

W. R. BUTLER-JONES
COPY HOLDING APPLIANCE AND COPIES FOR
USE IN ENGRAVING MACHINES
Filed Jan. 31, 1941 3

3 Sheets-Sheet 1

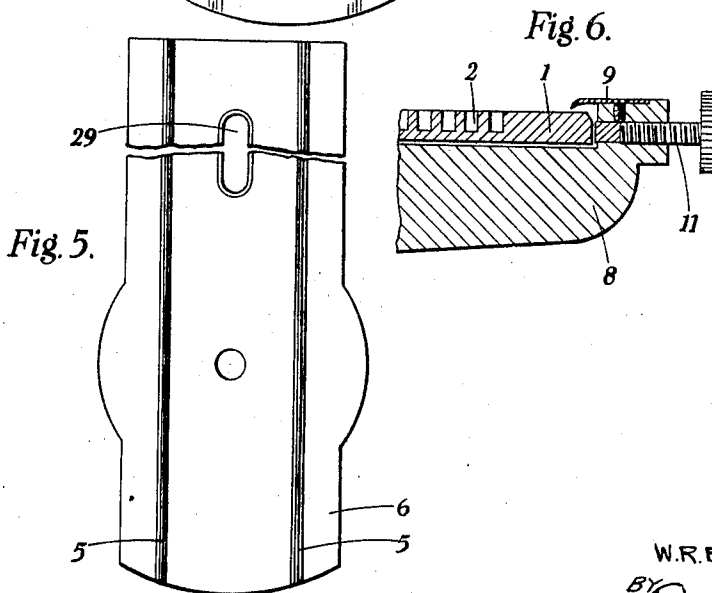
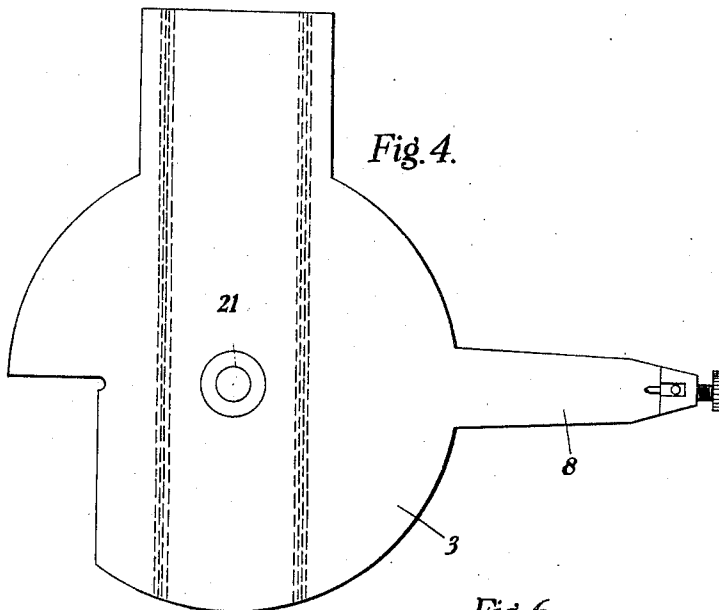
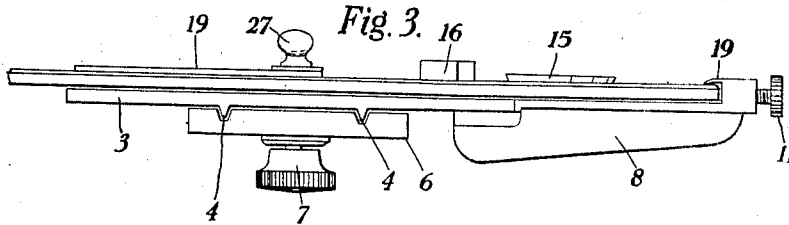
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March 21, 1944.

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2,344,849

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Fig. 7.

