June 18, 1946. A. G. OCHSNER 2,402,438

PANTOGRAPH DEVICE

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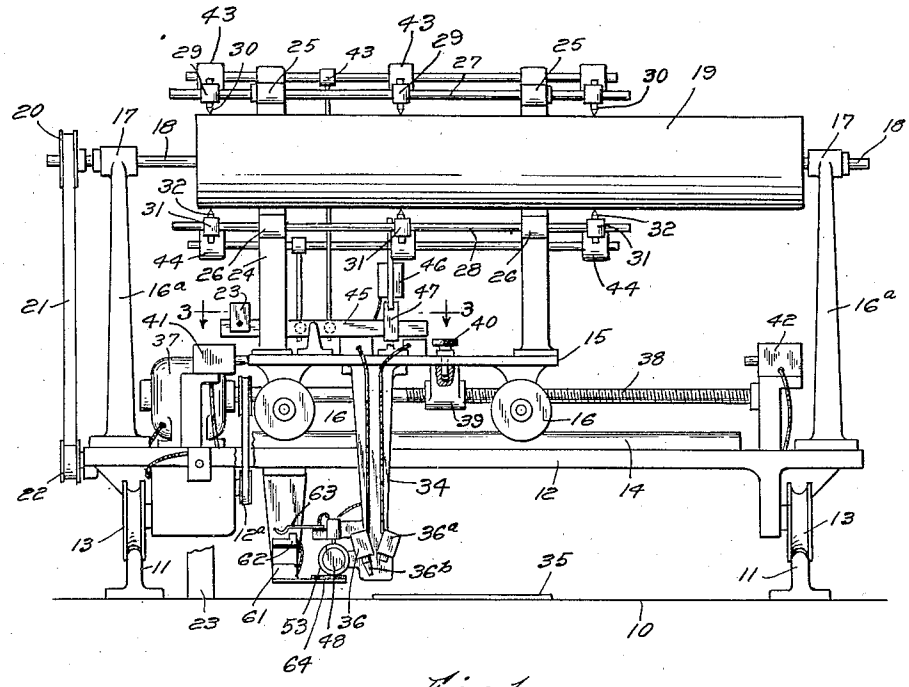


Fig. 1

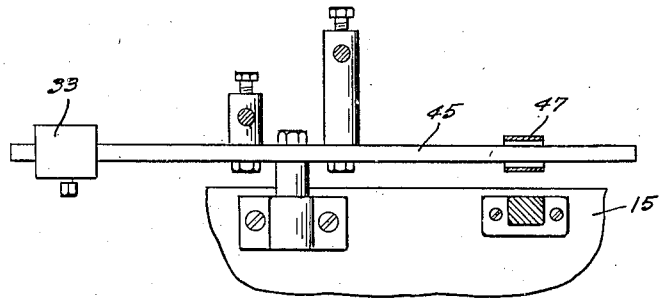


Fig. 3

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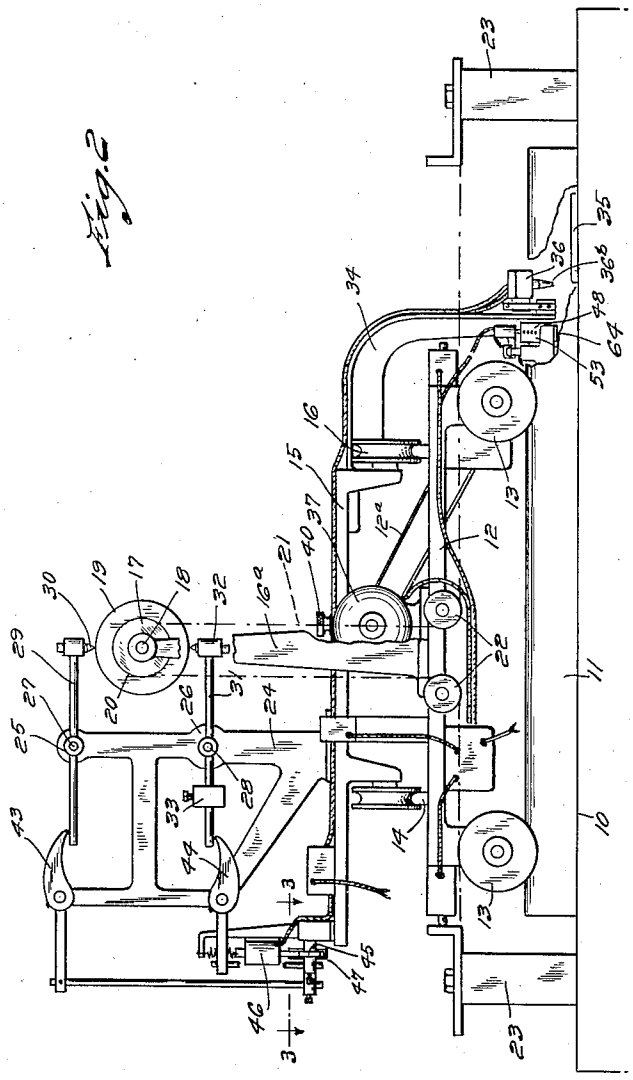
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Fig. 2



