

Dec. 26, 1939.

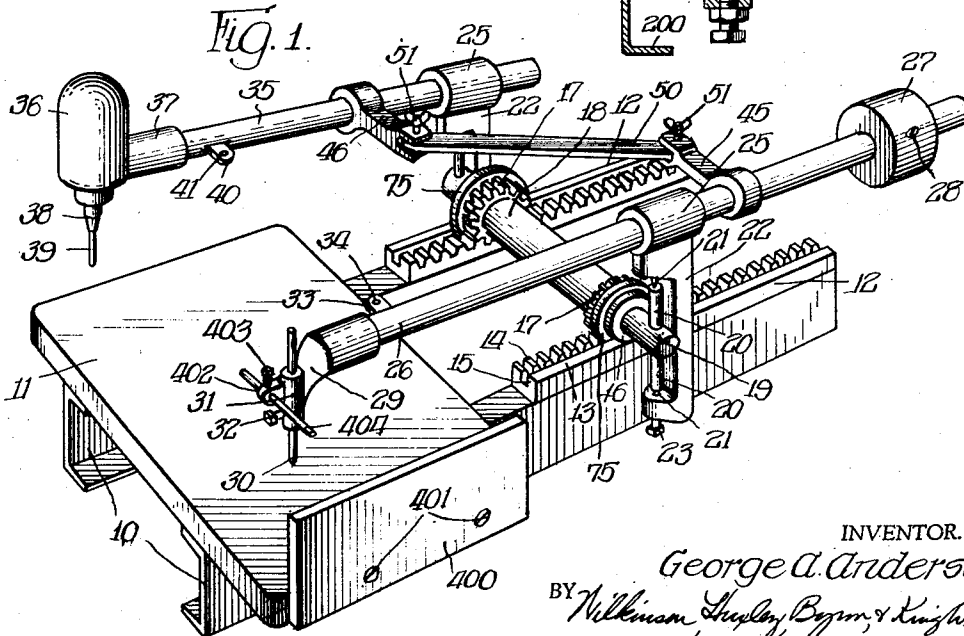
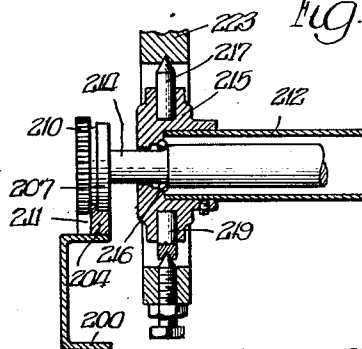
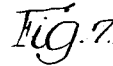
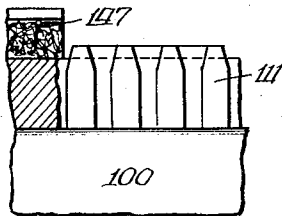
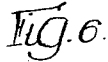
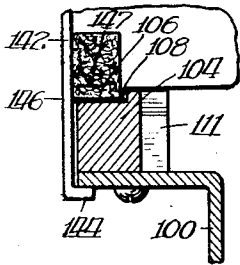
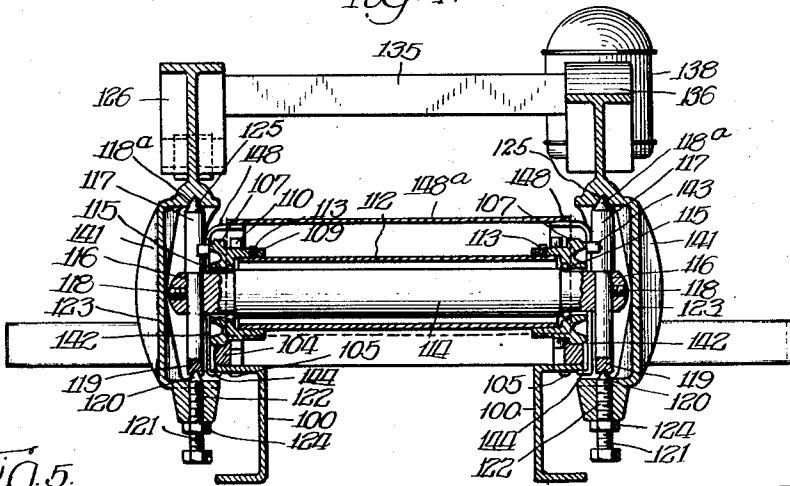
G. A. ANDERSON

