

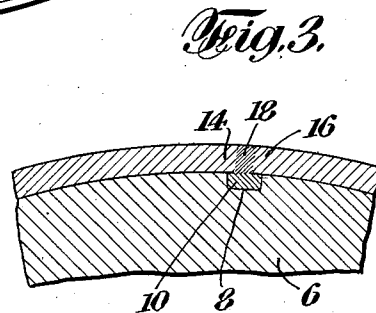
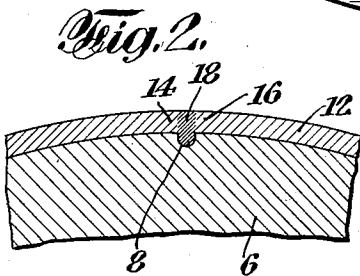
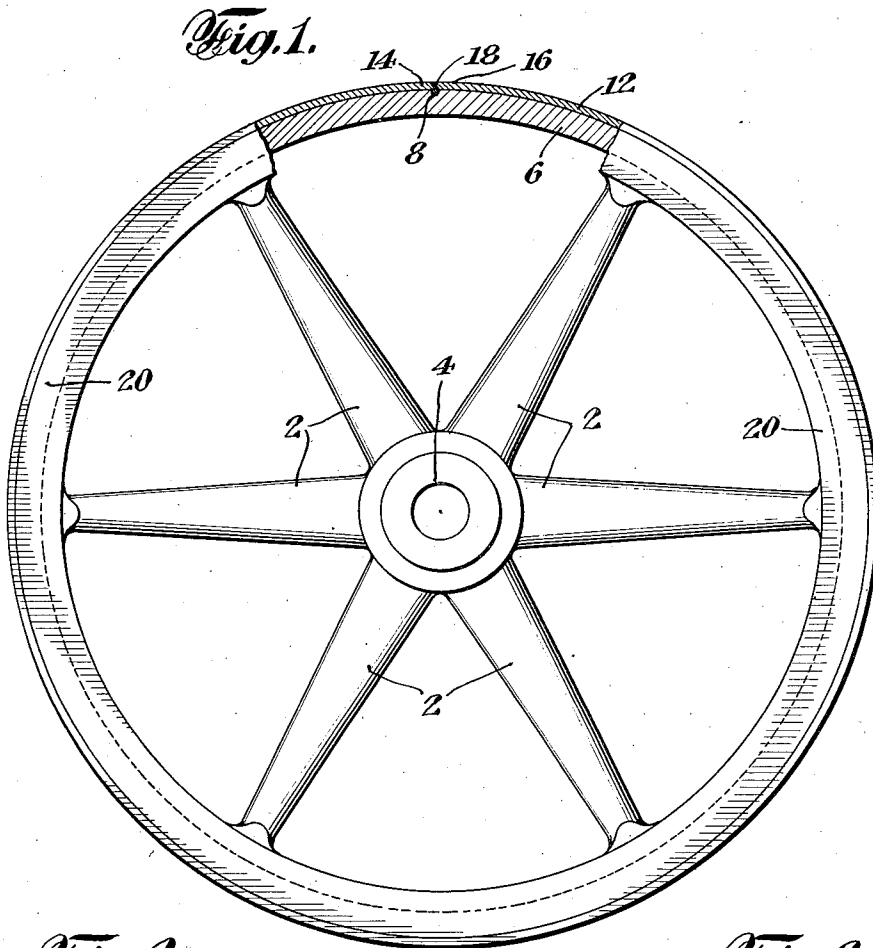
Oct. 27, 1936.

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2,058,670

CASTING WHEEL

Filed Dec. 1, 1933



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UNITED STATES PATENT OFFICE

2,058,670

CASTING WHEEL

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Application December 1, 1933, Serial No. 700,602

5 Claims. (Cl. 18—15)

This invention relates to an improved film-casting-wheel and aims to provide such a wheel with a wear-resisting casting surface capable of imparting a high degree of uniformity and surface smoothness to cast film.

