

Oct. 19, 1948.

H. EDELMANN

2,451,931

CONSECUTIVE RULING MACHINE

Filed July 27, 1944

3 Sheets-Sheet 1

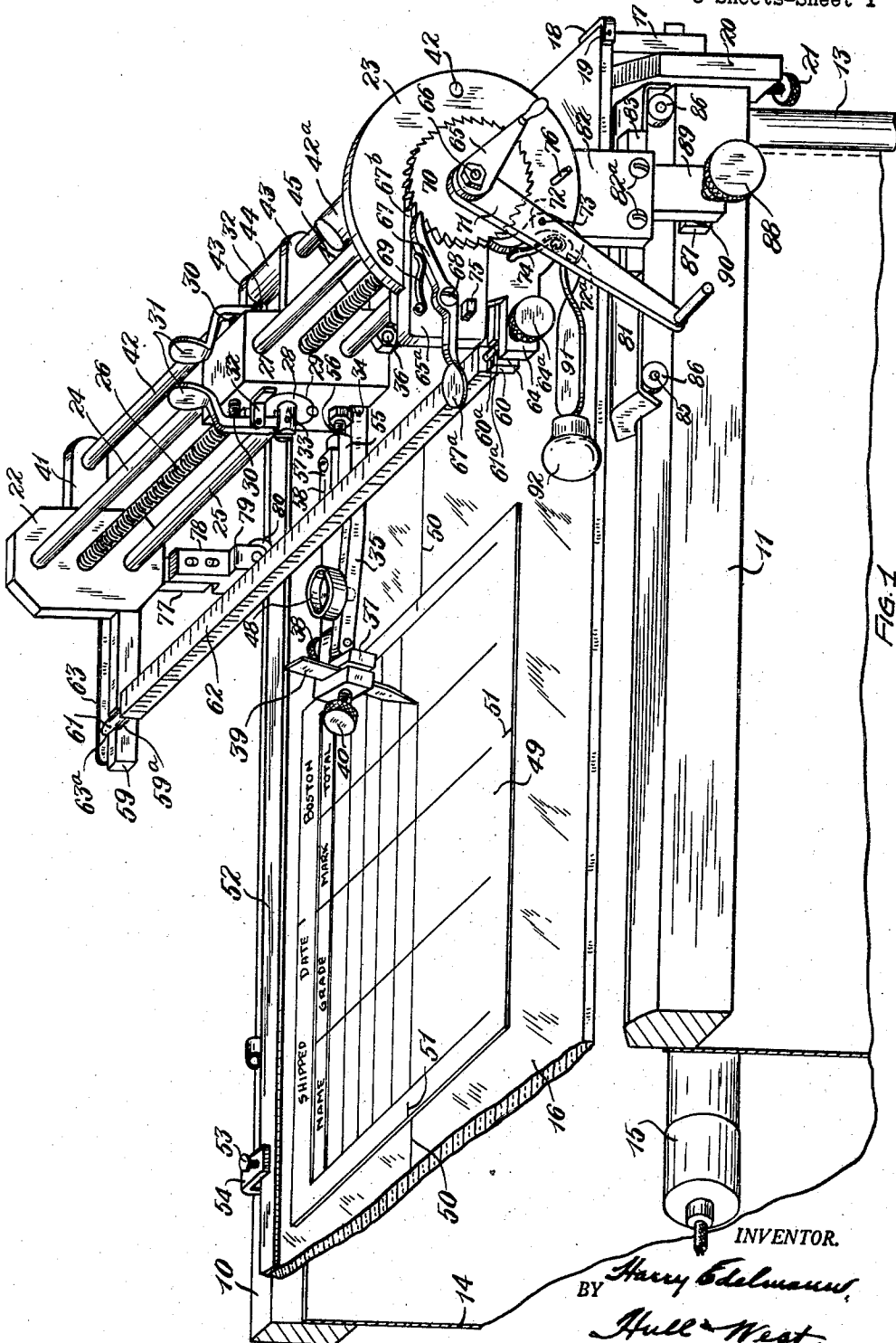


FIG. 1

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3 Sheets-Sheet 2

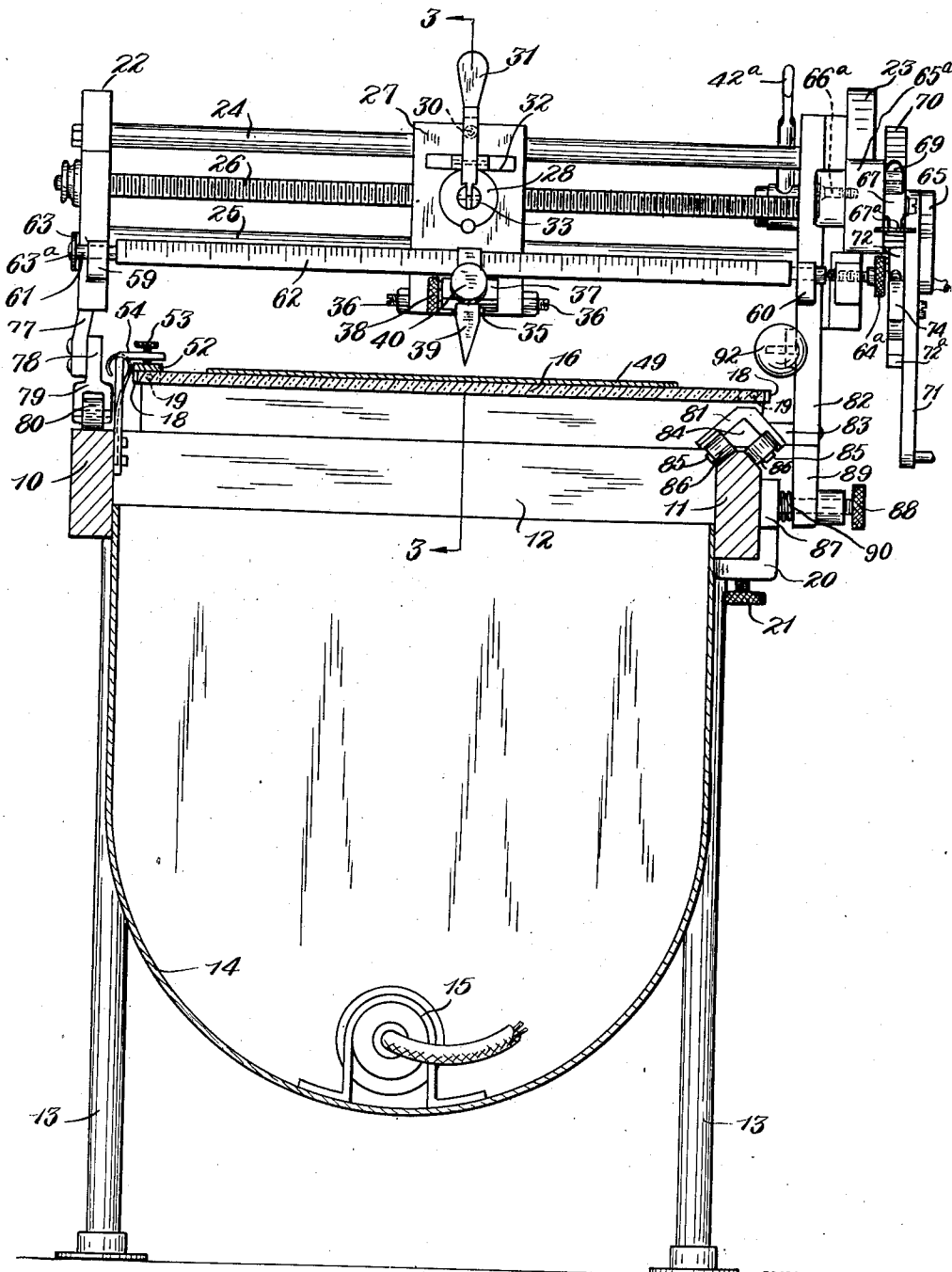


FIG. 2

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3 Sheets-Sheet 3

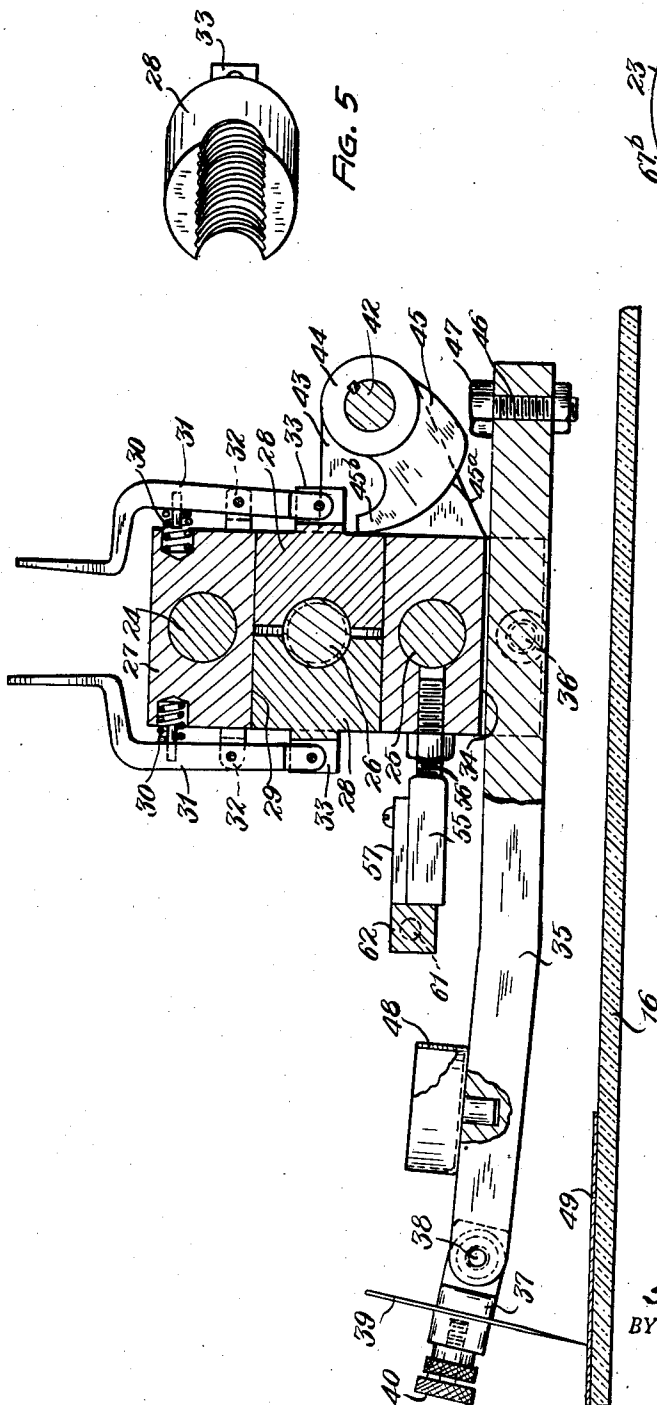


FIG. 5

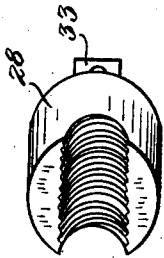


FIG. 3

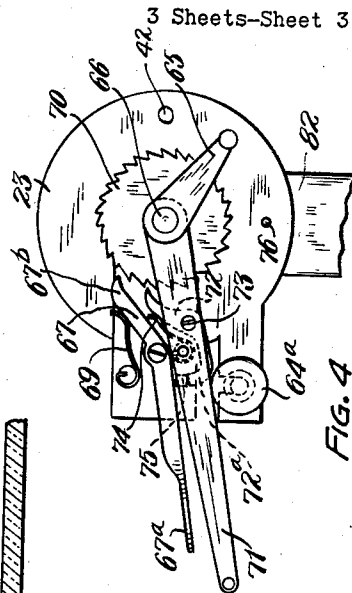


FIG. 4

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UNITED STATES PATENT OFFICE

2,451,931

CONSECUTIVE RULING MACHINE

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Application July 27, 1944, Serial No. 546,837

8 Claims. (Cl. 33—32)

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This invention relates to machines which are especially adapted for the purpose of ruling lines upon sheets of material such as paper or photographic negatives containing headings at the top and/or one or both of the sides thereof, thereby to produce vertical and/or horizontal columns corresponding to the said headings. It is the general purpose and object of the invention to produce a machine of this character which is capable of enabling a sheet (whether it consists of paper or of a film negative) to be conveniently lined up with reference to the ruling point or stylus; which is capable of enabling overlapping and variously-spaced lines to be ruled in a particularly convenient and effective manner and which will enable the quick and accurate spacing between lines to be ruled to be readily accomplished.