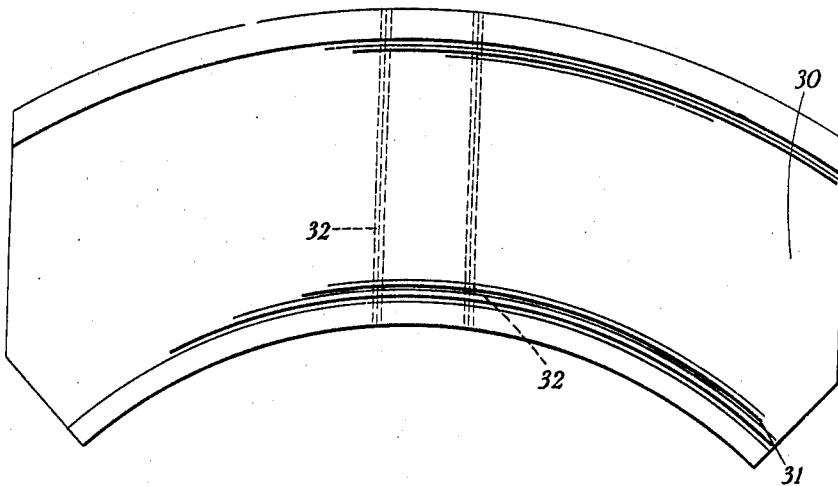


Fig. 8.

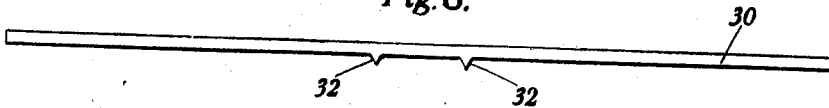


Fig. 9.

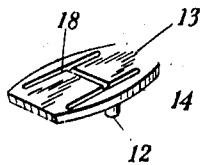
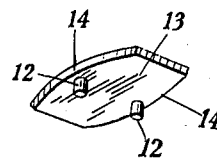


Fig. 10.



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UNITED STATES PATENT OFFICE

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COPYHOLDING APPLIANCE AND COPIES
FOR USE IN ENGRAVING MACHINES

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16 Claims. (Cl. 90—62)

This invention relates to engraving machines for use in engraving letters and symbols upon plates of metal and other materials, and upon articles of a variety of shapes, and it is concerned with copy holding appliances whereby the letters and symbols to be copied are set up and adjusted for use. It is also concerned with the copies themselves and the means for applying them to the holding appliances.

In such engraving machines there is usually a pantograph linkage carrying a style which traces out the grooves in the copy and serves to control the movements of a rotary cutter or etching tool whereby the symbols are reproduced, generally to a reduced scale, on the article to be engraved. When letters are to be engraved so as to lie along a circular arc or arcs, a circular copy-plate is usually employed, having all the copy letters and symbols cut in its surface generally in two or three concentric rings of different sized letters, and this copy-plate is turned round when in use to bring each selected letter or symbol into position for tracing out by the pantograph style. The plate or article to be engraved is also carried on a turntable or dividing head and is turned to bring the spaces for successive letters or symbols into position for being engraved. If a large number of reproductions are to be engraved with the same lettering sometimes a blank is first engraved and then used as a copy from which all the others are reproduced.

Letters and symbols of various sizes are required to enable lettering of the desired size and arrangement to be engraved, taking into account the scale reductions obtainable with the pantograph, the spacing of the lettering around the dial to be engraved, and so forth. According to this invention a circular copy holder is made consisting of a disc with a large number of concentric channels or grooves on its surface, and the copies are made with pins or pegs on the back which will enter any of the grooves so that any copy piece can be fitted to any groove. In this way a sort of circular chase is provided which will receive the necessary copies to make up the complete lettering on the article to be engraved, and the composite copy so made up is used as a master copy to enable any number of engraved reproductions to be prepared without any turning of the copy holder or of the article during the engraving.

