

Sept. 16, 1952

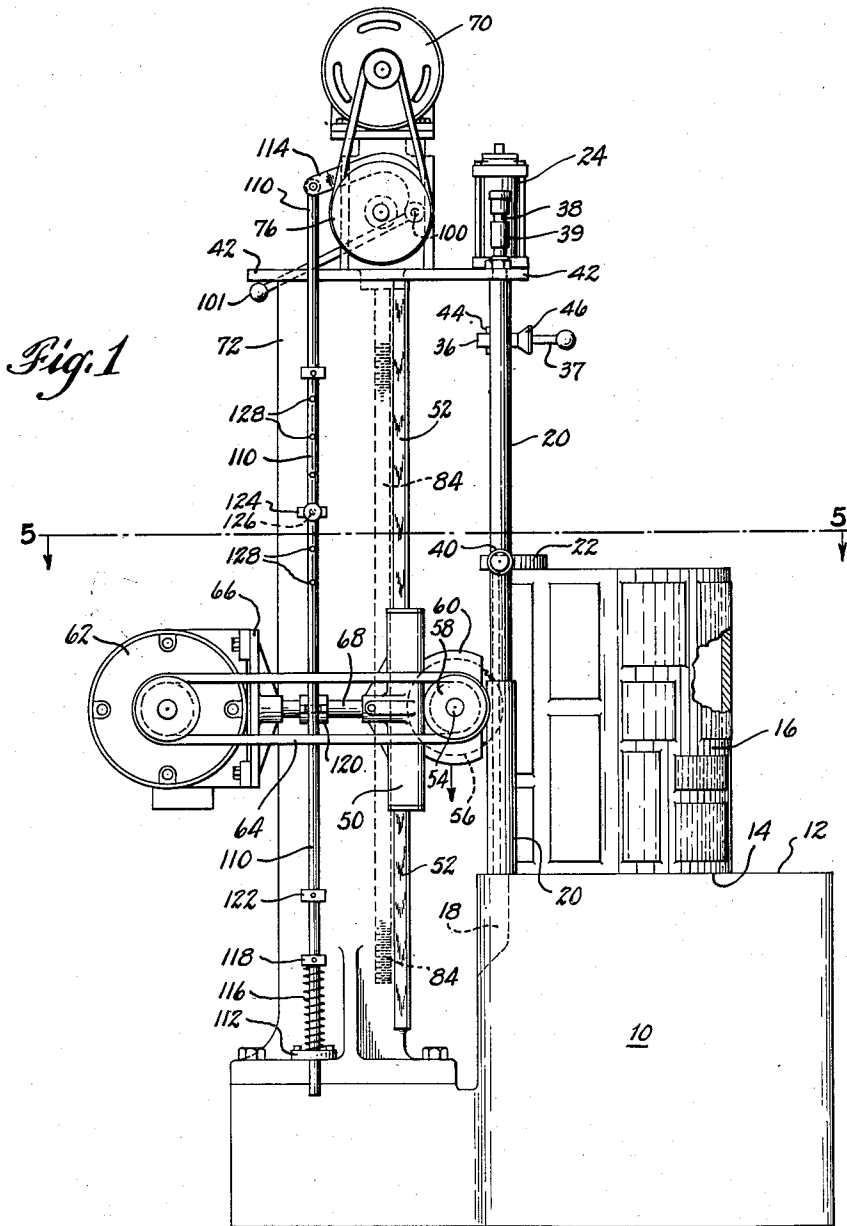
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2,610,389