Further and more limited objects of the invention will be set forth hereinafter and will be realizable in and through the construction and arrangement of parts shown in the drawings hereof wherein Fig. 1 represents a perspective plan view of the major portion of a machine constructed in accordance with my invention; Fig. 2 a vertical sectional view through the said machine showing the operating parts thereof in elevation; Fig. 3 an enlarged detail in section taken on the line 3—3 of Fig. 2 and looking in the direction of the arrows; Fig. 4 a side elevational view of the ratchet-and-pawl mechanism for imparting variable movements to the spacing block on which the pointer-supporting yoke is pivotally mounted and Fig. 5 a detail in perspective of one of the members of the split nut which is mounted within the spacing block.

The machine shown herein comprises generally a work table having side rails, a bed plate of translucent material above the said rails on which the object to be ruled is placed, with a hood and fluorescent lamp beneath the bed plate, and a carriage movable along said rails and provided with mechanism for supporting a ruling point and for imparting a variable movement to the latter whereby any desired spacing between, or overlapping of lines ruled thereby may be obtained.

Describing the various parts by reference characters, 10 and 11 designate the side rails and 12 the front cross rail of a work table, the same being supported by legs 13. Supported by and depending from the inner surfaces of the rails is a U-shaped hood 14 of opaque material having a fluorescent lamp 15 supported adjacent to the bottom thereof and extending substantially the full length of the working surface of a bed plate 16 of translucent material, such as ground glass,

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the front end of which is shown as supported above the rails 10 and 11 by means of posts 17 secured to the rail 12, being mounted upon the said posts by means of angle brackets 18 which receive the corners of the glass, the brackets at one side of the glass being provided with clamping screws 19 to retain the glass in place. The brackets enable the glass to be accurately positioned for cooperation with the line-ruling mechanism. One of these brackets is indicated at the right hand of Fig. 1.

20 denotes a stop clamp which is shown as adjustably secured upon the rail 14 by a clamp screw 21, the purpose of which will be explained hereinafter.

For convenience of description, the portion of the machine which is equipped with the carriage having incorporated therewith means which enables the workman to operate the same will be referred to hereinafter as the "front" of the machine and the opposite end as the "rear." 22 denotes a rear head and 23 a front head of the carriage, said heads supporting vertically spaced guide rods 24 and 25 and an interposed lead screw 26. Slidably mounted upon the guide rods is what I term a spacing block 27 and through which the said guide rods and lead screw extend, the latter having a non-driving connection with the block. A split nut comprising members 28 is mounted in the said spacing block within a guide bore 29 extending fore-and-aft through the said block, one of the members 28 being shown in perspective in Fig. 5. The internal threads on these members are normally held in engagement with the thread on the lead screw by means of springs 30 mounted in recesses in opposed surfaces of the upper portion of the spacing block and pressing at their outer ends against levers 31 which are pivoted between lugs 32 carried by the said block above the bore 29, the lower ends of the levers extending between and being pivoted to lugs 33 with which the outer ends of the nut members 28 are provided.

34 denotes a slot which extends upwardly from the bottom of the spacing block 27. 35 denotes an arm which extends from the said block toward the remote end of the bed plate, the said arm extending through and beyond the said slot and being pivotally supported from the block by means of pivot screws 36 which are mounted within the portions of the block on opposite sides of the slot and the inner ends of which screws engage the opposite sides of the portion of the arm within the slot. The axis of the arm 35 is parallel with the side rails 10 and 11. At its operating

end, the arm has a clamp 37 adjustably secured to the outboard end of the same by a screw 38. The clamp is slotted for the reception of the ruling stylus or point 39 which is secured in place within the slot by means of a set screw 40.

41 denotes an arm projecting from the head 22 within which one end of a cam shaft 42 is rotatably supported, the opposite end being journaled within the head 23. The cam shaft 42 is provided with an operating lever 42^a attached thereto adjacent to the head 23. The shaft also extends through arms 43 projecting from the spacing block 27, the portion of the shaft between said arms having slidably secured thereto a sleeve 44 provided with a cam 45. Between the arms 43, the portion of the arm 35 therebeneath is provided with a bolt 46 the head 47 whereof is adapted to be engaged by the cam surface 45^a whereby, by rotating the shaft 42 toward the left, the portion of the arm 35 therebeneath will be depressed and the outer end of the needle-carrying portion of said arm will be raised. However, by rotating the shaft further to the right than is shown in Fig. 3, the cam will not only be disengaged from the bolt head 47 but its toe 45^b will engage the external surface of the adjacent split nut member 28 thereby to prevent separation of the nut members and their disengagement from the lead screw during the ruling movement of the carriage, and the needle carrying arm will then be "full floating." In practice, the weight of the portion of the arm which is opposed to the needle-carrying portion thereof is insufficient to balance the latter portion of said arm, but the downward reaction of the latter portion may be insufficient to enable the needle to scrape the emulsion off the film, in which event weights sufficient to secure this result may be placed within the cup 48. By varying the mass of the weights in said cup, the operating end of the point 39 may be made to exert a corresponding pressure upon the sheet 49, and where the sheet is a film negative, to penetrate the emulsion thereon to any desired depth.

