June 27, 1939. D. SWAROVSKI 2,163,814

MANUFACTURING OF JEWELRY SET WITH STONES

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Fig. 1

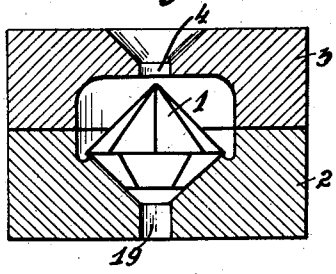

Fig. 3

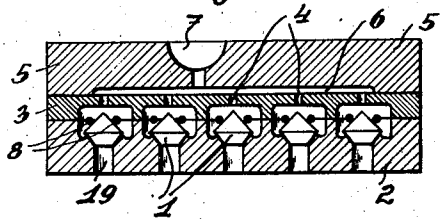

Fig. 2

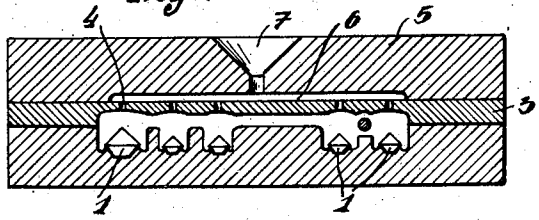

Fig. 4

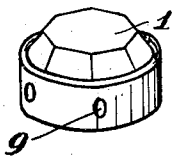

Fig. 5

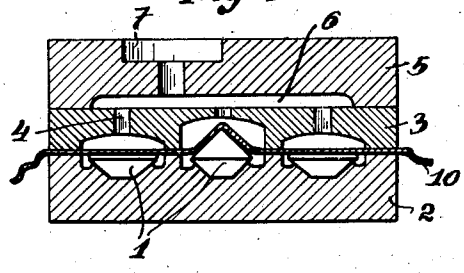

Fig. 6

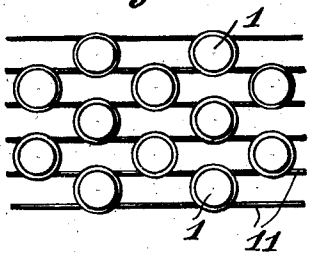

Fig. 7

Fig. 8

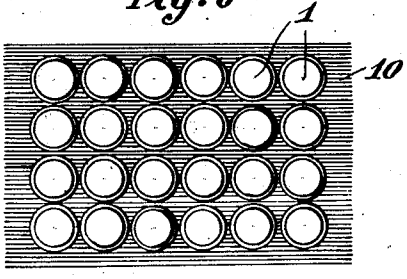

Fig. 9

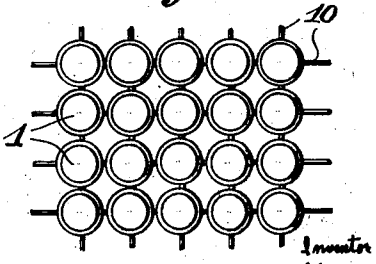

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Fig. 10

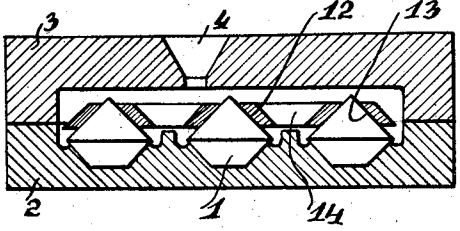


Fig. 11

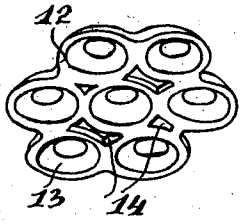


Fig. 12

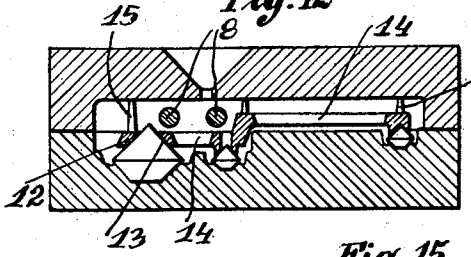


Fig. 13

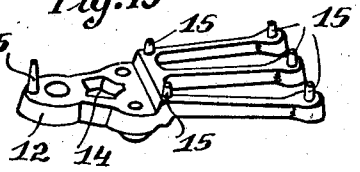


Fig. 15

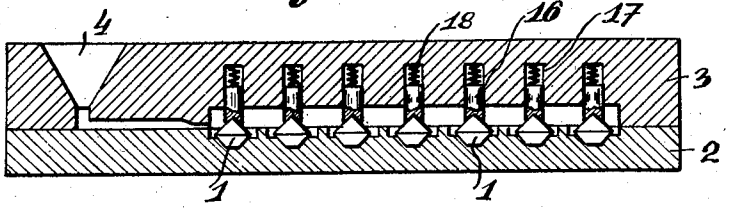


Fig. 14

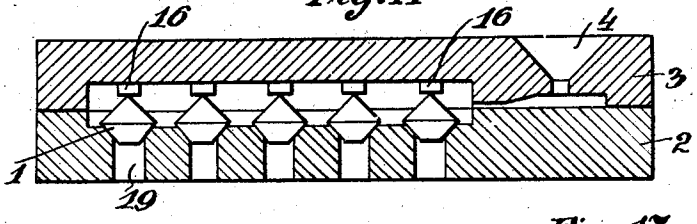


Fig. 17

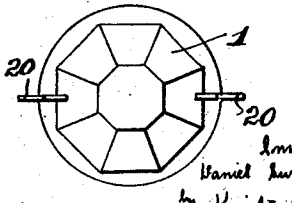
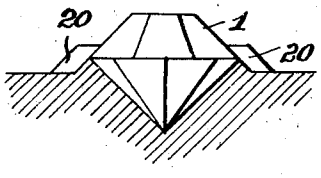


Fig. 16



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Patented June 27, 1939 2,163,814

UNITED STATES PATENT OFFICE

2,163,814

MANUFACTURING OF JEWELRY SET WITH STONES

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Application August 29, 1936, Serial No. 98,459
In Austria September 4, 1935

15 Claims. (Cl. 18—42)

This invention relates to improvements in manufacturing of jewelry set with stones by the method described in Letters Patent No. 1,997,500 and has for its object to prevent the stones inserted in the casting mould from becoming unintentionally altered in position or displaced during the pouring in or injecting of the embedding mass.

Another object of the invention is the new method of employment of metals as embedding mass owing to the possibility of injecting the mass against the stones secured in position at a much greater rate.

