Dec. 9, 1930. L. McDONALD 1,784,152

LETTERING MACHINE

Filed July 5, 1924 2 Sheets-Sheet 1

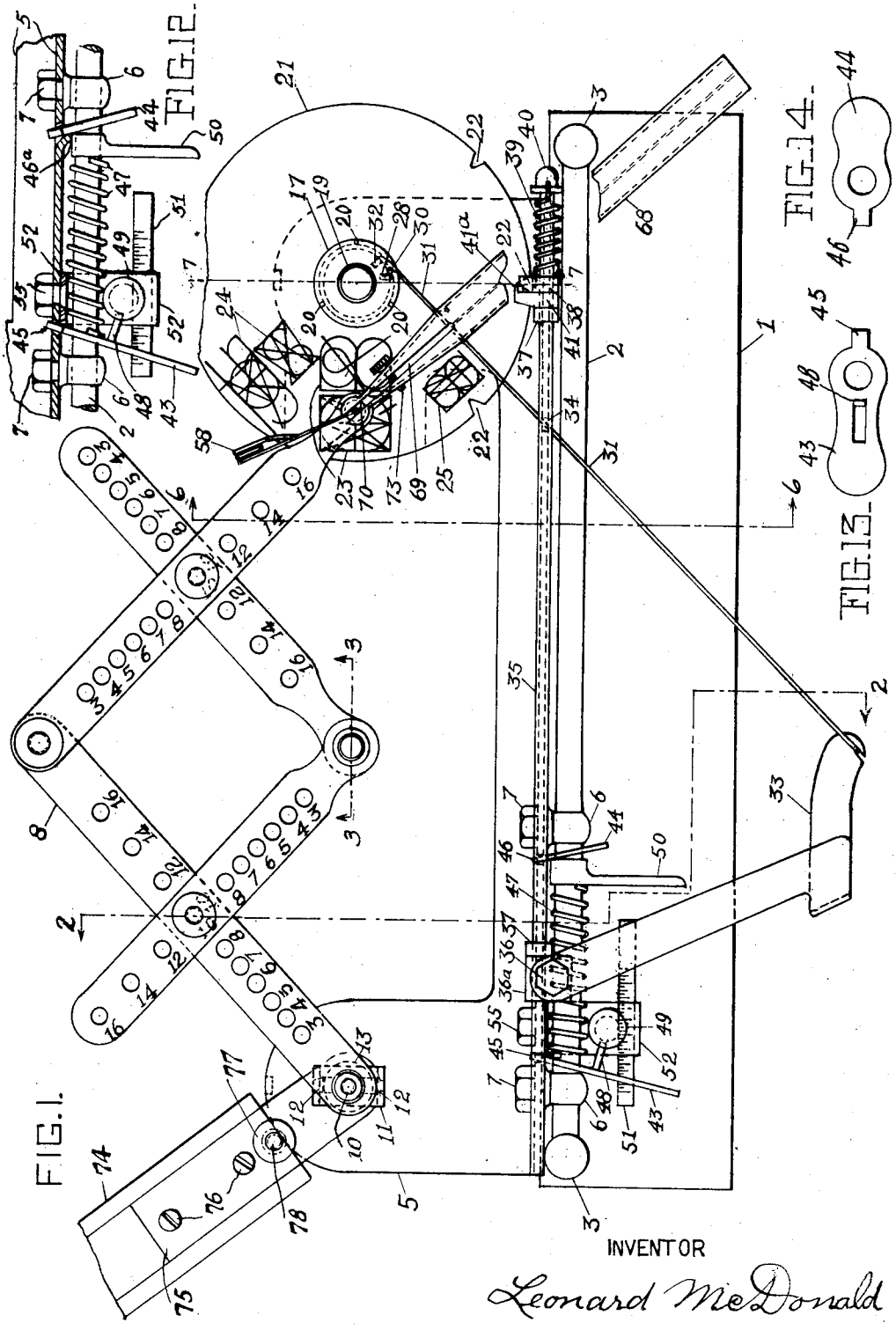


FIG. 1.

FIG. 12.

FIG. 13.

FIG. 14.

INVENTOR

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FIG. 2.

