No. 637,263. Patented Nov. 21, 1899.

A. E. JACOBS.

REPRODUCING DEVICE.

(Application filed July 20, 1899.)

(No Model.) 3 Sheets—Sheet 1.

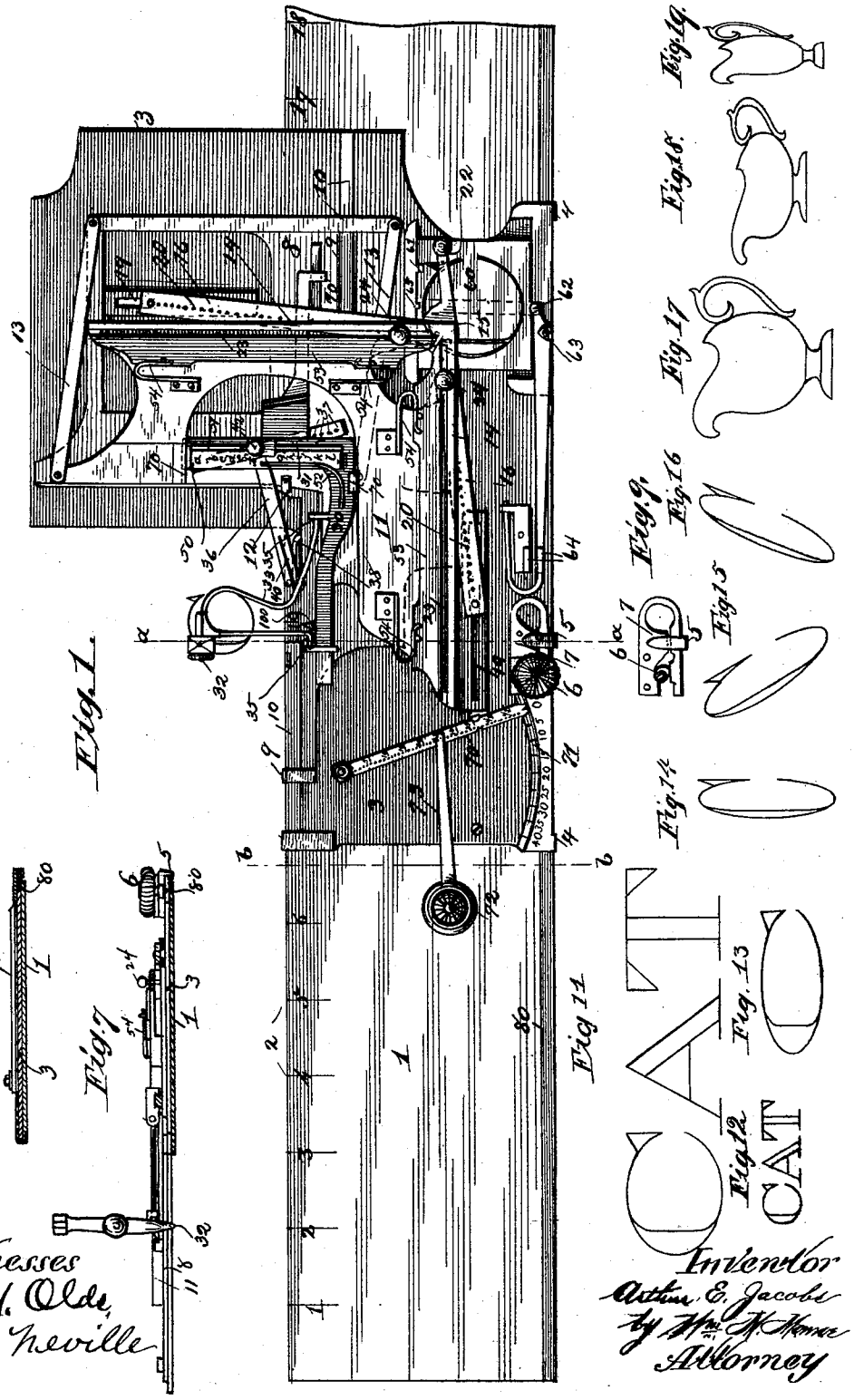


Fig. 1.

