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E. W. DAVIS

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SAFETY RAZOR

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Fig. 1

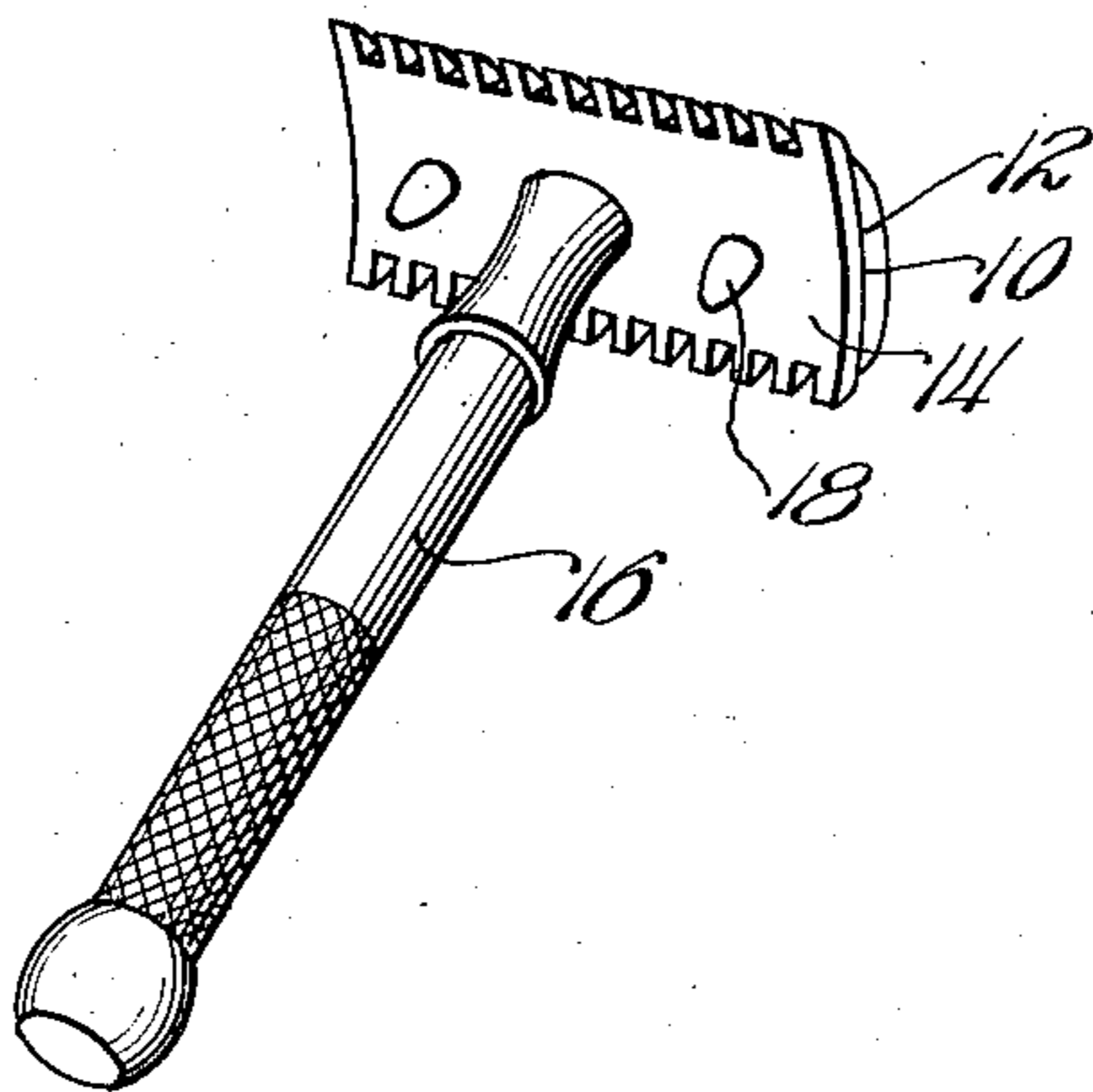


Fig. 2

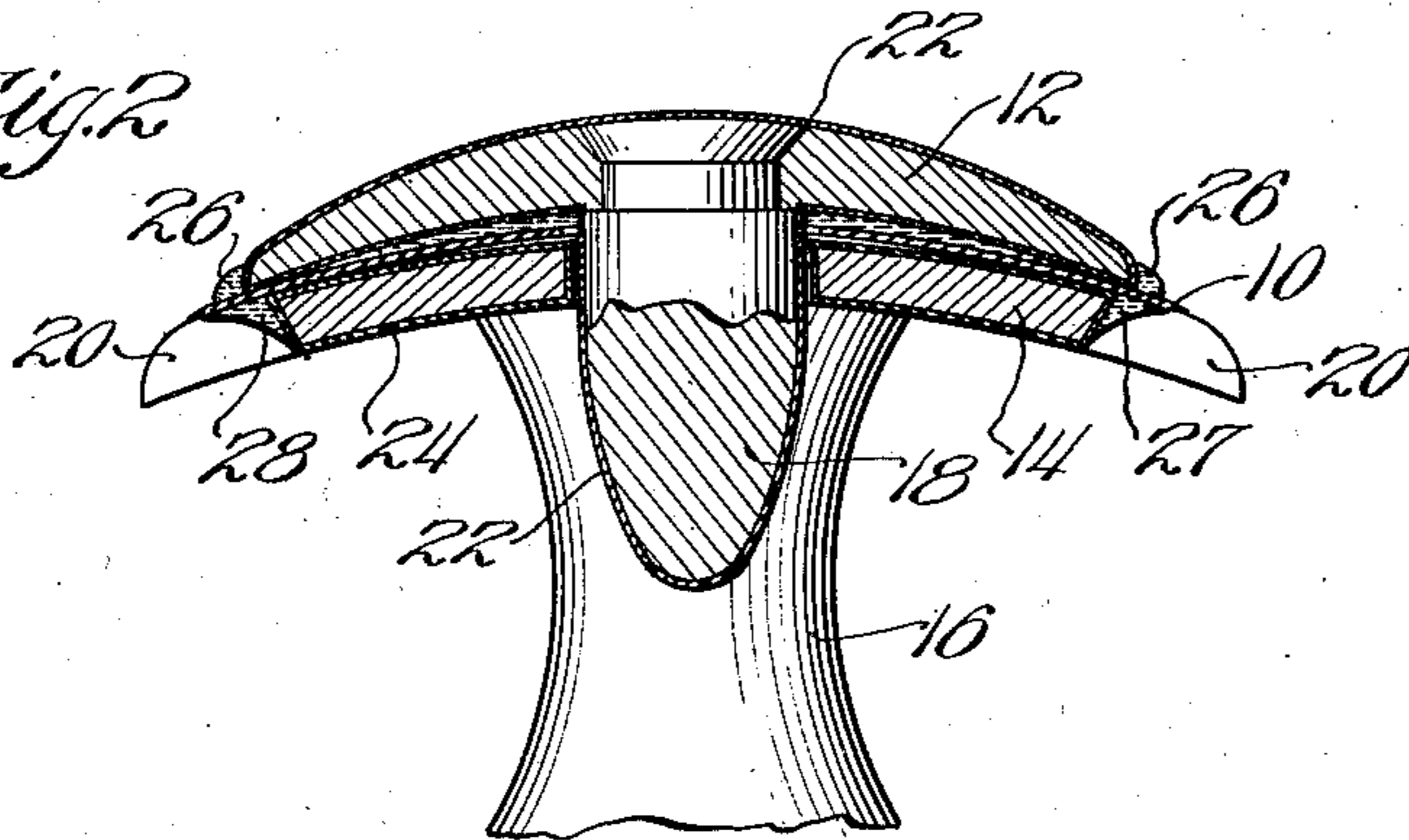
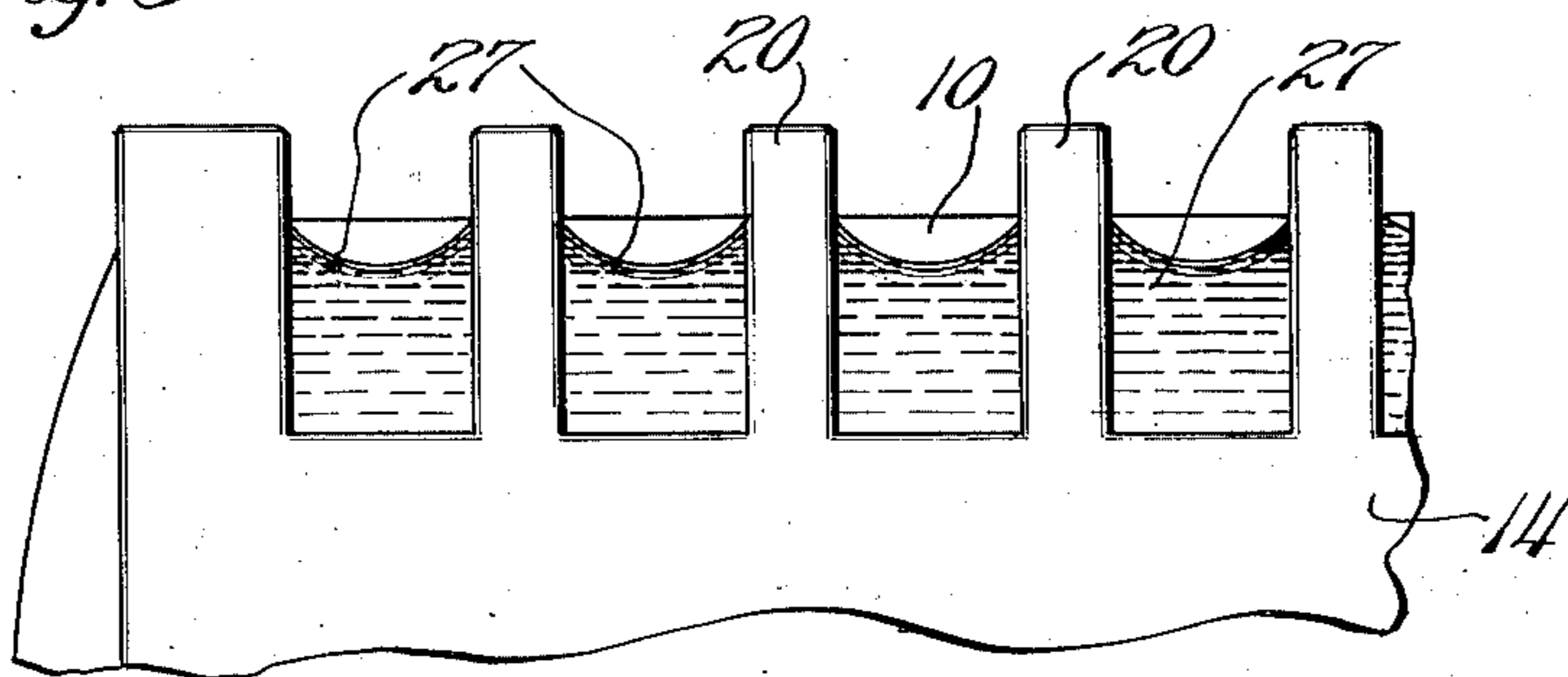


