Our invention relates to lining sheets and plates, and sheet iron stove and furnace bodies, which are called upon to withstand the heat that will be developed in ovens used for cooking purposes, domestic heating and the like.

It has been a problem of considerable scope to provide an inexpensive steel or iron sheet, not expensively alloyed, but having a suitable coating thereon which will resist the action within a stove or hot air furnace.

In recent years, the trade has gone to a considerable extent to vitreous enameled ware for oven lining purposes, but there are a few products on the market having metal coatings on steel plates, which will withstand the temperature of the oven for a considerable period.

The difficulty with the plates last noted, in which we are most directly interested, lies in the fact that the effect of applying heat to the coatings on the oven plates is to render them quite dark, and also somewhat rough in surface texture. This is a defect both from the point of view of the ultimate life of the plate, and also from the appearance point of view within the stove. The darkened and roughened linings are not so easily cleaned, they look grimey, and also fail to reflect heat from the combustion units as efficiently as an oven plate should do. In the same manner, sheet iron stove parts, pipes and the like, will darken and deteriorate.

In a co-pending application, we describe generally and claim a steel or iron sheet or a plane surfaced body of steel or iron coated with zinc aluminum alloy, and we have discovered that such a product has very high value as an oven lining sheet or stove or furnace plate, so much so that even if the coating were to be found in the prior art, (contrary to the results of our research and our belief in the premises,) still its application for oven lining, stoves and furnace purposes has never made itself apparent industrially in this country. Thus we believe it to be our invention to provide as a heat resistant sheet or plate, a piece of metal coated with an alloy of zinc high in aluminum.

The plates are formed of a base sheet of iron or steel, which has been metal coated by applying thereto a flux, and then a coating of commercially pure zinc, to which has been added sufficient aluminum to prevent the formation of spangle, but in which coating the zinc predominates.

We have found that, taking into consideration manufacturing costs and processes, and cost of materials, that a coating containing commercially pure zinc with aluminum in proportions around 8% will provide a lining plate for ovens which possesses all of the desired qualities to which we have directed our invention. It is also most satisfactory for other heat purposes.

The ranges in which the aluminum addition greatly improves the product lie within three per cent and around twenty per cent, above which we do not understand that it will be practical to go. The aluminum cannot be too high, as it forms a brittle product within certain ranges where aluminum predominates.

A sheet coated with commercially pure zinc together with say 8% of aluminum, will possess a coating as fully flexible or bendable as the metal itself. A temperature up to around 700 degrees Fahrenheit, for example, will not result in a discoloration or any apparent change in the coating. The coating will be bright and without spangle, although when not polished, it will show hair lines of demarkation between fairly large sized spots approaching the size of a spangle.

A temperature at around the melting point of the alloy will not result in a rupture, but will change the structure of the coating, preserving much of the color, but due to recrystallization under the conditions in question, building up a rough, spangle condition.

The material of our invention may be used with some advantage, but not so satisfactorily in a number of ways, when made with a spelter consisting mainly of zinc, with the impurities found in commercial stoppers, with the addition of over two per cent of aluminum. Spangle will be present, and there may be a slight change of color after prolonged heating, but the coating withstands bending most excellently in formation of the plates.
and does not deteriorate or become drab and dark after prolonged exposure to oven temperatures.

Having thus described our invention what we claim as new and desire to secure by Letters Patent is:—

An oven lining plate or sheet, having a steel or iron base coated with an alloy of commercially pure zinc with aluminum as the main alloying agent, said aluminum being present in proportions to the zinc by weight of two percent or more, but less in proportion by weight than the zinc.

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