

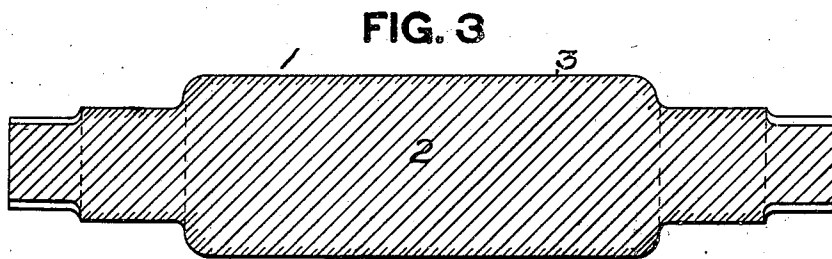
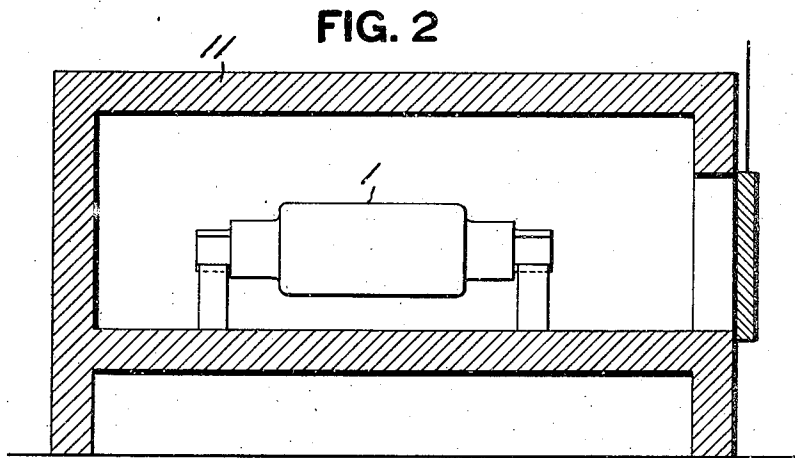
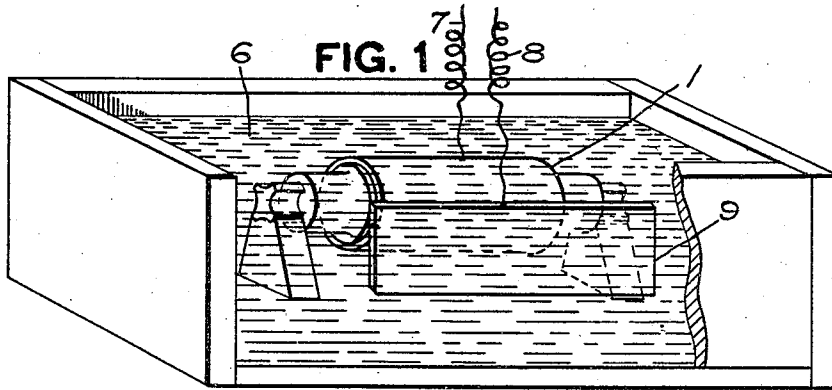
No. 861,558.

PATENTED JULY 30, 1907.

R. C. TOTTEN.

PROCESS OF FINISHING THE SURFACES OF ROLLS, DIES, &c.

APPLICATION FILED MAY 5, 1906.



WITNESSES.

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ROBERT C. TOTTEN, OF PITTSBURG, PENNSYLVANIA.

PROCESS OF FINISHING THE SURFACES OF ROLLS, DIES, &c.

No. 861,558.

Specification of Letters Patent.

Patented July 30, 1907.

Application filed May 5, 1906. Serial No. 315,401.

To all whom it may concern:

Be it known that I, ROBERT C. TOTTEN, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Processes of Finishing the Surface of Rolls, Dies, &c.; and I do hereby declare the following to be a full, clear, and exact description thereof.

This invention relates to a process of forming hard smooth wearing faces on rolls, dies, journals, bearings, etc., and its object is to so treat the article named that its life will be much longer than of similar articles now in use.

My invention is designed especially for finishing rolls used in sheet and other mills, and as the invention is illustrated as well in connection with such rolls as with other articles, I will describe the same when applied thereto, but it will be understood that no limitation is to be imposed on the claims by reason of such illustration and description.