POWER SAW FOR CYLINDRICAL PRINTING PLATES

Filed Nov. 29, 1949

5 Sheets-Sheet 1



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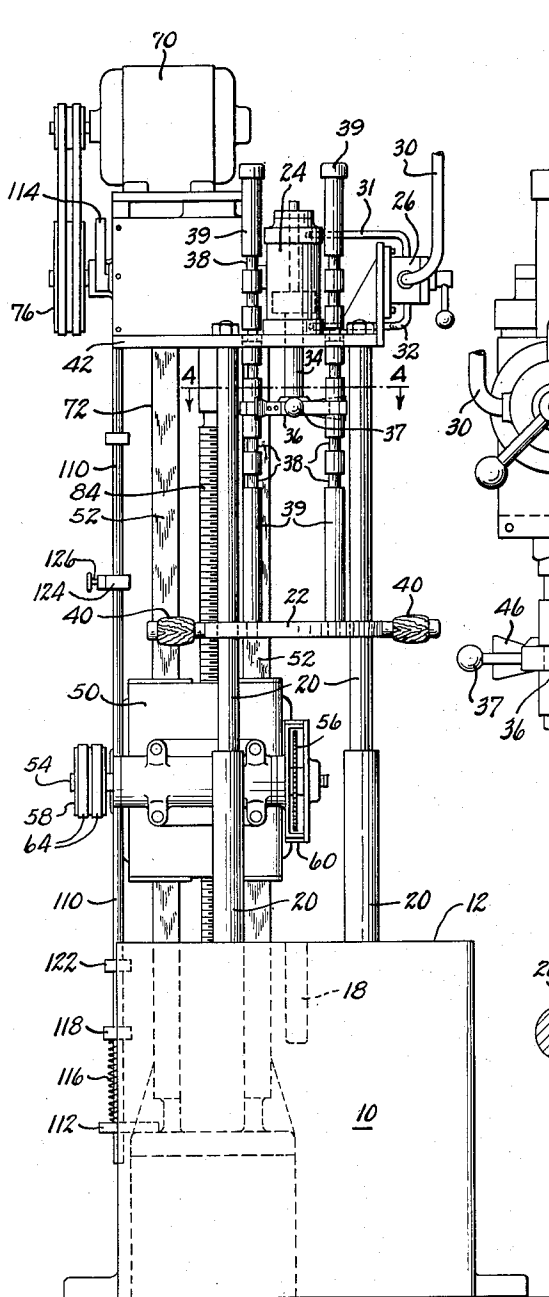


