May 28, 1940. H. L. CAMPBELL 2,202,309

SNOWPLOW SHOE

Filed Dec. 31, 1938 2 Sheets-Sheet 1

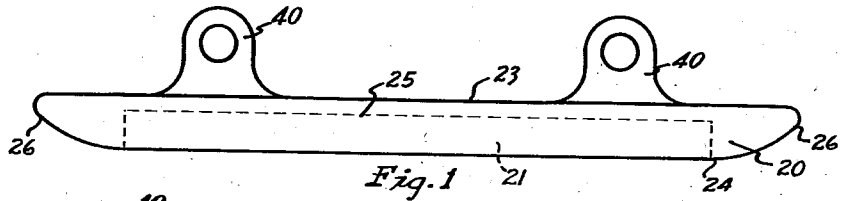


Fig. 1

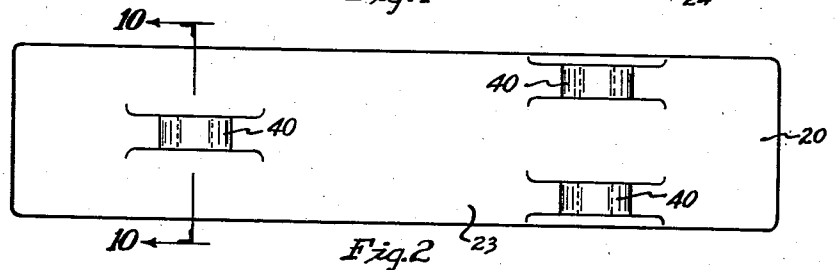


Fig. 2

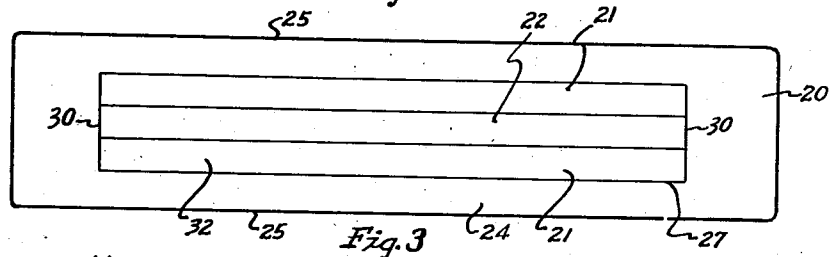


Fig. 3

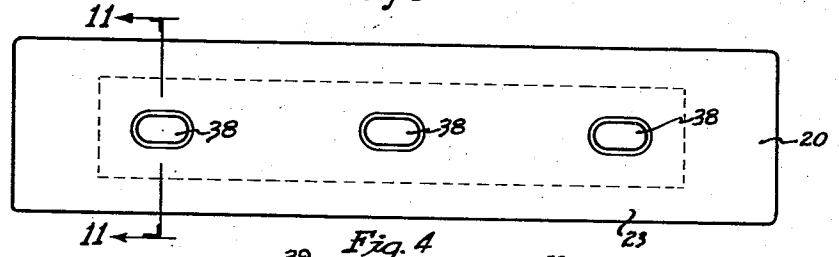


Fig. 4

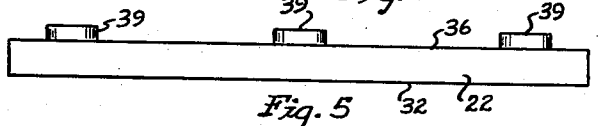


Fig. 5

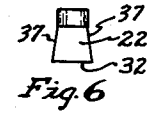


Fig. 6

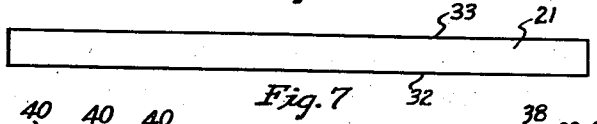


Fig. 7

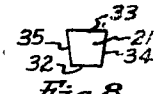


Fig. 8

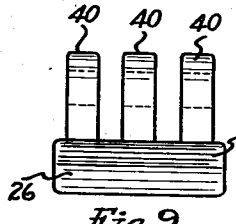


Fig. 9

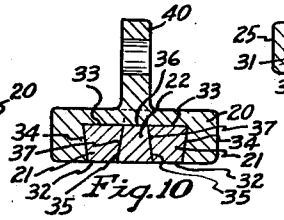


Fig. 10

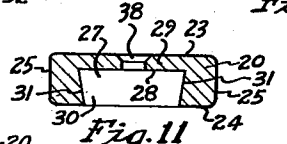


Fig. 11

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May 28, 1940. H. L. CAMPBELL 2,202,309

