L. J. BERKELEY.

FORGING MACHINE ROLLS.

APPLICATION FILED MAR. 14, 1919.

1,360,261.

Patented Nov. 30, 1920.

2 SHEETS—SHEET 1.

Fig. 2.

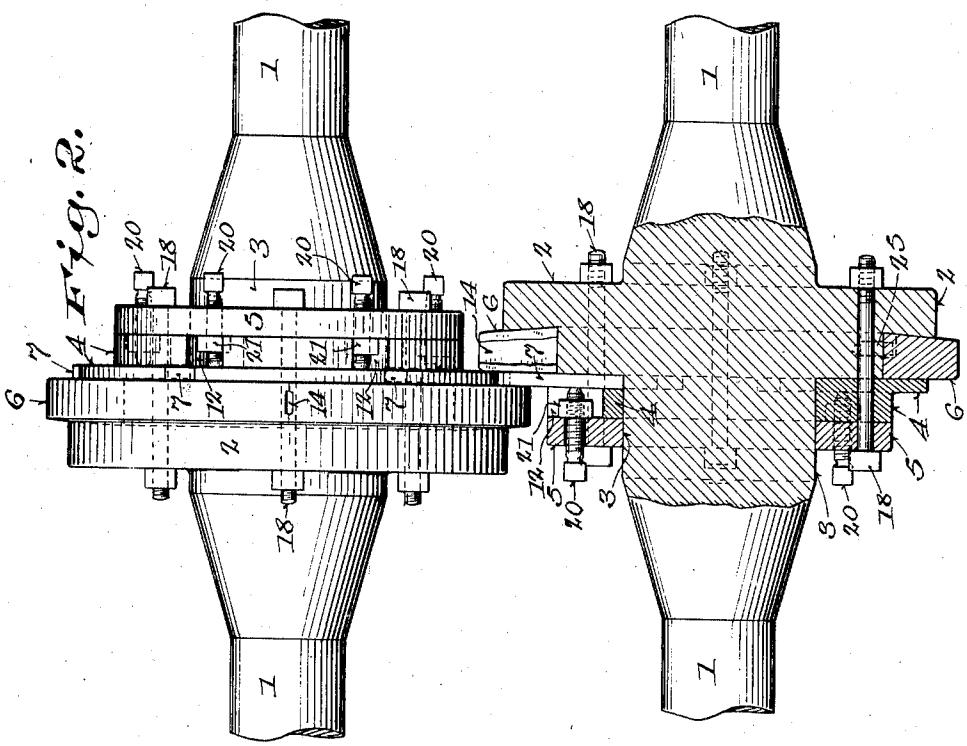
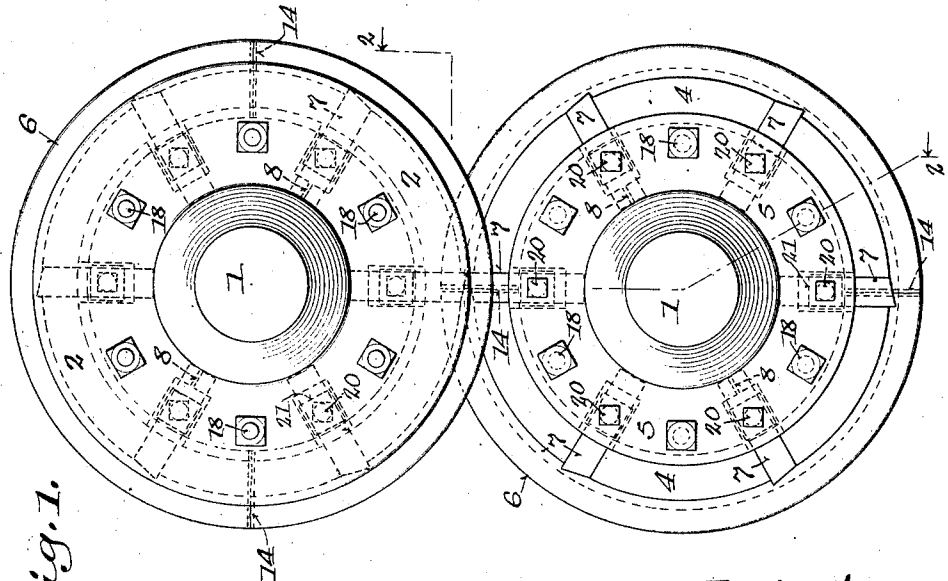


Fig. 1.



