(No Model.)

2 Sheets—Sheet 1.

J. C. DERBY.

TOOL FOR CUTTING OR TRIMMING GLASS.

No. 316,430. Patented Apr. 21, 1885.

Fig. 1.

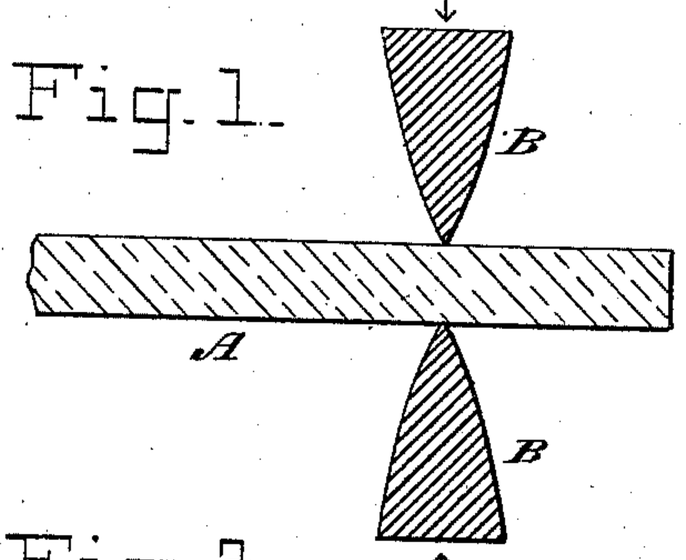


Fig. 2.

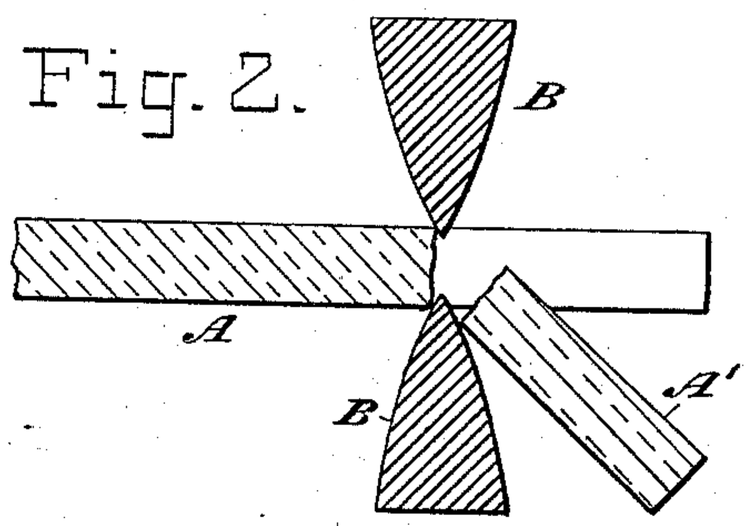


Fig. 3.