Fig. 8.

Fig. 7.

Fig. 11.

Fig. 9. Fig. 16. Fig. 15. Fig. 14. Fig. 13. Fig. 12.

Witnesses
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(No Model.) 3 Sheets—Sheet 2.

Fig. 3

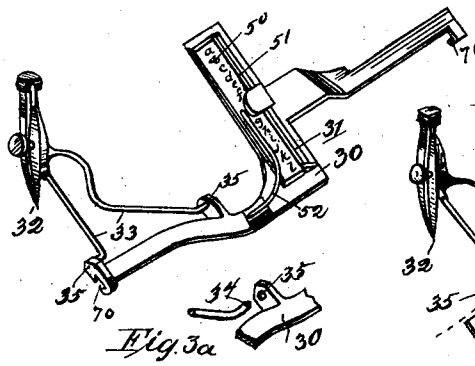


Fig. 3a

Fig. 2

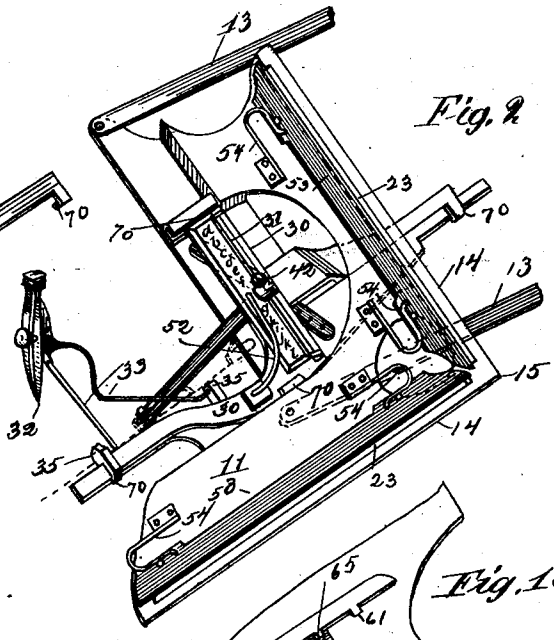


Fig. 4.

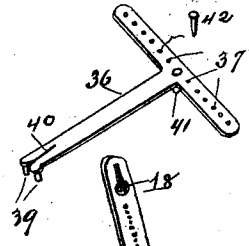


Fig. 10.