Fig. 3



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SAFETY RAZOR

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My invention relates to safety razors, and more particularly to razors using blades of carbon steel in contact with metal holding means.

5 The object of my invention is to provide a safety razor in which blades of carbon steel will not rust when the razor is put away without being dried. The operation of successfully drying a safety razor involves disassembling the entire razor, drying each part separately and then re-assembling. The inconvenience occasioned by this operation has been the one outstanding disadvantage of the safety razor ever since its introduction.

15 In order to overcome this disadvantage, razor blades manufactured from chromium steel have recently been introduced, but the fine edge that is obtainable with carbon steel, also its comparative low cost make this metal a most suitable material, with the exception of its tendency to rust when exposed to moisture.

25 In order to overcome this tendency, I employ a substance that is electro-positive to the steel blade, and in electrical contact therewith, whereby a weak current of electricity is generated by the simultaneous contact of the blade and said electro-positive substance with any water remaining on the blade after using.

30 My invention utilizes the fact that the water in drying will by capillary action be always in contact with both blade and holder, together with the fact that an electro-positive metal (one having a higher solution pressure than iron) will prevent the solution and corrosion of the razor blade, as will be more particularly pointed out as the description of my invention proceeds.

40 In the accompanying drawings, in which I have shown a preferred embodiment of my invention, and in which similar parts are referred to by like reference characters throughout the several views—

45 Figure 1 is a perspective view of a safety razor of well known construction;

Figure 2 is an enlarged transverse sectional view of the head portion thereof with the blade clamped in position;

50 Figure 3 is an enlarged bottom plan view of

the portion of the guard plate and blade, showing how water may accumulate between both the teeth of the guard plate if the razor is not taken apart and the parts thoroughly dried.

55 The razor shown in the drawings is of well known construction, and is intended to be illustrative of any form of safety razor, in which the blade is held in close proximity to a guard. It comprises the usual blade 10, which is held between a clamping plate 12 and a guard plate 14; the clamping plate 12 having a screw threaded projection passing through the blade and guard plate 14, said screw threaded projection being threaded into a tapped aperture in handle 16. The guard plate has the usual aligning dowels 18, which pass through suitable holes in the razor blade and in the guard plate 14. The guard plate 14 is provided with the usual teeth 20, which project slightly beyond the cutting edges of blade 10.

65 My invention comprises the provision of metallic cadmium or a cadmium alloy in contact with the blade at points where moisture is likely to cause rusting.

75 In Figures 1 to 3, I have shown this plating on the clamping plate 12, dowel 18 and guard plate 14. If desired, the handle 16 may also be cadmium plated for the sake of uniformity of appearance. The plating may be effected by any conventional process, such as the electro deposition of cadmium from a solution of this metal in sodium or potassium cyanide. A razor plated by this means has a silver-white color, and even after continuous exposure to damp air, it has a characteristic greyish-white film of sub-oxide which protects the sub-adjacent metal from further change, and which does not materially detract from its appearance. Obviously, instead of plating with cadmium, the guard plate, the clamping plate, or both, may be made of a cadmium alloy.

