

UNITED STATES PATENT OFFICE.

CHARLES GOODYEAR, OF NEW YORK, N. Y.

IMPROVEMENT IN THE PROCESS OF DIVESTING CAOUTCHOUC, GUM-ELASTIC, OR INDIA-RUBBER OF ITS ADHESIVE PROPERTIES; AND ALSO OF BLEACHING THE SAME, AND THEREBY ADAPTING IT TO VARIOUS USEFUL PURPOSES.

Specification forming part of Letters Patent No. 240, dated June 17, 1857.

To all whom it may concern:

Be it known that I, CHARLES GOODYEAR, of the city of New York, in the State of New York, have invented or discovered a new and improved mode or process of divesting caoutchouc, gum-elastic, or india-rubber of its adhesive properties, not only at the surface, but for some distance below it, and under certain circumstances throughout its whole thickness, and also of bleaching the same and adapting it to various useful purposes, which process is applicable to that material either in its natural state or after it has been dissolved in any of the known solvents thereof and made into sheets or employed as a covering to cloth or other substances; and I do hereby declare that the following is a full and exact description thereof.

I employ the various acid solutions of the metals, either saturated or partially saturated, and with such metallic solution I wash over the surface of the caoutchouc, of which I mean to destroy the adhesive property; or, instead of washing the surface of the caoutchouc, I dip it or the article coated with it into such a solution. If the article is cloth, coated on one side only with the solution, it is necessary in general to protect the uncoated side from the action of the acid solution, more especially when the more corrosive acids are used. The cloth may in this case be united together at the edges and at the ends, so as to form a sort of bag, capable of being dipped into the metallic solution without its interior being brought into contact therewith. The metallic solutions are not by any means equally effective in destroying the adhesiveness of the caoutchouc, the stronger acids being in all cases preferred as being perfect in their action; nor is it indifferent what kind of metal is employed. The strong nitric acid undiluted is that which I in general prefer, and among the metals I prefer either copper or bismuth, forming a nitrate of copper or a nitrate of bismuth, as the full effect is produced by these solutions in from one to five minutes. After the action is thought to be complete the article acted upon is to be washed with water, so as to remove the whole of the acid solution, and it will be found that not only the surface of the caoutchouc will re-

semble that of soft cloth, but that the surface may be worn off to a considerable depth and the new surface not manifest the slightest tendency to adhesiveness. It is indeed so far altered in its properties as to resist to a considerable extent the action of those menstrua by which it is ordinarily dissolved. It may, for example, be washed in spirits of turpentine or in the oil of sassafras without being rendered tacky, and it will equally resist the action of solar or of artificial heat under all ordinary temperatures.

I have thus fully described what I believe to be the best modes of carrying my discovery into effect by the use of metallic solutions, and have said that they are not equally efficacious. Some of them I am well convinced would not answer the purpose at all—as the acetate of lead, for example—and probably all the solutions of metals in the vegetable acids, and there are some which will produce the effect in a less perfect manner than the nitrates which I have named, or which will require a much longer time for their complete action; but these are differences which it is not necessary or possible to particularize; neither are they essential to a full knowledge of the means which I have adopted to produce the intended effect. I have also spoken of dipping the article to be acted upon into a metallic solution, or of washing its surface therewith; but other modes may be devised of producing the same effect by means substantially the same. I have sometimes covered the surface of the caoutchouc with the metallic powder known by the name of "bronze," and have afterward washed it over with nitric acid, which has produced the same effect as the washing it with or dipping it in the metallic solution, such a solution being in this case immediately produced by the action of the acid upon the metal. It is a common practice to add some of the absorbent earths or some pigment to the dissolved caoutchouc, and when this is done the metallic solution may be readily made to operate to a greater or less extent throughout the whole mass of a sheet of considerable thickness.

Instead of the process above described, or preparatory to it, I combine the caoutchouc with

quicklime, as I have found this earth preferable to either of the others in fitting the sheet-caoutchouc to be acted upon throughout its whole thickness by the metallic solution; but, besides this, the lime has the property of bleaching the caoutchouc and of giving to it a surface and texture adapting it to the receiving impressions from copper plates or by other modes of printing, rendering it, either alone or when used as a coating for cloth, applicable to the purpose of printing charts or other devices. The caoutchouc so prepared with lime will, however, be rendered adhesive by the action of heat or of solvents, unless the metallic solution be applied to it, in which case much of the whiteness communicated to it by the bleaching property of the lime will disappear. I however view my discovery of the action of lime in the way in which I have applied it as of great importance, and therefore proceed to point out the manipulation which I have found necessary to its successful use. I slack a portion of the finest quicklime, and then mix and agitate it with so much water as that it shall not be thicker than milk; when, on allowing it to stand at rest, all the coarser particles contained in it will rapidly subside. The upper portion, containing the finer particles, is then to be poured off and the fine lime allowed to subside. The water left on the surface of this being then poured off, it is obtained in a state fit for incorporation with the caoutchouc in that form of thick paste into which it is brought by the manufacturer preparatory to its being rolled into sheets.

What I claim as my invention is—

1. The destroying of the adhesive property not only of the surface of caoutchouc, gum-elastic, or india-rubber, but also to a considerable extent below the surface, whether the same be in sheets unconnected with cloth or other substances or when used as a coating therefor, by the application thereto of an acid solution of the metals, substantially in the manner set forth.

2. The manner of preparing and incorporating lime with the caoutchouc-paste for the purpose of bleaching it and giving to the sheets formed of it a color and texture adapting it to receive printed impressions, and rendering it applicable to various other purposes, either without or with the treatment by the metallic solutions, as herein set forth.

3. As an entirely new manufacture, the sheet-caoutchouc prepared by the within-described process of treatment by the metallic solutions, as herein described, as it is thereby so essentially changed in its properties as to bear but little resemblance to such articles as have heretofore been manufactured out of the same material, and is rendered applicable to a variety of new purposes hitherto unattempted, or attempted without success.

CHARLES GOODYEAR.

Witnesses:

THOS. P. JONES,
W. THOMPSON.