

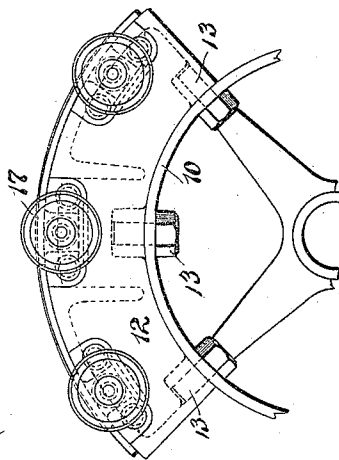
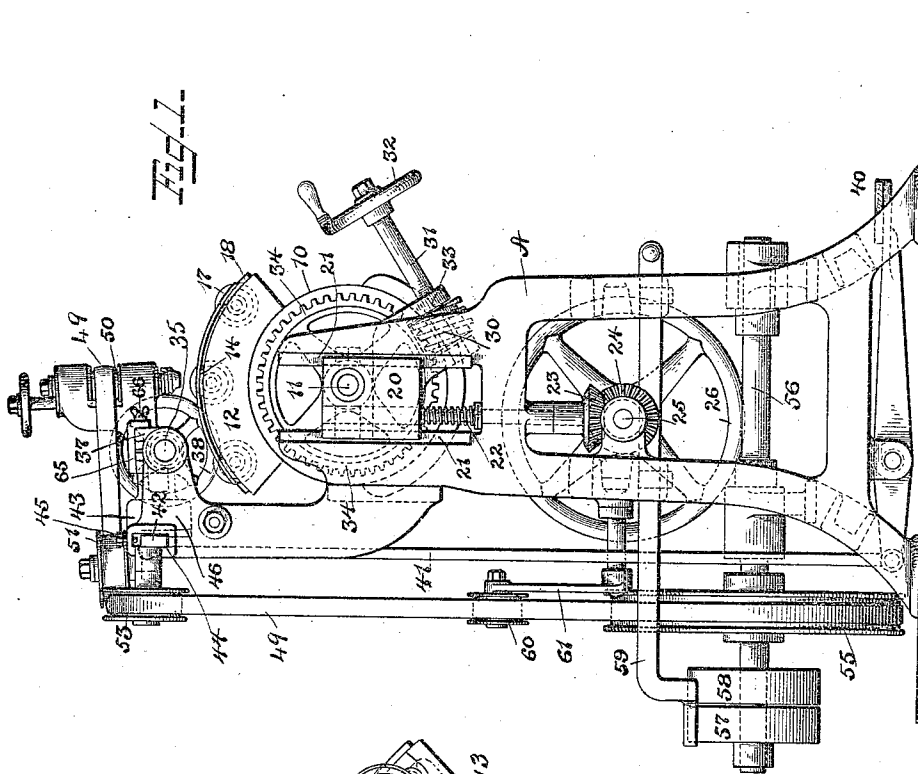
(No Model.)

2 Sheets—Sheet 1.

W. SPALCKHAVER.
ROUTING MACHINE.

No. 544,011.

Patented Aug. 6, 1895.



Attest
Arthur A. Kent
T. F. Kehoe

Inventor
William Spalckhaver
by Phelps, Hanson & Phelps
Attys

(No Model.)

