

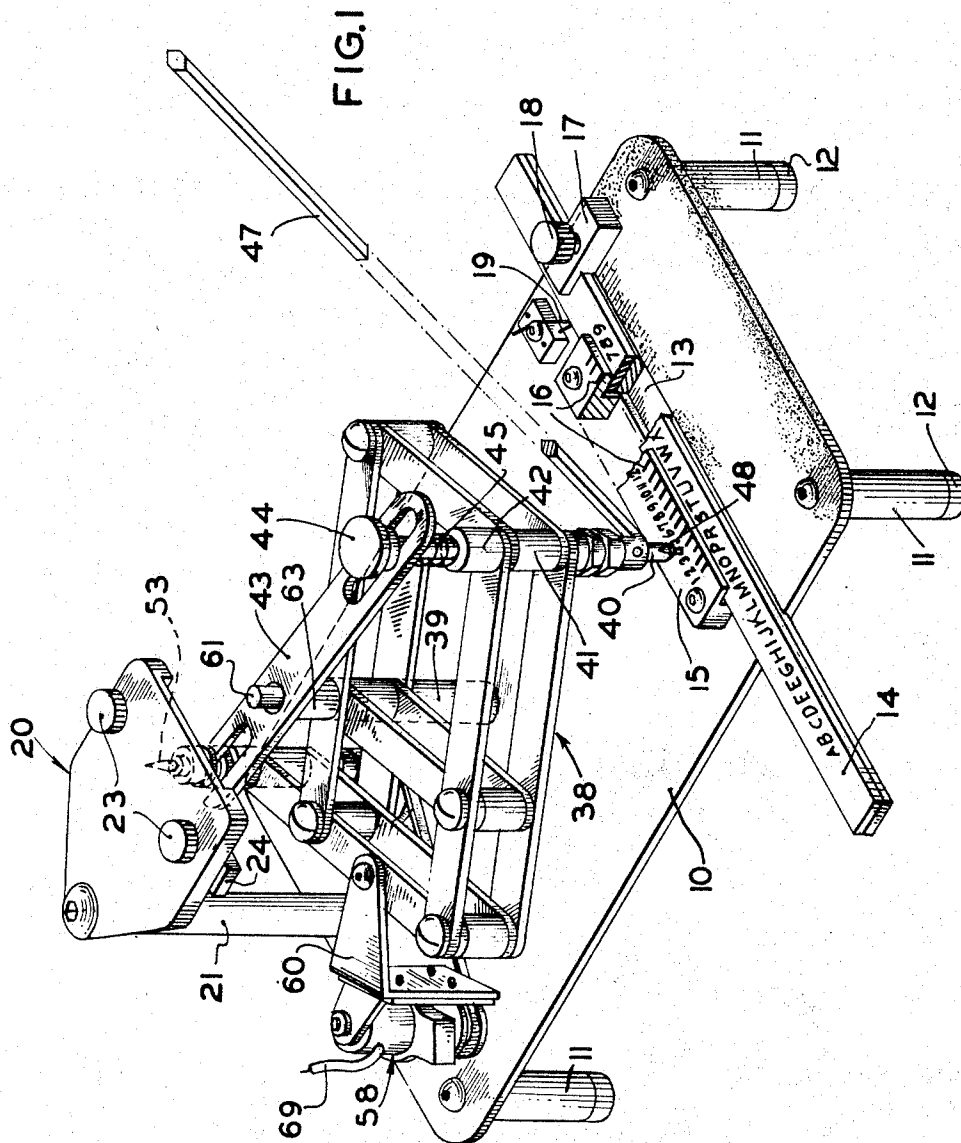
Aug. 1, 1967

G. WUERTHNER
ENGRAVING APPARATUS

3,333,341

Filed Dec. 20, 1965

