Apr. 24, 1923.

1,452,858

R. WETZER ET AL

ENGRAVING MACHINE

Filed Aug. 11, 1921

3 Sheets-Sheet 1

Machine Fig. 1.

Machine Fig. 3.

Machine Fig. 2.

Machine Fig. 4.

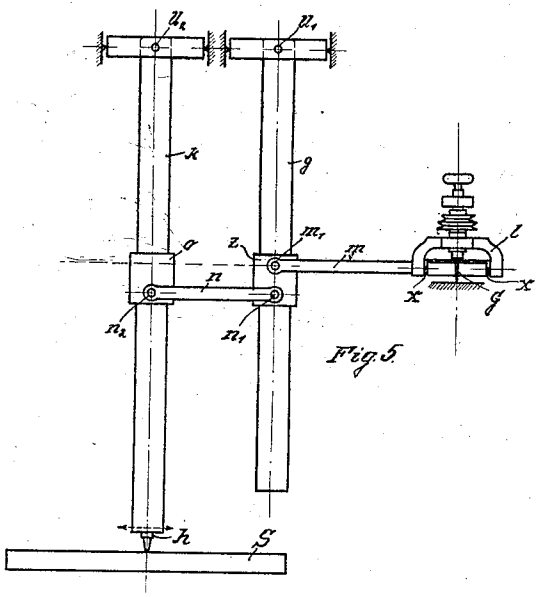


Fig. 5.

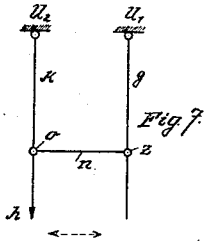


Fig. 7.

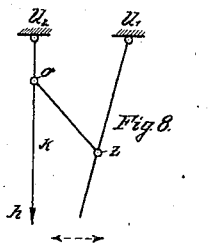


Fig. 8.

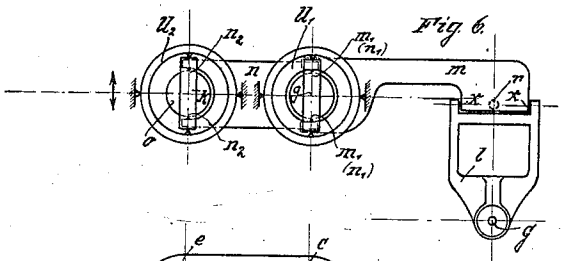


Fig. 6.

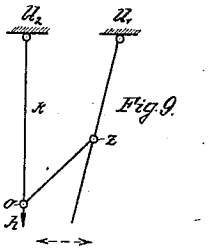


Fig. 9.

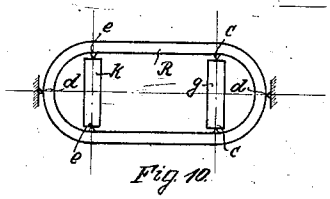


Fig. 10.

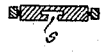


Fig. 12.



Fig. 11.

INVENTORS

Rudolf Wetzer

Curd Nube

By Otto Munk

their ATTORNEY

Apr. 24, 1923. **1,452,858**

R. WETZER ET AL

ENGRAVING MACHINE

Filed Aug. 11, 1921 3 Sheets-Sheet 2

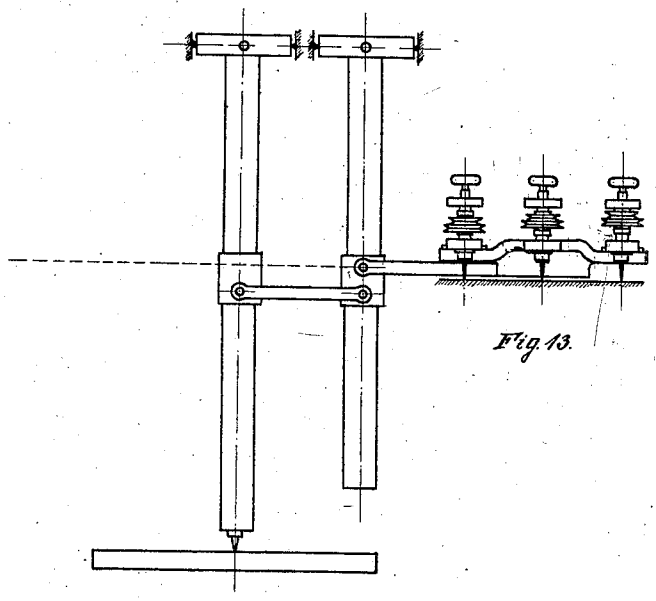


Fig 13.