90 In order that my invention may be more clearly understood, I have illustrated in Figures 2 and 3, the usual drying process and the manner in which water ordinarily collects on these razor blades. Water will remain on each side of the razor blade 10 be-

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tween the clamping plate 12 and the guard plate 14, and it will also collect in beads at the points 26 at the lateral edges of the clamping plate 12, and in the spaces 27 between the teeth 20 of the guard plate 14. It is well known that this water actually causes a rusting of the razor blade. Several theories have been advanced to explain the rusting, all of which agree that the iron must first be dissolved by this water, or by the dilute acid, which may be formed by carbon dioxide dissolved in the water, etc. The most plausible of these theories is the electrolytic theory, which is based on the fact that the water is slightly ionized, that there are always impurities in the steel or foreign metals touching it, that these impurities and foreign metals exert a lower solution pressure than iron, and that iron is, therefore, dissolved, yielding free hydrogen at the points where the impurities or other metals touch the solution. The iron once in solution is quickly oxidized to Fe_2O_3 .

While I cannot explain the phenomenon which I have discovered, I have developed the following theory to account for the fact that when cadmium is in contact with the blade, rusting is prevented. Cadmium is electro-positive with respect to iron; or, in other words, it has a higher solution pressure as distinguished from gold and silver, which have almost negligible solution pressures. When cadmium is in contact with iron, and also with an aqueous solution, its tendency to dissolve will be greater than the tendency of the iron to dissolve, so that an electrolytic cell will be set up, depositing hydrogen on the iron (steel razor blade).

Since the iron is a cathode in this cell, it cannot dissolve, and since it cannot dissolve, there can be no rusting. In other words, the greater solution pressure of the cadmium prevents the solution of the iron and, therefore, prevents rusting. An experimental fact substantiating this theory is that cadmium yields hydrogen very slowly with dilute acids, and that the velocity is increased by contact with a metal, such as iron.

It will be noted from Figures 2 and 3 that as the water evaporates it recedes gradually from the cutting edge of the blade, but surface tension will always keep the water in contact with both the blade and the surface of the teeth 20, or with the clamping plate 12 or guard plate 14, as the case may be. Thereby, the influence of the cadmium plate is constantly exerted. The thin coat of oxide, which forms on the cadmium, is not objectionable.

I have found that the assembled safety razor may be left immersed in water for a long time, or exposed to atmosphere a long time after immersion without drying, and in either case, no rust is formed upon the blade; thus, the necessity for carefully drying of

blade; thus, the necessity for carefully drying of blade, guard and clamping parts is eliminated, and the dulling of the edge of the razor by rusting is made impossible.

I have shown my invention applied to a certain type of safety razor, but it will be understood that it may be used with other types of safety razors and other similar articles with equal efficiency.

While I have described in detail a specific embodiment of my invention, I do not limit myself to the elements mentioned except as defined by the following claims.

I claim:

1. In a safety razor, the combination of a steel blade having an exposed cutting edge and a cadmium surface in non-permanent contact with said blade for holding its cutting edge and preventing said blade from rusting, said cadmium surface being of substantial area and quantitatively sufficient to react with a large number of blades.

2. In a device of the class described, the combination of an oxidizable blade having an exposed cutting edge, means for holding the blade, and a surface on said means containing a substantial quantity of cadmium whereby continued presence of moisture between the blade and the holding means does not cause rusting.

3. A safety razor having blade holding parts which come in contact with and lie adjacent a blade, said parts having on their surface a substantial quantity of a metallic element having a solution pressure which is greater than the solution pressure of the metal of which the blade is composed, thereby to prevent oxidation of the cutting edge of the blade.

4. In a safety razor, a blade subject to conditions producing rust, and a holder therefor composed of a metallic element of higher solution pressure than the metal of which said blade is composed, said element being in contact with said blade whereby the rusting of the blade is prevented.

5. A safety razor comprising an oxidizable blade, a holder for said blade having a substantial amount of a metal at its surface capable of producing an electrolytic action on said blade when said razor is immersed in water, and capillary means on said holder adjacent the cutting edge of said blade to maintain said electrolytic action after said razor has been withdrawn from the water.

6. A safety razor, comprising a blade having an oxidizable cutting edge, a holder for said blade having a guard with notches of capillary dimensions and composed of a substantial amount of a substance electro-positive to the substance of said blade and in electrical contact therewith, the guard and said electro-positive substance being in close proximity to the cutting edge of said blade, where-

by capillary action will at all times draw water away from the cutting edge and will maintain it in contact with both the blade and said electro-positive substance.

5 In witness whereof, I hereunto subscribe my name this 17th day of November, 1928.

ERNEST W. DAVIS.

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