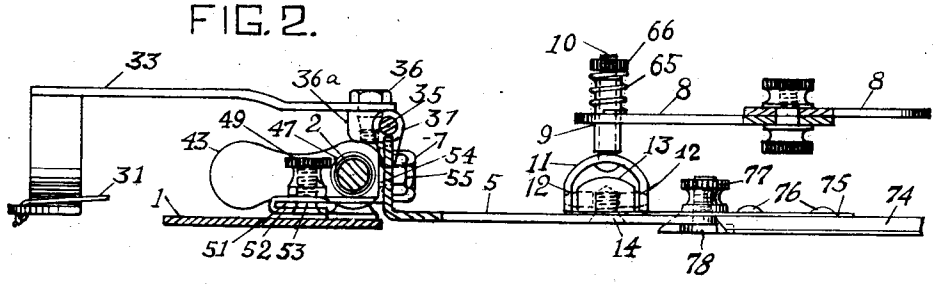


FIG. 6.

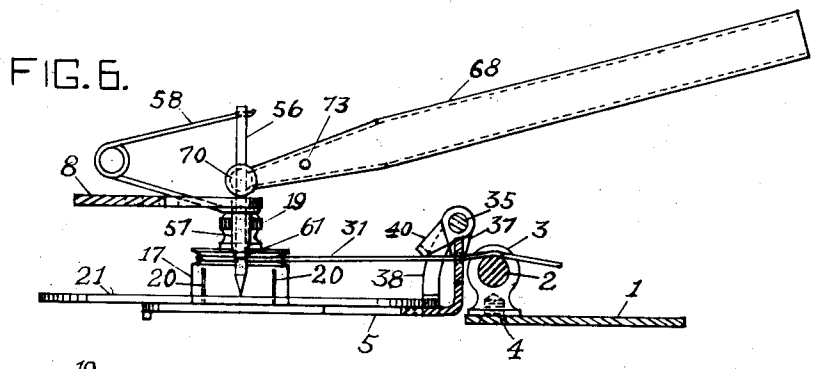


FIG. 7.

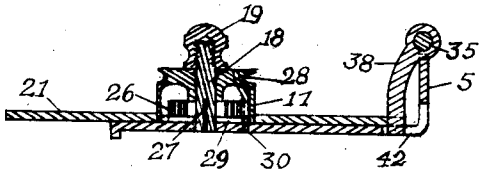


FIG. 3.

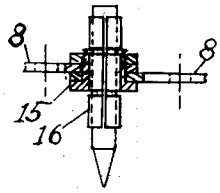


FIG. 4

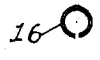


FIG. 5.

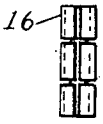


FIG. 8.

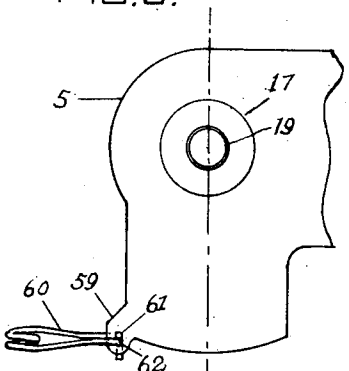


FIG. 9.

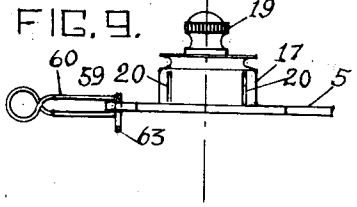


FIG. 10.

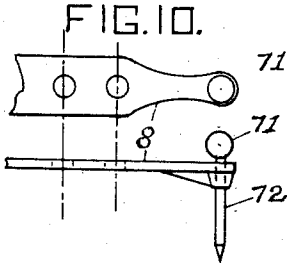


FIG. 11.

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UNITED STATES PATENT OFFICE

LEONARD McDONALD, OF HOUSTON, TEXAS

LETTERING MACHINE

Application filed July 5, 1924. Serial No. 724,347.

My invention is a combination parallel ruler and lettering device for lettering drawings, and for lettering and ornamenting signs, etc.

