

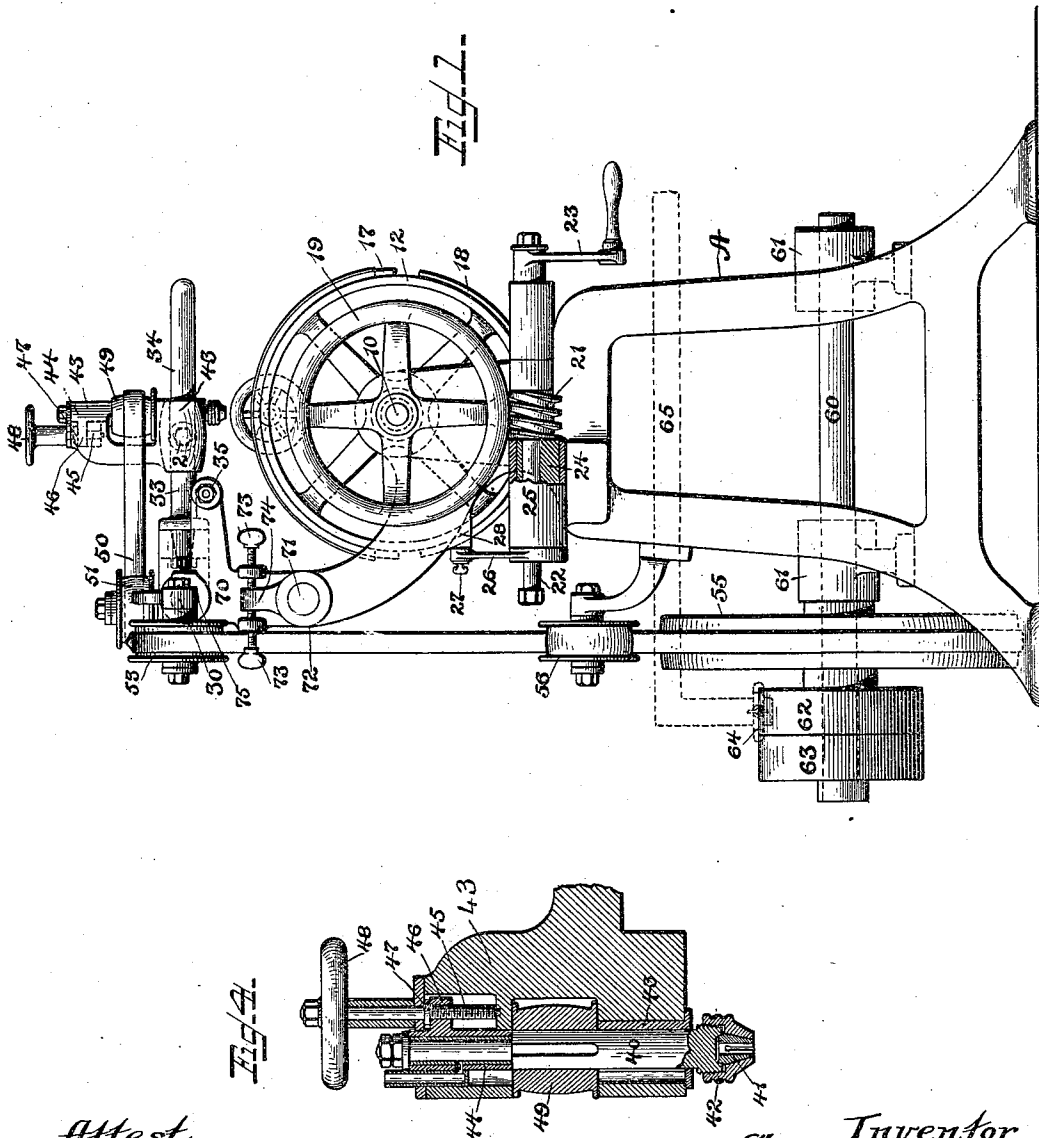
(No Model.)

3 Sheets—Sheet 1.

W. SPALCKHAVER.
ROUTING MACHINE.

No. 544,010.

Patented Aug. 6, 1895.



Attest
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(No Model.)