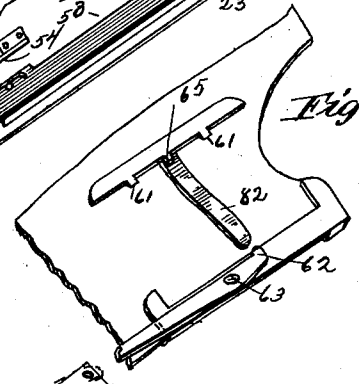


Fig. 6

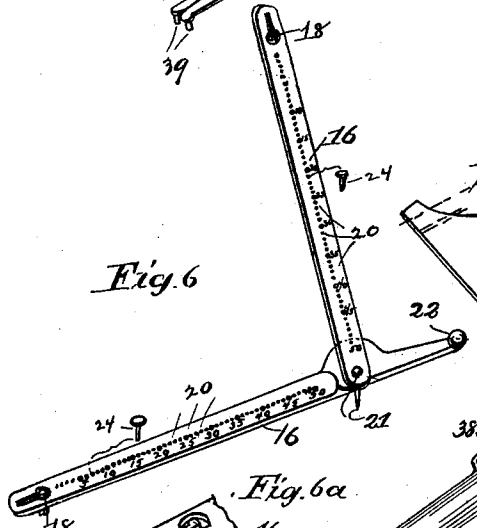


Fig. 6a

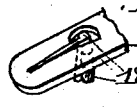


Fig. 5

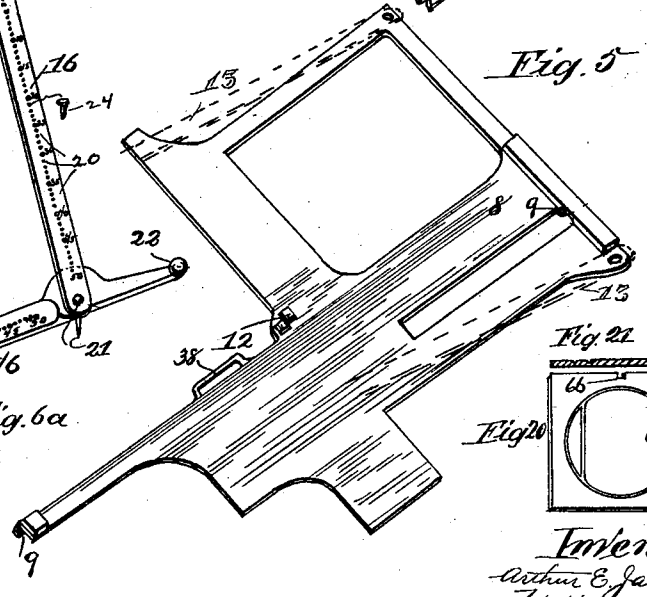


Fig. 21

Fig. 20

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No. 637,263. Patented Nov. 21, 1899.

A. E. JACOBS.

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(No Model.) 3 Sheets—Sheet 3.

Fig. 22

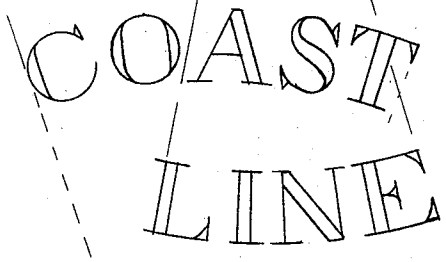


Fig. 24.

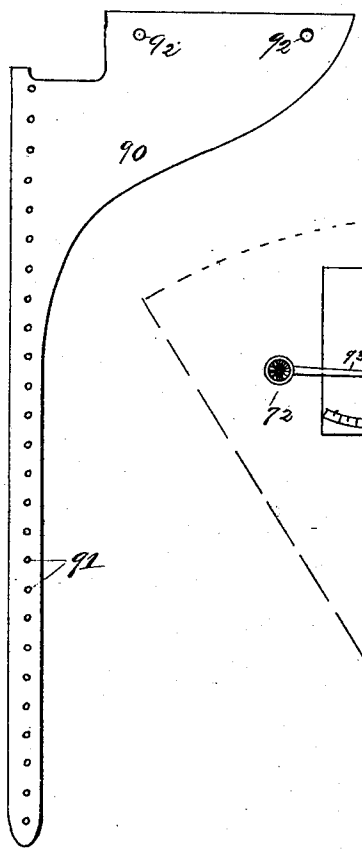


Fig. 23.

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UNITED STATES PATENT OFFICE.

ARTHUR E. JACOBS, OF CLEVELAND, OHIO.

REPRODUCING DEVICE.

SPECIFICATION forming part of Letters Patent No. 637,263, dated November 21, 1899.

Application filed July 20, 1899. Serial No. 724,513. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR E. JACOBS, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, State of Ohio, have invented certain new and useful Improvements in Reproducing Devices, of which I hereby declare the following to be a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to reproducing devices whereby letters or other designs can be directly copied from a model upon paper or metal with such variations of size or proportions as may suit the taste or convenience of the draftsman. In a former application I have described a similar device in which letters or other designs could be reproduced from a model in great variety of modifications in size and proportion, but in which the vertical and horizontal lines were maintained as in the model. In this invention, however, I add to the other features of the device mechanism which acts upon the pen to produce a diagonal movement thereof, and hence will change the vertical lines of the model to oblique lines in the reproduction. I also provide means whereby curved lines of letters can be written as well as straight.

My invention further consists in many alterations in the arrangement and mode of operation of the various parts and construction of details, as hereinafter described, shown in the accompanying drawings, and specified in the claims.

