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ROUTING MACHINE

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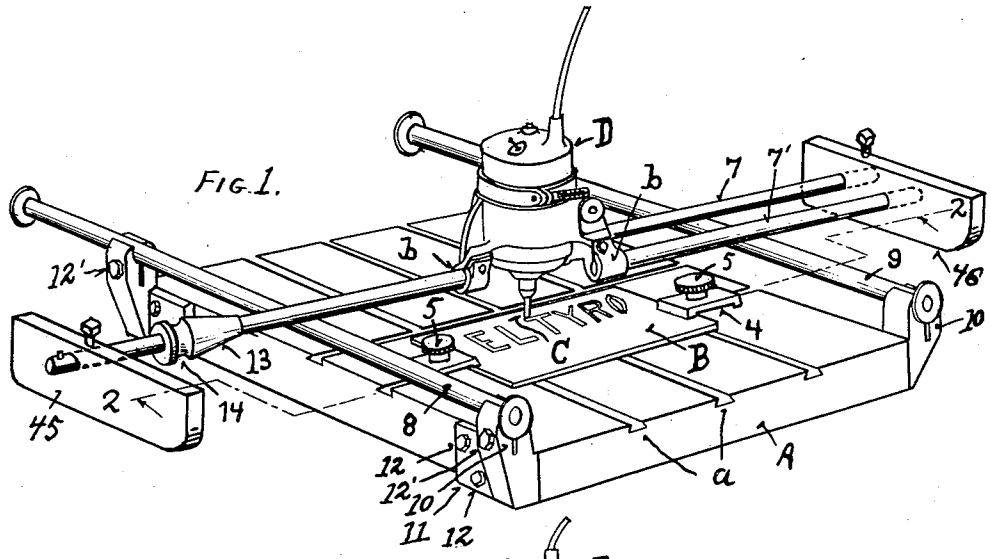


FIG. 1.

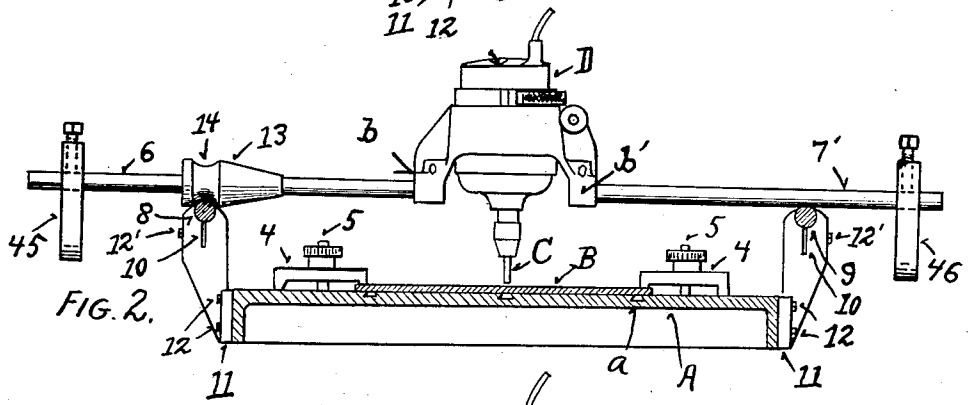


FIG. 2.

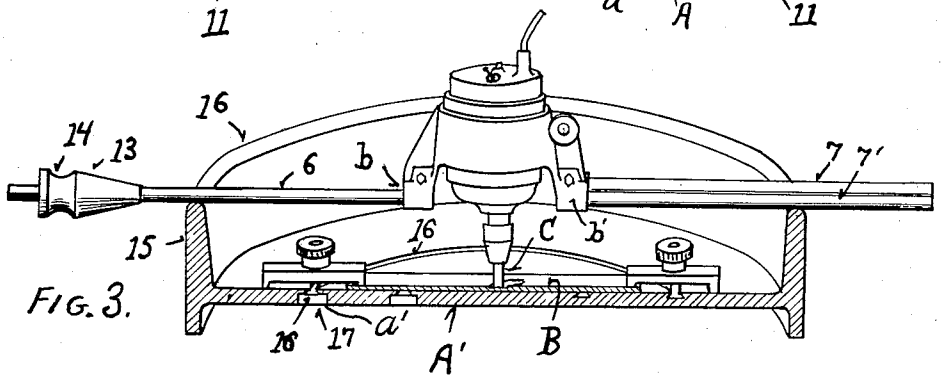


FIG. 3.