2,185,011

WOOD CARVING MACHINE

Filed June 30, 1938

2 Sheets-Sheet 1



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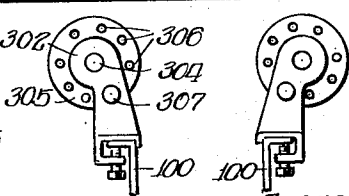
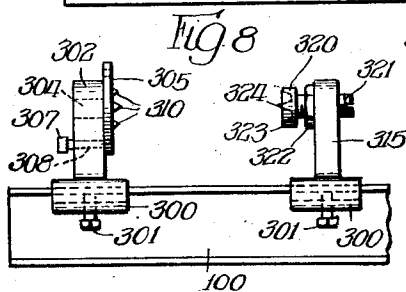
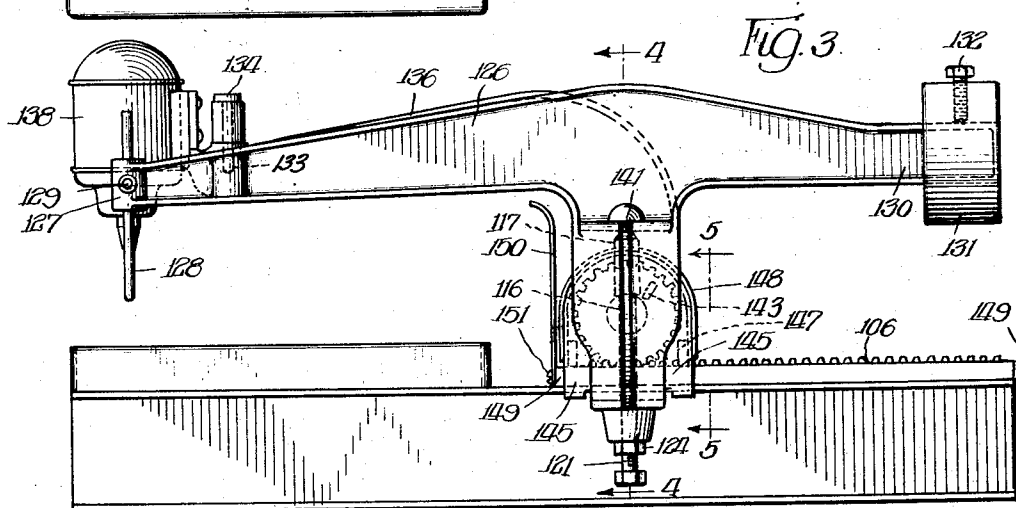
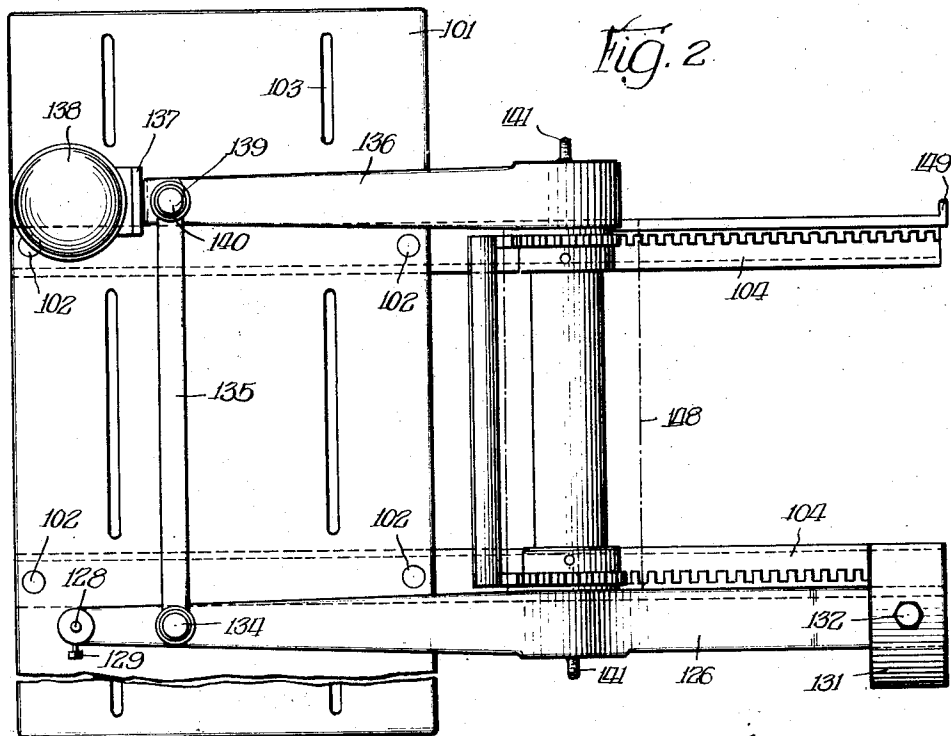
G. A. ANDERSON

