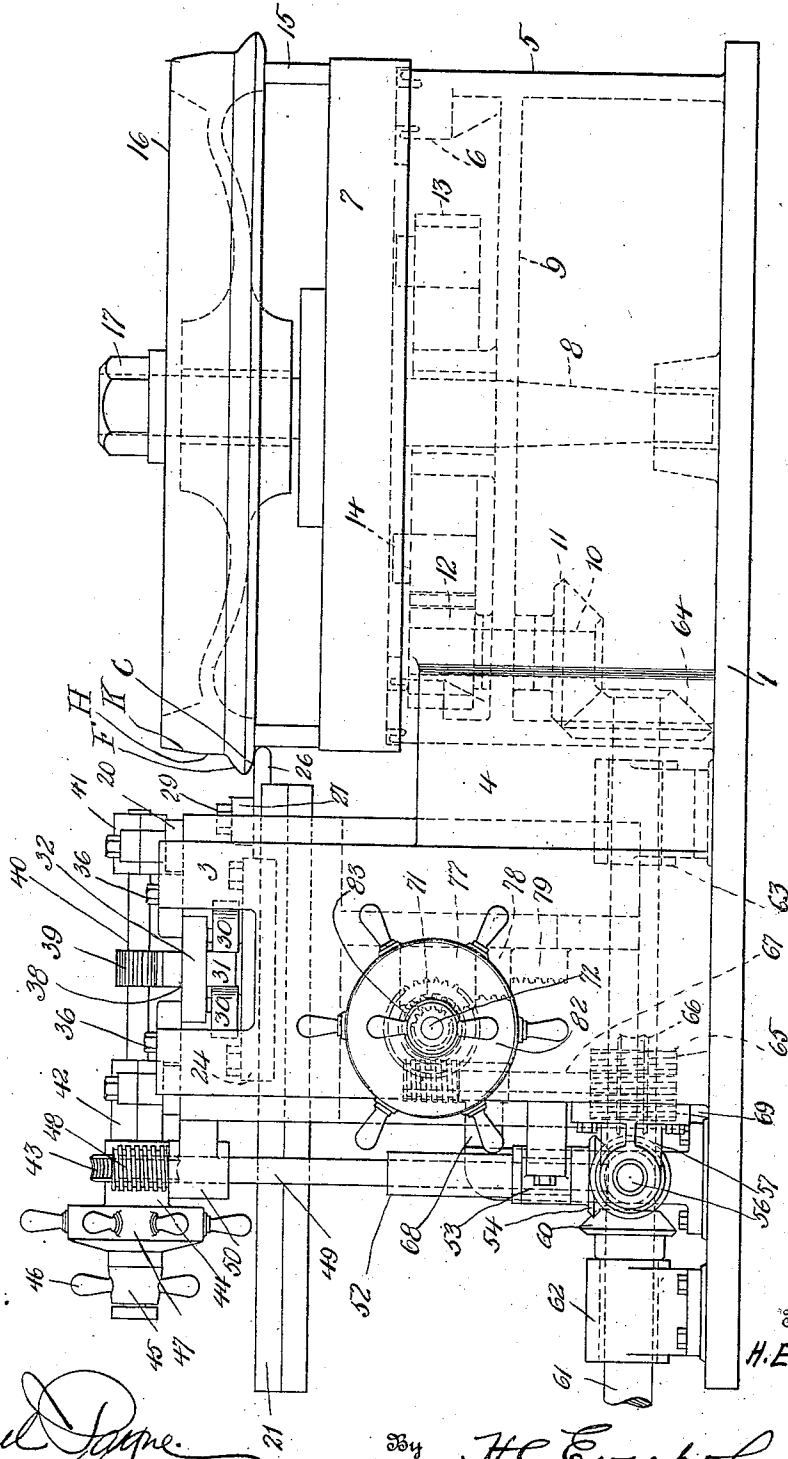


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 SHAPER AND PLANER.
 APPLICATION FILED JUNE 1, 1909.