One object of the invention is, therefore, an assembly, for use in an engraving machine, comprising a copy holder formed with a plurality of concentric arcuate grooves of different radii, and

a plurality of copy pieces each provided with projections upon it adapted to be located on said holder by any one of said grooves.

Another object of the invention is a circular copy holder formed with a plurality of concentric circular grooves of different radii, means for supporting said copy holder about an axis of rotation at the common centre of said circular grooves, said grooves being co-planar and of equal width and spaced at equal intervals apart radially, and means for clamping said copy holder in adjusted position.

A further object of the invention is a copy piece adapted to be located on a copy holder by any one of a number of grooves of equal width therein having different radii of curvature, the said piece being provided on its upper surface with a formation to be copied, and on its lower surface with a pair of pins adapted to project into any one of said grooves whereby to locate the piece in any desired radial position on the copy holder.

Yet another object of the invention is the combination of a baseplate adapted to be attached to an engraving machine, an undercarriage slidably mounted on said baseplate, means for locking said undercarriage to said baseplate, a disc formed with a plurality of concentric circular grooves of different radii of curvature, rotatably mounted on said undercarriage with the grooves on the side of said disc remote from said undercarriage, means for locking said disc in any angular position relatively to said undercarriage, and a plurality of copy pieces, each formed with a pair of pins adapted to fit into any one of said grooves to locate the copy piece on said copy holder.

The invention further comprises the elements and the combinations of parts set forth in the annexed claims.

In order that the invention may be clearly understood and readily carried into effect constructions in accordance therewith will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a plan of a copy holder assembly, Figure 2 is a side elevation, partly in section, of the assembly in Figure 1, as viewed in the direction of the arrow I,

Figure 3 is a side elevation of the assembly in Figure 1 as viewed in the direction of the arrow II,

Figures 4 and 5 are plans of details of the assembly of Figures 1 to 3,

Figure 6 is a vertical section through part of the assembly of Figures 1 to 3,

Figure 7 is a plan of a supplementary or auxiliary copy holder,

Figure 8 is a side elevation of the copy holder in Figure 7, and

Figures 9 and 10 are perspective views of copy pieces for use with the copy holders of the preceding figures.

The assembly shown in Figures 1 to 6 comprises a copy holder disc 1, which in this particular example is 13½ inches in diameter, and is formed on its upper surface with 25 concentric circular grooves 2 ranging from a diameter of 12 inches down to a diameter of 3 inches. The disc is mounted upon an undercarriage 3 formed on its under surface with two parallel V-shaped ridges 4 which slide longitudinally in corresponding V-shaped grooves 5 formed in a baseplate 6, arranged to be attached to an engraving machine. The undercarriage is therefore constrained to slide longitudinally on the baseplate 6 so as to allow the necessary adjustment of position according to the setting of the pantograph for the desired scale reduction. A quick-locking screw 7 is provided to clamp the undercarriage in any position within its range of movement on the baseplate, and the undercarriage is also formed with an arm 8 carrying a pointer 9 projecting over a scale 10 of degrees on the rim of the disc 1. The arm 8 also carries a locking screw 11 to clamp the disc 1 in any of the degree settings on the scale.

The concentric grooves on the face of the disc 1 are preferably of rectangular cross-section, so that cylindrical pins 12, on the backs of copy pieces 13, can be fitted by simple pressure into the grooves 2 and will locate the copy pieces on the disc in any required position. It is possible, by providing each copy piece generally with two pins on the back, spaced apart on the centre line of the letter or other formation to be copied, to enable each copy piece to be fitted into any one of the 25 grooves of the disc 1 or the grooves of supplementary copy holders which will be described later with reference to Figure 7, and to enable the copy piece to take its place thereon as part of a word or caption set up around a circular arc of any radius from about 1½ to 6 inches on the surface of the disc. If instead of pins a rib or the like is used, it will only fit in grooves of one diameter, but the two pins can form part of a rib of any curvature.