2,185,011

WOOD CARVING MACHINE

Filed June 30, 1938

2 Sheets-Sheet 2



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2,185,011

WOOD CARVING MACHINE

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Application June 30, 1938, Serial No. 216,748

16 Claims. (Cl. 90—13.1)

This invention relates to improvements in wood carving machines and is here illustrated as embodied in a wood carving machine having a single cutting tool which is particularly adapted for pattern making or for individual or home use for the purpose of carving individual facsimiles of any particular work pattern which the user may desire to copy.

It is an object of this invention to provide a wood carving machine which can be easily operated and controlled and which is productive of work of high quality, the various carved portions of which are produced as to form and proportion with great exactness as compared to the original.

A further object of this invention is to provide a carving machine of the type referred to comprising a pantograph mechanism which presents the carving tool in any selected position above the work holding table and in connection with which the work may be mounted in a horizontal position on the work table or in any other position by rotatable work holding and centering means.

It is a further object of this invention to provide a wood carving machine of the pantograph type which has a novel supporting mechanism which permits bodily movement of the pantograph frame but assures the movement thereof in absolute parallelism.

More specifically, it is an object of this invention to provide a pantograph mechanism with supporting rollers which are connected to rotate together and in connection with which rack and gear means are provided for assuring uniform and simultaneous rotary displacement of both of said supporting rollers.

It is a further object of this invention to provide a novel track and rack construction for co-operation with the supporting rollers and gears, which automatically frees itself from chips or other foreign particles which would otherwise impair the uniform motion of the pantograph carriage.

A further object of this invention is to provide a pantograph mechanism having an attachment which enables the production of carved pieces of the opposite hand from the original being copied and to accomplish this result by a simple and inexpensive mechanism which can conveniently be converted back to the usual type of pantograph machine.

Other objects are contemplated for this invention which are not specifically enumerated, as will readily appear to one skilled in the art as the following description proceeds. It is to be understood that the particular disclosure of this ap-

plication is given merely by way of illustration and is not to be considered as limiting the invention in any respect as the invention is to be given the broadest possible interpretation coming within the scope of the appended claims and permitted by the prior art.

The forms of the invention here illustrated will be more readily understood by referring to the accompanying drawings, in which

Figure 1 is a perspective view of one form of the invention showing the use of an attachment enabling the production of carved objects of the opposite hand;

Figure 2 is a plan view of a slightly modified construction of a wood carving machine constructed in accordance with this invention;

Figure 3 is a side elevational view of the wood carving machine shown in Figure 2;

Figure 4 is a cross-sectional view taken on the line 4—4 of Figure 3 and looking in the direction of the arrows;

Figure 5 is an enlarged fragmentary cross-sectional view taken on the line 5—5 of Figure 3 and looking in the direction of the arrows;

Figure 6 is an enlarged elevational fragmentary view, partly in cross-section, showing the construction illustrated in Figure 5 as seen from the right of said figure;

Figure 7 is an enlarged cross-sectional fragmentary view similar to Figure 4, showing a somewhat modified form of the applicant's invention;

Figure 8 is an elevational view illustrating a modified form of holder for the pattern and the piece being carved; and

Figure 9 is a view of the work holders shown in Figure 8 as seen from the left hand side of the figure.

Referring to Figure 1, it will be noted that this form of the invention comprises a pair of frame members 10—10, which are here shown as channel pieces but which can be of any suitable construction. Adjacent one end of the frame is a work table 11, which is suitably secured thereto so as to enable it to be removed when desired in order to permit the installation of other work holding means hereinafter more particularly referred to. On the top sides of the channel frames 10—10, adjacent the opposite ends thereof, are preferably mounted and securely fixed track and rack bars 12—12. As clearly shown, each of these bars comprises a track portion 13 which has a smooth upper surface and a tooth portion 14, constituting the gear rack. These two parts are preferably spaced by a small groove 15, which may act as a guide for the flange 16 between the rollers

and gears to take up the side thrusts and prevent lateral displacement. Whereas these bars are shown as one piece in this form of the invention, it is apparent that they may be composed of two or more pieces suitably secured together to constitute the composite whole.

Disposed on the tracks 13—13 are rollers 16—16 which have hard and smooth surfaces adapted to traverse the same type of surfaces of the tracks, whereby the entire mechanism which is supported by the rollers is caused to have a very accurate smooth horizontal path of travel.

