

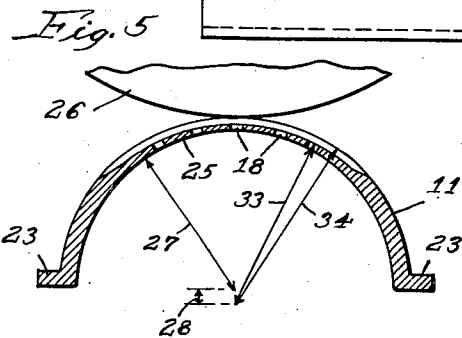
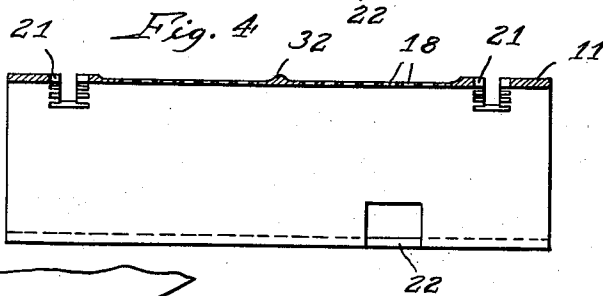
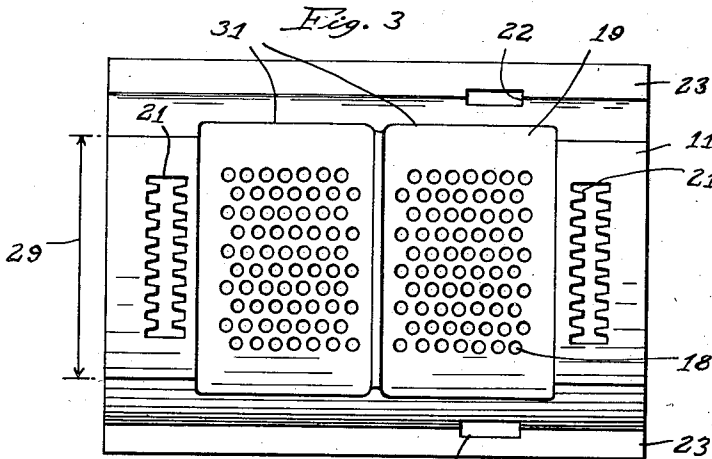
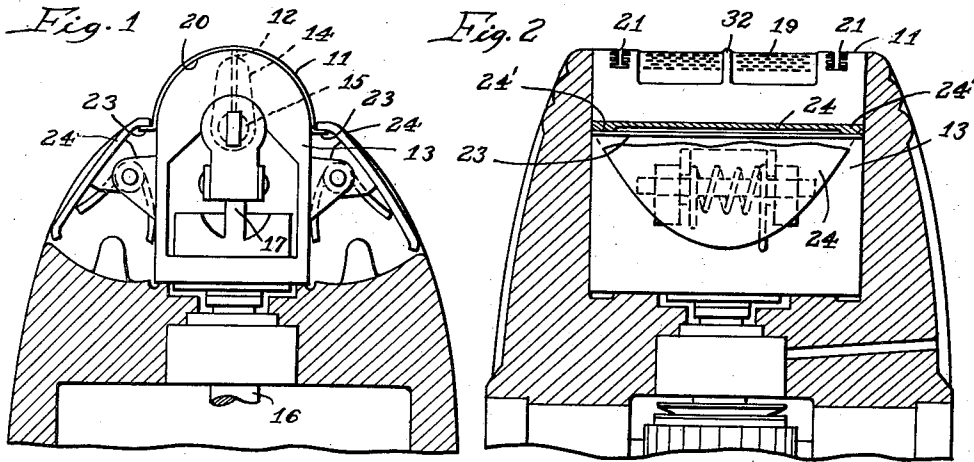
May 13, 1941.

