E. LURKER.

MILLING CUTTER.

APPLICATION FILED NOV. 24, 1917.

1,273,248.

Patented July 23, 1918.

2 SHEETS—SHEET 1.

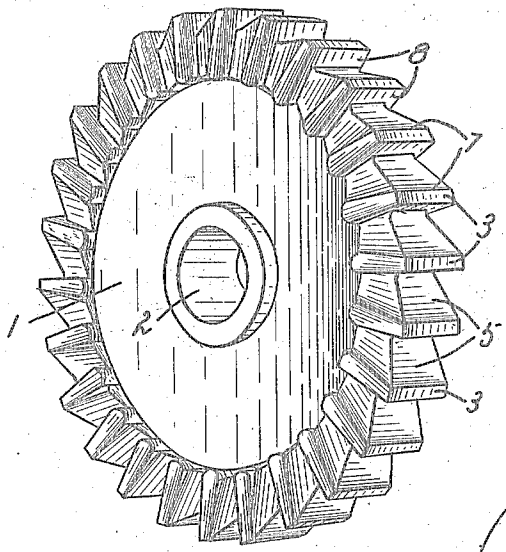


FIG. I

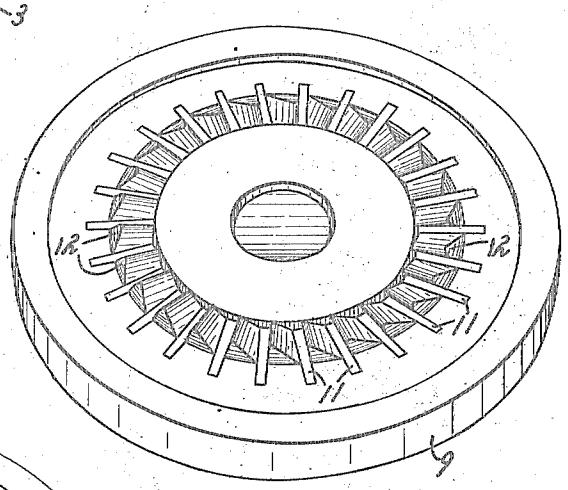


FIG. III

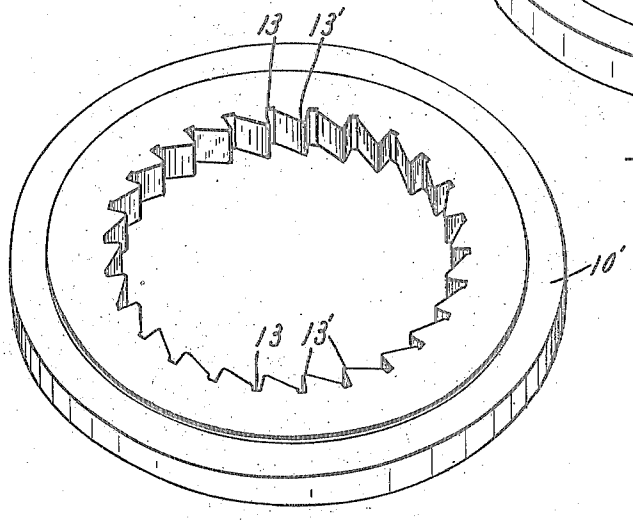


FIG. II

Witness

Luther Blake

M. Louise Thurston

Inventor

EDWARD LURKER

By C. Lappeee & Earl

Attorney

E. LURKER.

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2 SHEETS—SHEET 2.