SNOWPLOW SHOE

Filed Dec. 31, 1938 2 Sheets-Sheet 2

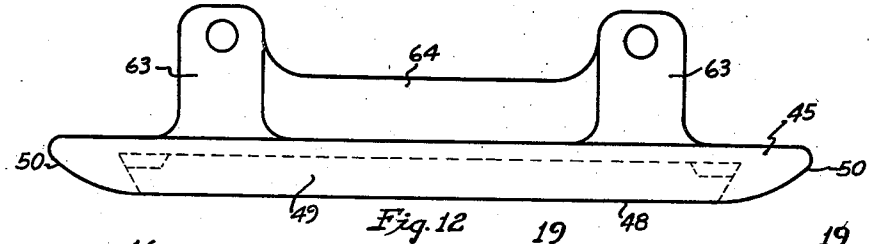


Fig. 12

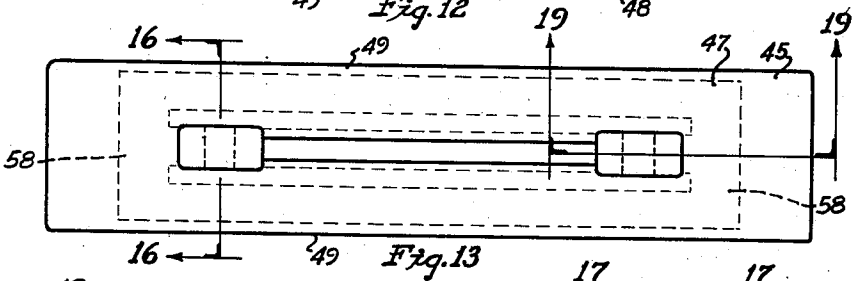


Fig. 13

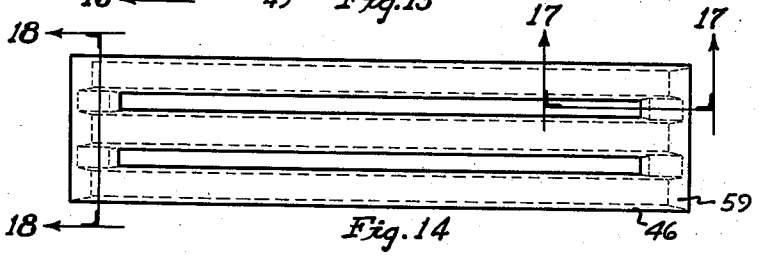


Fig. 14

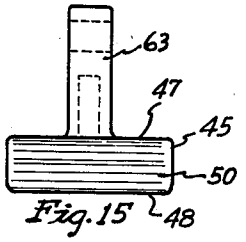


Fig. 15

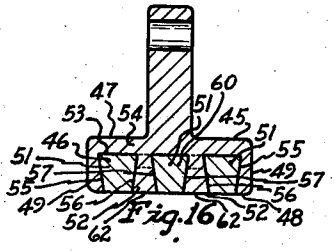


Fig. 16

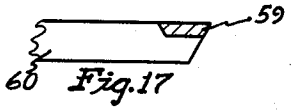


Fig. 17

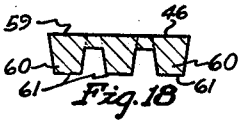


Fig. 18

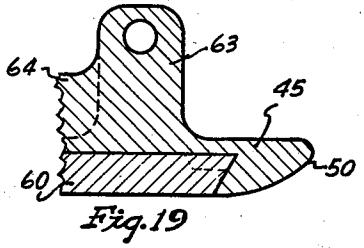


Fig. 19

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2,202,309

UNITED STATES PATENT OFFICE

2,202,309

SNOWPLOW SHOE

Harry L. Campbell, St. Paul, Minn., assignor to American Hoist and Derrick Company, St. Paul, Minn., a corporation of Delaware

Application December 31, 1938, Serial No. 248,813

7 Claims. (Cl. 280—28)

This invention relates to a shoe or runner of character adapted to support an entity or vehicle, such, for example, as a snowplow, for sliding or dragging movement over the ground or other surface.

An object of the invention is to provide a shoe or runner adapted to the purpose of supporting an entity or vehicle for sliding or dragging movement which will be of novel and improved construction.

A further object is to provide a shoe or runner for supporting an entity or vehicle for sliding or dragging movement wherein will be incorporated various improved features and characteristics of construction.

A further object is to provide a novel and improved shoe or runner for supporting an entity or vehicle for sliding or dragging movement which will be of structure to be or remain efficient and satisfactory in use for a long period of time though subjected to severe blows, shocks, strains and abrasive action.

A further object is to provide a novel and improved shoe or runner of the present character which will incorporate features and characteristics of construction intended to render the shoe or runner capable of withstanding, and remaining intact against, blows, shocks and strains which said shoe or runner inevitably must encounter in use, and will also incorporate other and different features and characteristics of construction intended to render the shoe or runner capable of more effectively resisting wear or abrasive action than have more or less similar shoes or runners heretofore of commerce.

