L. B. BENTON.

PARALLEL LINER.

APPLICATION FILED SEPT. 12, 1910.

1,066,576.

Patented July 8, 1913.

2 SHEETS—SHEET 1.

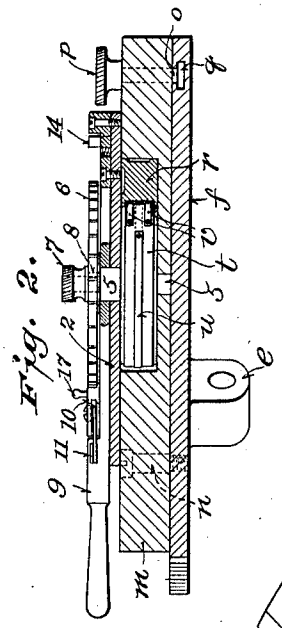


Fig. 2.

Fig. 1.

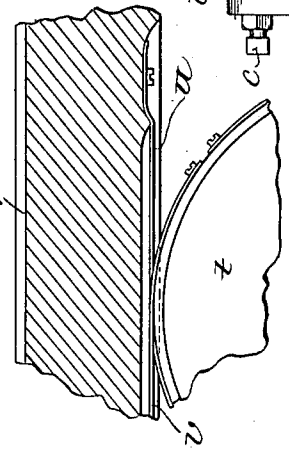


Fig. 7.

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2 SHEETS—SHEET 2.

Fig. 6.

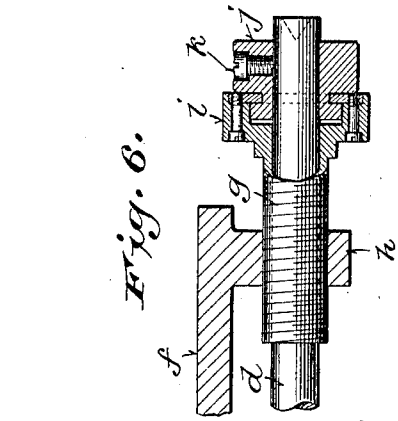


Fig. 3.

Fig. 4.

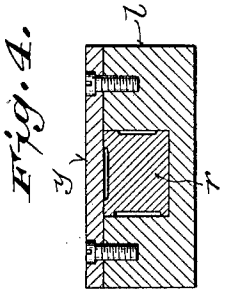
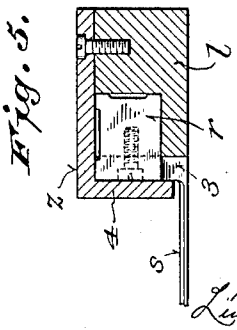


Fig. 5.



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UNITED STATES PATENT OFFICE.

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PARALLEL LINER.

1,066,576. Specification of Letters Patent. Patented July 8, 1913.

Application filed September 12, 1910. Serial No. 581,515.

To all whom it may concern:

Be it known that I, LINN BOYD BENTON, a citizen of the United States, residing at Plainfield, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Parallel Liners, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof.

This invention relates to instruments for cutting, drawing or marking parallel lines at various predetermined intervals apart. Its main object is to facilitate performing such work with accuracy and generally to improve the construction and operation of instruments of this class.

It consists in the construction, arrangement and combination of parts as hereinafter particularly described and pointed out in the claims.

In the accompanying drawing like characters designate the same parts in the several figures.

Figure 1 is a plan view of a device embodying the invention; Fig. 2 is a vertical cross section thereof on the line 2 2, Fig. 1; Fig. 3 is a plan view, similar to Fig. 1, showing the device without the cover plates, index or spacing wheel and operating lever; Fig. 4 is an enlarged cross section on the line 4 4, Fig. 1; Fig. 5 is a like section on the line 5 5, Fig. 1; Fig. 6 is an enlarged detail view, partly in section, of the device for adjusting the liner laterally with relation to the work or pattern support and Fig. 7 is an enlarged sectional detail.