946,399.

Patented Jan. 11, 1910.
 4 SHEETS—SHEET 1.

Fig. 1.



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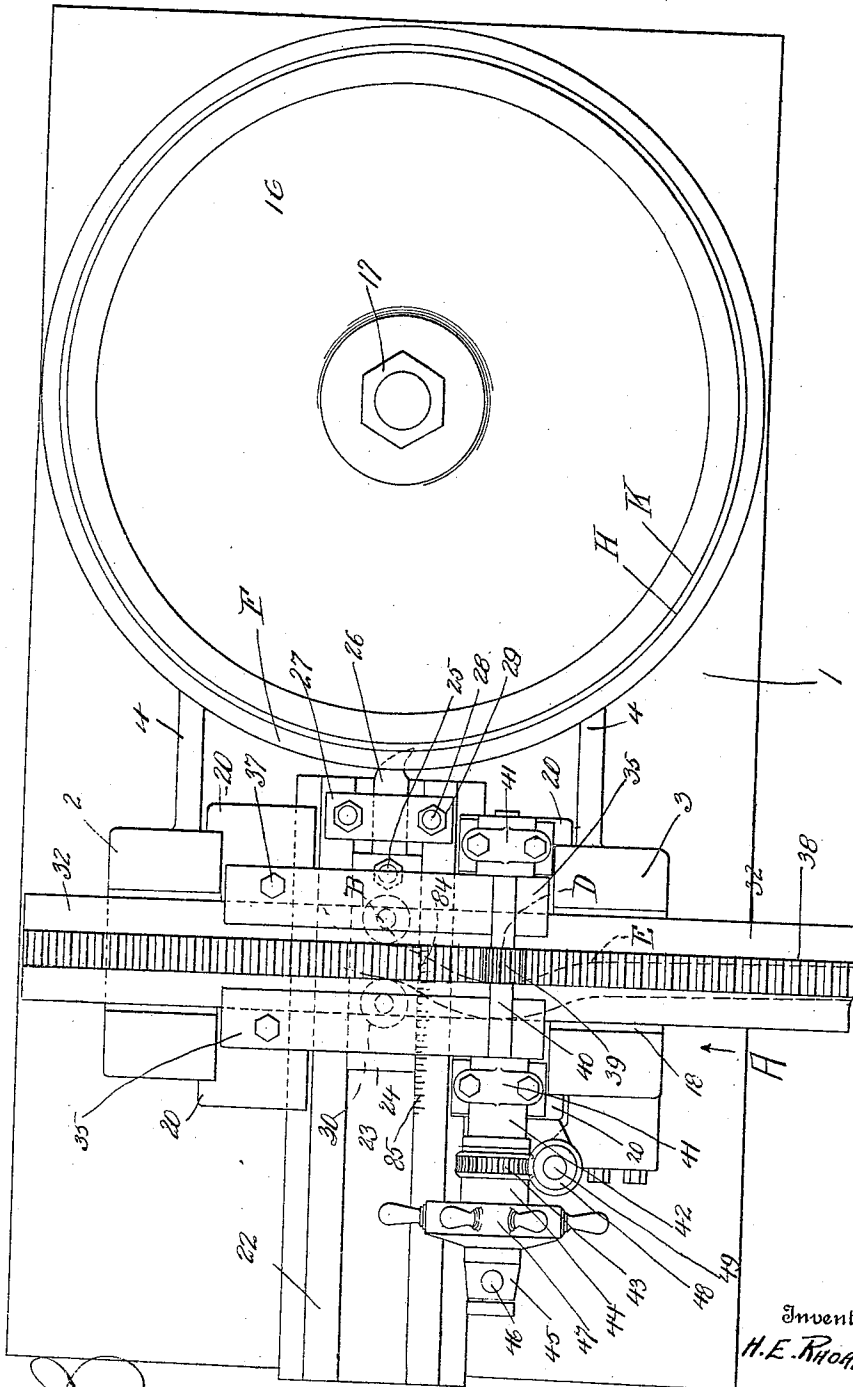
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Fig. 2.