A further object is to provide a novel and improved shoe or runner for supporting an entity or vehicle, such as a snowplow, for sliding or dragging movement over the ground or other surface which will include a supporting body or casing member of metal possessing physical properties, including toughness, adapted to render said supporting body or casing member yieldable to force without breaking, and will also include one or more insert pieces of metal possessing physical properties, including hardness, adapted to render said insert piece, or insert pieces, quite effectively resistant to wear or abrasive action, and in which said shoe or runner said supporting body or casing member and said insert piece, or insert pieces, will be assembled together so that the supporting body or casing member houses and confines and protects the insert piece, or insert pieces, against blows, shocks and strains, and said insert piece, or insert pieces, will be adapted to engage the ground or other surface and resist wear or abrasive action upon the shoe or runner occasioned by sliding or dragging movement of said shoe or runner.

Iron and steel are most useful to the purpose of providing shoes or runners of the character herein presented. It is well known that iron and steel products when treated and made hard, and thus more capable of resisting abrasive action, have tendency toward becoming brittle, and thus less suitable to absorb blows, shocks and strains without breaking. On the contrary, iron and steel products when treated and made tough, and thus more capable of absorbing blows, shocks and strains, have tendency toward becoming soft, and thus less capable of resisting abrasive action. Heretofore, iron and steel products at once including tough cores yieldable to force without breaking and hard, wear-resisting surfaces have been produced by suitable treatment of the bodies of the products designed to make them tough and skin hardening or case hardening of said products.

It is an object of the present invention to provide a novel and improved shoe or runner adapted to support an entity or vehicle for sliding or dragging movement which will at once include a tough core constituted as a supporting body or casing member of the shoe or runner and a hard, wear-resisting surface constituted as an insert piece, or insert pieces, incorporated in said supporting body or casing member.