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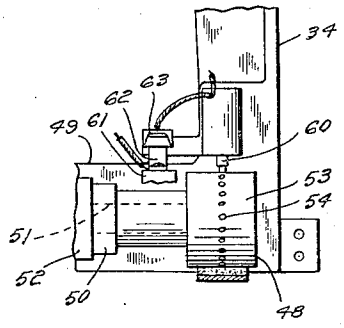


Fig. 4

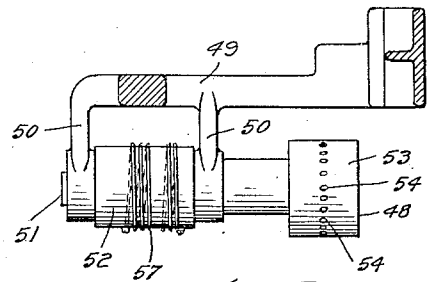


Fig. 5

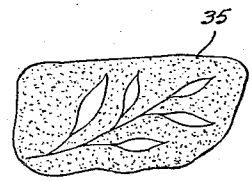


Fig. 6

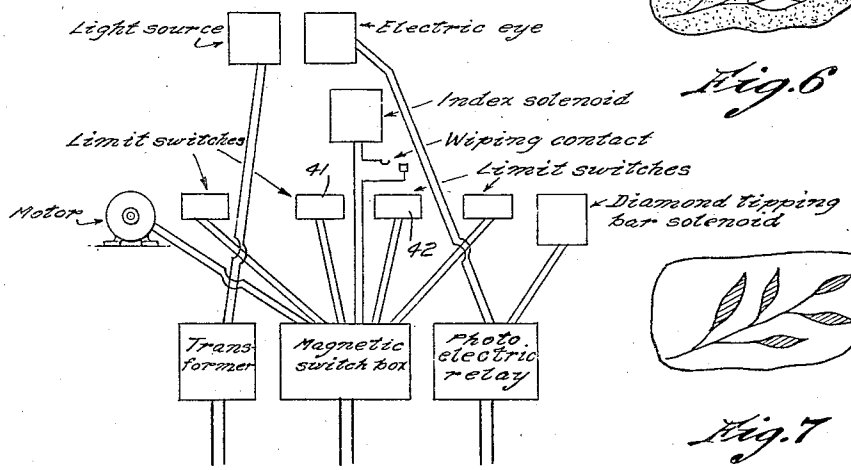


Fig. 8

Fig. 7

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UNITED STATES PATENT OFFICE

2,402,438

PANTOGRAPH DEVICE

Arnold G. Ochsner, Danielson, Conn.

Application March 27, 1942, Serial No. 436,507

2 Claims. (Cl. 178—6.6)

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My present invention relates to the engraving of printing rollers for printing textiles, wall papers, wrapping papers, and the like, and has specific reference to mechanism for obtaining an automatic grounding of areas.

It is the principal object of the invention to provide a mechanism for automatically grounding or ruling design areas on a printing roller.

Another object of the invention is to facilitate a selective duplication of the grounding.

Further objects are to accomplish the desired results with a simple, inexpensive, and readily installed mechanism which selectively replaces manual grounding.

With the above and other objects and advantageous features in view, the invention consists of a novel arrangement of parts more specifically disclosed in the detailed description following, in conjunction with the accompanying drawings, and more specifically defined in the claims appended thereto.

In the drawings:

Fig. 1 is a side elevation of a pantograph machine equipped with the novel grounding mechanism;

Fig. 2 is a side view thereof;

Fig. 3 is a sectional detail on the line 3—3 of Figs. 1 and 2;

Figs. 4 and 5 are enlarged details of the indexing wheel control and indexing wheel mounting;

Figs. 6 and 7 are views of a master plate detail and the grounded design; and

Fig. 8 is a schematic wiring diagram for the electrical control wiring.