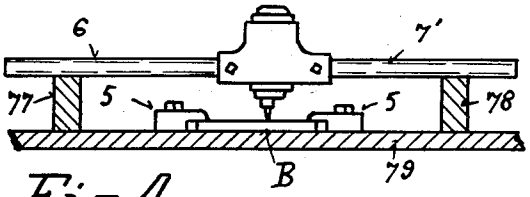


Fig. 4.

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ROUTING MACHINE

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12 Claims. (Cl. 90—15)

This invention relates to portable electrically-driven routing tools or implements adapted to the removal or scorping of surplus surface metal or wood surrounding the effective printing or impression part of the plates used in the production of printed matter of all kinds, and it has for one of its advantageous objects the convenient mounting and hand manipulation of the routing-bit carrier and its associated driving-motor on oppositely-extended diametric, horizontal rods or arms that rest on and traverse horizontal end-rails of a suitable foundation of any kind, but more particularly on a bed-plate or heavy block on which the "work" is firmly held and clamped beneath the plane of rotation of the routing-bit so that the latter can be accurately and easily gauged and downwardly-traced over said "work", with a clear and full view of exactly what surplus metal is to be removed from around the printing surface, and with a view always to the economical use of labor and time in the production of satisfactory plates for the printer, and another important advantageous object of the invention is to provide a routing-implement that is so mounted, on a base or foundation, by means of extension-rods and raised border supports or rests for said rods, that no pulleys, nor belting, nor gear mechanism of any kind are required to drive the motor, the ordinary flexible electric-conductors from the source of driving-current to the motor being all that is necessary and the slack held suspended out of the way above the machine for utilization in its varied paths along the said "work" to remove said surplus metal from around the actual printing part of the surface of the plate.

Other minor but quite important features of the invention will be referred to in detail in the following description of the accompanying drawing, in which:

Figure 1 is a perspective view of the device embodying my invention in its preferred form, showing the bit in routing position on a printing-plate, the printing-surface of said plate being partly cleared of the surrounding extraneous surface metal or wood by said bit; Figure 2, a transverse sectional elevation taken along the dotted-line 2, 2, of Figure 1, but with the said bit ready for descent into the surface of the printing-plate that is clamped in tooling-place on the bed or base-plate of the machine, as it appears in use; and Figure 3, a perspective view taken on the same line 2, 2, of Figure 1, but of a modified form of bed or base plate that has a raised edge or skirting for the resting and traversing of the motor-driven tool in a more varied or circuitous, enlarged path than that of Figures 1 and 2, and adapted to use by the operator in a circular manner across and around the machine bed or foundation for covering more ground in such sweeping-service. Fig. 4 is a fragmental elevational view of a modified form of the device of the invention.

A indicates the preferred form of base or bed-plate, having straight dovetail grooves *a* in parallel series along its upper face, as best seen in Fig. 1, but in circular series in Fig. 3, the grooves in said Fig. 3 having one or more enlarged portions or gates *a'* on the bottom of the bed-plate for the desired entrance of the clamp-bolt heads into the grooves when attaching the "work" in place for the routing operation on the said bed-plate.

B indicates the printing-plate upon which the routing is to be done in the tracing of the bit or tool C of the electric-motor D around the letters, figures or designs that are to remain on the surface of the plate when the removal-routing or scooping of surplus metal has been done for using the plate in the subsequent printing process. Clamps 4 are provided in connection with said dovetail grooves and the said printing-plate, and set-screws 5 used in the clamps for securing them in a removable and adjustable manner on the upper surface of the said printing-plate for the routing-work of the said bit C.