A further object is to provide a shoe or runner adapted to support an entity or vehicle for sliding or dragging movement over the ground or other surface which will include a supporting body or casing member of metal, iron or steel, and an insert piece, or insert pieces, of metal, iron or steel incorporated in said supporting body or casing member, wherein said insert piece, or insert pieces, will possess hardness or wear-resisting quality as an essential characteristic thereof and will be adapted to ride upon the ground or other surface, said supporting body or casing member will constitute, in effect, a core of said shoe or runner possessing toughness, or ability to yield to force without breaking, as an essential characteristic thereof and will be assembled with said insert piece, or insert pieces, to cause the insert piece, or insert pieces, to be protected in the structure against the possibility of becoming broken or otherwise impaired, and said insert piece, or insert pieces, will have relation to said supporting body or casing member adapted to cause wear upon the supporting body or casing

member to be less rapid than otherwise would be the case were said insert piece, or insert pieces, not present in the structure.

And a further object is to provide a shoe or runner of the present character which will include a supporting body or casing member and an insert piece, or insert pieces, assembled together in novel and improved manner.

With the above objects in view, as well as others which will appear as the specification proceeds, the invention comprises the construction, arrangement and combination of parts as now to be fully described and as hereinafter to be specifically claimed, it being understood that the disclosure herein is merely illustrative and intended in no way in a limiting sense, changes in details of construction and arrangement of parts being permissible so long as within the spirit of the invention and the scope of the claims which follow.

In the accompanying drawings forming a part of this specification,

Fig. 1 is a side elevational view of a snowplow shoe or runner including features and characteristics of the invention;

Fig. 2 is a top plan view of the snowplow shoe of Fig. 1;

Fig. 3 is a bottom plan view of the snowplow shoe of Figs. 1 and 2;

Fig. 4 is a top plan view of the body or casing member of the snowplow shoe of Figs. 1 to 3, without the insert pieces and the attachment elements adapted to be assembled and united with said body or casing member to produce said snowplow shoe;

Fig. 5 is a side elevational view of one type of insert piece adapted to be assembled and united with the body or casing member of Fig. 4, as disclosed between insert pieces of the character as shown in Fig. 7;

Fig. 6 is an end elevational view of the insert piece of Fig. 5;

Fig. 7 is a side elevational view of another type of insert piece adapted to be assembled with and secured to the body or casing member of Fig. 4, as disclosed at the opposite sides of an insert piece of the character as shown in Fig. 5;

Fig. 8 is an end elevational view of the insert piece of Fig. 7;

Fig. 9 is an end elevational view of the snowplow shoe of Figs. 1 to 3;

Fig. 10 is a transverse sectional view, taken on line 10—10 in Fig. 2;

Fig. 11 is a transverse sectional view, taken on line 11—11 in Fig. 4;

Fig. 12 is a side elevational view of a snowplow shoe of modified construction including features and characteristics of the invention;

Fig. 13 is a top plan view of the snowplow shoe of Fig. 12;

Fig. 14 is a top plan view of the insert piece of the snowplow shoe of Figs. 12 and 13, as said insert piece would appear disassembled from the body or casing member of said snowplow shoe of said Figs. 12 and 13;

Fig. 15 is an end elevational view of the snowplow shoe of Figs. 12 and 13;

Fig. 16 is a transverse sectional view, taken on line 16—16 in Fig. 13;

Fig. 17 is a fragmentary longitudinal sectional view, taken on line 17—17 in Fig. 14;

Fig. 18 is a transverse sectional view, taken on line 18—18 in Fig. 14; and

Fig. 19 is a fragmentary longitudinal sectional view, taken on line 19—19 in Fig. 13.

With respect to Figs. 1 to 11 of the drawings and the numerals of reference thereon, a supporting body or casing member of the snowplow shoe there shown is denoted 20 and insert pieces of said snowplow shoe are, respectively, indicated 21 and 22.

As disclosed, the body or casing member 20 is constituted as a generally rectilinear block or plate of metal having a flat upper surface 23, a flat lower surface 24 in spaced, parallel relation to the upper surface 23, generally curvilinear opposite side surfaces 25 which extend upwardly and outwardly from the flat lower surface 24 to the upper surface 23, and generally curvilinear opposite end surfaces 26 which also extend upwardly and outwardly from said flat lower surface 24 to said upper surface 23.

