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DEVICE FOR PROTECTING THE LEGS AND FEET OF WORKMEN FROM INJURY BY MOLTEN METAL, &c.

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1,097,354. Patented May 19, 1914.

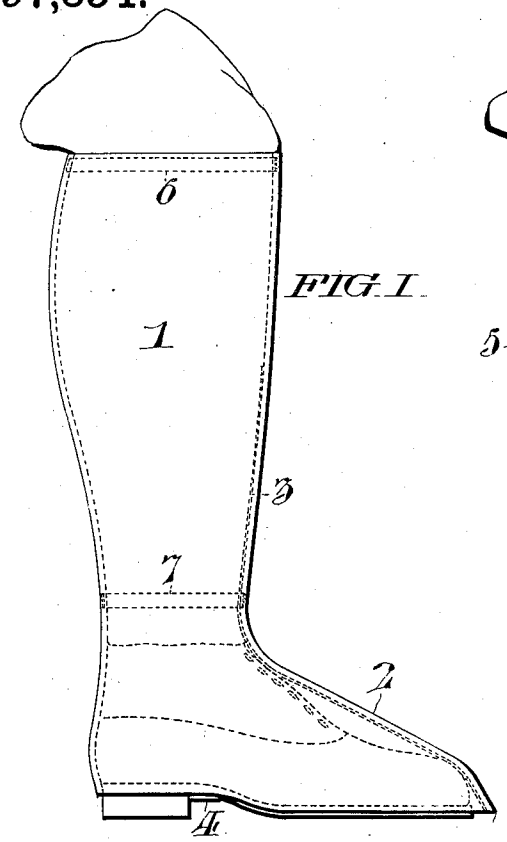


FIG. I.

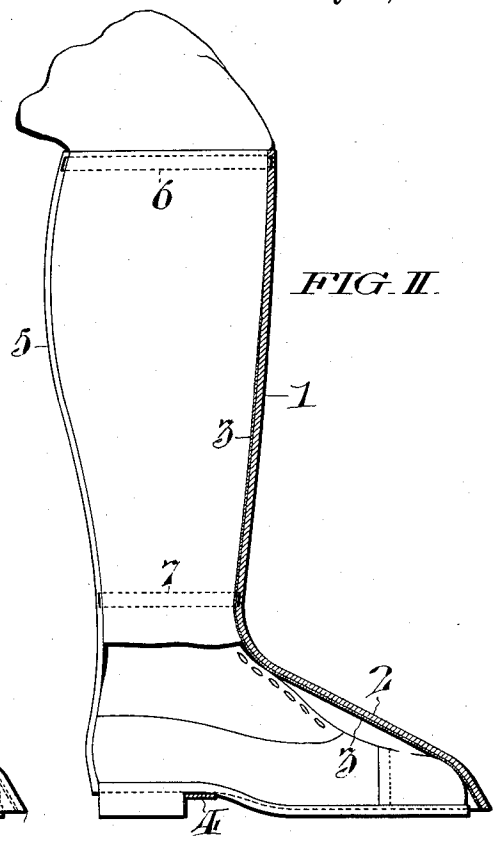


FIG. II.

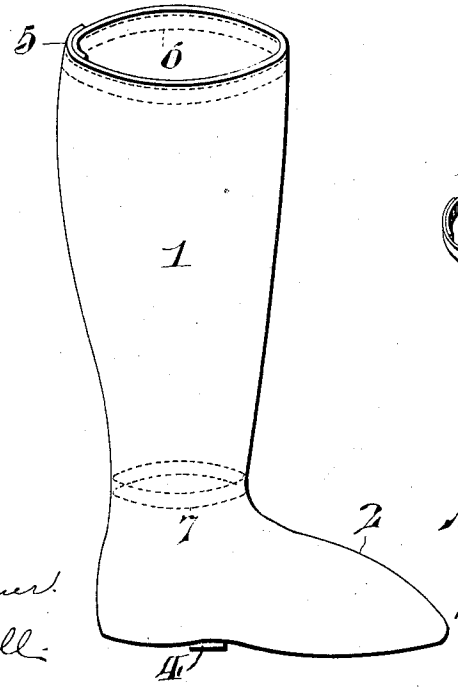


FIG. III.

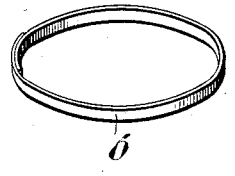


FIG. IV.

