

Dec. 4, 1934.

F. CZEMBA

1,982,983

SCROLL CUTTING MACHINE

Filed Oct. 17, 1932

3 Sheets-Sheet 1

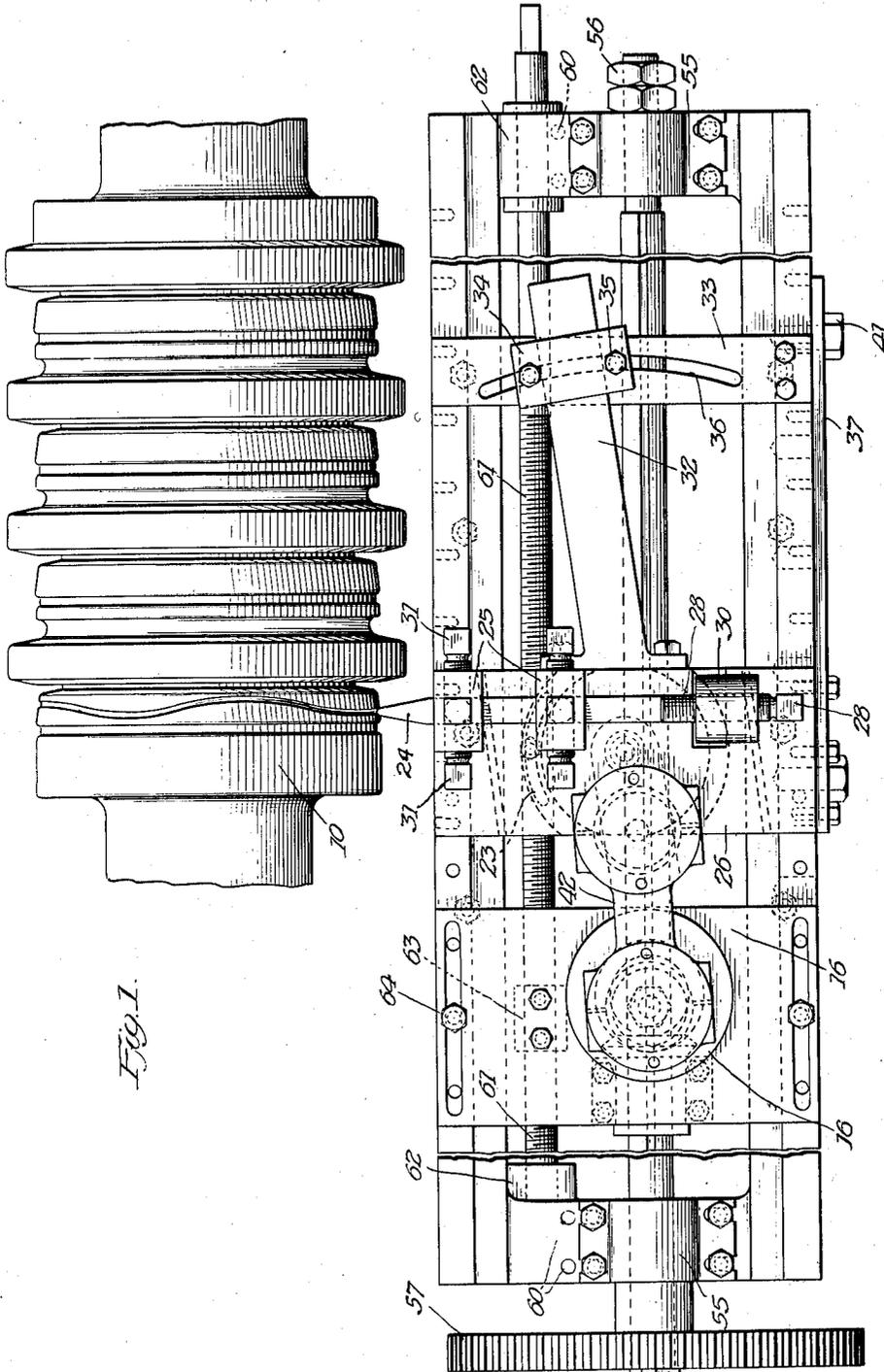


Fig. 1.