Casting wheels have heretofore been made by plating a surface of copper on a wheel and then plating a layer of nickel on the copper to form the casting surface. The nickel surface is rather soft so that it does not wear well and quite frequently small metal crystals or flakes which have been formed during and as the result of the plating process, detach themselves from the casting surface with the result that thereafter the casting surface is irregular and a blemish is caused in the film. It has been suggested to plate chromium on the nickel, but the chromium also flakes to some extent. Furthermore, electro deposited surfaces must necessarily be thin to avoid imperfections and it thus becomes necessary to replating them from time to time due to the wearing through of the thin layer. Also, a metal wheel base having on its rim several thin adherent coatings of dissimilar metals does not make an ideal film casting wheel, because the metals have different coefficients of expansion, and, when alternately heated and cooled, the thin layers are subjected to successive expansion and contraction which breaks or cracks them, thus destroying the smooth surface as well as loosening the casting surface, and the film which is thereafter cast on the wheel has blemishes in it.

The casting wheel which I have invented includes a wheel body with a peripheral casting surface of a sheet of corrosion resisting metal, preferably a surface of stainless steel, which is extremely hard and resistant to all kinds of blemishes, and which does not become pitted during use. The stainless steel surface is relatively thick and may be laid directly on the wheel body thus eliminating the difficulty inherent in using several thin layers of electro deposited metal. The steel is much stronger than any of the metals heretofore used for casting surfaces and therefore, even though it may have a coefficient of expansion which is slightly different from that of the wheel body, it will not break. Furthermore, a stainless steel band of appreciable thickness may be keyed directly to the body of the wheel and thus may be firmly fixed to the wheel body. The stainless steel band may be and preferably is, manufactured so that it is very close grained, that is, so that it will not flake, and the difficulty inherent in the usual electro deposited surfaces is overcome. Furthermore, as the stainless steel

band is so very much thicker than any suitable electro deposited surface, it will wear for a very much greater period of time than will an electro deposited surface and can be used until it is worn down almost to the rim of the wheel body. As it takes a considerable period of time and special apparatus to prepare a copper and a nickel casting surface and a considerably longer period of time to prepare a chromium surface, none of which surfaces will wear for the desired length of time, the advantage of having a surface which will wear for a long period of time and which will not become pitted or blemished and which will be strong and which can be laid directly on the wheel body without the use of special plating apparatus, will readily be understood.

My invention can readily be understood by reference to the illustrative example shown in the accompanying drawing in which Fig. 1 is a side view of the wheel with portions broken away to show its construction, Fig. 2 is a detail of the weld as shown in Fig. 1, and Fig. 3 is a detail of a modified form of the weld for the casting surface.

The wheel body is preferably a single casting with spokes 2, extending outwardly from a central bearing 4, to support the rim 6 of the body. The rim 6 of the wheel body, after being cast, is trued up with the center line of the central bearing. Then a key-way or slot 8 is preferably, although not necessarily, cut across the rim of the body and a key or lock 10 may be placed in the key-way. A sheet 12 of stainless steel or other hard and corrosion resisting metal is then placed around the wheel body. The casting band is wide enough to extend to the sides of the rim 6 of the wheel body and is of such a length that when it is cold and drawn tightly around the rim 6 of the body, the ends 14 and 16 of the band lack a small fraction of an inch of touching each other. When the band is on the wheel, the band is preferably heated to expand it sufficiently for the ends of the band to come almost together, whereupon the ends are welded together while the band is hot, the welding material being indicated at 18. The band may conveniently be heated to expand it, by blow torches applied to its surface.

The welding rod is preferably made of the same composition as the stainless steel band, except that it has a slightly higher carbon content than the band. This excess carbon content is burned out during the welding operation so that the composition of the weld is the same composition as the band. In the preferred form

of the invention, the welding metal is first laid into the key-way 8 and is then built up into the space between the ends 14 and 16 of the stainless steel band. This welds together the ends of the band and also forms a key or lock which fastens the sheet of stainless steel to the wheel body. In the form of weld shown in Fig. 3, a key or lock 10 is placed in the key-way 8 and the welding metal is welded both to the key and to the ends 14 and 16 of the stainless steel band.