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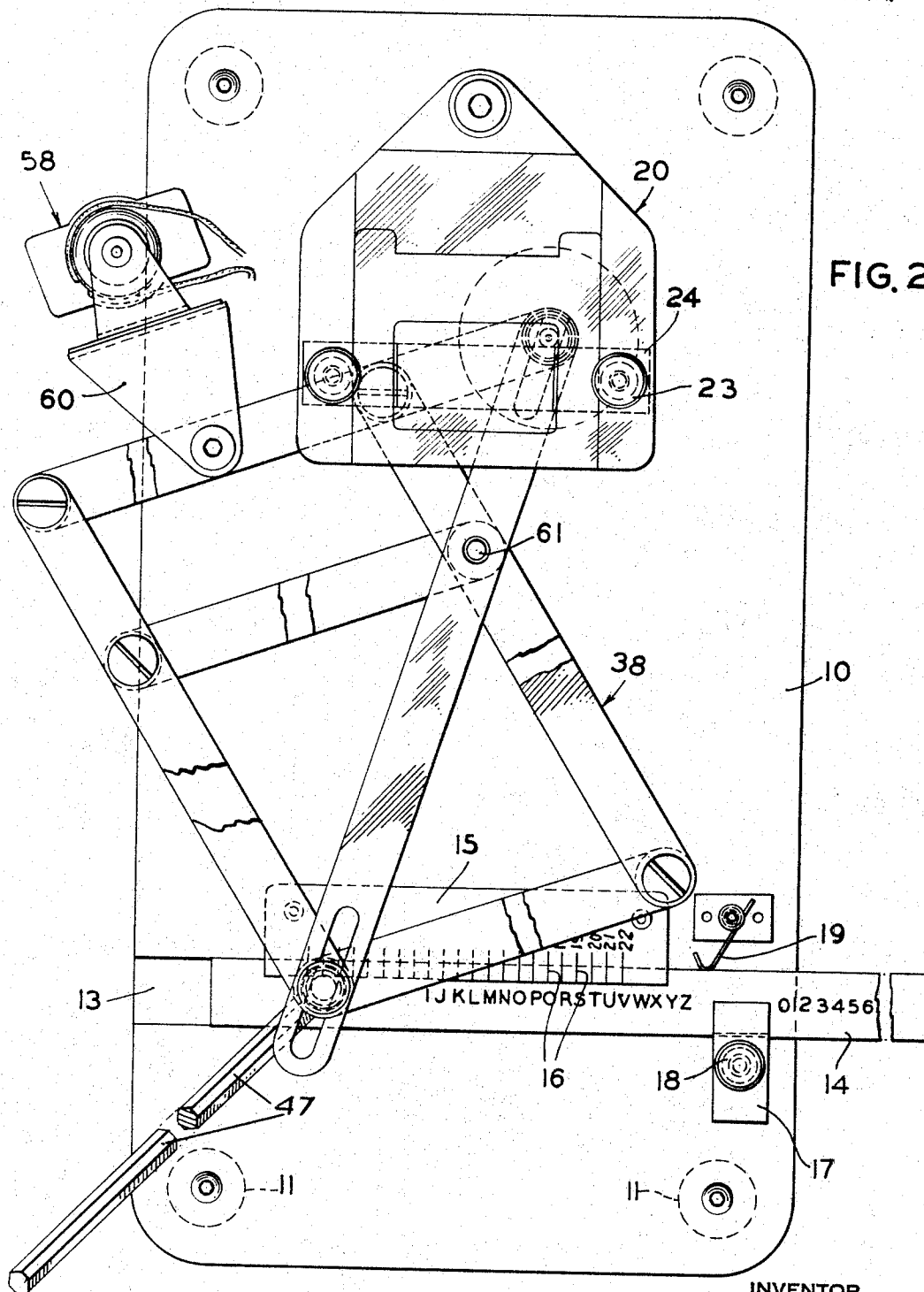
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5 Sheets-Sheet 2