For the purpose of illustration a lining device specially designed for use with engraving machines for cutting matrices for shaded letters or characters is herein shown and described, but with little or no change the device may be used for other purposes within the principle and scope of the invention.

Referring to the drawing and more particularly to Figs. 1, 2 and 3, *a* designates a horizontal pattern or work support, in the present case the bed of a matrix engraving machine on which the pattern to be traced is held. It is provided on the rear side with ears or lugs *b* in which cone pointed screws *c* are threaded in line with each other. A rod *d* is rotatably mounted at the ends on the points of these screws parallel with the adjacent side and upper face of the bed *a*, and on this rod is mounted by means of lugs or ears *e* as indicated by dotted lines in Fig. 3, a plate or block *f*, which forms a support for the lining mechanism. The rod *d* passing through the ears or lugs *e* on the underside of the plate or block *f*, also passes through a tubular adjusting screw *g*, which is threaded as shown in Fig. 6, in a lug or ear *h* on the under side of the plate or block *f*, and is provided with a head *i* which has a swivel connection with a grooved collar *j* fastened on said rod *d* by a set screw *k*.

A longitudinally channeled guide *l* has a transverse plate or offset *m*, which is pivotally connected with the upper side of the plate or block *f* by a screw or pin *n*. The guide *l*, which is thus capable of angular adjustment on the plate or block *f*, is fastened in adjusted position by a screw *o* passing loosely through a hole in the plate or offset *m* and provided at its upper end with a clamping nut *p* and at its lower end with a head working in an undercut curved groove *q* in the plate or block *f* concentric with the pivot screw or pin *n*.

A bar *r* preferably of square or rectangular form in cross section, is fitted to slide in the channel of the guide *l* and is provided at or near one end with a laterally projecting ruling arm *s*, preferably at right angles thereto, as shown.

In a recess formed in the upper part of the plate or offset *m* and intersecting at one side the channel in the guide *l*, is rotatably mounted a drum *t* which is connected by belts *u* and *v* winding in opposite directions thereon with the bar *r* adjacent to its ends. The bar *r* is formed on the side next to the drum *t* with a longitudinal groove or channel to receive the belts *u* and *v*, which are stretched near their ends as shown in Figs. 1 and 7 over raised bearings on the bar to hold them out of contact with said bar and the opposing walls of the guide *l* between said bearings and the drum and thus prevent friction and wear. A single belt *u*, leads from the drum *t* toward the end of the bar *r*, which is provided with the arm *s*, while two belts *v*, lead from said drum on opposite sides of the belt *u* toward the opposite end of said bar, where they are adjustably fastened thereto by a sliding block *w* fitted into a recess in the bar and threaded on an adjusting screw *x* arranged lengthwise of the bar, said block being formed

with one of the raised bearings above mentioned. By means of this screw the head of which is accessible through the adjacent end of the guide *l*, the belts *v* are stretched and kept taut so as to avoid any play or lost motion between the laterally movable ruling or guiding arm *s* and the rotary winding drum *t*, which operates it and determines its position.

The rotation of the drum *t*, the circumference of which is somewhat greater than the full traverse of the bar *r*, is limited to less than a complete revolution, so that each of the three belts *u* and *v* makes but a single wrap in winding thereon, and as they wind and unwind they are kept constantly in the same plane parallel with the guide *l*, tangent to the periphery of the drum and at right angles to its axis. This arrangement for converting rotary into reciprocating or rectilinear movement, avoids not only lost motion, but also any variation in the relative rate of speed of the drum and of the ruling arm, and it also avoids any strain which would cause excessive or unequal wear on the moving parts.