The preferred form for general use consists of a support movable on a stationary guide rod. The support having mounted on it pantographic mechanism, and master copies of letters, or ornamental characters consisting of grooved designs, making it easy to guide the tracer for copying the required letters of the master copies on paper or other material over which the support is being advanced by letter spacing means and a ruling blade attached to the support having angular adjustment with respect to the support. Other important features are hereinafter described and claimed. The scope of my broad claims is further indicated at the close of the general description.

Fig. 1 is a plan view of the device. Fig. 2 is a vertical section on the line 2—2 of Fig. 1. Fig. 3 is a vertical section of a joint of the pantograph on the line 3—3 of Fig. 1 showing pen and pencil holding means. Figs. 4 and 5 are details of the same. Fig. 6 is a vertical section on the line 6—6 of Fig. 1. Fig. 7 is a vertical section on the line 7—7 of Fig. 1. Figs. 8, 9, 10, and 11 show a variation of a certain feature of the device. Fig. 12 is a horizontal sectional view of the spacing mechanism, taken on the center of guide rod 2. Figs. 13 and 14 are details of the same.

A stationary base 1 holds a guide rod 2 in two bearings 3 attached to base 1 by screws 4. A support 5 having an upturned side portion forming an angle, is slidably mounted on guide rod 2 by two bearings 6 clamped to the upturned side portion of support 5 by nuts 7. Upon the left extension of support 5 (see Fig. 2) is attached a pantograph 8 on universal swivel bearings consisting of a sleeve 9 fixed to pantograph 8, and having bearings on a vertical pivot 10 fixed to a spring yoke 11 having conical bearings on two conical horizontal pivots 12 fixed in stud 13, which is attached to support 5 by screw 14. This universal joint attaching means permits the tracing end of the pantograph to be lifted upward in any direction.

Figs. 3, 4, and 5 show means adapting the pantograph 8 to conveniently and adjustably hold pens of the tubular type, and pencils. It consists of a short tubular bolt 15 used for joining the arms of the pantograph, and for holding by frictional contact a slotted spring collet 16. The spring collet holds pens, or pencils adjustable vertically.

Upon the right hand extension of support 5 is mounted a drum 17 on a pivot 18 (Fig. 7) fixed to support 5. The drum is held on pivot 18 by nut 19. The drum has three slots 20 (Fig. 9), and the upper part of it forms a grooved pulley. The lower part of the drum is slightly flared, and holds by frictional contact a disk 21 having three notches 22. On this disk are grooved designs, the central group 23 having the elements of capital letters, the left design of this group having the elements of all the alphabet except B P K R S &, which are contained in the right hand design. The upper group 24 contains the elements of the lower case letters, the left design, contains all of the letters except s w x z, which are contained in the right hand design. The lower design 25 contains all the numerals.

Combining several letters together in one design makes frequent shifting of letters into the position for their being copied unnecessary.

The drum 17 has in it a coiled spring 26 (Fig. 7) having one end held in a slot 27 in pivot 18, the other end being attached to a pin 28 fixed in the upper part of the drum. This pin projects below the edge of a small washer 29. A small fixed stop pin 30 projects up behind pin 28 to the level of washer 29, and limits the rotation of the drum to one revolution by pin 28 coming into contact with it. The spring should be wound to an initial tension of one revolution. A cord 31 has one end wound on the grooved pulley, and wedged in a small hole 32 in the bottom of the groove of the pulley, the other end of the cord being attached to a lever 33 to be operated by the hand. The cord also extends through a hole 34 in the upper part of sup-

port 5. The lever 33 swings horizontally on screw 36 having a conical portion which clamps collar 36a to rod 35, which is free to turn in two bearings 37 fixed on the top of the upturned portion of support 5. A locking pawl 38 having bearings on rod 35, is engaged by one end of a spring 39, the other end of spring 39 projecting through a hole in the flange of nut 40. There may be several holes in this flange for adjusting the tension of the spring 39. When the lever 33 is down the spring 39 will force the locking pawl 38 into any one of the holes 22 that may be presented by revolving the disk 21. When the lever 33 is raised the dog 41 fixed to rod 35 by brazing, or otherwise, and having a projection 41a will force the locking pawl 38 out of engagement with notches 22. The lower part of locking pawl 38 is accurately fitted to slot 42 in support 5.

