UNITED STATES PATENT OFFICE.

CARL LUDWIG VALENTIN ZIMMER, OF HAMBURG, GERMANY.

MANUFACTURE OF INSULATING OR PROTECTIVE COMPOUNDS.

SPECIFICATION forming part of Letters Patent No. 713,190, dated November 11, 1902.

Application filed May 13, 1901. Serial No. 60,115. (No specimens.)

To all whom it may concern:

Be it known that I, CARL LUDWIG VALENTIN ZIMMER, doctor of philosophy, residing at 11 Schäferkamp-Allee, Hamburg, Germany, have invented certain new and useful Improvements in the Manufacture of Insulating or Protective Compounds, (for which I have applied for a patent in Germany, February 4, 1901; in Austria, March 8, 1901; in France, March 15, 1901; in Belgium, March 16, 1901; in Spain, March 16, 1901; in Hungary, March 18, 1901; in Great Britain, March 22, 1901; in Russia, March 16, 1901; in Norway, March 21, 1901; in Sweden, March 22, 1901; in Denmark, March 23, 1901, and in Italy, March 26, 1901,) of which the following is a full, clear, and exact specification.

The exclusion of moisture and chemical influences from surfaces of metal, stone, wood, and other materials—in other words, the insulation or protection of said surfaces from moisture and chemicals—has been effected or attempted by a variety of methods, the majority of compositions used for this purpose containing some constituent of tar as their principal ingredient. None of these compounds are, however, free from objections. Some can be applied only in a hot condition and are then allowed to dry and solidify on cooling. Consequently they could not be used conveniently on walls and other upright surfaces, and it was difficult to produce with them a perfectly uniform coating. Other protective or insulating media gradually become brittle and form scales, and others do not offer sufficient resistance to the influence of chemicals, such as acid or alkaline liquids or salt solutions. One of the principal defects of the protective paints hitherto known consists in their inability to follow the expansion of the object painted, which is caused by changes of temperature, in consequence of which the surface or protective paint forms cracks, allowing moisture or chemicals to penetrate.

The present invention has for its object to provide an insulating substance or protective coating which is free from the above defects, which can be easily applied to any solid body requiring to be thus protected, which firmly adheres to the article coated and closes it completely against the atmosphere, besides being completely inert to chemicals and capable of following the expansion and contraction of the objects coated without ever forming cracks or scaling off.

The manufacture of the new insulating or protective medium is based on the following facts: If animal or vegetable fats or oils are exposed at a high temperature and for a long time to the influence of oxidizing agents or of substances, such as sulfur, which are capable of forming additive compounds with unsaturated fatty acids, while removing the double bond of the carbon atoms, they will gradually get thicker, as is well known, until they attain the consistency of syrup. A similar process takes place also in case the fats and oils before or during this treatment are partly or completely saponified by means of alkalies or substances which have an analogous effect. The products obtained by the prolonged action of the thickening substances on unsaponified and also upon completely or partly unsaponified fats and oils if taken alone are not suitable for the purpose in view—that is to say, as insulating or protective media—or they have very little value for that purpose. If, however, the thickened products obtained from completely or partly saponified fats and oils are subjected under certain conditions to the action of considerable quantities of bituminous matter—such as bitumen, fossil resin, or substances having the nature of asphalt—or if the same substances are allowed to act simultaneously with a small quantity of alkali on the thickened products made from unsaponified fats, products are obtained which when dissolved or diluted with suitable solvents—such as light tar-oils, petroleum-naphtha, or oil of turpentine—constitute the insulating or protective medium having the properties stated above. Although the utility of the thickened fatty bodies as insulating or protective media is enhanced by merely mixing the same thoroughly with the bituminous substances at a higher than atmospheric temperature, a much better effect, and consequently a material far more suitable for the purpose in view, may be obtained by heating the fatty matter with the bituminous substance to a high temperature for a long time, which fact suggests the conclusion that the final product is not simply a

mixture of thickened fatty matter with bituminous matter, but that a chemical reaction has taken place between the bodies of the two groups. The heating of the thickened unsaponified or saponified fatty body with the bituminous matter may take place while the thickening process is being performed or after it has been completed. The proportions between the fatty body, on the one hand, and the bitumen or analogous body, on the other hand, may vary. One part of bitumen to four parts of fatty matter has given good results. The temperature during the thickening of the fatty body and during the heating of the latter with the bitumen may be raised up to about 200° centigrade.

It follows from the above description that the most important features or operations of the present process are the thickening of the fatty body and the prolonged heating of the product with bitumen or analogous bodies.

Example: From three to four parts of cotton-seed oil are mixed with one part of bitumen, and to the mixture is added the approximate quantity of caustic-soda solution necessary for saponifying the glycerides. After saponification the temperature is gradually raised to about 200° centigrade, thereby causing the water to evaporate. At this temperature air is now conducted into the mixture for about forty to fifty hours. If the air introduced into the mixture has been previously enriched with oxygen, the duration of the process may be reduced to about four to ten hours.

The insulating or protective medium produced as described above may be used by dissolving it in light tar-oil, oil of turpentine, or other suitable solvent and then applying it to the surface of the object to be protected by the same, the solvent being subsequently allowed to evaporate and leaving behind a homogeneous coating or film which adheres very firmly and is not liable to get cracks or fissures. The objects thus coated may be bent without damaging the film and causing it to scale off. The film or coating is not materially altered by contact with chemicals, such as acid or alkaline liquids or solutions of salts. Moreover, it is very difficult to set on fire or burn and may therefore serve in a certain degree as a protection from fire.

What I claim is—

1. The process for the manufacture of a damp-proof insulating or protective medium, which consists in continuously heating at a temperature up to 200° centigrade, a vegetable or animal fat with a saponifying agent, and oxygen or its equivalent, to thicken the composition, and bituminous matter, substantially as described.

2. The process for the manufacture of a damp-proof insulating or protective medium, which consists in mixing three to four parts of cotton-seed oil with one part of bitumen, adding the approximate quantity of alkali solution necessary for saponifying the glycerides, heating until the saponification is completed, then gradually raising the temperature to about 200° centigrade, and finally introducing air, while maintaining the temperature, substantially as described.

3. The process for the manufacture of a damp-proof protective medium, which consists in mixing cotton-seed oil with bitumen, then adding caustic-alkali solution for saponifying the glycerides, heating until the saponification is complete, subsequently raising the temperature to about 200° centigrade, and finally introducing air enriched with oxygen, while maintaining the temperature, substantially as described.

4. A damp-proof insulating or protective material obtained from animal or vegetable fat, a saponifying agent, oxygen or its equivalent to thicken the composition, and bituminous matter, substantially as described.

5. A damp-proof insulating or protective material obtained from cotton-seed oil, alkali solution, bitumen and air, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

CARL LUDWIG VALENTIN ZIMMER.

Witnesses:

MAX MULLER,

ALFRED DIETRICH.