Dec. 20, 1955 A. S. DE LUCA 2,727,672

INSULATED METAL LADDER

Filed April 3, 1953

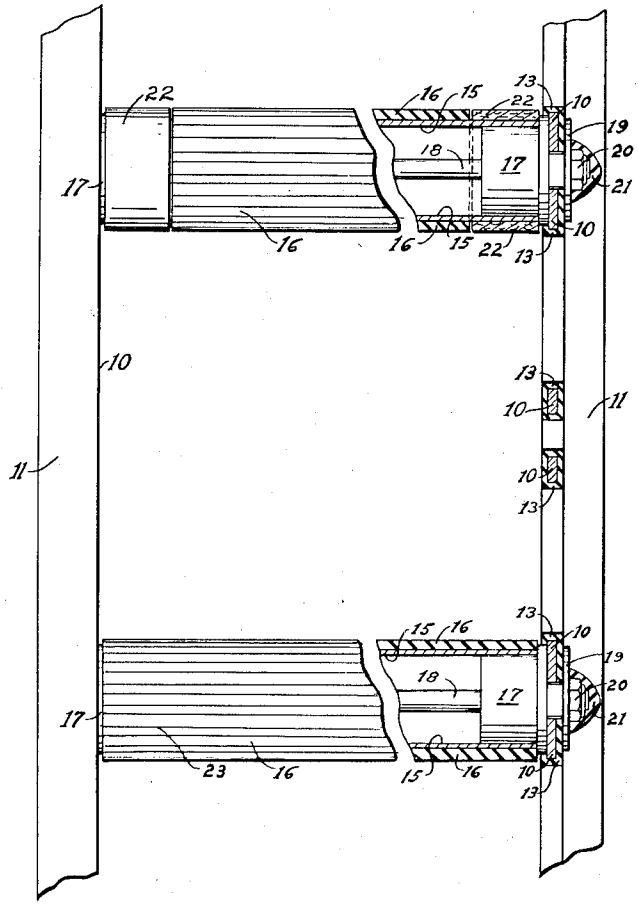


Fig. 1

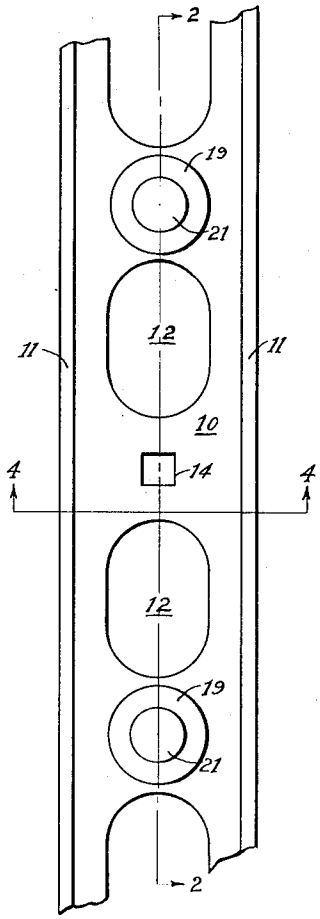


Fig. 3

Fig. 2

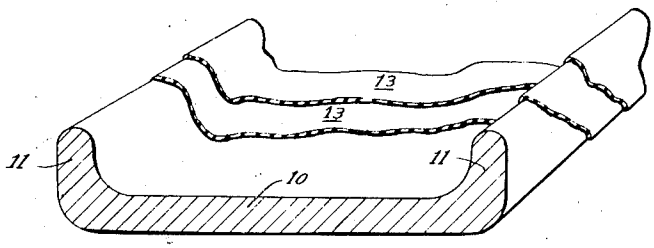


Fig. 4

INVENTOR.
Arthur S. De Luca

BY

W. B. Hardman

ATTORNEY

United States Patent Office

2,727,672

Patented Dec. 20, 1955

2,727,672

INSULATED METAL LADDER

Arthur S. De Luca, Youngstown, Ohio

Application April 3, 1953, Serial No. 346,570

3 Claims. (Cl. 228—56)

This invention relates to a ladder and more particularly to a metallic ladder having a multilayered dielectric and abrasive resistant covering.

The principal object of the invention is the provision of a metallic ladder having a multilayered dielectric and abrasive resistant covering.