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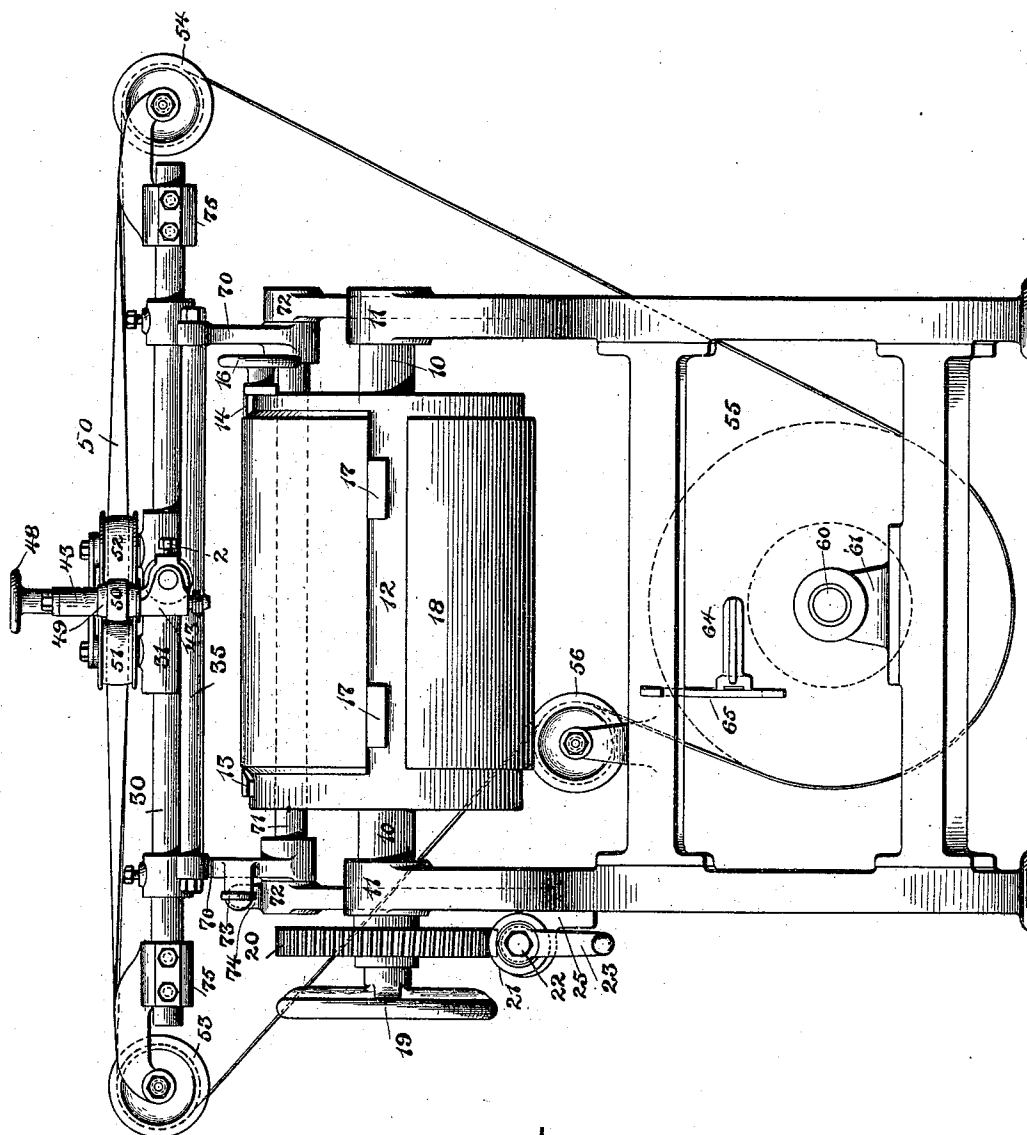


Fig. 2.

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(No Model.)

