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COLD ROLLING SOLUTION

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6 Claims. (Cl. 252—11)

This invention relates to a solution peculiarly well suited for the dual function of cooling and lubricating material undergoing reduction between the rolls in a rolling mill. While not limited thereto, the solution is well suited for cooling strip material undergoing a rolling operation on a cold reduction mill such as used in a tin mill.

Solutions heretofore used were made by adding approximately equal parts of soluble oil and palm oil to a sufficient quantity of water to produce a solution containing the desired percentage of palm oil. Such old solutions for successful operations must be maintained at a minimum temperature of approximately 125 degrees Fahrenheit at all times. This necessitates the use of a large amount of steam or other source of heat, which is costly and undesirable. In a hot solution of this old type, the palm oil is constantly breaking down, thus losing its lubricating value and making necessary frequent additions of oil.

The present invention provides a lubricating solution having improved characteristics which can be used at ordinary room temperatures, referred to herein as cold solution, and such improved cold solution has been shown in practice to be more satisfactory than the hot solutions heretofore used.

The solution comprises 100 gallons of palm oil, 2½ gallons triethanolamine and 7 gallons of an oil known to those skilled in the art as tall oil. The tall oil is a composition of fatty acids and rosin acids. The composition may vary somewhat, but an average composition would be:

	Per cent
Fatty acids, oleic and others	35
Rosin acid (crude)	42
Water	23

The tall oil is a by-product from the manufacture of paper pulp and is preferable for use because of its availability and low cost.

In practice I have found that the above enumerated cold solution is superior to the hot solutions heretofore used for the following reasons. It costs from 20 to 35 per cent less to make up, as the solution will do the work of hot solutions heretofore used which contained approximately 100 gallons of palm oil and 100 gallons of soluble oil. The cost is still further reduced due to the fact that more palm oil can be added without additional emulsifier.

The improved solution requires no steam or other source of heat for keeping it hot. Practice has demonstrated that my novel solution can be successfully used at temperatures ranging from 55 to 155 degrees Fahrenheit and no special heating is required once it has been mixed.

The fact that the cold solution is usable at room temperature, whereas the ordinary hot solution heretofore used is applied at a minimum temperature of approximately 125 degrees Fahrenheit, allows for considerably more cooling of the work rolls. It has been demonstrated in practice that it is easier to secure and maintain the gage of the strip when my cold solution is used.

There is no loss, or at least very little, of palm oil due to the breakdown thereof into soluble oil due to high temperature or from the presence of soluble oil in the solution, as is the case with hot solutions heretofore used. Less total oil is required to maintain the desired percentage of oil in the solution. To the cold solution is added only the amount of palm oil to give the required percentage, whereas in the hot solutions heretofore used approximately an equal amount of soluble oil must be added.

The cold solution specified involves the saponification of oleic and rosin acids and the emulsifying power of this soap. The soap is free of excessive alkalinity, yet it retains the adhesive power of the rosin soap, causing a very thin film of emulsifier and palm oil to be retained on the metal surface being rolled.

Palm oil is not readily emulsified in, or with, most emulsifiers, and emulsions made with them are quite unstable below the melting point of the palm oil. However, by adding oleic or rosin acids, or a combination of the two, to the palm oil and some active saponifier to the water, then making a mixture by adding the oil mix to the water and saponifier, an emulsion is formed which is very stable as a rolling solution.

In preparing the cold rolling solution above specified, I mix together 100 gallons of palm oil and 7 gallons of tall oil, the palm oil having first been brought to a temperature of approximately 140 degrees Fahrenheit. In the meantime, 2½ gallons of triethanolamine is added to the water in the solution tank at room temperature and mixed thoroughly. Then the oil and acid mix is added to the water and triethanolamine mix and the whole is agitated until thoroughly mixed, whereupon it is ready for use.

In using the above solution or water emulsion for serving the dual function of collant and lubricant, there is no definite or critical limit as to the amount of water which is to be added. It may be made up to contain any desired per-

centage of oil. In using this solution for cold rolling operations in tin mills, I have found that in a 4,000 gallon batch the water may range from 3,680 to 3,440 gallons. Expressed in percentages, this means that the solution or emulsion may range from 8 to 14 per cent of oil.

The above solution may serve as a combined lubricant and coolant for material being subjected to a rolling operation, and it is to be understood that the cooling function is operative above normal room temperatures. In fact, practice has demonstrated the effectiveness of the cooling and lubricating characteristics of my novel solution in the cold rolling of stock in a tin mill at solution temperatures ranging from 50 to 150 degrees Fahrenheit.

Throughout this disclosure the term "solution" is used in the broad sense, although the oils or fatty acids are present in a state of emulsion.

While I have described quite specifically certain definite proportions of the ingredients set forth, it is to be understood that various changes may be made without departure from the scope of the invention, as defined in the following claims.

I claim:

1. A lubricant for material being subjected to rolling comprising an emulsion of palm oil, triethanolamine, tall oil and water.

2. A lubricant for material being subjected to a rolling operation comprising a water emulsion containing 100 parts of palm oil, 2½ parts of triethanolamine and 7 parts of tall oil.

3. A lubricant for material being subjected to a rolling operation comprising a water emulsion of palm oil, oleic and rosin acids and triethanolamine, the rosin acid being present in sufficient amount to cause proper adhesiveness.

4. A lubricant for material being subjected to a rolling operation comprising approximately 100 parts of palm oil, 7 parts of a mixture of oleic and rosin acids and 2½ parts of triethanolamine, plus a substantial amount of water, the rosin acid being present in sufficient amount to cause proper adhesiveness.

5. A lubricant for material being subjected to a rolling operation comprising a water emulsion of palm oil, a mixture of higher fatty acids and rosin acids in approximately the proportions in which they occur in tall oil.

6. An emulsion for use as a combined lubricant and coolant for material being subjected to a rolling operation comprising 100 parts of palm oil, 2½ parts of triethanolamine and a mixture of higher fatty acids and rosin acids in approximately the proportions in which they occur in tall oil in sufficient amount to cause proper adhesiveness, plus a substantial amount of water.

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