The grounding of areas for receiving printing dyes has heretofore been manually controlled. A master plate is prepared from the original design, and is mounted on a pantograph engraving machine; the operator traces the design from the master plate by means of diamond pointed tools which scribe the operator's work on the surface of the printing roller, cutting through a surface layer of acid resisting varnish. Each printing area is thus ruled with a number of lines, from 20 to 150 per inch, depending on the type and character of the printing; the ruling provides scribed breaks in the varnish acid-resist layer, and subsequent etching produces a printing area having a series of depressions of predetermined depth, dependent on the fineness of the ruling. The depressions provide a series of dams for holding the printing dye, the separating boundary lines supporting the doctor blade; an outline is manually scribed about each area to give a sharp, clean edge.

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I have provided an automatic mechanism for ruling the grounding lines. To this end, I provide an electric eye operating on the principle of light change and light reflection, and a light control by painting such surfaces of the master plate as it is desired to ground, with a light reflecting paint, the other portions of the master plate being dark and non-reflecting.

I attach a scanning head, comprising the electric eye and its light source, to the upper carriage of the pantograph, in lieu of the operator's tracing handle and point. The lower carriage of the pantograph is utilized to move the scanning head from one end of the master plate to the other. When the scanning head is activated by a light change on the master plate, the power from the scanning head is amplified by means of a photo-electric relay to operate a control bar for lifting and for dropping the diamond scribing tools onto and off the roller.

Referring to the drawings, the machine comprises a base 10 having spaced parallel tracks 11 mounted thereon. A lower carriage 12 is provided with rollers or wheels 13 which ride on the tracks 11, and also has upper spaced parallel tracks 14 which are positioned at right angles to the tracks 11. An upper carriage 15 has rollers or wheels 16 which ride on the tracks 14, whereby the combination of upper and lower carriages provides a universal movement.

The lower carriage 12 has spaced standards 16a having bearings 17 at their upper ends, in which a shaft 18 is rotatably mounted to carry the printing roller 19 on which the design is to be scribed. The shaft 18 is turned by means of a pulley 20 keyed to one end of the shaft, a driving belt 21 and idling pulleys 22, the ends of the belt being secured to fixed posts 23 mounted on opposite sides of the base 10. When the lower carriage is driven backward or forward on the tracks 11 by belt 12A for power operation, or by hand for scribing the outline, the belt 21 moves over the pulley 20 and this produces rotation of the shaft 18 and the printing roller 19.

The upper carriage 15 carries spaced frames 24 having upper bearings 25 and lower bearings 26. A shaft 27 is rotatably mounted in the upper bearings 25 and a similar shaft 28 is mounted in the lower bearings 26. One or more diamond carrying bars 29 are fixed to the shaft 27 at right angles thereto, and are provided with diamond scribing points 30 adapted to normally contact the roller 19. Similar diamond carrying bars 31 are fixed to the lower shaft 28, each having scribing points 32 extending upwardly; a counter weight 33 may

be adjustably positioned on each bar 31 to swing the points 32 into contact with the roller 19.

An arm 34 is fixed to the upper carriage 15 and extends downwardly towards the base 10 and a master plate 35, bearing the design, which is mounted on the base. The operator moves the arm, which normally carries a tracing handle, around the design on the master plate and the movement of the upper and lower carriages turns and moves the roller 19 accordingly and traces the same outline on the roller 19 beneath each scribing point.

To scribe the design with the necessary spaced lines, the design on the master plate is painted with a light reflecting paint, and the tracing handle is replaced with a scanning head 36 which includes a source of light 36A and also a photoelectric eye 36B adapted to pick up the light reflected from the painted portion of the design.

Mounted on the lower carriage is an electric motor 37 coupled to a screw 38 mounted beneath the upper carriage 15. A nut 39 rides on the screw 38 and is fixed to the upper carriage 15, as by removable pin 40. Rotation of the screw thus moves the carriage 15 back and forth, depending on the direction of rotation, across the carriage 12, the direction of rotation of the motor being controlled by limit switches 41 and 42 which are adjustable for size of plate and operate when they are engaged by the nut 39. The upper and lower carriages thus provide the pantograph with linear and cross movements.

Contact between the diamond points 30 and 32 and the roller 19 is controlled by upper and lower tipping bars 43 and 44, which are pivotally mounted on the frames 24, the tipping bars 43 and 44 being linked to a pivoted bar 45 mounted at the rear of the upper carriage. A solenoid 46 is mounted above the bar 45 and loosely attached thereto by means of a strap 47, and is operated by electrical impulses from the scanning head 36. Referring to Fig. 3, the links 43a and 44a operating the tipping bars 43 and 44 are mounted on each side of the pivot of the bar 45 so that downward movement of the bar 45 causes the tipping bars to release the diamond points and permit them to contact the surface of the roller 19.