Fig. 2

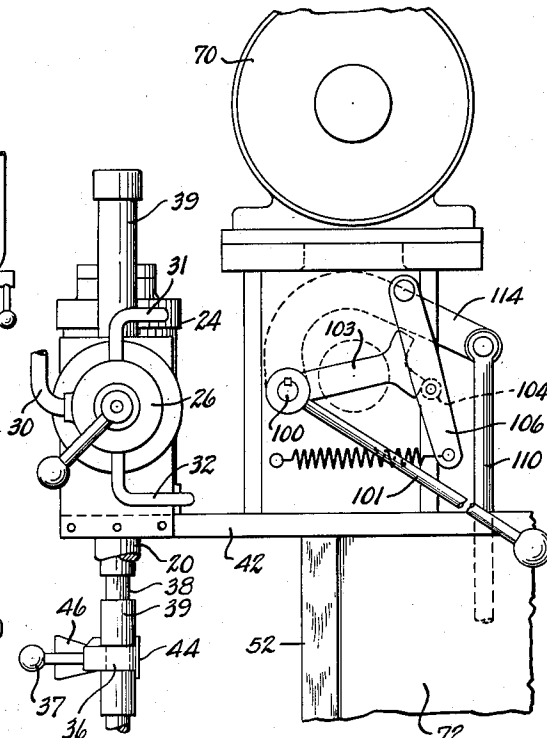


Fig. 3

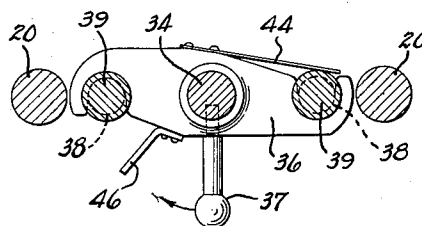


Fig. 4

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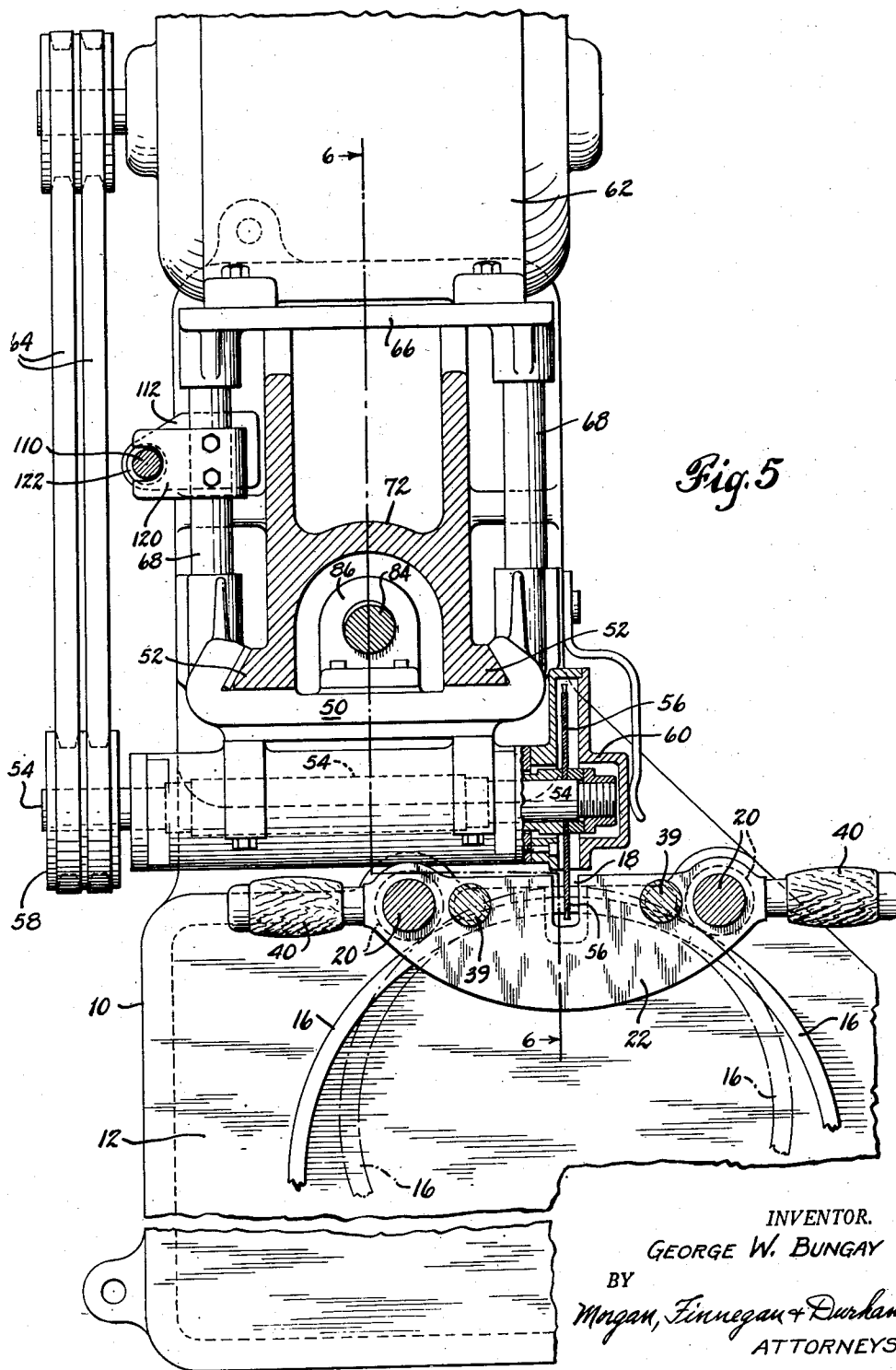