The means for advancing the support 5 on guide rod 2 for spacing the letters and words, and for holding it at any desired point (Figs. 1, 2, 12, 13, and 14), consists of two clamping levers 43 and 44 on rod 2, each having a part 45 and 46 engaging in diagonal slots in the upturned portion of support 5, and each being held in frictional engagement with rod 2 by the pressure of spring 47. The clamping lever 43 grips against forward movement of support 5, and clamping-lever 44 grips against rearward movement of support 5. Clamping-lever 50 grips the stationary guide rod 2 by pressure of the thumb, using the left hand, while pressure of the finger against clamping-lever 43 advances support 5. The bar 51 is for regulating the distance of the spacing of the words and letters, and is adjustably mounted in clamp 52 by screw 53 and nut 49. The clamp is attached to the upturned part of support 5 by screw 54 and nut 55. The movement of the support 5 for spacing the letters is limited by the bar 51 coming into contact with clamping-lever 50. The bar 51 may have any required graduations on it. The clamping-lever 50, when released after support 5 has been advanced, is automatically advanced by spring 47 until it again contacts with clamping-lever 44.

The projecting part 48 of clamping-lever 43 contacts with nut 49 when pressure is exerted against the clamping-lever, which limits its inward movement. The part 48 is not entirely essential when the part 45 fits properly in its diagonal slot in the upturned part of support 5, and it is still less essential when the material punched out of the slot is bent to one side to form a support for the clamping-lever, as 46a of the slot of the part 46 of clamping-lever 44, which is necessary when the material of support 5 is very thin. The objects of the slot being diagonal, and the objects of the parts 48 and 46a is to permit the clamping-lever to engage the support with sufficient flexibility to allow them to grip the guide rod 2 by outward pressure against them, and release their grip by inward pressure, but be rigid against other than slight inward movement. The slots need to be only slightly diagonal to give sufficient relief for the necessary flexibility. And, of course, the parts 45 and 46 may fit angularly in straight slots, which amounts to the same thing.

If it should be desirable to operate support 5 in both directions for spacing, the clamping-lever 50 would be centrally located between clamping-levers 43 and 44, and would have a spring 47 on both sides of it, and clamping-lever 44 would project as far out as clamping-lever 43, as it would not then be in the way of the finger or thumb operating clamping-lever 50.

And this spacing mechanism arranged as last mentioned or as illustrated in the drawings by making it stationary, can be made to advance a rod like rod 2, longitudinally in its bearings, for example, merely by having clamp 52 fixed to base 1, and the parts 45 and 46 engaging in diagonal slots in an upturned part of base 1.

The pantograph 8 has a series of holes in its arms, located at the proper points of adjustment for making different sizes of letters, and has numerals adjacent the holes, indicating the sizes, and the spacing bar 51 has graduation marks on it for setting it to correspond with any one of the numerals, for example, if set at the 8th graduation mark, it would space correctly the size of letters made when the pantograph is set to the adjustment indicated by the numeral 8. With sets of master letters of the same height but different width, a separate spacing bar would be required for each set.

It is essential that the tracer contact with the grooved characters before the drawing point contacts with the paper on which it draws, and that the drawing point should break contact with the paper before the tracer is withdrawn from the grooved characters, and to this end (Fig. 6) a tracer 56 is slidably held in a sleeve or guide bearing 57 fixed to pantograph 8, and is normally held at its lowest position in sleeve 57 by spring 58, one end of which encircles sleeve 57, and the other end projects through a hole in the upper end of tracer 56. In the drawing the tracer is shown at its highest position in sleeve 57.

A variation of this last mentioned mechanism is shown in Figs. 8, 9, 10, and 11, in which a small extension 59 on the right hand extension of support 5 holds a spring 60 having one of its ends projecting from the under side of extension 59 upward through a hole 61, and the other end of the spring projecting downward through hole 62, and having a right angled bend about 1/8 in. below, the bend making a better surface for sliding on the paper. This spring serves the same pur-

pose as spring 58. It holds the support 5 slightly elevated until the tracing point in contact with the grooves characters depresses the support 5 against the resistance of spring 60, thereby forcing the drawing point to contact with the paper. With this arrangement a fixed non-yieldable tracer is used. See Figs. 10 and 11.