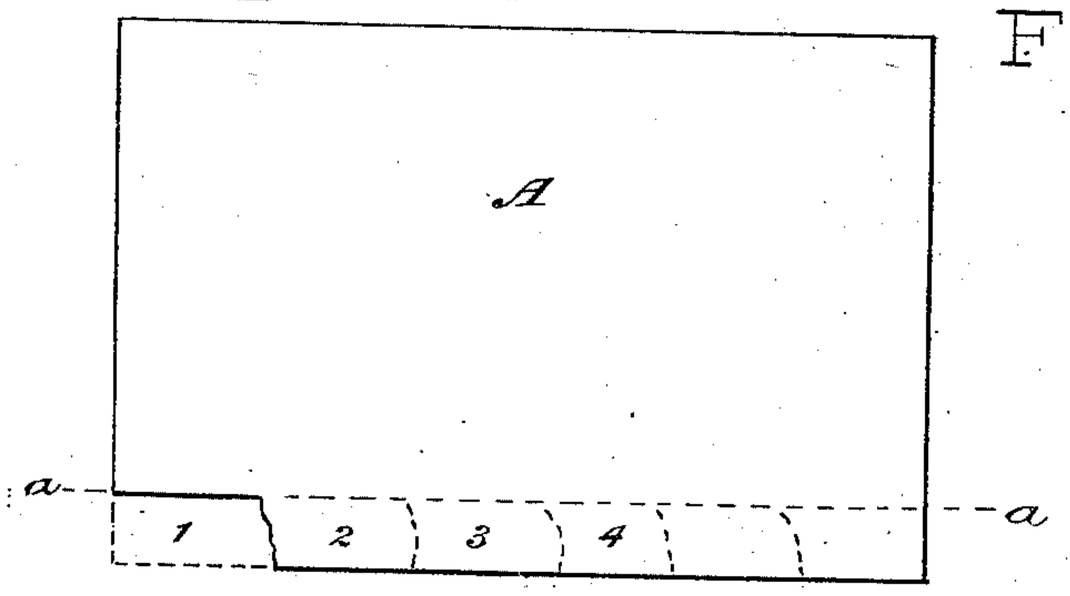


Fig. 4.

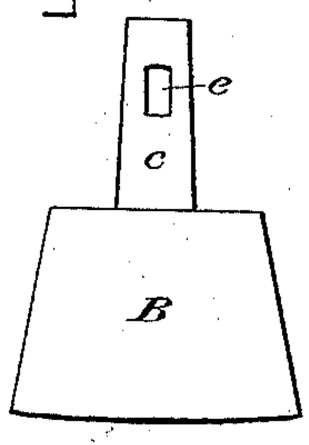


Fig. 5.

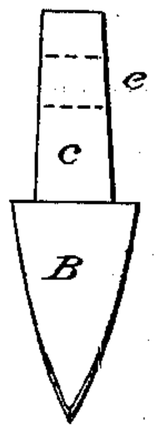


Fig. 6.