I. JEPSON

2,242,180

PROCESS OF MAKING COMBS FOR SHAVING IMPLEMENTS

Filed May 21, 1938



Inventor:
Ivar Jepson

By
McLanna, Wintercorn & Norbach
Attys.

UNITED STATES PATENT OFFICE

2,242,180

PROCESS OF MAKING COMBS FOR SHAVING
IMPLEMENTSIvar Jepson, Chicago, Ill., assignor to Chicago
Flexible Shaft Company, Chicago, Ill., a corpo-
ration of Illinois

Application May 21, 1938, Serial No. 209,236

10 Claims. (Cl. 76-104)

This invention relates to shaving implements of the type known as dry shavers and has more particular reference to a process of making that part commonly known as the comb.

One of the objects of my invention is to provide an improved process of making a comb having hair-receiving perforations in a curved skin-engaging portion which is reduced in thickness to provide an extremely thin section and reinforced externally by means of integral ribs which do not interfere with the shaving operation but tend to facilitate entrance of beard hairs into the openings.

Another object is to provide an improved process of making a comb of the character described having long hair perforations and close shaving perforations of improved shape characteristics with the view to promoting better shaving efficiency and avoiding irritation of the skin.

Another object is to improve the manufacture of shaver combs with the view to promoting economy in cost.

Other objects and attendant advantages will be appreciated as the invention becomes better understood by reference to the following description when considered in connection with the accompanying drawing, in which—

Figure 1 is a fragmentary cross-section through the cutting end of a shaving implement having a comb embodying my invention;

Fig. 2 is a fragmentary section through the shaver showing a side view of the comb;

Fig. 3 is a top view of the comb; and

Figs. 4 and 5 are longitudinal and cross-sections, respectively, through the comb.

In illustrating my invention I have shown a comb for application to an electric dry shaver embodying the teachings of the Bruecker Patent 2,081,694. It should be understood, however, that my invention in certain of its phases is not confined to the manufacture of a comb or cutter head for use with the said Bruecker invention, but is applicable to combs or cutter heads for dry shavers generally. In the embodiment here shown, the comb designated generally by 11 has a perforated portion curved in cross-section and a cutter blade 12 is rapidly moved across the inner side of the perforated portion and supported with freedom to be urged outwardly against the comb in shearing coaction therewith by centrifugal force, or spring force, or both. In this instance the comb is removably supported on a body 13 and the blade 12 is carried in a holder 14 mounted on the body 13 to oscillate about the shaft center 15, rapid oscillation being trans-

mitted to the blade holder from the armature shaft 16 of the motor through an eccentric driving connection 17, this forming the subject matter of a separate application for patent.

The present invention deals with a process of manufacturing a comb per se.

My invention contemplates making the comb from sheet steel stock heavier than the extremely thin spring steel stock of approximately .003" heretofore used, and forming and fabricating the strip by simple and economical operations in such manner as to obtain the advantages of the prior comb construction and the additional advantages of a permanently shaped and reinforced comb body. As an illustration the sheet steel may be approximately .012" in thickness. The first step is to perforate the strip by one or more punch press operations to form the desired hair-receiving openings. Here I have shown two types of such openings consisting of small annular holes 18 of approximately .025" diameter closely positioned throughout a shaving area designated generally by 19 and toothlike perforations 21 at opposite sides of the shaving area. The small closely positioned perforations are for close shaving and the tooth-like perforations are for long hair cutting as claimed in the Bruecker application Serial No. 178,221, filed December 6, 1937, now Patent No. 2,234,891. Any further perforations may also be made at the same time, such, for example, as locating abutments 22 adapted to fit against complementary abutments on the body 13 and relief or cleaning openings not shown which may be formed along the outer sides of the shaving area 19 for the discharge of cut hair particles. Following this the comb is formed by suitable dies to the desired cross-sectional shape characterized by a curved formation of the perforated portion preferably on a true arc. In this embodiment the comb is formed to a shape approximately semi-circular in cross-section with the perforated areas equally divided at opposite sides of the longitudinal center of the comb. Since the comb retains its inherent formed shape it may be accurately supported in operative position on suitable locating or supporting shoulders or points preferably engaging its internal face. In the present case the comb seats on shoulders 20 on the body 13 and may be so held by suitable means. I have here turned the longitudinal side margins of the comb outwardly as at 23 to provide projecting flanges for engagement by suitable clamping or hold-down members 24. Each member 24 so engages the adjacent flange as to firmly hold the comb seated, in this instance