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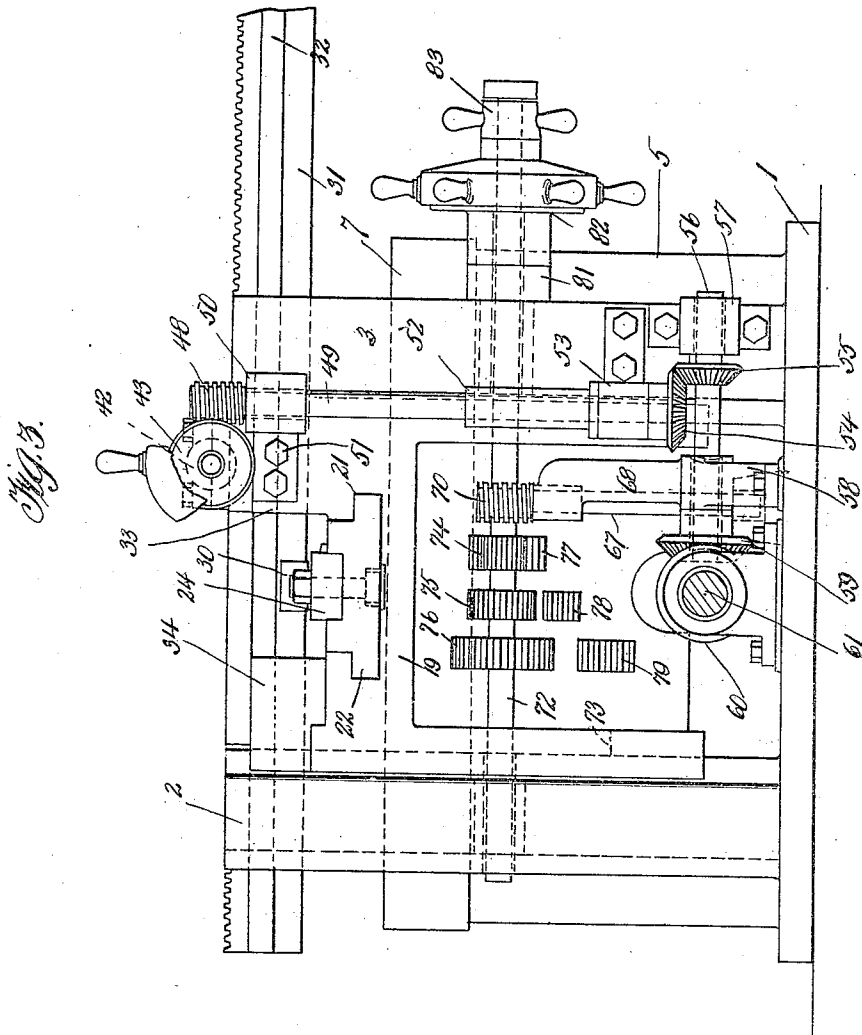
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4 SHEETS—SHEET 4.

Fig. 4.

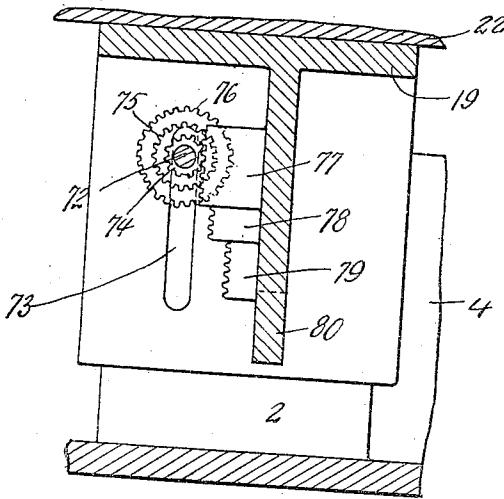


Fig. 5.