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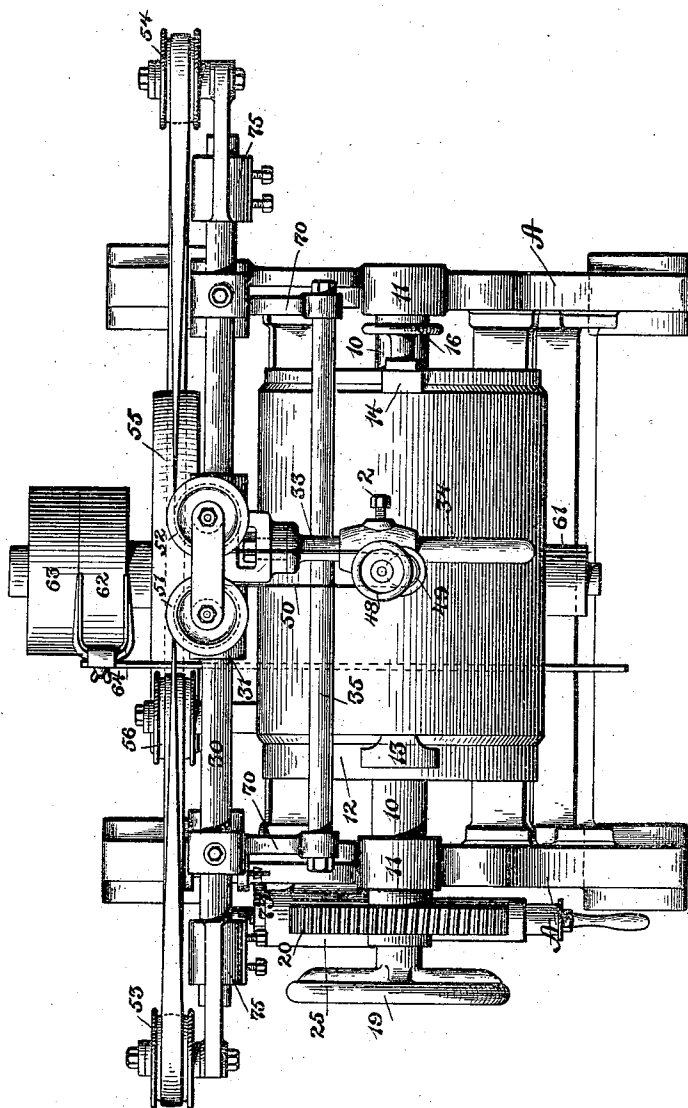


Fig. 3.

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UNITED STATES PATENT OFFICE.

WILLIAM SPALCKHAVER, OF BROOKLYN, ASSIGNOR TO ROBERT HOE, THEODORE H. MEAD, AND CHARLES W. CARPENTER, OF NEW YORK, N. Y.

ROUTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 514,010, dated August 6, 1895.

Application filed September 17, 1894. Serial No. 523,228. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM SPALCKHAVER, a citizen of the United States, residing at Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Routing-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to routing-machines, and more particularly to that class of routing-machines for operating on curved or cylindrical surfaces; and the object of the invention is to provide an improved machine of this kind which shall be more conveniently and easily operated than those heretofore in use. I have aimed especially to produce such a machine which shall be particularly well adapted for cutting away the "blank" or non-printing portions of the surface of curved stereotype or electrotype plates or other curved printed plates; but it is to be understood that the invention may be used in machines for operating on other surfaces and for other purposes.

To the ends named the invention consists in various constructions, arrangements, and combinations of parts, as will be hereinafter fully described, and specifically pointed out in the claims.

As a full understanding of the invention can best be had by a detailed description of a machine embodying the invention in the preferred form, all general description will be omitted, and such a detailed description will now be given in connection with the accompanying drawings, in which—

Figure 1 is a side elevation of a curved-plate routing-machine embodying the various features of the invention. Fig. 2 is a front elevation. Fig. 3 is a plan view. Fig. 4 is a sectional detail showing how the tool-holder is mounted.

Referring to the drawings, A is a suitable frame by which the various parts of the machine are supported. Carried by a shaft 10, mounted in suitable bearings 11 in the frame at each side of the machine, is a cylinder 12, which forms a bed on which the plate to be operated upon is mounted. The cylinder 12 is provided with any suitable means for secur-

ing the plate in position thereon, as a stationary clamping-piece 13 at one end of the cylinder and a movable clamping-piece 14, which slides in a groove at the other end of the cylinder and is operated by a screw 16. Side guide-pieces 17 are also preferably provided. When the plate extends only part way around the cylinder, as shown, a counterbalancing-weight 18 is preferably mounted on the other side of the cylinder. The cylinder may be rotated by means of a hand-wheel 19 on one end of the shaft 10. It is preferable, however, to provide for a more accurate movement of the cylinder than can be given by the hand-wheel, and to this end I preferably provide the shaft 10 with a worm-wheel 20, which is engaged by a worm 21 on a shaft 22, which is operated by means of a crank 23. To enable the worm to be thrown out of engagement with the worm-wheel when it is desired to turn the cylinder by the hand-wheel 19, the shaft 22 is mounted eccentrically in a sleeve 24, mounted in a suitable bearing 25 on the frame A, so that by rocking the sleeve the worm will be drawn away from the worm-wheel. The sleeve 24 is provided with an arm 26, by which the sleeve may be locked in position to hold the worm in engagement with the worm-wheel, as by a screw 27, carried by the arm 26 engaging in a lug 28 on the frame A.