The body or casing member 20 is adapted to be secured in supporting relation to an entity or vehicle, such as a snowplow, so that the flat lower surface 24 of said body or casing member 20 can rest squarely upon the ground or other surface over which it is intended to slide or drag said entity, vehicle or snowplow.

The flat lower surface 24 of the body or casing member 20 is provided with a rectilinear concavity 27, which as shown is disposed centrally of said flat lower surface. Desirably, the concavity 27 has considerable length, width and depth. As disclosed, said concavity 27 is defined at its base by a flat surface 28 which is separated from the upper surface 23 of the body or casing member 20 by a thin wall 29, at its opposite ends by spaced apart surfaces 30 each of which is adjacent an end portion of said body or casing member, is substantially perpendicular to the flat upper and lower surfaces 23 and 24 and extends transversely of the body or casing member, and at its opposite sides by spaced apart surfaces 31 each of which is adjacent a side portion of said body or casing member 20, is substantially oblique to the flat upper and lower surfaces 23 and 24 and extends longitudinally of the body or casing member. The spaced apart surfaces 31 which define the side walls of the concavity 27 slant downwardly and inwardly of the block or plate of metal which constitutes the body or casing member 20, toward each other.

Each insert piece 21, 22, 21 is constituted as an oblong mass of metal which is angular in cross section, and all of said insert pieces are adapted to be disposed or situated within the concavity 27, desirably to exactly fill said concavity and so that the lower surfaces 32 of the insert pieces are exactly flush with the flat lower surface 24 of the body or casing member 20. In the disclosure as made, the insert piece 22 is between the insert pieces 21, 21 and is secured within the concavity 27 and to the wall 29 of said body or casing member 20 in relation to said insert pieces 21 to cause these latter to be fixedly and rigidly retained within said concavity. More explicitly, each insert piece 21 has length equal to that of the concavity 27, a flat upper surface 33 adapted to engage the flat surface 28, an outer side surface 34 which slants downwardly and inwardly of the block or plate of metal constituting the body or casing member 20 and is adapted to engage an adjacent surface 31 defining a side wall of said concavity 27, and an inner surface 35 which slants downwardly and outwardly of said block or plate of metal. The adjacent side surfaces 35, 35 of the different insert pieces 21, 21, respectively, are spaced apart a distance, when in place, adapted to define a space between said adjacent surfaces of size to snugly receive the insert

piece 22. Said insert piece 22 has length equal to that of the concavity 27, a flat upper surface 36 adapted to engage the flat surface 28, and outer side surfaces 37, 37 which slant downwardly and outwardly and are, respectively, adapted to engage the adjacent side surfaces 35, 35 of the insert pieces 21, 21, respectively. The arrangement is such that securing of the insert piece 22 within the concavity 27 between the insert pieces 21, 21 causes said insert pieces 21, 21 to be fixedly and rigidly retained within said concavity. Clearly, the insert pieces 21, 21 will be locked or fastened within the concavity 27, when the insert piece 22 is made secure within said concavity, by reason of the engagement of a downwardly and inwardly slanting side surface 31 of the block or plate of metal 20 with an outer downwardly and inwardly slanting side surface 34 of each of said insert pieces 21 and the engagement of a downwardly and outwardly slanting side surface 37 of said insert piece 22 with an inner downwardly and outwardly slanting side surface 35 of each of said insert pieces 21. That is, the slanting or oblique side surfaces 31, 31 of the concavity 27 and the slanting or oblique side surfaces 37, 37 of the insert piece 22 together provide or supply means through the instrumentality of which the insert pieces 21, 21 are fixedly and rigidly secured, in dovetail fashion, so to speak, within the concavity 27.

