May 16, 1950 D. ECHTER ET AL 2,508,017

METHOD FOR CUTTING ROUNDED GLASS BLANKS

Filed June 30, 1948

Fig. 1.

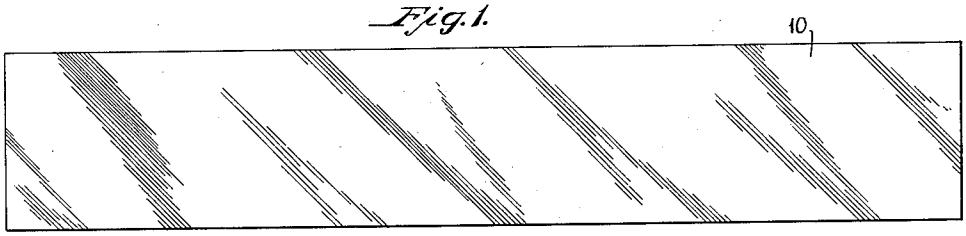


Fig. 2.

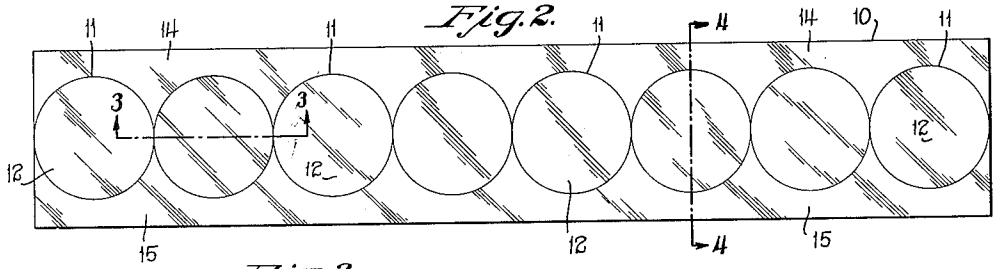


Fig. 3.

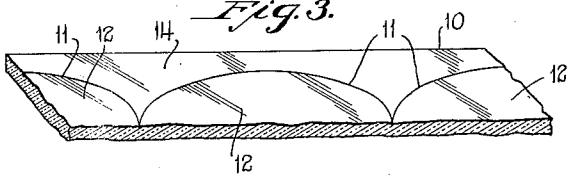


Fig. 6.

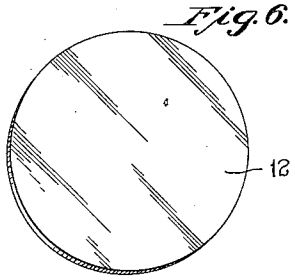


Fig. 4.

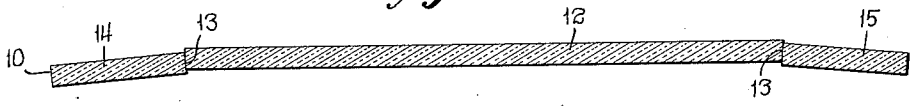
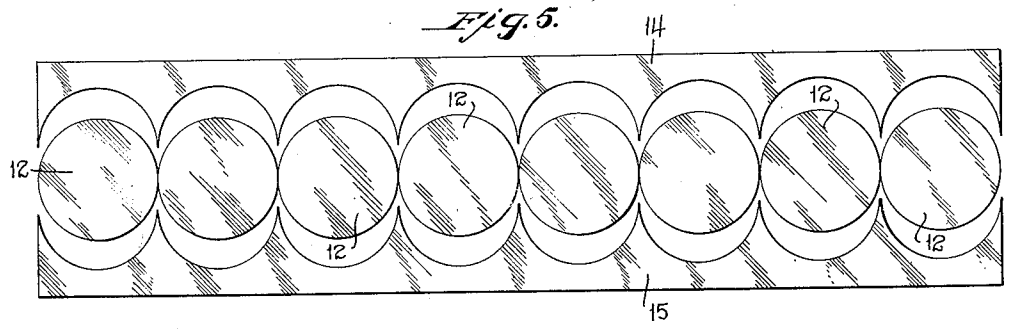


Fig. 5.



