

UNITED STATES PATENT OFFICE.

WILLIAM JAMES CORDNER, OF LONDON, ENGLAND, ASSIGNOR TO LOUIS D. BRANDEIS, TRUSTEE, OF BOSTON, MASSACHUSETTS.

PROCESS OF SYNTHETIC PRODUCTION OF INDIA-RUBBER.

SPECIFICATION forming part of Letters Patent No. 667,191, dated February 5, 1901.

Application filed February 6, 1900. Serial No. 4,193. (No specimens.)

To all whom it may concern:

Be it known that I, WILLIAM JAMES CORDNER, a subject of the Queen of Great Britain and Ireland, residing at London, England, have invented a certain new and useful Process for the Synthetic Production of India-Rubber, (for which I have made application for Letters Patent in Great Britain under No. 20,934, dated October 19, 1899, and in France under No. 284,728, dated January 25, 1900,) of which the following is a specification.

The object of this invention is the synthetic production of india-rubber by the assimilation of kindred gums and fibers which under certain conditions appear to have a natural affinity for each other and yield in the after production an elastic material possessing the qualities of natural rubber.

In carrying out my process I take china-grass or rhea fiber, which I have previously desiccated to remove any oil or volatile matter therefrom and the latex of the *Tabernaemontana crassa* in or about the proportions hereinafter mentioned. I thoroughly incorporate these materials by feeding them in between a pair of hot rolls at a temperature of about 120° Fahrenheit and work the materials until they are thoroughly incorporated. I then place the mixed materials in an oven the temperature of which is about 300° Fahrenheit. The oven heat is gradually raised to a temperature between 350° and 400° Fahrenheit. The whole time of the working operation will be about four hours, and I find that the required combination will take place if during the last two hours of the process a temperature of about 360° Fahrenheit is maintained. The mass thus formed is then allowed to cool, when on examination it will be found that, although the fibrous structure of the rhea or other similar fiber remains, its textile strength has completely broken down. The material is then worked at a temperature of about 120° Fahrenheit through mixing-rolls until its fibrous structure has disappeared and the whole is reduced to a uniform mass. During this latter treatment oxygen-giving substances are introduced—such as borate of manganese, permanganate of potassium, or a curing agent, such as sulfur—to the extent of five to eight per cent., and, if desired, a toughening material, such as balata, to the extent of about ten per cent. may be added to give strength to the resultant product. The

mass is then allowed to rest for about forty-eight hours for the purpose of what might be termed “synthetic digestion or assimilation.” It is then placed in a suitable vessel inside a steam-chest and subjected to steam heat at a pressure of forty to forty-five pounds to the square inch, the pressure being gradually raised from *nil* until the working pressure is reached, the time allowed for raising being about one hour. This pressure is kept up for one to two hours and then allowed to fall back to zero, when the material should be removed and allowed to cool. This completes the synthesis, and the resultant product possesses all the qualities of india-rubber. From this stage it can be worked the same as cleaned rubber and loaded up in accordance with the purpose for which it is intended.

I have found from experience the following proportions to give excellent results for various grades of material:

Formulae.		Product.	
Per cent.			
Class I.	(Latex	{ A flexible material similar to that known in the trade as “dough.” This is a cheap grade.	80
	(Rhea fiber		
	(Sulfur		
Class II.	(Latex	{ A similar material to Class I, but of a higher grade.	
	(Rhea		
	(Balata		
	(Sulfur		
Class III.	(Latex	{ A flexible material like Class I, for making up into hard goods like vulcanite.	85
	(Rhea		
	(Sulfur		
Class IV.	(Latex	{ A material similar in every respect to Class I.	90
	(Rhea		
	(Permanganate of potassium or borate of manganese		
	(Sulfur		

What I claim as my invention, and desire to secure by Letters Patent, is—

A process for the synthetic production of india-rubber consisting of the intimate mixture of cleaned rhea fiber with the latex of the *Tabernaemontana crassa*, the assimilation of the same under heat, the mechanical reduction of the mass to a uniform condition, and the treatment of the material during such reduction with a curing agent, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

WILLIAM JAMES CORDNER.

Witnesses:

LINDSAY RALFS CASEY,
CHARLES THOMAS YOUNG.