Each copy piece is preferably a die-casting in a hard zinc-base alloy or other suitable metal. Its sides are curved, as at 14, so that the letters will lie properly side by side no matter to which groove the copy pieces may be fitted. Letters which taper between top and bottom, such as A, V, or T, are formed on copy pieces which preferably have joggled edges 15 in order to facilitate the adjustment of spacing. Moreover, in some cases, for example if A is followed by V or T, the joggles will fit together enabling part of one letter copy to overhang the next. This enables the lettering in the engraving to be more uniformly spaced improving the effect of the composition. Where a joggled copy abuts against a copy with a plain curved edge of course there is no inter-engaging with the joggled portion.

Besides letters of course the copy pieces may have symbols upon them such as stops, arrow heads or other signs, the surface being recessed, as at 18, for engagement by the usual form of pantograph style, and parts of a symbol such

as an arrow head and feathered end can be recessed in separate copy blanks. In order to lock the copies in their grooves it is preferred to use spring clamps each consisting of a block 16 with pins or pegs on the back to engage any of the grooves in the disc, and each with a projecting spring arm 17 having a looped end 19 for bearing against the side of a copy piece. When the lettering is assembled, with or without stops, spaces and so forth, spring clamps are applied at the ends of the line of lettering, as shown in Figure 1, the blocks being pegged into grooves some distance within or outside the one in which the lettering is pegged, so that the springs bear against the copies at the ends, and by pushing the blocks laterally they can be made to apply any required spring tension to hold the letter copy pieces fixedly in place.

The grooves in the disc may be undercut if desired and the pegs made of a suitable shape to fit the undercut grooves, but this involves making cross slots or other breaks to enable copy holders to be introduced into and removed from the grooves, and tests have shown that plain cylindrical pegs serve the purpose equally well, and are much easier to assemble and remove.

The copy holder and copy pieces can of course be used to engrave any number of articles from the one set-up of the copy pieces thereon. By using about three sets of copy alphabets, of lettering whose height (allowing for width of cutter) is say ⅜ inch, ¾ inch, and 1½ inches respectively, practically any desired size of lettering can be engraved by making use of the possibilities of scale reduction within the range of the pantograph. With each copy alphabet of course is associated a set of copy numerals and other symbols normally required, made of a corresponding size. The copies may also include sets in reversed lettering for use in cutting dies, such as are required for embossing for example.

The baseplate 6 is readily adapted for attachment to the holder of any standard type of engraving machine as by a screw which fits into a threaded bore 24 in the baseplate. By utilizing the scale 10 of degrees on the rim, the copy holder 1 and the pointer 9 and clamp 11 cooperating therewith may be used to enable a copy of letters or numerals to be set up at any angles around a circle, and this is useful in many cases.

A detachable groove-indicator member 19^a is provided. This is formed with a pin 20 which fits into a corresponding recess 21 in an upstanding projection 23 on the undercarriage 3. Threaded on the projection 23 is a washer 25 which serves as a journal for the disc 1 which is held in position by a clamping washer 26. The indicator member is graduated as shown in Figure 1 to indicate by number each of the grooves 2. This is useful because the appliance may be used with tables of instructions as to the size of copy pieces, the scale reduction by pantograph, and the number of the groove on the disc to be used, in order to give lettering on the article to be engraved of any predetermined dimensions, and the detachable member 19^a can be dropped readily into position wherever there is a space unoccupied on the disc to indicate with certainty the correct groove to be used. Alternatively, the groove-indicator member 19^a may be swung into the desired position by means of a small handle 27.

The baseplate 6 is formed with a slot 29 into which a lug 33 formed on the undercarriage projects. The screw 7 engages in the lug 33 and

bears on a washer 34 which, in turn, bears on the under surface of the baseplate 6.

The disc 1 can also be used for cutting out circular blanks of any required size within the limits of the pantograph, by placing the style in a centre point formed in a blank copy piece located in the appropriate groove and rotating the disc 1.