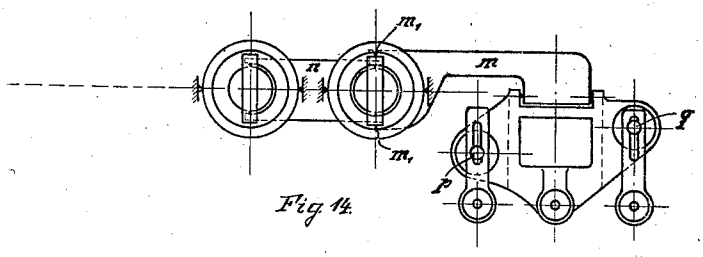


Fig 14.

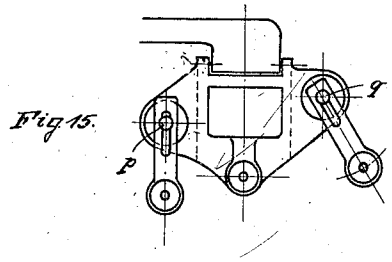


Fig 15.

INVENTORS
Rudolf Wetzer
Curd Nube
By Otto Munk
their ATTORNEY

Apr. 24, 1923. **1,452,858**

R. WETZER ET AL

ENGRAVING MACHINE

Filed Aug. 11, 1921 3 Sheets-Sheet 3

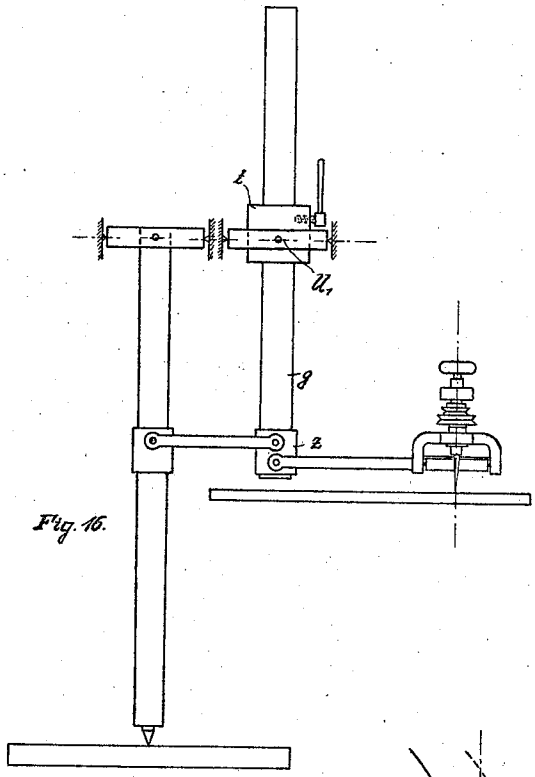


Fig. 16.

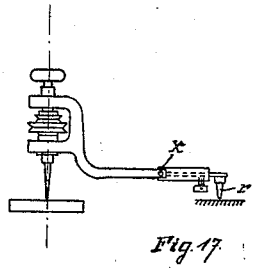


Fig. 17.

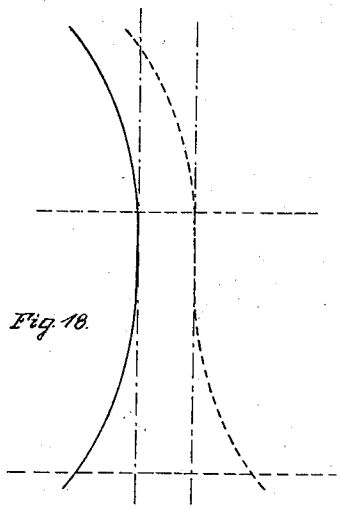


Fig. 18.

INVENTORS
Rudolf Wetzer
Curd Nube
By Otto Munk
their ATTORNEY.

Patented Apr. 24, 1923. 1,452,858

UNITED STATES PATENT OFFICE.

RUDOLF WETZER, OF PFRONTEN, AND CURD NUBE, OF OFFENBACH-ON-THE-MAIN, GERMANY.

ENGRAVING MACHINE.

Application filed August 11, 1921. Serial No. 491,357.

To all whom it may concern:

Be it known that we, RUDOLF WETZER and CURD NUBE, citizens of Germany, residing respectively at Pfronten, Bavaria, and Offenbach-on-the-Main, Hesse, Germany, have invented certain new and useful Improvements in Engraving Machines (for which we have filed application in Germany on May 22, 1919, Patent No. 318,882, dated May 23, 1919); and we do hereby declare the following to be a full, clear, and exact description of the invention such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to improvements in engraving machines of the type in which the tracing pencil is suspended so as to be capable of swinging in all directions and is connected with an arm carrying the engraving-tool, and the object of our invention is to provide certain changes in the construction of these machines, as hereinafter set forth, with a view of eliminating certain disadvantages inhering in machines of the class referred to.