A further object of the invention is the provision of a lightweight metallic ladder having a multilayered dielectric covering, each layer of which covering is seamless.

A still further object of the invention is the provision of a metallic ladder having a multilayered dielectric and abrasive resistant covering, each layer of which covering is seamless and of a different color one from another so that the degree of wear of the insulating covering may be visually determined therefrom.

The metallic insulated ladder discosed herein comprises an improvement in the art in that a lightweight structurally strong ladder is provided and completely insulated with a multilayered dielectric and abrasive resistant covering to enable the metallic ladder to be safely used in various industrial organizations where the ladder may accidentally be brought into contact with electric conductors.

The advantages of a lightweight metallic ladder have long been known in industry as such ladders have long lives, are relatively free from accidental breakage and are free of maintenance, all of which render wooden ladders short-lived and relatively expensive to maintain.

Metallic ladders have not been used widely in industrial organizations due to their ability to conduct electricity and the fact that many workmen would be injured from electrical shock when handling the ladders and accidentally bringing them into contact with electric conductors, etc.

The present invention discloses a lightweight metallic ladder preferably formed of aluminum which is in turn provided with a multilayered dielectric and abrasive resistant covering, each layer of the covering being seamless and applied in situ.

Additionally, the insulated ladder disclosed herein possesses a unique characteristic in that each of the several layers of the dielectric and abrasive resistant coating are of a different color. For example, the innermost layer is red and the outermost layer or layers being green or black so that when the covering is worn away, as will eventually occur when the ladder is used extensively, the visual indication of the wearing away of the covering will occur when the red covering is exposed. Users of the ladder are thus completely safe from electric shock and the ladder may be and is safely used in various industrial enterprises.

This application is a continuation-in-part of my copending application Serial No. 77,428 filed February 19, 1949, for Coated Ladder-Like Article and Method of Making the Same, and now abandoned.

With the foregoing and other objects in view which will

appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being the intention to cover all changes and modifications of the example of the invention herein chosen for purposes of the disclosure, which do not constitute departures from the spirit and scope of the invention.

The invention is illustrated in the accompanying drawing, wherein:

Figure 1 is an elevation of a portion of an insulated ladder with parts broken away.

Figure 2 is an elevation of a portion of a ladder with parts broken away and parts in cross section.

Figure 3 is a side view of the ladder shown in Figure 1.

Figure 4 is a cross section taken on line 4—4 of Figure 3.

By referring to the drawings and Figures 1, 2 and 3 in particular it will be seen that an insulated ladder is disclosed which comprises side rails **10—10** which are flanged at **11—11** and provided with a plurality of longitudinally spaced hand hole openings **12**. The side rails **10** are completely enveloped with a multilayered dielectric and abrasive resistant covering **13**, the layers of the covering **13** preferably being of different colors.

The covering material is preferably a rubber-like material such as neoprene which provides real protection against electric hazards and is resistant to most acids and salt solutions and will withstand extreme hot and cold temperatures.

The side rails **10** are preferably formed of extruded aluminum alloy and are, therefore, rust-proof, spark and fire-proof and will not warp. The hand holes **12** are punched in the side rails **10** prior to the application of the insulating covering **13** and, in addition to serving as convenient hand holes enabling a sure grip on the ladder, they lighten the weight of the ladder materially. Additionally, smaller openings **14** are formed in each of the side rails **10** intermediate the hand holes **12** and to provide means for joining a plurality of rungs to the side rails.

The rungs comprise tubular members **15** provided with dielectric and abrasive resistant sleeves **16** or alternately provided with multilayered coverings or dielectric and abrasive resistant material. The tubular members **15** forming the rungs are provided with insulating flanged plugs **17** in their opposite ends, the plugs being of slightly smaller circumference than the inner diameter of the tubular members **15** with the flanges on the insulating plugs **17** being of larger diameter than the tubular members **15**.

The insulating plugs **17** are apertured on their longitudinal axis to permit tie rods **18**, which have threaded patterns formed on their outermost ends, to be positioned through the insulating plugs **17** in the opposite ends of the tubular members **15** forming a rung and then thereby provide means for securing the tubular member **15** and the insulating plug **17** to the side rails **10** of the ladder by positioning the ends of the tie rods **18** through the openings **14** heretofore referred to.