According to the invention the casting mould for producing the articles is provided with means for securing the desired position of the stones inserted in depressions of the mould during the injection of the embedding mass in the mould. These means consist either in admission apertures in the mould each situated coaxially with a stone for pressing the stones against their seats by the mass itself or in fittings inserted in the mould or in pins arranged on the mould and facing the back of the stones.

The injection of the mass at a greater rate entails also the advantage that far less caution need be exercised, so that a very considerable increase in the rate of manufacture can be achieved. Hitherto it has been impossible to use metals as the embedding mass since metals would have had a still greater tendency to bring about displacement of the stones during the moulding operation, on account of their greater weight and in consequence of the higher injecting velocity which is necessary on account of their readiness to congeal. The use of metals as embedding mass represents, however, an important advance in the art disclosed in Letters Patent No. 1,997,500, since metals are particularly fancied for the purpose of mounting gems, and are eminently suited for this purpose by reason of their strength and resistance, so that the stones can be held in the metallic article only by two short thin prongs produced during the casting operation.

With the above general objects in view and others that will become apparent as the nature of the invention is better understood, the same consists especially in the novel form, combination and arrangement of parts hereinafter more fully described in connection with the accompanying drawing in which,

Figs. 1, 2 and 3 are vertical sections of three different moulds for articles of jewelry in which, during the casting process, the embedding mass impinges directly upon the stones inserted in the mould and presses them against their seats.

Fig. 4 is a perspective view of an article of jewelry cast in the mould shown in Fig. 3.

Fig. 5 is a vertical section of a mould which serves for the production of articles of jewelry with stones mounted on fabric or a network of threads.

