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FREDERICK M. BECKET, OF NEW YORK, N. Y., ASSIGNOR TO ELECTRO METALLURGICAL COMPANY, OF NEW YORK, N. Y., A CORPORATION OF WEST VIRGINIA.

NICKEL-PLATED ARTICLE.

No Drawing.

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To all whom it may concern:

Be it known that I, FREDERICK M. BECKET, a citizen of the United States of America, residing at 565 Park Avenue, New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Nickel-Plated Articles, of which the following is a specification.

As is well known, nickel plating makes it possible to impart to articles formed from relatively inexpensive and easily workable materials a surface which has the attractive color, ability to take a polish, and resistance to atmospheric corrosion which are characteristic of nickel, the latter being neither cheap enough nor workable enough to commend itself as a material for the entire article. When minimum cost or high strength is desired, the base on which the nickel is plated is ordinarily a ferrous metal, such as cast-iron or steel.

However nickel plating usually contains imperfections even when freshly applied, and is very likely to be damaged during use of the article bearing it. When the plate has been deposited on a ferrous metal, the latter soon rusts at every point where it is exposed to atmospheric influences, and such rusting is accelerated by electrochemical action set up between the nickel and iron. The unsightly rust spots defeat the purpose for which the nickel was applied.

The better class of nickel-plated iron or steel ware has a thin electrodeposited layer of copper intermediate the ferrous metal and the nickel. This, to some extent, avoids the difficulty above mentioned, but still leaves much to be desired, as the copper is entirely different in color from the nickel, is inferior to it in resistance to atmospheric corrosion, and is apt to be removed with the nickel from the ferrous base by trifling impacts or abrasion.

According to the present invention the nickel plating is applied to a ferrous alloy base containing a substantial proportion of chromium. Thereby all of the foregoing disadvantages are overcome, as hereinafter pointed out.

The iron-chromium alloys which I employ are characterized by their resistance to corrosion under atmospheric influences. Alloys containing as little as 5% of chromium, the balance principally iron, are suffi-

ciently resistant under many conditions of use, and may serve the purposes of this invention. I prefer however the more highly resistant alloys containing upward of about 10% of chromium. Alloys containing upward of about 20% of chromium are resistant not only to atmospheric corrosion, but to oxidizing conditions at high temperatures as well. Of these latter alloys some are so readily workable that they may be rolled into sheet, or otherwise worked into finished shapes as disclosed in the patent to Becket and McQuigg, No. 1,454,464 dated May 8, 1923. The alloys of lower chromium content are readily workable, provided their carbon content is sufficiently low. My invention contemplates the application of nickel plating to all of these corrosion-resistant alloys, without regard to their other physical and chemical characteristics. The presence of other alloying metals, such as nickel, etc. in the iron-chromium alloys does not render them unsuitable for the purposes of this invention, and is not precluded.

These various alloys, herein referred to as ferrous alloys containing chromium, are capable of receiving a high polish; and when so polished are attractive in color and appearance and highly resistant to atmospheric influences. But by reason of their hardness, or possibly other physical characteristics, the labor and expense involved in preparing such a surface is so great as to be prohibitive for many purposes. On the other hand the cleaned, and if desired, partially polished article, sheet or the like may readily be plated with nickel electrodeposited directly thereon, that is to say without the usual intermediate coating of copper; and such nickel surfaces may readily be buffed to provide the high polish and perfect surface characteristic of this metal. Moreover, nickel deposited upon these ferrous alloys containing chromium has proven decidedly more durable than similar deposits upon iron or steel. Minute defects, abrasions, etc. are initially less apparent because of the similarity in appearance and color of the overlying metal and the alloy base. Moreover on account of the rust-resisting characteristic of the base, such defects do not tend to become increasingly more apparent through the development of rust spots or rust-stained areas, as is al-

ways the case when nickel is applied to iron or steel. The electrolytic action taking place when a discontinuous nickel coating overlies steel has already been referred to.
5 When nickel is plated upon ferrous alloys containing chromium the potentials are such as to avoid, or at least to mitigate this effect, whereby the advantage due to the high intrinsic resistance to corrosion of chrome iron
10 is augmented.

Deposition of nickel upon these alloys involves no special difficulties. No intermediate plating of copper is required, and the practice is essentially the same as that employed in the plating of iron or steel.
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As above stated, pin holes and other small imperfections in the nickel plate become unimportant when the underlying metal is a ferrous alloy containing chromium; and
20 even larger defects, such as those caused by impacts or abrasions during use of the plated article are scarcely noticeable, or may be rendered almost imperceptible by local

polishing and buffing. This latter is an important advantage possessed by these novel
25 nickel plated articles, and arises from the circumstances that the underlying metal closely approximates the nickel in color; is susceptible to the same high polish, and is similarly resistant to atmospheric influences.
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I claim:

1. A nickel-plated article composed of a ferrous alloy containing sufficient chromium to render it substantially non-rusting under atmospheric conditions.
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2. A nickel-plated article composed of a ferrous alloy containing more than 5% chromium.

3. A nickel-plated article composed of a rollable ferrous alloy containing sufficient
40 chromium to render it substantially non-rusting under atmospheric conditions.

In testimony whereof, I affix my signature.

FREDERICK M. BECKET.