Patented Mar. 10, 1936 2,033,120

# UNITED STATES PATENT OFFICE

2,033,120

## THREAD-TREATING COMPOSITION AND METHOD

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No Drawing. Application October 5, 1933, Serial No. 692,316

7 Claims. (Cl. 91—68)

This invention relates to the preparing of thread for sewing operations and more particularly to improvements in compositions for treating sewing thread to be used, for example, in the sewing of shoe parts and to methods of preparing such thread.

Objects of the invention are to provide improved liquid compositions for treating sewing thread and to provide such compositions which may be applied to the thread at room temperature to impart improved properties to the thread and to the seam formed therewith. Such compositions do not require to be heated before application to thread as is necessary with so-called "hot waxes". A further object is to provide improved liquid thread-treating compositions which may be employed in connection with sewing machines such as used in welting and other shoe manufacturing operations and which will impart improved sewing characteristics to the thread and the resulting seam without "gumming up" or otherwise disadvantageously affecting the rolls and other portions of the sewing machine with which the coated thread comes in contact in its passage from the wax pot to the sewing needle.

I have found that the above-expressed and other objects may be attained by coating the thread with a liquid emulsion of the water-in-oil type wherein the continuous phase comprises a resin dissolved in an organic solvent and wherein the dispersed phase comprises water.

In carrying out the invention I prefer to employ rosin as the resin constituent. The invention includes within its scope, however, the use of other resins, such as burgundy pitch, ester gum, gum copal, and synthetic resins of suitable characteristics.

A preferred organic solvent is naphtha, on account of its volatility and non-toxic properties, and I prefer ordinarily to associate therewith a less volatile organic solvent, such as pine oil, in order to defer somewhat the "set" of the composition after its application to the thread and after the volatilization of the naphtha. Other suitable organic solvents may be used singly or in combination, for example, benzol, toluol, and other solvents of the petroleum or coal tar series, and turpentine.

Particularly where rosin is employed as the resin constituent, I prefer to associate a plasticizing and softening agent therwith. I have found rosin oil to be particularly suitable for the instant purpose, although other plasticizers, such as rezyl balsam and venice turpentine, may be used singly or in combination. Furthermore, in addition to any other plasticizing material I prefer to include rubber in my improved composition in amount in the neighborhood of 1% of the entire emulsion. Rubber not only acts as a softening and plasticizing agent for the resin but also has a marked effect in preventing adhesion to, or "gumming up" of the rolls or other parts of the sewing machine with which the coated thread comes in contact in its passage from the wax pot to the needle. In this connection the term "rubber" is to be interpreted sufficiently broadly to include balata and the usual rubber equivalents.

In order to increase the total solids content of the film remaining on the thread after the dispersion of the volatile constituents of the composition and to obtain certain other advantages, I prefer to incorporate in the thread-treating composition an oil of a drying nature. A preferred constituent of this type is boiled linseed oil, although other oils may be used, such as boiled tung oil, raw linseed oil, raw tung oil, and soya bean oil.

In order more readily to produce a water-in-oil emulsion and to obtain a better and more permanent emulsion I prefer to employ water which has been rendered alkaline. For the instant purpose I have found tri-sodium phosphate to be unusualy efficacious. However, other alkaline materials, such as ammonia, tri-ethanolamine, ethylene diamine, sodium hydroxide, and sodium carbonate are also useful for this purpose.

For treating the thread to be used in the sewing of shoe parts, the emulsion contemplated by this invention preferably has a viscosity in the neighborhood of 100–200 seconds at 22° C. as determined in the Störmer viscosimeter, employing a 200 gram weight.

