July 4, 1933. J. H. WILHELM 1,916,874

FRAZING TOOL

Filed June 25, 1928

Fig. 1.

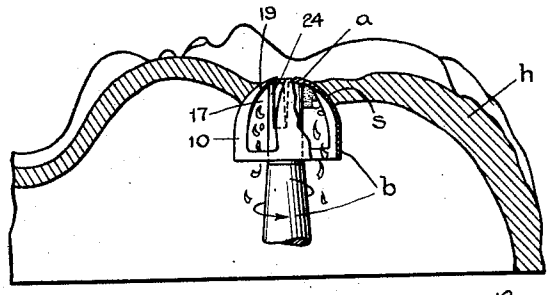


Fig. 2.

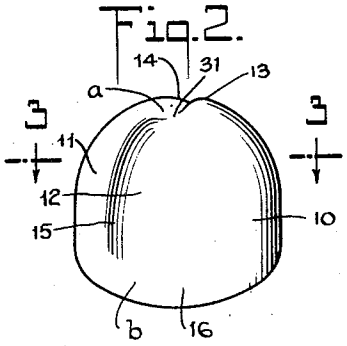


Fig. 3.

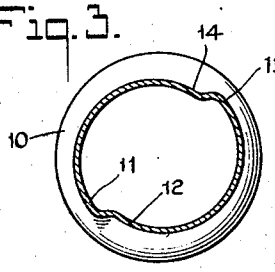


Fig. 4.

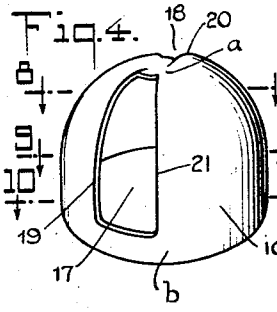


Fig. 5.

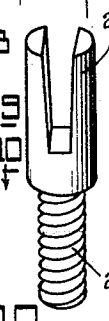


Fig. 8.

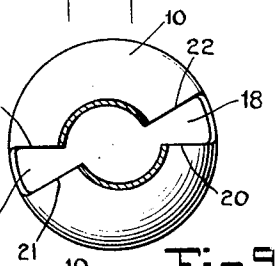


Fig. 6.

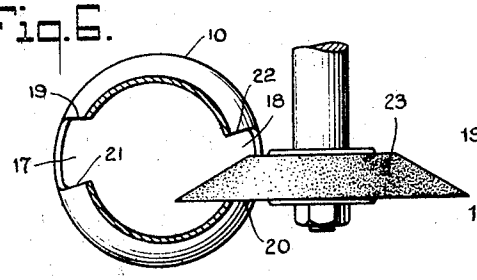


Fig. 10.

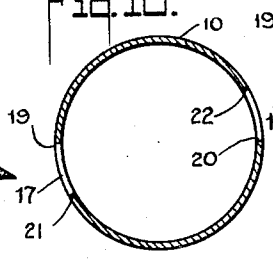


Fig. 9.

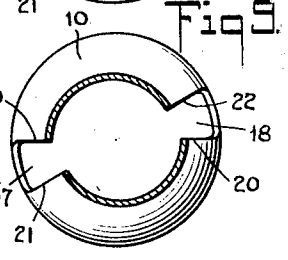


Fig. 11.

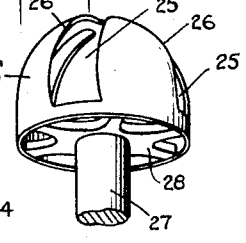


Fig. 12.

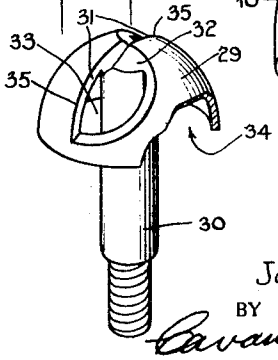
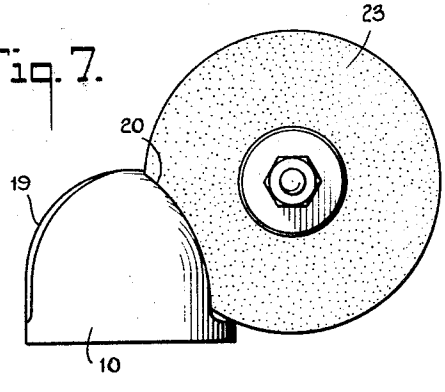


Fig. 7.



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UNITED STATES PATENT OFFICE

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FRAZING TOOL

Application filed June 25, 1928. Serial No. 288,024.