In describing our invention we refer to the drawing herewith in which Figures 1, 2, 3 and 4 are examples of the relative arrangement of letters, as produced by the employment of the old machines of the type referred to and, in comparison therewith, show the character of such arrangement attainable with machines improved as herein set forth. Figure 5 is a front-view of my improved construction and Figure 6 a plan or top-view of the same. Figures 7, 8 and 9 are diagrams illustrating the arrangement and action of certain parts of the machine hereinafter more particularly referred to. Figure 10 is a plan or top-view of a somewhat modified construction of our improved machine, likewise hereinafter more particularly referred to. Figure 11 illustrates letters obtainable by the employment of our improvements, also referred to hereinbelow. Figure 12 is a diagram in transverse section on the line x—x of Figure 6 and will be likewise hereinafter referred to. Figures 13, 14, 15 of which Figures 13 and 14 correspond with Figures 5 and 6, illustrate a modified construction of our machine, though within the spirit and scope of our invention, where three engraving spindles have been provided instead of one. Fig. 16 is an elevational view of a further modified form of the invention; Fig. 17 is a detail in side elevation of the arm carrying the engraving tool, and Fig. 18 is a diagram hereinafter referred to.

In the engravings made with engraving machines, as constructed heretofore, the height of the letters would always bear a certain proportion to the width of the letters and that proportion would correspond with the original pattern or stencil plate.

As a consequence it would frequently occur, for instance, in cases where small shields were to be made which were not to exceed a certain length, that the engraving had to be in very small type, as shown by way of example in Figure 1 of the drawing herewith, while in order to be more distinct the types in a shield of the same length should be somewhat higher, as indicated in Figure 2. The case would be reversed in the example illustrated by Figure 3 where the letters, to make a better appearance, if of the same height should be greater in width, as shown in Figure 4.

With a view of overcoming this disadvantage we design the hereinafter described engraving-machine on the swinging-system which permits of producing with the same stencil-plate types distorted in the sense indicated.

In machines of the class alluded to, as in use heretofore, a tubular rod k is provided, suspended, swinging in all directions from a universal joint U_2, the said rod carrying a telescopically movable tracing-pencil h and being attached by means of a movable and adjustable sleeve o to an arm comprising two members m, l of which the member l carries the engraver G which may be a chisel or cutter. The members m and l may be jointed to each other at x.

In our invention the said rod k which serves for the tracing of the stencil-pattern, is not directly connected to the arm m, l, but through the medium of another tubular rod g which is also suspended swingingly in all directions by means of a universal joint U_1. Both rods k, g are connected with each other by a guiding bar or plate n which has one end connected at n_1 with a sleeve z, movable and adjustable on the rod g, and the other end connected at n_2 with the movable and adjustable sleeve o on the rod k. The arm

m, l has its member m connected to the sleeve z at m_1.

The device, as described, operates in the following way: When the distance between the working points n_1 and n_2 of the bar or plate n is, as shown in Figures 5 and 7, equal to the distance between the suspending points of the rods g and k, the transfer of the stencil-pattern S traced by the pencil h takes place in the same proportion and exactly in the same way as if the rod g carried the tracing pencil.

If, however, the said distances are unequal as, for instance, when the sleeve o is, as shown in Figure 8, moved upward on the rod k towards the universal joint U_2, only those of the lines traced by the pencil h will be transferred in the proportion of the stencil-pattern which are perpendicular to the plane of the sheet of drawing containing Figure 5, indicated in Figure 6 by an arrow in full lines, while all other lines which are in the direction of the arrows shown in Figures 5 and 8 in dotted lines, are transferred shortened, the shortening being the greater the nearer the sleeve o is to the universal joint U_2.

When the sleeve o is, as shown in Figure 9, moved downward on the rod k, the result will be just the reverse. The lines which were previously transferred shorter will now be transferred longer.

During the movement perpendicular to the plane of the sheet of drawing containing Figures 7, 8, 9 the members g, k, n, act as if they were rigidly connected and, therefore, in all these cases the movement from o will be the same as if the pencil h were attached to the rod g.

A somewhat modified construction is illustrated in a plan or top-view in Figure 10. In this construction the rods k and g are not suspended from separate universal joints. The two rods in this case are supported in the frame B at e and c so as to be capable of swinging in the same direction in the frame R which, in turn, is swingingly supported at d transverse to the swinging direction of the rods g and k.