The lower edge or base of the motor-casing is provided with three lateral pendant clamp-lugs *b*, *b'*, *b'*, the lug *b* being a single one at the left side of the motor-casing, and the pair of lugs *b'*, *b'*, being corresponding, associated twin ones on the opposite right-side of said motor-casing, (one only of the lugs *b'* being visible in the several views of the drawing), and a single tool-supporting rod 6 being removably-clamped in laterally-extended position from the said single clamp-lug *b*, while a corresponding double or twin-pair of parallel tool-supporting rods 7, 7', is similarly removably-clamped in laterally-extended position from the said associated twin-pair of clamp-lugs *b'*, *b'*, practically diametrically-opposite the said single tool-supporting rod 6.

Elevated side-rails 8 and 9 are removably and adjustably mounted in upright clamping-jaws 10 that are located at the corners of the bed-plate A, said jaws 10 being provided with lateral lugs or plates 11 that are adapted to receive the fastening-screws 12, for ready mounting or dismantling or adjustment, as desired.

The said rods 6, 7 and 7' are preferably made of

circular cross-section tempered and preferably chromium-plated metal, and so are the two side-rails 8 and 9, being of the same superior material and conforming in diameter and rigidity so that when the tool is mounted, with its said supporting rods or arms resting on the said side-rails 8 and 9, respectively, as best shown in Fig. 1, the minute wearing-contact of the said rods with the said side-rails is thereby reduced to the minimum and protected from undue friction, and a material economy results from their use, in my improved machine. The suspension of the tool between the opposite inner ends of the said laterally-extended rods 6, 7 and 7' is somewhat of a slight swinging but not sagging nature and thereby adapts the router-cutter C to easily follow traced work (such as the word "eltyro") on the face of the said printing-plate B, in removing the surplus or extraneous metal surrounding the said traced work to the desired depth, and provides for the operator to easily raise or lower the tool and its cutter-bit as the work progresses, there being no obstruction whatever to a clear and accurate view of the work before him in traversing the said printing-plate, back and forth, with the said cutting-bit.

In order to facilitate the holding of the tool in slightly elevated detached position above the work, while the bit is revolving, or otherwise, I provide a cone-shape auxiliary-member 13 that is rotatably and slidably mounted on the said single rod 6, Fig. 1 showing the conical member 13 as normally slid backwardly out of engagement with the side-rail 8 which is the position it occupies when the machine is in use, and Fig. 2 showing the said conical member 13 as being slid forwardly on the said side-rail 8, with its circumferential groove 14 in engagement with the said side-rail 8 at the head or large end of the cone. The said cone can be rolled back and forth on the rod or side-rail 8 and its tapered face easily ridden transversely over the said rod or side-rail 8 when any emergency arises for holding the tool raised from working-contact with the printing-plate especially while the tool is running and when it is not expedient to stop its running, for even but a short time, or while adjusting or removing and replacing the printing-plate.

In Fig. 1, I have shown the two side-rails 8 and 9 as somewhat extended at their rear ends from beyond the rear corner-jaws 10, 10, which may be accomplished, the same way, from beyond the fore corner-jaws 10, 10, when it is desired to shift the tool to an idle position and support it in an idle position above said bed-plate. The adjustment of the said side-rails is readily effected by loosening the jaw-screws 12' and sliding said side-rails lengthwise forwardly or rearwardly, as needed, and to suit the will of the operator in laying the tool aside when applying, adjusting, or removing a "work" plate, or when the tool is idle.

The provision of a twin-pair of rods 7 and 7' at one side of the tool is to properly level the latter on the side resting-rails and to prevent said tool from tilting when in operation, while, at the same time, allowing any desired tilting or rocking of the tool on the single rods 6 and 7 in the course of its router-cutting on the face of the printing-plate B, or in setting the bit into cutting-position on the "work" plate, when and how desired.

