July 25, 1950 R. C. BARRETT 2,516,668

GLASS CUTTER

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Fig. 1.

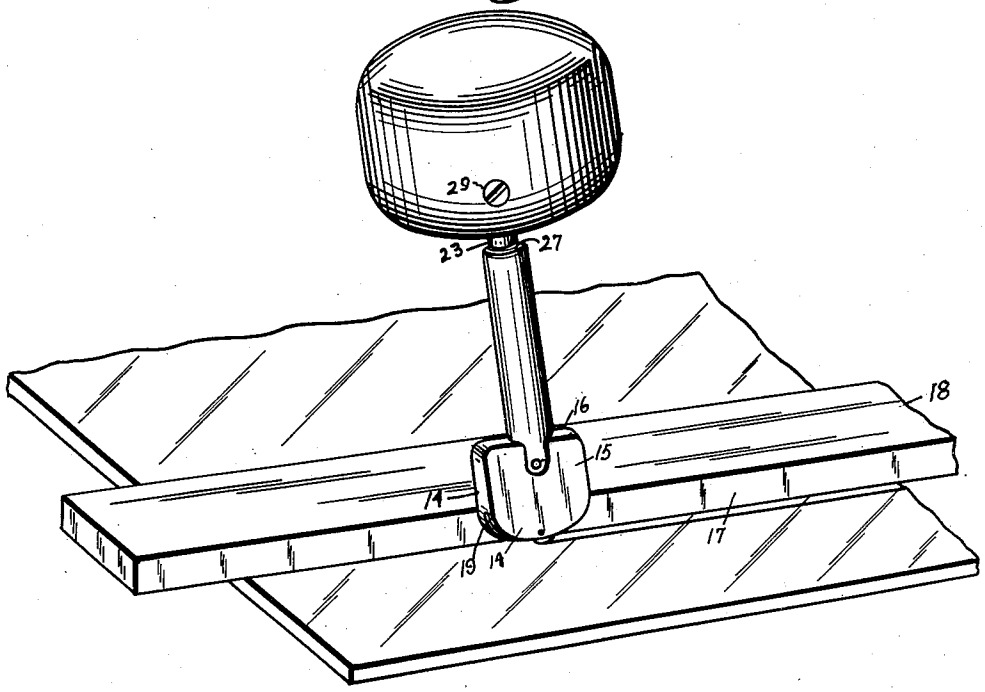


Fig. 2.

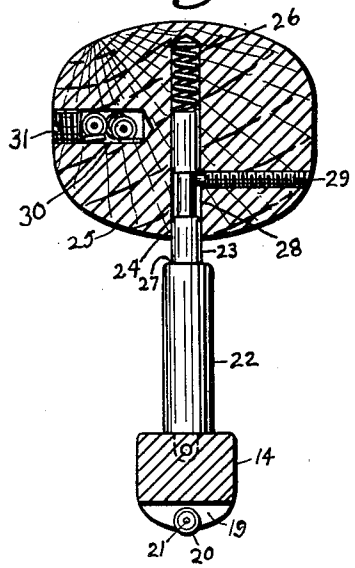


Fig. 3.

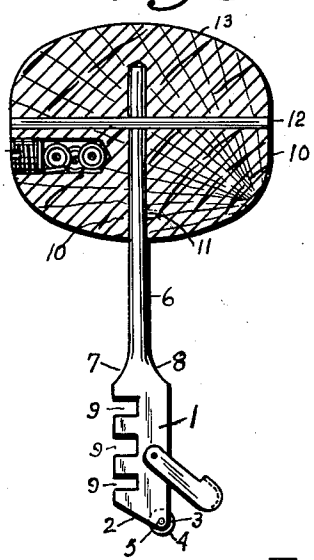
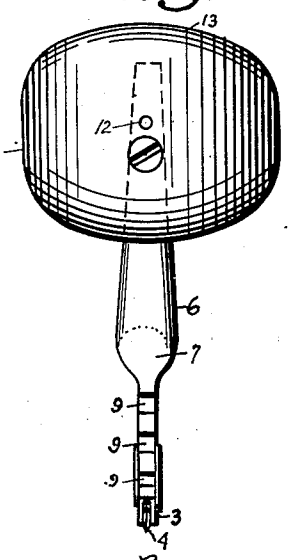


Fig. 4.