In practically carrying out our invention the following should be noticed in addition to what has been set forth herein with respect to the production of distorted letters, as illustrated in Figures 1 to 4: In using stencil-plates of the customary size there is room in the stencil-plate-holder for about twenty letters only. By decreasing the width of the stencil-plates in proportion to their height, as illustrated by the letters marked a and b in Figure 11, there will be ample room in the said holder for 30 letters. By using the position of the sleeve o shown in Figure 9 the width of the letters will by the transfer be enlarged and accordingly the engraving appear normal.

In all engraving machines of the class referred to distortions are, as hereinafter explained, liable to occur in as much as strokes perpendicular to the plane of the sheet of drawing containing Figure 5 do not become precisely parallel, when they are drawn in the middle and on the two sides of the pattern-holder S, and to correct such distortions and compensate therefore we provide in the forepart of the arm m a slot s wherein a pencil or point r may be moved back and forth and held in adjusted position as indicated in Fig. 17. Following is a description of the operation of this part of the invention.

Assuming the point r to be in the plane indicated by the line x—x in Fig. 6, with every movement of the tracing-pencil h the point m, (Figure 5) moves on an imaginary ball-cup the center of which is identical with the center of the universal joint U_1. Accordingly, this point ascends whenever the tracing-pin h is brought out of its particular position and the farther the movement of the said pin h extends and the larger the radius of the imaginary sphere U_1, m_1 is, the larger is the engraving. The distance from m_1 to the point of the cutter being invariable however, the cutter will, whenever the pencil h moves in perpendicular direction to the plane of the sheet containing Figure 5, have to make a movement which somewhat diverges from the straight line, as shown, greatly exaggerated in full lines in Figure 18.

Now, when the pencil is not, as assumed and as shown in Figure 6, in the line x—x, but is moved rearwardly thereof as shown in Figure 17, which is a side-view, the raising and lowering of the fulcrum x—x would with the above-mentioned movement of the pencil h cause the distortion shown in dotted lines in Figure 18, if the distortion just described and shown in full lines in Figure 18 would not at the same time come out. It will be thus understood that the two distortions in the forepart compensate each other if they are of corresponding extent.

Now, the area which is covered by the tracing-pin h is so positioned that only that portion is used in which those distortions do compensate each other.

It will be clear from the foregoing that by a suitable adjustment of the pencil r for each respective size of the cut, the distortion may be made to disappear. The larger the engraving desired, the more should the pencil r be taken back.

For the manufacture of articles in quantities I prefer the modified construction shown in Figures 13, 14, 15. In this modification there may be provided a plurality, say three spindles each of which may be adjusted for a working-piece, independent of the others by a movement and swing about the pin p or, q. While in Figure 14 the

three spindles are supposed to work in one line, in Figure 15 one of the spindles, for example the one on the left side, is moved forward and the one on the right side is swung aside at a suitable angle.

In the modification illustrated in Figure 16 the sleeve z is not movable on its rod, but is rigidly attached thereto. But the rod g, with the sleeve z thereon, is movable with the sleeve or collar t provided in the joint U_1, and may be made secure in any position. This arrangement permits of an increased scope of use of the machine, inasmuch as larger objects intended to be engraved upon are not obstructed by the lower portion of the rod g, as would be the case with the form illustrated in Figure 5.

We claim:—

1. An engraving machine, including a pair of normally parallel freely movable suspended members, one of said members adapted to carry a tracing point, a tool holder movably connected to the other of said members, and means interconnecting said members and adjustable to vary the relative position of said members to one another.

2. An engraving machine, including a pair of freely movable suspended members, one of said members adapted to carry a tracing point, a sleeve on each member, means engaging said sleeves for adjustably connecting said members to one another, a tool holder, and means for movably connecting the tool holder to the sleeve of the member not carrying the tracing point.

3. An engraving machine, including a pair of normally parallel supports, universal joints in which said supports are suspended, means interconnecting said supports and adapted to vary the angular relation between the same, a tool holder, and means for movably and adjustably connecting said tool holder to one of said supports.

4. An engraving machine, including a pair of relatively adjustable freely movable members, one of said members adapted to carry a tracing point, a tool holder, an arm movably connecting said tool holder to the movable member not carrying the tracing point, and means adjustable in the arm to compensate for the tendency of the machine to distort letters during the engraving operation.

5. An engraving machine, including a pair of relatively adjustable freely movable members, one of said members adapted to carry a tracing point, a tool holder, an arm movably connecting said tool holder to the movable member not carrying the tracing point, said arm having a slot therein, and a pencil adjustable in said slot to compensate for the tendency of the machine to distort letters during the engraving operation.

In testimony whereof we hereunto affix our signatures in the presence of two witnesses.

RUDOLF WETZER.
CURD NUBE.

Witnesses:
ALB. WEICKMAN,
L. KOLB.