In using my implement, it will be seen that every part of the upper face of the bed-plate is easily accessible for the mounting and doing of the "work", and the entire tool is easily lifted and removed from the side-rails and easily replaced for any required and expected purpose of the implement, for inspection, repairs, or otherwise.

When the rods and the side-rails are in anywise or materially worn flat, they can each be independently turned or rotated slightly in their clamping-jaws when loosened so as to clear the flat surfaces, and then provide at once a renewed minimum-frictionless round contact bearing-surface for each of said rods and side-rails, to facilitate the easy and economical working of the implement, without undue loss of time, labor or material, all of which is important in the performance of a routing-machine for both general and special service to which my improvements herein are especially and admirably adapted.

In Fig. 3, I have shown a modified form of my device, in which a circular bed-plate A' is present, such bed-plate, in that event, having a raised circular rim or rail 15 with a rounded upper edge 16 to correspond with the round side-rails 8 and 9 of the other two views of the drawing and for a like frictional-resistance and wear off setting purpose of reducing the frictional bearing and sweeping contact of the extension supporting-rods 6, 7 and 7' to the minimum. Such circular form of bed-plate and rail would, also, require in its upper face corresponding circular dovetail grooves 16 having expanded or enlarged gateways 17 located in the bottom of the bed-plate therein, for the accommodation of the heads of bolts or screws that are used in connecting or fastening the printing-plate B in set-place for routing-operation thereon. The circular rail, being continuous, would enable the operator to girdle or encompass the machine in performing his work on the printing-plate at any point, with the extension-rods 6, 7 and 7' of the tool in performing the routing-work on the clamped printing-plate B, within said circular rail, to all or any part of its area. The slidable cone 13 is also adapted to use with this circular form of routing-machine, and shown in said Fig. 3 in normal, idle position on the rod 6 sufficiently separated or remote from the rail.

It will be apparent that the preferred rigid mounting of a routing-implement in an open skeleton, extension-rod supporting-frame, such as I have shown and described herein, is well adapted to prevent the high-speed throbbing, wobbling, or otherwise creeping or jumping action of the rotary cutter-bit out of its duly traced pit or furrow and, also, to readily permit said cutter-bit to follow along the traced lines and cut to any shape, or to groove to any desired or approved depth, the printing-plate "work" that is clamped upon the upper surface of the table or bed-plate, or upon any suitable or convenient foundation, and for various kinds of "work", including electrotypes, stereotypes, paneling in relief or intaglio, raised or sunken lettering, straight or circular slotting, key-seating, beveling, bordering, and other like purposes.

It frequently happens that the work to be performed is of relatively large dimensions, such as routing upon the floor of a room, or upon the top of a bench or table, where it would be difficult to mount stationary rails 8 and 9, or supporting brackets or jaws 10 to support such rods 8 and 9, in which event I employ independently adjustable bars as shown in Fig. 4 or the shoes or runners 45 and 46, which are detachably attached to the rod 6, and the twin rods 7 and 7' respectively, as shown in Figs. 1 and 2. The shoes 45 and 46 are adapted to rest upon the floor, or upon the top of a bench or table, and to be slid, or adjusted both endwise or laterally of said shoes

to bring the routing tool to any desired position, and said shoes are sufficiently remote from the routing tool so as not to drop into the recesses cut by the routing tool, or to be interfered with in their movements by any openings or channels made by the routing tool. The shoe 43 also serves to unite the free ends of the twin rods 7 and 7' to materially strengthen the structure. If desired the twin rods 7 and 7' may be extended past the routing casing upon opposite sides thereof to take the place of the rod 6, and into position to receive the shoe 45, or to rest upon the stationary rod 8. In practice the routing casing is conveniently rocked by the operator, using one hand, upon the rod 7, as an axis, to lift the routing tool from engagement with the work, and lower it back into engagement with the work. Either the rods 6 and 7 and 7', or the rods 8 and 9 may if desired be polygonal in cross-section, and be adjusted from time to time to bring a new face into operative position, whenever a previously used face becomes worn or inaccurate.

