

[54] ENGRAVING MACHINE

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[58] Field of Search 178/6.6 B, 6.7 R; 346/138

[56] References Cited

UNITED STATES PATENTS

3,396,234 8/1968 Zeuthen 178/6.6 B
2,966,357 12/1960 Fritzinger 346/138

OTHER PUBLICATIONS

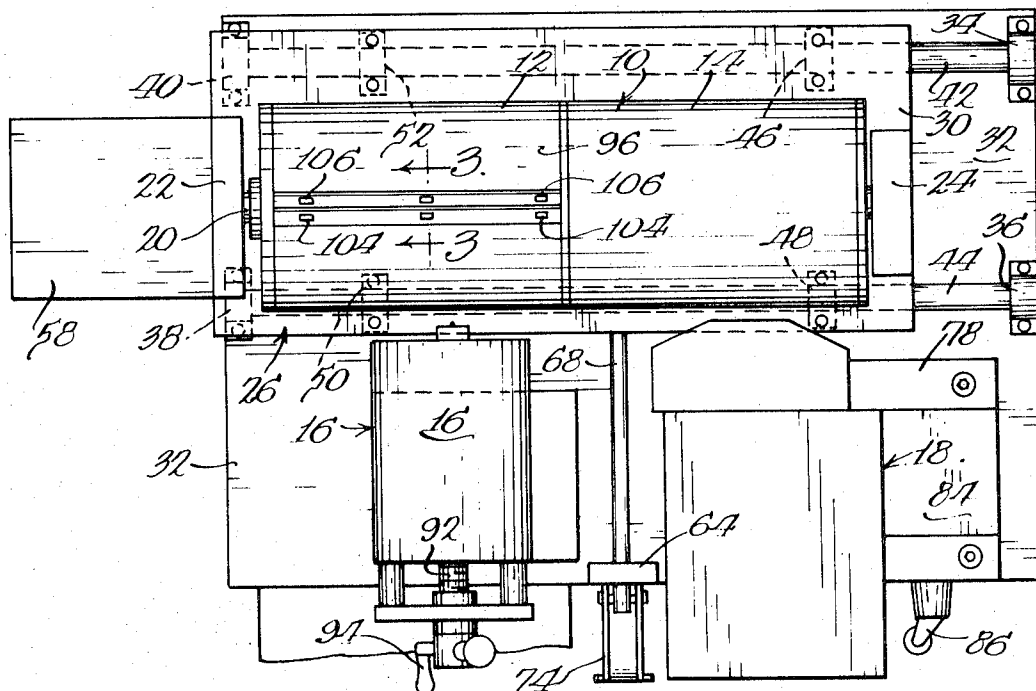
Anderson, Wendell G., QST November 1965
TK5700QZ pp. 11-17