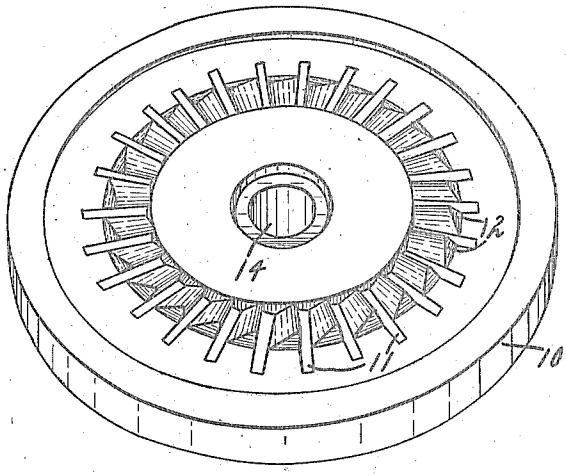


FIG. IV

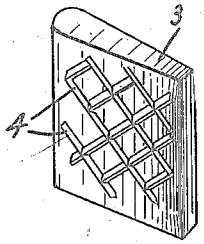


FIG. VI

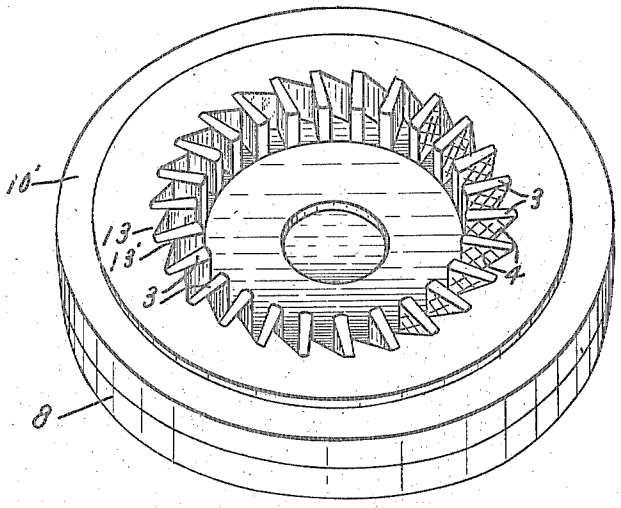


FIG. V

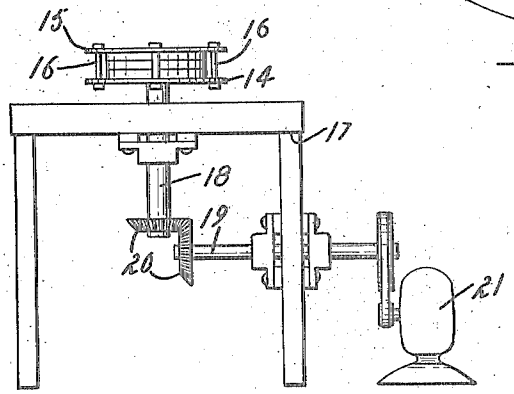


FIG. VII

Witness

Luther Blake

M. Louise Thurston

Inventor

EDWARD LURKER

By Chappell & Earl

Attorney

UNITED STATES PATENT OFFICE.

EDWARD LURKER, OF KOKOMO, INDIANA, ASSIGNOR TO HAYNES STELLITE CO., OF KOKOMO, INDIANA.

MILLING-CUTTER.

1,273,248. Specification of Letters Patent. Patented July 23, 1918.

Application filed November 24, 1917. Serial No. 203,761.

To all whom it may concern:

Be it known that I, EDWARD LURKER, a citizen of the United States, residing at Kokomo, county of Howard, State of Indiana, have invented certain new and useful Improvements in Milling-Cutters, of which the following is a specification.

This invention relates to improvements in milling cutters.

The main objects of this invention are:

First, to provide an improved cutter of superior strength and durability and of large capacity.

Second, to provide a milling cutter having a body of tough elastic metal, such as nickel steel, and cutting blades held in place by casting the body thereon, the cutting blades not being of such a character as to be affected by the casting operation and not requiring retempering or hardening.

Further objects, and objects relating to structural details, will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification. The invention is clearly defined and pointed out in the claims.

A structure which is a preferred embodiment of my invention is clearly illustrated in the accompanying drawing, forming a part of this specification, in which:

Figure I is a perspective view of a milling cutter embodying the features of my invention.

Fig. II is a perspective view of the lower portion of the cope or the intermediate part of the flask or mold which I preferably employ in the manufacture of my improved cutters.

Fig. III is a perspective view of the drag of the mold.

Fig. IV is an inverted perspective view of the upper or top portion of the cope of the mold which I preferably employ.

Fig. V is a perspective view of the drag and the lower portion of the cope or intermediate portion of the mold assembled with the cutter blades positioned therein.

Fig. VI is a rear perspective view of one of the blades of my improved cutter.

Fig. VII is a more or less conventional side elevation of means which I employ for rotating the mold during the casting operation.

In the drawing similar reference characters refer to similar parts throughout the several views.

In the manufacture of my improved cutter I employ for the blades special alloys of cobalt and metals of chromium group, known commercially under the trade name "stellite" and more particularly described in Letters Patent to Elwood Haynes, #873,745, Dec. 17, 1907; #1,057,423, and #1,057,828, dated April 1, 1913, and 1,150,113, dated August 17, 1915.