One of three supplementary copy holders is shown in Figures 7 and 8 and consists of an arcuate plate 30 formed with concentric arcuate grooves 31 arranged to receive the copy pieces such as that shown in Figures 9 and 10. The under side of the plate is formed with parallel V-shaped ridges 32 which fit the corresponding grooves in a baseplate such as that appearing in Figure 5 and enable the plate to be adjusted longitudinally on the baseplate.

As already stated, in the embodiment illustrated, the copyholder disc 1 has an outer groove of a diameter of 12 inches that is a radius of 6 inches. The supplementary copyholders such as shown in Figures 7 and 8 are provided for use when grooves of a greater radius than 6 inches is required. One of the three plates provided has grooves of radii of from $6\frac{1}{8}$ inches to $12\frac{1}{8}$ inches, the second plate has grooves of radii from $12\frac{3}{8}$ inches to $18\frac{3}{8}$ inches and the third from $18\frac{5}{8}$ inches to $24\frac{5}{8}$ inches so that the grooves in all of them are of $\frac{1}{8}$ inch pitch as in the disc 1. The copyholders 30 are not rotatably mounted but as stated above are located at the correct positions on the baseplate by rectilinear adjustment.

I claim:

1. For use in an engraving machine, an assembly comprising a copy holder formed with a plurality of concentric arcuate grooves of different radii and each of the same width and a plurality of copy pieces each formed with a pair of pins of such a width as to be a neat sliding fit in each said groove whereby the piece may engage in any one of said grooves securely to locate the piece on said copy holder.

2. For use in an engraving machine, in combination, a copy holder formed with a co-planar concentric, arcuate grooves of different radii each of substantially rectangular cross-section, and a plurality of copy pieces, each provided with a pair of projecting pins, each said pin being of circular cross-section of diameter substantially equal to the width of each of said grooves, whereby said copy pieces may be securely located by inserting said pins in any one of said grooves.

3. For use in an engraving machine, an assembly comprising, in combination, a copy holder formed with a plurality of concentric arcuate grooves of different radii and a plurality of copy pieces formed on their upper faces respectively with formations to be copied and on their lower faces each with a pair of pins of such diameter as to form a neat fit in any of said said grooves, and so disposed that said copy pieces may be arranged in an arcuate row having a radius of curvature corresponding to a selected one of said grooves while said pins project into and neatly fit the selected groove to retain said pieces on said copy holder.

4. For use in an engraving machine, an assembly comprising, in combination, a copy holder formed with a plurality of concentric arcuate grooves of different radii, a plurality of copy pieces formed on their upper faces respectively with letters of the alphabet and on their lower

faces each with a pair of pins so disposed that said letters may be arranged in an arcuate row with a radius of curvature corresponding to a selected one of said grooves, while said pins project into selected grooves to retain said pieces on said copy holder, said pieces having their lateral edges formed to permit the letters to be correctly spaced in the row.

5. For use in an engraving machine, an assembly comprising, in combination, a copy holder formed with a plurality of concentric arcuate grooves of different radii, a plurality of copy pieces formed on their upper faces respectively with formations to be copied, and on their lower faces each with a pair of pins so disposed that said copy pieces may be arranged in an arcuate row having a radius of curvature corresponding to a selected one of said grooves, while said pins project into the selected grooves to locate said pieces radially on said copy holder, and retaining members having portions adapted to engage in any of said grooves and having other portions adapted to bear resiliently against the outer edges of the outer ones of the copy pieces in the row whereby to hold the copy pieces in contact with each other and retain them in a circumferential direction with respect of said copy holder.

6. For use in an engraving machine, an assembly comprising a copy holder formed with a plurality of concentric arcuate grooves of different radii, a plurality of copy pieces, each formed with a pair of pins adapted to project into any one of said grooves for the purpose of locating the piece radially with respect to said copy holder, and an indicator member graduated to permit the ready selection of the groove which is to be engaged by each copy piece, said member being pivotally mounted with respect to said copy holder to swing about the center of curvature of said grooves and lie in any radial position on said copy holder with the graduations at a fixed distance from the centre of curvature of said grooves.