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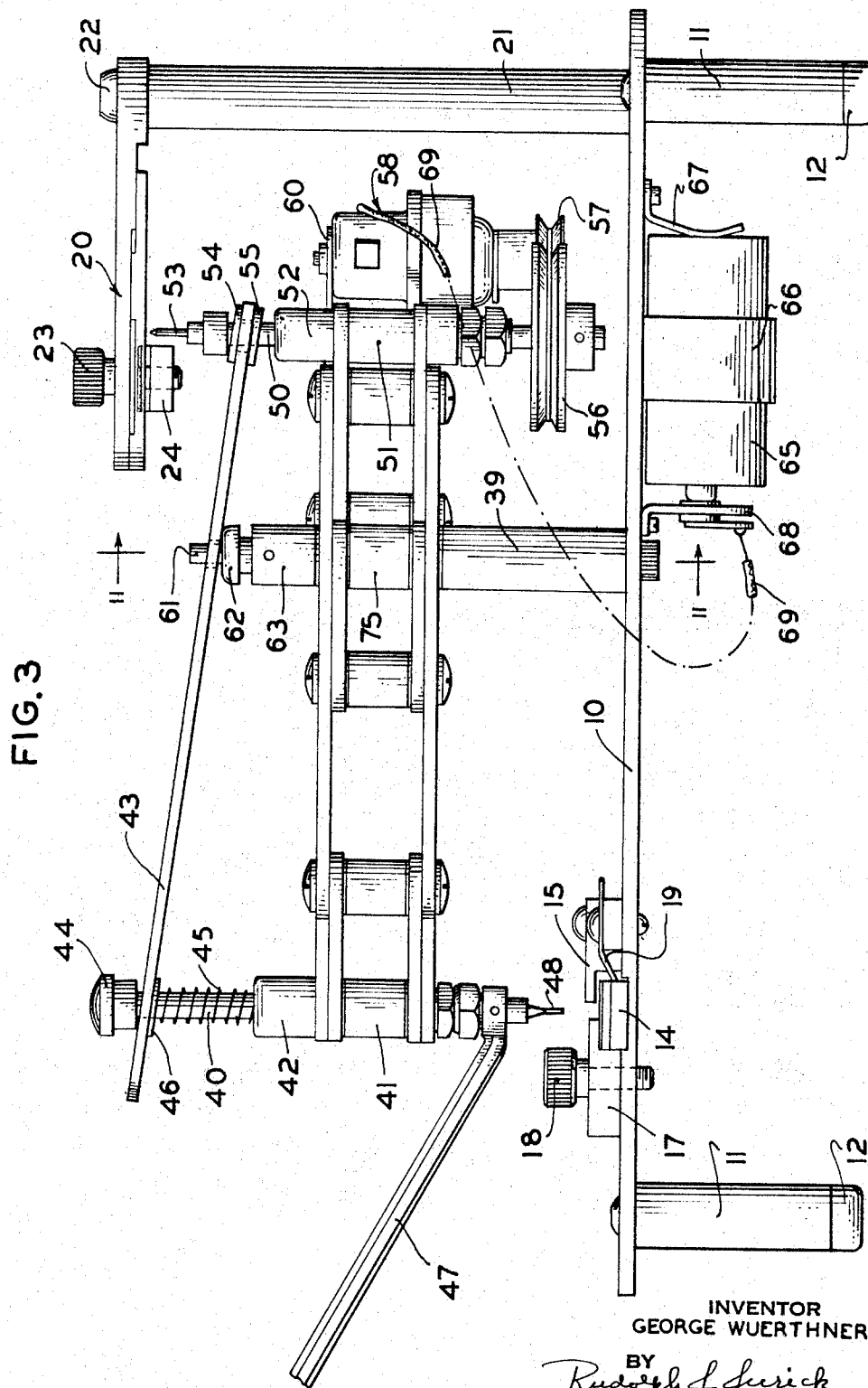
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5 Sheets-Sheet 3