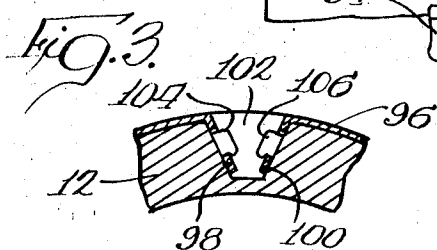
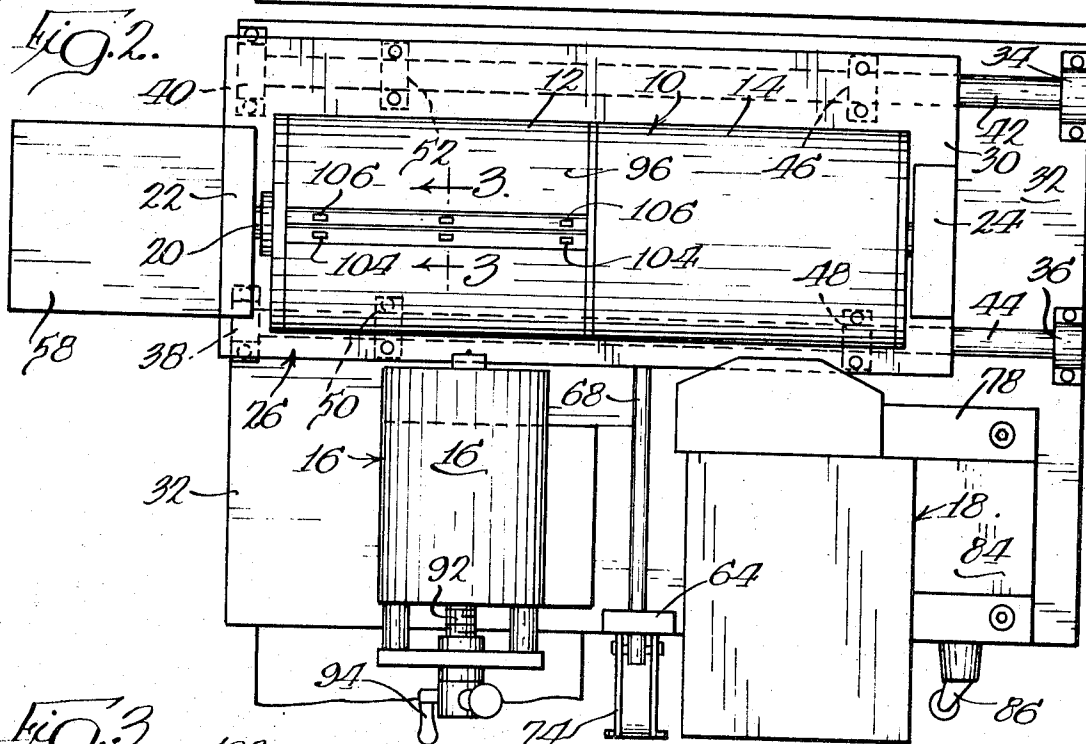
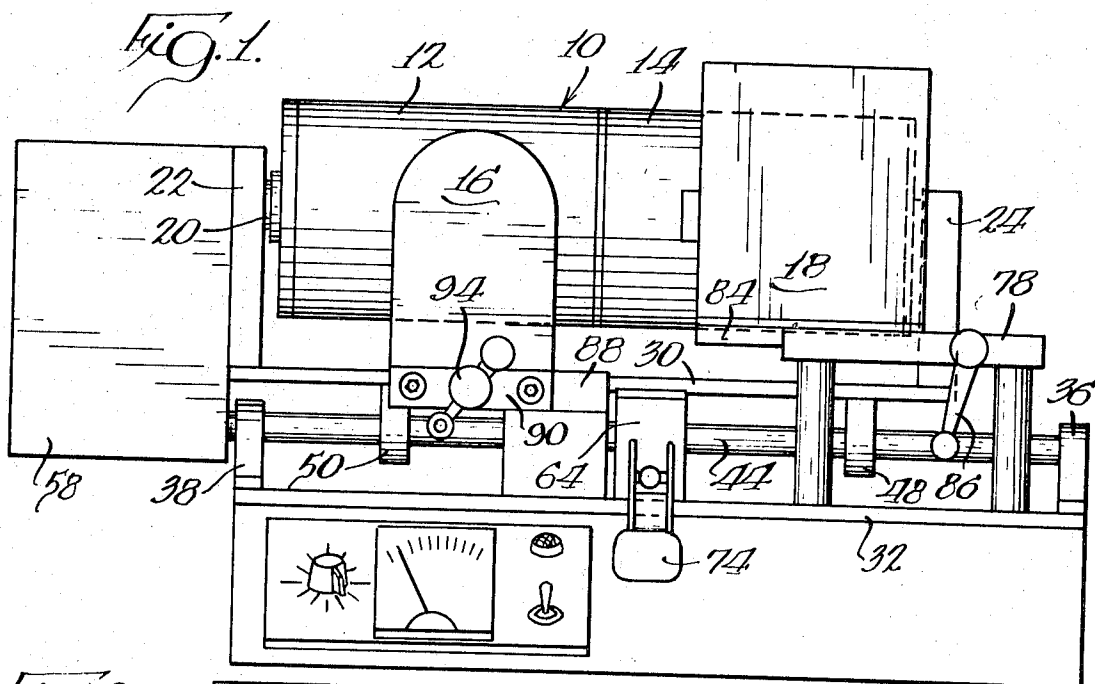
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[57] ABSTRACT