Inventor:

Laurence J. Berkeley

By Bottum Bottum Hudnall & Leche

Attorneys.

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2 SHEETS—SHEET 2.

Fig. 3.

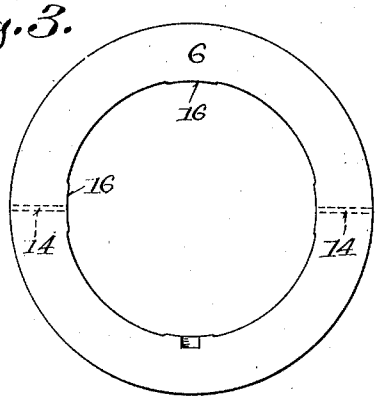


Fig. 4.

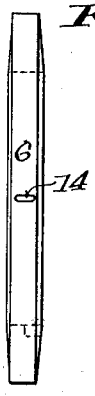


Fig. 5.

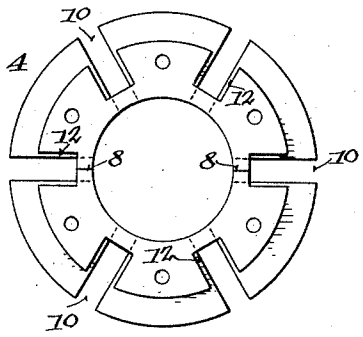


Fig. 6.

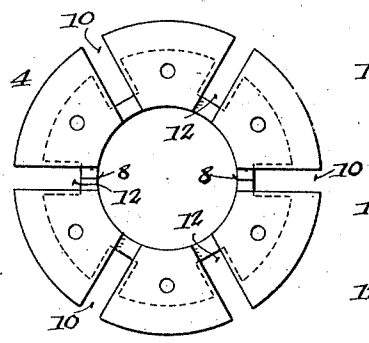


Fig. 7.

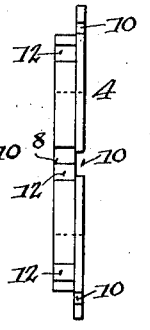
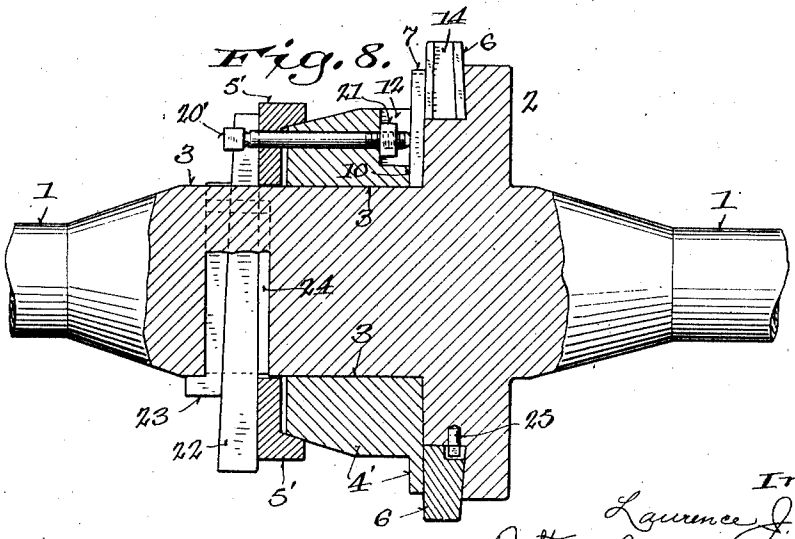


Fig. 8.



Inventor:
Laurence J. Berkeley,
By Bottum Bottum Fudwall & Lechen
Attorneys.

UNITED STATES PATENT OFFICE.

LAURENCE J. BERKELEY, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO HERCULES MANUFACTURING COMPANY, OF RACINE, WISCONSIN, A CORPORATION OF WISCONSIN.

FORGING-MACHINE ROLLS.

1,360,261. Specification of Letters Patent. Patented Nov. 30, 1920.