In the accompanying drawings, Figure 1 is a plan view of the device. Fig. 2 is a perspective view of the upper sliding plate. Fig. 3 is a detail of the penholder and sliding slotted plate to which the pen is attached. Fig. 3ª shows a detail view of the spring attachment for the pen. Fig. 4 is a perspective view of the device whereby the oblique movements of the pen are controlled. Fig. 5 is a detail of the intermediate or second sliding plate. Fig. 6 is a perspective view of the perforated arms which control the vertical and horizontal movements of the pen. Fig. 6ª is a detail in perspective of one of the self-adjusting guide-pins for the arms. Fig. 7 is a transverse section on line line *a a*, Fig. 1. Fig. 8 is a transverse section and elevation on line *b b*, Fig. 1. Fig. 9 is a detail of clamp for the base-plate. Fig. 10 is a detail view of the spring-releasing device and lock for the model. Fig. 11 represents a word written by the machine from models of the letters. Fig. 12 shows a word written smaller from the same models. Figs. 13, 14, 15, and 16 show modifications made from one model by the machine, and Figs. 17, 18, and 19 represent a design and modifications made from one model by the machine. Fig. 20 is a detail view of the model-plate, and Fig. 21 is a transverse section thereof. Fig. 22 shows words written in curved lines, and Figs. 23 and 24 show a swinging plate by means of which this is effected.

In the views, 1 represents a draftsman's straight-edge or ruler, upon which are mounted all the working parts of the device. The edge of this ruler is graduated at 2 for the purpose hereinafter described, and the opposite edge is provided with a narrow raised strip 80.

The various parts of the device and their relative movements may be described as follows:

3 is a base-plate which slides upon the blade of the ruler and is secured to said strip 80 by means of guides 4, the clamp 5 being adjustable by means of the cam-pin 6 and slotted plate 7, so that the base-plate 3 can easily be released from the ruler. Sliding longitudinally upon the base-plate is the plate 8, by means of which the horizontal movements of the pen are obtained. This is secured by means of horizontal guides 9 and 10. Upon this plate is mounted the vertically-moving plate 11, moving in a guide 12 and movably secured to the intermediate plate by means of parallel bars 13 13. Two sides 14 of this plate form a right angle at 15.

It will readily be seen that by means of the two plates 8 and 11 moving in opposite directions a universal movement is obtained for transmission to the transcribing-pen. These movements are controlled by means of the bars 16, pivoted together at one end at 21 and supplied with the pins 18 at their opposite or inner extremities. These pins enter

the slotted guide 19 in the base-plate 3, which lie parallel to the sides 14 of the upper plate 11.

The bars 16 are perforated alike at regular intervals at 20, a scale being engraved thereon, so as to be easily seen. One end of one of the bars is extended to form a handle at 22, and a tracing-point 21 is secured at the connecting-point of the bars in a position to follow the model, which is placed directly underneath.

In order to communicate movement to the two moving plates by means of the bars, slots 23 are made in the upper plate adjacent to and parallel with the edge 14 thereof. In these slots move the pins 24, which are set wherever desired in the holes 20.

It will be seen that as the handle 22 is moved to trace a letter or design the pins moving in the slots in the upper plate will communicate an equal amount of movement to each side of the plate when they are set at equal distances from the inner pins 18. When an unequal movement is desired, the pin farthest from the inner extremity of its respective bar will communicate the greatest degree of movement and the pin nearest the inner point of its respective bar will afford the least degree of movement. Thus letters or designs can be narrowed in width, as in Fig. 14, or lowered in height, as in Fig. 13, at pleasure.

In Fig. 11 is seen a word composed of letters of the same or nearly the same size as in the model and in similar proportions. In Fig. 12, both pins 24 being moved alike nearer to the inner ends of their respective bars, the degree of movement is lessened in each direction and the letters are made smaller without changing their proportions. In Figs. 17, 18, and 19 similar effects are seen with a design of a large pitcher for a model, a gravy-boat and cream-pitcher being produced therefrom.