each member having spaced abutments 24' which engage the flange 23 at opposite ends as shown in Fig. 2 and having a loose fit at its mounting so that the member 24 may accommodate itself to any irregularities and the clamping pressure will be equally distributed at opposite ends of the comb. Following formation of the comb as described it is hardened. Certain grinding, lapping or honing operations are then performed, the particular order or sequence of which is not essential except perhaps as respects the grinding of the outer face. In practice, I prefer to grind or lap the inner face 25 of the perforated portion on a true arc to provide accurately finished cutting edges at the inner end of each of the hair-receiving perforations and at the same time provide a shearing face accurately conforming to the shape of the movable cutting blade or blades as the case may be when the comb is assembled in its working position, this process of manufacture being the subject matter of an application of John Bruecker, Serial No. 189,573, filed February 8, 1938, now Patent No. 2,182,067. The comb is then ground on its exterior face to reduce the dimension or section of the perforated hair-receiving portions to provide shape characteristics contemplated by my present invention and at the same time reinforce the perforated body in view of the extreme thinness to which it is reduced by the grinding. This grinding may be performed in various ways and for purpose of illustration I prefer to clamp the comb onto an arbor and perform certain grinding operations by relative movement between the arbor and a grinding wheel. In furtherance thereof the comb is clamped to a rotary arbor (not shown) the center of which is approximately .004" off from the center of the comb in a plane intersecting the center of the grinding wheel, the circumference of which is here indicated by 26, as shown in Fig. 5. Here, the center and radius of the inner face of the comb is designated by the radius line 27 and the offset of the arbor center is designated by the dimension arrows 28. In the preferred operation the outer face of the comb is ground off throughout its length over the area indicated by 29, Fig. 3, leaving a center thickness of approximately .008". In view of the off center mounting of the comb on the arbor, the comb gradually increases in thickness from the center to the outer side portions, substantially as shown in Fig. 5. Following this the outer surface is ground off approximately over the area indicated by 31, Fig. 3, to a thickness of approximately .003" at the center of the comb, thus reducing the close shaving area to a very thin section. During this grinding operation a portion 32 is left to provide an integral reinforcing rib across the center of the thin section and this section is further reinforced by the ribbed formation at each extreme end. As a further illustration of these grinding operations, assuming the inside radius 27 to be .312", the radius 33 is .319" and the radius 34 is .324". These dimensions are merely for purpose of illustration and not as limitations except wherein claimed relatively as preferred embodiments.

The invention is not to be understood as restricted to the details set forth, since these may be modified within the scope of the appended claims, without departing from the spirit and scope of the invention.

I claim:

1. The process of making a comb for a shaving implement including the steps of perforating

a strip of sheet steel to provide hair-receiving openings, forming the strip to dispose the perforated portion in a curved shape, hardening the strip, grinding or lapping the inner side of the curved portion to provide accurately finished cutting edges at the inner end of the perforations, and grinding the outer face of the perforated portion to reduce the same to a thin section.

2. The process set forth in claim 1, in which the grinding operation leaves an external rib integral with the perforated portion for reinforcing the same.

3. The process of making a comb for a shaving implement including the steps of perforating a strip of sheet steel to provide small closely arranged openings in a shaving area and tooth-like perforations at one side of said area, forming the strip to dispose the perforated portions in a curved shape, hardening the strip, grinding or lapping the inner side of the curved portion to provide accurately finished cutting edges at the inner end of the perforations, and grinding the outer face of the perforated portion to reduce this portion to a thin section.