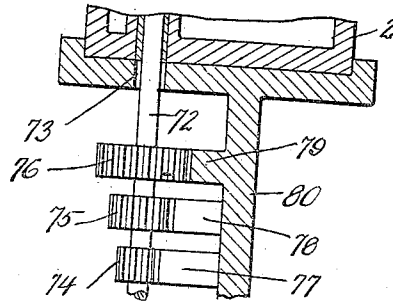


Fig. 6.

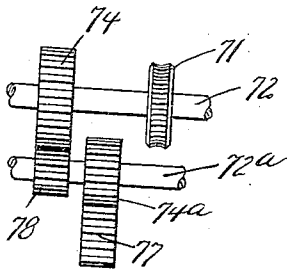


Fig. 7.

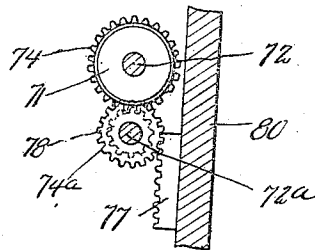


Fig. 8.

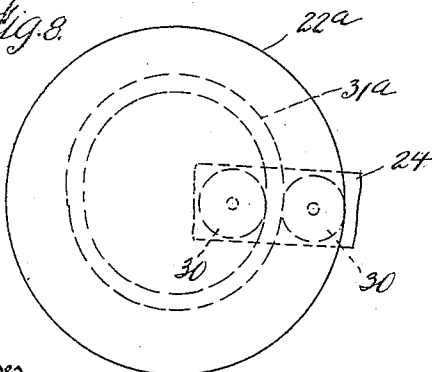
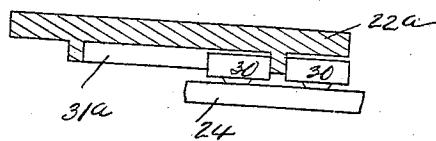


Fig. 9.



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UNITED STATES PATENT OFFICE.

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SHAPER AND PLANER.

946,399.

Specification of Letters Patent.

Patented Jan. 11, 1910.

Application filed June 1, 1909. Serial No. 499,282.

To all whom it may concern:

Be it known that I, HARRY E. RHOADS, a citizen of the United States of America, residing at Wilksburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Shapers and Planers, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to shapers and planers, and more particularly to certain new and useful improvements designed for controlling the movement of a tool or bit employed for cutting and shaping the periphery of wheels.

The invention aims to provide a novel shaper or planer wherein positive and reliable means are employed for effecting the accurate and unswerving cutting of surfaces upon a wheel or similar structure, said means including a traveling contour or pattern.

The invention in its entirety primarily involves in combination with certain parts of a shaper or planer, certain mechanisms for laterally guiding the movement of a tool post, whereby the tool carried by said post will be moved to cut various surfaces as a piece of work is revolved in engagement with the tool. Upon the basis of this combination, the invention comprehends a movable contour or pattern set in the machine to accurately guide the tool in a lateral plane, while other mechanism are provided for moving the tool in a vertical plane, whereby the peripheral flange and tread of a wheel can be expeditiously and economically cut to a desired shape and size. To this end, the invention aims to automatically accomplish what has been heretofore manually performed by the use of gages and templets thus dispensing with the employment of a skilled attendant for the machine, and eliminating the prerequisites of carefulness and precision heretofore essential in cutting and trimming car wheels.

With the above and other objects in view which will more readily appear as the invention is better understood, the same consists in the novel construction, combination and arrangement of parts to be presently described and then claimed.

