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H I S T O R Y

THE NATIONAL VULCANIZED FIBRE COMPANY

AND

THE VULCANIZED FIBRE INDUSTRY

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By Manly P. Northam

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THE VULCANIZED FIBRE INDUSTRY

VULCANIZED FIBRE was invented by an English chemist named Taylor about the year 1869, but its commercial development dates from 1873, when the Vulcanized Fibre Company, (later absorbed by the National Vulcanized Fibre Company) was established in Wilmington, Delaware. The Vulcanized Fibre Industry has a long history of stable and profitable growth.

The use of Vulcanized Fibre is increasing at a rapid rate, and for the past ten years its growth has been proportional to that of the electrical industries which are necessarily large consumers of the product. Market connections are thoroughly established and are practically unlimited.

PROCESS OF MANUFACTURE

Two distinct processes are required, for each of which an entirely different plant is necessary, viz:

- (1) - Rag Paper Mill
- (2) - Fibre or Converting Mill

The process of manufacture of Vulcanized Fibre consists of the action of zinc chloride on an all cotton cellulose paper, unsized and unloaded.

This paper is passed through a bath of zinc chloride maintained at about seventy degrees Baume' and forty degrees C., depending upon the quality of the paper and the atmospheric conditions.

It is then rolled up over large heated drums to the desired thickness, the zinc chloride hydrolizing the cellulose and gelatinizing the surface to such an extent that the paper unites together and forms a homogeneous mass.

The "green fibre" is then washed in zinc chloride baths of progressively diminishing concentration until it is commercially "pure", i.e., contains less than 0.15 percent zinc chloride. The process is of necessity very slow, requiring about eight months for two inch fibre.

The wet "pure" fibre is dried at a temperature of forty degrees to sixty degrees C., the product shrinking to one-half its original thickness, after which it is pressed and calendered and otherwise made ready for market.

It is made in almost any color, such as red, black, gray, olive, brown, etc. The colors are permanent and are not only on the surface, but all through the fibre. There are two chief grades--- "hard" and "flexible" --- but there are many variations of these, each being made for some particular

use. The two basic forms are Sheets and Tubes; these are fabricated into other appropriate forms for the numerous uses required by the trade.

CHARACTERISTICS

Vulcanized Fibre is a homogeneous material, having great density, toughness, durability, and resistance to elements, and possesses dielectric, insulating properties in a high degree.

It is almost as hard as iron, as hard as horn, as tough as leather, as adaptable as rubber, and more economical than any of these materials for the purposes for which it is used.

It has a perfectly smooth, even surface that readily takes a high polish. It is not brittle and will not dent, crack, split, break or splinter. It can be turned, tapped, threaded, drilled, stamped, cut, sawed, riveted, and shaped in any manner in which it is possible to machine metal. It can also be embossed and bent.

Vulcanized Fibre wears long and uniformly. It is resilient and fire resisting. Has a low co-efficient of friction. It does not rust, corrode or deteriorate with age like metal. It is not water-proof, but is not injured by immersion in water, either hot or cold. It is impervious to oils or grease, unaffected by heat, cold or by ordinary organic solvents.

USES

Vulcanized Fibre, as a basic raw material, possesses such distinctive properties that its use has extended to thousands of commodities in common use which are made either wholly, or in part, of fibre.

In the electrical, mechanical, and transportation fields, Vulcanized Fibre is playing a most important part. Its application in the industrial field is practically unlimited.

The continually changing conditions of industry requiring materials of unusual properties, has led manufacturers to recognize, more and more, the value of using fibre and fibre parts in their products.

In fact, new uses for fibre are being discovered daily which not only improve the manufacturer's product but which also lower the production cost.

Vulcanized Fibre is called "The Material of a Million Uses", because it is applicable to so very many uses in so many industries, as may be realized from the brief typical outline which follows:

Electrical

Insulation

Switch Handles

Lightning Arresters

Switch Bars

Cleats

Commutator Rings

Electrical (continued)

Conduits

Bushings

Fuse Casings

Slot Wedges

Parts for Dynamos & Generators, etc.