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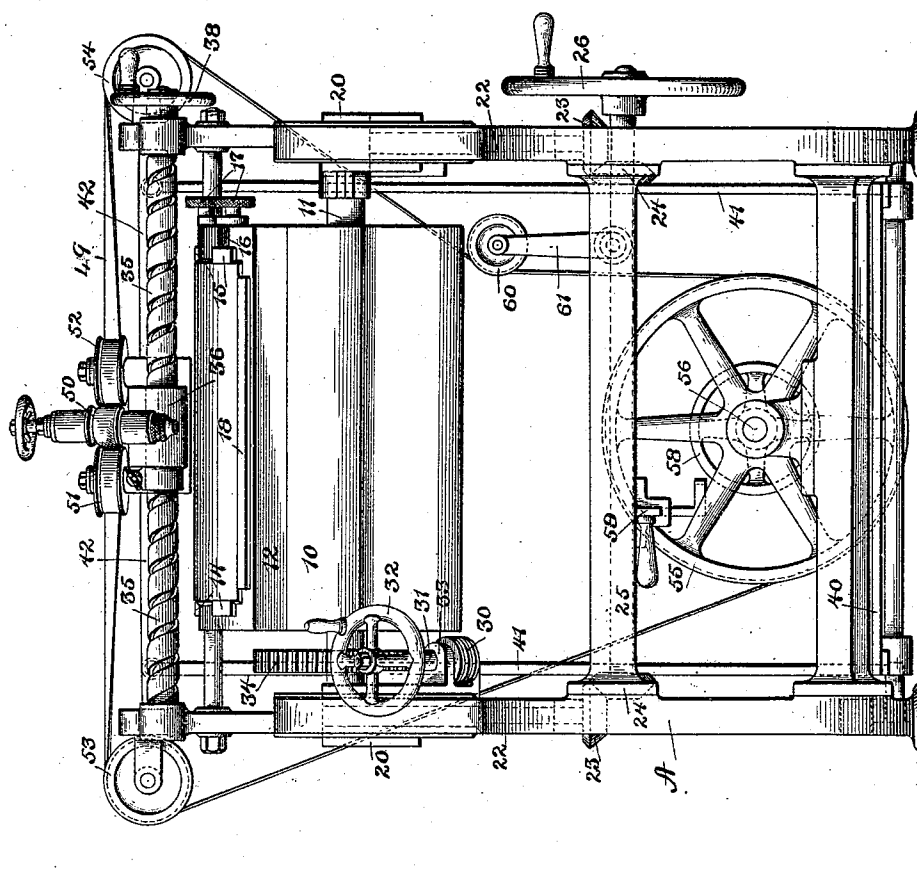


Fig. 2.

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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. 544,011, dated August 6, 1895.

Application filed September 17, 1894. Serial No. 523,229. (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 certain improvements in routing-machines which are especially applicable to machines having a general construction similar to that described in my application for Letters Patent of the United States executed on even date with this application, filed September 17, 1894, and serially numbered 523,228.

It is found in practice that the high speed at which the routing-tool is made to revolve tends to cause a very considerable vibration of the bracket or arm by which the tool is carried, and where the movement of the tool is controlled by a handle on the arm or bracket, as is customary, the vibrations, being communicated to the hand of the operator, not only affect his accuracy in guiding the tool, but also considerably lessen the time for which he can operate the machine, the constant and rapid vibrations having a very tiring and injurious effect on the wrist and arm of the operator.

One of the objects of the present invention is to provide a means for controlling the movements of the tool so that the operator does not receive the vibrations; and to this end I mount the tool-holder on a carriage which is reciprocated by means of a worm-shaft, the rotation of which is controlled by the operator, means also being provided for moving the tool into or out of operative position, preferably by a foot-treadle, the carriage being preferably pivotally mounted on the worm-shaft.

Another object of the invention is to provide a machine which may be used for operating on plates of different curvatures, and this object I attain by constructions hereinafter described, and pointed out in the claims.

The invention also consists in various details of construction of these and other parts of the machine, all as will hereinafter be fully described, and 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 various features of the invention in the preferred form, all further general description will be omitted and such a full description will now be given, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a machine embodying the various features of the invention. Fig. 2 is a front elevation. Fig. 3 is a detail showing how the segmental forms for increasing the diameter of the cylinder may be secured to the cylinder.

Referring to the drawings, A is a suitable frame by which the various parts of the machine are supported.

A cylinder 10, by which the plates to be operated upon are supported, is carried by a shaft 11 mounted in bearings at either side of the machine.