The channel in the guide *l* in which the sliding bar *r* works, and the recess in the plate or offset *m* containing the drum *t*, are covered as shown in Figs. 1, 4 and 5, by removable plates *y*, *z* and 2. That part of the guide *l* traversed by the end of the bar *r* to which the arm *s* is attached by an offset shank 3, as shown in Figs. 3 and 5, is cut away on one side of the channel and the cap plate *z* is formed with a depending flange 4 extending downwardly over that side of the channel and of the bar. The spindle 5 of the drum *t*, which is journaled in the plate or offset *m* and the cap plate 2, is reduced and threaded at its upper end, on which are removably fitted interchangeable index or spacing wheels 6 and a nut 7 for fastening said wheels thereon. Index or spacing wheels, having different numbers of notches in their peripheries for cutting, drawing or marking lines different distances apart, are furnished with each machine according to the nature and variety of the work to be done therewith. To prevent these wheels from turning on the spindle of the winding drum *t*, the shoulder or hub of the spindle is provided as shown in Figs. 2 and 3, with a pin 8, which fits into a corresponding hole in each of said wheels.

A lever 9 is pivoted or fulcrumed on the spindle 5 below the spacing wheel 6 and next to the cap plate 2 and is provided with a pivoted dog 10 adapted when oscillated to engage with the notches in said wheel one after another, and to turn the wheel forward step by step predetermined intervals corresponding with the distance between the notches and the throw of the lever. The dog 10 is held in yielding engagement with the spacing wheel by a spring 11. To prevent overthrow of the spacing wheel and backward movement thereof with the operating lever 9, a dog 12 is pivotally mounted on the cap plate 2 and is held by a spring 13 in yielding engagement with said wheel. The lever 9 has a projection 14 which is adapted by engagement with the heel of the dog 12 to hold said dog in engagement with a notch in the spacing wheel and prevent overthrow of said wheel as the lever is brought to the limit of its advance movement. This projection with the dog 12 serves as a stop to limit the advance movement of the lever and of the spacing wheel. A spring 15 connecting the lever 9 with the plate 2, tends to turn said lever forward and hold the projection 14 in engagement with the dog 12, as shown in Fig. 1. A stop 16 adjustably attached to the plate or offset *m* limits the backward movement of the lever 9 according to the spacing of the notches of the index or spacing wheel 6. The dogs 10 and 12 are provided with pins or projections 17 for throwing them by hand out of engagement with the index or spacing wheel 6, in order to move the arm *s* back to its initial or starting position toward the plate or offset *m*.

The lateral movement of the guiding or ruling arm *s* is limited by stop screws 18, threaded in the end plates 19 of the guide *l* in position to engage with the ends of the sliding bar *r*.

The device when used in connection with a matrix engraving machine is adjusted and operates as follows: A raised pattern defining the outline of the shaded character or design to be cut in the matrix is fastened in place on the bed *a*, the liner being turned up on the hinge rod *d* to readily admit of this. The liner is then turned down into place with the guide *l* and arm *s* in a plane parallel with the pattern and shifted laterally lengthwise of the rod *d* into approximately the proper position relative to the pattern by loosening the set screw *k* and sliding the instrument with the adjusting screw *g* on said rod, the guide *l* and arm *s* having been turned on the pivot screw or pin *n* and locked by the thumb nut *p* in the desired angular position on the supporting plate or block *f*, for cutting or tracing lines at the desired angle or in the desired direction across the face of the matrix or design. The set screw *k* being tightened to lock the collar *j* on the rod *d*, the liner is adjusted laterally to exact position by turning the adjusting screw *g*.

The liner being provided with an index or spacing wheel 6 having the required number of notches to produce the desired spacing of the lines to be cut or traced and the arm *s* being set with the parts in posi-

tion as shown in Fig. 1, to make the first cut or line, the tracing tool or follower of the engraving machine is moved along and in constant contact with the front edge of said arm from one side of the pattern to the other, its movement being limited by the raised shoulders or ribs of the pattern defining the outline of the character or design. This movement of the tracing tool or follower causes a corresponding movement of the cutting tool of the engraving machine across the face of the matrix in which the grooves for shaded lines are to be cut. The lever 9 is then drawn by the operator back against the stop 16 which has been adjusted to correspond with the spacing of the notches in the wheel 6. During this operation the wheel 6 is held in place by the dog 12 while the dog 10 is carried back into engagement with the next notch. The lever being released by the operator, is thrown forward by the spring 15 turning the spacing wheel 6 an interval exactly corresponding with the distance between adjacent notches in its periphery, and the arm *s* is moved laterally a corresponding distance forward or away from the plate or offset *m* by the belts *v* winding on the drum *t*. The tracing tool or follower is then moved back along the working edge of the arm *s* between the outline defining shoulders or ribs of the pattern, causing the cutting tool to make another groove in the matrix parallel with the first. These operations are repeated until the work is completed.