In order to enable the sheet 49 to be properly indexed for the ruling operation, I provide the bed plate 16 with a central fore-and-aft line 50 and the sheet with notches or similar marks in opposed edges of the same, as indicated at 51 whereby, by mounting the sheet upon the bed plate with the notches in one pair of opposed edges in register with the line 50, lines may be ruled on the said sheet in parallelism with the line 50; and, by giving the sheet a quarter turn and registering the notches or marks in the other opposed edges with the line 50, parallel lines may be ruled at right angles to the former lines. In practice, when the sheet has been lined up properly with the indexing line 50, it may be secured to the bed plate by means of adhesive tabs. Where a sheet is wider than the bed plate, the portion which is not being operated upon may be deflected over the rear edge of the bed plate and be extended downwardly within the rail 10 and the adjacent side of the hood 14, the portion of the sheet which is adjacent to the rear edge of the bed plate being held down by means of a clamp plate 52 which may be raised and lowered by means of screws 53 connected thereto and threadably mounted in the overhanging arms of angle brackets 54, secured to the rail 10.

55 denotes a supporting arm which is connected to the center of the outboard surface of the spacing block 27, above the arm 35, by means of a bolt 56. Adjustably mounted upon this arm 55 is an indexing member 57 provided with an

indexing line 58 thereon, the purpose of which will be explained hereinafter.

Projecting in an outboard direction from the heads 22 and 23 are arms 59 and 60 having recessed seats 59^a and 60^a therein, respectively, for the reception of pintles 61, 61^a on the ends of a ruler 62 which is polygonal in section, being shown here as rectangular or square. One of the pintles 61 is mounted for rotation in a cupped seat 63^a in a spring steel plate 63 secured to the arm 59, while the opposite pintle is square in section, thereby to be received and retained against rotation in the correspondingly-shaped seat 60^a. The end of the pintle 61^a is provided with a conical recess for the reception of the pointed end of an adjusting screw 64^a mounted on the arm 64. The sides of the rule are graduated in accordance with different scales of measurement, for convenience of line-spacing. By this manner of constructing and mounting the rule, the same may be adjusted lengthwise thereof, to bring any graduation thereon, within the range of longitudinal adjustment thereof, into alignment with the indexing line 58 and may also be lifted from its seat, rotated, and resealed thereby to utilize any of the scales of measurement on the respective faces thereof for the spacing and ruling of lines by the point 39.

The front end of the lead screw 26 has an operating handle 65 secured thereto whereby the screw may be rotated, thereby to move the spacing block 27 and the point 39 to any desired position with respect to the bed plate and to the sheet to be ruled. By pressing together the finger pieces provided at the tops of the levers 31, the nut segments will be separated, and the spacing block, together with the cam and point-supporting arm, can be moved quickly to any desired position along the lead screw after which, by releasing the grip upon the finger pieces, a driving connection will be reestablished through the split nut between the lead screw and the spacing block.

65^a denotes a block pivotally secured to the head 23 by means of a screw 66^a (see Fig. 2). 67 denotes a detent pawl which is pivotally mounted upon the outboard face of the block 65^a by means of the screw 68, the said pawl being provided at one end with a finger piece 67^a and at its opposite end with the detent proper 67^b. A spring 69, also secured to the block 65^a, normally holds the detent end of the pawl in engagement with the teeth upon a ratchet wheel 70, mounted upon and rigidly secured to the lead screw 26.

71 denotes an operating arm or lever which is loosely mounted upon the lead screw and which has a feed pawl 72 pivotally secured thereto, as indicated at 73. Normally the operating end of the feed pawl is pressed into engagement with the ratchet teeth by means of a spring 74 also attached to the arm 71. The pawl 72 is provided with a tail 72^a which, when the arm 71 is moved upwardly a sufficient distance, will engage a projection 75 upon the block 65^a, thereby to disengage the pawl from the ratchet. 76 denotes a stop pin projecting outwardly from the head 23 and which is adapted to be engaged by the arm 71 when the latter is swung downwardly from the position shown in Fig. 1.