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GLASS CUTTER

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4 Claims. (Cl. 49—52)

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This invention relates to improvements in glass cutters for scoring a sheet of glass along a predetermined line to sufficient depth to enable the sheet to be broken accurately along said line. Usual glass cutters have handles of the type of the old-fashioned glazier's diamond glass cutter comprising a diamond mounted in a head having a thin handle which fits between the first and second fingers of the user with a wider portion adjacent the head having a concave depression on the upper surface thereof adapted to be engaged by a finger or fingers of the user and a like depression on the under side of the handle to be engaged by the thumb thereby enabling the diamond to be drawn along a predetermined score line. The glazier's diamond glass cutter will score the glass with a pressure approximating one pound.

The greater percentage of glass cutters which are made and sold at the present time have handles similar to those of the glazier's diamond glass cutter with a thin flat head having mounted therein between the parallel walls of the head a thin circular disk of hard material, usually in the form of a steel wheel, having a sharp peripheral cutting edge a portion of which projects beyond the end of the head. The cutting disk is usually of hard steel and the term "steel wheel" is used herein in the broad sense as including a wheel of any suitable material. In the use of steel wheel glass cutters a force of from six to ten pounds is required. Since all the downward pressure in usual glass cutter constructions is exerted by the finger tips several disadvantageous factors are present. (1) The novice or casual user does not know the correct position for holding the cutter; (2) his fingers are not accustomed to providing the necessary pressure; (3) he falters during the movement of the cutter along the predetermined score line as his fingers slip on the handle; (4) he tends to swerve the cutter into or away from the straight edge or other guide as the angles of his wrist and elbow change.

It is important that the plane of rotation of the cutting wheel must be kept in parallel with the edge of the guide or the edge of the wheel will be ruined quickly.

The principal object of the invention is to provide a steel wheel glass cutter which will be more effective in the hands of a novice as well as a skilled user.

One object of the invention is to provide a glass cutter of any type with a handle having a shank extending from the head in the central

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longitudinal axial direction thereof with a hand grip mounted upon the end of the shank having a convexedly curved surface to engage the palm of the hand of the user so that the necessary pressure upon the cutting instrumentality may be easily and comfortably exerted in correct relation to the position of the cutting instrumentality.

A further object of the invention is to provide a glass cutter having a steel cutting disk and a spheroidal hand grip rotatably mounted upon the shank of the cutter thereby permitting the wheel to run parallel to the straight edge or other guide in spite of the changing angles of the operator's wrist and elbow as the wheel is caused to travel along a predetermined score line.

A further object of the invention is to provide a glass cutter construction having a spheroidal hand grip adapted to fit the palm of the hand of the user provided with a bore or socket extending radially toward the portion engaged by the palm of the hand adapted slidably and rotatably to fit a cylindrical shank of the cutter with a compression spring of predetermined strength interposed between the end of the shank of the cutter and the bottom of the socket adapted to indicate to the user the necessary amount of pressure required for a clean cut in the sheet of glass throughout the length of the score line.

Other advantages which are attained by the present invention are as follows: In the conventional cutters the handle is made of cast iron or other material having a surface of sufficient roughness to permit a proper grip upon it, whereas the hand grip of the present invention may be of smooth surface wood, plastic, or other material, since the grip of the hand does not depend upon friction. The handle of the present invention may also provide a bore or cavity for the storage of spare parts, such as wheels, axles, screws, etc., which can be readily replaced for the original parts when necessary. A constant user can cut with a glass cutter embodying the present invention all day with much less fatigue and without skin irritation, formation of calluses, etc., which are inherent in the use of usual types of cutters.

In the commercial production of sheet glass a suitable bait is dipped into a molten pool of glass of proper consistency and then raised between complementary parallel rolls suitably spaced to provide the desired thickness. When a sheet of desired length has been raised above the rolls an operator passes the glass cutter along

a guide suitably positioned transversely of the sheet to score the sheet in such manner that the section of predetermined length may be broken therefrom along the score line. The operator proceeds in thus cutting the glass throughout the day, or such portion thereof, as is required and consequently is subject to great fatigue. Also in glass storing and dispensing stores and plants glass cutting operators are required to work continuously for long periods and are likewise subject to fatigue and wear which is greatly reduced or eliminated by reason of the present invention.

These and other objects and features of the invention will more fully appear from the following description and the accompanying drawings and will be particularly pointed out in the claims.