Integral with or fixed with respect to the rollers 16—16 are gears 17—17 which are identical in character and which are disposed respectively to mesh with the teeth of the racks 14—14. The supporting rollers and their associated gears are so constructed with relation to the track and rack bars that the entire support falls on the rollers, which in turn hold the gears in mesh with the racks, but so that none of the supporting weight is carried on the gears and racks themselves. Each of the gears, and its attached roller, is connected to the central rotating tube 18, which provides a rotating assembly extending from one track to the other which is suitably mounted on an axle 19, preferably by suitable anti-friction bearings.

The axle 19 extends entirely through the tube 18 and projects beyond the rollers 16—16 to provide ends which have the radially disposed spindles 20—20 extending therefrom in diametrically opposed directions.

These spindles have socketed ends which form pivotal mountings for the point bearing members 21—21 adjustably mounted in the opposed portions of the yoke 22. The upper point bearing 21 may be permanently mounted, while the lower point bearing is adjustable by means of screw heads 23, so that suitable adjustment of the pivot mounting may be obtained.

It will be noted that the diametrically extending spindles 20—20 on the opposite sides of the machine extend from the same points in the circumference of the axle, so that they provide pivot supports for the yokes 22—22 on parallel axes.

The yoke members 22—22 preferably terminate at their upper ends in frame connecting collars 25—25, as clearly shown in Figure 1. One of the collars 25 has permanently secured therein a frame bar 26 which extends to the rear of the machine and provides a mounting for a counterbalancing weight 27 which may be adjusted therealong and held in any adjusted position by means of the set screw 28.

This frame bar terminates at its forward end in a bracket 29, which serves as a means for mounting the tracing pin 30 adjustably held in the tube 31 by the locking screw 32. The bar 26 also has thereon a lug 33, having an opening 34 therein which will serve as a mounting for a cross-bar connecting the two arms to form the usual pantograph construction.

The collar 25 of the opposite yoke 22 serves as a mounting for the frame bar 35 which extends forwardly and has mounted thereon an electric motor 36 held by means of the bracket 37. This motor may be of any suitable construction and per se constitutes no part of the present invention, provided only that it is of suitable construction to do the work intended therefor.

Extending from the lower end of the motor is a holder 38 for a suitable cutting tool 39, which is thus presented in a suitable position for engaging the work held on the table 11. The frame

bar 35 also has a lug 40 provided with a bearing opening 41, which is disposed opposite to the lug 33 of the frame bar or arm 26. These lugs are adapted to be connected by an arm (not shown) for the formation of a usual pantograph mechanism when the piece being carved is to be of the same hand as the work being copied. This connecting link will cause the cutting tool to move to the right when the tracing pin moves to the right, and vice versa.

However, as shown in the drawings, this device further has a bracket 45 secured to the frame bar 26 at a location between the collar 25 and the adjustable counterweight, and the frame bar 35 has the bracket 46 mounted thereon between the frame collar 25 and the electric motor 36. In other words, as clearly shown in the drawings, these brackets 45 and 46 are disposed on opposite sides respectively of the plane of the axes of the yokes 22—22 on the spindles 20—20. Each of the brackets 45 and 46 has a yoke at its inner projecting end for receiving respectively the ends of a connecting link 50, which is pivoted to each of said yokes by means of a pivot pin which extends through openings in each yoke and openings in the ends of the link, and which may be removed by means of the wing bolts 51—51.

The link 50 thus serves as a means for imparting to the cutting tool 39 a movement corresponding to the movement of the tracer pin 30, but in the opposite direction. Thus, with the link 50 installed as above described, movement of the tracer pin 30 a predetermined amount to the right will impart a corresponding movement to the cutting tool 39, but to the left instead of to the right. This, of course, will result in the production of an accurate copy of the original, except, however, that the finished work will be of the opposite hand.

It is apparent that if work of the same hand as the original is desired the link 50 may be quickly removed from the machine by turning the wing bolts 51 and another link corresponding to the link 50, but somewhat greater in length, inserted between the lugs 33 and 40, respectively, and pivotally installed by means of the same or similar wing bolts. The several named links above referred to, but not shown, should be of such a length that when connected to lugs 33 and 40 a parallelogram is formed wherein one of the sides represented as the distance between tracer pin 30 and cutting tool 39 is the same as the side represented as the distance between spindles 20—20.