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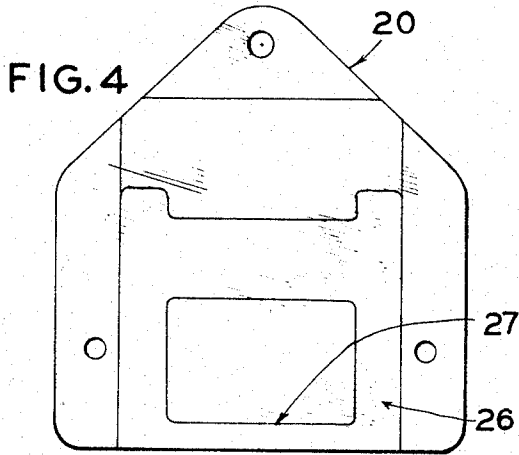
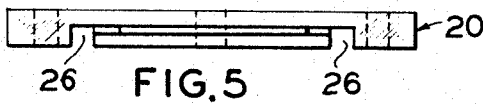
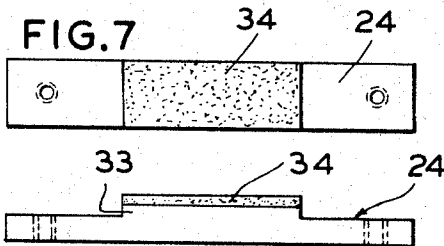
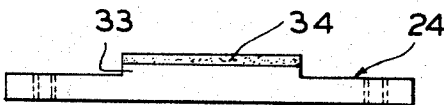
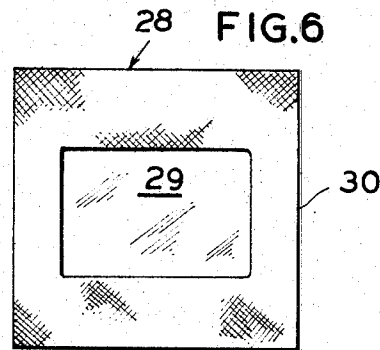
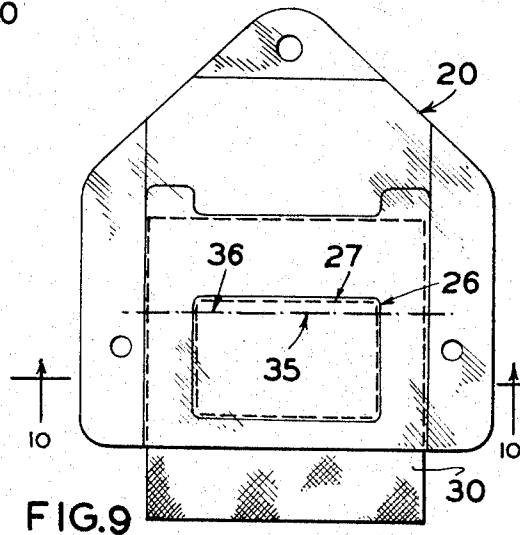
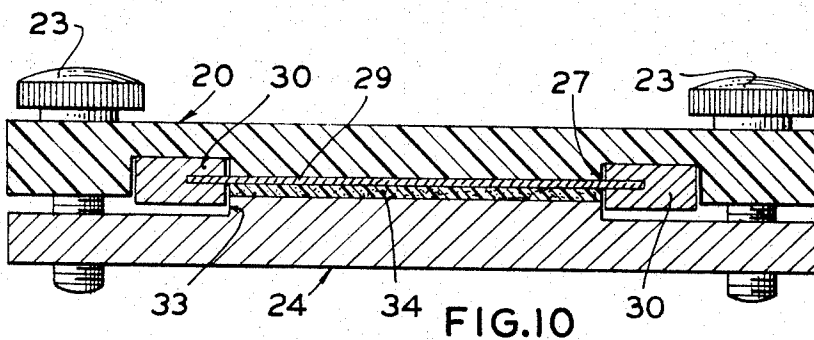
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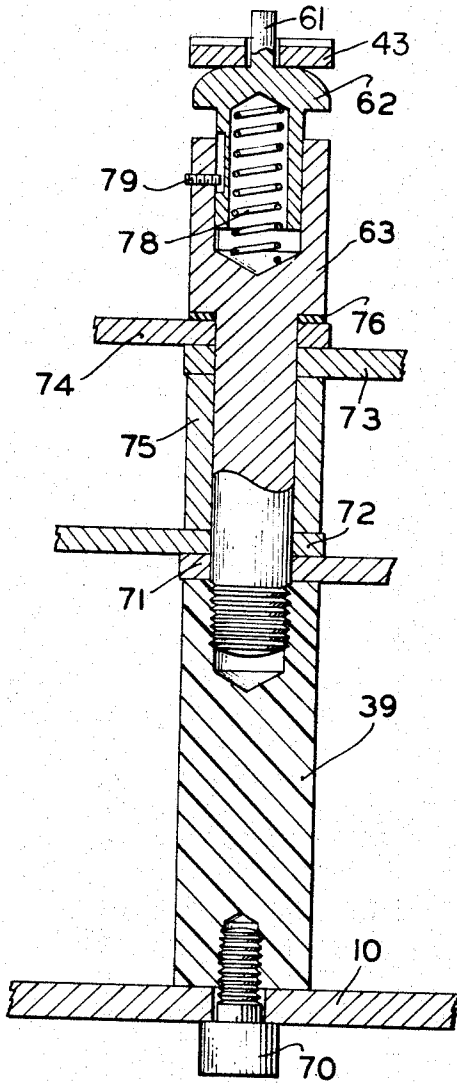