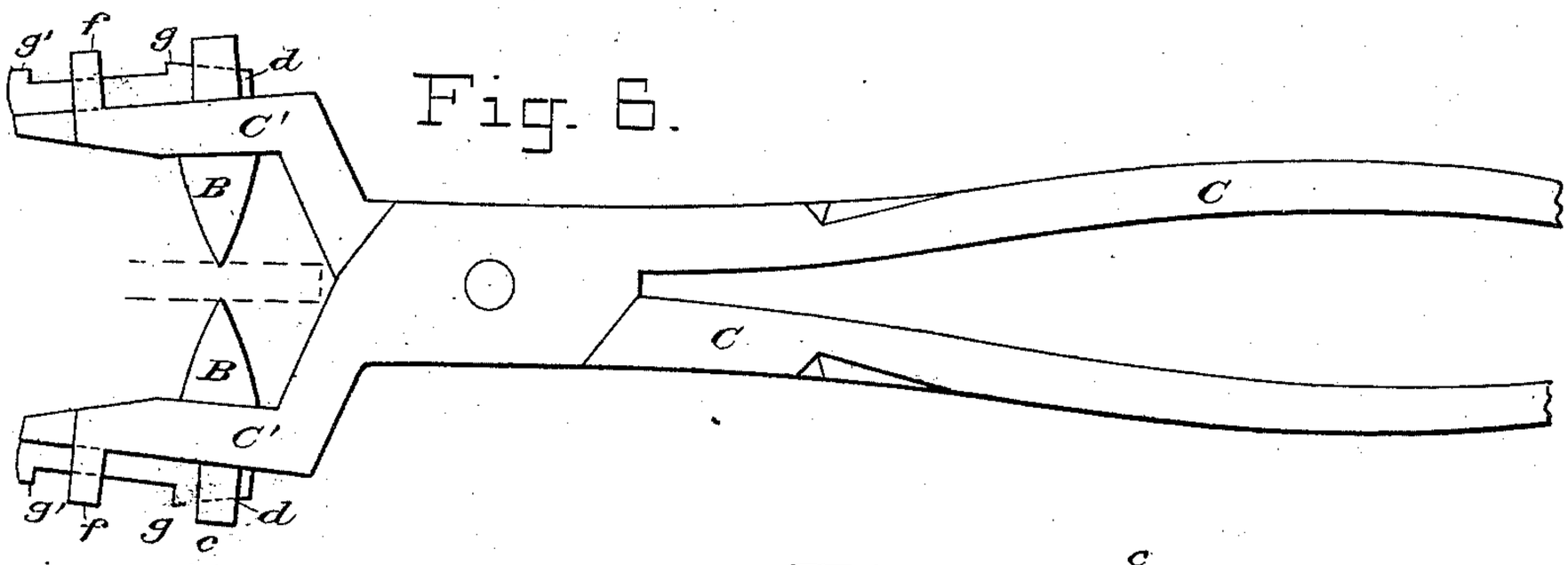


Fig. 7.

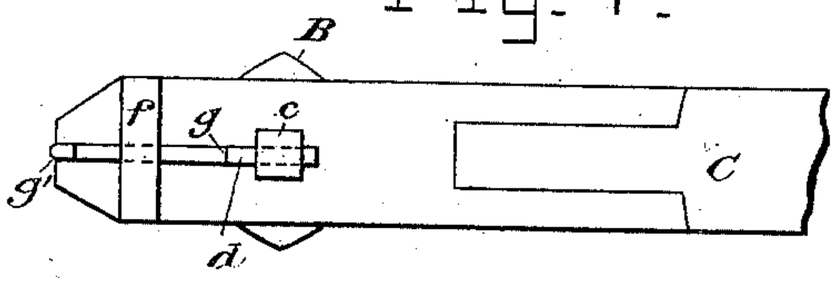
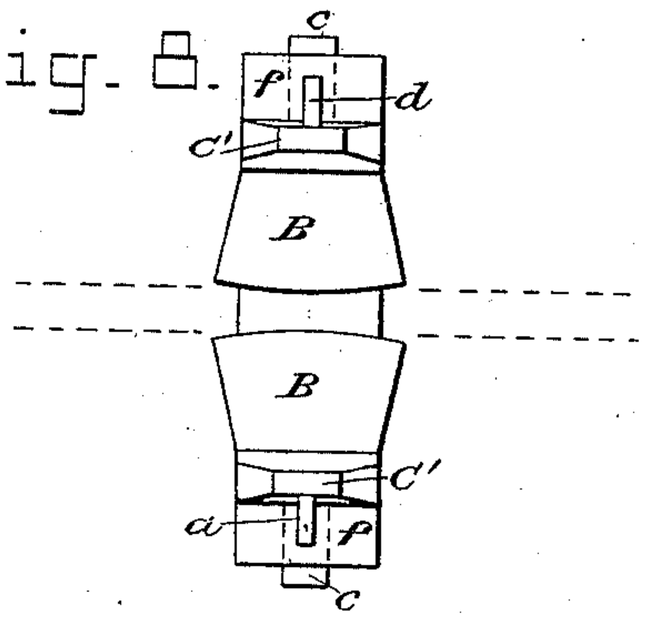


Fig. 8.



WITNESSES:

Geo. H. Fraser.

E. B. Bolton

INVENTOR:

John C. Derby

By his Attorneys,

Burke, Fraser & Bonnell

(No Model.)

2 Sheets—Sheet 2.

J. C. DERBY.

TOOL FOR CUTTING OR TRIMMING GLASS.

No. 316,430. Patented Apr. 21, 1885.

Fig. 9.