Preferred embodiments of the invention are illustrated in the accompanying drawings, in which:

Fig. 1 is a perspective view of a preferred form of cutter shown as producing a score line in a sheet of glass along a straight edge placed at a distance from an end of the sheet;

Fig. 2 is a vertical diametrical sectional view through the spheroidal hand grip embodying the present invention, showing the shank of the cutter extending radially into a socket in the cutter, a spring interposed between the end of the socket and the shank of the cutter, and means for limiting the movement of the shank within the socket, and also illustrating the chamber in the hand grip for spare parts;

Fig. 3 is a similar view illustrating the invention as applied to a cylindrical shank of a usual form of glass cutter; and,

Fig. 4 is a front view of the cutter illustrated in Fig. 3.

The glass cutter, as illustrated in Figs. 3 and 4, is of a conventional type comprising a head 1 of generally rectangular form having a beveled end 2 the junction of which with the longitudinal back of the cutter provides a bifurcated end portion 3, the cutting disk 4 being mounted on a suitable pivot 5 in such manner that the peripheral edge of the cutting disk projects beyond said end. The shank of the cutter, which is integral with the head, is provided with an enlarged tapering shank portion 6 having adjacent the head concave sections 7 and 8 on opposite sides adapted to be engaged by the finger and thumb of the operator as in usual cutter constructions such as that disclosed in my prior Patent No. 2,283,134, May 12, 1942. The head is also provided with a series of slots 9 of different widths adapted to engage the edge of the plate of glass to be broken from the body portion thereof as in usual constructions. A spheroidal hand grip 10 is provided with a radial socket 11 extending well into the body of the hand grip 10 and adapted to be secured therein by a rod 12 which passes preferably diametrically through the spheroidal hand grip 10. The spheroidal hand grip 10 has a convexedly curved upper surface 13 adapted to fit the palm of the hand of the user, thereby enabling him to exert a pressure in the axial direction of the head upon the cutting disk which is offset from said axis in such manner that the pressure of the hand will not only be sufficient to cause the cutting disk to score the sheet of glass to a predetermined depth but also to cause it to travel along a predetermined line which is determined by a straight edge or guide against which the flat side of the

head is engaged. Thus the invention may be applied to a usual form of glass cutter whether the cutting instrumentality is a disk wheel as illustrated, or a diamond mounted in the pointed end of the head. In either instance, irritation of the fingers of the hand is avoided and the pressure exerted, whether light as in the use of a diamond cutter, or heavy as in the use of the disk wheel cutter, more comfortably applied and fatigue of the user greatly minimized.

The preferred form of glass cutter which is illustrated in Figs. 1 and 2 comprises a thin generally rectangular head 14 having parallel sides 15 and 16 either of which is adapted to be moved along the edge 17 of a suitable guide 18, as illustrated in Fig. 1.

The lower end of the head desirably is of arcuate form having a slot 19 therein midway between and parallel to the walls 15 and 16 of the head and the cutting disk 20 is journaled upon a stud 21 extending through the walls of the slot 19 with the peripheral edge of the disk projecting beyond the arcuate end of the head. The pivot of the cutting disk 20 desirably is sufficiently spaced from the longitudinal axis of the head to enable the resultant of the pressure applied to the head to force the disk along the line defined by the guide 18. The cutter head is provided with a preferably cylindrical shank 22 which is rigidly secured to or integral with the head 14 and extends in the central longitudinal axial direction of the head. The shank 22 may be of any suitable length and is provided with a cylindrical extension 23 of smaller diameter which extends into and fits a cylindrical socket 24 extending radially into the spheroidal head 25 well beyond the center thereof. A spiral compression spring 26 of predetermined force is interposed between the base of the socket and the upper end of the extension 23 of the shank. A spheroidal hand grip is mounted upon the socket extension at such distance from the shoulder 27 at the junction of the section 22 of the shank and its extension 23 that when the spring is so collapsed by the pressure of the palm of the hand upon the convex upper surface of the hand grip a minimum amount of pressure will be applied to the cutting disk to cause it to score the sheet of glass to the necessary depth.

Suitable means are provided for retaining the shank of the cutter and its spring within the hand grip. The desired construction for accomplishing this purpose comprises a circumferential recess 28 in the shank extension 23 of sufficient length to permit the hand grip to engage the shoulder 27 and a screw 29 extending transversely through the hand grip has a cylindrical end portion extending into said recess. The spheroidal head desirably is provided with a cylindrical recess 30 extending into it perpendicular to the axis of the shank of the cutter to form a storage place for spare disks, pivots, etc., and a plug screw 31 may be provided for removably retaining the spare parts thus stored when required for substitution for the original parts.