Radio Apparatus

Wireless Apparatus

Industrial

Trunk Fibre, Trunk Corners,
Trunk Angles
Shipping Cases

Suit Cases

Chair Seats

Innersoles

Glove Gauntlets

Buttons

Parts for Cooking Utensils

Tire Separators

Veneer Cauls

Combs

Belts

Golf Bag Bottoms

Megaphones

Saddle Seats

Shoe Horns

Handles

Skate Rollers

Tags

Lug Straps

Brush Backs

Shaving Brush Holders

Knobs

Stops

Cue Tips

Drawer Pulls

Push Buttons

Manifold Tubes

Vacuum Suction Tubes

Mechanical

Gears (silent)

Bushings

Gaskets

Thrust Washers

Bibb Washers

Pump Valves

Brake-shoes

Rollers for Printing Presses
Looms, Elevators, Cash
Carriers, etc.

Slides

Sheaves

Reel Frames

Industrial (continued)

Bearings

Journals

Thermos Bottle Rings

Push Buttons

Pinions

Pulleys

Wheels

Automobile Industry

Battery Box Linings

Speedometer Gears

Gaskets

Conduits for Wiring

Push Rod Tappets

Bushings

Clutch Linings

Discs

Brake Bands

Packings

Liners, Clutch and Brake

Insulation and Railway Equipment

Bridle Rings

Braddock Plates

Bushings and Washers

Continuous Plates

Loom Friction Straps

Glazing Strips

Cutting Blocks

Bunters for Pickers

Sugar Tips

Gibs

Switch Handles

Transmission on Handles

Timer Rings

Washers

Wire Manifolds

Fuse Plugs

Parts of Starting, Light-
ing and Ignition System

Starting Crank Handles

Insulation

Frictions

Keystone Plates

O'Brien Plates

Switch Shims

Washer Angles

Insulation and Railway Equipment (continued)

Dust Guards	Webber Angles
End Posts	Wiring Tags
Engine-Box Liners	Standard Fish Plates
Ferrules	Gaskets
Fish Plates	Liners
Gauge Cock Handles	Engine Box Liners
Head Pieces	

Textile

Spool Heads	Swift Brace
Shuttle-Box Liners	Bobbin Heads
Loom Picks	Gears
Thrust Washers	Bobbin Boxes
Shuttles	Picker Stick Ends
Lacing Combs	Spindle Guards

Receptacles

Trucks	Delivery Cases
Books	Doffing Cars
Desk Trays	Elliptical Cans
Barrels	Mill Baskets
Tote Boxes	Wet Cans
Roving Cans	Tube Trays
Waste Baskets	Compound Boxes

Vulcanized Fibre has unlimited industrial uses and is in demand in many major industries not enumerated above.

THE METAL TRADES' FIELD

AND

ITS EXTENT AS A MARKET

The field is composed of about 40,000 various, diversified, industrial establishments which by reasons of common characteristics combine to form what is generally known as the Metal Trades field, but to be more clearly defined as being composed of producers, and a much larger percentage of manufacturing consumers of metal and metal products.

The extent and sales value of the Metal Trades field as a market for fibre, can be best visualized from the fact that it produces about 35% of the value of all products produced.

As a market for fibre to replace metal, the Metal Trades field is second to none, as it represents every industry using metal as a raw material in the manufacture of products made either wholly, or in part, of metal.

Manufacturers in the Metal Trades field are more and more likely to use Vulcanized fibre as a means of cutting production costs; to improve their product; to replace a more expensive material of no better quality, or properties for a given application; to replace metal machine parts with fibre parts where the use of fibre had produced better machine performance.

SUBSTITUTES

Other materials have many of the same uses in common with Vulcanized Fibre, but in those fields to which it is especially adapted there are no substitutes.

BUYERS

Generally speaking, the Buyers of Vulcanized Fibre may be divided into two groups--

First Group:- This group is composed of manufacturers using vulcanized fibre who buy it in any or all of its three basic forms-- Sheets, Rods, or Tubes-- and who work it up themselves.

Second Group:- This group is composed of manufacturers who use fibre parts which they buy from fibre manufacturers, but who do not, as a rule, engage in strictly fibre working operations.

PRICES

The price of Vulcanized Fibre varies widely by reason of the variety of conditions in which each of the basic forms is marketed.

The prices of sheets vary on account of thickness. Tubes vary in price according to inside diameter and thickness of wall. Both of the forms further vary in price if they have been fabricated as sheets into hollowware, or sheets and tubes into other forms, and prices vary still greater if machine work has been done on them.