Figs. 6–9 are plan views of several articles of jewelry produced with the aid of similar moulds.

Fig. 10 is a vertical section of a mold showing a weighting member for the stones.

Fig. 11 is a perspective view of the weighting member shown in Fig. 10.

Fig. 12 is a vertical section of a different mold containing a special holding member pressed against the top of the mold cavity.

Fig. 13 is a perspective view of the holding member shown in Fig. 12.

Fig. 14 is a vertical section of another mold provided with pins at the top of the mold cavity for pressing the stones into their sockets.

Fig. 15 is a vertical section of a slightly different mold wherein pins are yieldably mounted.

Fig. 16 is a vertical section of a stone and setting made in accordance with the invention, and

Fig. 17 is a plan view of the same stone and setting.

In the carrying out of the invention the stones 1 are inserted in the lower part 2 of a two- or multi-part mould which is provided with special depressions for this purpose. The upper part 3 of the mould is then fitted on, and the embedding mass injected or poured in through apertures 4 in the mould, special precautions being taken to ensure that the stones do not alter their position or become displaced during the casting process. The result is achieved in the simplest manner by directing the flow of the poured or injected embedding mass in such a manner that the mass impinges on each stone in the direction of its main axis and presses it against its seating. In the case of moulds in which only one stone is inserted the pouring or injecting aperture is for this purpose disposed immediately over the stone (Fig. 1). If the moulds are complicated construction, and if there be a larger number of stones inserted in their lower part the upper part of the mould is provided with a plurality of pouring apertures corresponding to the number of stones present, so that there is an aperture 4 over each stone (Fig. 2). In a cover portion 5 situated above the part 3 there are provided distributing passages 6 which lead to the individual apertures 4, and which are fed with embedding mass from a central aperture 7. The same type of construction with distributing passages may be employed in conjunction with moulds which serve for the simultaneous production of a plurality of articles of jewelry each set with a single stone (Fig. 3). If there be inserted in the moulds fittings intended to serve later on as parts of fasteners for the article of jewelry these fitting may also be made use of during the casting process for securing the stones in position. More

particularly fittings such as rods 8 (Fig. 3) and the like which are removed from the articles of jewelry again after the casting operation, and which only serve to form recesses, eyes, or passages 9 (Fig. 4) in these articles, may be employed for the holding fast of the stones during the casting operation.

In producing articles of jewelry in which fabrics, network 10 of threads, or threads 11 serve as carriers for individual stones embedded in the mass secured to the carrier by means of the mass the procedure may be to insert the network before the pouring of the mass into the mould in such a manner that the individual stones are thereby held fast in position. With such moulds the feed flow of the embedding mass may of course also be directed axially against the stones (Fig. 5). With such articles of jewelry, which are employed either in the form of strings or chains, more or less wide bands, or sheets of material set all over with gems (Figs. 6–9) speeding up the manufacture is only possible, on account of the large number of stones to be embedded, provided the stones be reliably held fast against any displacement.

If there is no possibility of fixing the stones by means of elements already introduced for other purpose into the mould it is advisable to hold them by means of special inserted holding members 12 (Fig. 10). These members are preferably made from the same material as the jewelry, so that they form a unitary, homogeneous body with the embedding mass. The inserted holding members are provided with recesses 13 corresponding to the arrangement of the stones in the finished article of jewelry, and are further provided, between these recesses, with gaps 14 which allow the embedding mass to penetrate through and to become readily distributed within the mould. The inserted holding members are placed in position upon the stones and rest upon them with their dead weight. During the casting operation the jet of in-flowing embedding mass is directed against the holding members and presses them down, so that the stones are more firmly held against their seats. If this does not afford sufficient security against displacement of the stones the inserted holding members are provided with small pegs 15 which bear against the upper part of the mould and thereby render displacement impossible (Figs. 12 and 13). The pegs 15 may also be made resilient.