In order to obtain slanting letters, as shown in Figs. 15 and 16, I employ special mechanism to move the pen in oblique directions instead of following absolutely the vertical movements of the sliding plate 11. This mechanism is seen distinctly in Figs. 2, 3, and 4 in detail, where 11 is the upper sliding plate, upon which is mounted in horizontal guides the sliding plate 30, moving in guides 70, and is provided with the slot 31 at right angles to the direction of the guides. To the plate 30 is attached the pen 32 by means of spring connection 33, the shape of the spring being such that the tapered extremities 34 can be easily withdrawn from recesses in keepers 35.

As seen in Figs. 2 and 4, the oblique movement is caused by the controller 36, placed directly underneath the plate 30. This controller is a T-shaped piece of metal, the cross-arm being perforated at equal intervals at 37 and the extremity of the other arm being mounted in the horizontal guide 38 by means of pins 39 upon either side thereof. To make the grip of these pins positive and insure a perfect bearing, the extremity of the arm is slit at 40 to give a spring action as the pins are separated to move on either side of the guide. This constant spring action maintains a perfect fit free from any loose motion.

The cross-bar of the T-shaped controller is pivoted centrally at 41 to the plate 11, and a pin 42, passing through the slot 31, is fixed in one of the perforations 37. The effect of this construction upon the movements of the pin is readily seen when the plate 11 moves upward. The pen will be swung away from the vertical to either side, according to which side of the center of the bar the pin is placed, since the pins at the extremity of the longer arm prevent vertical motion of that part and impart a rocking movement to the T-shaped bar upon its pivot.

To prevent loose motion in the pin 42 and slot 31, a spring-actuated plate 50 is set partially over the slot and is provided with a beveled edge 51, so that the pin will press it back when entering the slot and the spring 52 will press the edge against the pin and insure a tight fit and prevent loose motion. For a vertical movement the pin 42 is passed through the pivotal point 41 into the plate beneath. The slots 23 in the plate 11 are also closed by similar plates 53, actuated by springs 54 for the same object.

The model 60 is seen to be a removable plate, in the trace of which the design is deeply engraved to facilitate tracing with the metal point. This plate is retained by means of keepers 61 at the top and by the spring-catch 62, pivoted at 63, and released by the thumb-pieces 64, so that simply pinching them together will remove the catch. A small lug 65, entering the recess 66 in the model, centers it. An ejecting-spring 82 will throw out the model as soon as it is released from the catch 62.

The spacing device is similar to that shown in my former application, but is not separate. Here 70 is the pivoted index-finger, 71 the graduated arc, and 72 is a weight connected by means of the arm 73 with the index-finger. This weight is placed upon the ruler and remains there while the base-plate is being moved to the required position. The index-finger and weight are then slid forward till the finger points to zero in the graduated arc, when it is ready for the next spacing.

In Fig. 23 is seen an additional plate 90, to which the base-plate 3 may be attached when it is desired to write words in curved lines, as is often most convenient in map-lettering or engraving. As seen in the figure, the plate 90 is provided with an extended arm perforated at regular intervals at 91. The pivotal point can be made at any one of these perforations, as at *z*, when the entire plate 90 and the machine above can be swung to write the letters in the arc of a circle, as shown in Fig. 22. The plate 90 can be detachably secured to the base-plate 3 by means of pins 92, and the positions of the plates can be reversed, if

desired, to reverse the curve, as in Fig. 22. In this case the spacing-weight 72 will act as before, but will rest directly upon the paper instead of on the ruler-blade, which is dispensed with.

I do not confine myself to the use of a pen for reproducing the design, but any kind of a tracing-point or graving tool or wheel or etching-tool may be employed. No detail of this character limits the scope of my invention.

I claim—

1. In a reproducing device the combination with a base-plate and oppositely-moving plates mounted thereon, the upper of said plates being provided with two sides forming a right angle between them and with slots parallel to said sides, of a pen actuated by said plates, and means for moving said plates to produce predetermined movements in the pen consisting of, a model adapted to be followed by a tracing-point, a pair of arms pivoted together at one extremity at which pivotal point the said tracing-point is inserted and provided at their other extremities with guide-pins moving in slots in the base-plate and also provided with perforations at regular intervals, pins adapted to be inserted in predetermined perforations in said arms and passing through the slots in said upper plate whereby positive movements are given the said plate, substantially as described.