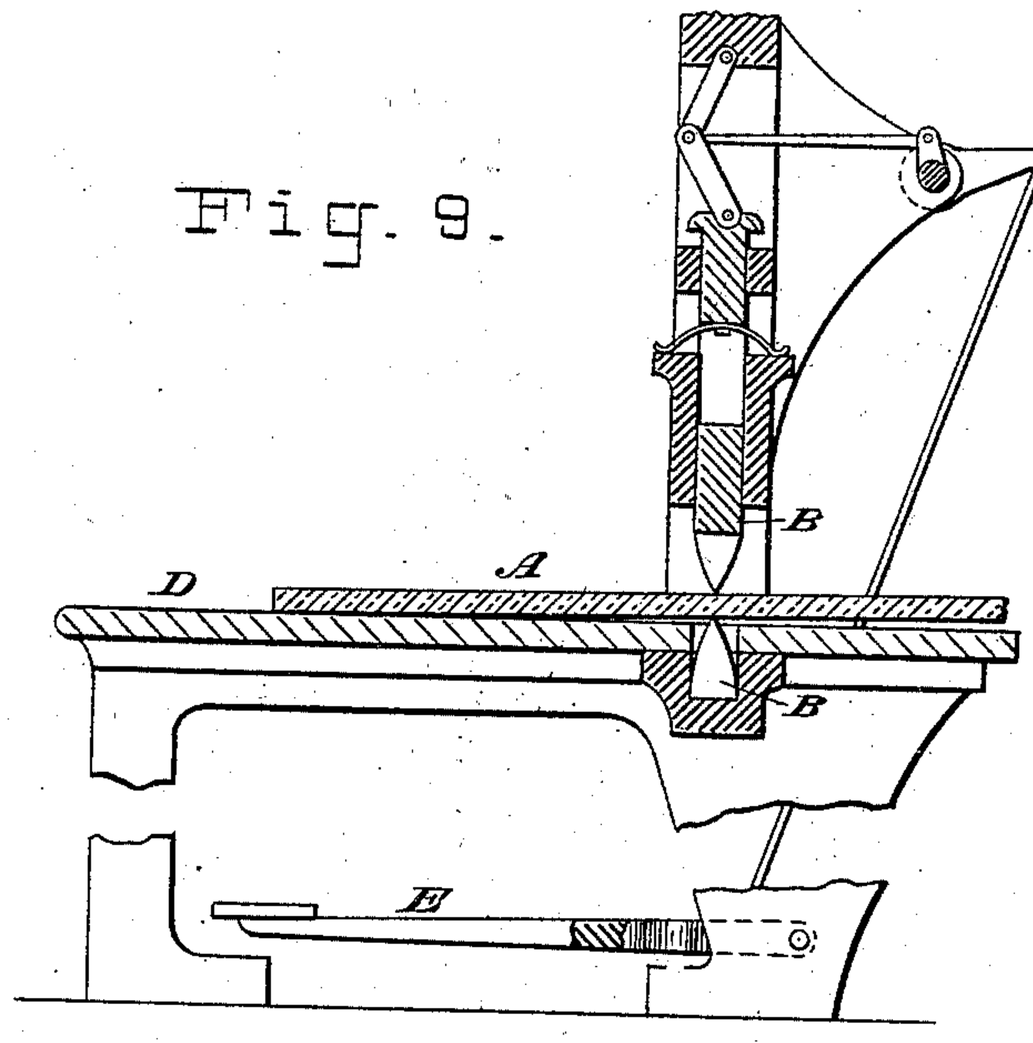


Fig. 10.