In order to avoid the use of separate inserted holding members the stones may also be pressed against their seating depressions by means of small cylindrical pins 16 (Fig. 14) which extend downwards from the wall of the upper part of the mould. This extremely simple mode of fixing the stones does, it is true, entail the production by the pin 16 of a slight depression on the back of the article of jewelry opposite each stone, but these depressions do not impair the appearance of the finished article. Since, however, when all is said and done, the last described method of fixing the stones requires a considerable degree of accuracy in the machining of the mould, so that each pin may bear accurately and without play against the point of the stone facing it, the pins 16 may also be arranged to be longitudinally slidable in guides 17 in the upper part of the mould (Fig. 15), and to be pressed against the stones by means of small springs 18. The springs 18 can of course be replaced by other elastic materials such as rubber. It would also be possible to hold down the pins and to press them against the stones by means of compressed air. In this manner each individual stone is reliably held down and prevented from becoming displaced. The depressions in the lower part of the mould, which serve for the reception of the stones, preferably merge into outwardly leading passages 19 through which during the casting operation the air can escape from the interior of the mould (Figs. 1, 3, 14).

As already mentioned, the main advantage of the invention resides on the one hand in the fact that the casting operation, and with it the total time required for the production of the articles of jewelry, is very considerably curtailed, and on the other hand in the fact that, through the possibility of introducing the embedding mass more rapidly, metals of low melting point can be employed as embedding mass, whereas hitherto it has only been possible to use for this purpose relatively light, Celluloid-like masses. The employment of metal as the embedding material in making the articles of jewelry suggests holding fast the individual stones not, as when the Celluloid-like masses are used, by means of a beading running round the widest part of the stone, but solely by means of two (or more) short thin radial webs 20 (Figs. 16 and 17) which are formed from the in-flowing metal during the casting operation by the provision of suitable recesses in the lower part of the mould.

When the embedding part has set, the moulds are opened and the articles of jewelry can be taken out in the finished state. If desired or necessary the latter may then be subjected to a further treatment, consisting in removing the burr from the cast parts, polishing in the usual manner, and varnishing, silverplating, or goldplating.

I claim:

1. The method of setting ornamental stones each having a crown portion and a belt at the major base of the crown constituting that portion of the stone having the maximum cross section, which comprises seating a stone within a mold, in a socket which covers the crown of the stone completely except for clamping surfaces adjacent the widest cross-section of the stone; and pouring a molten plastic material into the mold while pressing the stone into the socket.

2. The method of setting ornamental stones each having a crown portion and a belt at the major base of the crown constituting that portion of the stone having the maximum cross section, which comprises seating a stone within a mold, in a socket which covers the crown of the stone completely except for clamping surfaces adjacent the widest cross-section of the stone; and pouring a molten plastic material into the mold while pressing the stone into the socket by directing the stream of molten material coaxially against the exposed end of the stone.

3. The method of setting ornamental stones each having a crown portion and a belt at the major base of the crown constituting that portion of the stone having the maximum cross section, which comprises seating a stone within a mold, in a socket which covers the crown of the stone completely except for clamping surfaces adjacent the widest cross-section of the stone; forcibly holding the stone in the socket; and pouring a molten plastic material into the mold while continuing to hold the stone in the socket.

4. The method of setting ornamental stones each having a crown portion and a belt at the major base of the crown constituting that por-

tion of the stone having the maximum cross section, which comprises seating a stone within a mold, in a socket which covers the crown of the stone completely except for clamping surfaces adjacent the widest cross-section of the stone; placing over the stone a filamentous stabilizer in such a way that it presses upon the stone and holds it in its socket; and pouring a molten plastic material into the mold.

5. The method of setting ornamental stones each having a crown portion and a belt at the major base of the crown constituting that portion of the stone having the maximum cross section, which comprises seating a stone within a mold, in a socket which covers the crown of the stone completely except for clamping surfaces adjacent the widest cross-section of the stone; placing over the stone a fabric stabilizer in such a way that it presses upon the stone and holds it in its socket; and pouring a molten plastic material into the mold.

6. The method of setting ornamental stones each having a crown portion and a belt at the major base of the crown constituting that portion of the stone having the maximum cross section, which comprises seating a group of the stones in one or more rows within a mold, in sockets which cover the crowns of the stones completely except for clamping surfaces adjacent the widest cross-section of the stones; placing over the stones parallel stabilizing threads in such a way that they press upon the stones and hold them in their sockets; and pouring a molten plastic material into the mold.