With the machine set up as hereinabove described, when the motor 37 moves upper carriage 15 along the length of the screw 38, the arm 34 passes the scanning head 36 over the master plate 35. As the eye reaches the light reflecting painted portion of the design, an electric impulse is relayed to the solenoid 46 to thus cause the diamond points to scribe lines on the roller 19 as hereinabove described. As the eye leaves the painted portion of the design, the reflection ceases, the electric impulse is shut off, and the solenoid operates the tipping bars 43 and 44 to shift the diamond points away from the roller 19. When the upper carriage 15 reaches the desired limit of travel, it operates the limit switch 42 to reverse the motor 37, the scanning head 36 being shut off, whereupon the upper carriage returns to the beginning of its movement without operating the diamond points over the inscribed lines. Upon completion of the return movement, the upper carriage operates the limit switch 41 to reverse the motor and switch on the scanning head 36.

The machine is now in position to scribe the next line. The roller 19 meanwhile has been turned a sufficient distance to space the next line from the previously formed line. To accomplish this, I provide an indexing unit 48, see Figs. 4 and 5, which is preferably mounted on the arm 34. A support 49 is positioned on the arm 34 and is provided with spaced arms 50 in which a shaft 51 is rotatably journalled. A spool 52 is keyed to the shaft between the arms 50 and an indexing wheel 53 is keyed to the forward end of the shaft. The indexing wheel 53 is provided with a plurality of rows of spaced openings 54, the spacing of the openings controlling the spacing of the inscribed lines as hereinafter described.

Mounted above the indexing wheel 53 is a solenoid operated pin 60 adapted to selectively enter the spaced openings 54 on the wheel. A post 61 is mounted on the lower carriage adjacent the path of return movement of the arm 34 and indexing unit 48 and has a contact 62 at its upper end adapted to be engaged by a spring contact 63 on the solenoid. As the arm 34 reaches the end of its return movement, the contact 63 brushes over the contact 62 and thus actuates the solenoid to lift the pin 60 out of its opening.

A spring pressed friction bar 64 extends laterally from the post 61 to frictionally engage the lower periphery of the wheel 53 prior to engagement of the contacts 62 and 63. As the arm 34 approaches the end of its return movement, the bar 64 frictionally engages the wheel 53 to rotate it, but seating of the pin 60 in the opening 54 prevents this rotation until the pin 60 is lifted by the solenoid, whereupon the wheel 53 turns, whereby the contact 63 leaves the contact 62, the solenoid releases and the pin 60 drops into the next opening 54.

Turning movement of the wheel 53 causes the spool 52 to wind or unwind the wire 57 which is connected to the standard indexing mechanism, thereby causing the lower carriage 12 to move a predetermined distance. This produces a corresponding turning of the roller 19 to provide the necessary spacing for the next ground line; the action is repeated at the end of each return movement of the lower carriage until the entire design has been inscribed.

Although I have described the invention as embodied in a pantograph machine for scribing printing rollers, it is obvious that the invention may be readily applied to other uses, as for example the reproduction of dots and dashes on printing plates by means of wire photo impulses, to thus produce printing plates directly, in quantity if desired. Other uses will be readily apparent to one skilled in the art.

Changes in the size, shape and arrangement of the parts, and in the manner of controlling the pantograph movements and scribing point actuation, may be made to suit the requirements for different printing conditions, without departing from the scope of the invention as defined in the appended claims.

I claim:

1. In a mechanism for scribing, a printing roller, a support for a master plate having a design painted thereon, the paint being light reflecting, a pantograph having upper and lower carriages for obtaining linear and cross movements, an electric eye mounted on the upper carriage, means for moving said carriages, means for reversing the movement of said carriages, limit switches for reversing the movement of the lower carriage, means for indexing the upper carriage, means for turning said printing roller in correspondence with movement of the cross movement carriage, scribing mechanism, means for manually moving said scribing mechanism to obtain a scribed outline of the painted design, and means

for scribing grounding lines within the scribed outline comprising means responsive to reflection of light from the painted design to said electric eye for placing said scribing mechanism in scribing relation to said printing roller.

2. In a mechanism for scribing, a printing roller, a support for a master plate having a design thereon of different light reflecting qualities from the background, a pantograph having two carriages for obtaining movements at right angles to each other, an electric eye mounted on said carriages for movement in any direction, means for moving said carriages, scribing mechanism,

means for turning said printing roller in correspondence with movements of one of said carriages, means for moving said scribing mechanism longitudinally of said roller by movement of the other of said carriages, means for manually moving said scribing mechanism to obtain a scribed outline of the design, and means responsive to variations in reflection from the design to said electric eye for controlling said scribing mechanism to scribe grounding lines on said roller.

ARNOLD G. OCHSNER.