The essential features of the present invention involved in carrying out the objects above specified are necessarily susceptible to structural change without departing

from the scope of the invention; but the preferred embodiments are shown in the accompanying drawings, in which—

Figure 1 is a front elevation of a machine constructed in accordance with my invention, Fig. 2 is a plan of the machine, Fig. 3 is an end elevation of the same, Fig. 4 is a vertical transverse sectional view of a portion of a section of the machine, Fig. 5 is a horizontal sectional view of the same, Fig. 6 is an elevation of a modified form of gearing, Fig. 7 is a vertical sectional view of the same, Fig. 8 is a plan of an eccentric contour pattern, and Fig. 9 is a cross sectional view of the same.

In the drawings 1 designates a bed plate and upon this bed plate are two oppositely disposed standards 2 and 3 connected by parallel webs 4 to a circular housing 5 carried by the bed plate 1. The housing 5 is provided with a circular trap 6 for a revolvable head 7, said head being connected to a vertical shaft 8 journaled in the housing 5. The housing 5 is provided with a horizontal partition 9 through which the shaft 8 extends and journaled in said partition is a vertical shaft 10 having the lower end thereof provided with a beveled gear wheel 11, while the upper end thereof is provided with a small gear wheel 12 meshing with a large gear wheel 13 mounted upon the shaft 8 and fixed to the head 7, as at 14.

The head 7 is provided with supports for a gear wheel 16, which is retained upon the upper end of the shaft 8 and the supports 15 by a cap 17, said cap clamping the wheel upon the supports 15, whereby said wheel will revolve simultaneously with the head 7.

The upper ends of the standards 2 and 3 are cut away as at 18, and slidably mounted between said standards is a vertical table 19, said table having side flanges 20 engaging the outer sides of the standards, whereby said table will be guided in its vertical movement. The top of the table is provided with a longitudinal groove 21, inverted T-shape in cross section, for a movable tool holder 22. The top of the tool holder 22 is provided with a longitudinal groove 23 for an adjustable block 24 which is fixed in the groove 23 by a screw bolt 25. Arranged in the groove 23 and engaging the block 24 is a tool 26, said tool being retained within the groove 23 by a strap 27 secured to the holder 22 by bolts 28 and nuts 29. The

tool 26 is adapted to operate upon the wheel 16 as the same is revolved.

Revolubly mounted upon the block 24 are two rollers 30 adapted to bear against a depending longitudinal contour rib or pattern 31, carried by a bar 32 arranged transversely of the machine, said bar being guided by enlargements 33 upon one side of the table 19 and blocks 34 upon the opposite side of the table, said bar being retained in place by transverse parallel plates 35 secured to the enlargements 33 by screw bolts 36 and to the blocks 34 by screw bolts 37, the bolts 37 also holding said blocks in engagement with the table 19. The enlargements 33, blocks 34 and plates 35 constitute guides for the bar 32, and to move said bar transversely of the machine, the top of said bar is provided with a longitudinal rack 38 with which meshes a pinion 39 mounted upon a longitudinal shaft 40, journaled in bearings 41 fixed to an enlargement 33.

Fixed upon the forward end of the shaft 40 is a hub 42 and loosely mounted upon said shaft adjacent to said hub is a gear wheel 43. To fix the gear wheel 43 relative to the shaft 40 and hub 42, a sleeve 44 is slidably keyed upon said shaft, and for holding said sleeve in engagement with the gear wheel 43 to bind said gear wheel against the hub 42, a jam nut 45 is employed, said nut being threaded upon the forward end of the shaft 40 and rotated through the medium of oppositely disposed handles 46. The sleeve 44 is provided with a hand wheel 47, to permit of said sleeve being manually rotated to turn the shaft 40 and properly position the bar 32 to perform the work.