In order that the machine may be adapted to operate upon plates of different curvatures, segmental beds 12 are provided to carry the plates, and these segmental beds may be secured to the cylinder 10 in any convenient manner, so as to be readily removable, as by screws 13, as shown in Fig. 3. By providing a number of these segmental beds of different thicknesses, and, therefore, having exterior surfaces corresponding to cylinders of different diameters, cylinder 10 may be made to carry plates of different curvatures.

Any suitable means may be employed for securing the plates to the segmental beds, as by providing stationary clamping-pieces 14 and movable clamps 15, sliding in slots 16 and operated by screws 17, side guide-pieces 18 also being preferably provided.

As using a thicker or thinner segmental bed will bring the plate nearer or farther away from the tool, it becomes necessary to provide for adjusting either the cylinder or the tool, or both, toward or away from the other or each other. In the construction shown, the cylinder is adjustably mounted, and for this purpose the ends of the shaft 11 are journaled in boxes 20, mounted to slide on ways 21 on the frame A, and the boxes 20 are supported and moved vertically by screw-shafts 22 journaled in the frame A and provided with miter-wheels

23, which are driven by miter-wheels 24 on a shaft 25, which may be turned by a hand-wheel 26. Thus by turning the hand-wheel 26 the cylinder 10 may be raised or lowered 5 to bring the surface of the plate carried by the cylinder to the proper height. It will thus be seen that the machine may be adapted, by simply changing the segmental bed and adjusting the position of the cylinder, to operate on plates differing considerably in curvature. It will be observed that changing the segmental bed for one of a different thickness is in effect the same as changing the cylinder 10 for one of a different diameter, and that 15 the means shown is but a preferred way of changing the curvature of the bed to receive plates of different curvatures. The cylinder 10 is rotated preferably by means of a worm 30, carried by a shaft 31, provided with a hand-wheel 32 and journaled in brackets 33, carried by one of the boxes 19, and which worm engages a worm-wheel 34 on the shaft 11. Extending longitudinally of the machine, parallel with the axis of the cylinder 10, is a 25 worm-shaft 35, pivoted on which, by means of a sleeve 36 interiorly threaded to engage the thread of the worm-shaft, is a carriage or bracket 37, by which the tool-holder is carried. The worm-shaft 35 is provided at one end 30 with a hand-wheel 38, by turning which the carriage 37 may be moved in either direction at will, while being at all times free to be rocked on said worm-shaft to move the tool into or out of operative position, the tool-holder being mounted some distance in front of the 35 shaft.

The carriage 37 is preferably rocked by means of a foot-treadle 40 connected in any suitable manner to the carriage, so that when 40 the treadle is depressed the carriage will be rocked and the tool carried into cutting position. The treadle preferably operates through connecting-rods 41 and a cross-bar 42, which engages a rearwardly-extending arm 43 of the carriage and the ends of which cross-bar ride in slots 44 in the frame A. To provide for adjusting the length of the rocking movement of the carriage set-screws 45 may be provided to vary the length of the slots 44. 50 The arm 43 is preferably provided with a counterweight, as 46, to hold the tool normally out of cutting position, although other means may be employed for returning the carriage to normal position, as a spring connected to the arm 43 or to the treadle or its 55 connections.

Any suitable rotary cutter-holder may be used, and it may be mounted in any convenient manner on the carriage 37, preferably in 60 a position vertically over the axis of the cylinder 10. I prefer to use such a spindle and mounting therefor as is described in the specification of my said application, Serial No. 523,228, which I will not describe here, as it is there fully described, and as any other suitable construction may be used.

The cutter-holder is preferably driven by a

belt arranged as described in my above-said application—that is, the belt runs in either direction from the carriage in a line parallel to the line in which the carriage moves. As 70 shown, the belt 49, after passing around the pulley 50 on the tool holder, turns on horizontal sheaves 51 and 52 on the sleeve 36, and passes thence in either direction parallel with the worm-shaft 35 to vertical sheaves 53 and 75 54, thence to the driving-pulley 55. The tension of the belt will thus not be affected by the moving of the carriage, and the movement of the carriage will not be interfered with whether the belt be in motion or at rest, the belt simply rolling on the pulley 50 and sheaves 51 and 52. The driving-pulley 55 is fast on a shaft 56, which is preferably provided with fast and loose pulleys 57 and 58 85 for the main driving-belt by which the machine is driven. A belt-shifter 59 leads to a convenient position at the front of the machine. The belt preferably passes over a guide-sheave 60, between one of the sheaves 90 53 or 54 and the driving-pulley 55, and this sheave 60 may be adjustable, as by being carried by an adjustable arm 61, to provide for regulating the tension of the belt, or any other means may be employed to adjust the 95 tension of the belt.