FIG. 11

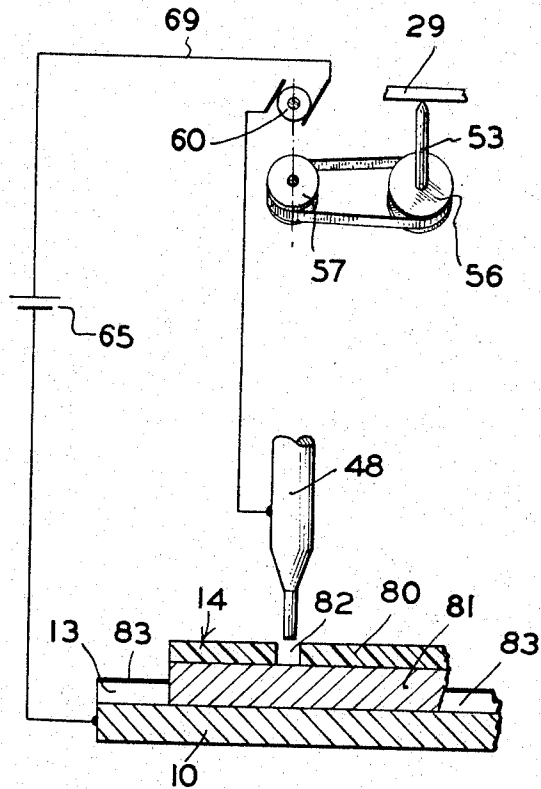


FIG. 12

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ABSTRACT OF THE DISCLOSURE

Pantograph apparatus having a stylus movable into tracing engagement with a lettering template and a motor-driven scriber simultaneously movable into engagement with the emulsion of a developed photographic film carried by the apparatus. The motor is energized upon engagement of the stylus with the template and the stylus and the scriber are carried by a spring-biased cross bar to limit the maximum pressure which can be applied to the film by the scriber.

This invention relates to engraving apparatus and more particularly to apparatus for engraving information on a developed photographic film.

In the case of conventional 35 millimeter transparencies, an exposed roll of film is developed by a processor, cut, mounted in individual cardboard frames and returned to the user ready for projection onto a screen. Often, it is desirable to apply pertinent information to the finished slide in such manner that the information is projected onto the screen along with the subject matter of the slide. Such information should be of distinct and pleasing character and applied in such manner as to result in a minimum destruction or obliteration of the subject matter to be projected. With apparatus made and constructed as described herein, these results are obtained by engraving small characters in the emulsion side of the film.

An object of this invention is the provision of apparatus for engraving information on a photographic film.

An object of this invention is the provision of apparatus for forming letters on a photographic slide, which apparatus comprises a lettering template, means for supporting the slide in an engraving station, and a pantograph mechanism carrying a rotatable engraving scriber and a stylus, the arrangement being such that the engraving scriber cuts through the film emulsion when the stylus is brought into operative registry with a selected character of the template.

These and other objects and advantages of the invention will become apparent from the following description when taken with the accompanying drawings. It will be understood, however, that the drawings are for purposes of illustration and are not to be construed as defining the scope or limits of the invention, reference being had for the latter purpose to the claims appended hereof.

In the drawings wherein like reference characters denote like parts in the several views:

FIGURE 1 is an isometric view of apparatus made in accordance with this invention;

FIGURE 2 is an enlarged top plan view thereof;

FIGURE 3 is a corresponding side elevational view thereof;

FIGURE 4 is a top plan view of the slide holder plate;

FIGURE 5 is an end elevational view thereof;

FIGURE 6 is a plan view of a photographic slide;

FIGURE 7 is a top plan view of the slide-clamping bar;

FIGURE 8 is a side elevational view thereof;

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FIGURE 9 is similar to FIGURE 4 and showing the slide positioned within the locating recess formed in the slide-holder plate;

FIGURE 10 is an enlarged cross-sectional view taken along the line 10—10 of FIGURE 9 but showing the slide clamped in position for engraving;

FIGURE 11 is an enlarged, cross-sectional view taken along the line 11—11 of FIGURE 3; and

FIGURE 12 is a diagrammatic representation to show the arrangement for energizing the motor when the stylus is positioned within the outline of a character formed on the lettering template.

Referring now to FIGURES 1—3, the apparatus is supported on a flat plate, or base 10, having secured thereto four legs 11 provided with rubber feet 12. Formed in the upper surface of the base is a transverse channel 13 accommodating a lettering template 14 having letters and numbers engraved thereon. Secured in fixed position on the base is a guide bar 15, which bar has a portion overlying the template and carrying reference markings 16. A clamping block 17 is attached to the base plate by means of a thumb screw 18. Upon loosening the thumb screw, the template is slidable within the channel to position a selected letter or number in registry with an appropriate one of the markings 16. Tightening of the thumb screw clampingly secures the template in the set position during the engraving operation. A spring member 19, secured in fixed position on the base, engages the side of the template for purposes which will be described hereinafter.

The slide holder comprises a plate 20, made of a transparent plastic, said plate being secured to an upright post 21 by the screw 22. A pair of thumb screws 23 have threaded shanks passing through clearance holes in the plate 20 and threaded into holes formed in a clamping bar 24. A better understanding of the construction and arrangement of the slide holder will be had by reference to FIGURES 4—10.