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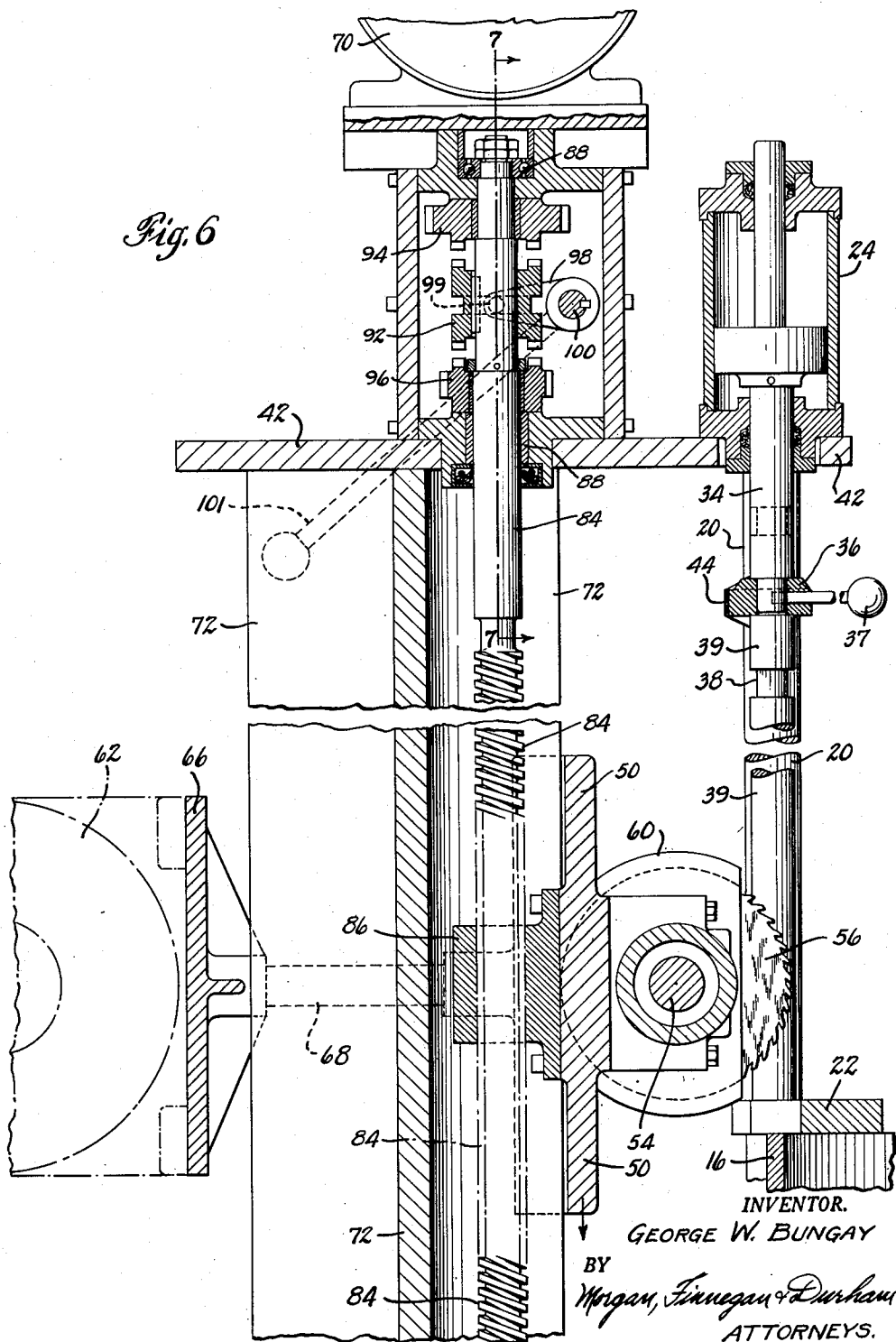
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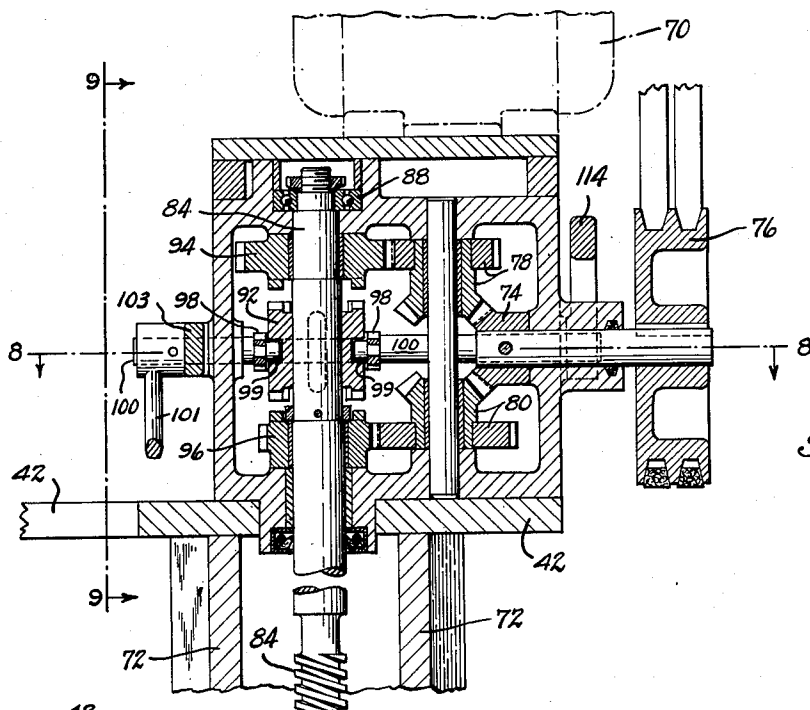