Application filed March 14, 1919. Serial No. 282,679.

To all whom it may concern:

Be it known that I, LAURENCE J. BERKELEY, citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Forging-Machine Rolls, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof.

This invention relates more particularly to the construction of rolls for forging spike blanks or bodies and similar articles.

Its main objects are to facilitate changing parts of the rolls for forging spike bodies or other articles of different lengths or sizes; to facilitate the construction and replacement of parts subject to most rapid wear without removing the rolls from the machine or from their bearings; to avoid the tendency of the blanks as they pass the rolls to curl and follow one of the rolls; and generally to improve the construction and operation of forging rolls of this class.

It consists in the construction, arrangement and combination of parts as hereinafter particularly described and pointed out in the claims.

In the accompanying drawing like characters designate the same parts in the several figures.

Figure 1 is an end elevation of a pair of forging machine rolls constructed in accordance with the invention; Fig. 2 is a side elevation of one of the rolls and an axial section on the line 2—2, Fig. 1, of the other roll; Fig. 3 is an end elevation, and Fig. 4 is a side elevation of a cheek ring forming a part of each roll; Figs. 5 and 6 are reverse end elevations of a sectional die ring forming a part of each roll; Fig. 7 is a side elevation of the die ring; and Fig. 8 is a section, similar to that of Fig. 2, showing a modification.

As shown in Figs. 1 and 2, two rolls of the same or substantially the same construction, are mounted on approximately parallel axes, and form at their meeting sides a pass of the desired shape and size in cross section, of the spike bodies or other articles to be formed, the parts of one of the rolls being reversed relative to the corresponding parts of the other roll.

Each roll comprises a shaft 1, formed or provided with a collar 2, and a cylindrical seat 3, coaxial with the shaft and collar, a die ring 4, a clamping ring 5, a cheek ring 6, and for making spike blanks or bodies and the like, pointing and cut-off blades 7.

The die ring 4, which may be made of steel or other suitable metal and is accurately bored and faced to fit the seat 3 and the adjoining end of the collar 2, is made in two parts or sections, or is preferably sawed or cut after it is finished, into two parts or sections, as shown at 8 in Figs. 5 and 6, in order to facilitate its removal from and replacement in the roll without removing the roll from its bearings.

The inner end of the ring 4, which is placed next to the collar 2, is formed, as shown in Fig. 6, with radial slots 10, to receive the pointing and cut-off blades 7, which bear at their inner ends against the seat 3, and project at their outer beveled ends beyond the peripheral working face of the ring.

In its outer end, which is of reduced diameter, the ring 4 is formed, as shown in Fig. 5, with square pockets 12, into which the outer sides of the slots 10 open.

The cheek ring 6, which is made of chilled cast iron and is accurately ground or faced to fit a shoulder and annular recess formed therefor in the end of the collar 2 next to the die ring 4, is formed in opposite sides as shown in Figs. 3 and 4, with cored cleavage openings 14, into which a wedge is driven after the ring is finished, to split it into two parts or sections, forming with each other at the ends, closely mating or matching joints, which will not mar or mark the spike bodies or other articles. The bore of the ring 6 is cast with projections 16, as shown in Fig. 3, to avoid unnecessary grinding or finishing in fitting the ring to the roll.

The inner end of the ring 6, which is next to the die ring 4 and blades 7, and forms one side of the pass between the rolls, is slightly tapered or beveled outwardly at an angle, say, of two degrees to a plane perpendicular to the axis of the roll, so that the axes of the rolls may be crossed horizontally at an angle twice that of the taper or bevel of the working face of the ring 6, and the spike blanks or bodies or other articles, as they leave the pass in which they are formed between the rolls, will be relieved from the side pressure of the cheek rings and will be delivered straight from the rolls, the tendency, which might otherwise occur, of the spike

blanks or bodies or other articles as they are delivered from the rolls, to curl around and follow either of the rolls, being thus avoided.

The outer end of the ring 6 may be tapered or beveled, as shown in Fig. 2, say at an angle of about five degrees to a plane perpendicular to the axis of the roll, and the face of the collar 2 against which it fits, correspondingly beveled, to assist in holding the ring securely in place in the annular recess of the collar, the beveled face of the recess slightly overhanging its cylindrical face or the shoulder on which the bore of the ring is fitted and seated.