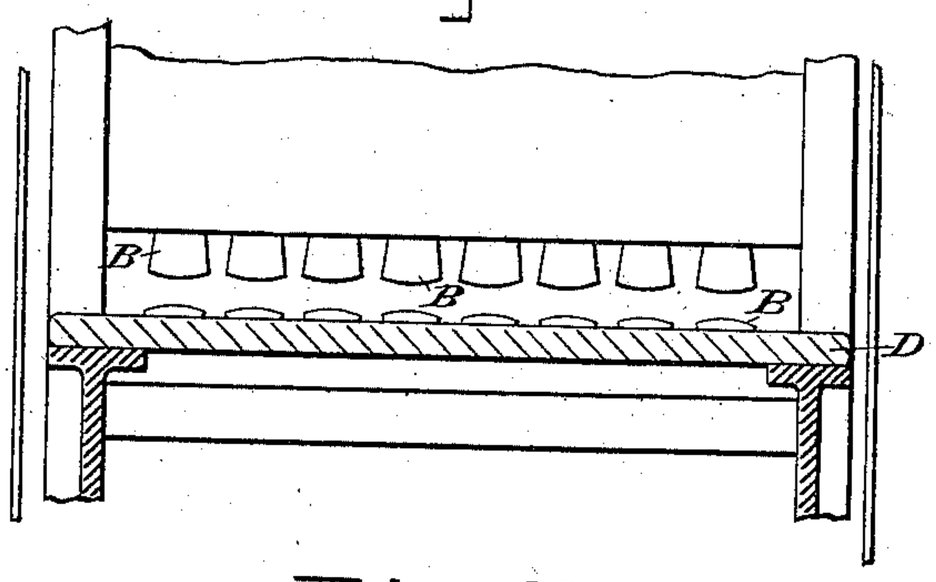


Fig. 11.

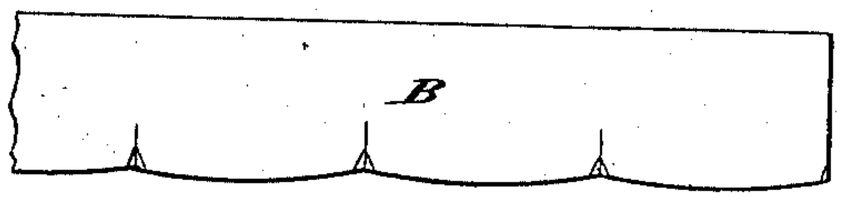


Fig. 12.

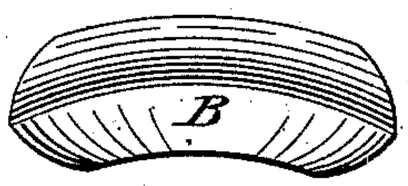
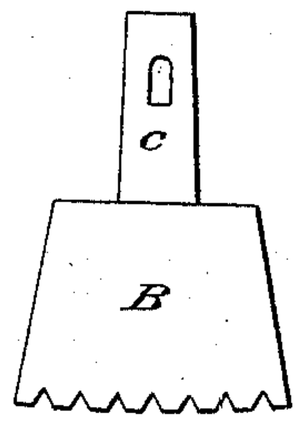


Fig. 13.



WITNESSES:

E. B. Bolton

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INVENTOR:

John C. Derby,

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UNITED STATES PATENT OFFICE.

JOHN C. DERBY, OF NEW YORK, N. Y.

TOOL FOR CUTTING OR TRIMMING GLASS.

SPECIFICATION forming part of Letters Patent No. 316,430, dated April 21, 1885.

Application filed August 28, 1882. Renewed March 27, 1885. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. DERBY, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in the Art of Cutting or Trimming Glass and in tools or instruments therefor, of which the following is a specification.

The object of my invention is to provide a means of cutting or trimming plates or sheets of glass, especially very thick plate-glass, by which the risk of fracture incurred by present methods shall be avoided.

Panes of thin glass—such as common window-glass—are easily cut with the diamond, the portion or strip to be removed being grasped with the fingers or caught in a notch in the glazier's tool and broken off from the pane with but very slight risk of breakage, the score cut by the diamond being sufficiently deep in proportion to the thickness of the glass to determine the line of the fracture or the breaking off of the strip; but thick plate-glass is very difficult to trim in this way, it being impossible to cut a sufficiently deep score with a diamond, even when both surfaces are scored, to insure that the fracture shall follow the score, and as a consequence the fracture will frequently extend into the plate or pane in the form of a crack, sometimes breaking it into two or more pieces, and always greatly deteriorating the pane or plate for the purposes to which such glass is commonly applied. Much loss is in this way occasioned to all dealers and workers in plate-glass, especially in the more valuable kinds, since the thicker and larger is the plate the greater is its value, and the greater also is the risk of ruining it in the operation of cutting.

