuch as the work is moving always in right lines.

My invention is furthermore embodied in mechanism by which the tool-carriage shall always move in lines at right angles to the chord of the curved pattern-plate; moreover, in the shape and peculiar form of the pattern-plate, which tapers from the center toward the ends, while the opposite edges differ in curvature, with the result that the distance between two corresponding points on opposite edges in planes at right angles to the chord of the pattern-plate shall always be equal.

Other peculiarities and novel features will be hereinafter fully explained and set forth.

The drawings represent, in Figure 1, a side elevation of a stone-planer embodying my invention. Fig. 2 is a plan of the same. Fig. 3 is an end elevation in direction of arrow 1 in Fig. 1. Fig. 4 is a vertical transverse section on line 4 4 in Fig. 2, looking in direction of arrow 2. Fig. 5 shows an end elevation in part, but enlarged and with the planer equipped with three tool-heads, two for right-line reciprocations especially. Fig. 6 is a plan of the same.

In said drawings, 2 represents a base or standard of a planer with longitudinal V-grooves 3 for the support and travel of a bed 4, which is adapted to reciprocate by any well-known form of mechanism, in the present instance by means of the shaft 5, gears 6 7 and pulleys 8 8'. Since the gear 6 and the shaft 5 are merely intended to rotate, while their rotations are to cause the bed 4 to reciprocate, said shaft is screw-threaded for its entire length, and is to engage a sleeve or nut (not shown) which is fast on the bed-plate, an arrangement very generally adopted in machines of this class, and therefore further description is omitted.

The material in process is shown at 9, the tools at 10 10' 10², the tool-holders at 12 12' 12², and the tool-carriage proper at 13. This carriage contains a tool-holder 12, which is mounted and operated as follows: Upon the front side of the machine and securely affixed to the casting 2 about midway of the latter is positioned a vertical plate 14. Upon said plate are fastened twin parallel guide-rods 15 15'. Movably mounted on said rods is a frame 16 adapted for vertical right-line reciprocation. Said frame consists of similar end plates 17 17' which slide on the guides and are united by the rods 18 18'. Laterally of said frame is bolted a flat bar 19 which carries a removable pattern-plate 20, either straight or curved.

In the present instance I am describing the mechanism by which the tool 10 is caused to move in curved paths after the manner of a trammel. The tool-carriage proper is shown at 13 and is controlled and adjusted for vertical movement by means of two screw-rods 23 23', while screw-threaded lugs or sleeves 24 are made fast to the said carriage. The tool-holder is at 12 and comprises a swinging

head-block 26. This element is equipped for fine vertical adjustment by means of the screw 27, while lateral adjustment is had by means of the screw 28. Thus it will be seen that if any extensive movement of the tool-carriage is required, as when a thick stone is introduced, the screw-rods 23 are actuated to raise the carriage 13 proper, while the smaller lateral variations in a horizontal plane are obtained by aid of the screw 28, and vertical changes for the vertical steps or traverses are controlled by the screw 27.

In the operation of the tool-holder 12 laterally of the work simultaneously with the reciprocations of the bed-plate and the maintenance of the carriage at a right angle to the chord of the pattern-plate is embodied the primary feature of my invention, since by the movement of said holder the transverse travel of the tool-holder is produced while the work is advancing in right lines. Hence the path described by the tool is a curved one. To control the movements of the tool-holder the holder 12 and block 30 are arranged for sliding movement on the carriage. The rear surface of the block contains two studs 31 with antifriction-rollers, between which the pattern-plate 20 moves. The block 30 in fact forms a part of the carriage, but is made separable and adapted for sliding movement on said carriage in order that the tool-holder and the carriage may be adjusted vertically without requiring the movement of the pattern-plate.

The vertical reciprocations of the pattern-plate are produced by means of a screw-threaded rod 32, a sleeve-shaft 34 carrying a gear 35, while a gear 36 upon a shaft 37 interconnects with the main driving-shaft by the gears 5 6 before mentioned. Hence simultaneous movement of the bed-plate and tool-holder is produced. However, the rates of speed may be varied, since the pitch of the screw-threaded shafts 5 and 32 may be varied by substituting different shafts with varying pitch. Hence the pattern-plate may, if desired, be caused to move faster or slower while the rate of the bed-plate continues unchanged. In this manner the curve described by the tool and tool-holder may be caused to vary.

The resultant movements of the above-described group of elements are as follows: The shafts 5 and 32 are set in motion, the bed-plate prior to such movement being so adjusted that the tool 10 is at the commencement of a traverse—say 39 in Fig. 2—while the frame 16 is so positioned that the block 30 is at one end of the pattern-plate, either upper or lower, according as to whether an active traverse of the tool is to the right or the left. During the right-line travel of the table carrying the work, the frame 16 is, for example, descending. As a consequence, the tool is swung gradually from the center of the stone laterally until the center of the pattern-plate is reached. The extreme lat-

eral position of the tool is now attained and as the frame 16 continues to advance downwardly a converse action on the tool-holder is produced and the latter is thrust inwardly upon the tool-carriage until a point corresponding to the point 39 on the opposite end of the stone has been reached. The adjusting-screws 27 28 are now actuated to depress or raise the tool 10 or slide the latter in or out before a second traverse is connected.