The spring 65 (Fig. 2) with nut 66 on pivot 10, is for regulating the pressure on the drawing point when it is near the attached end of the pantograph. But this spring is not entirely essential.

A small shoulder 67 on tracer 56 limits the downward movement of the pantograph when the drawing point is near the attached end of the pantograph.

With the variation mentioned above, the spring 65 and sleeve 9 may be dispensed with, and pivot 10 made shorter, and the nut 66 screwed down tight, thereby clamping the yoke 11 rigidly to the pantograph, in which case the stud 13 should be loose enough to turn in its bearings. It may, also, be used this way with the first described mechanism, as well as with the variation.

A tubular handle 68 for guiding the tracer, formed preferably of sheet metal, has two opposite slots 69 in its tapered end, and has two ball sockets stamped in its tapered end, for engagement with the ball 70 slidable on tracer 56, or for engagement with ball 71 fixed on the fixed tracer 72. And a small screw 73 for adjusting it to the balls.

The device is equally well adapted for use as a parallel ruler. For this purpose a ruling blade 74 having a thin spring metal strip 75 attached to it by screws 76, is attached to the left extension of support 5 by the same stud 13 and screw 14 by which the pantograph is attached. And is held at any required angle by clamp nut 77 on screw 78, the head of which is made flush with the bottom of blade 74 by counterboring its hole in the end of the blade. The stud 13 has a shoulder 79 to prevent binding the strip 75.

Operation

The lever 33 will be held between the base of the thumb and the fore finger of the left hand. When the lever is raised thereby releasing the locking pawl 38 from the notches in the disk 21, the drum will tend to revolve in the unwinding direction of its spring, making it easy to shift designs into position for being traced, from either direction, by a horizontal movement of the hand while the thumb is in engagement with clamping-lever 50, and the finger in engagement with clamping-lever 43, ready to operate the spacing mechanism. The direction in which to rotate the disk will depend on the location of the required design. It being necessary to remember that the drum can revolve only one revolution in one direction, and that a certain design will always occupy the same position at the starting point of revolution, assuming this point to be at the left side at the center, which is the proper place for being traced, it will only be necessary to remember that if this particular design occupies some other position than the starting point, all designs on the left of it are to be revolved to the left, and all designs to the right of it are to be revolved to the right to the position for being traced. The particular design referred to may be made conspicious by a colored spot, or other means. In revolving the disk 21 the lever 33 should be depressed before the required design reaches the proper location. The notches 22 would be far enough apart to permit this even with a full set of separate letters, making it easy to rapidly locate letters. The support 5 may be slid on rod 2 any distance to the right by pressure against clamping-lever 43, to the left by pressure against clamping-lever 44, but slides more easily by grasping both these clamping-levers between the thumb and finger.

The base 1 may be held in position by pins projecting beneath it, or by any other suitable means, and while this base is desirable for most uses, it is not entirely essential, as the guide rod 2 may be held by any suitable means, and may be of any desired length.

By referring to Fig. 1 it will be observed that the base, the guide rod, and to some extent the letter spacing mechanism represent essential features of several well known section liners. There is quite a variety of section liners differing very much in mechanical construction, and, also, a number of different species of pantographs that may be embodied in different species of my invention, which would be included under my broad claims.

I claim:

1. A guide bar, a support mounted on said guide bar, movable longitudinally thereof, a master copy and a pantograph mounted upon said support, a drawing point and a tracing point carried by said pantograph, and means cooperating with said pantograph for causing said tracing point to contact with said master copy before said drawing point contacts with the drawing surface, and for causing said tracing point to break contact with the master copy after said drawing point breaks contact with the drawing surface, for copying the characters of the master copy.

2. A guide bar, a support mounted for movement longitudinally on said guide bar, a master copy and a pantograph mounted upon said support, a tracing point and a drawing point carried by said pantograph, for copying the characters of said master copy, and spacing mechanism adapted for producing an intermittent movement of said support for spacing the copied characters.

3. A guide bar, a support mounted for movement longitudinally on said guide bar, a master copy and a pantograph for copying the characters of said master copy mounted upon said support, a ruling blade attached to said support, adjustable angularly with respect to the support, and spacing mechanism for moving said support on said guide bar to space the copied characters, and words, and lines drawn by said ruling blade.

