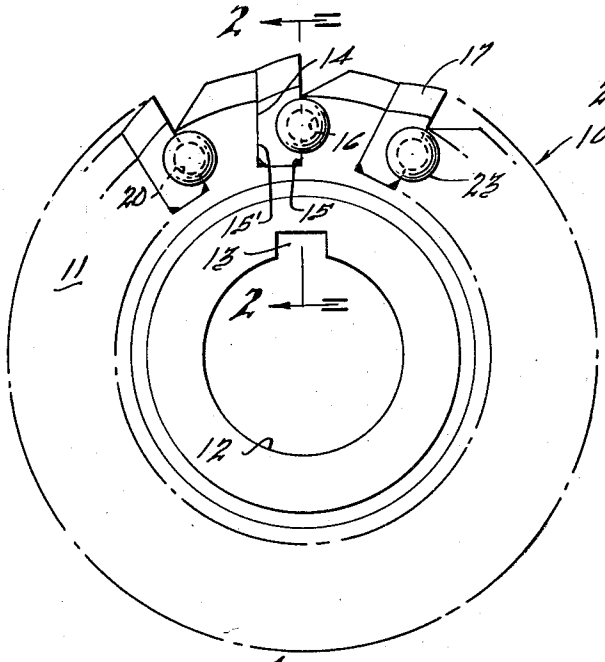
Nov. 2, 1954 H. PELPHREY 2,693,020

INSERTED BLADE HOB

Filed Aug. 30, 1951

FIG. 1.



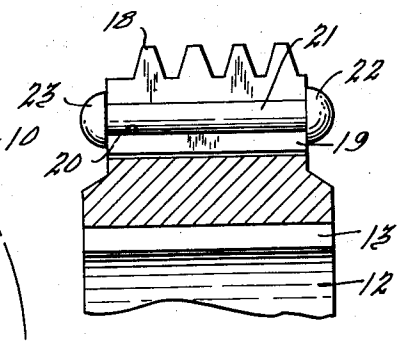
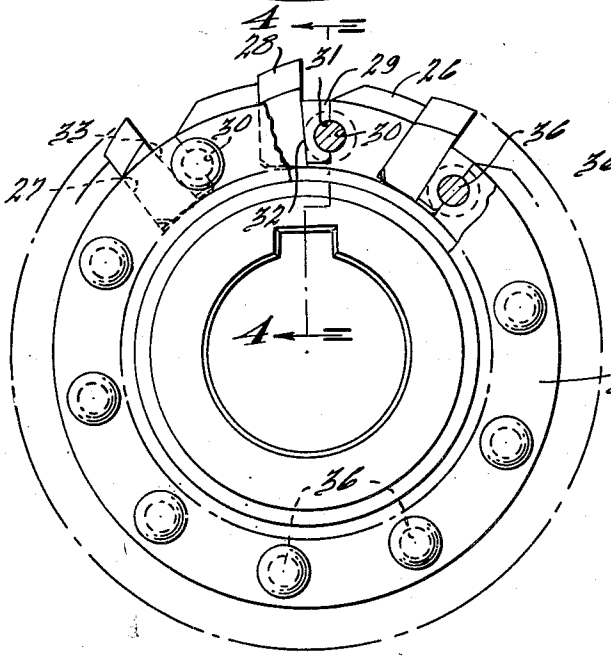


FIG. 2.



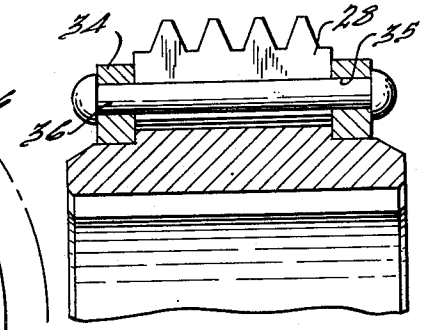


FIG. 4.

FIG. 3.

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INSERTED BLADE HOB

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4 Claims. (Cl. 29—105)

This invention relates to an improved hob assembly and particularly relates to inserted blade hobs and to the method of manufacturing the same.

Heretofore hobs have been fabricated from a single blank of material and it is commonly recognized that one disadvantage of such hobs is that the entire hob must be discarded when only one of the teeth becomes damaged. This disadvantage is particularly pronounced and expensive in the case of large diameter hobs. Additionally, it is recognized that the teeth of large diameter hobs possess less desirable strength characteristics than the teeth of smaller hobs because the teeth are subjected to less cold working during manufacture. Furthermore manufacturing difficulties and expenses are disproportionately increased as the size of the hob increases.

It is, therefore, one of the objects of this invention to provide a hob assembly of the inserted blade type which may be readily manufactured in large sizes.