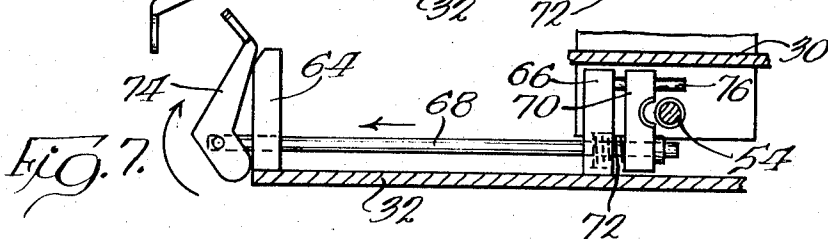
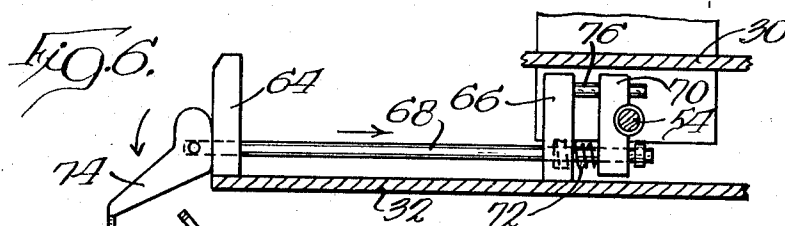
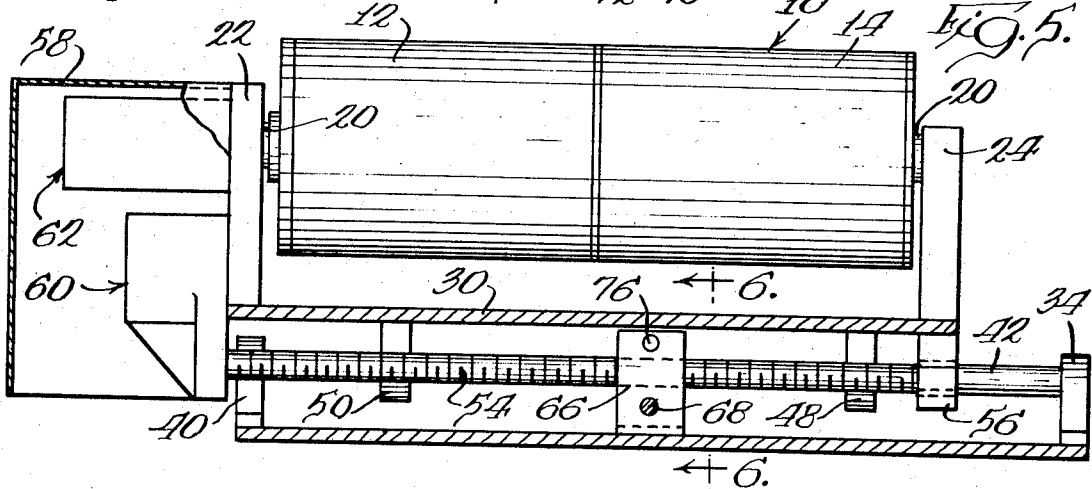
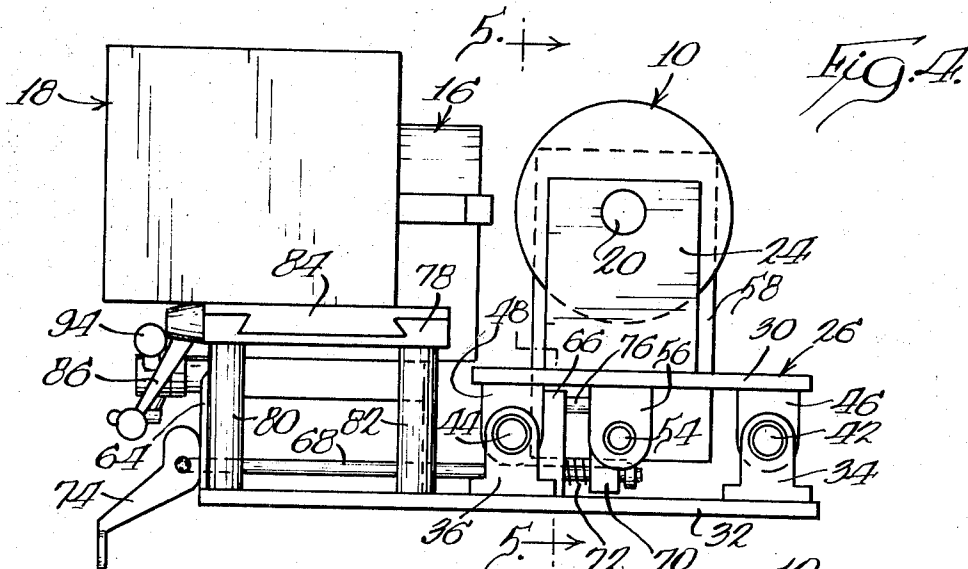
An improved engraving machine having a cylinder on which is wrapped in side-by-side relation an image to be reproduced and a plate to be engraved with such image, including a scanning member and a cutting member arranged adjacent respective portions of the cylinder for cooperation with the image and the plate to be engraved respectively, the apparatus including means for rotating the cylinder and moving the same axially relative to the scanning and cutting carriages while the latter remain stationary.