A composition suitable for use in treating sewing thread in accordance with this invention is as follows:

| | Pounds |
|---|---|
| Rosin grade M (by U. S. Dept. of Agriculture color standard) | 364.7 |
| Rosin oil | 45.2 |
| Pine oil | 10.6 |
| Boiled linseed oil | 5.2 |
| Tri-sodium phosphate | 10.6 |
| Hot rolled crepe rubber | 6.3 |
| Naphtha (textile spirits) | 111 |
| Water | 281 |
| Total | 835.1 |
| Yield 100 gallons | |

The above composition advantageously may be prepared by melting the rosin and adding thereto the rubber, linseed oil, pine oil and rosin oil, and agitating until substantial homogeneity is obtained. The solution is cooled and a portion of the naphtha added and then the tri-sodium phosphate dissolved in a portion of the water is added and agitation continued for several minutes. The balance of the water is then added

and agitation continued until the water has been dispersed. The balance of the naphtha may then be added and agitation continued for an hour or longer until emulsification has been completed, with water in the dispersed phase and the organic constituents in the continuous phase. The emulsion thus formed, wherein the rosin is the predominating constituent of the continuous phase, is of great permanence.

To illustrate the use of my improved thread-treating composition in one shoe manufacturing operation, namely, the welting operation, the composition may be placed in the wax pot of a welting machine and the thread, after passing through the wax pot, where it becomes coated, passed over the tension wheel and the usual machine rolls and through the needle. When my composition is employed the wax pot need not be heated, since the composition is liquid at room temperature, and, furthermore, the composition does not adhere substantially to or "gum up" the rolls of the machine during the passage of the thread from the wax pot to the needle. Moreover, the coated thread passes through the work readily whereby the sewing operation may be accomplished with facility and without substantial danger of thread breaking even when the thread is under a comparatively high tension, while, on the other hand, the composition "sets up" or hardens reasonably rapidly to hold the seam tightly and permanently in place. This is of particular importance when it is remembered that the welting and similar sewing operations are accomplished by means of a chain stitch. In addition, the composition remains permanently flexible even after it has "set up".

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. The method of preparing a thread for sewing operations which comprises coating the thread with a liquid emulsion of the water-in-oil type wherein the continuous phase comprises a resin dissolved in an organic solvent, and wherein the dispersed phase comprises water.

2. The method of preparing a thread for sewing operations which comprises coating the thread with a liquid emulsion of the water-in-oil type wherein the continuous phase comprises rosin in predominating amount and an organic solvent, and wherein the dispersed phase comprises water.

3. The method of preparing a thread for sewing operations which comprises coating the thread with an emulsion liquid at room temperature and of the water-in-oil type, wherein the continuous phase comprises rosin, an organic solvent for said rosin, and a small amount of rubber, and wherein the dispersed phase comprises water.

4. The method of preparing a thread for sewing operations which comprises coating the thread with an emulsion liquid at room temperature and of the water-in-oil type, wherein the continuous phase comprises rosin, a volatile solvent for said rosin, a plasticizer, and a small amount of rubber, and wherein the dispersed phase comprises water.

5. The method of preparing a thread for sewing operations which comprises coating the thread with an emulsion liquid at room temperature and of the water-in-oil type, wherein the continuous phase comprises rosin in predominating amount, solvent material of the arbitrary class comprising turpentine, naphtha, benzol and toluol, a liquid plasticizer, and rubber in the neighborhood of 1% of the entire composition, and wherein the dispersed phase comprises water rendered alkaline.

6. In a thread-treating composition, an emulsion liquid at room temperature and of the water-in-oil type, the continuous phase of said emulsion comprising rosin, a volatile organic solvent for said rosin, a liquid plasticizer, and rubber in the neighborhood of 1% of the entire composition, the dispersed phase of said emulsion comprising water.

7. In a thread-treating composition, an emulsion liquid at room temperature and of the water-in-oil type, the continuous phase of said emulsion comprising rosin in predominating amount, organic solvent material of the arbitrary class comprising turpentine, naphtha, benzol and toluol, a liquid plasticizer, a drying oil, and rubber in the neighborhood of 1% of the entire composition, the dispersed phase of said emulsion comprising water rendered alkaline.

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