For cutting the shaded face of a matrix of a smaller size than another with a given pattern, the same pattern being employed for cutting various sizes, an index or spacing wheel 6 having fewer notches, spaced farther apart, is used, while for cutting the shaded face of a matrix or design of larger size than another with the same pattern, an index or spacing wheel having a greater number of notches closer together, is used.

The device may be used for cutting, drawing or tracing with any kind of instrument, parallel, vertical, horizontal or oblique, continuous, broken, straight, curved or zigzag lines, directly or indirectly, on paper or other material placed on the bed *a* or other suitable support.

Various changes in the details of construction and arrangement of parts of the device may be made to adapt it to the various uses and kinds of work to which it is applicable, without departure from the principle and scope of the invention.

I claim:

1. In a parallel liner the combination of a guide, a ruling arm, means slidably connecting said arm with the guide, a rotary drum mounted on one of said parts, reversely winding belts connecting said drum with the other part and stretched in opposite directions between the drum and said other part constantly parallel with said guide and tangent to the periphery and at right angles to the axis of the drum, and means for turning said drum through predetermined angles.

2. In a parallel liner the combination of a guide, a ruling arm, means slidably connecting said arm with the guide, a rotary drum mounted on one of said parts and adapted to make less than one revolution to the full traverse of said ruling arm, reversely winding belts connecting the drum with the other part, and constantly tangent to the periphery and at right angles to the axis of the drum, two of said belts leading in one direction and an intermediate belt leading in the opposite direction from the drum to said other part, and means for turning said drum through predetermined angles.

3. In a parallel liner the combination of a guide, a longitudinally slidable member fitted to said guide, a ruling arm attached at one end to said slidable member and movable therewith at a constant angle to said guide, a rotary drum mounted on said guide, reversely winding belts connecting the drum with said slidable member and leading from the drum in opposite directions constantly tangent to its periphery and at right angles to its axis, a spacing wheel attached concentrically to said drum, a lever fulcrumed concentrically with said wheel and drum and provided with a dog for intermittently turning said wheel and moving the ruling arm predetermined distances, and an adjustable stop for determining the throw of said lever according to the graduation of the spacing wheel.

4. In a parallel liner the combination of a guide, a longitudinally slidable member fitted to said guide, a ruling arm attached at one end to said slidable member and movable therewith at a constant angle to said guide, a rotary drum mounted on said guide, reversely winding belts connecting said drum and slidable member and leading from the drum in opposite directions constantly at right angles to its axis and tangent to its periphery, one of said belts having an adjustable attachment to said slidable member for taking up lost motion, and means for turning said drum and moving the ruling arm predetermined distances.

5. In a parallel liner the combination of a relatively stationary guide, a ruling arm, means slidably connecting said arm with said guide, a rotary drum mounted on one of said slidably connected parts, reversely winding belts connecting said drum with the other of said parts, a spacing wheel for turning said drum, a dog arranged to prevent reverse rotation and overthrow of said wheel, and a lever provided with a dog for

turning said wheel forward intermittently and having a projection arranged to cooperate with the first dog to hold said wheel and drum immovable at the limit of the advance movement of the lever.

6. In a parallel liner the combination of a guide, a ruling arm, means slidably connecting said arm with said guide, a rotary drum mounted on one of said slidably connected parts, reversely winding belts connecting said drum with the other of said parts, a spacing wheel connected with said drum, a lever pivoted concentrically with said wheel and provided with a dog for turning the same forward, a spring tending to turn said lever forward, and an adjustable stop for limiting the throw of said lever.