2. In a reproducing device, the combination with a base-plate provided with slots at right angles to each other, of upper and intermediate plates thereon, the said plates being adapted to move in opposite directions and the said upper plate being provided with two slots forming a right angle between them, and parallel to the said slots in the said base-plate, arms pivoted together at one of their extremities and perforated at regular intervals and provided with pin-guides in their other extremities adapted to move in the slots in the said base-plate, a tracing-point at the pivotal connection of the said arms, pins adapted to pass through the slots in the upper plate and inserted in predetermined perforations in said arms, a pen actuated by said movable plates, and means for changing the vertical movements of said pen to oblique movements, substantially as described.

3. In a reproducing device a pen and a base-plate in combination with oppositely-moving plates mounted upon said base-plate and constructed and arranged to afford vertical and horizontal movements to said pen, a model and tracing-point, and mechanism adapted to transmit the vertical and horizontal movements of said tracing-point to said plates in any predetermined degree of either, and means for changing the vertical movements of said pen to oblique movements, substantially as described.

4. In a reproducing device the combination with a pen and tracer and means for imparting to the pen vertical and horizontal movements of the tracer, of means for changing the vertical movements of the tracer to either right or left oblique movements of the pen, substantially as described.

5. In a reproducing device the combination with a pen and oppositely-moving plates adapted to impart vertical and horizontal movements to the pen, of means for changing the said vertical movements to alternately right or left oblique movements at pleasure, consisting of a vertically-slotted plate to which said pen is attached, the said plate being mounted in horizontal guides in the vertically-moving plate aforesaid, and a controlling device for said pen-carrying plate, consisting of a T-shaped piece pivoted to said vertically-moving plate at the intersecting point of its arms, provided with a horizontal guide in the horizontally-moving plate at the extremity of the longer arm, with perforations in the cross-arm at regular intervals and a pin passing through the vertical slot in the pen-carrying plate and inserted in one of said perforations in the cross-arm of the controller, substantially as described.

6. In a reproducing device, in combination, a base-plate, an intermediate plate adapted to slide horizontally upon the base-plate, and an upper plate adapted to slide vertically upon the intermediate plate, a vertically-slotted pen-carrier mounted in horizontal guides upon the vertically-moving plate, and a T-shaped controlling device constructed and arranged to change the vertical movements of the pen to oblique movements, said controlling device being pivoted upon the vertically-moving plate at the intersection of its arms, and having the cross-arm perforated at regular intervals and the extremity of the other arm secured in a horizontal guide in the horizontally-moving plate.

7. In a device for the purpose described, slotted plates adapted to receive guiding-pins therein, in combination with spring-actuated keepers for said pins, consisting of a spring-pressed side for each slot, substantially as described.

8. In a reproducing-machine, a base-plate mounted upon a ruler-blade in guides, a clamping device for the plate and a spacing device, said spacing device consisting of a graduated arc upon the base-plate, an indicating-finger, pivoted upon the base-plate, the said finger being perforated at regular intervals and marked with a scale, and a weight adapted to rest upon the rear blade and connected to the index-finger by means of an arm and pin at the extremity thereof, substantially as described.

9. In combination with a pen for use in a machine of the character described, means for removably securing said pen to one of the moving parts of the device consisting of a spring to which the pen is secured and keeper provided with conical depressions into which the pointed extremities of the spring are secured, substantially as described.

10. In a reproducing device, a grooved

model-plate adapted for insertion in said device, in combination with a fastening device, consisting of a spring-actuated lever, constructed and arranged to engage one edge of said plate, when in position and an automatic releasing device, substantially as set forth.

Signed at Cleveland, Ohio, this 13th day of July, 1899.

ARTHUR E. JACOBS.

In presence of—
WM. M. MONROE,
JOHN H. BEHR.