As shown, the wall 29 between the flat upper surface 23 and the base 28 of the concavity 27 includes spaced apart apertures or openings 38 which are adapted to receive attachment lugs or bosses 39 upon the flat upper surface 36 of the insert piece 22. In the disclosure as made, said insert piece 22 is fixedly and rigidly united with the wall 29 by welding the lugs or bosses 39 within the apertures or openings 38 and to the metal of said wall 29. In the manufacture of the shoe or runner, the insert pieces 21, 21 will be first situated within the concavity 27, and the insert piece 22 will afterwards be situated within said concavity and united with the block or plate 20 by welding of the lugs or bosses 39 to the wall 29 while said insert piece 22 is in retaining and locking or fastening relation to the insert pieces 21. When the welds which unite the block or plate 20 and the insert piece 22 with each other are complete, the upper surface 23 of the block or plate may desirably be, or be made, smooth and even, as disclosed at the central portion of Fig. 2.

Attachment elements 40, for securing the shoe to an entity, vehicle or snowplow which is to be slid or dragged over the ground or other surface while supported by a plurality of shoes of the character here presented, may be of any construction which in a particular instance may be suitable. As disclosed, the shoe includes three attachment elements 40 welded in spaced apart relation to each other to the flat upper surface 23 of the body or casing member 20. That is, there are two spaced apart attachment elements 40 adjacent one end of the shoe and a single attachment element 40 adjacent the opposite end of said shoe. Each attachment element is constituted as an apertured ear to be secured to the entity, vehicle or snowplow which is to be supported.

The body or casing member 20 will be composed of metal adapted or intended to render the shoe or runner capable of withstanding, and remaining intact against, blows, shocks and strains. The insert pieces 21, 21 will be composed of metal adapted or intended to render the shoe or runner capable of more effectively resisting wear or abrasive action than have more or less similiar shoes or runners heretofore known. The insert piece 22 can be composed of metal of the nature of that of the body or casing member 20, or of the nature of that of the insert pieces 21, 21, or of some other nature.

A material or metal which satisfactorily and efficiently can constitute the body or casing member 20 is low carbon cast steel, which possesses physical properties, including toughness, adapted to render said body or casing member yieldable to force without breaking. A material or metal which satisfactorily and efficiently can constitute the insert pieces 21, 21 is Nihard cast iron, which possesses physical properties, including hardness, adapted to render said insert pieces 21, 21 quite effectively resistant to wear or abrasive action. As before mentioned, the insert piece 22 can be of any suitable nature. When said insert piece 22 is of nature to materially resist wear or abrasive action, it of course will operate in assistance with the insert pieces 21, 21 to slow down inevitable wearing away of the shoe or runner.

The body or casing member 20 and the insert pieces 21, 22, 21 are obviously assembled together in such manner that the supporting body or casing member houses and confines and protects said insert pieces against blows, shocks and strains, and so that the insert pieces can engage the ground or other surface over which the shoe or runner is to be slid or dragged and resist wear or abrasive action upon said shoe or runner.

The shoe or runner of Figs. 1 to 11 at once includes what is in effect a tough core constituted as the body or casing member 20 and a hard, wear-resisting surface constituted as, or provided by, the insert pieces 21, 21, as well as the insert piece 22 when this is composed of hard metal intended to assist in opposing wear or abrasive action.

While cast steel having low carbon content has been mentioned as a material or metal of which the body or casing member 20 can be composed, and Nihard cast iron has been mentioned as a material or metal of which the insert pieces 21, 21, can be composed, it is to be understood that other metals of nature to accomplish the same or substantially similar results can be substituted for the metals specifically mentioned. In any event, the body or casing member 20, or equivalent, will be of metal selected to possess toughness or ability to yield to force without breaking, as an essential characteristic of said body or casing member, and the insert pieces 21, 21, or equivalent, will be of metal selected to possess hardness of wear-resisting quality as an essential characteristic of said insert pieces. In any installation, the insert pieces, such as 21, in number as shown, or greater or less number, will be adapted to engage the ground or other surface over which the shoe or runner is to be slid or dragged, the body or casing member, such as 20, will be assembled with the hard, wear-resisting insert pieces to cause said insert pieces to be protected in the structure against the liability of becoming broken or otherwise impaired, and the hard, wear-resisting insert pieces will have relation to the body or casing member, or core, which supports said insert pieces, adapted to cause wear upon the shoe or runner to be considerably less rapid than would be the case were the hard, wear-resisting insert pieces not incorporated in the structure.