7. In a parallel liner the combination of a guide, a ruling arm, means slidably connecting said arm with said guide, a notched spacing wheel removably mounted on one of said slidably connected parts and having an actuating connection with the other, a lever pivotally mounted concentrically with said wheel and provided with a dog adapted by engagement with the notches in said wheel to turn the same through predetermined angles, and an adjustable stop to control the throw of said lever to correspond with the graduation of said spacing wheel.

8. In a parallel liner the combination of a guide, a ruling arm, means slidably connecting said arm with said guide, a notched spacing wheel removably mounted on one of said slidably connected parts and having an actuating connection with the other, a lever pivoted concentrically with said wheel and provided with a dog adapted by engagement with the notches therein to turn the same forward intermittently, a dog adapted to be engaged and held by said lever in engagement with a notch of said wheel at the limit of the advance movement of the lever, and an adjustable stop for limiting the backward movement of said lever.

9. In a parallel liner the combination of a guide, a ruling arm, means slidably connecting said arm with said guide, a notched spacing wheel removably mounted on one of said slidably connected parts and having an actuating connection with the other, a lever pivoted concentrically with said wheel and provided with a dog adapted to engage with the notches in said wheel, a spring tending to turn said lever forward, a dog adapted to be engaged and held by said lever in engagement with a notch of said wheel at the limit of the advance movement of the lever, and an adjustable stop for limiting the backward movement of said lever.

10. In a parallel liner the combination of a longitudinally channeled guide, a bar fitted to slide lengthwise and held against turning in the channel of said guide and provided with a ruling arm projecting transversely therefrom, a rotary drum mounted on said guide, belts connecting said bar adjacent to its opposite ends with said drum, and means for turning said drum through predetermined angles and locking it with said arm.

11. In a parallel liner the combination of a longitudinally channeled guide, a bar fitted to slide endwise and held against turning in the channel of said guide and provided with a laterally projecting arm, a rotary drum mounted on said guide, reversely winding belts connecting said drum with said bar adjacent to the ends thereof, a spacing wheel connected with said drum, a lever pivoted concentrically with said wheel and provided with a dog adapted to engage with and intermittently turn the wheel and drum, and stops one of which is adjustable for limiting the movement of said lever.

12. In a parallel liner the combination of a longitudinally channeled guide, a bar fitted to slide lengthwise in said guide and provided with a laterally projecting arm, a rotary drum mounted on said guide, reversely winding belts connecting said drum with said bar adjacent to the ends thereof, a notched spacing wheel removably attached to said drum concentrically therewith, a lever pivoted concentrically with said wheel and provided with a dog adapted by engagement with the notches therein to turn the same intermittently forward, and stops one of which is adjustable for limiting the movement of said lever.

13. In a parallel liner the combination of a longitudinally channeled guide, a bar fitted to slide lengthwise in said guide, a rotary drum mounted on said guide, reversely winding belts connecting said drum with said bar adjacent to its ends, one of the belts being adjustably attached to the bar, a notched spacing wheel removably fastened to said drum concentrically therewith, a lever pivoted concentrically with said wheel and provided with a dog adapted by engagement with the notches therein to turn the same intermittently forward, a dog adapted to be held by said lever in engagement with a notch in said wheel and to hold the same immovable at the limit of the advance movement of the lever, and an adjustable stop for limiting the backward movement of the lever.

14. In a parallel liner the combination of a guide having a longitudinal channel, a bar of angular cross section fitted to slide lengthwise in said channel and having a longitudinal channel in one side and raised bearings adjacent to the ends of said channel, a ruling arm attached to said bar at an angle thereto, a rotary drum mounted on said guide with its periphery projecting slightly into the channel in said bar, re-

versely winding belts fastened at one end to said drum and at the other to said bar and stretched over said bearings from which they pass through the channel in said bar to the drum and are held out of contact with the opposing walls of the bar and guide, and means for turning said drum and advancing said ruling arm predetermined intervals.

In witness whereof I hereto affix my signature in presence of two witnesses.

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Witnesses:
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."