In the modification Fig. 4 I have shown two bars 77 and 78, corresponding to the bars 8 and 9 of Fig. 1, preferably of rectangular cross section, which are laid upon the floor or a bench or table upon opposite sides of the work where they may be clamped or retained in position by the force of gravitation. The rods 6, 7, 7', rest upon and are adjustable relative to the bars 77 and 78 in the same manner that bars 8, 7, 7' are adjustable relative to bars 8 and 9 of Fig. 1.

The apparatus herein shown and described is capable of considerable modification within the scope of the claims without departing from the spirit of my invention.

What I claim is:

1. In an electrotype or similar routing machine, a rectangular work-table, means adapted to clamp work members on said work-table, normally stationary longitudinal rods adjustably and detachably mounted on raised clamps above the opposite side edges of said work-table and adapted to be extended to overhang one end of said table to form a tool rest or emergency support for such tool when not in use on said work-table, a router casing, a motor-driven routing tool rotatable relative thereto, and an open skeleton-frame adapted to support said routing tool and casing and composed of a single rod or bar extending from one side of the router casing and a pair of associated or twin rods or bars extending from the opposite side of said implement, such rods resting on the said longitudinal rods to form an open-sighted medium by which the routing-tool is rigidly swung and accurately, unrestrictedly and easily moved in all directions by hand over the surface of the printing-plate to be routed, substantially as shown and described.

2. A routing apparatus comprising in combination an enlarged frame having a continuous smooth upper surface for supporting a router casing, said frame being adapted to be positioned relative to the work piece so that the router supported thereby may operate upon the work piece, a routing device comprising a casing considerably smaller in all lateral dimensions than the area of the frame opening, a motor in the casing, and a cutting tool depending substantially vertically from the casing, and a plurality of arms extending outwardly from the casing in a common plane with the arms resting in traversing contact for free unrestricted gliding movement in all directions on the continuous smooth upper surface of the frame.

3. A routing apparatus comprising in combination an enlarged frame having a base and an arcuate smooth surface elevated relative to the base for supporting a router casing, said frame being adapted to be positioned relative to the work piece so that the router supported thereby may operate upon the work piece, a routing device comprising a casing considerably smaller in all lateral dimensions than the area of the frame opening, a motor in the casing, and a cutting tool depending substantially vertical from the casing, and a plurality of arms having arcuate under-surfaces for effecting a single point contact upon the arcuate elevated surface of the frame, and extending outwardly from the casing in a common plane with the arms resting in traversing contact for free, unrestricted gliding movement in all directions on the arcuate smooth elevated surface of the frame.

4. A routing apparatus comprising in combination an enlarged frame having a base and an arcuate smooth surface elevated relative to the base for supporting a router casing, said frame being adapted to be positioned relative to the work piece so that the router supported thereby may operate upon the work piece, a routing device comprising a casing considerably smaller in all lateral dimensions than the area of the frame opening, a motor in the casing, and a cutting tool depending substantially vertical from the casing, a plurality of arms having arcuate under-surfaces for effecting a single point contact upon the arcuate elevated surface of the frame, and extending outwardly from the casing in a common plane with the arms resting in traversing contact for free, unrestricted gliding movement in all directions on the arcuate smooth elevated surface of the frame, and means associated with the frame for adjusting the arcuate smooth elevated surface to effect disposition of new single point contacts with the arms of the router casing.

5. A work supporting table for routing apparatus comprising in combination a substantially flat table portion, means associated with the table portion for clamping a work piece thereon, and router supporting means comprising substantially frictionless round smooth rods stationarily and rigidly mounted relative to the table portion in an elevated position relative thereto, and means for adjusting and fixedly securing the rods in various positions relative to the table portion to present new supporting surfaces for the routing apparatus.