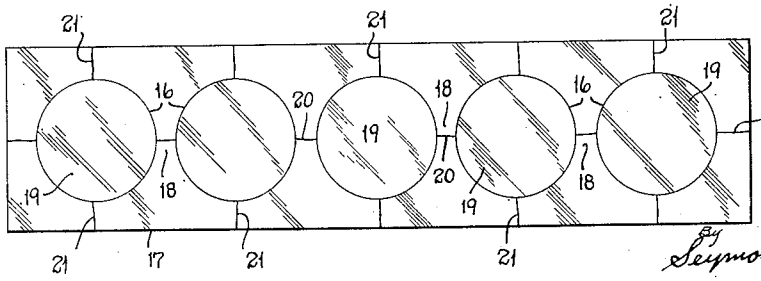


Fig. 7.

Inventor
David Echter
Ernest B. Paul
By Seymour, Earle & Nichols
Attorneys

Patented May 16, 1950 2,508,017

UNITED STATES PATENT OFFICE

2,508,017

METHOD FOR CUTTING ROUNDED GLASS BLANKS

David Echter and Ernest B. Paul, New Haven, Conn., assignors to The Echter-Paul Corporation, New Haven, Conn., a corporation of Connecticut

Application June 30, 1948, Serial No. 36,014

4 Claims. (Cl. 49—77)

1

The present invention relates to improvements in methods for cutting glass and relates more particularly to methods for cutting a plurality of rounded (circles, ovals, etc.) blanks from sheets of glass such, for instance, as blanks which are useful as crystals for clocks, watches and other instruments.

Heretofore it has been the general practice to scribe upon the surface of a sheet of glass a plurality of incisions or outline-cuts which constitute incipient fractures. Such prior practice, however, has located the said outline-cuts markedly spaced from each other so that an uncut portion of the sheet of glass intervened between each blank of an adjacent pair of blanks. The described practice has required the further cutting of the portions of the sheet outside of the said blanks in order to complete the incipient fractures into complete fractures and to free the said blanks from the surrounding portions of the sheet. This procedure has been slow and expensive and has produced a wasteful number of defective or broken blanks.

We have discovered that the major portion of the defects of the described prior practice may be obviated by the simple expedient of causing the rounded outline-cuts defining one rounded blank to substantially coincide with or be superimposed upon a portion of the rounded outline-cut defining an adjacent blank, as will be apparent from the following description considered in conjunction with the accompanying drawings.

One of the main objects of the present invention is to provide a superior method for cutting rounded glass blanks whereby over-all costs are kept at a minimum.

Another object of the present invention is to provide a superior method of the character described whereby a plurality of rounded blanks may be produced from a sheet of glass with a minimum number of cuts.

A further object of the present invention is to provide a superior method for cutting rounded glass blanks whereby a minimum number of defective blanks is produced.

A still further object of the present invention is to provide a superior method of the character described which is suitable for being carried out by automatic machinery.

With the above and other objects in view, as will appear to those skilled in the art from the present disclosure, this invention includes all features in the said disclosure which are novel over the prior art.

2

In the accompanying drawings, in which certain modes of carrying out the present invention are shown for illustrative purposes:

Fig. 1 is a face view of an elongated sheet of glass from which a plurality of rounded blanks may be produced in accordance with the present invention;

Fig. 2 is a similar view but showing the said sheet after the same has been provided with a plurality of rounded outline-cuts to produce in the said sheet the desired incipient fractures;

Fig. 3 is a broken sectional perspective view taken on the line 3—3 of Fig. 2, but on a larger scale;

Fig. 4 is a transverse sectional view taken on the line 4—4 of Fig. 2, but on a larger scale, and showing the effect of flexing the edge-portions of the sheet to complete or "open" the incipient fractures and permit the separation of the said edge-portions from the blanks;

Fig. 5 is a face view of the parts of the sheet of glass after the same has been provided with the plurality of outline-cuts and has been flexed to "open" the incipient fractures and with the resultant parts shown as separated, for clarity of illustration;

Fig. 6 is a perspective view of one of the resultant blanks; and

Fig. 7 is a face view similar to Fig. 2 but showing the extra cuts required in accordance with the prior general practice.