4. A guide bar, a support mounted for movement longitudinally on said guide bar, a master copy mounted upon said support, a pantograph mounted upon said support, a drawing point and a tracing point carried by said pantograph, means cooperating with said pantograph for causing said tracing point to contact with the master copy before said drawing point contacts with the drawing surface, and for causing said tracing point to break contact with the master copy after said drawing point breaks contact with the drawing surface, for copying the characters of the master copy, and spacing mechanism adapted to produce an intermittent movement of said support of the required distance for spacing the copied characters.

5. In mechanism as in claim 4, a ruling blade attached to said support, adjustable angularly with respect thereto.

6. A guide bar, a support mounted on said guide bar, movable longitudinally thereof, a master copy mounted on said support, a pantograph mounted on said support, adjustable for copying the characters of said master copy in various sizes, and spacing mechanism adapted for producing an intermittent movement of said support, adjustable to correspond with the adjustment of said pantograph for spacing the various sizes of copied characters.

7. A guide bar, a support mounted for movement longitudinally on said guide bar, a master copy and a pantograph mounted upon said support, a drawing point and a tracer carried by said pantograph for copying the characters of said master copy, means cooperating with said pantograph for causing said tracer to contact with the master copy before said drawing point contacts with the drawing surface, and for causing said tracer to break contact with said master copy after said drawing point breaks contact with the drawing surface, said pantograph being adjustable for copying said characters in various sizes, and having numerals thereon indicating said sizes adjacent the proper points of adjustment for making said sizes, and spacing mechanism adjustable to correspond with the adjustment of said pantograph, for producing an intermittent movement of said support of the required distance for spacing the various sizes of copied characters.

8. A guide bar, a support mounted for movement longitudinally thereon, a pantograph having a drawing point and a tracer, mounted on said support, a master copy mounted on said support, consisting of grooved designs of characters superposed, each design having the elements of several characters, the grooves serving to guide said tracer.

9. A guide bar, a support mounted for movement longitudinally on said guide bar, a master copy and pantographic means for copying the character of said master copy, carried by said support, and means for uniformly spacing the copied characters and words, comprising two clamping levers slidable on said guide bar having their ends engaged in slots in said support, adapted to prevent other than slight movement of said levers towards each other, a spring between said levers holding them in gripping engagement with said guide bar, a free clamping lever slidable on said guide bar under the pressure of said spring, a clamp fixed to said support, and a removable spacing bar held adjustable longitudinally by said clamp to limit the movement of said support to any required distance by the spacing bar coming into contact with said free clamping lever while it is held in gripping engagement with said guide bar by the thumb or finger.

10. A guide bar, a support mounted on said guide bar, a master copy and a pantograph for copying the characters of said master copy mounted on said support, said pantograph being adjustable for making various sizes of letters, and having numerals thereon indicating said sizes, adjacent the proper points of adjustment for making said sizes, means for spacing the copied characters including therewith a clamp on said support, a spacing bar held adjustable longitudinally in said clamp, having graduation marks on it corresponding with the numerals on said pantograph, thereby indicating the correct adjustment of the spacing bar for spacing various sizes.

11. A guide bar, a support mounted on said guide bar, a master copy and a pantograph carried by said support, a drawing point attached to said pantograph, a sleeve attached to said pantograph, a tracer slidable in said sleeve, a spring attached to said pantograph and normally holding said tracer at its lowest position in said sleeve, whereby a downward movement of said pantograph will cause said tracer to contact with said master copy before a further downward movement against the resistance of said spring causes said drawing point to contact with the paper on which it draws, and on upward movement to break contact before said tracer breaks contact.

12. In mechanism as in claim 11, a ruling blade attached to said support, adjustable angularly with respect to the support, and spac-

ing mechanism for moving said support on said guide bar to space the copied letters and the lines of the ruling blade.

13. A guide bar, a support mounted on said guide bar, a master copy and a pantograph carried by said support, a drawing point and a tracer attached to said panograph, a spring in operative engagement with said support, normally holding it slightly elevated, whereby a downward movement of said tracer in contact with said master copy will cause said drawing point to contact with the drawing surface.