Because of these elements in manufacture it is impossible, without intricate detail, to establish a definite range of prices, but price lists and discount lists have been established to cover the three basic forms of Sheets, Rods, and Tubes.

"Fabricated" prices vary with each particular specialty according to the work expended thereon.

Generally, the minimum prices per pound are for --

Sheets	\$.21
Tubes75
"Fabricated"	1.00

The initial cost of Vulcanized Fibre is slightly more than that of Mica, Porcelain, Glass, Leather, Hard Rubber, and Metal of various kinds; but on account of its longer life and longer wearing qualities, it is much more economical in the long run, and is therefore supplanting the above mentioned materials in many fields.

LOCATION OF VULCANIZED FIBRE MILLS

Name of Manufacturer

Location of Mills

- | | |
|----------------------------------|---|
| 1. Continental Fibre Co. | Newark, Del. |
| 2. Delaware Hard Fibre Co. | Marshallton, Del. |
| 3. Diamond State Fibre Co. | (Bridgeport, Pa.
(West Conshohocken, Pa.
(Elsmere, Delaware
(Chicago, Ill. |
| 4. National Vulcanized Fibre Co. | (Kennett Square, Pa.
(Yorklyn, Del.
(Wilmington, Del.
(Newark, Del. |
| 5. Rogers Fibre Co. | (Kennebunk, Me. |
| 6. J. Spaulding & Sons Co. | Tonawanda, N. Y. |
| 7. Standard Fibre Co. | Somerville, Mass. |
| 8. Wilmington Fibre Spec. Co. | New Castle, Del. |

CAPITAL INVESTED

The capital invested in the whole Industry is around 25,000,000 dollars.

The importance and growing activities of the Industry may be realized by the fact that, of necessity, there has been required the addition of about \$1,000,000 of capital investment a year for the past eight years.

The Sales Ratio to the Capital invested has steadily increased during this period.

NORMAL OUTPUT OF INDUSTRY

The normal output of the whole Vulcanized Fibre Industry is about 45,000,000 pounds per annum, of which business National's share is about 30 per cent.

LABOR

The labor situation is especially good. Labor disputes are practically unknown in the Industry. It is remarkably free of union labor and is not subject to agitators.

The Mills being located in small towns, the labor, for the most part, comes from the immediate vicinities surrounding the Industry. Local skilled and unskilled labor is the backbone of the Industry.

The unskilled men are put under the direction and supervision of trained and skilled foremen who are responsible for teaching new employees the company's policies and methods, and for teaching them how to perform their respective duties and kinds of work in the easiest, quickest, and best ways.

The Industries have established piece work and bonus methods wherever practical, based on quality, quantity, and economy production.

SALES

The magnitude of the Industry may be gauged by the Annual Sales as well as by the invested capital.

The normal annual sales of the whole Industry are approximately 16,000,000 dollars.

The relation between the Domestic and Foreign Sales is around ten to one.

Both the Domestic and Foreign Sales are steadily increasing.

The relative percentage of Sales for the basic forms is approximately:

Sheets.....	51%
Tubes	7%
Fabricated.....	42%

The Industry has branch offices in most of the principal cities throughout the world, and maintains storage warehouses at its principal distributing centers.

Its products, such as Sheets, Rods, Tubes, Special Shapes, and Trunk Fibre, are distributed largely direct to other manufacturing companies.

Waste Baskets are sold almost exclusively to the retail stationers for distribution.

Holloware and Textile mill supplies are distributed largely through mill supply houses.

Export business is done through agents or commission men under direction of the home offices.

General Terms are 2% ten days, net thirty days.

Dealers are circularized, and among other sales aids, there are issued exceedingly attractive catalogs and booklets and advertisements in trade and technical magazines.

FOREIGN COMPETITION

The development of the Vulcanized Fibre Industry has been wholly in the United States.

With the exception of England, where a small quantity has been manufactured, Vulcanized Fibre, up to a short time ago was not made in any other country.

HISTORY OF THE NATIONAL VULCANIZED FIBRE CO.

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The National Vulcanized Fibre Company is an outgrowth of the National Fibre & Insulation Company, which started business in 1905. The attached chart tells a brief story of the growth of the business.