In the operation of the device illustrated in Figs. 1 and 2 the flat side of the head is placed in engagement with the straight edge or other suitable guide, pressure applied by the palm of the hand upon the curved upper surface of the spheroidal head in the direction of the axis of the shank, thereby exerting sufficient pressure upon the cutting disk to cause it to penetrate the surface of the glass to the desired depth when the compression spring 26 has been collapsed suf-

ficiently to cause the lower surface of the hand grip to engage the shoulder 27 on the shank. Thus proper pressure is applied to accomplish this purpose and the resultant of such pressure will cause the cutting disk, which is somewhat offset from the axis of the shank to travel accurately along the straight edge or other guide, thereby enabling the glass cutter to be used comfortably and with such accuracy that a score of predetermined depth will be made in the surface of the glass plate throughout the length of the score line as defined by the edge of the guide.

It will be understood that the embodiments of the invention shown and described herein are of an illustrative character and that various modifications in the form of the hand grip and other parts may be made within the spirit and scope of the following claims.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is:

1. A glass cutter, for scoring a sheet of glass along a predetermined line, having a narrow flat head, a cylindrical shank rigid therewith extending therefrom in substantial alinement to the central longitudinal axis of said head and perpendicular to the axis of rotation of the cutting disk, a thin circular cutting steel disk having a sharp edge rotatably mounted on the lower end of said head and extending peripherally therebeyond, means for applying pressure to said cutting disk comprising a spheroidal hand grip rotatably mounted on the upper end of said shank with a convex surface to fit the palm of the hand of the user in radial alinement with said shank, whereby sufficient pressure may be comfortably applied to the cutting disk to cause uniform penetration thereof into the surface of the glass throughout the length of the scoring line.

2. A glass cutter, for scoring a sheet of glass along a predetermined line, having a head, a cylindrical shank rigid therewith extending therefrom in substantial alinement with the central longitudinal axis of said head having a cylindrical end extension of less diameter extending therebeyond forming a shoulder therebetween, a steel cutting disk having a sharp cutting edge rotatably mounted on the end of said head with a portion of its periphery extending beyond said end, means for applying pressure to said disk comprising a large spheroidal hand grip fitting the palm of the hand of the user provided with a radial socket rotatably and slidably fitting the extension of said shank, a coiled compression spring of predetermined strength seated in said socket and engaging the end of said shank adapted when the hand grip is depressed into engagement with the shoulder upon said shank to insure that sufficient force is applied to the cutting disk to cause proper penetration of the cutting disk into the surface of the glass throughout the scoring line, and means for preventing detachment of the hand grip from said shank.

3. A glass cutter, for scoring a sheet of glass along a predetermined line, having a head, a

cylindrical shank rigid therewith extending therefrom in substantial alinement with the central longitudinal axis of said head having a cylindrical end extension of less diameter extending therebeyond forming a shoulder therebetween, a steel cutting disk having a sharp cutting edge rotatably mounted on the end of said head with a portion of its periphery extending beyond said end, means for applying pressure to said disk comprising a large spheroidal hand grip fitting the palm of the hand of the user provided with a radial socket rotatably and slidably fitting the extension of said shank, a coiled compression spring of predetermined strength seated in said socket and engaging the end of said shank adapted when the hand grip is depressed into engagement with the shoulder upon said shank to insure that sufficient force is applied to the cutting disk to cause proper penetration of the cutting disk into the surface of the glass throughout the scoring line, and means for preventing detachment of the hand grip from said shank comprising a circumferential recess in said shank extension and a screw extending transversely into said hand grip with its end engaging said recess, the recess being of sufficient length to enable the hand grip to engage the shoulder upon the shank.

4. A glass cutter, for scoring a sheet of glass along a predetermined line, having a narrow head with parallel sides and a convexedly arcuate end, a cylindrical shank rigid therewith extending from the opposite end of said head in substantial alinement with the central longitudinal axis of said head and having a cylindrical end section of less diameter extending therebeyond provided with a circumferential groove, a steel cutting disk having a sharp edge rotatably mounted on the end of said head suitably offset from the longitudinal axis of the head, means for applying pressure to said cutting disk comprising a large spheroidal hand grip fitting the palm of the hand of the user provided with a radial socket slidably and rotatably fitting the extension of said shank, a coiled compression spring of predetermined strength seated in said socket and engaging the end of said shank adapted when the hand grip is depressed into engagement with the shoulder on the shank to insure that sufficient force is applied to the cutting disk to cause proper penetration of the cutting disk into the surface of the glass and to cause the resultant of the force thus applied to force the cutter along the score line throughout its length.

RICHARD C. BARRETT.

REFERENCES CITED

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

FOREIGN PATENTS

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