5 Claims, 7 Drawing Figures





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ENGRAVING MACHINE

BRIEF SUMMARY OF THE INVENTION

Engraving machines are known for sensing an image on a sheet of copy material and reproducing such image by engraving the same in a metal or plastic plate. Such conventional engraving machines normally include a plate cylinder on which is wrapped a metal or plastic plate to be engraved, and a copy cylinder on which is wrapped a sheet of paper or a photograph or the like which comprises the copy material to be engraved on the plate. In such machines, an electronic scanner carriage and a cutter carriage are mounted on a feed screw for movement along an axis parallel to the cylinder axis. The two cylinders are normally mounted on a common shaft for conjoint rotation, and the scanner and cutter carriages are mounted on a common feed screw. The cylinders are rotated, but are not moved axially, while the scanner and cutter carriages are moved axially parallel to the cylinder axis, so that the scanner apparatus will scan the copy material on the copy cylinder and at the same time the cutter will engrave on the plate in response to electrical signals received from the scanner.

In a known engraving machine of the foregoing type, the scanner and cutter carriages may be driven in the same or in opposite axial directions depending upon the purpose to be achieved. If the two carriages are to be driven in opposite axial directions then the feed screw may be oppositely threaded on its two ends to effect such a driving relationship. Such a feed screw may be utilized to feed the two cylinders in the same axial direction if one of the carriages is disengaged from the feed screw and interconnected with the other carriage so as to be driven conjointly therewith. It will be understood that when the two carriages are driven in the same axial direction, a "right-reading" image will be engraved on the plate, whereas movement of the two carriages in opposite axial directions will cause a reverse image to be engraved on the plate, i.e., a mirror image of the copy material. An engraving machine as described above is disclosed in my U.S. Pat. No. 3,183,745 which is assigned to the assignee of the instant invention.

The principal object of the present invention is to provide an improved engraving machine which is relatively inexpensive to manufacture and highly simplified in its operation and yet fully capable of producing high quality "right-reading" engravings from conventional copy material. The machine of the present invention is well suited for metal decorating and the like such as the production of engravings from diplomas, certificates, etc., and it is also well suited for engraving printed circuit boards in accordance with the method disclosed and claimed in my U.S. Pat. No. 3,552,002 which is also assigned to the assignee of my present invention.

The foregoing and other objects and advantages of my invention will be apparent from the following description of a preferred embodiment thereof, taken in conjunction with the accompanying drawings.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevational view of an engraving machine constructed in accordance with the present invention;

FIG. 2 is a top plan view of the machine of FIG. 1;

FIG. 3 is a fragmentary sectional view, taken along the line 3—3 of FIG. 2, showing the manner in which a plate to be engraved is wrapped on a cylinder and anchored thereto;

FIG. 4 is an end elevational view of the machine of FIG. 1;

FIG. 5 is a vertical sectional view taken substantially along the line 5—5 of FIG. 4; and

FIGS. 6 and 7 are sectional views taken substantially along the line 6—6 of FIG. 5.

