F. E. FARNHAM.

PROCESS OF THE MANUFACTURE OF GEM SETTINGS.

APPLICATION FILED MAR. 28, 1912.

1,050,935. Patented Jan. 21, 1913.

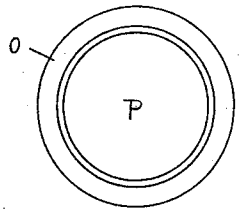

FIG. 1.

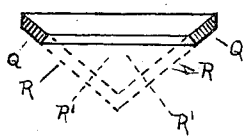

FIG. 2.

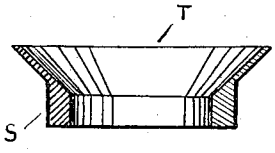

FIG. 3.

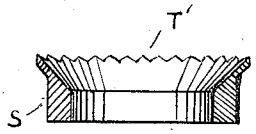

FIG. 4.

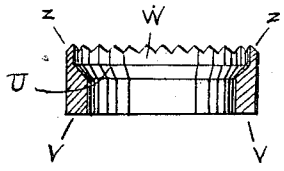

FIG. 5.

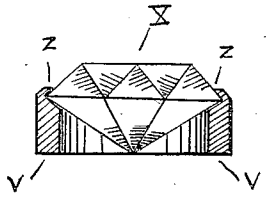

FIG. 6.

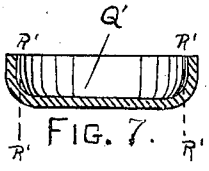

FIG. 7.

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PROCESS OF THE MANUFACTURE OF GEM-SETTINGS.

1,050,935. Specification of Letters Patent. Patented Jan. 21, 1913.

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To all whom it may concern:

Be it known that I, FRANK E. FARNHAM, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Processes of the Manufacture of Gem-Settings, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to the processes of the manufacture of gem settings.

In the accompanying drawings like reference numerals indicate like parts.

Figure 1 is a plan view of the blank or washer from which my improved box setting is made. Fig. 2 is a view, partly in elevation and partly in diametrical section, of said blank or washer. Fig. 3 is a view, partly in elevation and partly in diametrical section, and illustrates the result of the second operation on the blank or washer. Fig. 4 is a view, partly in elevation and partly in diametrical section, and represents the result of the third (or trimming) operation upon the blank. Fig. 5 is a view, partly in elevation and partly in diametrical section, and shows the result of the final (or drawing) operation on the blank and constitutes the completed box setting. Fig. 6 is a view, partly in elevation and partly in diametrical cross section, and shows a gem or stone held by the turnover edge of the setting and resting on the seat or bearing. Fig. 7 is a diametrical section of a modified form of a cupped blank, adapted to be used in my said invention.

In the prior art of the manufacture of gem settings, leaded brass has been the only kind of metallic stock available for this manufacture. Leaded brass differs from the common brass in that a certain per cent. of lead or other metal is added as an alloy. Such alloy is used for the purpose of changing the character of the brass, so that in removing the metal by a cutting tool, such alloyed metal will not tear, catch, jam, or clog the machine, and the chips are not long, but break off, while in the cutting operation, and will form waste in small sections or pieces. Any suitable metal may be used in my improved process, but for the cheaper grades, the stock which is to be used is preferably gilding metal or gilder's metal, composed of about 95 per cent. of copper, and about 5 per cent. of zinc. It is easily worked, is very homogeneous; does not break, split, or crack, during the various operations; and is susceptible of a high finish and a superior coloring.

In my improved box setting and in the process of its manufacture, a piece of flat stock of gilding or other metal is pierced at regular and suitable intervals, and then the blank is cut therefrom to form a washer, as represented in Fig. 1, the outer circle showing the periphery of the blank O with a central circular aperture P. The blank, so made, is cupped by die and plunger to the shape shown in Fig. 2, partly in elevation and partly in diametrical section, comprising an inclined base Q, with a conically inclined edge as thick as the original stock.

The cupped washer, shown in Fig. 2 is placed in a die, and by a suitable plunger is forced or cold-swaged into the form shown in Fig. 3 in diametrical section and in elevation. Here, the base S has become tubular and its bottom edge is horizontal, but the flange T is very flaring and much reduced in thickness. By this cold-swaging operation the flange T is considerably hardened and is less ductile than the base S, and the base is of uniform thickness. The next step in the process is to form the edge of the flange T with a smooth finish, or to give it such ornamental peripheral form as may be useful for gem-setting purposes, such as a knurled, beaded, serrated, scalloped, fluted, or other kind of edge. The hardness of the flange T enables the formation of a very accurate and beautifully finished wearing edge. This operation results in a gem setting having an ornamented edge, such, for example, as that shown in Fig. 4, or a perfectly straight edge may be formed. Fig. 4 is a diametrical section of the trimmed ring so formed. The blank shown in Fig. 3 is placed in a trimming die and the surplus metal is removed by cutter action, leaving the trimmed edge T′. The annular flange T′ of Fig. 4 is flared so as to extend at an angle of about 40° or 45° from the base S. The trimming tool is applied to the flange T in a direction substantially parallel with the tubular sides of the base S, so that the edge of said flange T′ has a bevel such that when it is bent over to cramp the gem X, the bevel will extend parallel to the base V V, as represented at *z z*. Finally, the trimmed blank is placed in a draw plate,

and by means of a suitable plunger is forced through the aperture of the draw plate into its finished form, and becomes an article of merchandise as a jeweler's finding. In Fig. 5 this finished form of the completed box setting is shown. In this figure V is the base, U is the sloping seat for the gem, and W is the flange which is to be turned over upon the facets or surface of the gem. The flange W is now seen to be of the same diameter as the body or ring V, which constitutes the base of the gem setting. The edge of the flange W is seen to be beveled, as shown at *z*, and when the flange is bent over upon the gem said beveled surface *z* will extend in a plane parallel to the outer edge of the base V V.