My invention, it will be thus understood, is capable of making the tool 10 travel in any desired curved path, or straight, if it is so desired, by changing the curve of the pattern-plate 20 or making the latter straight. Owing to the oblique position which the ends of said plate assume with respect to the antifriction-rolls at the end of a traverse, said pattern-plate is widest in the center and tapers toward each end.

By inspection of the drawings it will be seen that the antifriction-rolls are set firmly in bearings and have no to-and-fro motion, since at various times said rolls become active and must be positive in their action to cause the tool-carriage to advance across the work in process. It will likewise be noticed that the position of the tool-carriage is always in a line at right angles to the chord of the pattern-plate. Hence because the antifriction-rolls are at a fixed distance apart it becomes necessary to taper the extremities of the pattern-plate in order that the distance between any two corresponding points on opposite edges of the pattern-plate in planes at right angles to the chord shall be the same or, in other words, equal to the distance between the antifriction-rolls. Hence the curvature of the opposite edges always differs at corresponding points one from the other while the curve of the work is always different from the curve of the pattern-plate.

In connection with my improvements—to wit, a tool-head adapted in move in a curvilinear path—I propose to employ other tool-heads for straight-line work. Hence I disconnect or remove the pattern-bar 20. Under these conditions the tool-holders 12' 12² are stationary except for adjustments such as are requisite for the varying thickness of stone when the tool-carriage 13 proper may be raised or lowered by aid of the screw-rods 23 23' and their actuating mechanism.

Lateral adjustments are obtained respectively for the tool-holders 12' 12² by means of the screws 40 40', while vertical changes are effected by means of the screws 41 41'. By this manner of mounting said tools, straight traverses may be secured while the tools are capable of being operated for undercut work, or curvilinear traverses may be produced in connection with the pattern-plate.

In connection with the adjustment of the tool laterally for changes requisite for a number of curved traverses, reference to Fig. 6 shows that the shaft 28 is splined at 42. Hence movement of the tool-holder may take place

while the block 30 is stationary. The adjusting mechanism in Fig. 6 varies slightly from that in Fig. 3, but the same results are obtained, the advantages of that in Fig. 6 being
 5 that the operating mechanism for changing the position of the tool is near the operator and consequently controlled more readily and with greater ease.

In some instances the pattern-plate may be
 10 straight with the active edges or those which control the movement of the tool-holder converging or diverging, as shown in the dotted lines in Fig. 3. Under such an arrangement the tool is adapted for columnar work, and the
 15 pattern-plate may be made tapered, swelled or fluted, as may be desired to produce the requisite form of shaft or column.

I do not desire to be limited, as I have heretofore expressed, to the exact shape of the
 20 pattern-plate, since it may be varied considerably in form and still embody the spirit of my invention.

What I claim is—

1. The combination with a suitable frame
 25 having a movable bed-plate, and a tool carriage above the same, of a tool holder adapted to slide upon the carriage, a curved pattern plate, and mechanism to operate the pattern plate, the chord of said pattern plate always
 30 remaining at right angles to the carriage, substantially as described.

2. In combination with a suitable frame, a bed-plate adapted to travel in right lines, and an adjustable tool holder arranged to move
 35 transversely of the bed-plate, a lateral frame reciprocating in vertical planes, a pattern plate carried on said frame and located in a plane at right angles to the path of movement of the bed-plate, and means for reciprocating
 40 the lateral frame to cause the pattern plate to move the tool-holder transversely of the bed-plate, substantially as stated.

3. The combination with a bed-plate arranged for right line reciprocations, a carriage
 45 adjustable thereabove, and a sliding tool holder mounted on said carriage, of a mov-

able frame, a curved pattern plate having motion of its own and interconnected with the tool holder, said pattern plate tapering toward its extremities and the opposite edges
 50 being of different curvature, substantially as explained.

4. The combination with a bed-plate, mechanism for reciprocating the same, a tool carriage for vertical adjustment thereabove, and
 55 a sliding tool holder mounted on the carriage, of a curved pattern plate tapering from the center toward its ends, a frame for actuating said pattern plate, whereby the tool-carriage is caused to move in planes at right angles to
 60 the chord of the pattern plate, as set forth.

5. The combination with a bed plate arranged for right line movements, a carriage adjustable thereabove, and a sliding tool
 65 holder mounted on said carriage, of a movable frame, anti-friction rollers at a fixed distance apart for sliding movement on the tool carriage, and a curved moving pattern plate, said plate being of such form, that the distance between any two corresponding points,
 70 on opposite edges in planes at right angles to the chord of the pattern plate, shall be equal, and the same with the distance between the anti-friction rolls, substantially as described.

6. In combination with a suitable frame, a
 75 bed-plate adapted to travel in right lines, and an adjustable tool-holder arranged to move transversely of the bed plate, a carriage supporting the tool holder, a curved pattern plate in fixed relation to and located in a plane
 80 at right angles to the bed-plate and united with the carriage, and means for reciprocating the pattern-plate, whereby the tool holder describes a path dissimilar from the curve of the pattern plate, as set forth.
 85

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

MICHAEL J. CAMPBELL.

Witnesses:

H. E. LODGE,

FRANCIS C. STANWOOD.