Fiber washers **19** are applied over the ends of the tie rods **18** and lock nuts **20** engaged thereon to complete the assembly. Subsequently, insulating caps **21** are applied over the lock nuts **20** so that a completely insulated structure results.

The structure just disclosed is illustrated in Figure 2 in the lower portion thereof. In the upper portion of Figure 2 the same construction is illustrated with the exception that the dielectric and abrasive resistant sleeves **16** are cut away from the tubular member **15** adjacent their ends and fiber bands **22** substituted. The fiber bands **22** form rollers which will turn on the tubular member **15** and will facilitate the operation of an extension ladder as will readily occur to those skilled in the art.

The dielectric and abrasive resistant sleeve **16** may be ribbed longitudinally if desired, as indicated by the numeral **23**, and which ribs **23** will serve to insure a workman's grip on the rung as well as to increase the wearing surface of the rung.

By referring again to Figure 2 of the drawings it will be observed that the dielectric and abrasive resistant covering **13** is applied to the side rails **10** of the ladder prior to the assembly of the rungs thereto and that it is believed desirable to cut away portions of the covering **13** adjacent the flanged portion of the insulating plugs **17** so that the same may register directly against the aluminum alloy of the side rails. The washers **19** are engaged over the insulating layer **13** which serves to increase the tension applied to the assembly by the lock nuts **20** and is, therefore, desirable in the finished product.

It will thus be seen that the insulated metal ladder comprises an assembly of the side rails and the rungs which are in turn assembled from the members **15**, the insulating plugs **17** and the tie rods **18** and that the rungs and the side rails are provided with the insulating coating prior to assembly so that the resulting ladder is completely insulated.

The dielectric and insulating covering is preferably applied by dipping the respective parts of the ladder into a liquid solution of the material and subsequently air drying and curing said material by application of heat as indicated and as known in the art, each layer of the covering being seamless.

It will occur to those skilled in the art that if a portion of the ladder is damaged in use, the damaged portion may be removed from the assembly and replaced and that the resulting repaired ladder will be equally effective in insulating ability and wearing characteristics as compared with the ladder initially formed.

It will also occur to those skilled in the art that safety shoes or other forms of adjustable feet (not shown) may be applied to the lower ends of the ladder to insure its satisfactory positioning on a supporting surface and which devices will protect the lower ends of the ladder against damage to the insulating covering. As such safety shoes are well known in the art, no further reference to the same is deemed necessary herein.

It will occur to those skilled in the art that at such time as the insulating covering on the ladder wears away so that one of the different colored layers is exposed, the ladder may be re-insulated by applying additional coverings of dielectric and insulating material thereto which will enable the ladder to be used over a long period of time.

It will thus be seen that the ladder disclosed herein meets the several objects of the invention.

Having thus described my invention, what I claim is:

1. A metallic ladder comprising side rails and rungs, each of said rails and rungs before assembly into said ladder structure having a multilayered dielectric and abrasive resisting covering, each layer of said covering being seamless, applied in situ, and each layer being of a different color one from another, and means for securing said rungs to said side rail comprising insulating plugs applied to said rungs, tie rods positioned through said rungs and insulating plugs and fasteners on said tie rods securing the same to the said side rails.

2. The metallic ladder set forth in claim 1 wherein dielectric and abrasion resistant caps are applied to cover the ends of the tie rods and fasteners.

3. The metallic ladder set forth in claim 1 wherein the end portions of at least one of the rungs in the ladder are provided with rotatable fiber bands in lieu of said dielectric and insulating cover.

References Cited in the file of this patent

UNITED STATES PATENTS

175,544	Willis	Mar. 28, 1876
444,035	Wyatt	Jan. 6, 1891
997,281	Ely	July 11, 1911
1,136,010	Hendricks et al.	Apr. 20, 1915
1,243,436	Marshall	Oct. 16, 1917
1,248,445	Braine	Dec. 4, 1917
1,718,385	Sherwood	June 25, 1929
1,852,146	Carns et al.	Apr. 5, 1932
2,040,977	Carbis	May 19, 1936
2,064,803	Grove	Dec. 15, 1936
2,143,783	Liebman	Jan. 10, 1939