With respect to Figs. 12 to 19, a supporting body or casing member there shown is denoted 45 and a single insert piece of the shoe or runner is indicated 46.

The body or casing member 45 is constituted as a generally rectilinear block or plate of metal having a flat upper surface 47, a flat lower surface 48 in spaced paralled relation to the upper surface 47, generally curvilinear opposite side surfaces 49 which extend upwardly and outwardly from the flat lower surface 48 to the upper surface 47, and generally curvilinear opposite end surfaces 50 which also extend upwardly and outwardly from said flat lower surface 48 to said upper surface 47.

The body or casing member 45 is adapted to be secured in supporting relation to an entity or vehicle or snowplow so that the flat lower surface 48 of said body or casing member 45 can rest squarely upon the ground or other surface over which it is intended to slide or drag said entity, vehicle or snowplow.

The flat lower surface 48 of the body or casing member 45 is provided with spaced apart, longitudinally extending concavities 51, which as shown are disposed substantially centrally of said flat lower surface. The concavities 51 are in fact provided by spaced apart flanges 52 which are integral with and extend downwardly from an internal surface 53 of the body or casing member defining the base of each of said concavities 51. The surface 53 is provided by a comparatively thin wall 54 which is disposed between said surface 53 and the upper surface 47 of the body or casing member 45. More explicitly, there are two flanges 52 and three concavities 51 as disclosed, including two outer concavities 51, one adjacent each side of the shoe or runner and a middle concavity 51 between said outer concavities and also between the flanges 52. Each outer concavity 51 is defined at its base by the surface 53, at its outer side by a downwardly and inwardly slanting side surface 55 of the block or plate of metal 45, at its inner side by a downwardly and outwardly slanting side surface 56 of the adjacent flange 52, and at its opposite ends by metal of the block or plate 45. Each middle concavity 51 is defined at its base by said surface 53, at each of its opposite sides by the adjacent downwardly and inwardly slanting side surface 57 of the flange 52 at the corresponding side of said middle concavity, and at its opposite ends by metal of said block or plate.

The block or plate of metal which constitutes the body or casing member 45 includes additional concavities 58 adjacent the ends of and above the concavities 51, and all of said concavities 51 are in open relation to the concavities 58.

The insert piece 46 is constituted as a rectilinear piece of metal including a frame 59 thereof adapted to lie contiguous with the surface 53 and having portions at its opposite ends adapted to lie in the concavities 58. Said insert piece 46 also includes oblong masses 60 of metal which are integral with the frame 59 and extend downwardly therefrom into each of the concavities 51, desirably to exactly fill said concavities 51 and so that the lower surfaces 61 of said oblong masses 60 are flush with the lower surfaces 62 of the flanges 52, which surfaces 62 desirably terminate flush with the flat lower surface 48 of the body or casing member 45. The arrangement is such that the insert piece 46 is fixedly and rigidly incorporated or inlaid into the concavities 51 and 58 of the body or casing member 45 and so that said insert piece 46 desirably completely fills all of said concavities.

In practical manufacture of the shoe or runner as disclosed in Figs. 12 to 19, the body or casing member 45 and the insert piece 46 can be united by casting the one within the other.