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3 Sheets-Sheet 2

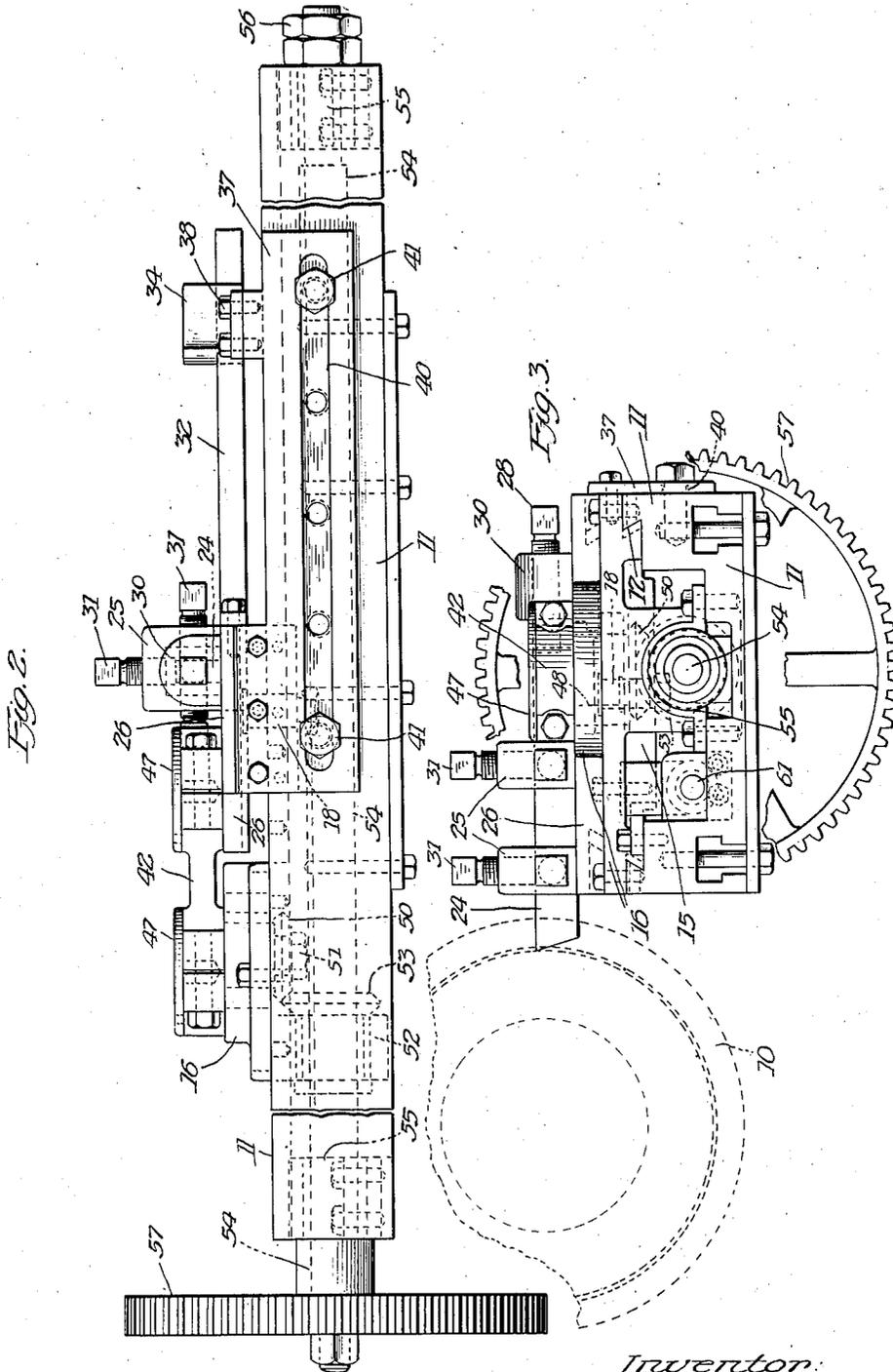


FIG. 2.

FIG. 3.