The die ring 4, cheek ring 6, and the blades 7, are securely fastened together and held in place as a unit on the roll, by the clamping ring 5 and bolts 18, passing through the several rings and the collar 2 parallel with the axis of the roll, and by set screws 20 passing loosely through holes in the ring 5, threaded in nuts 21 held in the pockets 12 of the die ring 4, and engaging at their inner ends with the blades 7.

By constructing the cheek rings 6, which are subjected to more rapid wear than other parts of the rolls, of chilled cast iron, and breaking them after they are finished and just before they are placed in a forging machine, into separately removable sections, they can be cheaply and easily replaced without removing the rolls from their bearings, and cannot be mismated.

By constructing the die ring 4 in sections, and assembling and fastening them with the pointing and cut-off blades 7 on the rolls by the clamping rings 5, bolts 18 and set screws 20, as shown and described, the die rings and pointing and cut-off blades may be readily removed and replaced by other die rings and blades for forming spike blanks or bodies or other articles of different lengths, sizes or shapes, without removing the rolls from their bearings. Worn or defective parts can also be readily renewed or replaced in like manner.

The clamping rings 5 may be made in halves or sections, but this is not necessary except to facilitate replacing broken or defective clamping rings.

Referring to Fig. 8, the die ring 4′ may be extended at the end opposite the slots 10 beyond the nut pockets 12 and tapered as shown, and may be fastened with the cheek ring 6 against the collar 2 and on the shoulder 3 of the shaft 1, by means of a flanged clamping ring 5′ fitting over the tapered end of the ring and a wedge or cotter 22 and gib 23, inserted in a transverse slot 24 formed in the shaft.

With this construction the flanged clamping ring 5′ is preferably made continuous or in one piece, so as to confine the halves or sections of the die ring 4′ together on the shaft 1, and the set screws 20′ which fasten the cut-off blades 7 in place, are made longer and pass loosely through holes formed therfor in the die ring parallel with its axis and intersecting the nut pockets 12.

In both the constructions shown, the cheek ring is held against turning or slipping on the collar 2 by a pin or lug 25, fastened in the collar and engaging a notch in the ring, as shown in Figs. 2 and 8.

Various changes in the details of construction and arrangement of parts of the rolls other than those shown and described, may be made without departure from the principle and scope of the invention as defined in the following claims.

I claim:

1. A forging machine roll comprising a supporting collar and a sectional chilled cast metal cheek ring formed with broken mating joints at the ends of the sections and removably mounted on the collar.

2. A forging machine roll comprising a supporting collar and a chilled cast metal cheek ring removably mounted on the collar and formed with transverse and radial cleavage openings at which it is broken through the sides into sections having close fitting joints at their mating ends.

3. A forging machine roll comprising a supporting collar and a chilled cast metal cheek ring formed with a slightly beveled side working face and broken into sections which are removably fitted and secured on the collar and form closely matching joints with each other at the ends.

4. A forging machine roll comprising a shouldered supporting collar having a beveled face overhanging its shoulder and a chilled cast metal cheek ring fitting the shoulder and beveled face of the collar and broken transversely into separately removable sections which form closely matching joints.

5. In a forging machine roll the combination with a shaft provided with a collar, of a die ring composed of separately removable sections and formed in one end with radial slots and in the other end with pockets, blades fitted in said slots and projecting therefrom beyond the periphery of said ring, nuts held in said pockets, a clamping ring bearing against the outer end of the die ring, bolts passing through the several rings and the collar and securing them together, and set screws passing loosely through the clamping ring, threaded in said nuts and engaging with said blades.

6. In a forging machine the combination of a pair of rolls each comprising a shaft provided with a collar having an annular recess, a chilled cast metal cheek ring fitting into said recess and broken transversely, after it is faced, into separately removable sections which form closely matching joints

with each other, a die ring fitting at one end against the collar, extending outwardly beyond the bore of the cheek ring and composed of separately removable sections, a clamping ring fitting against the opposite end of the die ring, and bolts passing through the several rings and the collar and securing them in place together, the die rings and cheek rings forming a pass on the adjacent sides of the rolls.

In witness whereof I hereto affix my signature.

LAURENCE J. BERKELEY.