In operation it is apparent that, irrespective of the installation of the link 50, a pantograph mechanism is provided which has a tracing arm and a cutting tool which are connected for parallel or related movement in the manner intended, and that as a whole these arms are pivotally mounted for swinging on parallel axes provided by the yokes 22—22, and that further the entire assembly is adapted to be moved bodily along the tracks 13—13 in absolute parallelism, whereby the accuracy of the carving operation is assured. It is further apparent that the axle 19 which pivotally supports the yokes 22—22 forms a horizontal axis on which the entire assembly may be lifted up and down as when the tracing pin and cutting tool are lifted and lowered during the use of the machine. It will further be apparent that the counterweight 27 may be adjusted to balance the forwardly extending portions of the machine in the desired manner to

give facility and accuracy of movement in operation.

An essential feature of this invention resides in the gear and rack mechanism, which by virtue of the connecting tube 18 assures a uniform rolling movement on both tracks, where all liability of the mechanism becoming out of parallel is eliminated.

Referring now to Figures 2 to 6, inclusive, a somewhat modified form of the invention is illustrated in which the frame is composed of a pair of spaced parallel channel members 100—100 having a suitable support and suitably cross-braced and upon which is mounted adjacent one end thereof a work table 101. This table may be held in position by suitable screws 102, as clearly shown in Figure 2. The work table may be further provided with slots 103 for accommodating suitable clamping means for holding the work on the table.

Adjacent the opposite ends of the frame channels 100—100 are track and rack bars 104—104. These are held by suitable screws or other holding means 105 which extend upwardly through the top flange of the channels 100—100.

As clearly shown in Figure 3, each of the rack bars 104 has an upper surface 106 which is smooth and hard and forms a supporting surface for rollers hereinafter more fully described. On the inside of each of the track bars is a plurality of laterally extending teeth which have their upper surfaces cut collectively to provide the gear rack 111. Each space between the teeth is of substantial depth, whereby ample space is provided for any wood chips or dust or other foreign matter that might tend to accumulate on the rack. In this way the absolute horizontal movement is assured.

As shown in Figure 4, rollers 107—107 are provided for supporting the pantograph mechanism on the tracks 104—104. Each roller has a lateral edge which is in engagement respectively with the shoulders 108—108 of the track, whereby the rollers are held against lateral displacement. Each roller preferably has a sleeve member 109 on which are mounted the gears 110—110 which are suitably disposed for meshing engagement with the gear racks 111—111. The sleeves 109—109 are connected at each end respectively to a tube 112 by means of holding screws 113—113. This tube connects the rollers and gears on opposite sides of the machine and forms a unitary rolling assembly. Extending through this assembly is an axle 114 which has bearing surfaces at its outer ends in engagement with the antifriction bearings 115—115 carried in the race rings provided in the roller constructions, as shown in Figure 4. The axle 114 has parallel transverse openings 116—116 therethrough in which are mounted the bearing spindles 117—117 respectively held by means of the set screws 118—118. These bearing spindles preferably are constructed as shown in Figure 4, with pointed upper ends 118^a—118^a and socketed lower ends 119—119. The lower ends are of smaller diameter than the upper ends, whereby the pins may be dropped into position from above and held by the set screws 118—118.

The socketed lower ends form female bearing members in engagement with the pointed ends 120—120 of the adjustable bearing screws 121—121, which are screw-threaded in the openings 122—122 of the yoke members 123—123. These bearing pins may be locked in position by means of lock nuts 124—124. The yoke mem-

bers are provided with female bearing recesses 125—125 at their upper portions for pivotal support on the upper bearing points 118^a—118^a.

As thus shown in Figures 2 and 4, the yoke 123 on one side of the mechanism has integrally formed therewith a frame bar 126 which extends in opposite directions from the yoke and is provided at one end with a holding collar 127 for mounting the tracer pin 128, held by means of the lock screw 129. The opposite end of the frame bar 126 terminates in a reduced portion 130, serving as a sliding support for the counterweight 131, which may be slid therealong and held in any adjusted position by the lock screw 132. This bar is also provided with a threaded recess 133 adjacent the tracing pin, in which may be mounted the bearing pin 134 for pivotally attaching the connecting link 135.

The yoke on the opposite side of the machine has integrally formed therewith a frame bar 136 which extends forwardly and is formed to provide a bracket face 137 for mounting the electric motor 138. This motor is so positioned that the axis of its rotor is vertically disposed, whereby it will serve as a means for mounting a cutting tool disposed on an axis parallel to the axis of the tracing pin 128. The motor is equipped with suitable electrical connections (not shown), whereby it is operated by turning a suitable switch. The bar 136 is also equipped with a threaded opening 139 for mounting a bearing pin 140 for pivotally connecting the opposite end of the connecting link 135.

