Nov. 29, 1932. H. S. WALKER 1,889,165

PACKING AND PROCESS

Filed March 29, 1930

Fig. 1.

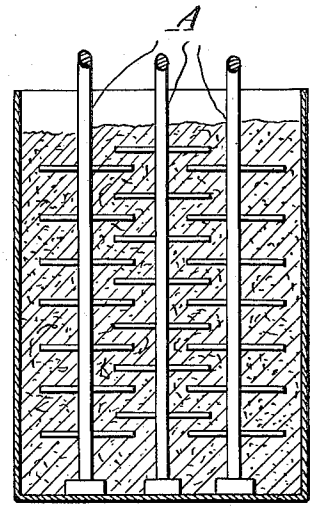


Fig. 2.

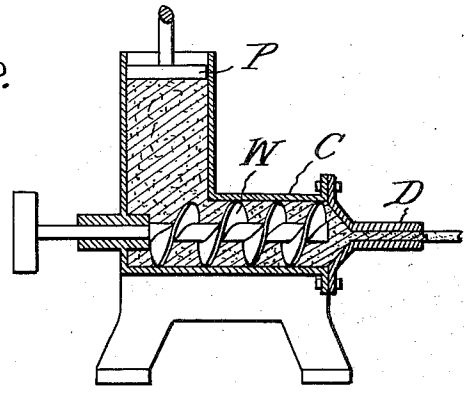


Fig. 3.

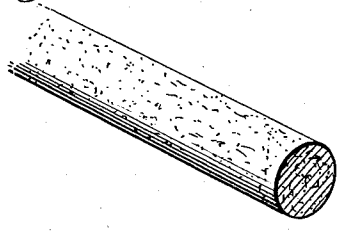
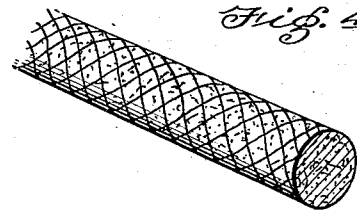


Fig. 4.



Witness
H. Woodard

Inventor
Herbert S. Walker

By H. B. Williamson & Co
Attorneys

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UNITED STATES PATENT OFFICE

HERBERT STANLEY WALKER, OF LARCHMONT, NEW YORK, ASSIGNOR TO THE ALLPAX COMPANY, INC., OF MAMARONECK, NEW YORK

PACKING AND PROCESS

Application filed March 29, 1930. Serial No. 440,053.

The invention relates to a new and improved packing for shafts, rods and the like, and it relates more particularly to a packing of strand or rope-like form.

The general practice of producing strand or rope-like packing embodies numerous steps in the production of asbestos or other yarn, entailing carding, spinning, twisting and winding. The yarn, after manufacture is lubricated and twisted to various diameters to produce desired sizes of packing, and while such packings are efficient and well lubricated for a short while, in little time the lubricant is completely pressed out or melted by heat, leaving only the dry yarn in contact with the rod or shaft. This is necessarily injurious to rod or shaft, particularly if asbestos yarn be used, for this material is naturally more or less abrasive. Moreover, improperly lubricated yarn in contact with a reciprocating rod, is soon worked out through the end of the stuffing box, causing leakage. My invention however, provides a new and improved packing and process of manufacturing the same, whereby a superior article is produced with less expense, and the characteristics are such that when the packing is forced into place in a stuffing box or the like, it becomes molded into a unitary packing ring which is self-lubricating and under the action of heat will become vulcanized, though not to a hard solid condition.

Fig. 1 of the accompanying drawing diagrammatically illustrates a mixing machine in which the various ingredients are mixed.

Fig. 2 is a diagrammatic sectional view of an extruding machine which handles the mixed materials in a dough-like mass, extrudes them through a die and twists the dough incident to extrusion.

Fig. 3 is a sectional perspective view of the packing with no covering.

Fig. 4 is a perspective view illustrating a covering of textile netting which may be used if desired.

In the manufacture of the improved packing, pure unvulcanized rubber gum and a solvent therefor, are employed, together with vulcanizing, anti-oxidant and lubricating agents, soft shredded metal and long staple fibre. The character of metal used will vary according to the uses to which the packing is to be put, illustrations being lead and lead alloys, tin, aluminum, brass, copper, etc. The fibre may be of vegetable nature, such as cotton, flax or substitutes, but long staple asbestos fibre is preferably employed.

Specifically, one advantageous combination of ingredients and proportions, is given below, the percentages relating to weight.

	Per cent
Pure unvulcanized rubber gum	1.5
Shredded soft metal	48.0
Long staple fibre	17.0
Graphite	27.0
Sulphur	1.0
Palm oil	5.0
Stearic acid	.5

The process of manufacture is as follows:

With the use of six gallons of appropriate solvent, the rubber gum is first made into a lean solution of about the consistency of milk. This solution is placed in a mixing machine such as that illustrated in Fig. 1 of the drawing, and is agitated by the spiked agitators A therein. These agitators are driven so that the adjacent arms thereof move in opposite directions which is of advantage in producing a carding or drawing action on the fibres and other ingredients when they are added, thereby effectively separating them and insuring thorough distribution in the rubber solution.