Fig. 7

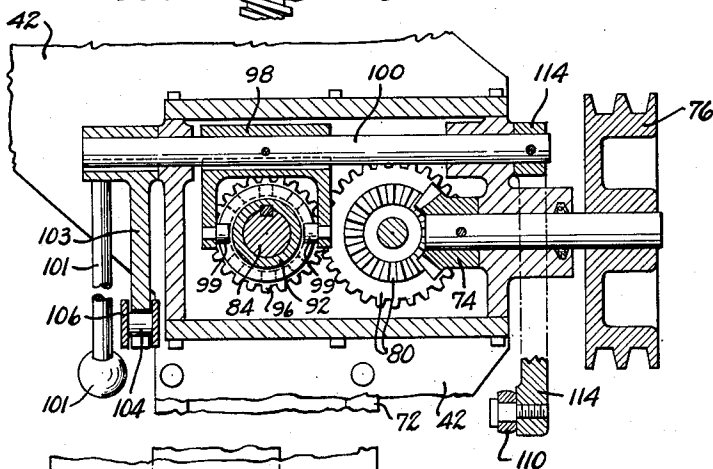


Fig. 8

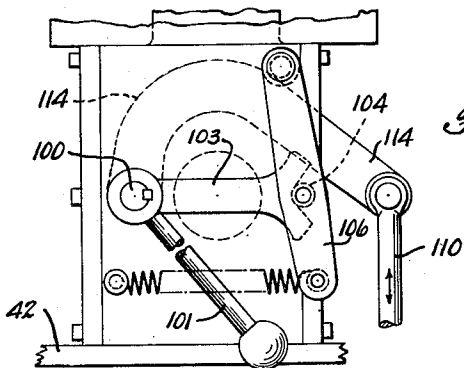


Fig. 9

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POWER SAW FOR CYLINDRICAL
PRINTING PLATES

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3 Claims. (Cl. 29—72)

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The present invention relates to a novel and improved motor driven saw for sawing cylindrical printing plates along their straight parallel edges prior to the finishing operation.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements herein shown and described.

The accompanying drawings, referred to herein and constituting a part hereof, illustrate one embodiment of the invention, and together with the description, serve to explain the principles of the invention.

Of the drawings:

Figure 1 is a side elevation of a typical and illustrative embodiment of the present invention;

Figure 2 is a front elevation looking from the right of Figure 1;

Figure 3 is a detailed elevation showing the clutch mechanism and fluid pressure motor for holding the plate while it is sawed;

Figure 4 is a detail horizontal section taken on the line 4—4 of Figure 2;

Figure 5 is a horizontal section taken on the line 5—5 of Figure 1;

Figure 6 is a fragmentary vertical section taken on the line 6—6 of Figure 5;

Figure 7 is a sectional view taken on the line 7—7 of Figure 6 showing the internal structure of the clutch and reversing gears;

Figure 8 is a sectional view taken on the line 8—8 of Figure 7; and,

Figure 9 is a detailed elevation showing the clutch operating levers in neutral position.

The present invention has for its object the provision of a novel and improved cylindrical plate saw for sawing curved stereotypes and electrotypes. A further object is the provision of a power saw which may be rapidly operated with a minimum of manual effort, and produces accurately sawed plates with complete certainty. A further object is the provision of a plate saw which will operate with equal accuracy on plates of widely different diameter. The invention further provides a power saw of the kind set forth in which the plate is supported vertically on a flat table and may be easily lifted to and from the saw table.

The power saw of the present invention is illus-

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tratively embodied in mechanism comprising a flat table on which the curved plate is supported with one of its curved edges resting on the flat surface. A pair of guide rods, close together and parallel to each other are perpendicular to the table and serve to accurately position the plate so that the saw passing between them cuts the plate along radial straight edges, accurately perpendicular to the plane of the curved edges. A clamping member is power moved along the guide rods so as to clamp the plate between it and the table. The saw is power driven by a vertically movable motor on guideways which carry a frame supporting both the saw and motor. A lead screw is also motor driven through a clutch and reversing gear so that the saw and its motor are lowered and raised by the elevator motor. Automatic means are provided for controlling the travel of the motor-driven saw. After one straight edge of the plate has been sawed, the clamp is released, the plate shifted, again clamped and the second cut is taken and is parallel to the first.

It will be understood that the foregoing general description and the following detailed description as well are exemplary and explanatory of the invention but are not restrictive thereof.