A further object of this invention is to provide an improved inserted blade hob wherein the blade is rigidly secured to the hob body and yet may be removed and replaced when desired.

Another object of this invention is to provide a novel attachment means for detachably securing hob blades positively and rigidly to hob bodies.

A still further object is to provide an improved method for manufacturing the improved hob assemblies of this invention.

Still another object is to provide a novel attachment means for detachable hob blades which does not require the maintenance of close tolerances or the production of exacting parts.

Other objects and advantageous features of the invention will be specifically pointed out or will become apparent as the full description of the invention is developed when taken in conjunction with the accompanying drawing wherein:

Figure 1 is an elevation view of an inserted blade hob embodying the features of this invention.

Figure 2 is a sectional view of the structure illustrated in Figure 1 taken along the line **2—2** thereof.

Figure 3 is a view partly in elevation and partly in section similar to the structure illustrated in Figure 1 and showing a modification thereof.

Figure 4 is a sectional view of the structure illustrated in Figure 3 taken along the line **4—4** thereof.

Referring more particularly to the drawing, there is illustrated a hob, generally designated **10**, having a body portion **11** of generally disc shape and having a centrally located aperture **12** therein adapted to permit the mounting of the hob **10** on a rotatable shaft. Means for securing hob **10** to the rotatable shaft is provided in the form of key-way **13**. On the periphery of body portion **11** there is provided a plurality of longitudinally extending recesses **14** which are adapted to receive individual hob blades. Positioned within peripheral recesses **14** are unitary hob blades **17**. The blades **17** are elongated rectangular-shaped members having a body portion **19** adapted for engagement with the wall portions **15** and **15'** of recess **14** and a plurality of teeth **18** on the periphery thereof.

It will be appreciated that in order for hob blades **17** to function in a manner comparable to a single piece hob, it is vital to provide a positive seating for the blades and means for maintaining that seating rigidly during use. It is furthermore desirable that the seating means be of a character that is not dependent upon the mating of precision-machined surfaces and the like, but rather will permit broad tolerances and ease of manufacture. To this end there is provided, in accordance with this invention, securing means for blades **17** which uniquely exhibits these desirable features as well as others. As is illustrated in Figures 1 and 2 the sealing means may comprise a longitudinally extending groove **16** positioned in wall **15** of recess **14**, a corresponding groove **20** positioned in body portion **19** of blade **17** adapted to register with the groove in wall **15** and a holding or securing means **21** mounted in the bore defined by the cooperating groove surfaces **16** and **20**. As illustrated grooves **16** and **20** are semicylindrical in shape, but it will be appreciated that the shape of the grooves is not critical and that square grooves, V-shaped grooves, etc. are equally operative.

In the assembly of the parts comprising the securing means, it is to be noted that grooves **16** and **20** may be manufactured to loose tolerances inasmuch as all that is necessary is that they register within about $\frac{1}{32}$" to $\frac{1}{16}$". The holding means **21** is, before assembly, a stud having a diameter somewhat smaller than the bore defined by cooperating grooves **16** and **20**, for example, about $\frac{1}{16}$" to $\frac{1}{32}$" smaller. Blade **17** is positioned in recess **14** and stud **21** is inserted in the bore. The end extremities of stud **21** are contacted with a pressure applying means and stud **21** is cold upset within the bore while blade **17** is rigidly held in proper position. Pressure is slowly applied to stud **21** until the bore is intimately filled positively locking blade **17** and body **11** into unitary relationship. Pressure on the ends of stud **21** is then increased and applied intermittently, if desired, until head portions **22** and **23** are formed on either side of body **11**. Head portions **22** and **23** are in pressed contact with body **11** and overlap the axial end portions of blades **17**.

The slow application of force axially of the stud **21** is essential for the successful accomplishment of the purposes of this invention. The use of intermittent blows such as are commonly employed in riveting is not recommended since the head portions are thereby formed before the shank portion of stud **21** is cold upset and the bore remains incompletely filled. A wide variety of materials are suitable for use as the holding means and, in general, any common metallic material having a Rockwell C hardness lower than about 25 may be employed. Materials illustrating this class of metallic materials which are successful for this purpose include brass, bronze, and other copper-base alloys, annealed low carbon steel such as SAE number 1110, etc.

It will be appreciated that this procedure allows the formation of larger hobs than have been previously considered economically feasible and when using blades of high speed steel provides blade portions which are inherently superior to previous hobs due to the greater amount of mechanical working to which the teeth of the blades are subjected. It is thought that the increased amount of cold working enhances the even distribution of carbides throughout the matrix thereby increasing the strength and fatigue characteristics of the metal in the tooth portions of the blades.