4. The process of making a comb for a shaving implement including the steps of perforating a strip of sheet steel to provide small closely arranged openings in a shaving area and tooth-like perforations at one side of said area, forming the strip approximately to semi-circular shape in cross-section, grinding the outer face of the strip throughout the perforated area to reduce the thickness of the perforated portions, and grinding only the outer face of the area having the small perforations to reduce this area to an extremely thin section.

5. The process of making a comb for a shaving implement including the steps of perforating a strip of sheet steel to provide small closely arranged openings in a shaving area and tooth-like perforations at one side of said area, forming the strip approximately to semi-circular shape in cross-section, hardening the strip, grinding or lapping the inner side of the curved portion to provide accurately finished cutting edges at the inner end of the perforations, grinding the outer face of the strip throughout the perforated area to reduce the thickness of the perforated portions, and grinding only the outer face of the area having the small perforations to reduce this area to an extremely thin section.

6. The process of making a comb for a shaving implement including the steps of perforating a strip of sheet steel of approximately .012" to provide small closely arranged openings in a shaving area and tooth-like perforations at one side of said area, forming the strip to approximately semi-circular shape with the perforated areas distributed equally at both sides of the longitudinal center of the comb, grinding the face of the comb throughout the perforated areas to a center thickness of about .008", and grinding the shaving area to a center thickness of about .003".

7. The process of making a comb for a shaving implement including the steps of perforating a strip of sheet steel of approximately .012" to provide small closely arranged openings in a shaving area and tooth-like perforations at one side of said area, forming the strip to approximately semi-circular shape with the perforated areas equally distributed at both sides of the longitudinal center line, clamping the comb to an arbor, the center of which is approximately .004" off the center of the comb, grinding about .004" off the outer face of the comb over the length

thereof leaving a center thickness of about .008", then grinding the shaving area to a center thickness of about .003", in both instances the grinding being effected by turning the arbor about its center with the grinding wheel held on a fixed center.

8. The process of making a comb for a shaving implement including the steps of perforating a blank of sheet steel to provide in a given area hair-receiving openings having shape characteristics of a kind adapted for close shaving and in an adjoining area hair-receiving openings of different shape characteristics adapted for long hair cutting, bending the perforated areas of the blank to a curved form, grinding or lapping the inner side of the curved portion on an arc approximately coincident with that of a coaxing cutter to provide accurately finished cutting edges at the inner end of the perforations, and grinding the outer face of the first mentioned perforated area on an arc greater than that of the first mentioned arc to provide an extremely thin section at the center of said first mentioned area gradually increasing in thickness toward the sides of said area.

9. The process of making a comb for a shaving implement including the steps of forming a blank of sheet steel to provide hair-receiving openings in a given area, forming said area to a curved

shape, lapping the inner side of said area to provide accurately finished cutting edges, and grinding the outer face of said area to reduce the same to an extremely thin section except for one or more narrow portions extending across said area and serving to reinforce the same.

10. The process of making a comb for a shaving implement including, stamping a blank from sheet steel to provide an area intended for close shaving, an area for long hair cutting, and an area constituting a frame portion for supporting the comb on a shaving implement, perforating the blank to provide relatively small openings in the first mentioned area having shape characteristics adapted for close shaving and to provide elongated slot-like openings in the second mentioned area having shape characteristics adapted for long hair cutting, bending the blank to position the said areas in the relative relation to each other which they are intended to occupy in the shaving implement, and grinding the exterior surfaces of the perforated areas, the first mentioned area to an extremely thin section adapted for said close shaving shape characteristics and the second mentioned area to a lesser degree to provide a relatively rigid section adapted for said long hair cutting shape characteristics.

IVAR JEPSON.