7. The method of setting ornamental stones each having a crown portion and a belt at the major base of the crown constituting that portion of the stone having the maximum cross section, which comprises seating a group of the stones in one or more rows within a mold, in sockets which cover the crowns of the stones completely except for clamping surfaces adjacent the widest cross-section of the stones; placing over the stones parallel threads so that each stone is stabilized by a plurality of said threads in such a way that the threads press upon the stones and hold them in their sockets; and pouring a molten plastic material into the mold.

8. The method of setting ornamental stones each having a crown portion and a belt at the major base of the crown constituting that portion of the stone having the maximum cross section, which comprises seating a group of the stones in a plurality of rows in a mold, in sockets which cover the crowns of the stones completely except for clamping surfaces adjacent the widest cross-section of the stones, the stones in the different rows being relatively staggered and arranged so that lines can be drawn parallel to the rows which intersect the stones of two neighboring rows; placing over the stones along said lines parallel stabilizing threads in such a way that they press upon the stones and hold them in their sockets; and pouring a molten plastic material into the mold.

9. The method of setting ornamental stones each having a crown portion and a belt at the major base of the crown constituting that portion of the stone having the maximum cross section, which comprises seating a stone within a mold, in a socket which covers the crown of the stone completely except for a plurality of recesses exposing small strips of the face of the stone radial to the axis of the stone; and pouring a molten plastic material into the mold while pressing the stone into the socket.

10. A mold for casting a setting for an ornamental stone having a crown portion and a belt at the major base of the crown constituting that portion of the stone having the maximum cross section, said mold having a socket in its cavity and an in-gate coaxial with said socket; said socket being adapted to cover the crown of the stone completely, except for clamping surfaces adjacent the widest cross-section of the stone.

11. A mold for casting a setting for a plurality of ornamental stones each having a crown portion and a belt at the major base of the crown constituting that portion of the stone having the maximum cross section, said mold having a socket for each stone in its cavity, a plurality of in-gates respectively coaxial with said sockets, and a common distributing passage for all of said in-gates; said sockets being adapted to cover the crowns of their respective stones completely, except for clamping surfaces adjacent the widest cross-section of each stone.

12. A two-part mold for casting a setting for an ornamental stone having a crown portion and a belt at the major base of the crown constituting that portion of the stone having the maximum cross section, one part of said mold having in its cavity a socket adapted to cover the crown of the stone completely, except for clamping surfaces adjacent the widest cross-section of the stone, the other part of said mold having an in-gate; and a filamentous material clamped between the two parts of the mold so as to bear upon the top of the stone in such a way that the filamentous material passes upon the stone and holds it in its socket.

13. A two-part mold for casting a setting for an ornamental stone having a crown portion and a belt at the major base of the crown constituting that portion of the stone having the maximum cross section, one part of said mold having in its cavity a socket adapted to cover the crown of the stone completely, except for clamping surfaces adjacent the widest cross-section of the stone, the other part of said mold having an in-gate; and a fabric clamped between the two parts of the mold so as to bear upon the top of the stone in such a way that the fabric presses upon the stone and holds it in its socket.

14. A two-part mold for casting a setting for an ornamental stone having a crown portion and a belt at the major base of the crown constituting that portion of the stone having the maximum cross section, one part of said mold having in its cavity a socket adapted to cover the crown of the stone completely, except for clamping surfaces adjacent the widest cross-section of the stone, the other part of said mold having an in-gate; and a fabric clamped between the two parts of the mold so as to bear upon the top of the stone in such a way that the fabric presses upon the stone and holds it in its socket, the dividing plane between the two parts of the mold being below the top of the stone.

15. A mold for casting a setting for an ornamental stone having a crown portion and a belt at the major base of the crown constituting that portion of the stone having the maximum cross section, said mold having a socket in its cavity and an in-gate; said socket being congruent to the crown of the stone except for a plurality of recesses at the rim of the socket adapted to expose small radial strips of the face of the stone.

DANIEL SWAROVSKI.