In operation a segmental bed of the proper thickness being secured to the cylinder, and the plate to be operated upon being secured to the bed, and the cylinder being adjusted 100 to the proper height, and the machine having been started by shifting the main driving-belt to the fast pulley 57, the operator by the hand-wheel 38 controls the longitudinal movement of the tool and by the hand-wheel 32 105 controls the transverse movement of the plate, and with his foot on the treadle 40 throws the tool into or out of cutting position at will. The operator is thus able, by moving one or the other of the said hand-wheels, to cause 110 the tool to rout in a straight line either longitudinally or transversely of the plate, or by moving both at once may cause the tool to rout in any desired direction and is able at any moment to stop the cutting. 115

It will be observed that the operator is enabled thus to control the movements of the tool without receiving the vibrations therefrom, as is the case where the tool is guided directly, as has been customary heretofore. 120 He is thus enabled to guide the tool more accurately and with less fatigue, and consequently can do better work and a greater amount of work.

It may sometimes be desirable to secure the 125 carriage rigidly on the worm-shaft 35, as when it is desired to cut in a straight line transversely of the plate; and for this purpose I provide a suitable clamp carried by the carriage, as a strap 65 extending around the 130 worm-shaft and which may be tightened by means of a screw 66.

It will be understood that I am not to be limited to the exact construction or arrange-

ment 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 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, as 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 rotary tool holder, a carriage for said tool holder, a worm shaft by which said carriage is reciprocated and on which it is pivoted, and means for driving said tool holder, substantially as described.

2. The combination of a rotary tool holder, a carriage for said tool holder, a worm shaft by which said carriage is reciprocated and on which it is pivoted, means for driving said tool holder, means for rotating said worm shaft, and means for rocking the carriage on the worm shaft to move the tool into operative position, substantially as described.

3. The combination of a rotary tool holder, a carriage for said tool holder having a sleeve threaded internally to engage the thread on a worm shaft, said worm shaft, means for driving said tool holder, means for rotating said worm shaft, and a foot treadle and connections for rocking the carriage on the worm shaft to move the tool into operative position, substantially as described.

4. The combination of a rotary tool holder, a carriage for said tool holder pivoted on a shaft, means for reciprocating the carriage on said shaft, means for driving said tool holder, and a foot treadle and connections for rocking the carriage on said shaft to move the tool into and out of operative position, substantially as described.

5. The combination of a rotary tool holder, a carriage for said tool holder, a worm shaft by which said carriage is reciprocated and on which it is pivoted, means for driving said tool holder, means for rotating said worm shaft, means for rocking the carriage on the worm shaft to move the tool into operative position, and means for locking said carriage to said worm shaft, substantially as described.

6. The combination of a rotary tool holder, a carriage for said tool holder, a worm shaft by which said tool holder is reciprocated and on which it is pivoted, and a driving belt for said tool holder which lies parallel with and near to said worm shaft in either direction from the tool holder, substantially as described.

7. The combination of a worm shaft, a car-

riage pivoted on the worm shaft by means of a sleeve threaded to engage the thread of the worm shaft, a rotary tool holder carried by the carriage, and a driving belt for the tool holder which lies parallel with said worm shaft in either direction from the carriage, substantially as described.