Witness:
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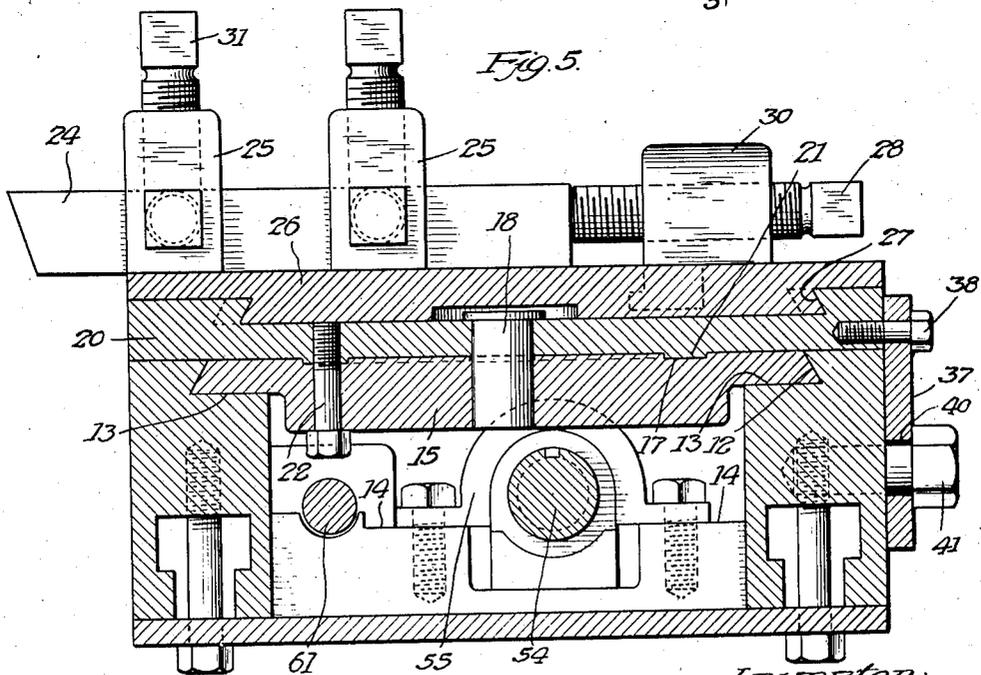
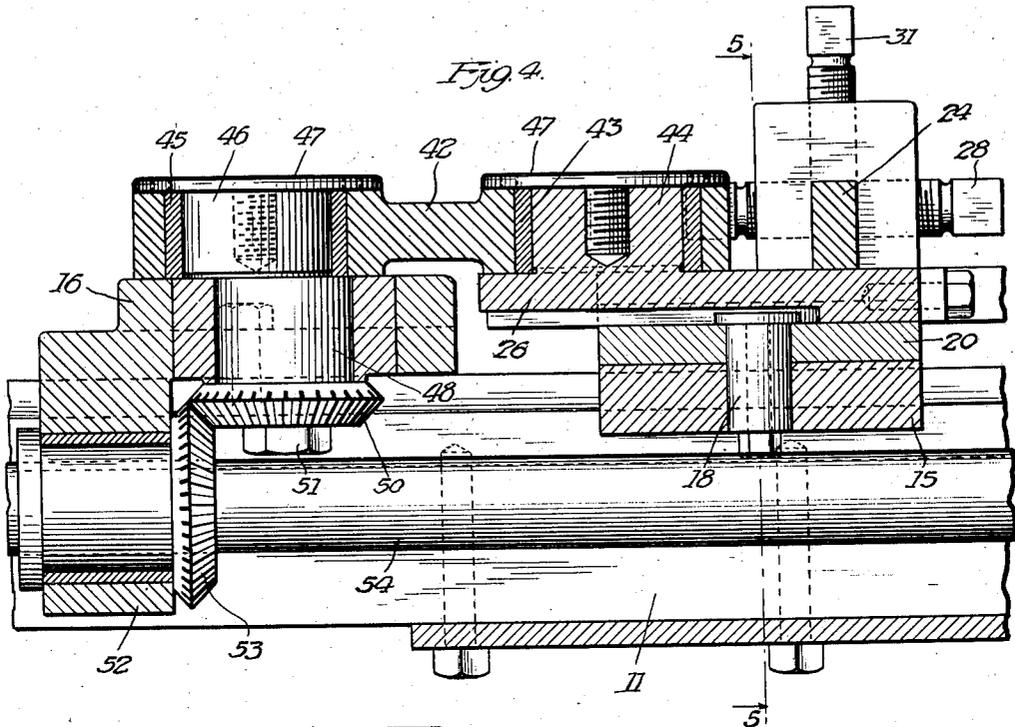
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

1,982,983

SCROLL CUTTING MACHINE

Frank Czemba, Duluth, Minn., assignor to American Steel & Wire Company, Chicago, Ill., a corporation of New Jersey

Application October 17, 1932, Serial No. 638,251

11 Claims. (Cl. 82—11)

The invention relates to apparatus for cutting a serpentine groove, having reference more particularly to apparatus for grooving the conical surface of a roll of a mill such as is used for rolling fence posts.