As best shown in Figure 4, the yokes 123—123 are preferably made in the form of housing plates which substantially enclose and protect the vertical spindles, the ends of the axle and to some extent the supporting rollers and associated gears. These housings may be equipped with suitable strengthening ribs 141—141, shown in Figures 2 and 4.

Carried on the ends of the axles between the rollers 107—107 and the bearing spindles 117 are located members 142—142, which have a central opening to fit over the reduced ends of the axle and have upstanding ends provided with a lug 143 for engaging the upper part of the spindle 117 so as to hold the frame when in a lifted position as hereinafter more fully described. These members have inwardly turned ends 144 at their bottoms which underlie the upper horizontal flange of the channel frame members 100—100, whereby the entire rotating assembly and supported carriage are held against upward movement. The entire pantograph mechanism is thus held against accidental lifting off of the track or otherwise becoming accidentally displaced.

Secured to the wall of members 142—142, by means of glue or any other desired material, are wipers 147—147 in wiping engagement with the upper surfaces of the track. One of these wipers is positioned at each side of the roller, whereby the track is thoroughly cleaned in either direction of movement to assure the provision of a clean smooth surface on which the rollers may travel. This, coupled with the novel rack construction, assures at all times that the carriage will not meet any obstructions which would prevent its proper operation.

Furthermore the members 142—142 are additionally provided with an inwardly turned edge 148—148 and extending between the edges on opposite sides of the machine is a U-shaped housing 148^a secured thereto and serving as a guard which, together with the inturned edges

148—148, substantially encloses and protects the roller and gear assemblies.

In addition, a guard 150 is preferably provided in the shape of an upstanding plate, having its bottom edge secured to the ends of the track bars by means of screws 151, as shown in Figure 3. This guard protects the rack, tracks, gears and rollers and the bearing parts of the pantograph mechanism from the chips, dust and dirt produced as a result of the carving operations. The guard may also extend, partially at least, around the sides of the mechanism.

The horizontal travel of the carriage on the tracks is limited at the extreme ends by contact between the members 145—145 and lugs 149—149 located at the ends of the tracks, as shown in Figure 3.

A slightly modified form of assembly is shown in Figure 7 which differs from the form illustrated in Figure 4 in that the yokes are carried on a tube member 212, which is in turn mounted in surrounding relationship to a rotating axle 214. The ends of the axle have fixedly secured thereto gears 210 and a roller 207 which are mounted respectively on a rack 211 and a track 204. These racks and track bars may be constructed substantially like the corresponding parts shown in Figure 4, with the exception that as here illustrated the track is on the inside and the rack is on the outside. These rack and track bars are mounted on frame channel members 200 in substantially the manner previously described in connection with the other modification.

Mounted on the tube 212 is a bracket member 215 which is equipped with bearing pins 217 and 219, respectively, which pivotally mount the yoke members 223—223 in substantially the manner previously described. Anti-friction bearings 216—216 may be provided between the axle 214 and the brackets 215.

As illustrated in Figures 8 and 9, modified work holders may be provided constructed substantially as shown and comprising brackets 300 adapted to overlie the upper flange of the channel frame 100 and be held in any adjusted position therealong by means of the lock screws 301. This bracket is equipped with an upstanding portion 302 which has a pivot 304 therein for rotatably mounting the work holding plate 305. The work holding plate is preferably equipped with a plurality of holes 306 equally spaced around the periphery thereof, which may be successively presented in alignment with the end of a pin 307 held in an opening 308 in the upstanding portion 302. The work holding plate is further equipped with pointed projections 310 on the face thereof for engaging and immovably holding a piece of wood or other material to be worked on in the desired position.

The cooperating member comprises a similar bracket 300 having a holding screw 301 and an upstanding portion 315, adjacent the upper end of which is a work holding and centering device 320. This device is pivoted to a screw 321 which may be screwed into and out of a threaded opening in the bracket or upstanding portion 315 and held in any adjusted position by means of the lock nut 322. This holding and centering device has a circular conformation provided with an edge 323 and a centering pin 324. The centering pin is disposed on the same axis as one of the projections 310, which serves as a centering pin on the work holding plate 305, so that the piece of wood being worked upon may be placed between the centering pins and the holding plate by mov-

ing the brackets 300 into a position closely to embrace the work piece.

As shown in Figure 9, an identical pair of holding devices is provided on the opposite channel frame part 100, whereby the pattern is properly presented in convenient relationship to the end of the tracer pin.