8. The combination of a worm shaft, a carriage pivoted on the worm shaft by means of a sleeve threaded to engage the thread of the worm shaft, a rotary tool holder carried by the carriage, a driving belt for said tool holder, guide sheaves for said belt carried by the carriage, stationary guide sheaves so positioned that the belt between the stationary sheaves and the sheaves on the carriage shall be parallel with the worm shaft in either direction from the carriage, a hand wheel by which the worm shaft is rotated to reciprocate the carriage, and a foot treadle and connections for rocking the carriage on the worm shaft to move the tool into operative position, substantially as described.

9. The combination of a rotatable cylindrical bed, a rotary tool holder, a carriage for said tool holder, a worm shaft parallel with the axis of the bed by which said carriage is reciprocated and on which it is pivoted, means for driving said tool holder, means for rotating said cylinder and said worm shaft, and means for rocking said carriage on said worm shaft, substantially as described.

10. The combination with a rotatable cylindrical bed and means for rotating said bed, of a worm shaft parallel with the axis of the bed and means for rotating said worm shaft, a rotary tool holder, a carriage for said tool holder pivoted on the worm shaft by means of a sleeve threaded to engage the thread of the worm shaft, means for driving said tool holder, and means for rocking the carriage on the worm shaft to move the tool into operative position, substantially as described.

11. The combination with a rotatable cylindrical bed and means for rotating said bed, of a worm shaft parallel with the axis of the bed and means for rotating said worm shaft, a rotary tool holder, a carriage for said tool holder pivoted on the worm shaft by means of a sleeve threaded to engage the thread of the worm shaft, means for driving said tool holder, and a foot treadle and connections by which the carriage is rocked on the worm shaft to move the tool into operative position, substantially as described.

12. The combination with a rotatable cylindrical bed and means for rotating said bed, of a rotary tool holder, a carriage for said tool holder pivoted on a shaft parallel with the axis of said bed, means for reciprocating the carriage on said shaft, means for driving said tool holder, and a foot treadle and connections for rocking the carriage on said shaft to move the tool into operative position, substantially as described.

13. The combination in a routing machine for operating on curved plates, of a rotatable

cylinder, means whereby the cylinder is adapted to support plates of different curvatures, a rotary tool holder mounted to reciprocate longitudinally of the cylinder, and means for driving said tool holder, substantially as described.

14. The combination in a routing machine for operating on curved plates, of a rotatable cylinder, means whereby the cylinder is adapted to support plates of different curvatures, a rotary tool holder mounted to reciprocate longitudinally of the cylinder, means for driving said tool holder, and means for adjusting the distance between the axis of said cylinder and said tool holder, substantially as described.

15. The combination in a routing machine for operating on curved plates, of a rotatable cylinder, means whereby the cylinder is adapted to support plates of different curvatures, a rotary tool holder mounted to reciprocate longitudinally of the cylinder, means for driving said tool holder, and adjustable bearings for said cylinder whereby it may be adjusted toward and away from the tool holder, substantially as described.

16. The combination in a routing machine for operating on curved plates, of a rotatable cylinder, and means whereby the cylinder is adapted to support plates of different curvatures, substantially as described.

17. The combination in a routing machine for operating on curved plates, of a rotatable

cylinder and a segmental bed for the plates adapted to be secured to the cylinder, substantially as described.

18. The combination of a carriage pivotally mounted, a tool holder carried by the carriage, treadle 40, connecting rods 41, cross bar 42, a rearwardly extending arm of the carriage having a sliding connection with the cross bar 42, and means for reciprocating the carriage, substantially as described.

19. The combination of a carriage pivotally mounted, a tool holder carried by a forwardly extending arm of the carriage, treadle 40, connecting rods 41, cross bar 42, rearwardly extending arm 43 having a sliding connection with the cross bar 42, counter weight 46, and means for reciprocating the carriage, substantially as described.

20. The combination of a carriage pivotally mounted, a tool holder carried by the carriage, treadle 40, connecting rods 41, cross bar 42, adjustable slots 44 for the ends of cross bar 42, a rearwardly extending arm of the carriage having a sliding connection with the cross bar 42, and means for reciprocating the carriage, 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.