An object of the invention is to provide mechanism which will cut a serpentine or sinuous groove in cylindrical as well as conical surfaces and which can be adjusted to vary the depth of the groove or the pitch of the convolutions within limits.

The present device has been designed to cut a groove on the roll of a mill so that the fence post rolled thereby will be provided with a decorative scroll and as the size of the rolls varies the apparatus embodies novel means permitting adjustment to suit the conical surfaces of different tapers and different diameters.

With these and various other objects in view, the invention may consist of certain novel features of construction and operation, as will be more fully described and particularly pointed out in the specification, drawings and claims appended hereto.

In the drawings which illustrate an embodiment of the device and wherein like reference characters are used to designate like parts—

Figure 1 is a top plan view of the device of the present invention showing the same associated with a roll for cutting a groove thereon;

Figure 2 is a side elevational view of the groove cutting apparatus shown in Figure 1;

Figure 3 is an end view of the device looking toward the left of Figure 2;

Figure 4 is a fragmentary sectional view taken substantially on the line 4—4 of Figure 3 and showing the means for driving the eccentric to reciprocate the tool carrier; and

Figure 5 is a vertical sectional view taken along the line 5—5 of Figure 4.

The apparatus of the invention has been designed especially for grooving the conical face of a roll 10 used in mills for rolling fence posts, the grooves being of wavy or serpentine form so that the fabricated post will be provided with a decorative scroll. The base 11 of the apparatus is provided with a pair of parallel guideways 12 extending longitudinally of the base and also a plurality of stepped surfaces 13 and 14 positioned on opposite sides of the longitudinal axis respectively. The guideways receive a supporting plate 15 for the tool carrier and a second supporting plate 16 for journalling an eccentric to be later described.

The upper surface of the plate 15, as more par-

ticularly shown in Figure 5, is provided with a circular groove 17 concentric with the centering pin 18, which passes through a central opening in plate 15 and swivel plate 20 associated therewith. An annular projection 21, depending from the base of plate 20, is received within groove 17 on the supporting plate and thus the members permit of a plurality of movements as the supporting plate rides within the grooves 12 on the base, while the swivel plate carried thereby has alternative movements with respect to the base. The securing bolt 22 extends through an arcuate slot 23 in the supporting plate in alignment with groove 17 and has threaded engagement in plate 20 so that the members can be locked in adjusted rotated position.

The cutting tool 24 has movement longitudinally of the base in addition to movement transversely thereof and is mounted in tool posts 25 integral with the tool carrier 26 having guideways 27 formed on its bottom surface for fitting in guideways provided by the swivel plate 20. It is to be noted that the guideways 27 extend at an angle to the transverse axis of the tool carrier which in the present structure is approximately eight degrees, conforming to the taper of the conical surface of the roll. Accordingly, tool 24 will travel parallel with the conical surface to be grooved when the edges of the tool carrier and swivel plate 20 are in alignment with the edges of the base. In order to vary the angularity of tool 24 with respect to the longitudinal axis of the base the swivel plate 20 is rotated on supporting plate 15 which will necessitate minor alterations in the existing structure, as will be better understood as the description proceeds.

The position of the cutting tool 24 in its supporting posts is varied by the adjusting screw 28 threaded in block 30, while the tool after once being properly adjusted is securely held in position by the locking screws 31.

Suitably secured to the tool carrier 26 is a guide member 32, the outer end of which rests on plate 33 having undercut guideways on its lower surface for fitting with guideways 12 in the base. The guide member also forms an angle with the longitudinal axis of the base member, in the present case approximating eight degrees, whereby the guiding of the member by means of the guide block 34 adjustably secured to plate 33 by means of screws 35 passing through the arcuate slot 36 in the plate directs the reciprocating movement of the tool carrier on the guideways of plate 20. Proper positioning of the guide block

34 will steady the reciprocating movement of the tool carrier by providing a defined and definite path for the carrier so that the travel of the cutting tool 24 will throughout its limits of movement follow the selected angle of eight degrees with the longitudinal axis of the base.