Referring specifically to FIGURES 4 and 5, the transparent plastic plate 20 has a recess 26 formed in the lower surface and a generally-rectangular boss 27. The rectangular recess 26 conforms to the shape of, say, a 35 millimeter transparency, or slide. Such slide is shown in FIGURE 6 and comprises a developed film 29 having its edges sandwiched between a cardboard frame, or mount, 30. The recess 26 has a length slightly greater than the length of the slide and the boss 27 is adapted to fit within the area defined by the inner edges of the slide mount. As shown in FIGURE 9, when the slide is positioned against the lower surface of the plate 20, the slide mount 30 is positioned within the recess 26 and the film lies in engagement with the boss 27. Preferably, a portion of the mount projects beyond the edge of the plate 20 to facilitate the placement and removal of the slide. It is here pointed out that the slide is positioned against the plate 20 with the emulsion side of the film facing down, that is, away from the boss 27.

FIGURES 7 and 8 are top and side views of the clamping bar 24. Such bar includes an integral boss 33 having a felt, or soft-plastic covering 34 cemented thereto to prevent marring of the film emulsion. The slide is clampingly secured in position by drawing the clamping bar toward the plate 20 by means of the thumb screws 23, as shown in the enlarged, cross-sectional view of FIGURE 10. It will now be apparent that the non-emulsion side of the film 29 is pressed against the face of the boss 27 by the covering 34 carried by the clamping bar 24. The length of such covering is substantially equal to the film length, but the width of the covering is significantly less than the film width. Thus, although substantially the entire area of the film is backed by the boss 27, a portion of the film emulsion is exposed for engraving thereon

the desired information. More specifically, the broken line 35, shown in FIGURE 9, represents the innermost side edge of the clamping plate, whereby the area 36 identifies that portion of the film emulsion presented to the engraving tool.

Referring again to FIGURES 1-3, a pantograph mechanism 38 is pivotally supported on the base 10 by a vertical post 39. The forward pivot connection for the arms of the pantograph mechanism comprises a rod 40 passing through the aligned bushings 41, 42. The upper end of this rod passes through a slot formed in the cross bar 43 and is threaded to receive a cap nut 44. A coiled spring 45 is carried by the rod and has its ends abutting the bushing 42 and a floating washer 46 (see particularly FIGURE 3). The lower end of the rod has secured thereto a handle 47 and a stylus 48. Normally, the spring 45 biases the rod and the cross bar 43 upwardly so that the stylus is spaced above the template 14. It will be apparent that the handle 47 may be manipulated to align the stylus with a selected character on the template and then to depress the rod so that the end of the stylus enters into such character.

The rear arms of the pantograph mechanism have extended ends provided with aligned holes. As shown in FIGURE 3, a rod 50 passes through such aligned holes and through the bushings 51 and 52. The upper end of this rod passes through a second slot formed in the cross bar 43 and carries a scribe 53. Floating washers 54 and 55 are positioned on opposite sides of the cross bar. Secured to the lower end of the rod 50 is a pulley 56 which is aligned with a pulley 57 secured to the drive shaft of a D.C. motor 58. The motor is secured to an arm of the pantograph mechanism by a suitable bracket 60 (see also FIGURE 1) and the two pulleys are coupled together by suitable means as, for example, an elastic band.

As shown in FIGURE 3, a rod 61, carried by the post 39, extends through a clearance hole formed in the cross bar 43, which rod terminates in a piston 62 having a rounded head. Such piston is slidable within the bushing 63 and is spring-biased toward the cross bar, as will be described hereinbelow. The stylus 48 and the scribe 53 are shown in the normal, non-operating positions. If, now, the stylus 48 is moved downwardly, by depression of the handle 47, the scribe 53 is moved upwardly toward the film positioned against the slide-holder plate 20. During the engraving operation, the scribe 53 is rotating and its sharp point cuts through the film emulsion. Hence, the emulsion is cut away to form the particular letter or number traced by the stylus 48. Only a light pressure is required for the pointed scribe 53 to cut through the emulsion. Once the scribe 53 is pressed into engagement with the film, a further downward movement of the stylus 48 results in a downward movement of the piston 62. This action limits the maximum pressure which can be applied to the film by the engraving scribe 53, thereby preventing such scribe from cutting through the film. One or more small batteries 65 are carried by the base 10 by a conventional clamping bracket 66. One terminal of the battery is electrically connected to the base plate 10 through a strap 67 made of spring material. The other battery terminal engages a conventional terminal member 68 having a soldering terminal electrically insulated therefrom. A lead wire 69 is soldered between such terminal and the motor. As will be described, below, the circuit between the battery and the motor is completed only when the tracing stylus 48 is pressed into a character formed on the lettering guide.