The body is preferably formed of nickel steel alloy, although other steels may be used with quite satisfactory results. Cutter blades made from "stellite" may be worked at considerably higher speed and have greater cutting qualities and are more durable than any high speed steel known to the applicant. Further, on account of the very high fusing point of the "stellite" the body may be cast thereon without the blades being affected in any manner by the resulting heat, that is, their temper is not drawn or affected in any manner and, consequently, they do not require re-heating for hardening or tempering purposes.

The body, when formed of nickel steel, is tough and elastic, so that it is capable of withstanding very severe shocks and strains and further, in cooling, shrinks evenly upon the blades, so that they are very securely united and effectively supported and retained.

Referring to the drawing, the cutter illustrated in Fig. I is of the type known as a "side milling cutter". It will be understood that my invention is adapted to other forms of milling cutters and cutting tools. The body 1 is, as stated, preferably formed of nickel steel alloy although other metals may be employed with quite satisfactory results.

The body has a bore 2 for the shaft or arbor. The blades 3 are, as stated, formed of "stellite". These blades are preferably outwardly tapered, as shown in Figs. I and V, and their rear faces are preferably provided with diagonally disposed crossed ribs 4. When the body is cast upon the blades the wedge-shape of the blades and these ribs form a very secure joint between the body and the blades, the body shrinking upon the blades, so that the blades are very effectively clamped thereby. The portions 5 between the blades, which serve as supports or abutments therefor, are beveled toward the rear

from the rear side 7 of the one blade to the front side 8 of the succeeding blade. This provides proper clearance for the blades and also permits easy sharpening or grinding of the blades.

In the manufacture of my improved cutters I preferably provide a three part flask or mold comprising a drag member 9, an annular intermediate or lower cope member 10′ and a cope member 10. The drag member is provided with shallow grooves 11 adapted to receive the blades 3. Between these grooves are wedge-shaped projections 12 which form the beveled sides of the blade support or abutment parts 5 of the body.

The intermediate or lower part 10′ of the cope is provided with groove-like recesses 13 adapted to receive the ends of the blades alined with the grooves 11 of the base. The projections 13′ form the beveled top or peripheral portions of the blade supports 5. The upper part 10 of the cope is similar to the drag, being provided with grooves and projections opposed to those of the drag. The top part of the cope is provided with a central sprue 14.

The flask parts are assembled with the blades inserted or supported therein in the position which they occupy in the cutter. The body metal is then poured into the flask and I preferably, at the same time, rotate the flask, which insures that the metal is forced out to the periphery, effectively embedding the several blades. The flask parts are clamped together by means of the clamping rings 15 and the bolts 16. In Fig. VII, I show a means for rotating the flask comprising the frame 17 supporting a vertical shaft 18, which is connected to the driving shaft 19 by the gears 20. A motor 21 is shown as furnishing power for the driving shaft.

The molten metal is, by the centrifugal action, driven outwardly so that the blades are all completely embedded. The metal, in cooling, shrinks upon the blades and, owing to this shrinking action and to their tapered form and the ribs thereon, the blades are very firmly and strongly retained and supported. In fact, it is necessary to practically destroy the cutter to loosen a blade. The blades formed of "stellite" are not in any wise affected by the heat resulting from the casting of the steel body thereon, so that it is not necessary to temper or re-temper the same or to subject the body to any tempering heat which might affect its strength and elasticity.

My improved cutters are very strong and durable and well adapted for high speed and heavy work.

I have illustrated my improvements as particularly adapted to "side milling cutters", though they may be adapted to other forms of cutters and other tools, as will be readily understood by those skilled in the art to which my invention relates.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A cutter comprising a cast metal body of nickel steel alloy, and a cutter blade of "stellite" embedded in said cast metal body.

2. A cutter comprising a cast metal body and a cutter blade of "stellite" embedded in said cast metal body.

3. A cutter comprising a cast metal body, and a blade of "stellite" having transversely disposed ribs thereon of substantial cross section embedded in said cast metal body, the fusing point of the blades being above the pouring point of the body, so that the ribs are not fused with the body, but constitute retaining members.

In witness whereof I have hereunto set my hand and seal in the presence of two witnesses.

EDWARD LURKER. [L. S.]

Witnesses:
F. C. JACOBS,
ALLEN SHELDON.