This invention relates to a frazing tool and more particularly to a tool for frazing sockets or apertures in various materials such as hardened plastic compositions of which dolls' heads are made and various other materials of similar or like nature.

Frazing tools most commonly employed in the arts for cutting sockets or eye openings in dolls' heads and the like are made to comprise a convex boring head having a plurality of teeth running longitudinally of the head and arranged circumferentially thereof. The operation and use of these frazing tools are attended with a number of drawbacks and objections. In operation the teeth of such frazers quickly become clogged with chips and shavings of the material or composition under treatment, this necessitating oft cleansing of the tool with consequent repeated interruptions of the frazing operation. The teeth of such frazers also readily become dull, particularly when used on hardened compositions, with the result that frequent sharpening of the tool is necessary. These frazers are frequently made of predetermined size to correspond with the diameters or general dimensions of the sockets or apertures that they are designed to form, and several sharpening operations of the teeth of these frazers have the result of reducing the size of the tool beyond such predetermined dimensions; and this reduction in size of the frazer results in shortening the useful life of the frazer.

The prime object of my present invention centers about the provision of an improved frazing tool designed and constructed to obviate or eliminate these objections in operation and use incident to frazing tools of prior design, the construction of the improved frazer of my present invention being such as to eliminate clogging of the tool under all circumstances, to obviate frequent sharpenings and to permit the same to be sharpened a large number of times without causing any substantial reduction in its effective size.

The frazing tool of my present invention further embodies the important constructional features of practically eliminating chattering of the tool and preventing any sideways cutting of the tool when the maximum size of the socket or opening has been obtained.

To the accomplishment of the foregoing and such other objects as will hereinafter appear, my invention consists in the elements and their relation one to the other, as hereinafter more particularly described and sought to be defined in the claims; reference being had to the accompanying drawing which shows the preferred embodiments of my invention, and in which:

Fig. 1 shows one embodiment of the frazer and the manner in which it is used;

Fig. 2 shows the form blank that illustrates the first step in the manufacture of the frazer;

Fig. 3 is a sectional view on line 3—3 of Fig. 2;

Fig. 4 shows a later step in the formation of the frazer;

Fig. 5 shows the supporting stud;

Figs. 6 and 7 show the step of sharpening the cutting edges of the frazer;

Figs. 8, 9 and 10 are sectional views along lines 8—8, 9—9, and 10—10, respectively, in Fig. 4; and

Figs. 11 and 12 show modified embodiments of the invention.

While the embodiments of the invention disclosed in this application relate to a frazer specifically designed for frazing eye sockets in dolls' heads, it will be understood that the frazer shown herein may be utilized for a large variety of materials and that the specific forms of the frazer shown herein is only illustrative of the principles of the invention.

One of the essential features of the construction of the frazer is that it is made in the form of a convex head having a surface cutting edge and an interior hollow or cavity defining a discharge valley for the chips and shavings; and in the preferred form of the invention this is accomplished by making the frazer in the shape of a hollow steel shell having its cutting edge or edges on the surface of the shell with the construction such that

the chips and shavings are free to fall through the hollow interior of the shell downwardly and thereby keep the cutting edges constantly clean and devoid of any accumulation of chips or shavings. Referring now more in detail to the drawing, I show such a convex head in the form of a cup-shaped steel shell 10 generally hemispherical in shape. While the hemispherical contour of the frazing head is preferred, it will be understood that any other shape or configuration having a cross-sectional diameter increasing from the apex to the base of the head may be employed with substantially equal effect; and the term "convex" or "cup-shaped" wherever used herein is meant to apply to any of such shapes or configurations.

In Figs. 2 to 4 of the drawing, I show the manner of producing the steel shell forming the head of the frazing tool. The cup-shaped steel shell 10 is first formed by a dieing operation to produce the shape or configuration shown in Figs. 2 and 3 of the drawing, the said shell being formed to provide one or more pairs of immediately adjacent parts which are displaced relatively to each other roughly along the line from the apex to the base of the shell. One pair of such displaced portions is indicated by the reference characters 11 and 12, the shell being so formed that the portion 12 is displaced inwardly with relation to the portion 11. In the embodiment shown in these figures, the shell is provided with two such pairs of portions, the second pair being indicated by the reference characters 13 and 14 and being diametrically opposed to the portions 11 and 12.

Incidental to this step of forming the shell, the apex is formed with a depression 31 having raised portions immediately adjacent thereto. This causes the upper ends of the cutting edges to be displaced upwardly from the adjacent material so that such upper ends of the cutting edge may be useful for initiating the cutting operation.