Referring now in detail to the illustrative embodiment of the present invention as shown specifically in the accompanying drawings, there is provided a heavy rigid base 10 one part of which is finished to provide a flat horizontal table 12 adapted to receive the curved, uniplanar edge 14 of a parti-cylindrical stereotype, electrotypes or other rigid arcuate printing plate 16 which is to have its straight parallel edges trimmed to provide radial surfaces by which the plate may be clamped to the cylinder during printing. The curved edges 14 of the plate 16, as cast or otherwise formed, are generally true and form the reference surfaces by which the other edges may be trimmed.

Means are provided for accurately locating the plate, so that the plate may be accurately positioned with the saw blade on its radius.

Table 12 is formed with an edge slot 18 wide enough to provide clearance for a circular saw blade and deep enough to receive the saw blade far enough to cut through the plate. Closely adjacent the slot 18 are two parallel rods 20 fixed in the table surface 12 of base 10 and extending upwardly therefrom. The exterior of these cylindrical rods form surfaces to contact with the convex surface of the plate 16 of any normal size, so a radius of the plate 16 lies over

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the slot 18 and is uniformly positioned with respect to the saw blade.

Means are provided for clamping the plate 16 during the sawing operation. As embodied, a flat clamping member 22 is movable up and down along rods 20 at their portions of reduced diameter. Clamp 22 is preferably power actuated by means of a reversible fluid pressure motor 24 under control of a normally actuated reversing valve 26. The reversing valve 26 controls the supply of fluid pressure from supply pipe 30 to the pipe 31 or 32 connected to the upper and lower ends of the motor cylinder 24 so as to lower or raise (respectively) piston rod 34 which is connected to the cross head 36 which is oppositely slotted at its ends and is engageable in the grooves 38 formed along the length of the slidable rods 39 which are connected to the clamp 22. The clamp 22 is provided with hand grips 40 at its ends and is apertured to slide on the guide rods 20, while the upper ends of the rods 39 are slidable in the upper guide plate 42. To insure the proper locking of the cross head 36 in the grooves 38, a leaf spring 44 is secured to the cross head and tends to pull the slotted end into the groove 38. On the other end, a stop 46 is provided to prevent the cross head being swung too far so as to endanger breakage of the spring 44.

By manually lifting or lowering the clamp 22 while the cross head 36 is swung by handle 37, the clamp may be adjusted so as to be power actuated from plate released to plate securing position for all normal lengths of plates.

The motor driven saw is carried on a vertically movable frame and the saw rotates in the same path as it is bodily moved. As embodied, a slide 50 is movable up and down along a dovetail guideway 52, and is gibbed thereto. On one side, the slide is formed with suitable bearings for the saw shaft 54 on one end of which is mounted a circular saw blade 56, while on the other end there is provided a double pulley 58. A suitable saw guard 60 is mounted on the slide 50 to cover the saw except where the saw passes into slot 18.

A motor 62 drives saw pulley 58 through belts 64 and is mounted on a plate 66 supported on the slide 50 by means of the rigid rods 68, the motor being so positioned that the vertically movable saw and motor are substantially balanced about the guideway 52 so that any tendency to bind is avoided. A suitable power supply and switch are provided for motor 62.

For moving the motor-saw unit up and down, power means are provided for slowly moving the saw down as it cuts the plate and for more rapidly moving the saw upwardly on its idle return stroke. As embodied, a motor 70 is mounted on the upper end of the column 72 which supports guideways 52. Motor 70 drives a bevel pinion 74 through reduction pulleys 76 so as to drive two compound gears 78 and 80.

A threaded rod 84 extends vertically parallel to the guideways 52 and engages with a threaded sleeve 86 fast to the slide 50 so that rotation of the rod 84 raises or lowers the slide 50 and the motor 62 and saw 56 carried thereby. Rod 84 is journaled at its upper end in bearings 88 in the gear box in which the gears 74, 78 and 80 are rotatably mounted.