With the parts constructed and arranged as thus far described, it will be evident that, by first moving the arm 71 into engagement with the stop pin 76, the ratchet wheel may thereafter be rotated by the arm 71 through a maximum distance determined by the engagement of the tail of the

pawl 72 with the projection 75. However, by moving the arm 71 a distance corresponding to the space between two consecutive teeth of the ratchet 70, a slight rotary movement will be imparted to the lead screw, with a correspondingly slight movement of the spacing block and the ruling point. In practice, this distance may impart an advance of only $\frac{1}{1000}$ inch to the spacing block and the point, and this distance will enable the point to rule a heavy line by overlapping in part a line which it has previously drawn. Obviously, by repeating this operation any desired width of a single line can be ruled.

By moving the arm 71 from the stop 76 until the tail of the pawl 72 engages the stop 75 the carriage and point will be advanced a distance to secure the desired spacing between two lines comprising a "double line." Variations in the width of this double-line spacing can be accomplished by loosening the screw 86^a and rotating the block 65^a either upwardly or downwardly.

When it is desired to operate the lead screw by the arm 65, the operator simultaneously grasps the finger piece 67^a of the detent pawl 67 and the arm 71, bringing these elements to the positions shown in Fig. 4. This will result in disengaging both the feed pawl and the detent pawl from the ratchet wheel, whereupon the operator can rotate the lead screw directly by his other hand through the arm 65, and the spacing block and the point 39 can be moved quickly to the desired position for ruling the next line, which position may be ascertained by reference to the rule 62. As pointed out hereinbefore, when it is desired to traverse the spacing block 27 quickly along its supporting rods 23 and 24, the operator merely presses together the handle pieces on the levers 31, thereby releasing the lead screw from engagement by the split nut, whereupon the block is free to be moved quickly to its desired position, or to a position approximating the same, whereafter it may be accurately positioned by releasing the pressure upon the handle pieces and operating the block by the lead screw and handle 65.

The carriage supporting the ruling point and the mechanism for operating and adjusting the same, comprising the parts 22-75 hereinbefore described, are slidably mounted upon the rails 10 and 11 in the following manner: 77 denotes an arm depending from the head 22 and to which is bolted an arm 78 having at the bottom a yoke 79, in which a roller 80 is journaled. 81 denotes an inverted V-shaped metallic housing 81 which is secured intermediate of its length to a block 82, depending from the head 23, by means of screws 82^a and an interposed filler block 83. Secured to and within opposite ends of the housing 81 are blocks 84, these blocks forming supports for the shafts 85 on which rollers 86 are supported in an inclined position, whereby they may cooperate with the oppositely inclined surfaces of the top of the rail 11. This manner of supporting the mechanism from the rollers 80 and 86 provides a "three-point" support; and the shape of the rail 11, in cooperation with the rollers 86, prevents any lateral distortion of the carriage and the parts of the mechanism supported by the rails.

In practice, the rollers are mounted on ball bearings, and the consequent free movement of the carriage and the operating mechanism supported thereby is such that I have provided the same with brake mechanism which may be adjusted to offset any excess freedom of movement. This brake mechanism comprises a brake block

87 which is mounted upon an adjusting screw 88 threaded into a hanger 89 depending from the block 82, there being a coiled spring 90 surrounding the adjusting screw and interposed between the block 87 and the hanger. The clamp block 20 may be adjusted along the rail 11 to any desired position to limit the extent of the return movement of the carriage, by engaging the adjacent end of the housing 81, being secured in such position by the screw 21. An arm 91 secured to the carriage and having a knob 92 thereon provides means whereby the operator may reciprocate the carriage and the point 39 longitudinally of the table and enable the point to draw lines upon the sheet on the bed plate by movement of the carriage to the right.