In Fig. 2 of the drawing, the line 15 indicates roughly the border line between the raised portion 11 and the depressed portion 12. The amount of displacement between the adjacent portions is at a maximum at the upper end of line 15, or at the end adjacent to the apex and the displacement diminishes gradually and regularly to the lower end of the line 15 and the annular portion 16 of the shell which is immediately cylindrical in shape without any depressed or raised portions.

In the next step of the making of the frazer, elongated portions of the depressed parts 12 and 14 immediately adjacent to the raised parts 11 and 13 respectively, are cut out of the shell forming the openings 17 and 18. The edge 10 of the opening 17, which corresponds in position to the line 15 shown in Fig. 2, forms one cutting edge of the tool and the edge 20 of the opening 18 forms another cutting edge of the tool.

The precise construction and formation of the blank and the tool will be clearly understood from a careful examination of Figs. 8, 9 and 10 of the drawing, which show sectional views of the tool in the form in which it appears in Fig. 4 along different levels. It will be seen that the cutting edges 19 and 20 at the level at which Fig. 8 is taken, have large cutting clearances as will be observed from the fact that at these points the cutting edges are much further removed from the axis of the tool than their opposing edges 21 and 22 respectively. When we observe the relationship of the cutting edges to their opposing edges at a lower level as shown in Fig. 9, it will be found that the cutting clearance is substantially less than at the level at which Fig. 8 was taken. The cutting clearance disappears entirely when the bottom of the cut out portions is reached as is seen from the view shown in Fig. 10. It will be further observed that the depressed portion 12 merges with the opposite raised portion 13 and correspondingly the raised portion 11 merges uniformly with the depressed portion 14.

To complete the formation of the tool, the cup-shaped shell 10 is mounted on a stud having a forked end 24 which is permanently affixed as by welding to the interior surface of the shell at its apex *a* and having a threaded lower end 24′ which is adapted to be received by any rotatable holder or implement.

The use and operation of the frazing tool and the many advantages thereof will become apparent from a consideration of Fig. 1 of the drawing showing the manner of using the tool and of Figs. 6 and 7 showing the manner of sharpening the tool. For frazing or excising eye openings or sockets *s* for dolls' heads *h* (Fig. 1), the frazing tool 10 is rotated in the direction indicated by the arrows in Fig. 1 of the drawing, the cutting edges 19 and 20 of the shell or head 10 moving in cutting engagement with the wall of the doll's head *h*. The chips or shavings cut from the doll's head wall freely fall into and through the hollows or cavities defined by the openings 17 and 18 as illustrated in Fig. 1 of the drawing, leaving the cutting edges 19 and 20 clean and free or devoid of any accumulation of chips or shavings. The substantial clearances between the cutting edges, such as 19, and the opposing edges, such as 21, at the apex of the head, produce a quick and rough cutting operation in the initial cutting stages and the gradual reduction in such clearances as the cutting tool bores its way into the wall under operation, produce a more finished frazing operation at intermediate stages and the very small clearances (reducing down to a zero clearance) at the base *b* of the frazing tool, results, first, in produc-

ing a finished eye opening or socket and, second, in preventing any further sideways cutting of the tool when the predetermined maximum size of the socket is obtained. This last mentioned feature is very important when the tools are used by unskilled help, since the unskilled operator may be relied upon to obtain eye openings of uniform sizes to a high degree of accuracy. The smooth operation of the tool is such as to eliminate any chattering thereof, this further aiding in producing a finished product.

Figs. 6 and 7 of the drawing show the manner of sharpening the cutting edges by means of a rotary abrading tool 23, the cutting surface of the tool being disposed at an angle substantially 30° with relation to the diameter of the shell 10. These figures illustrate both the method of sharpening and the method of resharpening the tool and thus depict other important advantages obtained by the invention. Due to the method of forming the cutting edges of the tool and the removal of the chips and shavings as soon as they are formed, the tool requires infrequent sharpening operations. When the tool becomes dull, however, the same may be sharpened as shown in Figs. 6 and 7 without materially reducing the graduated clearances referred to, the diametrical cross-section of the base being always maintained the same so that a reduction in the size or dimension of the tool is obviated. The tool may thus be given a large number of sharpenings without reducing its effective operating size.

In the modification of the invention shown in Fig. 11 of the drawing, the head shell 10′ of the tool is provided with four cutout portions 25 and four cutting edges 26, the said head 10′ being mounted on a spider disk 28 affixed to the base of the shell, to which spider disk is attached the stud 27. Otherwise the construction of the head 10′ is similar to the head 10 heretofore described.