Reversible clutch means are provided for driving rod 84 from gear 74 and for this purpose a dog clutch member 92 is slidably keyed to the rod 84 at its upper unthreaded end. Member 92 may be moved upwardly into driving engagement with the clutch member 94 formed integrally with a

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gear journaled for rotation on shaft 84 and meshing with the spur gear portion of compound gear 78. Gear 78 and gear 94 form a speed reducing pair and slowly drive the threaded rod 84 so as to slowly lower the saw as it cuts the edge of the metal plate. Below clutch member 92 and cooperating with the lower face thereof is another gear 96 so that the rod 84 may be driven faster in the opposite direction, gear 96 meshing with the spur portion of the compound gear 80, gears 80 and 96 forming a speed increasing unit whereby the rod 84 is turned faster and in an opposite direction than by gears 78 and 94. In the position shown in Figure 7, clutch member 92 is in neutral position and rod 84 is stationary holding the saw against vertical movement.

For shifting the clutch from neutral to either up or down motion of the saw, a fork 98 has pins 99 which run in an annular groove in the clutch member 92. Fork 98 is pivotally mounted on shaft 100 and may be swung by handle 101 so that clutch member 92 engages with either gear 94 or 96 or with neither.

Means are provided for holding the clutch in any of its three positions and for returning the clutch to neutral position from either of its other positions when the saw has reached a definite point in its vertical travel. For this purpose, a fork 103 is keyed to shaft 100 and has flat ends which are engageable with a roller 104 carried by an arm 106 spring urged into contact with one of the flat ends of fork 103 or with the notch between the forked end. Thus the spring and roller 104 tend to hold the clutch in any position until it is pushed manually or otherwise to another position.

Variably positionable stops are provided for engagement with the motor saw sliding unit to release the clutch to neutral position as it reaches a predetermined point in its vertical travel. Vertical rod 110 extends parallel to the guideways 52 being supported at its lower end in a guide plate 112 and pivoted at its upper end to a bell crank 114 keyed to shaft 100. At its lower end, rod 110 has a coil spring 116 compressed between collar 118 and plate 112.

Rod 110 passes through an eye 120 carried on one of the rods 68. Eye 120 is adapted to contact with collar 122 near the bottom of rod 110 and as the saw moves upwardly with a movable collar 124. Collar 124 has a radial pin 126 which is spring pressed to engage with one of the holes 128 formed in rod 110, while collar 122 has a set screw to hold it in the desired vertical position.

As soon as eye 120 engages with collar 122 or 124, travel of the saw as driven by motor 70 causes rod 110 to be moved thereby swinging the fork 98 and the clutch member 92 towards neutral position, which movement is assisted in its later stage by the spring pressed roller 104.

In operation, clamp 22 is adjusted to the proper height by hand lever 36 and after plate 16 has been seated against rods 20 on the face of table 12, valve 26 is moved to force the clamp 22 powerfully against the upper curved edge of the plate thereby securely clamping the plate with saw blade 56 radial with respect to the plate, regardless of its diameter.

Motor 62 and motor 70 are then energized and clutch lever 101 is pushed up to cause the saw to travel downwardly until eye 120 engages stop collar 122 to stop downward travel of the saw. During its downward travel, the saw cuts one straight edge of the curved plate 16. Lever 101 is then

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pulled down and the saw is rapidly raised until eye 120 engages collar 124 to restore the clutch to neutral.

Clamp 22 is then released by valve 26, the plate 16 is shifted so that it is in position for its other straight edge to be sawed and the operations are repeated for sawing that edge, thereby severing the cylinder into a plurality of curved plates.

The invention in its broader aspects is not limited to the specific mechanisms shown and described but departures may be made therefrom within the scope of the accompanying claims without departing from the principles of the invention and without sacrificing its chief advantages.

What is claimed is:

1. Apparatus for mechanically sawing the straight edges of a parti-cylindrical printing plate including in combination a flat horizontal table, a pair of parallel rods rigidly mounted on and normal to the surface of the table, a saw slot in the table surface between the rods, a power driven saw, and means guiding the saw in a path parallel to the rods, said parallel rods being engageable with the convex surface of the plate to locate the plate on the table in a definite relation to the path of the saw.

2. An apparatus as claimed in claim 1 in which power means slidable on said parallel rods are

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provided for holding the plate firm against the table.

3. Apparatus for mechanically sawing the straight edges of a parti-cylindrical printing plate including in combination a flat horizontal table to receive the plate while standing on a curved edge, a pair of parallel rods normal to the table surface, a saw slot in the table surface between the rods perpendicular to a line through the rods, a power driven saw movable vertically and parallel to the rods, said rods forming stops engageable with the convex surface of the plate to position the plate with the saw radial thereto and separate power means for moving the saw in either vertical direction.

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