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THREAD SEALING COMPOUND

Algernon S. Badger and John Beson, Houston, Tex., assignors, by mesne assignments, to Jersey Production Research Company

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1 Claim. (Cl. 106—33)

This invention is directed to a composition particularly adapted for sealing the threads in leaking couplings used to connect threadedly joints of pipe.

This application is a continuation-in-part of copending application Serial No. 468,532 by Algernon S. Badger and John Beson, filed November 12, 1954, entitled "Thread Sealing Compound," now abandoned.

It is conventional to the art to make up strings of pipe by connecting together with threaded couplings ends of said pipe. Examples are strings of tubing used in petroleum condensate and gas wells and strings of casing in wells.

It oftentimes happens that one or more couplings in a string of tubing or casing used in a well develops a leak when subjected to the pressure of the well. The leak in the coupling may be a result of any one or a combination of conditions such as malalignment of threads, thread machining tolerances, erosion, corrosion, or physical damage to the thread form. The removal of such strings of tubing or casing is difficult, if not at times impossible, and it is thus desirable to seal the leaking threads without removing the string of pipe from the well. A procedure for sealing such leaking couplings without removing the pipe from the well is disclosed in copending U. S. application entitled "Sealing Leaking Tubing Couplings Without Removing the Tubing From the Well," U. S. patent application Serial No. 468,306, filed November 12, 1954, in the names of Harry Pistole et al. The present application is directed to a plastic or conventional viscous thread sealing material particularly useful for carrying out the procedure disclosed in said application.

The thread sealing composition of the present application consists of an effective portion of a plastic or viscous lubricating base within the range of 50 to 95% by volume and preferably within the range of 60 to 90% by volume and an effective portion of sized, nondeformable bridging material having a particle size range from 100 mesh to 200 plus mesh within the range of 5 to 50% by volume and preferably within the range of 10 to 40% by volume.

The plastic lubricating base may be any of the lubricating bases well known to the art. For example, the base may be a conventional grease such as cup grease consisting principally of soap and lubricating oil. The base may also consist of a mixture of grease and finely divided lubricating solid such as zinc, copper, lead or graphite which are known to the art and act primarily as a coating spacer and are conventionally used to coat threads prior to making up joints of pipe to effect a seal between the steel thread surfaces which are susceptible to galling in forceful contact. By way of example, lubricating compositions which may be used as the plastic lubricating base in the present composition may be composed of

oils, metal soaps and powdered soft metals, such as disclosed by U. S. Patent 2,205,990 to Nelson et al., or petroleum or a metal soap grease such as disclosed in U. S. Patent 2,065,248 to Smith, or aluminum soap grease and powdered lead or zinc such as disclosed in Abstract 165,377 entitled "Thread Lubricant," 662 O. G. 4, page 1188. Other greases and/or viscous lubricating oils may be employed.

The nondeformable bridging material used in the composition is preferably sized to have a particle size range from 100 mesh to 200 plus mesh. It will be understood that any material having the requisite sizing and nondeformable physical characteristics may be employed as the bridging material. Examples of suitable bridging materials are silica, magnesium silicate, aluminum silicate, steel, carbon, Carborundum, emery, Feldspar, flint, corundum, magnetite and pyrite. Silicia which has a hardness of about 7 in terms of Moh's scale is readily available and inexpensive and for commercial reasons will usually be used but the other minerals and metals and similar materials may be used.

By way of example, the sized, solid bridging material may consist of equal parts of 100–140 mesh, of 140–200 mesh, and of 200 plus mesh of silica.

As a specific example, a material having the following composition was found to give satisfactory results in sealing threads (under pressures up to 5000 pounds per square inch).

Example I

	Percent by vol.
Cup grease	60
Silica (equal volumes of 100–150 mesh, of 150–200 mesh and of 200 plus mesh)	40

Another specific example which has been found to produce satisfactory results (under pressures up to 5000 pounds per square inch) is as follows:

Example II

	Percent by vol.
Aluminum stearate	59
Lubricating oil	8
Graphite	23
Silica (equal quantities 100–140 mesh silica, of 140–200 mesh and of 200 plus mesh)	10

It is to be emphasized that the size and the amount of the bridging compound in the composition of the present invention is important in order to obtain a tight seal for a leaking thread. The various sizes and ranges employed act to block fluid passageways through the threads desired to be sealed by the smaller particles lodging behind the next larger particles which results in a screen so small the viscous carrier cannot flow through. For example, using the bridging compound, silica, in Examples I and II, in amounts too small or too large or using only small sizes or only large sizes does not effect the sealing of the threads as required in the thread sealing operation to which the composition is particularly adaptable.

To achieve optimum sealing results the composition is placed under a pressure substantially in excess of the natural pressure of the well and forced into contact with the interior of each coupling in the string of pipe and allowed to remain in contact with each coupling in the string of pipe for a sufficient period of time to permit the sealing material opportunity to seal each thread in the string of pipe which may be leaking.

While specific embodiments of the present invention have been disclosed, it will be understood that these specific embodiments are given by way of illustration only and not by way of limitation.

We claim:

A thread sealing composition consisting of silica having a particle size consisting of equal portions of 100 to 140 mesh, of 140 to 200 mesh, and of 200 plus mesh dispersed in a viscous lubricating base, said silica being in the range of 10 to 40% by volume.

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