A preferred mode of carrying out the method of the present invention comprises providing an elongated sheet or strip of glass or equivalent material 10 indicated in Fig. 1, which sheet is preferably of a width slightly exceeding the width of the blanks to be cut therefrom and of a length substantially equal to the total length of the desired plurality of blanks.

As is indicated in Figs. 2 and 3, there is scribed upon the face of the sheet 10 a plurality of rounded outline-cuts 11 which constitute incipient fractures and each of which outlines a complete blank 12 which it is desired to produce. In the instance shown, eight blanks 12 are provided for and it is to be noted that the respective outline-cuts 11 of any two adjacent outline-cuts substantially coincide with and preferably are superimposed upon the nearest portion of the outline-cut defining each adjacent blank 12. Preferably, also, the outline-cuts 11 at the respective opposite ends of the sheet 10 intersect the ends of the said sheet, while in a transverse direction the group of outline-cuts 11 are spaced

inwardly from the respective opposite side edges, as is apparent by reference to Figs. 2 and 3.

The outline-cuts 11 will normally be of V-form, and while it is preferred that each of said outline-cuts should coincide with a portion of a next adjacent outline-cut, it is sufficient for practical purposes to have a portion of one such V-form break through into the next adjacent V-form. The distance between the respective apices of such V-form outline-cuts should always be less than twenty-five percent of the thickness of the glass being cut.

After being provided with the incipient fractures defined by the outline-cuts 11, the sheet 10 may be transversely flexed by any suitable manual or automatic means to accomplish what is known in the art as the "opening" of the said outline-cuts, i. e., the causing of the incipient fractures to become complete fractures 13 (Fig. 4) extending from face to face through the sheet 10 or its equivalent to thus not only free the blanks 12 from each other and from the remaining portions of the sheet 10 but also freeing the two side-strips 14 and 15 from each other. The respective inner edges of the opposite side-strips 14 and 15, will each have a scalloped outline, as is indicated in Fig. 5.

In cases where extremely long side-strips 14 and 15 are produced, the same are apt to break into two or more pieces, but this in no way detracts from the economy of the method of the present invention.

The outline-cuts 11 or their equivalent may be produced in a manner well known in the art, by wheel-cutters or by diamond-cutters or their equivalent.

Inasmuch as there is substantially no uncut material between each adjacent pair of outline-cuts 11, the said outline-cuts may be completely "opened" to form the complete fractures 13, without requiring cuts in addition to the said outline-cuts in order to permit the said "opening," as has been the case in the prior general practice.

In Fig. 7 is illustrated an example of prior practice in producing rounded blanks from a sheet of glass.

In the prior practice, as schematically indicated in Fig. 7, a plurality of outline-cuts 16 are produced in a sheet of glass 17 in such manner that each outline-cut 16 is separated from an adjacent outline-cut by an uncut web 18. Before the incipient fractures produced by the outline-cuts 16 can be converted into complete fractures to thus free the blanks 19 from each other and from the adjacent material of the sheet, connecting-cuts such as 20 must be made in the various webs 18. It is further the custom to provide connecting-cuts such as 21 extending inwardly from the side edges of the sheet 17 to the outline-cuts 16, as is indicated in Fig. 7.

Connecting-cuts such as 20 can only be produced by careful manipulation of a glass cutter so as not to carry over into either of two adjacent blanks 19, while the connecting-cuts 21 may be made by specially designed glass-cutting snips but here, again, with the danger of fracturing the actual blanks which it is desired to produce.