Attachment elements 63, for the same purpose as are the attachment elements 40, may also be of any desired construction. As disclosed, the shoe of Figs. 12 to 19 includes two attachment elements 63 arranged in spaced apart relation to each other upon the flat upper surface 47 of the body or casing member 45. The attachment elements 63 can be cast integral with or welded to the body or casing member 45. There is an attachment element 63 adjacent each end of the body or casing member 45, at about the transverse center of said body or casing member, and said attachment elements 63 are interconnected by a web 64. Each attachment element 63 includes an aperture by means of which it can be secured to the entity, vehicle or snowplow which is to be supported.

The body or casing member 45 can be composed of any metal suitable to the purpose for which the body or casing member 20 is employed, and the insert piece 46 can be composed of any metal suitable to the purpose for which the insert pieces 21, 21 are employed.

Obviously, the shoe or runner of Figs. 12 to 19 includes the advantageous features as set forth in connection with the shoe or runner of Figs. 1 to 11. The body or casing member 45 is adapted to provide what is in effect a tough core of the shoe or runner of Figs. 12 to 19, and the insert piece 46 is adapted to constitute, or provide, a hard, wear-resisting surface of said shoe or runner. Said insert piece 46, with oblong masses 60 as shown, or in greater or less number, is adapted to engage the ground or other surface over which the shoe or runner is to be slid or dragged, the body or casing member 45 is assembled with the insert piece 46 and its material 60 to protect said insert piece in the structure against liability of becoming broken or otherwise impaired, and the hard, wear-resisting insert piece 46 is incorporated or inlaid within the body or casing member 45 in such manner that wear upon the shoe or runner will be considerably less rapid than would be the case were said hard, wear-resisting insert piece 46 not employed in the structure.

What is claimed is:

1. An article of the character described, comprising a body member of metal having a concavity in a surface thereof, an insert piece of metal united with said body member and disposed within said concavity, and an insert piece of metal retained within said concavity by the first mentioned insert piece.

2. An article of the character described, comprising a body member of metal having a concavity in a surface thereof, and insert pieces of metal retained in said concavity in contiguous relation to said surface, said insert pieces including a middle insert piece and a pair of insert pieces at the opposite sides of the middle insert piece, said middle insert piece being united with said body member, as by welding, and said pair of insert pieces being retained within said concavity by said middle insert piece.

3. An article of the character described, comprising a body member of metal having a concavity in a surface thereof, an insert piece of metal united with said body member and dis-

posed within said concavity to terminate flush with the base of said body member, and a second insert piece of metal retained within said concavity by the first mentioned insert piece to terminate flush with said base of the body member.

4. An article for supporting an entity upon a surface for dragging movement thereover, comprising a body member composed of metal possessing physical properties, including toughness, adapted to render said body member yieldable to force without breaking, said body member having a concavity in the base thereof, insert pieces of metal possessing physical properties, including hardness, adapted to render said insert pieces effectively resistant to abrasive action, said insert pieces being inlaid into the concavity of said body member to terminate flush with the base of the body member, and means within said concavity and between said insert pieces for retaining the insert pieces in fixed relation to said body member, said means and said insert pieces together filling said concavity.

5. An article of the character described, comprising a body member of metal having a concavity in a surface thereof, a piece of metal united with said body member, and an insert piece of metal retained within said concavity by said first mentioned piece of metal.

6. An article of the character described, comprising a body member of metal having a concavity in a surface thereof, a piece of metal united with said body member, and an insert piece of metal retained within said concavity, said first mentioned piece of metal cooperating in the retention of said insert piece of metal in said body member.

7. An article for supporting an entity upon a surface for dragging movement thereover, comprising a body member composed of metal possessing physical properties, including toughness, adapted to render said body member yieldable to force without breaking, said body member having a concavity in the base thereof, insert pieces of metal possessing physical properties, including hardness, adapted to render said insert pieces effectively resistant to abrasive action, said insert pieces being inlaid into the concavity of said body member to terminate flush with the base of the body member, and means between said insert pieces cooperating with said body member to retain the insert pieces in fixed relation to said body member.

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