Now, in order to acquaint those skilled in the art with the manner of making and using my invention, I shall describe, in conjunction with the accompanying drawings, a preferred embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to the drawings, there is shown a cylinder 10 having a plate portion 12 and a copy portion 14, and adjacent the cylinder are mounted a cutter member 16 and a scanner member 18. The cylinder 10 is mounted on a shaft 20 the ends of which are journaled in upright walls 22 and 24, respectively, which form a part of a cylinder carriage indicated generally at 26. The cylinder carriage 26 includes a flat platform member 30 on which the two uprights 22 and 24 are fixedly mounted. Beneath the platform 30, a stationary base plate 32 has fixed thereto four bearings 34, 36, 38 and 40 in which are journaled the ends of two stationary parallel guide rods 42 and 44. The platform member 30 is supported on the two guide rods 42 and 44 by means of bearings 46, 48, 50 and 52 which extend downwardly from the underside of the platform and permit the latter to slide back and forth along the guide rods.

A feed screw 54 is mounted beneath the cylinder carriage 26. The feed screw 54 is disposed between the guide rods 42 and 44 and extends parallel thereto with its outer end journaled in a bearing 56 which is affixed to the underside of the platform 30. The other end of the feed screw 54 is journaled in a motor housing 58 and is rotated by a motor 60 (see FIG. 5). A second motor 62 is provided to rotate the cylinder 10. As best shown in FIGS. 6 and 7, the base plate 32 has fixed thereto a pair of stationary block members 64 and 66 each of which has an opening to accommodate a slidable rod 68. A half-nut member 70 is carried on the end of the rod 68 and is movable with the rod into and out of engagement with the feed screw 54. A compression spring 72 biases the half-nut 70 toward the feed screw 54, whereas the half-nut may be disengaged from the feed screw by moving a handle member 74 on the opposite end of the rod 68 from the position shown in FIG. 6 to the position shown in FIG. 7. The half-nut member 70 slides on a guide rod 76 fixedly carried by the block 66 when the nut member is moved between the operative position of FIG. 6 and the inoperative position of FIG. 7 through actuation of the manually operable handle 74.

It will be understood from the foregoing that when the half-nut member 70 is operatively engaged with the feed screw 54, and the motor 60 is operating to rotate the feed screw, the feed screw is moved axially relative to the nut member 70 and thereby moves the entire cylinder carriage 26 including the cylinder 10. Moreover, the motor housing 58 is mounted on the

cylinder carriage wall 22, so that the motor housing including the cylinder motor 62 and the feed screw motor 60 are shifted axially along with the cylinder 10.

FIG. 4 shows a stationary dovetail way 78 for mounting the scanner member 18. The stationary way 78 is mounted on fixed upright walls 80 and 82 which in turn are fixedly mounted to the baseplate 32. The scanner member 18 is mounted on a dovetail base 84 which is slidably received on the way member 78 and locked in a desired position by a locking handle 86. With reference to FIG. 1, a fixed way member 88 is provided to mount a base member 90 on which the cutter assembly 16 is carried, whereby the cutter assembly 16 may be moved along the fixed way 88 to a desired axial position and locked in that position by any suitable locking means (not shown). It will further be noted from FIGS. 1 and 2 that the cutter assembly includes a feed screw 92 and handle 94 for the purpose of permitting adjustment of the cutter assembly toward and away from the plate portion 12 of the cylinder 10.

FIG. 3 shows the manner in which a flexible metal or plastic plate 96 is anchored to the plate portion 12 of the cylinder 10. Such a plate 96 to be engraved is wrapped around the cylinder and its bent end portions 98 and 100 are positioned in a recess 102 formed longitudinally along the exterior portion of the cylinder. Locking members such as shown at 104 and 106 (see FIGS. 2 and 3) are then tightened in order to anchor the ends of the plate to be engraved.

In operation, copy material or an image to be reproduced, for example a diploma or certificate or the like or a drawing of a desired printed circuit, is wrapped on the copy portion 14 of the cylinder 10 and fixed thereon. A flexible metal or plastic plate 96 to be engraved is wrapped on the plate portion 12 of the cylinder 10 and anchored thereon in the manner shown in FIG. 3. The cutter assembly 16 and scanner assembly 18 are located in their desired positions and locked therein so as to remain stationary during an engraving operation. The motors 60 and 62 are operated so as to rotate the cylinder carriage feed screw 54 and the cylinder 10. Consequently, upon movement of the handle 74 from the position of FIG. 7 to the position of FIG. 6, the half-nut member 70 will be engaged with the feed screw 54 thereby causing the entire cylinder carriage 26 including the rotating cylinder 10 to be moved axially in a continuous manner relative to the cutter and scanner members 16 and 18.