From the foregoing it will be apparent that by adopting the simple expedient of causing one rounded outline-cut to substantially coincide with or preferably be superimposed upon an adjacent outline-cut at their nearest point of adjacency, the side-strips 14 and 15 are separated from each other and may be readily removed to thus free the blanks 12 or their equivalent without injury to the said blanks.

The invention may be carried out in other specific ways than those herein set forth without departing from the spirit and essential characteristics of the invention, and the present embodiments are, therefore, to be considered in all respect as illustrative and not restrictive, and all changes coming within the meaning and equivalency range of the appended claims are intended to be embraced therein.

We claim:

1. The method for cutting a plurality of substantially-abutting rounded blanks from a sheet of glass or the like, each of the said blanks having its peripheral edge substantially perpendicular to the plane of the said sheet, the said method comprising the steps of: scribing the surface of a sheet of glass to provide the same with a plurality of substantially-abutting continuous rounded incipient-fracture outline-cuts with each outline-cut forming a closed figure outlining a complete blank which it is desired to produce from the said sheet and with a portion of one outline-cut substantially coinciding with a portion of an adjacent outline-cut so as to leave substantially no uncut material between coinciding portions of two adjacent outline-cuts and with each of said outline-cuts located inwardly of the side edges of the said sheet thus leaving a continuous marginal strip at each of the said side edges, and subsequently breaking away the marginal strips of the said sheet outside of the said outline-cuts to free the said blanks.

2. The method for cutting a plurality of substantially-abutting rounded blanks from a sheet of glass or the like, each of the said blanks having its peripheral edge substantially perpendicular to the plane of the said sheet, the said method comprising the steps of: scribing the surface of a sheet of glass to provide the same with a plurality of substantially-abutting continuous rounded incipient-fracture outline-cuts with each outline-cut forming a closed figure outlining a complete blank which it is desired to produce from the said sheet and with a portion of one outline-cut substantially coinciding with a portion of an adjacent outline-cut so as to leave substantially no uncut material between coinciding portions of two adjacent outline-cuts and with each of said outline-cuts located inwardly from the side edges of the said sheet thus leaving a continuous marginal strip at each of the said side edges; and subsequently transversely flexing the said sheet to open the said outline-cuts and removing the marginal strips of the said sheet outside of the said outline-cuts to free the said blanks.

3. The method for cutting a plurality of substantially-abutting rounded blanks from a sheet of glass or the like, each of the said blanks having its peripheral edge substantially perpendicular to the plane of the said sheet, the said method comprising the steps of: scribing the surface of a sheet of glass to provide the same with a plurality of abutting continuous rounded incipient-fracture outline-cuts with each outline-cut forming a closed figure defining a complete blank which it is desired to produce from the said sheet and with a portion of one outline-cut superimposed upon a portion of an adjacent outline-cut so as to leave substantially no uncut material between the superimposed portions of two adjacent outline-cuts and with each of said outline-cuts located inwardly from the side edges of the said sheet thus leaving a continuous marginal strip at each of the said side edges; and subsequently removing the marginal strips of the said sheet outside

of the said outline-cuts to free the said blanks.

4. The method for cutting a plurality of substantially-abutting rounded blanks from a sheet of glass or the like, each of the said blanks having its peripheral edge substantially perpendicular to the plane of the said sheet, the said method comprising the steps of: scribing the surface of a sheet of glass to provide the same with a plurality of abutting continuous rounded incipient-fracture outline-cuts with each outline-cut forming a closed figure defining a complete blank which it is desired to produce from the said sheet and with a portion of one outline-cut superimposed upon a portion of an adjacent outline-cut so as to leave substantially no uncut material between the superimposed portions of two adjacent outline-cuts and with each of said outline-cuts located inwardly from the side edges of the

said sheet thus leaving a continuous marginal strip at each of the said side edges; and subsequently transversely flexing the said sheet to open the said outline-cuts and removing the marginal strips of the said sheet outside of the said outline-cuts to free the said blanks.

DAVID ECHTER.
ERNEST B. PAUL.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
676,799	McLoughlin	June 18, 1901
744,245	Semmer	Nov. 17, 1903