Rolls for reducing metal are formed by casting in chill molds so as to give a hard wearing face to the roll, while the center or body thereof remains soft or of gray iron. All such rolls are subjected to alternate contractions and expansions which cause the chilled surface to form innumerable minute cracks, which are scarcely visible but which in use pick up the scale and cause the same to adhere to the roll, thus cutting and working into the surface of the roll and soon roughening it to such an extent that it must be turned down. This, however, removes a portion of the chilled or hardened surface and the dressed roll has not as hard a surface as it should have and will again quickly roughen. After a few dressings the entire chilled exterior is removed and the roll must be thrown away as useless. The expense of renewing chilled rolls from this cause is a very important item of cost in sheet metal mills.

The object of this invention is to so treat the working or wearing surfaces of such chilled rolls, as well as of all other forms of rolls, dies, journals, bearings, car wheels, tires, etc., that the foregoing difficulties are overcome and a hard, smooth, comparatively frictionless and a very enduring surface is formed thereon.

My invention is based on the principle that a very smooth hard wearing surface greatly reduces friction and wear and prevents scale and other foreign substances from adhering thereto.

The invention consists, generally stated, in coating, preferably by electro-plating, the working or wearing face or faces of articles of the kind named, with nickel, or a metal of the nickel group, or combinations thereof, and then heating said article to weld the nickel coating firmly to the iron backing. The nickel coating fills up all surface cracks and depressions forming a very smooth surface, and also forms a hard alloy with the iron, while

the heating of the article causes the nickel coating to firmly weld to the iron backing and prevents said coating from chipping or flaking off in use.

In the accompanying drawing the invention is illustrated as applied to the treatment of chilled rolls and Figure 1 is a diagrammatic view illustrating the electro-plating thereof; Fig. 2 is a similar view illustrating the welding thereof; and Fig. 3 is a longitudinal section through a chilled roll indicating the different characters of metal therein.

The roll 1, or other article to be treated, is formed by casting, or other manner, and may be cast in a chill mold in the usual way to give the soft gray iron body or interior 2 and the hard or chilled exterior surface 3. The casting is done in the usual way. The article is then covered with a thin coating of nickel, preferably by electro-plating the same thereon. This can conveniently be done by placing the article in a suitable bath 6 composed of a solution of nickel, or other metal of the nickel group, or combinations of the same, and has connected thereto one pole 7 of an electric circuit while the other pole 8 is connected to a plate 9 in said bath. This deposits the nickel or similar metal on the surface of the article in the well understood manner of electro-plating. The electro plated article is then raised to a sufficiently high temperature to cause the nickel coating to firmly weld to the iron backing. This can be accomplished in any suitable way, such as by placing the same in a suitable heating furnace 11, shown in Fig. 2. The surface may be afterwards, if desired, further smoothed by burnishing in the usual way. Old or worn articles may be treated in the same way by first dressing down the worn surface and then subjecting to the electrolytic bath.

The electro plating results in filling up all minute cracks or other inequalities or depressions in the surface of the article, thus giving a very smooth exterior. The heating of the article causes the coating to so firmly weld to the iron backing that it cannot chip, flake or scrape off in use. As a consequence the article has an exceedingly smooth and hard surface which greatly reduces friction and wear and prevents the scale, in case of rolls and the like, from adhering thereto. The life of such wearing surface is very many times greater than of a similar article uncoated with nickel.

My invention may be applied to the treatment of the working surfaces of unchilled rolls or other articles. The manner of treating such articles will be obvious from the illustration and description.

While I have specially referred to nickel as the coating material, I wish it understood that by this term I include not only nickel but any metal of the nickel group, such as manganese, cobalt, chromium, tungsten, or combinations of any two or more thereof.

What I claim is:

1. The process of forming hard smooth wearing surfaces on cast iron articles of the character specified which consists in electro-plating the working or wearing face or
5 faces thereof with metal of the nickel group, and then heating said coated article to cause the coating to weld to the iron body.
2. The process of forming cast iron articles with hard smooth wearing faces consisting in casting such articles in
10 chill molds, then electro-plating the working or wearing face or faces thereof with metal of the nickel group, and finally heating such coated articles to cause the coating to weld to the iron body.
3. The process of forming hard smooth wearing faces on cast iron articles of the character specified which consists in providing the working face or faces of such articles
15 with a coating of metal of the nickel group, and then heating the coated article to cause the coating to weld to the iron body.

In testimony whereof, I the said ROBERT C. TOTEN have
20 hereunto set my hand.

ROBERT C. TOTEN.

Witnesses:

G. H. RANKIN,
J. R. KELLER.