In Fig. 12 of the drawing, I show a further modification of the invention wherein the discharge channel or valley for the chips is obtained by cutting or hollowing out a part of a solid head having a stud integral therewith. More specifically, the tool of this modification comprises a solid head portion 29 having the stem 30 integral therewith, the said head being cut along a radial plane 31 to produce the cutting edges and along planes such as 32 substantially at right angles to the plane 31 to produce the discharge openings such as 33, the interior of the head being hollowed out as indicated at 34. In this way, the tool may be fashioned from a single piece of metal. The convex face of the head is shaped (as by filing the exterior wall thereof) to displace the cutting edges 35, 35 outwardly with relation to the surface of the head to produce substantially the same contour and construction as those characterizing the previous forms described.

The use and operation of the tool of my present invention and the many advantages thereof will, in the main, be fully apparent from the above detailed description thereof. It will be further apparent that while I have shown and described my invention in the preferred forms, many changes and modifications may be made in the structure disclosed without departing from the spirit of the invention, defined in the following claims.

What I claim is:

1. A frazing tool comprising a generally hemispherical or cup-shaped metallic shell, having a portion displaced outwardly along a line intermediate the apex and base of the shell, and a cutting edge formed directly on the outer or undisplaced hemispherical surface, whereby said cutting edge is located outwardly with relation to the adjacent inwardly displaced surface of the shell, the amount of said relative displacement diminishing from apex to the base.

2. A frazing tool comprising a convex generally hemispherically shaped head, said head being depressed along a line intermediate the apex and base of the head, the amount of depression diminishing from apex to base, the resulting upstanding portion of said head being cut out to form a cutting edge, and a hollow from the cutting edge through the base which defines a discharge valley for chips and shavings.

3. A frazing tool comprising a substantially hemispherical metallic shell having an elongated cut-out portion extending along a line intermediate the apex and base, one of the edges of said cut-out portion constituting a cutting edge and being displaced radially outwardly relatively to the opposite edge of the said cut-out portion, the amount of displacement diminishing from the apex to the base.

4. A frazing tool comprising a cup-shaped metallic shell having a portion depressed inwardly along a line extending from the apex to the base, the amount of depression diminishing from the apex downwardly and from said line circumferentially, and having the upstanding wall portion immediately adjacent said line cut out to form an edge on the shell serving as a cutting edge.

5. A frazing tool comprising a cup-shaped metallic shell having a plurality of gashes, one edge of each gash serving as a cutting edge, and the other edge of each gash being displaced inwardly relatively to the cutting edge, the displacement diminishing from the apex toward the base of the shell.

6. A frazing tool comprising an inverted cup-shaped metallic shell having a gash, one edge of said gash serving as a cutting edge, and the other edge of the gash being displaced inwardly relatively to the cutting edge

to give a cutting clearance diminishing from the apex toward the base of the shell.

7. The method of making a frazing tool comprising the steps of forming a cup-shaped metallic shell, depressing the same along a line intermediate the apex and base to form relatively raised and depressed parts, and cutting out the upstanding portion between said depressed part and said raised part.

8. The method of making a frazing tool comprising the steps of forming a generally hemispherical metallic shell, depressing the same along a line intermediate the apex and base to form relatively displaced parts, the displacement varying from a maximum near the apex to a minimum near the open face, and removing a portion of the shell at and adjacent the wall dividing the said parts in order to form a cutting edge on the shell.

9. A frazing tool for cutting eye sockets in dolls' heads comprising a substantially hemispherical metallic shell having a portion cut out and removed, one of the edges bounding said cut-out portion constituting a cutting edge, the said edge being displaced radially outwardly relatively to the opposite edge bounding said cut-out portion, the amount of radial displacement decreasing from the apex to the base, and the cut-out portion being large and forming an unobstructed space for the rapid passage of the chips and shavings cut by the tool.

10. A frazing tool for cutting eye sockets in dolls' heads comprising a substantially hemispherical metallic shell having an elongated portion extending along a line intermediate the apex or pole and the base or equator cut out and removed, the outer periphery or base or equatorial portion of said hemispherical shell being left complete and intact, one of the edges bounding said cut-out portion constituting a cutting edge and being displaced radially outwardly relatively to the opposite edge bounding said cut-out portion, the cut-out portion being large and forming an unobstructed space for the rapid passage of the chips and shavings cut by the tool.

11. A frazing tool comprising a cup-shaped metallic shell having its apex depressed, and having a portion extending from said depressed portion cut out and removed, one edge bounding said cut-out portion being displaced inwardly relatively to the opposite edge, the amount of said displacement decreasing from the apex to the base, and said opposite edge being formed into a cutting edge formed directly on the remaining outer surface of the shell.

Signed at New York, in the county of New York and State of New York this 4 day of June A. D. 1928.

JOHN H. WILHELM.