Meshing with the gear wheel 43 is a worm 48 mounted upon a vertical shaft 49 revolubly supported in a bracket 50 secured to one of the enlargements 33, as at 51. The shaft 49 is slidably keyed in a vertical shaft 52 journaled in a bracket 53, fixed to the standard 3. The lower end of the sleeve 52 is provided with a beveled gear wheel 54 meshing with a similar wheel 55 mounted upon a transverse shaft 56 journaled in a bracket 57 carried by the standard 3 and a bearing 58 carried by the bed plate 1. The transverse shaft 56 is provided with a beveled gear wheel 59 adapted to mesh with the beveled gear wheel 60, mounted upon a driven shaft 61 journaled in longitudinally alining bearings 62 and 63, carried by the bed plate 1. The driven shaft 61 extends into the housing 5 and adjacent to the bearing 63 is provided with a beveled gear wheel 64 meshing with a beveled gear wheel 11 within the housing 5.

The driven shaft 61 is provided with a worm 65 adapted to mesh with a gear wheel 66 mounted upon a vertical shaft 67 journaled in an extension 68 of the bearing 58 and in the bearing 69 upon the bed plate 1.

The upper end of the shaft 67 is provided with a worm 70 meshing with a gear wheel 71 mounted upon a transverse shaft 72 journaled in the standards 2 and 3. The table 19 is slotted, as at 73 to provide clearance for said shaft and located upon said shaft are stepped three different sizes of pinions 74, 75 and 76, adapted to mesh respectively with racks 77, 78 and 79, carried by a transverse web 80 of the table 19. The racks 77 to 79 inclusive, are arranged to be successively engaged by the pinions 74 to 76 inclusive, consequently said racks are stepped as best shown in Fig. 4 and in conjunction with the pinions are adapted to impart a vertical movement to the table 19, the rapidity or speed of such movement being determined by the arrangement with the racks and pinions.

The shaft 72 protrudes from the side of the machine and is provided with a fixed collar 81, a loose hand wheel 82, and a jam nut 83 for locking said hand wheel frictionally against the collar 81, whereby the hand wheel can be utilized for rotating the shaft 72 and correctly positioning the table 19 preparatory to operating upon a piece of work.

To facilitate the adjustment of the block 24, and the correct position of the tool 26 relative to wheels of various diameters, the block 24 is provided with a pointer 84 and the sides of the holder 22 are graduated, as at 85.

In operation,—The bar 32 is correctly positioned in the machine with the table 19 in a lowered position, and after the wheel 16 has been placed in operable relation with the machine, the machine started, the operation is as follows:—As the bar 32 travels in the direction of the arrow A of Fig. 2, the curved portion B of the contour rib or pattern 31 moves the holder 22 outwardly, while the worm 70 meshing with the gear wheel 71 and the pinion 74 meshing with the rack 77 causes the table 19 to move upwardly, said lateral and vertical movement accurately carrying the end of the tool 26 in a curved plane to cut and trim the outer curved side C of the wheel flange. That portion of the contour rib or pattern 31 designated D, rounds the periphery of the wheel flange and then the tool is carried inwardly by the curved portion E of the contour rib to cut and trim the inner side F of the wheel flange. As the tool holder is laterly shifted by the contour rib or pattern, the table 19 is elevated, increasing in speed as the pinions 75 and 76 mesh with the racks 78 and 79. The contour rib or pattern 31 is shaped to provide the tread of the wheel with a flat portion H and a tapering portion K. After the wheel has been trimmed and cut the table 19 can be restored to its low position and the bar 32

can be positioned to operate upon another wheel.

Since the contour rib or pattern 31 represents a development of the cross sectional shape of the periphery of the wheel, said rib or pattern can be precisely formed to insure equal shaping of the wheel throughout the periphery thereof, thereby eliminating irregularities that might occur if the tool holder was regulated by hand and the periphery of the wheel judged by templates and similar instruments.

It is apparent that when the traveling contour rib or pattern is accurately formed, and the tool holder properly positioned, that all wheels shaped by a particular contour rib will have similar flanges and treads, and it is possible to maintain in stock a plurality of contour ribs or patterns for shaping the periphery of various sizes and types of wheels.