In operation the pattern and the piece of wood to be carved are placed in their respective holders and the initial carving is accomplished by tracing the pin over the surface of the pattern. After the first portion of the carving operation has been completed the pattern holder is rotated around to the next position of adjustment by placing the holding pin 307 into the next hole 306. A corresponding adjustment is made on the work holder and the carving operation continued. Thereafter the pattern and the work piece are similarly advanced by a corresponding angular displacement of their holders, whereby an accurate facsimile of any three-dimensional pattern may be produced.

As shown in Figure 1, this invention further contemplates the use of a guide plate 400 which may be mounted on the side of the work table 11 and held thereon by any suitable means such as screws 401. When this type of plate is used, the tracing pin tube 31 may have an additional holding eye 402 equipped with a locking screw 403 for clamping a second tracing pin 404 which is disposed in horizontal position for engagement with the inner surface of the guide plate 400.

With this attachment, the vertical and horizontal tracing pins may be suitably adjusted for engagement with the work table and guide plate, respectively. When so adjusted, the tracing pins may be caused to travel from front to back of the table and plate, whereby to give to the cutting tool 39 a predetermined movement on a fixed horizontal line. Thereafter the pins may be readjusted to cause a movement in a slightly different horizontal line, such as would result from a slight vertical as well as horizontal displacement. With the new adjustment a second horizontal cut may be made, and so on throughout the course of a plurality of cuts, each with its particular adjustment of the tracing pins. When the adjustments are made according to a predetermined plan, the series of horizontal cuts may form a molding or similar piece of any desired shape.

What is claimed is:

1. A carving machine of the character described, comprising a support, a pair of spaced tracks on said support, a pair of rollers mounted on said tracks connected for rotation together, a pantograph mechanism having a tracing means and a carving tool carried by said rollers, gear racks disposed in association with said tracks, and gears fixed to rotate with said rollers in mesh with said racks, respectively.

2. A carving machine of the character described, comprising a support, a pair of spaced tracks and associated gear racks mounted on said support, connected rollers supported on said tracks each having an associated gear connected thereto, said gears being disposed in mesh with said racks, respectively, a member carried by said rollers, a pair of arms pivotally mounted on said member, a link for pivotally connecting said arms, a tracing pin carried by one of said arms, and a carving tool carried by the other of said arms.

3. A carving machine of the character described, comprising a support, a pair of spaced

tracks and associated gear racks mounted on said support, connected rollers supported on said tracks each having an associated gear connected thereto, said gears being disposed in mesh with said racks, respectively, a member carried by said rollers, a pair of arms pivotally mounted on said member, a link for pivotally connecting said arms, a tracing pin carried by one of said arms, and a carving tool carried by the other of said arms, one of said arms having an extension on the opposite side of its pivot and having a counterweight adjustably mounted on said extension.

4. A carving machine of the character described, comprising a support, a pair of spaced tracks and associated gear racks mounted on said support, connected rollers supported on said tracks each having an associated gear connected thereto, said gears being disposed in mesh with said racks, respectively, a member carried by said rollers, a pair of arms pivotally mounted on said member, a link for pivotally connecting said arms, a tracing pin carried by one of said arms, and a carving tool carried by the other of said arms, said arms having connections for selectively receiving said link to connect said arms for movement in the same direction or for movement in opposite directions.

5. A carving machine of the character described, comprising a support, a pair of spaced tracks and associated gear racks mounted on said support, connected rollers supported on said tracks each having an associated gear connected thereto, said gears being disposed in mesh with said racks, respectively, a member carried by said rollers, a pair of arms pivotally mounted on said member, a link for pivotally connecting said arms, a tracing pin carried adjacent the end of one of said arms, an electric motor carried on the end of the other of said arms, and means carried by said motor for mounting a carving tool for rotation by said motor.

6. A carving machine of the character described, comprising a support, a pair of spaced tracks on said support, a pair of rollers mounted on said tracks connected for rotation together, a pantograph mechanism having a tracing means and a carving tool carried by said rollers, gear racks disposed in association with said tracks, and gears fixed to rotate with said rollers in mesh with said racks, respectively, said gear racks having deep spaces between adjacent teeth whereby dirt accumulations will not affect the movement of the associated gears therealong.

7. A carving machine of the character described, comprising a support, a pair of spaced tracks and associated gear racks mounted on said support, connected rollers supported on said tracks each having an associated gear connected thereto, said gears being disposed in mesh with said racks, respectively, a member carried by said rollers, a pair of arms pivotally mounted on said member, a link for pivotally connecting said arms, a tracing pin carried by one of said arms, a carving tool carried by the other of said arms, and wipers carried by said member disposed in engagement with said tracks adjacent said rollers.