Extending longitudinally of the machine, parallel with the axis of the cylinder 12, to the rear of and above the cylinder, is a rod 30, loose on which is a sleeve 31, which serves as a carriage for the tool-holder. The tool-holder is carried by an arm 33 extending forward from the carriage, and the outer end of which arm serves as an operating-handle 34. By this construction the sleeve 31 being free to slide and to rock on the rod 30 the carriage may be readily moved to carry the tool in either direction in a line parallel with the axis of the cylinder, and may also be rocked to carry the tool down into operative position or up away from the cylinder. The downward movement of the tool-holder is limited by a guide-bar 35, parallel with the rod 30, which acts as a stop and rest for the arm 33.

Any suitable tool-holder may be employed, and it may be mounted in any suitable manner. In the preferred construction shown

the tool-holder proper consists of the spindle 40, having gripping-jaws 41, which are engaged and tightened by a screw-head 42 on the lower end of the spindle. The lower part 5 of the spindle 40 is journaled in a bracket or casing 43, and the upper part thereof is journaled in and held against longitudinal movement in a sleeve 44, which sleeve is free to slide in the bracket or casing 43 and is raised and 10 lowered by a screw 45, which passes through a lug 46 of the sleeve 44, said screw being journaled in the casing and being held against longitudinal movement by a collar 47 and extending above the casing to receive a hand- 15 wheel 48. The spindle 40 will thus be raised or lowered as the hand-wheel is turned in one direction or the other, while being in all positions free to rotate. A pulley 49 is splined on the central portion of the spindle, the casing being cut away to receive it, as shown. 20 The bracket or casing 43 is free to slide on the arm 33 and is provided with a set-screw 2, thus providing for a backward and forward adjustment of the tool-holder.

The spindle 40 is driven by a belt 50, which, 25 passing around the pulley 49, leads backward on each side to horizontal sheaves 51 and 52, carried by the sleeve 31, thence outward in either direction parallel with the rod 30, and 30 consequently with the line of travel of the sleeve 31, to stationary vertical sheaves 53 and 54, and thence down to a driving-pulley 55, a guide-sheave 56 being preferably provided between the driving-pulley 55 and one of the 35 sheaves 53 or 54 to cause the belt to have a more extended bearing on the driving-pulley 55. By this arrangement of the belt the horizontal movement of the tool-holder by the sliding of the sleeve 31 on the rod 30 is not 40 interfered with whether the belt is in motion or not, as the belt between the sheaves 51 and 53, on one side of the sleeve 31, and between the sheaves 52 and 54, on the other side of the sleeve 31, being parallel with the line of travel 45 of said sleeve, the distance from one of the vertical sheaves, as 53, around the sheave 51, pulley 49, and sheave 52 to the other vertical sheave 54 is always the same, whatever the position of the sleeve 31 on the rod 30, the 50 belt simply rolling on the pulley 49 and on the sheaves 51 and 52 when the sleeve is being moved horizontally on the rod 30. The belt also does not interfere with the desired vertical movement of the tool-holder by the rocking of the sleeve 31 on the rod 30, as the 55 belt lies quite near the rod 30 in either direction from the sleeve.

The driving-pulley 55 is fast on a driving-shaft 60, mounted in suitable bearings 61 on 60 the frame A and preferably having fast and loose pulleys 62 and 63 for the main driving-belt, (not shown,) by which the machine is driven. A belt-shifter 64 is indicated by dotted lines carried by a rod 65, hung to the 65 frame A and extending to the front of the machine within reach of the operator.

The rod 30 and guide-bar 35 are preferably

supported by brackets 70, pivoted to the frame A, as by being fast on a shaft 71, the ends of which are journaled in bearings 72 in the 70 frame, and one or both of the brackets being provided with adjusting-screws 73, which bear on either side of a lug 74 on the frame A, thus providing for an adjustment of the rod 30 and guide-bar 35, and consequently of the limit of 75 the downward movement of the tool-holder, as, by swinging the brackets, the guide-bar 35 will be moved nearly vertically, while the movement of the rod 30 will be nearly horizontal. 80

The vertical sheaves 53 and 54 are preferably carried by brackets 75, adjustable on the 85 extended ends of the rod 30, to provide for adjusting the tension of the belt 50. By having the sheaves 53 and 54 carried by the rod 30, 85 on which is mounted the sleeve 31, by which the sheaves 51 and 52 are carried, the sheaves 51 and 52 will not be thrown out of line with the sheaves 53 and 54 by the adjusting of the 90 brackets 70.