Body member **11** may be suitably fabricated from any of the wide variety of hardening tool steels which are preferably heat treated to a Rockwell C hardness of 53–58 while the blade portion **17** may be made from high speed steel, standard cutting tool cast alloys or cemented carbides. The structure illustrated in Figures 1 and 2 has been found to be particularly advantageous for blades of the high speed steel type. For blades fabricated from the cast alloys or cemented carbides, having extremely high hardnesses, the structure illustrated in Figures 3 and 4 is preferred.

In Figure 3, there is provided a hob body **26** which is similar to that illustrated in Figure 1 but differing therefrom in that the peripheral recesses **27** are somewhat wider and adapted to accommodate hob blades **28** as well as wedge members **29**. Recess **27** has one wall thereof provided with a longitudinally extending groove **30**, and wedge member **29** is similarly grooved along its length to register with groove **30**. Blade **28** has its forward or cutting side **32** tapered so that the outer portion adjacent the cutting surface is slightly thinner than the portion positioned in the recess **27**. Wedge **29** has

its ungrooved face tapered to conform to the taper which is provided on the surface **33** of blade **28**. The degree of angularity is not critical and may satisfactorily vary, for example, between about 3 and 15 degrees.

As may best be seen in Figure 4, the hob of this modification may be assembled by providing end plates **34** which are adapted to abut the axial ends of blade **28** and wedges **29** thereby providing support and insuring rigid positioning of wedges **29**. End plates **34** are provided with apertures **35** aligned with the bore formed by cooperating grooved surfaces **30** and **31** and blades **28** are secured rigidly in place by inserting into the said bore a rivet member **36** and upsetting the same in situ in a manner comparable to that described hereinabove. It will be readily apparent that this modification is particularly advantageous when employing cast alloy or cemented carbide blades which are extremely difficult to satisfactorily groove, and furthermore that it enables the use of thinner and less expensive blades. It is, of course, to be realized that blades of cast alloys and cemented carbides may be fabricated with sufficient thickness such that the structure of Figures 1 and 2 may be employed.

While only two embodiments of the invention have been described and illustrated, it will be apparent to those skilled in the art that various changes, additions, omissions and substitutions may be made therein without departing from the spirit and scope of the invention.

What is claimed is:

1. In a hob assembly, the combination of a hob body having a plurality of peripheral longitudinally-extending blade recesses therein, hob blades in said recesses, means fastening each said blade individually in its recess including a longitudinally extending groove in the wall of said recess and a longitudinally extending registering groove associated with said blade, said registering grooves defining a bore, and means positioned in the bore defined by said registering grooves to secure said blade in said recess, said means consisting of a member having an expanded shank portion in said bore intimately filling the same and having enlarged head portions in pressed engagement with the opposite sides of said body holding said blades solidly in said body.

2. A hob assembly comprising a centrally apertured cylindrical body portion having a plurality of longitudinally-extending blade receiving recesses in the periphery thereof, each said recess carrying a longitudinal groove in one wall thereof, hobbing blades positioned in said recesses, said blades being secured in said recesses by wedge members having a longitudinal groove in one side thereof adapted to register with the groove in said wall, the other side of said wedges being tapered conjugate to the taper on one surface of said hobbing blades, and a stud member in the bore defined by the said registering groove surfaces, said stud having an expanded shank portion conforming to the bore defined by said registering groove surfaces and said stud having enlarged head portions in pressed engagement with the opposite sides of the said hob body holding said blades solidly in said body.

3. A hob having a generally disc-shaped body having a plurality of peripheral blade receiving recesses therein, hob blades in said recesses, means fastening each blade individually in its recess including registering grooves, one in the side of the blade and one in the side of the recess and a rivet in, and extending through, each pair of cooperating grooves, said rivets having an expanded shank portion intimately filling said grooves and head portions on opposite sides of the hob body, said shank portion conforming exactly to the bore form defined by the said cooperating groove surfaces and said head portions being in pressed engagement with the axial end portions of said blades and the sides of the said hob body to hold the said blades solidly in the said body.

4. A method for forming an inserted blade hob which comprises the steps of (1) providing a generally disc-shaped body having a plurality of blade receiving recesses on the periphery thereof, one wall of said recesses having an axially extending groove therein, (2) providing blades adapted to be positioned in said recesses, each said blade having a longitudinal groove registering with the groove in each said recess, the cooperating groove surfaces defining a bore, (3) positioning the said blades in the said recesses, (4) inserting a member into the said bore capable of being cold upset and having a diameter slightly less than the diameter of the said bore and (5) cold upsetting the said member in the said bore to intimately fill the same and continuing the cold upsetting to form head portions on the said member.

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