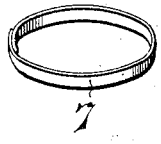


FIG. V.

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DEVICE FOR PROTECTING THE LEGS AND FEET OF WORKMEN FROM INJURY BY MOLTEN METAL, &c.

1,097,354. Specification of Letters Patent. Patented May 19, 1914.

Application filed October 8, 1913. Serial No. 794,012.

To all whom it may concern:

Be it known that I, ALEXANDER E. OUTERBRIDGE, Jr., of Chestnut Hill, Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Devices for Protecting the Legs and Feet of Workmen from Injury by Molten Metal, &c., whereof the following is a specification, reference being had to the accompanying drawings.

In metal foundries a very large percentage of the injuries which occur to workmen is due to the splashing or spilling of molten metal upon their legs and feet during the filling, handling, or pouring of ladles, or other receptacles.

Prior to the adoption of my present invention, in one of the large iron foundries of Philadelphia, accidents of this character were frequent, since the molten metal which splashed or spilled upon the legs or feet of workmen, and found even a temporary lodgment, burned through the clothing or leather shoes of the wearer, and inflicted painful and sometimes dangerous injuries.

My invention is based upon the discovery that molten metal, such as iron, even at the high temperature used in casting, can, under certain conditions, be poured against a fabric in itself inflammable, without setting fire thereto, or even causing charring thereof.

The above statement applies to such a textile fabric as canvas, which has a comparatively hard and smooth face without appreciable crevices, but I have found that other smooth fabrics, and even paper, are capable of exhibiting this immunity from combustion, under the conditions referred to. These conditions are that the fabric itself should have such a surface, and be so disposed with relation to the horizontal, that molten metal falling thereon, shall be free to immediately shed itself away from the fabric, under the effect of gravity, even a momentary detention by lodgment sufficing to produce injury, while, on the other hand, a stream of molten iron can run continuously downward for an appreciable time upon a surface of this character, without setting fire to the fabric or even charring it. I have practically utilized this discovery in an organized manner, to obtain a protecting device which may be readily applied to, and removed from, the leg and foot of a workman, and the result has been that after an experience of over a year, in the foundry above referred to, practically no injuries have occurred through burning, although the conditions as to the splashing or spilling of molten metal which formerly gave rise thereto, have still continued.

In the accompanying drawings, I have illustrated a preferred form of the device, Figure I, being a side elevation thereof, as applied to the leg and foot of the wearer; Fig. II, being a vertical section and Fig. III, a view in perspective, of the device detached therefrom; Figs. IV, and V, being perspective views of preferred fastening devices which I have found well adapted to the purpose.

The material which I prefer, when a textile fabric is to be employed, is a canvas having a relatively hard and closely woven surface and stiff enough to permanently maintain its general contour.

As will be seen from the drawings, the material is arranged in a form corresponding in a general way, to that of a legging, having a leg portion 1, and a foot portion 2. It will be noticed that the foot portion 2, is, as compared with that of an ordinary legging, extended laterally and forwardly and prolonged downwardly, so as to not only completely cover the upper, but to project over and shield substantially the entire upper edges of the sole of a normal shoe, meaning by that expression a shoe, of such size as would be appropriate for a person for whom the leg portion 1, would be proper. Furthermore, it will be noticed that the exterior contour of the protector is entirely free from any groove, ridge or projection, of a horizontal character, or approximately so, and that the incline of the foot portion 2, both laterally and forwardly, is uninterrupted, in the sense that there is no cupped or flat surface, such as ordinarily occurs in the upper of a shoe at the region between the instep and the toe. The dimensions of the foot portion 2, are preferably such as to also leave a free space between it and the upper of the shoe at this region, so that the upper of the shoe can bend, without forming permanent creases in the proximate material of the foot portion 2.