In operation, the plate to be operated upon 95 having been secured on the cylinder, and the worm 21 being in engagement with the worm-wheel 20, and the various parts being properly adjusted, and the main driving-belt having been shifted to the fast-pulley 62 to start the tool rotating, the operator with one hand 100 operates the tool by the handle 34, while with the other he operates the worm 21 by the crank 23 to rotatively move the cylinder or bed 12. When it is desired to rout, the arm 33 is held 105 down against the guide-bar 35, and it may be moved longitudinally to carry the tool longitudinally of the plate, whether so held down or thrown up to move the tool away from the 105 plate. By turning the crank 23 the cylinder is rotated, thus moving the plate transversely beneath the tool. Provision is thus made for a universal movement of the plate and tool 110 relatively to each other, and the tool may be thrown into or out of cutting position at will. By holding the cylinder against rotation and moving the tool the tool may be made to cut in a straight line longitudinally of the plate, 115 and by holding the tool and rotating the cylinder the tool will cut in a straight line transversely of the plate. By moving both tool and cylinder the tool may be made to cut in any desired direction.

The sleeve 31 and the parts carried thereby 120 are preferably so arranged and proportioned that the tool will be normally held away from the plate, or a suitable spring may be provided for this purpose, if desired.

It will be understood that I am not to be 125 limited to the exact construction or arrangement of the parts as shown, but that many changes may be made in the construction shown without departing from the invention; and it will also be understood that some of 130 the features of the invention will be found useful and may be used with constructions differing widely from that shown, and in themselves form part of the invention, as claimed.

By the expression "rotatable cylindrical bed," as used in the claims, is meant any bed or support for a plate or other body having a curved surface, which bed or support is adapted to be operated so as to move the surface of the plate or other body transversely to the axis of its curvature, or transversely of the plate in the sense in which that term has been used in the foregoing description, although a cylinder such as shown is the preferred form of bed.

What I claim is—

1. The combination of a rotatable cylindrical bed, a rotary tool holder, a carriage for said tool holder pivotally mounted on and free to slide on a rod parallel with the axis of the bed, and means for driving the tool holder, substantially as described.

2. The combination of a rotatable cylindrical bed, a rotary tool holder, a carriage for said tool holder pivotally mounted on and free to slide on a rod parallel with the axis of the bed, and a driving belt for said tool holder, substantially as described.

3. The combination of a rotatable cylindrical bed, a carriage pivotally mounted on and free to slide on a rod parallel with the axis of the bed, a rotary tool holder carried by an arm extending forward from the carriage, an operating handle by which the carriage is reciprocated to move the tool longitudinally of the bed and is rocked to carry the tool into and out of operative position, and means for driving said tool holder, substantially as described.

4. The combination of a rotatable cylindrical bed, a carriage pivotally mounted on and free to slide on a rod parallel with the axis of the bed, a rotary tool holder carried by an arm extending forward from the carriage and adjustable thereon, an operating handle by which the carriage is reciprocated to move the tool longitudinally of the bed and is rocked to carry the tool into and out of operative position, a guide bar which limits the downward movement of the arm by which the tool holder is carried, and means for driving said tool holder, substantially as described.

5. The combination of a rotatable cylindrical bed, a carriage mounted to reciprocate longitudinally of the bed, a rotary tool holder carried by an arm extending forward from the carriage, the outer end of which arm serves as an operating handle by which the carriage is reciprocated to move the tool longitudinally of the bed, and by which the arm may be moved to carry the tool into and out of operative position, a guide bar which limits the downward movement of said arm, and means for driving said tool holder, substantially as described.

6. The combination in a routing machine, of a carriage pivotally mounted on and free to slide on a rod, a rotary tool holder carried by the carriage, and a driving belt for said tool holder which lies parallel with and near

to said rod in either direction from the carriage, substantially as described.

7. The combination of a rotatable cylindrical bed, a carriage pivotally mounted on and free to slide on a rod parallel with the axis of the bed, a rotary tool holder carried by the carriage, and a driving belt for said tool holder which lies parallel with said rod in either direction from the carriage, substantially as described.