With the parts constructed and arranged as described, it is believed that the operation will be readily understood. The negative or other sheet upon which lines are to be ruled having been secured upon the bed plate, with the notches or marks upon one pair of opposed edges aligned with the central fore-and-aft line 50 upon the bed plate and with the fluorescent lamp illuminated, the operator rotates the cam shaft 42 to the left, thereby lifting the point 39 so that it will clear the sheet and, grasping the knob 92 with the other hand, moves the carriage as far forwardly as necessary. He then rotates the cam shaft in the opposite direction until the toe upon the cam engages the rear nut section 28 beneath the lugs 33 which will leave the arm 35 "full floating," the weights in the pan 48 determining the pressure to be exerted upon the sheet or film by the point. He then moves the carriage to the right a distance corresponding to the length of the line which it is desired to rule, following which he rotates the cam shaft to lift the point out of contact with the sheet and imparts a movement to the spacing block sufficient to enable the next line to be drawn by operating the lead screw in the manner described hereinbefore. When the required number of lines has been drawn, the point will be lifted from the sheet by rotation of the cam shaft and, if lines at right angles to those previously drawn are required, the sheet will be given a quarter turn and lined up with respect to the fore-and-aft line 50, whereafter the point may be moved quickly to the new starting position or to a point approximating the same by releasing the driving connection between the traversing block and the lead screw by means of the levers 31, as explained hereinbefore.

As pointed out hereinbefore, the construction of the rule and the manner of mounting the same enables me to utilize efficiently any of the scales of measurement on the respective faces thereof in connection with the spacing and ruling of lines by the point 39.

In practice, the table is so constructed that the bed plate forms an angle of approximately 20° with a horizontal plane, sloping upwardly away from the operator. This contributes materially to the facility of operation.

By utilizing a translucent material, such as ground glass, for the bed plate, and with a fluorescent lamp in connection therewith placed within an opaque hood, the sheet upon which lines are to be drawn will be effectively illuminated, thereby contributing to the facility of the ruling operation.

In the machine which is illustrated herein, the line-drawing implement is shown as a needle, which is necessarily used where my invention

operates upon the emulsion of a negative. Obviously, by substituting a ruling pen for the needle, the machine can operate for the purpose of ruling lines upon paper.

Due to the construction and arrangement of parts, it will be evident that I have produced a machine for the purpose indicated which is comparatively simple in construction and economical of production but which enables it readily to realize efficiently all of the objectives which machines of this character should accomplish.

Having thus described my invention, what I claim is:

1. In a machine of the character described, the combination, with a table having a bed plate thereon for the support of sheets to be ruled, of a carriage movable fore-and-aft of said table, a spacing block, a ruling point secured to said block, a lead screw supported by said carriage and having a driving connection with the said block, guide rods supported by the said carriage and extending through the spacing block above and below the lead screw, means for operating the said lead screw, and means for reciprocating the said carriage longitudinally of said bed plate.

2. In the machine set forth in claim 1, the carriage having opposed heads and the opposite ends of the lead screw and the guide rods being supported by the said heads.

3. In the machine set forth in claim 1 wherein said table has opposed rails, a brake device connected to the said carriage and comprising a block adapted to engage one of the said rails, and operating means for adjusting the said block thereby to vary the braking effect of the device upon the rail with which it cooperates.

4. In a machine of the character described, the combination, with a table having a bed plate thereon for the support of sheets to be ruled, of a carriage movable fore-and-aft of said table, a spacing block supported by said carriage for movement thereon transversely of said bed plate, a ruling point secured to said block, the said spacing block having a bore extending therethrough transversely of said bed plate and a bore also extending therethrough longitudinally of said bed plate, a lead screw supported by said carriage and extending through the first mentioned bore and being of less diameter than the internal diameter of the said bore, split nut members mounted in opposite ends of the second bore and each provided at its inner end with threads adapted to engage the threads on the lead screw, and means carried by the said spacing block for moving the split nut members into and out of driving engagement with the lead screw, the means for moving the split nut members into and out of driving engagement with the lead screw comprising a projection on the outer end of each of the said nut members, levers pivoted on the front and rear sides of the spacing block and secured to the respective projections on the split nut members, and springs interposed between the levers and the sides of the spacing block to which they are respectively pivoted and tending to force toward each other the ends of the levers secured to the said projections.