Since the cutting and trimming of the surfaces H and K of the wheels 16, is not as exacting as the surfaces C and F, the machine can control a greater rapidity, and it is in this connection that I do not care to confine myself to the mechanism employed for accomplishing a vertical movement of the table 19.

In Figs. 6 and 7 of the drawings, there is illustrated a modification of the gearing used for elevating the table. Instead of the pinions 74 to 76 inclusive meshing direct with the racks 77 to 79 inclusive, another shaft 72^a is employed, said shaft having a pinion 74^a adapted to mesh with the rack 77 and the shaft 72^a is provided with a small gear wheel 78 meshing with the pinion 74. In using the additional shaft 72^a, the gear wheels can be easily changed to provide different speeds in the elevation of the table 19.

A modification of the traveling contour rib and pattern is shown in Figs. 8 and 9, wherein a rib or pattern 31^a approximately circular is used for shifting the tool holder 22, the rib or pattern 31^a being carried by a revoluble head 22^a.

In some instances, a revoluble motion can be utilized to an advantage where it is impossible to use a machine having a longitudinally moving contour rib or pattern.

Having now described my invention what I claim as new, is:—

1. In a shaping machine, the combination with a revoluble work support, of a tool holder movable relative to said work support, rollers revolubly supported by said tool holder, a contour rib adapted to move between said rollers and laterally shift said tool holder relative to said work support, means for moving said contour rib, and means for moving said contour rib and said tool holder in a vertical plane relative to said work support.

2. In a shaping machine, the combination

with a revoluble work support, of a tool holder movable relative to said work support, a contour rib for moving said tool holder in a lateral plane relative to said work support, means for simultaneously moving said piece of work and said contour rib, and means for moving said tool holder and said contour rib in a vertical plane relative to said work support.

3. In a shaping machine, the combination with a revoluble work support, of a vertically moving table, a tool holder movably mounted upon said table, a contour rib for shifting said tool holder laterally relative to said work support, and means for simultaneously moving said contour rib and said table.

4. In a shaping machine, the combination with a revoluble work support, of a vertically moving table, a laterally moving tool holder arranged upon said table, a contour rib for moving said tool holder, means for simultaneously moving said contour rib and said table, said means including gearing operable from the same source of power as said revoluble work support.

5. In a shaping machine, the combination with a revoluble work support, of standards, of a vertical moving table arranged between said standards, a tool holder slidably mounted upon said table, a contour rib slidably mounted in said bearings and at right angles to said tool holder for moving said tool holder in and out relative to said work support, and means for simultaneously moving said table and said contour rib.

6. In a shaping machine, the combination with a revoluble work support, of standards, of a vertical moving table arranged between said standards, a tool holder slidably mounted upon said table, a contour rib slidably mounted in said bearings and at right angles to said tool holder for moving said tool holder in and out relative to said work support, and means for simultaneously moving said table and said contour rib, said means including racks, pinions, with some of said pinions arranged to increase the speed of said table as said table is elevated.

7. In a shaping machine, the combination with a revoluble work support, of standards, of a vertical moving table arranged between said standards, a tool holder slidably mounted upon said table, a contour rib slidably mounted in said bearings and at right angles to said tool holder for moving said tool holder in and out relative to said work support, means for manually and independently moving said contour rib and said table, and means for simultaneously moving said contour rib and said table.

8. In a shaping machine, the combination with a revoluble work support, of standards, of a vertical moving table arranged between said standards, a tool holder slid-

ably mounted upon said table, a contour rib
slidably mounted in said bearings and at
right angles to said tool holder for moving
said tool holder in and out relative to said
5 work support, means for manually and in-
dependently moving said contour rib and
said table, and means for simultaneously
moving said contour rib and said table, said
means including racks and pinions meshing

with said racks and driven from the same 10
source of power as said revoluble work sup-
port.

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

HARRY E. RHOADS.

Witnesses:

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GRACE LOVETT.