In order that the above may result it is necessary that plate 33 be maintained at a definite distance from the tool carrier and accordingly the invention provides a connecting plate 37 having securement at one end by means of bolts 38 to the plate 33 and at its other end to the swivel plate 20. As shown in Figure 2 the connecting member is disposed along one side of the base and in order that the position of the tool carrier may be altered to accommodate the various passes in the roll the member is provided with a longitudinal slot 40 for receiving the securing bolts 41 for securing the member to the base. By the above structure the swivel plate 20 and parts associated therewith in combination with the guide plate 33 can be moved bodily longitudinally of the base, while the particular spacing between the tool carrier and guide plate is maintained constant.

Reciprocation of the tool carrier on guideways 27 is accomplished by means of a connecting rod 42, Figure 4, provided with openings at its respective ends, one of which is fitted with bushings 43 for engaging the circular boss 44 formed integrally with the carrier plate, while the other opening is fitted with bushing 45 and engages with the eccentric 46. Cap members 47 threaded to the boss or eccentric respectively serve to maintain the connecting rod in operative position. Plate 16 journals the shaft 48 having the eccentric 46 and a bevel pinion 50 secured to the shaft by nut 51. A depending bearing 52 is formed integral with plate 16 for journalling the pinion 53 meshing with pinion 50 and being non-rotatably secured to the drive shaft 54 journalled at its respective ends in bearings 55 secured to the base. Lock nuts 56 are threaded to the right hand end of the drive shaft, Figure 1, while suitably secured to the opposite ends is the drive gearing 57 which is operatively connected through a chain of gears to the spindle stock of the roll lathe.

Through rotary movements imparted to shaft 48 from the driving shaft 54 the connecting rod 42 is actuated to reciprocate the tool carrier, movement of which takes place on guideways 27 parallel with the conical face of the portion of the roll to be grooved. By proper choice of the driving gears for shaft 54 the pitch of the convolutions of the groove can be made shorter or longer and by a change in the throw of the eccentric 46 the height of the scroll ordinate can be increased or decreased. It has been found from practical experience that when two ends of the connecting link 42 are too far displaced from a longitudinal line running through the center of one of them irregularities or jogs are produced in the scroll. It is very desirable that the center of the bevel gear 50 at the left hand end of the link shall not be greatly displaced laterally from the longitudinal axis through the center of the boss 44 on the carrier plate and in order to keep the displacement to a minimum additional threaded openings 60 are provided in the base for receiving securing screws for the bearings 55, permitting shifting of the drive shaft 54 transversely of the base. The shaft 61 is journalled at its ends in bearings 62 and has threaded en-

gagement with block 63 suitably secured to plate 16. Rotation of this shaft serves to adjust the position of plate 16 on the base which may then be locked in desired location by means of the securing bolt 64. The bearings 62 for the threaded shaft are removable as is also block 63 and thus the shaft can be removed when it is necessary to change the position of drive shaft 54.

In order to move the tool from the first pass to the second pass of the roll 10 it is first removed from the posts so as to provide clearance and then the plates 16, 20 and 33 are loosened from the base and moved to the right, Figure 1, by means of the threaded screw 61. With this adjustment the tool is again placed in the posts and the plates secured to the base. When it is necessary for the machine to accommodate different tapers than that for which the guideways 27 and guide 32 have been designed it becomes necessary to remove the connector 37 and rotate the swivel plate 20 on its supporting plate. Locking of the plates is then effected by screw 22.

It is to be understood that I do not wish to be limited by the exact embodiment of the device shown, which is merely by way of illustration and not limitation, as various and other forms of the device will be apparent to those skilled in the art without departing from the spirit of the invention or the scope of the claims.

I claim:

1. In a device of the character described, comprising a base having longitudinal guideways, a supporting plate fitting in the guideways and secured in position on the base, a tool carrier supported on said plate and having movement on the plate at an angle to the longitudinal axis of the base, an eccentric journalled by said base, a connecting rod between the eccentric and tool carrier, and means for rotating said eccentric whereby said carrier is reciprocated on the base.

2. In a device of the character described, comprising a base having longitudinal guideways, a supporting plate fitting in the guideways and secured in position on the base, a swivel plate rotatable on the supporting plate and provided with means for securing the plates in desired relation, a tool carrier mounted in guideways on the swivel plate, means for reciprocating said tool carrier, and a guiding member projecting therefrom and being guided by said base.