In the foregoing manner the scanner member 18 will scan along a spiral path on the copy material mounted on the cylinder portion 14 while the cutter member 16 will similarly cut along a spiral path on the flexible plate 96 wrapped on the plate portion 12 of the cylinder 10 and thereby engrave on such plate in response to electrical signals received from the scanner member. Such an engraving operation will continue until the scanner 18 has completely scanned the entire image or copy to be reproduced. It will be recognized that whenever the handle 74 is moved to the position of FIG. 7 to disengage the nut member 70 from the cylinder carriage feed screw 54, the cylinder carriage 26 may be moved manually in either direction along the guide rods 42 and 44.

I claim:

1. An electronic engraving machine for engraving a right-reading image on a flexible plate by scanning copy material comprising the image to be reproduced, the improvement comprising, in combination, cylinder means on which a flexible plate to be engraved and copy material to be reproduced are wrapped in axially spaced relation, stationary scanner means mounted alongside said cylinder adjacent said copy material for scanning the latter, stationary cutter means mounted alongside said cylinder adjacent said flexible plate for engraving the latter, said cutter being spaced axially along said cylinder from said scanner, cylinder carriage means on which said cylinder is rotatably journaled, said cylinder carriage being slidably mounted on a pair of stationary parallel guide rods for axial movement thereon alongside said scanner and cutter, cylinder drive means for rotating said cylinder, said cylinder drive means being mounted on said cylinder carriage for axial movement therewith, a cylinder carriage feed screw rotatably journaled on said cylinder carriage and extending along the length of said cylinder parallel to the cylinder axis, feed screw drive means for continuously rotating said feed screw, and nut means mounted independently of said cylinder carriage for engagement with said feed screw to effect axial movement of said feed screw when the latter is rotating and thereby effect axial movement of said cylinder carriage whereby as said rotating cylinder is advanced axially past said scanner and cutter, said scanner will scan said copy material along a spiral path and said cutter will engrave along a corresponding spiral path on said flexible plate in response to signals received from said scanner.

2. An electronic engraving machine in accordance with claim 1 wherein said cylinder drive means comprises a first drive motor mounted on said cylinder carriage, and wherein said feed screw drive means comprises a second drive motor mounted on said cylinder carriage.

3. An electronic engraving machine in accordance with claim 1 wherein said nut means is movable between an operative position wherein it is engaged with said feed screw and an inoperative position wherein it is disengaged from said feed screw, said cylinder carriage being freely slidable on said guide rods when said nut means is in its inoperative position.

4. An electronic engraving machine in accordance with claim 3 where said nut means comprises a half-nut member mounted adjacent said feed screw, and spring means biasing said half-nut member into engagement with said feed screw.

5. An electronic engraving machine for engraving a right-reading image on a flexible plate by scanning copy material comprising the image to be reproduced, the improvement comprising, in combination, cylinder means on which a flexible plate to be engraved and copy material to be reproduced are wrapped in axially spaced relation, stationary scanner means mounted alongside said cylinder adjacent said copy material for scanning the latter, stationary cutter means mounted alongside said cylinder adjacent said flexible plate for engraving the latter, said cutter being spaced axially along said cylinder from said scanner, cylinder carriage means on which said cylinder is rotatably journaled, said cylinder carriage being slidably mounted on a pair of stationary parallel guide rods for axial movement

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thereon alongside said scanner and cutter, a first drive motor for rotating said cylinder, said first drive motor being mounted on said cylinder carriage for axial movement therewith, a cylinder carriage feed screw rotatably journaled on said cylinder carriage and extending along the length of said cylinder parallel to the cylinder axis, a second drive motor for continuously rotating said feed screw, said second drive motor being mounted on said cylinder carriage for axial movement therewith, and half-nut means mounted independently of said cylinder carriage for engagement with said feed screw to effect axial movement of said feed screw when the latter is rotating and thereby effect axial movement

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of said cylinder carriage whereby as said rotating cylinder is advanced axially past said scanner and cutter, said scanner will scan said copy material along a spiral path and said cutter will engrave along a corresponding spiral path on said flexible plate in response to signals received from said scanner, said half-nut means being movable between an operative position wherein it is engaged with said feed screw and an inoperative position wherein it is disengaged from said feed screw, and said cylinder carriage being freely slidable on said guide rods when said half-nut is in its inoperative position.

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