14. A guide bar, a support mounted for movement longitudinally on said guide bar, a drum rotatably mounted upon said support, a disk removably attached to said drum, rotatable therewith, having a master copy thereon, and having a series of locating notches on its periphery, a locking pawl mounted on said support, adapted to engage with said notches, a spring in operative engagement with said locking pawl, a lever flexibly mounted on said support and operatively connected with said locking pawl, an element in operative engagement with said drum and said lever, whereby a swing of said lever by the hand will revolve said drum, while a substantial movement of said lever out of the plane of said swing will exert resilient pressure against said locking pawl through said spring, for forcing said locking pawl to engage with one of the notches on said disk at the proper point of revolution for locating the required character in the position for its being copied, a coiled spring inside said drum, in operative engagement with said drum and said support, tending to revolve said drum when said disk is released from said locking pawl, a pantograph mounted on said support, a drawing point and a tracer carried by said pantograph for copying the characters of said master copy, and spacing mechanism carried by said support for spacing the copied characters.

15. Mechanism as in claim 14, in which said spacing mechanism is located convenient for the engagement of said lever and said spacing mechanism both at the same time for operation by one hand.

16. In mechanism as in claim 14, a ruling blade attached to said support, adjustable angularly with respect thereto.

17. In mechanism as in claim 14, means cooperating with said pantograph for causing said tracer to contact with the master copy before said drawing point contacts with the drawing surface, and for causing said tracer to break contact with said master copy after said drawing point breaks contact with the drawing surface.

18. A guide bar, a support mounted for movement longitudinally on said guide bar, a drum rotatably mounted upon said support, a disk removably attached to said drum, rotatable therewith, and having a master copy thereon, and having a series of locating notches on its periphery, a locking pawl mounted on said support, adapted to engage with said notches, a spring in operative engagement with said locking pawl, a lever flexibly mounted on said support, and in operative engagement with said locking pawl, an element in operative engagement with said drum and said lever, whereby a swing of said lever by the hand will revolve said drum, while a substantial movement of said lever out of the plane of said swing will exert resilient pressure against said locking pawl through said spring, for forcing said locking pawl to engage with one of the notches on said disk at the proper point of revolution for locating the required character in the position for its being copied, a coiled spring inside said drum, in operative engagement with said drum and said support, tending to revolve said drum when said disk is released from said locking pawl, a master copy and a pantograph mounted upon said support, a drawing point and a tracer carried by said pantograph for copying the characters of the master copy, said pantograph being adjustable for copying said characters in various sizes, and having numerals thereon indicating said sizes adjacent the proper points of adjustment for making said sizes, and spacing mechanism carried by said support adjustable to correspond with the adjustment of said pantograph for spacing the various sizes.

19. In a lettering machine, a support, a drum rotatably mounted on said support, a disk removably attached to said drum, rotatable therewith, having a master copy thereon, and having a series of notches on its periphery, a locking pawl mounted on said support, adapted to engage with said notches, a spring in operative engaging with said locking pawl, a lever flexibly mounted on said support, and operatively connected with said locking pawl, an element in operative engagement with said drum and said lever whereby a swing of said lever by the hand will revolve said drum, while a substantial movement of said lever out of the plane of said swing will exert resilient pressure against said locking pawl through said spring, for forcing said locking pawl to engage with one of the notches on said disk at the proper point of revolution for locating the required character in the position for its being copied, a coiled spring inside said drum in operative engagement with said support and said drum, tending to revolve said drum when said disk is released from said locking pawl.

20. A guide bar, a support mounted on said guide bar, means on said support carrying a master copy and a pantograph having a universal swivel joint at its attached end for copying the characters of said master copy.

21. A pantograph having a universal swivel joint at its attached end, comprising a rotatable stud having two pivots oppositely projecting at right angles to its axes, a yoke attached to said pantograph, and having bearings on said pivots.

22. A guide bar, a support mounted for movement longitudinally thereon, a master copy, and a pantograph having a drawing point and a tracer, mounted on said support, and an operating handle flexibly engaging said tracer for moving the tracer over said master copy.

23. A pantograph having a universal swivel joint at its attached end, a drawing point and a tracer, and an operating handle flexibly engaging said tracer.

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