7. For use in an engraving machine, a circular copy holder formed with a plurality of concentric circular grooves of different radii, means for supporting said copy holder about an axis of rotation at the common centre of said circular grooves, said grooves being co-planar and of equal width and spaced at equal intervals apart radially, and means for clamping said copy holder in adjusted position.

8. A copy piece adapted to be located on a copy holder by any one of a number of grooves of equal width therein having different radii of curvature, the said piece being provided on its upper surface with a formation to be copied and on its lower surface with a pair of pins both adapted to project simultaneously into any one of said grooves whereby to locate the piece in any desired radial position on the copy holder.

9. A copy piece adapted to be located on a copy holder by any one of a number of grooves of equal width therein having different radii of curvature, the said piece being formed on its upper face with a formation to be copied and on its lower face with a pair of pins of circular cross-section both adapted to engage simultaneously in any one of the grooves and to locate the copy piece on the copy holder with the said formation lying radially with respect to the grooves.

10. For use in an engraving machine, in combination, a baseplate adapted to be attached to the machine, an undercarriage slidably mounted on said baseplate, means for locking said under-

carriage to said baseplate, a disc formed with a plurality of concentric circular grooves of different radii of curvature rotatably mounted on said undercarriage with said grooves on the side of said disc remote from said undercarriage, means for locking said disc in any angular position relatively to said undercarriage, and a plurality of copy pieces each formed with a pair of pins adapted to fit into any one of said grooves to locate the copy piece on said copy holder.

11. A copy holder assembly for use in an engraving machine, the assembly comprising, in combination, a baseplate adapted to be attached to the machine, an undercarriage constrained to slide in a straight line on said baseplate, means for locking said undercarriage in any position within its range of movement on said baseplate, a copy holding disc mounted to rotate on said undercarriage, and means for locking said copy holding disc in any angular position on said undercarriage, said disc being formed on its face remote from said undercarriage with a plurality of circular grooves of different radii of curvature adapted to locate copy pieces thereon.

12. A copy holder assembly for use in an engraving machine, the assembly comprising, in combination, a baseplate adapted to be attached to the machine, an undercarriage constrained to slide in a straight line on said baseplate, means for locking said undercarriage in any position within its range of movement on said baseplate, a graduated copy holding disc mounted to rotate on said undercarriage, an arm projecting laterally from said undercarriage, and means on the end of said arm to engage the periphery of said disc to lock same in any angular position, said disc being formed on its face remote from said un-

dercarriage with a plurality of concentric grooves of equal width and equally spaced radially, said grooves being adapted to receive and hold copy pieces on the face of the copy holding disc.

13. For use in an engraving machine, an assembly comprising a support, a copy holder formed with a plurality of concentric arcuate grooves of different radii and each of the same width, said copy holder being pivotally mounted on said support to turn about the center of curvature of said grooves, means for clamping said copy holder in adjusted position relatively to said support, and a plurality of copy pieces each formed with a pair of pins of such a width as to be a neat sliding fit in each said groove whereby the piece may engage in any one of said grooves securely to locate the piece on said copy holder.

14. For use in an engraving machine, an assembly comprising a copy holder formed with a plurality of concentric arcuate grooves of different radii and a plurality of copy pieces each formed with a pair of pins adapted to engage in any one of said grooves, to locate the piece on said copy holder, and a centrally pivotally mounted readily removable graduated indicator member to permit the ready selection of grooves as desired.

15. A device as set forth in claim 1 including a readily removable pivotally mounted indicating member graduated to permit the ready selection of grooves.

16. A device as set forth in claim 1 including a pair of pins adapted to engage in any one of said grooves to locate the piece on said copy holder, and a centrally pivotally mounted readily removable graduated indicator member to permit the ready selection of grooves as desired.

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