

UNITED STATES PATENT OFFICE.

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ACID-RESISTANT PACKING.

No Drawing.

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This invention relates to chemical resistant packings and is herein disclosed as embodied in packings especially adapted for stuffing boxes in which acids such as sulphuric, nitric, hydrochloric, citric, acetic, and tartaric come into contact with the packing. According to the present invention the packing includes metal which may be in the form of chips and is adapted to resist the acid, a fibre or fibres adapted to resist the acid, and an oily or grease material adapted to resist the acid, such as a paraffin petroleum product which may be present in small quantity only so that it mainly is present as a coating on the metal and asbestos and serves to hold them together and also serves to bind to these any solid lubricant present. Preferably the packing also includes a solid lubricant such as graphite.

By observing the proper order of mixing and using metal in a suitable form it is possible to prepare a packing which will contain a large proportion of metal in such form that it will not extrude through the clearance spaces between the fixed parts and moving parts of a stuffing box. Such a packing is very efficient, having long life and low coefficient of friction.

The following has been found to produce a satisfactory packing from every point of view for attaining such and other ends:

75 pounds of lead containing one-half of one per cent. of antimony was mixed in an Abbe mixer with 4 pounds of long, carded asbestos fibre to disintegrate the clumps of the fibre. The lead was in the form of small pieces, herein called chips, largely $\frac{1}{8}$ to $\frac{1}{2}$ inch long and mostly under $\frac{1}{8}$ inch wide. The asbestos was Mapleleaf Crude & Fibre Corporation, A. T. asbestos, varying from about 3 mm. in length and 0.25 mm. in diameter, to about 7 mm. in length and 1.5 mm. in diameter. The asbestos was first put through a picker having gripping feed rolls which delivered the fibre to a spike-covered rapidly revolving cylinder which had a disintegrating and carding effect. The mixer had two concentric horizontal shafts each carrying two blades working in a semicircular trough and rotating in opposite directions so as to feed the material toward the center while stirring and mixing it.

After the asbestos was disintegrated and was thoroughly mixed with the metal, 10 pounds of Standard Oil Co. paraffin wax, sold under the name of Parowax, which had been previously melted, was poured into the mixer, with steam in the jacket of the mixer. This was mixed hot, very thoroughly, until the liquid wax had completely coated the fibre and metal, and then there was added 10 pounds of Dixon's #2 flake graphite. The whole was then thoroughly mixed to produce the final packing.

The final product of this procedure was a sulphuric acid resistant packing. It was largely a fairly hard lumpy material in masses varying from a quarter to a half-inch or even an inch across, in which the graphite appeared for the most part closely bound either to the fibre and/or as a thin coating on the metal. In some of the larger lumps the metal chips were closely packed together, matted together. A little of the graphite was in the form of loose agglomerated granules. The fibre was almost as closely bound together as were the metal chips, and granules of graphite clung to projecting fibres.

Although the above description is limited to a packing resistant to sulphuric acid, the invention is in no wise restricted thereto. Packings resistant to various other acids may also be produced and are intended to be embraced by this invention. To produce a packing resistant to any particular acid, it is essential that the metallic ingredient of the packing be resistant to that particular acid. Thus, if a packing were to be used where it would contact with nitric, hydrochloric, fruit acids or acids produced by fermentation, the metallic ingredients should be aluminum, copper or tin respectively. The following illustrates a few of the specific examples of packings resistant to various acids:

Packing resistant to fruit acids or acids produced by fermentation.

75 lbs. tin.
4 lbs. carded asbestos fibers.
13 lbs. oily material (3 lbs. tristearin, containing less .5% free fatty acid and mixed with 10 lbs. of paraffin).
10 lbs. Dixon's No. 2 flake graphite.

Packing resistant to hydrochloric acid.

- 73 lbs. copper (annealed).
- 4 lbs. carded asbestos fibers.
- 5 10 lbs. oily material comprising 10 lbs. parowax which has been previously mixed with 3 lbs. C-706 oil.
- 10 lbs. Dixon's No. 2 flake graphite.

Packing resistant to nitric acid.

- 10 55 lbs. aluminum.
- 5 lbs. carded asbestos fibers.
- 10 lbs. parowax.
- 30 lbs. Dixon's No. 2 flake graphite.
- 15 To pack stuffing boxes, the packing is heated to bring it into plastic form, and then the stuffing box is packed.

Having thus described certain embodiments of the invention, what is claimed is,

- 20 1. An acid-resistant packing consisting largely of lead particles, and also containing asbestos, both thoroughly coated with an acid-resisting waxy material, a graphite coating on the lead and asbestos, and also
- 25 containing other graphite.
- 2. An acid-resistant packing consisting largely of lead particles, and also containing asbestos, both thoroughly coated with a small quantity of an acid-resisting waxy material,
- 30 a graphite coating on the lead and asbestos, and also containing other graphite.
- 3. An acid-resistant packing consisting largely of lead particles, and also containing asbestos, both thoroughly coated with a petroleum wax, a graphite coating on the lead
- 35 and asbestos, and also containing other graphite.
- 4. An acid-resistant packing consisting largely of lead particles, and also containing
- 40 asbestos, both thoroughly coated with paraffin wax, a graphite coating on the lead

and asbestos and also containing other graphite.

5. An acid-resistant packing consisting largely of lead particles, and also containing 45 asbestos, both thoroughly coated with a small quantity of paraffin wax, a graphite coating on the lead and asbestos, and also containing other graphite.

6. An acid-resistant packing contain- 50 ing about 75% of lead particles, about 4% of asbestos fibre, about 10% of paraffin wax coating the lead and asbestos, and about 11% of graphite, the packing being in the form of lumps. 55

7. A packing material consisting largely of lumpy agglomerates of graphite-coated lead bound together with fibre, and other graphite coating the fibre.

8. An acid-resistant packing consisting 60 largely of lead particles, and also containing asbestos, both thoroughly coated with an acid-resisting wax material, a graphite coating on the lead and asbestos.

9. An acid-resistant packing comprising 65 metal particles resistant to the acid with which it comes in contact in its intended use and asbestos, both coated with an acid-resisting waxy material, and graphite, said graphite coating the metal particles and asbestos 70 and also being present in the form of loose agglomerated particles.

10. An acid-resistant packing comprising metal particles resistant to the acid with which it comes in contact in its intended use, 75 asbestos, an acid-resisting waxy material, and graphite, said graphite being present in an amount in excess of that required to coat the metal particles and asbestos.

In testimony whereof, I have affixed my 80 signature to this specification.

WALTER RAUTENSTRAUCH.