5. In a machine of the character described, the combination, with a table having a bed plate thereon for the support of sheets to be ruled, of a carriage movable fore and aft of said table, said carriage comprising a front head and a rear head, a lead screw supported by the said heads, a spacing block having a driving connection with said lead screw, means connected with said lead

screw for effecting direct rotation of the latter thereby to move the said block transversely with respect to the bed plate, a ruling point secured to the said block, a ratchet wheel mounted on said lead screw in front of the front head, an arm pivoted on said lead screw in front of the front head, a pawl carried by said arm for driving said ratchet wheel, a stop on the front head adapted to engage the arm thereby to limit its movement and the movement of the pawl in a non-driving direction, a block adjustably mounted upon the front head and provided with a stop spaced from the former stop and adapted by contact of the pawl therewith to disengage the latter from the ratchet wheel whereby, when the pawl is brought into contact with the second mentioned stop, the lead screw may be rotated in either direction by the means connected thereto for effecting direct rotation thereof.

6. In the machine recited in claim 5, there being a detent pawl pivoted upon the said block for engaging the said ratchet wheel and provided with a finger piece extending above and beyond the stop on the said block which is adapted to be engaged by the pawl on the said arm whereby, when the said arm is moved to a position to bring the pawl thereon into contact with the stop on the said block thereby to disengage the pawl on the said arm from the ratchet wheel, the detent pawl may be disengaged from the ratchet wheel by the operation of its finger piece and the lead screw may be rotated directly while the pawls are thus disengaged.

7. In a machine of the character described, the combination, with a table having a bed plate thereon for the support of sheets to be ruled, of a carriage movable fore-and-aft of said table, a spacing block supported by said carriage for movement thereon transversely of said bed plate, an arm extending fore-and-aft of the bed plate and having a ruling point at its forward end, the said arm being pivotally connected to the bottom of the said spacing block and extending rearwardly therebeyond, the said spacing block having a bore extending therethrough transversely of said bed plate and a bore also extending therethrough longitudinally of said bed plate, a lead screw supported by said carriage and extending through the first mentioned bore and being of less diameter than the internal diameter of the said bore, split nut members mounted in opposite ends of the second bore and each provided at its inner end with threads adapted to engage the threads on the lead screw, means carried by the said spacing block for moving the split nut members into and out of driving engagement with the lead screw, and means carried by the rear portion of said block for engaging and disengaging the rear portion of the said arm thereby to lift the point from engagement with the sheet on said table during the nonruling movement of the carriage and to place the ruling point in contact with such sheet during the ruling movement of said carriage, the means carried by the rear portion of the spacing block for engaging and disengaging the rear end of the arm comprising a cam rotatably supported at the rear of the spacing block and having a portion adapted by rotation thereof in one direction to engage a projection on the rear of the said arm and having another portion adapted, by rotation of the cam in the opposite direction, to engage the rear surface of the rear split-nut member thereby to prevent separation of the nut members and their

disengagement from the lead screw during the ruling movement of the carriage.

8. In a machine of the character described, the combination, with a table having side rails, of a carriage mounted for reciprocatory movement along the said rails, a spacing block on said carriage and means on said carriage for slidably supporting the said block for movement transversely of the said table, an arm carried by said spacing block and projecting forwardly therefrom, a ruling point carried by said arm, a bed plate and means for supporting the same in operative relation to said carriage and said ruling point, a second arm also secured to the said spacing block and extending forwardly therefrom above the first mentioned arm, an indexing member adjustably supported by the second arm and provided with a fore-and-aft indexing line in a plane at right angles to the bed plate and including the operating end of the ruling point, and a rule having graduations thereon extending transversely of the bed plate and being supported by the said carriage in front of the second arm and in proximity to the indexing member thereon, the rule being polygonal in cross section and the faces whereof being graduated according to different scales of measurement and the said rule being removably supported whereby the in-

dexing line may register with graduations on any of the faces of said rule.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
927,468	Stevens -----	July 6, 1909
932,676	Brewster -----	Aug. 31, 1909
977,829	Ourdan -----	Dec. 6, 1910
1,276,060	Hancock -----	Aug. 20, 1918
1,331,966	Phinney et al. -----	Feb. 24, 1920
1,761,863	Bassist -----	June 3, 1930
1,852,310	Klages et al. -----	Apr. 5, 1932
2,031,221	Mazzocco -----	Feb. 18, 1936
2,034,529	Olsen -----	Mar. 17, 1936
2,190,947	Kinzler -----	Feb. 20, 1940
2,252,535	West et al. -----	Aug. 12, 1941

FOREIGN PATENTS

Number	Country	Date
3,192	Great Britain -----	Aug. 4, 1880
264,750	Great Britain -----	Jan. 27, 1927
392,379	France -----	Nov. 29, 1908