In the most complete form of the invention, I provide a stiffening or supporting member 3, such as a metal band, extending beneath what may be termed the ridge of

the foot portion and anchored in the leg portion, as shown, but this adjunctive device is not necessary where the material of the foot portion, such as strong canvas, is of such character as not to readily collapse or crease in use. A band 4, passes beneath the sole of the shoe to retain the device against riding up, but said band is so secured to the inner side of the fabric, that no external horizontal projection is formed opposite to the regions of attachment. The leg portion 1, is closed down the entire front, but has a vertical opening at the rear, as shown at 5, extending preferably throughout the entire length, the edges of the opening being preferably made to overlap slightly, so as to insure a complete closure of the vertical opening. The protector is secured to the leg of the wearer, by a non-projecting fastening means, preferably by metallic spring bands, one of which, 6, is located near the top of the leg portion 1, the other 7, of smaller diameter, being located preferably above the ankle and at about such a height as to surround the top edges of an ordinary shoe. The lower of these springs, and preferably both thereof, should be so attached to the material as not to present any substantial external ridge or projection in a horizontal direction, or approximately so; that is to say, the external contour of the organized structure, as well as the inherent structure of the material from which it is made, should be substantially flush in a vertical direction. I have found that with a device of this character, molten iron may be splashed or even poured upon the leg portion or the foot portion, without substantial injury to the fabric, or to the person or clothing of the wearer, as the metal will be shed under the effect of gravity, before it exercises any substantial burning effect.

While I have specified canvas as the preferred material for the protector, I do not limit myself thereto, for, theoretically, even paper having a smooth surface could be employed, but for obvious reasons a fabric more permanent than ordinary paper, under the conditions of practical use, is desirable. If desired, the material may be impregnated with a so-called fire-proofing salt, such as tungstate of soda, but this is not necessary in most cases.

I am of course aware that a canvas legging is an old article of manufacture, and that spring fastening clips have been employed for purposes generally similar to those above described. Hence while I do not limit myself to the use of such fastening means, I do not broadly claim a legging, or a legging provided with such clips. Nor do I broadly claim the use of a stiffening device in a legging.

The distinguishing and essential features of my invention are that the inherent structure of the fabric should itself be free from such crevices or projections as would detain the molten metal for any substantial period of time; as a convenient expression for which characteristic I use the term "non-detaining": also that the fabric should be capable of maintaining, under the wear and tear of use, the integrity of form both of its own surface and of the contour of the structure in which it is embodied; as a convenient expression for which characteristic I use the term "formally-durable": also that it should be structurally disposed in such a manner as not to present horizontal or approximately horizontal ridges or projections, or relatively flat surfaces; as a convenient expression for which characteristic I use the term "vertically flush": also that it should have a foot portion laterally and forwardly extended to form a shield which projects over substantially the entire upper edge of the sole of such a shoe as would correspond in size to that adapted to be worn by a person for whom the leg portion would be normally in size, the exterior contour of said foot portion having a substantially uninterrupted, though not necessarily uniform incline, in a downward direction; as a convenient expression for which characteristic of relative extension, I employ the term "overlapping"; and finally, as a preferable characteristic, that it should be readily applicable to, and removable from the person of the wearer. Under these circumstances, the discovery of the remarkable phenomenon above mentioned is practically utilized for a structure which though it resembles to the eye a well known article, embodies such modifications from the usual type of such articles as will obtain, for a specific purpose, a new result of serious importance to humanity and of economic value.

I claim:

1. The hereinbefore described device for protecting the human leg and foot from injury by hot metal; which device consists of an envelop having a leg portion and a foot portion, composed of formally-durable and non-detaining material, substantially as set forth; said foot portion being extended to form a shield overlapping substantially the entire upper edge of the sole of a normal shoe corresponding to the dimensions of the leg portion, and said leg and foot portions having a vertically flush surface and substantially uninterrupted downward incline; in combination with fastening means, non-projecting in a horizontal direction, substantially as set forth.

2. The hereinbefore described device for protecting the human leg and foot from injury by hot metal; which device consists of an envelop having a leg portion and a foot portion, composed of formally-durable and non-detaining material, substantially as set

forth; said foot portion being extended to form a shield overlapping substantially the entire upper edge of the sole of a normal shoe corresponding to the dimensions of the leg portion, and being also provided with a stiffening member extending along its ridge; and said leg and foot portion having a vertically flush surface and substantially uninterrupted downward incline; in combination with fastening means, non-projecting in a horizontal direction, substantially as set forth.

In testimony whereof, I have hereunto signed my name at Philadelphia, Pennsylvania, this seventh day of October, 1913.

ALEXANDER E. OUTERBRIDGE, JR,

Witnesses:
JAMES H. BELL,
E. L. FULLERTON.