

C. H. CALKINS.
COMPOSITE GEAR.
APPLICATION FILED AUG. 8, 1916.

1,212,608.

Patented Jan. 16, 1917.

Fig. 1.

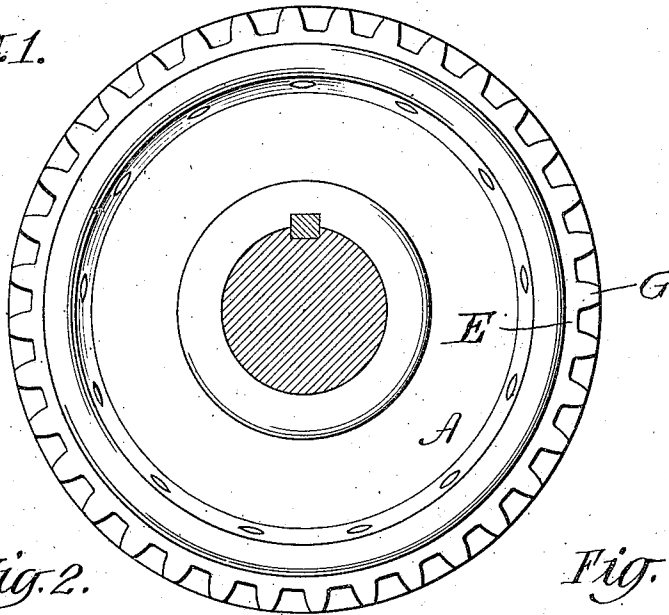


Fig. 2.

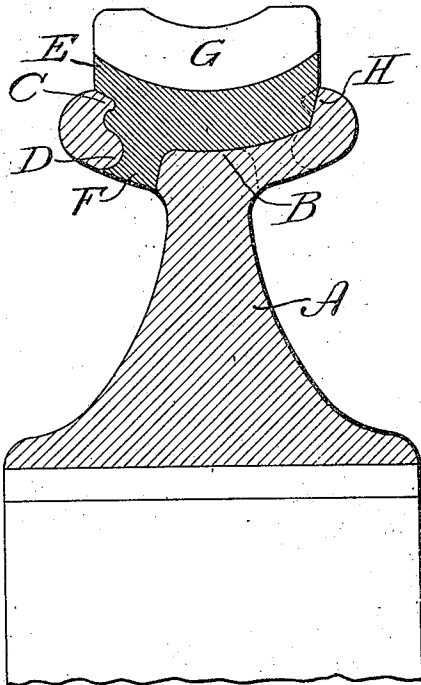
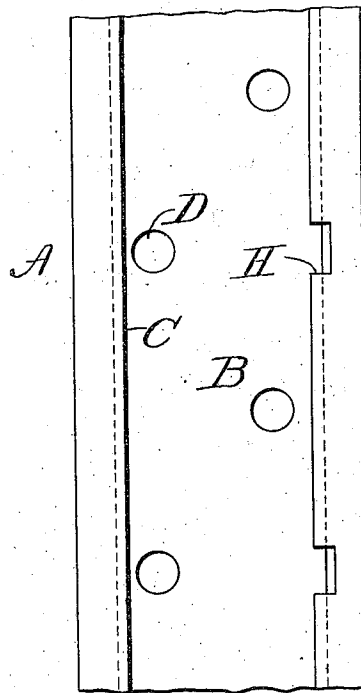


Fig. 3.



INVENTOR.
Charles H. Calkins
BY
D. Anthony Usina, ATTORNEY

UNITED STATES PATENT OFFICE.

CHARLES H. CALKINS, OF LUDLOW, MASSACHUSETTS, ASSIGNOR TO BAUSH MACHINE TOOL COMPANY, A CORPORATION OF MASSACHUSETTS.

COMPOSITE GEAR.

1,212,608.

Specification of Letters Patent.

Patented Jan. 16, 1917.

Application filed August 8, 1916. Serial No. 113,712.

To all whom it may concern:

Be it known that I, CHARLES H. CALKINS, a citizen of the United States, residing in Ludlow, Massachusetts, have invented certain new and useful Improvements in Composite Gears, of which the following is a specification.

In my application for Patent No. 85,809, filed March 22, 1916, I have described a worm gear made with a center of iron (including various kinds of iron and steel) or similar comparatively strong metal and with teeth of comparatively weak anti-friction material, such as bronze, and have shown several styles of construction and presented generic claims thereon. The present application is based on another style of construction of such a composite gear.

The accompanying drawings illustrate an embodiment of the invention.

Figure 1 is a side elevation of a gear; Fig. 2 is a radial section of the outer portion thereof; Fig. 3 is a face elevation of the center, before the outer ring is applied thereto.

Referring now to the embodiment of the invention illustrated the part marked A is the center, of cast iron. This is formed with an annular groove B around its face, the sides of which constitute undercut shoulders C. A number of holes D are formed in the iron center extending substantially or approximately toward the axis of the wheel and preferably, though not necessarily, extending through the rim of the center. They may be formed in the casting of the center or by drilling or otherwise. A bronze ring E is cast in the groove B, and, in the pouring, projections F of the bronze ring enter the holes D. The rim of the cast iron center is curved outward at its side edges as shown in Fig. 2 and the holes D are approximately normal to the faces of the rim so that they provide a firm anchor for the bronze ring against outward movement of the latter, similar to the anchor provided by the overhang of the shoulder C. In addition the engagement of the bronze ring with the holes D provides an anchor against circumferential movement of the bronze ring on the iron center. The bronze ring is thus firmly held in engagement with the iron center so

that teeth G may be cut therein in the usual way and of any desired shape, either worm gears, spur gears, spiral gears or other style.

This construction is extremely simple to make. There is a considerable saving of expense as compared with a solid bronze gear and an increased strength at the center for a wheel of given weight; or a lighter wheel for the same strength. A single casting operation is sufficient to form the bronze ring in the annular groove in the iron center and to anchor it firmly in place. In making this composite casting the iron center will first be cast in the usual way. This will then be placed in a mold and the bronze poured in place around it, preferably heating the cast iron before pouring the bronze. A number of slots H are provided around one of the overhanging shoulders of the iron center for permitting the escape of air which might be imprisoned. The projections on the bronze ring entering the holes in the center constitute in effect a bolted construction, which takes care of any looseness which might exist between the two parts under considerable variations of temperature owing to the difference between the coefficients of expansion of the two materials.

What I claim is:—

1. A gear having a center of comparatively strong metal and teeth of comparatively weak anti-friction material formed in a ring of such material extending around the center, said parts having shoulders engaging each other transversely to prevent relative axial movement and one of said parts having projections entering openings in the other to prevent relative circumferential movement.

2. A gear having a center of comparatively strong metal with an annular shoulder on its outer face and a cast ring of comparatively weak anti-friction material on said center in engagement with said shoulder, one of said parts having also projections entering openings in the other and extending toward the axis.

3. A gear having a center of comparatively strong metal with an annular groove in its outer face, and a ring of comparatively weak anti-friction material cast in said groove, said center having also open-

ings extending toward the axis and said ring having projections cast therewith and entering said openings.

5 * A gear having a center A of cast iron with an annular groove B extending around the rim thereof and with holes in said rim and a bronze ring E cast in said groove

and with projections entering the holes in the rim of the cast iron center, so as to firmly anchor the bronze ring on the cast iron center, said rim having teeth cut therein. 10

In witness whereof I have hereunto signed my name.

CHARLES H. CALKINS.