After the ends of the band are welded together, the band is permitted to cool whereupon it shrinks and holds itself firmly on the rim 6 of the wheel body. The contraction of the band is usually sufficient to fix the band firmly to the rim 6 of the wheel body but with the welding metal welded to the key or laid in the slot 8 to form the key, an exceedingly strong welded junction is obtained which is also used to insure that the casting surface will not slip on the rim 6 of the wheel body. After the band 12 has been shrunk on to the wheel body, a rim flange 20 may be welded to the band, or the flange may be a part of the original wheel body casting.

The casting surface is then finished off in any suitable manner, as by cutting with metal tools or grinding, to true it with the bearing 4 and finally the casting surface is polished to provide an absolutely smooth casting surface. If the welding and finishing are properly done, the weld cannot be seen and causes no irregularity in the casting surface. As the final weld is an integral part of the steel casting surface and is of the same composition, it wears at the same rate as the other portions of the casting surface and causes no blemishes in the film throughout the life of the casting wheel.

The preferred casting band is a sheet of stainless steel of an iron-chromium-nickel alloy. The chromium may vary 5 to 35% and the nickel may vary from 3 to 25%. The alloy may also contain small amounts of carbon, manganese, phosphorous, sulphur and silica, but these metals usually do not run over 2% in their total amount. The remainder of the alloy is iron. The stainless steel band has such a crystalline structure that the crystals are very closely knit and do not flake out or off of the casting surface and consequently the film which is cast on such a wheel is without blemish. As the steel alloy is resistant to corrosion, it is unaffected by any of the usual chemicals which might happen to come into contact with it, that is, any of the chemicals which are used in making the film "dope" or which are used for cleaning the wheel or which would ordinarily be used around a factory which produces films.

Although stainless steel is the preferable material for use as a casting surface, a nickel steel containing approximately 18% nickel may be used as it is practically non-corrosive. Also manganese steel containing approximately 11 to 15% manganese with small amounts of carbon and silica may be used. A small amount of copper, usually less than 1%, in steel also retards

corrosion, but wheels with a casting surface of the first mentioned stainless steel have been made and produce extremely satisfactory results.

It is to be understood that these examples are given only by way of illustration and may be modified in many particulars without departing from the spirit of my invention, which I desire to be construed as broadly as the following claims, taken in conjunction with the prior art may allow.

What I claim is:

1. A wheel for casting films from solutions containing cellulosic derivatives, that comprises a wheel body having mechanically attached thereto a peripheral integral casting element of substantial thickness composed of nonflaking corrosion resisting steel, said casting element having its outer peripheral surface finished to render it suitable for casting film, said wheel body and said casting element having substantially the same coefficient of expansion.

2. A wheel for casting films from solutions containing cellulosic derivatives, that comprises a wheel body having mechanically attached thereto a peripheral integral casting element of substantial thickness composed of nonflaking corrosion resisting steel alloy, said casting element having its outer peripheral surface finished to render it suitable for casting film, said wheel body and said casting element having substantially the same coefficient of expansion.

3. A wheel for casting films from solutions containing cellulosic derivatives, that comprises a wheel body having mechanically attached thereto a peripheral integral casting element of substantial thickness composed of nonflaking corrosion resisting iron-chromium alloy, said casting element having its outer peripheral surface finished to render it suitable for casting film, said wheel body and said casting element having substantially the same coefficient of expansion.

4. A wheel for casting films from solutions containing cellulosic derivatives, that comprises a wheel body having mechanically attached thereto a peripheral integral casting element of substantial thickness composed of nonflaking corrosion resisting iron-chromium alloy containing from 5 to 35% chromium, said casting element having its outer peripheral surface finished to render it suitable for casting film, said wheel body and said casting element having substantially the same coefficient of expansion.

5. A wheel for casting films from solutions containing cellulosic derivatives, that comprises a wheel body having mechanically attached thereto a peripheral integral casting element of substantial thickness composed of nonflaking corrosion resisting iron-chromium-nickel alloy containing from 3 to 25% nickel, said casting element having its outer peripheral surface finished to render it suitable for casting film, said wheel body and said casting element having substantially the same coefficient of expansion.

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