This invention relates to a metal-washing composition and has for an object the provision of a composition of matter which is particularly useful for removing grease and oils from metal surfaces.

Newly manufactured boilers usually have considerable quantities of grease and oil on their inside surfaces, produced during the fabrication of the boilers. The greases and oils are introduced in the form of reaming compounds during the process of manufacture of the boiler. It is desirable that these greases be removed from inside the boiler previous to use. It has been customary in the past to wash out new boilers with an aqueous solution containing caustic soda or soda ash. These compositions have been somewhat undesirable for the washing operation because of the expense involved and the relatively large amount of compositions that must be used to produce the desired result. A further disadvantage of the caustic ingredients that have been employed in the past for washing out new boilers is that the caustic material has a tendency to collect in the seams of the boiler during the preliminary washing, which often results in subsequent plate cracking due to caustic embrittlement.

Accordingly an object of this invention is to provide an easily and cheaply prepared washing composition useful for removing greases and oils from the interior of boilers.

A further object of this invention is the provision of a method for washing new boilers which acts to prevent subsequent plate cracking in the boilers due to caustic embrittlement.

A further object of this invention is to provide a method for washing new boiler which will impart to the boiler a measure of protection against intercrystalline corrosion.

Further and additional objects will appear from the following description and the appended claims.

In accordance with this invention, the washing composition that may be employed for the removal of grease from boilers or other metallic surfaces comprises a mixture of a water-soluble tetrabasic pyrophosphate, a water-soluble sulfate, and a complex organic material such as tannin or lignin, which may be extracted from wood or other vegetable materials in accordance with well-known methods. The pyrophosphate functions in the washing solution primarily as a scouring agent and helps to emulsify or solubilize the greasy material, whereby it is readily removed from the surface under treatment. The complex organic material such as lignin or tannin in the composition functions in part as a filler for the seams in the boiler that is being treated with the composition. This organic material also has a tendency to prevent subsequent intercrystalline corrosion within the boiler and cracking of plates due to caustic embrittlement. The soluble sulfate also acts as a means for preventing embrittlement of the metal.

Examples of organic materials that may be employed in a washing composition prepared in accordance with this invention are tannins and lignins such as are obtainable from cutch, quebracho, hemlock, chestnut, residues from paper mill sulfite liquors, and the like. Any of the water-soluble sulfates may be employed in the washing composition of this invention, such as ammonium sulfate, sodium sulfate, potassium sulfate, lithium sulfate, and the like. Sodium sulfate, however, may be most desirable, since it is readily and cheaply available. In like manner, any of the water-soluble tetrabasic phosphates may be employed in the washing composition of this invention, suitable examples being those of sodium, potassium, ammonium, and the like. It may be desirable, however, to employ the tetradsodium pyrophosphate because of its availability and cheapness.

In accordance with one specific embodiment of this invention, a washing composition may be prepared in the dry condition in accordance with the following formula:

<table>
<thead>
<tr>
<th>Parts by weight</th>
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<tbody>
<tr>
<td>Tetrasodium pyrophosphate</td>
</tr>
<tr>
<td>Sodium sulfate</td>
</tr>
<tr>
<td>Dried sulfite waste liquors</td>
</tr>
</tbody>
</table>

The dry ingredients of the mixture prepared in accordance with the above formula are thoroughly mixed and ground, if necessary, in order to produce a homogeneous mixture. This mixture has been found to be nearly five times as effective in cleaning solution for the removal of reaming compounds from new boilers as is caustic soda. It is also many more times as effective as soda ash. A suitable concentration for use in the washing of a boiler is approximately 50 pounds per 1000 gallons of boiler capacity.

While the above description has had particular reference to the washing of the interior of new boilers, it will be evident that the composition of this invention may also be employed for the scouring or washing of metallic or other surfaces in various types of apparatus. For example, it may be employed in removing greasy
materials from the interior of cooling and heating systems. The composition employed in connection with the present invention is not to be construed as limited to boiler operation alone. Furthermore, it will be evident to those skilled in the art that the ratios of the various compounds contained within the mixture may be varied widely depending upon the use to which the particular compound is to be put or upon the characteristics of the particular kind of material to be washed. Thus, a greater scouring effect may be obtained by increasing the relative proportions of the pyrophosphate and the sulfate.

While a particular embodiment of this invention is shown above, it will be understood, of course, that the invention is not to be limited thereto since many modifications may be made, and it is contemplated, therefore, by the appended claims to cover any such modifications as fall within the true spirit and scope of this invention.

I claim:

1. A composition for use in removing grease and reaming compounds from the interior of boilers and the like, comprising approximately 30 parts by weight of tetrasodium pyrophosphate, 40 parts by weight of sodium sulfate, and 30 parts by weight of sulfite waste liquor solids.

2. A composition for use in removing grease and reaming compounds from the interior of boilers and the like comprising substantially equal amounts by weight of a tetrabasic water-soluble pyrophosphate, an alkali metal sulfate, and sulfite waste liquor solids.

3. Process for removing grinding and reaming compounds from the interior of boilers and the like which comprises washing the boilers with an aqueous solution of a composition consisting of substantially equal amounts by weight of a tetrabasic pyrophosphate, an alkali metal sulfate, and sulfite waste liquor solids.

4. A process for removing grinding and reaming compounds from the interior of a boiler or the like which comprises washing the boiler with an aqueous solution having dispersed therein approximately 50 pounds of a washing composition for every 1000 gallons of boiler capacity, said washing composition comprising approximately 30 parts by weight of tetrasodium pyrophosphate, 40 parts by weight of sodium sulfate, and 30 parts by weight of sulfite waste liquor solids.