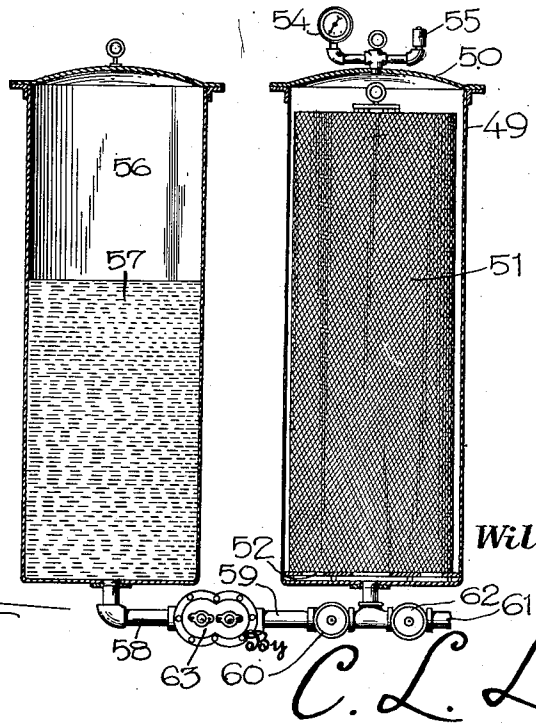
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PROCESS OF TREATING FABRIC.

APPLICATION FILED OCT. 19, 1916.

1,327,904. Patented Jan. 13, 1920.



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PROCESS OF TREATING FABRIC.

1,327,904. Specification of Letters Patent. Patented Jan. 13, 1920.

Application filed October 19, 1916. Serial No. 126,558.

To all whom it may concern:

Be it known that I, WILLIAM C. CARTER, a citizen of the United States, residing at Radnor, in the county of Delaware and State of Ohio, have invented new and useful Improvements in Processes of Treating Fabric, of which the following is a specification.

My present invention relates to processes of impregnating fabric with a lubricant in suspension, and is more particularly concerned with the introduction of a lubricant into pneumatic tire fabric.

In a pending application, Serial No. 94,994 for United States Letters Patent upon a pneumatic tire fabric, I disclose and claim a fabric impregnated with a lubricant in such manner that friction between the interwoven cross threads is very materially reduced, if not entirely eliminated, with a resultant increase in the longevity of the fabric when made up into a tire.

The object of my present invention is to provide a process for introducing the lubricant in the form of a suspension or emulsion into the yarn, threads or cords from which the fabric is woven, or into the woven fabric itself.

It is also an object of the invention to provide a process whereby yarn in the form of a woven fabric may be impregnated with a lubricant designed to reduce the friction between cross threads of the fabric when play is constrained therebetween.

These objects are attained by virtue of such instrumentalities as are illustrated in the accompanying drawings, described in the following specification and then more particularly pointed out in the claims which are appended hereto and form a part of this application.

The figure is a diagrammatic disclosure of means for practising a process of vacuum impregnation of fabric.

In my pending application, above referred to, no particular method or process is delineated whereby I may secure the advantages accruing from the production of the lubricated tire-fabric therein disclosed. I have discovered, however, that by suspending any suitable lubricating substance such as graphite, non-drying oils, etc., such as paraffin oil, castor oil, in a volatile liquid carrier such as water, naphtha, benzol, etc., a suspension or emulsion is obtained which will readily permeate the fabric. After the evaporation of the liquid carrier, the lubricant is left in intimate contact with the fibers forming the fabric. This evaporation will take place naturally or it may be hastened by means hereinafter described. The impregnation may take place at any stage of the manufacturing process from the raw material to the finished product. I have secured satisfactory results by passing the yarn through the suspension or emulsion during the twisting or beaming processes incident to ordinary yarn manufacture. I have also treated the yarn in the suspension or emulsion in a similar manner to standard dyeing processes both in skein and package dyeing, and I have impregnated the finished fabric.

I have found it advantageous to use the suspension or emulsion at a temperature approximating 200 degrees Fahrenheit and the addition of some non-drying oil, a great aid to quick and uniform penetration.

The figure shows the construction and operation of a vacuum impregnating machine for treating finished fabric. An air tight cylinder 49, having a detachable head 50 large enough to admit a roll of fabric 51, is provided at the bottom with a raised, perforated platform 52 to support the fabric. The fabric is wound on a series of parallel rods to permit the free contact of the emulsion or suspension with the inside of the roll. Mounted in the head 50 is a gage 54 to indicate the pressure on the inside of the cylinder 49 and an air valve 55 for the escape of the confined air.

A tank 56 contains the lubricating emulsion or suspension 57 and communicates with the cylinder 49 through the pipes 58 and 59. A valve 60 controls the flow of the emulsion or suspension. A steam pipe 61 controlled by a valve 62, connects the cylinder 49 with a suitable supply of steam. The operation of the machine is as follows: The valves 60 and 62 are closed, the detachable head 50 removed and the roll of fabric 51 is placed in the cylinder. The detachable head 50 is then secured in place and low pressure steam is admitted to the cylinder through the valve 62. This bathes and heats the fabric and drives out the air through the air valve 55. After the escape of the entrapped air, valve 62 is closed and valve 60 is opened. Cold emulsion or sus-

pension from tank 56 enters cylinder 49 and comes in contact with the hot water vapor. Condensation follows, automatically producing a vacuum which allows the emulsion or suspension to permeate the interstices of the fabric.

After this action takes place atmospheric pressure is admitted to cylinder 49 and the surplus emulsion or suspension is pumped back into the tank 56 through the pump 63. The fabric is then removed and thoroughly dried, leaving the lubricant in intimate contact with the fibers.

Various mechanisms may be utilized, the chief object sought being the uniform distribution and even impregnation of the lubricant throughout the fabric, and the mechanical devices disclosed being purely illustrative as a type, the practice of the process not being confined to the use of the same.

The advantages of my invention are the rapid and economical impregnation of pneumatic tire fabric with a lubricating substance which reduces the internal friction and increases the life and efficiency of the tire, the process of impregnation being adapted for use in connection with fiber or spun yarn in the skein or package, and also being capable of separate use, as a final step in the treatment of fabric already manufactured.

What I claim is:

1. That process of impregnating fibrous material with lubricating graphite, which includes bathing the material in a heated vapor, and then in a suspension of finely divided graphite, in a liquid carrier, such suspension being sufficiently cold to condense the vapor upon the material.

2. That process of impregnating fabric with a lubricant, which includes the bathing of the fabric, first in hot vapor, and secondly, in a relatively cold suspension or emulsion of the lubricant, thereby causing a condensation of the vapor, upon the fabric, and producing a vacuum.

3. That process of impregnating fabric with a lubricant, which includes the bathing of the fabric, first, in hot vapor, and secondly, in a relatively cold suspension or emulsion of the lubricant, and causing a condensing of the vapor upon the fabric, thereby producing a vacuum, allowing the suspension or emulsion to permeate the interstices of the fabric, and thirdly, subjecting to atmospheric pressure again, and removing excess suspension or emulsion.

4. The process of impregnating yarn or fabric with a lubricant, which consists in bathing the yarn or fabric in a hot vapor, and then bringing a relatively cold body of a liquid carrier, containing the lubricant in suspension, into contact with the yarn or fabric, whereby the vacuum formed by condensation of the vapor, causes impregnation of the yarn or fabric.

In testimony whereof I have signed my name in the presence of two subscribing witnesses.

WILLIAM C. CARTER.

Witnesses:
B. J. McDANEL,
L. E. WAGNER.