The following are some of the practical advantages of my said improved box setting and of the process of its manufacture. (*a*). Flat stock is used in this construction, which is cheaper than tubing, or solid, cylindrical, metal rods. (*b*). It is not necessary to use leaded brass, but any desired kind of metal may be used. (*c*). The cost of manufacture of box settings by my improved process is less than in the use of any of the previous methods known. (*d*). The cost of finishing my said box settings is less than in the other modes of manufacture because they are burnished to a finish in the process. (*e*). My improved box settings can be formed into squares, ovals and other shapes, without any danger of splitting. (*f*). When soldered to the brooch or other piece of jewelry, my said box settings are softer and more ductile than leaded stock can possibly be, and therefore they fit over the gem much more closely than box settings of the other methods of manufacture. (*g*). By my improved process it is possible to make the upper edges of the box setting knurled, beaded, serrated, scalloped, pointed, fluted, or to otherwise vary the design of said edges, or to finish them with plain surfaces. (*h*). By my improved process the upper peripheral edge is beveled and therefore the setting is able to turn over upon the gem into a very close contact with the stone, and presents no surface or portion to catch upon a garment or fabric. (*i*). The turned-over edge can be made exceedingly thin, without danger of tearing out the material while in process. (*j*). These box settings can be carried in stock in the swaged form, and any pattern of edge can be produced at short notice. (*k*). By means of trimming cutters of varying diameters different heights of turn-over edges can be obtained from the same swaged blanks.

My improved box settings above described are a new and useful invention, as also the new process employed in their manufacture. I have not only fully set forth the several steps or stages of the development thereof from the original blank to the finished product, but I will now explain the elemental change introduced as one of the steps or stages of this process which gives peculiar advantages to the box setting. This relates to the formation of the flange T in Fig. 3, for the purpose of giving the very smooth and accurate finished edge desired, and the various designs or ornamentation.

By the cold-swaging already described, the flange T shown in Fig. 3 is made hard and dense so that when the trimming tool is applied to it there is a clean cut removing the surplus metal without tearing and without subjecting it to any breakage resulting from the natural brittleness or granular quality which ordinarily accompanies the use of leaded stock, which harmful qualities make it impossible to produce on the resulting edge any of the ornamental and beautiful designs which are distinctive of my improved box settings, as already stated. For this reason I impart to said annular flange that hardness which is necessary in that particular portion of the gem setting, but do not produce it elsewhere. Thus the same unitary article shown in Fig. 3 has different qualities at different parts thereof, superior hardness in the flange T, where fine and delicate ornamentation is intended, which I desire to make as beautiful and artistic as possible; but not in the base where the ordinary density of the metal is desired for other reasons.

It is obvious that in order to get the angular effect of the trimming of the flange T along the bevel *z z*, said flange T must stand at an angle of about 45°, as before described. In this manner, access to the interior surface of the flange T by the trimming tool is absolutely necessary. But in the prior art, if the flange is straight and tubular, having a diameter equal to the diameter of the base, a trimming tool cannot be applied at an angle thereto on the inner surface thereof; nor can said flange be flared, because it would be split. In my process of manufacture, not only does the flange flare sufficiently to enable the trimming tool to be applied angularly, but after the trimming has been done, the draw plate operation brings the flange to the same diameter as that of the base.

It is obvious that the form of the blank may be modified to produce similar results but within the scope of my invention. Instead of having the blank dished as shown in Figs. 1 and 2, the sides may be prolonged as indicated by dotted lines R R, thus making the whole blank a cone instead of a conic section. If desired such blank may be pierced either before or after the swaging, as indicated by the dotted lines R′; or, as shown in Fig. 7, the blank may be cupped

and have a solid bottom, as represented at Q′; or, the bottom, however, can be made with a central circular hole or aperture cut, as indicated by the dotted lines in said figure.

I claim as a novel and useful invention and desire to secure by Letters Patent:

The improved process of manufacturing box settings for gems, consisting of the following steps, first, forming from sheet metal a circular washer with a central circular aperture and cupping said washer; secondly, forming a tubular base of uniform thickness with a flaring flange extending from said base on the upper edge thereof at an angle of about 45° therefrom and imparting to said flaring flange by cold-swaging a quality of greater hardness than said base has and at the same time forming an interior gem-supporting seat between said flange and base; thirdly, trimming the outer edge of said flange into an ornamentation having a beveled outline; and fourthly drawing said flaring flange by a draw plate and plunger so as to give to both the base and said trimmed flange a uniform cylindrical exterior surface.

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

FRANK E. FARNHAM.

Witnesses:
JOSEPH P. WHITAKER,
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