I have discovered that if a short wedge of hard material and of suitable shape be placed with its acute angle or edge against the surface of a thick glass plate on one side and near the edge of the plate, and another like wedge be placed exactly opposite to this on the other side of the plate, and if sufficient pressure be brought to bear against these wedges to force their edges through the skin of the glass, that the plate will be severed at this point, and that the fracture will extend from the end of the cut made by the wedges to the nearest edge of the plate, thus detaching a piece of glass, which drops free from the plate. The cut thus made is straight, following the two cutting-edges and then running back to the edge of the plate, so that by afterward moving the wedges along on the plate and repeating the operation another piece can be cut or bitten out, thus continuing the line of the cut, and by successively repeating this operation the plate can be trimmed in a straight line along one edge, and this with absolutely no risk of a crack extending into the plate, or of its becoming otherwise broken or injured. A reference to the accompanying drawings will elucidate this operation.

Figure 1 is a cross-section of the plate of glass, showing the shape and relative positions of the two wedges. The glass is lettered A, the wedges B B, and the short arrows denote the direction of the pressure.

Fig. 2 is a like view, except that the pressure has here been applied to the wedges, and they have done their work with the result of biting off a piece, A′, which is seen as falling from the plate.

Fig. 3 is a plan view of the plate or pane of glass, on a smaller scale, after the first piece has been bitten off. It is desired to trim this plate on the line *a a*, to do which a piece is first cut out, as shown in full lines at 1, then another (marked 2) is cut, then a third, (marked 3,) and so on clear across the plate.

Fig. 4 is a front view of one of the wedges B, and Fig. 5 is an end view thereof. It will be seen from Fig. 4 that the cutting-edge of the wedge is slightly rounded, so as to penetrate the skin of the glass first in the middle of the edge, the cut extending thence to each end thereof. This slightly-curved shape is a highly important feature of my invention, as by it the fracture or cut is commenced at one point and guided in both directions until the cohesive power of the glass succumbs to the disruptive pressure of the wedges when the piece A′ flies off. By this construction, too, a much longer cut may be made with the same power or pressure than if the edge were straight. A straight-edged wedge with square or sharp corners would be apt to cause cracks to extend from these corners into the plate of glass in the same manner as from a sharp-

pointed spike, if that were driven into the glass. The edge is only sufficiently rounded to prevent these corners from forcibly touching the glass at the commencement of the cut, but still to permit the cutting-edge near each corner to press upon the glass before it gives way, and so determine the direction of the fracture. I have shown the wedges as swelled on their front and back surfaces, but this is not essential.

Fig. 6 is a side elevation of a hand-tool for trimming glass, constructed according to my invention. Fig. 7 is a plan of a portion thereof, and Fig. 8 is a front or end elevation thereof. In these figures C C are two arms, levers, or handles pivoted together in the manner common to pliers. The arms C′ C′ of these levers are spread apart and extend approximately parallel to each other, and to these arms are fixed the wedges or cutting-jaws B B with their cutting edges exactly opposite to each other. The fastening by which the wedge is fixed to the arm consists of a square shank, *c*, projecting from the base of the wedge, Figs. 4 and 5, and passing through a square socket in the arm, on the other side of which a wedge or key, *d*, is driven through a hole, *e*, in the shank. The key *d* is prolonged toward the end of the arm C′, there passes through a hole in a perpendicular lug, *f*, on the arm, and has opposite shoulders, *g g′*, which prevent its escape and yet permit it to be tightened or withdrawn. With a few taps of a hammer both cutting-wedges may be detached from the handles, and others be substituted in their places.

The tool is shown in Fig. 6 as fully closed. It will be observed that the opposite cutting-edges are considerably separated. In no case should they be permitted to touch when the tool is closed, as in cutting, after the piece of glass snaps off, the edges fly toward each other, and, if permitted to touch, will strike edge to edge and dull each other. I prefer that the edges be stopped by the closing of the jaws immediately after they have penetrated the glass far enough to cut off the piece A′, as thereby splintering of the glass is prevented. The tool shown in Fig. 6 is designed to cut glass of the thickness shown in dotted lines, or of greater thickness up to the limit of opening of the jaws.