6. Work-piece trimming apparatus comprising in combination a plurality of spaced smooth round-surfaced rods normally fixed stationarily and rigidly relative to the work-piece in a plane above the work-piece, a motor driven work-piece engaging tool, a casing considerably smaller in all lateral dimensions than the space between the rods, means on the casing for supporting the motor driven work-piece engaging tool, and a plurality of arms having rounded under-surfaces for effecting single point contacts upon the rounded stationary rods, and extending outwardly from the casing in a common plane, with the arms resting in traversing contact for free and easy unrestricted gliding movement in all lateral directions, by reason of the point contacts, upon the smooth rounded surfaces of the elevated rods.

7. Work-piece trimming apparatus comprising in combination opposed spaced supports having smooth rounded upper surfaces normally fixed stationarily and rigidly relative to the work-piece in a plane above the work-piece, a motor driven

work-piece engaging tool, a casing considerably smaller in all lateral dimensions than the space between the spaced supports, means on the casing for supporting the motor driven work-piece engaging tool, and a series of three arms extending outwardly from the casing in a common plane and having rounded under-surfaces affording three single-point contacts upon the rounded upper surfaces of the spaced stationary supports, with the arms resting in traversing contact for free and easy unrestricted gliding movement in all lateral directions on the smooth rounded surfaces of the spaced stationary supports, by reason of the substantially frictionless single-point contacts.

8. Work-piece trimming apparatus comprising in combination opposed spaced supports having smooth rounded upper surfaces normally fixed stationarily and rigidly relative to the work-piece in a plane above the work-piece, a motor driven work-piece engaging tool, a casing considerably smaller in all lateral dimensions than the space between the spaced supports, means on the casing for supporting the motor driven work-piece engaging tool, and a series of three arms, each of a length approximating the distance between the spaced supports, extending outwardly from the casing in a common plane and having rounded under-surfaces affording three single-point contacts upon the rounded upper surfaces of the spaced stationary supports, with the arms resting in traversing contact for free and easy unrestricted gliding movement in all lateral directions on the smooth rounded surfaces of the spaced stationary supports, by reason of the substantially frictionless single-point contacts.

9. A work support comprising a substantially flat table portion upon which a work-piece may be placed, said table portion having at least two longitudinal side edges, a pair of rotatable and longitudinally shiftable spaced substantially parallel round rods each longer than the side edges of the table portion and extending beyond the table portion, brackets supporting the rods above and in substantial parallelism with said side edges of the table portion, and clamping means on the brackets for holding the rods in longitudinally and rotatably adjusted positions relative to the table portion.

10. A work support comprising a substantially flat table portion upon which a work-piece may be placed, said table portion having at least two longitudinal side edges, a pair of rotatable adjustable smooth round-surfaced rods each longer than the side edges of the table portion and extending beyond the table portion in the general direction of said side edges, brackets supporting the rods above and in substantial spaced parallelism with said side edges of the table portion, and clamping means on the brackets for holding the rods rigidly in rotatably adjusted positions relative to the table portion.

11. A work support for routing apparatus comprising a substantially flat table portion upon which a work-piece may be placed, said table portion having at least two spaced longitudinal side edges, a pair of rotatably adjustable smooth and round-surfaced rods for supporting a router, brackets supporting the rods above said side edges of the table portion and substantially in spaced parallelism, with the rounded surfaces of the rods uppermost, and clamping means on the brackets for holding the rods rigidly in rotatably adjusted positions relative to the table portion.

12. A routing apparatus comprising in combination an enlarged frame having a pair of continuous smooth upper surfaces for supporting a router casing, said frame being adapted to be positioned relative to the work piece so that the router supported thereby may operate upon the work piece, a routing device comprising a casing considerably smaller in all lateral dimensions than the area of the frame opening, a motor in the casing, and a cutting tool depending substantially vertically from the casing, and a plurality of arms extending outwardly from the casing in a common plane with the arms resting in traversing contact for free unrestricted gliding movement in all directions on the continuous smooth upper surfaces of the frame.

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