When the Company was organized, Mr. J. Warren Marshall was made President, and has been since that time, and is today, the active head and directing manager of the Company. He has been an outstanding figure in the industry and has been able to operate the Company at a profit every year. Mr. Marshall has been a leader in most of the progressive moves in the industry.

The National Fibre & Insulation Company purchased the Keystone Fibre Company in 1912 and developed a very profitable business in Vulcanized Fibre for trunks.

The American Vulcanized Fibre Company, with plants at Wilmington and Newark, Delaware, had a growing business in special machined shapes and in heavy sheet fibre and had very good plant facilities for the manufacture of these products. On the other hand, they had practically no facilities whatever for manufacturing thin fibre.

In 1922, the National Fibre & Insulation Company purchased the assets and good-will of the American Vulcanized Fibre Co. This step nicely rounded out a complete fibre line for the National.

The name of the Company at that time, was changed to the NATIONAL VULCANIZED FIBRE COMPANY.

The uniting of the National Fibre & Insulation Company, and the American Vulcanized Fibre Company proved to be profitable, and substantial savings have been effected by the elimination of the duplication of sales work and by the co-ordination of the combined manufacturing facilities.

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ORGANIZATION

The officers of the Corporation are--

J. Warren Marshall,	President,	Age 44
J. K. Johnston,	Vice President,	34
T. Clarkson Taylor,	Treasurer,	36
Wm. N. Shoemaker, Jr.	Secretary,	36

Mr. J. Warren Marshall, the active head and managing director of the Company grew up with the business, knows it thoroughly and under his direction of organization and development, the Company has continuously made a profit for twenty consecutive years.

Mr. J. K. Johnston, who handles and directs the sales of the Company, has had fifteen years actual experience in organizing, managing and directing sales work of the Vulcanized Fibre business.

Mr. Taylor and Mr. Shoemaker have had fifteen years of actual plant experience in the Vulcanized Fibre business, and are considered to be very able men in that field.

The Company has a well rounded out organization of competent superintendents and department heads, who have creditable records as to their ability in their respective departments over a period of years.

The Laminated Bakelite business being more technical than Vulcanized Fibre requires as a managing head a technically trained man.

We have in charge of the Bakelite factory a man who has had several years experience in actual management in the chemical field, and, as well, is a trained finished chemist, and the manufacturing process and the management of the factory has shown steady, creditable improvement from month to month under his management.

PHENOLITE

To meet an increased demand for Laminated Bakelite products, this Company made a substantial investment (approximately \$300,000.) in equipment for manufacturing such a product. The trade name of the product manufactured and sold by the National Company is "PHENOLITE", (Bakelite being a synthetic resin made from formaldehyde and carbolic acid).

In 1912, the total business in Laminated Bakelite products was less than \$1,000,000. Today, the sales of this product are over \$12,000,000. per annum.

The National Company is developing a good business in "PHENOLITE", their Laminated Bakelite product. Their sales in May 1925 (about the time of starting operations) were \$375.00. In May 1926-- one year later-- their sales were \$18,000. It is confidently expected that within the next two years, a business will have developed in this product of at least \$100,000. per month.

This material carrying a higher price than fibre finds a ready market in the same line of industry as does Vulcanized Fibre, and works in admirably as addition to the fibre line, without competitive with fibre.

"PHENOLITE" as a Laminated Bakelite product is rapidly being developed for silent gears for all sorts of small motors, and by the automotive industry; for the furniture trade for table tops, desk tops and decorated

panels; by the sign manufacturers for desk signs, department store signs and general engraved advertising placards.

Its largest consumption today lies with the Radio Industry, where it is very largely used for front panels, inside panels, and for general small insulating parts.

Laminated Bakelite is manufactured by taking the Bakelite Varnish and treating Paper, Canvas and Linen. The treated paper and fabric is then laminated together with heat and pressure. This material is made in three basic forms, the same as Vulcanized Fibre, viz: Sheets, Rods and Tubes; special shapes are machined and punched from the three basic forms.

PEERLESS INSULATION.

The National Vulcanized Fibre Company manufactures a complete line of fibre products, and has developed a number of special products of its own.

Among them, is a thin insulating fibre which possesses properties superior to any similar product.

This product is known by and sold under the trade name of "PEERLESS INSULATION", is manufactured with special machinery and under processes invented and developed by the National Company.