UNITED STATES PATENT OFFICE.

CHAS. GOODYEAR AND ROBT. HAERING, OF NEW HAVEN, CONNECTICUT, ASSIGNORS TO CHARLES GOODYEAR.

IMPROVEMENT IN MANUFACTURING GUTTA-PERCHA AND INDIA-RUBBER.

Specification forming part of Letters Patent No. **9,668**, dated April 12, 1853.

To all whom it may concern:

Be it known that we, CHARLES GOODYEAR and ROBERT HAERING, of New Haven, in the State of Connecticut, have invented a certain new and useful Improvement in the Manufacture of Objects Composed of Caoutchouc or Gutta-Percha or other Gums or their Compounds; and I do hereby declare that the following is a full, clear, and exact description thereof.

The method of forming or shaping caoutchouc and its compounds in metal molds and subjecting the compound while in the mold to a high degree of artificial heat is expensive and troublesome, and because they do not permit the escape of gases. A great many molds and forms are necessary, requiring a considerable preliminary outlay, a great deal of manipulation and handling are requisite in using them, they require a large space, are difficult of transportation, and are liable to get easily out of repair, and, what is still more important, the metal molds do not permit the free escape of the gases evolved from the substances under treatment by the heat. So important are these and some other objections to the use of metal molds that many articles of caoutchouc manufacture which would be made if these objections did not exist lie undeveloped for the want of some simple, easy, and economical process of forming or shaping or keeping or holding the shape of the articles while they are being heated or vulcanized.

By our improved method we are enabled to manufacture a great variety of articles of caoutchouc or its compounds which could not before be made, and to manufacture other articles with greater facility and economy than before.

Our invention consists in using or employing sand, pulverized soapstone, plaster, or some similar granular or pulverized and (when put together) porous matter, or molds made of porous substances, to sustain and keep the form of molded or modeled articles composed of caoutchouc or its compounds and other gums susceptible of vulcanization during the process of heating or vulcanization.

We take articles composed of compounds of caoutchouc or other gums susceptible of vulcanization in the green state. We cause them to be pressed or otherwise formed into the exact shapes which they are required to have after being vulcanized. We then cover the surface of the articles with pulverized soapstone or plaster or other similar non-adhesive powder. We then place the articles in a box filled with sand, the finer the sand the better, or pulverized soapstone, or other similar equivalent granular or pulverized matter, so that each article shall be completely surrounded and covered by the sand or pulverized soapstone or plaster, &c., and embedded in the same, and thereby sustained.

When it is desired to give a very smooth surface to the article we cause it to be completely surrounded with a layer of soapstone, even though sand may be employed about the layer of soapstone. We sometimes use moist sand or pulverized soapstone. When the articles are thus properly placed in the box we subject the sand or other material to pressure, so that the box shall be solidly filled. We then, by means of a cover, or sometimes by pressure, confine the sand or other material, so that the articles shall be at all times in contact with and pressed upon by the sand or other material during the process of heating. We then place the articles thus surrounded with and sustained by sand or pulverized soapstone or other material in an oven or heater and subject the same to a high degree of artificial heat, moist or dry heat—say from 200° to 300° Fahrenheit—for a period of from three or seven hours, and upon taking the articles out of the sand or other material the articles will be found to be vulcanized in the same form in which they were when put into the sand.

We are thus enabled to produce economically a great variety of objects, among them embossed or indented or plain sheets or plates or masses of regular or irregular forms, convex or concave, such as pieces of furniture, book-covers, buttons, toys of various kinds, &c.; or we make the molds of plaster-of-paris, best calcined, or other substance, which, when dried, will be porous and permit the escape of gases evolved from the matter under treatment and all contained air, and thereby prevent the expansion of confined air and other gases from injuring the surface of the molded substance; or we mold the article in a mold which is to produce the figure, and pack in sand or pulverized soapstone, or other like granular or pulverized substance, to support the other surface

or surfaces of the article to be produced, and thus keep the face which is to be figured in contact with the partial mold of metal or plaster or other material, and thus afford free discharge for air and gases, while at the same time the molds are greatly cheapened.

The molds or outer casing may be made of glass instead of iron or other metal; but we prefer the first mode of procedure, as it avoids entirely the use of molds during the process of vulcanization, the sand or other pulverized or granular material having the effect thoroughly to support and retain the form previously given to the article by molding or modeling.

The prepared caoutchouc, gutta-percha, &c., if it is to be embedded in moistened plaster, should be previously varnished, and to keep the surface of such article to be thus vulcanized in sand smooth India paper should be interposed between such surface and the sand.

Having thus fully described the nature of our invention, what we claim, and desire to secure by Letters Patent, is—

The art or method of manufacturing articles composed in part of caoutchouc or other gums susceptible of vulcanization by heating or vulcanizing the same when surrounded with and pressed upon externally or internally by or molded in pulverized soapstone, sand, plaster, or other similar granular, pulverized, or porous matter, or in molds of plaster or other porous substance, substantially as herein described.

CHARLES GOODYEAR.
ROBERT HAERING.

Witnesses:
JOSEPH H. DORR,
JAMES A. DORR.