8. A carving machine of the character described, comprising a support, a pair of spaced tracks and associated gear racks mounted on said support, connected rollers supported on said tracks each having an associated gear connected thereto, said gears being disposed in mesh with said racks, respectively, a member carried by said rollers, a pair of arms pivotally mounted on said

member, a link for pivotally connecting said arms, a tracing pin carried by one of said arms, and a carving tool carried by the other of said arms, said racks comprising a plurality of teeth formed from laterally extending lugs having deep spaces therebetween.

9. A carving machine of the character described, comprising a support, a pair of spaced tracks and associated gear racks mounted on said support, connected rollers supported on said tracks each having an associated gear connected thereto, said gears being disposed in mesh with said racks, respectively, a member carried by said rollers, a pair of arms pivotally mounted on said member, a link for pivotally connecting said arms, a tracing pin carried by one of said arms, and a carving tool carried by the other of said arms, said member and arms being horizontally tiltable on the axis of said rollers.

10. A carving machine of the character described, comprising a support, a pair of spaced tracks and associated gear racks mounted on said support, connected rollers supported on said tracks each having an associated gear connected thereto, said gears being disposed in mesh with said racks, respectively, a member carried by said rollers, a pair of arms pivotally mounted on said member, a link for pivotally connecting said arms, a tracing pin carried by one of said arms, a carving tool carried by the other of said arms, said member and arms being horizontally tiltable on the axis of said rollers, and means carried by said member for limiting the upward tilting movement thereof.

11. A carving machine of the character described, comprising a support, a pair of spaced tracks and associated gear racks mounted on said support, connected rollers supported on said tracks each having an associated gear connected thereto, said gears being disposed in mesh with said racks, respectively, a member carried by said rollers, a pair of arms pivotally mounted on said member, a link for pivotally connecting said arms, a tracing pin carried by one of said arms, a carving tool carried by the other of said arms, and means carried by said member for holding said rollers against accidental displacement from said tracks.

12. A carving machine of the character described, comprising a support, a pair of spaced tracks and associated gear racks mounted on said support, connected rollers supported on said tracks each having an associated gear connected thereto, said gears being disposed in mesh with said racks, respectively, a member carried by said rollers, a pair of arms pivotally mounted on said member, a link for pivotally connecting said arms, a tracing pin carried by one of said arms, a carving tool carried by the other of said arms, and means carried by said carriage for substantially enclosing and protecting said rollers.

13. A carving machine of the character described, comprising a support, a pair of spaced tracks and associated gear racks mounted on said support, connected rollers supported on said tracks each having an associated gear connected thereto, said gears being disposed in mesh with said racks, respectively, a member carried by said rollers, a pair of arms pivotally mounted on said member, a link for pivotally connecting said arms, a tracing pin carried by one of said arms, a carving tool carried by the other of said arms, and a guard carried by said member shielding said tracks and rollers and gears.

14. A carving machine of the character described, comprising a support, a pair of spaced tracks and associated gear racks mounted on said support, connected rollers supported on said tracks each having an associated gear connected thereto, said gears being disposed in mesh with said racks, respectively, a member carried by said rollers, a pair of arms pivotally mounted on said member, a link for pivotally connecting said arms, a tracing pin carried by one of said arms, a carving tool carried by the other of said arms, means mounted on said support for holding a pattern, and other means for holding a workpiece. 5
15. A carving machine of the character described, comprising a support, a pair of spaced tracks and associated gear racks mounted on said support, connected rollers supported on said tracks each having an associated gear connected thereto, said gears being disposed in mesh with said racks, respectively, a member carried by said rollers, a pair of arms pivotally mounted on said member, a link for pivotally connecting said arms, a tracing pin carried by one of said arms, a carving tool carried by the other of said arms, means mounted on said support for holding a pattern, and other means for holding a workpiece. 10
16. A carving machine of the character described, comprising a support, a pair of spaced tracks and associated gear racks mounted on said support, connected rollers supported on said tracks each having an associated gear connected thereto, said gears being disposed in mesh with said racks, respectively, a member carried by said rollers, a pair of arms pivotally mounted on said member, a link for pivotally connecting said arms, a tracing pin carried by one of said arms, a carving tool carried by the other of said arms, an adjustable counterweight for said arms, and means for limiting the movement of said arms under the influence of said counterweight. 15 20

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