3. In a device of the character described, comprising a base having longitudinal guideways, a supporting plate fitting in the guideways and secured in position on the base, a swivel plate rotatable on the supporting plate and provided with means for securing the plates in desired relation, a tool carrier mounted in guideways on the swivel plate, an eccentric journalled by said base, a connecting rod between the eccentric and tool carrier, and means for rotating said eccentric whereby said carrier is reciprocated.

4. In a device of the character described, comprising a base having longitudinal guideways, a supporting plate fitting in the guideways and secured in position on the base, a swivel plate rotatable on the supporting plate and provided with means for securing the plates in desired relation, a tool carrier mounted in guideways on the swivel plate, a second supporting plate journalled a drive shaft and mounted in the guideways on the base, means securing said second supporting plate to the base, an eccentric journalled in said second plate, a connecting rod between the eccentric and tool carrier, and means including

said drive shaft for rotating the eccentric where-
by the carrier is reciprocated.

5 5. In a device of the character described com-
prising a base having longitudinal guideways,
spaced supporting plates fitting in said guideways,
a tool carrier supported by one of said plates and
having rotative and reciprocating movement with
respect thereto, and an eccentric journaled by
10 said other plate, said eccentric having operative
connection with said tool carrier to cause recipro-
cation thereof.

15 6. In a device of the character described com-
prising a base having longitudinal guideways
spaced supporting plates fitting in said guideways,
a tool carrier supported by one of said plates and
having rotative and reciprocating movement with
respect thereto, means mounted for rotation in
said other plate and providing an eccentric, and a
20 connecting rod connecting said eccentric with the
tool carrier for causing reciprocation thereof.

25 7. In a device of the character described com-
prising a base having longitudinal guideways,
spaced supporting plates fitting in said guide-
ways, a tool carrier supported by one of said
plates and having rotative and reciprocating
movement with respect thereto, means rotatably
mounted in said second plate and providing an
eccentric, a driving shaft journaled by the base
and by said other plate and operatively connect-
30 ing with the rotatable means, and a connecting
rod between the eccentric and the tool carrier for
causing reciprocation thereof.

35 8. In a device of the character described, com-
prising a base having longitudinal guideways, a
supporting plate fitting in the guideways and se-
cured in position on the base, a swivel plate ro-
tatable on the supporting plate and having means
for securing said plates in desired relation, a tool
40 carrier mounted in guideways on said swivel plate
whereby said tool carrier has rotative and recip-
rocating movements with respect to the base, and
a hub provided on said tool carrier and operative-
ly connecting with means for reciprocating the
carrier.

45 9. In a device of the character described, com-
prising a base having longitudinal guideways, a
supporting plate fitting in the guideways and se-

cured in position on the base, a swivel plate ro-
tatable on the supporting plate and having means
for securing said plates in desired relation, a tool
carrier mounted in guideways on said swivel plate
whereby said tool carrier has rotative and recip-
rocating movement with respect to the base,
means for reciprocating said tool carrier, means
for guiding the tool carrier during reciprocation
thereof, and means adjustably fixed to the base
for association with said guiding means.

10. In a device of the character described, com-
prising a base having longitudinal guideways, a
supporting plate fitting in the guideways and se-
cured in position on the base, a swivel plate ro-
tatable on the supporting plate and having means
for securing said plates in desired relation, a tool
carrier mounted in guideways on said swivel plate
whereby said tool carrier has rotative and recip-
rocating movements with respect to the base, a
hub provided on said tool carrier, a second sup-
porting plate fitting in the guideways on the base
and secured in spaced relation with the tool car-
rier, means mounted for rotation in said second
plate and providing an eccentric, and a connect-
ing rod connecting the eccentric with the hub for
reciprocating the tool carrier.

11. In a device of the character described, com-
prising a base having longitudinal guideways, a
supporting plate fitting in the guideways, and se-
cured in position on the base, a swivel plate ro-
tatable on the supporting plate and having means
for securing said plates in desired relation, a tool
carrier mounted in guideways on said swivel plate
whereby said tool carrier has rotative and recip-
rocating movements with respect to the base, a
hub provided on said tool carrier, a second sup-
porting plate fitting in the guideways on the base
and secured in spaced relation with the tool
carrier, means mounted for rotation in said
second plate and providing an eccentric, a driving
shaft journaled by the base and by said second
plate and operatively connecting with said rotat-
able means, and a connecting rod between the ec-
centric and the tool carrier for causing reciproca-
tion thereof.

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