8. The combination of a rotatable cylindrical bed, a carriage pivotally mounted on and free to slide on a rod parallel with the axis of the bed, a rotary tool holder carried by the carriage, and a driving belt for said tool holder which lies parallel with and near to said rod in either direction from the carriage, substantially as described.

9. The combination of a rotatable cylindrical bed, a carriage pivotally mounted on and free to slide on a rod parallel with the axis of the bed, a rotary tool holder carried by the carriage, a driving belt for said tool holder, guide sheaves for said belt mounted on the carriage, and stationary guide sheaves for said belt so positioned that the belt between said stationary sheaves and the sheaves on the carriage shall be parallel with and near to said rod in either direction from the carriage, substantially as described.

10. The combination of a rotatable cylindrical bed, a carriage pivotally mounted on and free to slide on a rod parallel with the axis of the bed, a rotary tool holder carried by the carriage, a driving belt for said tool holder, guide sheaves for said belt mounted on the carriage, and stationary guide sheaves for said belt so positioned that the belt between said stationary sheaves and the sheaves on the carriage shall be parallel with said rod in either direction from the carriage, substantially as described.

11. The combination of a carriage pivotally mounted on and free to slide on a rod, said rod, a rotary tool holder carried by an arm extending forward from the carriage, an operating handle by which the carriage may be reciprocated and rocked to carry the tool into and out of operative position, a guide bar which limits the downward movement of the arm by which the tool holder is carried, adjustable pivoted brackets for said rod and said guide bar, and means for driving said tool holder, substantially as described.

12. The combination of a rotatable cylindrical bed, a rod parallel with the axis of the cylindrical bed, a sleeve loose on said rod, an arm carried by said sleeve, a rotary tool holder carried by said arm, a guide bar parallel with said rod which limits the movement of the arm toward the bed, and means for driving said tool holder, substantially as described.

13. The combination of rod 30, a carriage pivoted on and free to slide on rod 30, a rotary tool holder carried by the carriage, guide bar 35 for said carriage, adjustable brackets 70

by which rod 30 and bar 35 are supported, and a driving belt for said tool holder which lies parallel with the rod 30 in either direction from the carriage, substantially as described.

14. The combination of rod 30, sleeve 31 loose on rod 30, arm 33 carried by sleeve 31 and the end of which serves as an operating handle 34, a rotary tool holder adjustably mounted on arm 33, guide bar 35 for arm 33, and means for driving said tool holder, substantially as described.

15. The combination of rod 30, sleeve 31 loose on rod 30, arm 33 carried by sleeve 31, a rotary tool holder adjustably mounted on arm 33, a driving belt for said tool holder which lies parallel with rod 30 in either direction from the carriage, and sheaves for said belt carried by brackets 75 adjustable on the extended ends of the rod 30, substantially as described.

16. The combination of rod 30, sleeve 31 loose on rod 30, arm 33 carried by sleeve 31 and the end of which serves as an operating handle 34, a rotary tool holder carried by arm 33, an adjustable guide bar 35 for arm 33, and means for driving said tool holder, substantially as described.

17. The combination of rod 30, sleeve 31 loose on rod 30, arm 33 carried by sleeve 31, a rotary tool holder carried by arm 33, a driving belt for said tool holder, guide sheaves 51 and 52 for said belt carried by sleeve 31, and stationary guide sheaves 53 and 54 for

said belt positioned so that the belt shall lie parallel with the rod 30 between the sheaves 51 and 53 and between the sheaves 52 and 54, substantially as described.

18. The combination of rod 30, a carriage pivoted on and free to slide on rod 30, a rotary tool holder carried by the carriage, a driving belt for said tool holder, guide sheaves 51 and 52 for said belt carried by the carriage, guide sheaves 53 and 54 for said belt carried by brackets 75 adjustably mounted on the extended ends of the rod 30, said sheaves being positioned so that the belt shall lie parallel with the rod 30 between the sheaves 51 and 53 and between the sheaves 52 and 54, substantially as described.

19. The combination with a rotatable cylindrical bed, of rod 30 parallel with the axis of the cylindrical bed, sleeve 31 loose on rod 30, forwardly extending arm 33 carried by sleeve 31, a rotary tool holder carried by arm 33 and adjustable thereon, guide bar 35 which limits the downward movement of arm 33, adjustable brackets 70 by which rod 30 and bar 35 are supported, and means for driving said tool holder, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

WILLIAM SPALCKHAVER.

Witnesses:

EDWIN D. TUCKER,

ARTHUR L. KENT.