Reference now is made to FIGURE 11, which is an enlarged cross-sectional view taken along the line 11-11 of FIGURE 3. The vertical post 39, made of plastic, is secured to the base 10 by a screw 70 and supports the pantograph mechanism, the proximate arms of which are identified by the numerals 71-74. These arms are spaced apart by the bushing 75. The upper metal bushing 63 has an integral shank which is threaded in a hole formed

in the upper portion of the plastic post 39. Seated between the bushing 63 and the pantograph arm 74 is a spring washer 76. In the assembled condition, the post 39 and the bushing 63 remain stationary and the pantograph arms and the bushing 75 are rotatable about the shank of the bushing 63. The shank of the headed piston 62 is slidable in an axial hole formed in the bushing 63. Such piston has an axial hole formed therein for receiving the compression spring 78. A set screw 79 has its end extending beyond the inner wall of the bushing 63 and spaced slightly from a longitudinal flat formed in the outer surface of the piston shank, thereby preventing the piston from becoming disengaged from the bushing. Preferably, the components forming the pantograph mechanism are all made of metal, but it will be apparent that the entire mechanism, including the stylus 48 and the scribe 53, are electrically insulated from the base 10 by the supporting post 39.

Reference now is made to the diagrammatic representation of FIGURE 10. Here is shown the lettering template 14 slidably positionable within the channel 13 formed in the upper surface of the base plate 10. The template comprises a plastic sheet 80 cemented to a flat metal bar 81. The characters of the template are formed by engraving completely through the plastic sheet 80, the numeral 82 identifying a cut-away portion of the sheet which represents a portion of a single character. As described hereinabove, one terminal of the battery 65 is connected to the plate 10. The other battery terminal is connected to the motor 60 by the lead 69. The other end of the motor is connected directly to an arm of the pantograph mechanism. Inasmuch as the pantograph mechanism is made of metal members, the said other side of the motor effectively is connected to the stylus 48. If, during use of the apparatus, the stylus 48 is pressed downwardly into engagement with the plastic sheet 80, the motor remains deenergized, thereby preventing possible damage to the film 29 of the slide. For this same purpose, the upper surface of the base plate 10 is coated with a non-conducting coating 83. The motor, therefore, is energized only when the tip of the stylus 48 has entered into one of the characters of the template and comes into engagement with the underlying plate 81. Energization of the motor results in a rapid rotation of the engraving scribe 53, thereby cutting through the film emulsion to form that character which is traced by the stylus 48, the latter being pressed into engagement with the plate 81 as the user causes it to trace the complete character.

Although good electrical contact normally is established between the underlying metal plate of the template and the guide channel formed in the base plate, the spring member 19 (see FIGURES 1-3) provides an additional electrical path between these members. Upon gaining proficiency in use of the apparatus, the user may not wish to use the thumb screw for clamping the template to the base during the engraving operations. Retaining the template in a desired position with the left hand, the handle 47 may be operated with the other hand. In such case, the spring member 18 maintains a closed circuit to the motor in the event the template is moved during the engraving operation.

Referring specifically to FIGURE 1, the user slides the template so that a selected letter, say, T, lies between the number 1 and 2 reference graduations carried by the guide member 15. The template is then clamped in this position by tightening the thumb screw 18. By means of the handle 47, the user now effects a pivotal movement of the pantograph mechanism to bring the tracing stylus over the letter T and presses downwardly on the handle to bring the stylus into contact with the underlying metal plate of the template. This results in the energization of the motor and rotation of the stylus 53. When the stylus is in contact with the underlying plate of the template, the pressure of the scribe against the film is sufficient to cut through the emulsion. Maintaining the downward pressure on the

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stylus the user completes the trace of the letter T. Upon release of the handle 47, the stylus and the scribe are returned to the original, illustrated positions. Loosening the thumb screw 18, the user now slides the template to align a second letter, say, O, between the number 2 and 3 reference graduations 15, clamps the template in place, and repeats the described engraving operation.

The spacings between the reference markings 16 are slightly greater than the maximum width of a character carried by the particular template, thereby to provide spacings between the characters engraved on the film. Also, the reference markings extend over a distance somewhat less than the width of the film. Hence, as long as succeeding characters are aligned with succeeding reference markings, the scribe will be in proper position to engage the film for the engraving of information thereon. Further, the operation of the pantograph mechanism is such that the letters engraved on the film are reversed, are very small and fall along a line only slightly spaced from a horizontal edge of the film. The film emulsion being relatively thin, the sharp-pointed scribe forms thin characters. The net result is a minimum obliteration of the subject matter of the particular slide, while providing characters of distinct and pleasing form for simultaneous projection onto a screen.