Instead of being mounted on levers C C for hand use the wedges B B may be placed in a fixed frame or machine and operated by power. Fig. 9 is a vertical section of such a machine. The lower wedge B is here fixed in the frame of the machine with its edge projecting slightly above the table D on which the glass to be cut is laid. The upper wedge is fixed to the vertically-sliding frame of a toggle-press, of usual construction, worked from a treadle, E. Instead of a toggle-press, a screw-press or other means of securing a powerful leverage may be used. In a machine of this character a number of wedges B B may be arranged end to end, as shown in the fragmentary front view, Fig. 10, and all worked simultaneously, thereby cutting off a long strip or dividing a large plate at one operation. The plate to be divided has thus only to be slipped between the rows of wedges to the proper point and the upper row of wedges forced down, whereupon the plate is severed at one stroke, the fracture following the line of cutting-edges without deviating to either side, and without risk that cracks will extend into either portion of the plate. With this arrangement a plate may be trimmed along one edge without the delay of cutting out successive pieces, as shown in Fig. 3.

Instead of separate wedges arranged end to end a long wedge having a series of curves or scallops on its edge may be used, as shown in Fig. 11, which is a front view of such a wedge, or its edge may be made straight or unscalloped.

It is not necessary that the cutting-edge of the wedges extend in a straight line in order to make a straight cut, as it is practicable to make a curved cut by curving the cutting-edges of the wedges, as shown in Fig. 12, which is an edge view or plan of such a wedge designed to trim out concaves in the edges of glass sheets. The form shown in Figs. 4 to 8 may be used to trim around convex edges, cutting off pieces whose lines of severance form tangents to the desired curve, and so very closely approximating the curve.

It may be of advantage to make the cutting-edge of the wedges in a series of points or serrations as shown in Fig. 13, which is a view of such a wedge answering to Fig. 4.

I am aware that strong scissors or shears have been used to trim by hand pieces of glass; but these operate on a different principle from my invention, and are capable only of chipping off small projecting points, which are more commonly broken or twisted off with nippers. Scissor-blades are unadapted to cutting a brittle vitreous substance, their action in cutting commencing at one end of the intended cut and traveling along the same as the blades come together, so that the cut or crack must necessarily precede the contact of the blades instead of following it, whereby all control of the direction of the cut is lost, and the plate is almost invariably certain to crack in the wrong direction. Furthermore, the edges of scissor-blades are not wedge-shaped in cross-section, but nearly rectangular, with one side lying nearly parallel to the surface of the material to be cut; nor do they stand exacly opposite each other on each side the material, since they must be arranged to pass each other as they close together.

I am also aware that slabs or blocks of stone have been split by laying them on one wedge and striking them a quick and severe blow with another wedge on the upper side opposite the wedge on which the stone is placed; but this is different from my invention in that

I employ no percussion, but only a gradual pressure to force the wedges together, and I employ the wedges to cut glass, which is a vitreous and highly brittle substance, whereas stone is granular and easily worked with a chisel. Glass could not be safely cut by percussive action, while stone could not, as I believe, be cut by the means described without percussion.

What I claim as new, and desire to secure by Letters Patent, is as follows:

1. A tool for cutting or trimming glass, consisting of a pair of pliers combined with cutting-wedges B, having hardened slightly-convex edges, which wedges are secured at their base ends to the jaws of the pliers, substantially as herein shown and described, and for the purpose set forth.

2. A tool for cutting or trimming plates of glass, consisting of the combination of wedges B B, having hardened edges, plier levers or handles C C, to which said wedges are removably connected and on which they are arranged facing each other edge to edge, with their edges out of contact when the levers C C are closed or brought together, substantially as set forth.

3. The combination of plier-levers C C, wedges B B, shanks *c c* on said wedges passing through sockets in said levers, eyes *e e* in said shanks, and keys *d d*, substantially as set forth.

4. The combination of plier-lever C, wedge B, having shank *c*, eye *e* in said shank, tapered key *d*, working in said eye, shoulders *g g'* on said key, and projection *f* on the lever C, having socket for confining said key between its said shoulders, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOHN C. DERBY.

Witnesses:

ARTHUR C. FRASER,

GEORGE H. FRASER.