While the described arrangement for energizing the motor only when the stylus is fully pressed into a letter of the template is preferred, it is apparent that a conventional plastic template may be used and the energization of the motor controlled by a hand-operated switch, or by a switch mounted on the pantograph mechanism and actuated upon movement of the cross-bar 43. Also, it will be apparent that the apparatus is not limited for use with the described unitary lettering template. Individual letters, made by cutting through a plastic sheet of appreciable thickness, may be assembled together to form the desired wording and positioned in the transverse channel formed in the upper surface of the base plate, thereby eliminating the requirement to shift the unitary template to engrave the individual letters on the film. In such arrangement, the letters forming the template preferably are of a larger size and the guide markings 16 are spaced apart correspondingly, all for the purpose of properly engraving the film. Still further, the arrangement for properly supporting the film in the engraving station may take various specific constructions, the important requirement being the presentation of the emulsion to the engraving scribe and a backing for that portion of the film upon which the engraving operation is to be performed.

Having now described the invention, those skilled in this art will be able to make various changes and modifications without thereby departing from the spirit and scope of the invention as recited in the following claims.

I claim:

1. Apparatus comprising,

- (a) a pantograph mechanism pivotally carried by a base and electrically insulated therefrom,
- (b) a tracing stylus carried at one end of said mechanism and axially movable in a plane normal to that of the mechanism,
- (c) a rotatable scribe carried at the opposite end of said mechanism and axially movable in a plane normal to that of the mechanism,
- (d) a reference marking carried by the base,
- (e) a lettering template supported by the base and movable relative to the said reference marking, said template comprising a plastic sheet carried by a metal plate, with the characters of the template formed by cutting completely through the plastic sheet,
- (f) a film-supporting member carried by the base,
- (g) means for securing a photographic film to said film-supporting member,
- (h) operating means for moving the stylus into tracing registry with the template,
- (i) coupling means pivotally carried by the said mech-

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anism and mechanically-coupled between the stylus and the scribe, said coupling means effecting axial movement of the scribe into engagement with the photographic film when the stylus is brought into tracing registry with the template,

- (j) a motor for rotating the scribe, and
- (k) circuit elements for completing an electrical circuit between the motor and a voltage source, said elements including the said stylus and the metal plate of the template.

2. The invention as recited in claim 1, wherein the said coupling means is a cross-bar which is pivotally-carried by the mechanism by a spring-biased piston member having a pin passing through a clearance hole formed in the cross-bar.

3. The invention as recited in claim 2, wherein the stylus is carried by a first rod extending through a longitudinal slot formed in one end of the said cross bar, and wherein the scribe is carried by a second rod passing through a longitudinal slot formed in the other end of the said cross bar.

4. Apparatus comprising,

- (a) a base plate,
- (b) an upright post secured to the base plate,
- (c) a pantograph mechanism pivotally carried by said post,
- (d) a first rod rotatably carried at one end of said mechanism and having a head member secured to the upper end thereof,
- (e) a tracing stylus secured to the lower end of said first rod,
- (f) a handle secured to the said first rod,
- (g) a second rod rotatably carried by the opposite end of said mechanism and having a pulley secured to the lower end,
- (h) a scribe carried by the upper end of the second rod,
- (i) a flange member carried by the upper end of the second rod,
- (j) a flat cross bar having a longitudinal slot formed in each end and a hole intermediate of the ends, each of the said rods having an upper portion passing through one of such slots,
- (k) a headed piston member supporting said cross bar, said piston member including a pin passing through the cross bar hole,
- (l) a bushing carried by the said post, said piston member being slidable within the said bushing,
- (m) a compression spring disposed between the piston member and said bushing,
- (n) a D.C. motor carried by the pantograph mechanism and having a drive shaft coupled to the said pulley,
- (o) a guide member secured to the base plate and carrying spaced reference markings,
- (p) a template carrying traceable characters and mounted for sliding movement along the reference markings,
- (q) a film-supporting member carried by the base plate and spaced from the said scribe,
- (r) securing means for securing a photographic film to the film-supporting member, and
- (s) circuit elements for connecting the said motor to a source of D.C. voltage.

5. The invention as recited in claim 4, wherein said base plate is made of metal, the characters of the template are formed by cutting completely through a plastic sheet carried by a metal plate, the metal plate of the template is slidable within a channel formed in the base plate, the said D.C. voltage source is a battery carried by the base plate, and the said circuit element include the said stylus and the metal plate of the template.

6. The invention as recited in claim 4, wherein the said film-supporting member comprises a transparent plastic plate having recesses for accommodating a photographic

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slide and wherein the said securing means comprises a bar having a portion for engagement with the film of the slide, and thumb screws for securing the said bar to the transparent plate.

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