The fibres are added to the solution in a finely divided form while the agitators A are in motion and consequently they are thoroughly separated and each receives a coating of the solution. The other ingredients are added in a similar manner, resulting in thorough coating of the ingredients upon which said coating can form and insuring that all of said ingredients shall be thoroughly mixed.

The steps above described, produce a mass of dough-like consistency. This dough is transferred to an extruding machine such as that illustrated in Fig. 2 and is by this machine, extruded through an appropriate

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die D. The dough is placed under pressure by a plunger P or other desired means, and a worm W forces it through the die D. This worm operates within a stationary cylinder C and in addition to extruding the dough through the die D, said worm imparts a twisting action to the dough as the latter is being extruded. This naturally twists the fibre and metal, resulting in a rope-like packing having a twisted formation.

The extruded packing is placed in containers and passed on to a drying chamber, in which the solvent is evaporated, leaving a homogeneous substantially dry product, the fibres of which are equally distributed along with the other ingredients, and due to the formation and distribution particularly with regard to the fibres, a bonded product is produced which when in use cannot be disturbed in the stuffing box by existing pressures or shaft or rod motions.

The rubber, although in a very small percentage, gives to the mass a sufficient bonding effect and insures that even the graphite shall become a fixed property in the packing. The sulphur is sufficient to impart to the rubber the necessary degree of vulcanization when the packing is subjected to high temperatures, but not sufficient to have any other hardening effect upon the packing. In addition to acting as a vulcanizing agent, the sulphur acts to preserve the rubber by preventing oxidation. The stearic acid also functions toward the end of an anti-oxidant as well as constituting a lubricant, and the palm oil and graphite act as lubricating anti-friction materials. The quantity of rubber, is in small percentage compared with the other ingredients, yet is a very essential element. The only object in using this rubber is to produce the requisite bonding. Even when using such a small percentage of rubber, by mixing the other ingredients with the rubber solution as above described, all fibres and other components parts are equally covered and a homogeneous mass is produced, even with its lubricating properties equally divided and distributed over the whole.

The improved packing is suitable for all kinds of equipment whether of reciprocating or rotary nature and regardless of the materials to be handled, for it is not affected by oils, gases, solvents, acids, alkalies, etc. The lubricating medium is so dispersed and intermingled with the other component parts that the packing will retain its lubricating properties indefinitely, and it is virtually impossible therefore for the packing to injure any rod, shaft or the like against which it is used.

I claim:—

1. A process of manufacturing packing rope comprising the steps of forming a dough embodying long stable fibre, extruding the fibre-carrying dough through a die and twisting said fibre-carrying dough incident to extrusion to provide a strongly bonded product.

2. A process of manufacturing packing rope comprising the steps of mixing vulcanizing, anti-oxidant and lubricating agents, soft shredded metal and long staple fibre with a lean rubber solution to form a dough; forming said dough into rope shape, and evaporating the rubber solvent, leaving a substantially dry rope-like packing.

3. A process of manufacturing packing rope comprising the steps of mixing vulcanizing, anti-oxidant and lubricating agents, soft shredded metal and long staple fibre with a lean rubber solution to form a dough; forming the dough into single-strand rope shape and twisting said dough during formation of said strand to provide a strongly bonded product and evaporating the rubber solvent, leaving a substantially dry rope-like packing with its rubber content unvulcanized.

4. A process of manufacturing packing rope comprising the steps of mixing vulcanizing, anti-oxidant and lubricating agents, soft shredded metal and long staple fibre into said solution to form a dough; extruding the dough through a die and twisting said dough incident to extrusion to provide a strongly bonded product, and evaporating the solvent, leaving a substantially dry rope-like packing, with its rubber content unvulcanized.

5. A packing comprising a homogeneous rope-like mass consisting of unvulcanized rubber, shredded soft metal, long staple fibre, and vulcanizing, anti-oxidant and lubricating agents, the rubber constituting a very small percentage of the mixture and acting primarily as a binder instead of a space filler, the vulcanizing agent being in such small quantity as to prevent vulcanizing of the rubber to a hard state under use-generated heat.

6. A packing comprising a homogeneous rope-like mass consisting of substantially 1.5% unvulcanized rubber, substantially 48% shredded soft metal, and approximately 17% long staple fibre, the remainder consisting of vulcanizing, anti-oxidant and lubricating agents.

7. A process of manufacturing packing comprising the steps of mixing packing and lubricating ingredients to form a dough, forming said dough into substantially rope-shape, and placing a textile netting tube around the rope-shaped dough to combine the latter without covering an appreciable portion of its surface area.

8. A packing comprising a rope-like body of long staple fibres, metal fragments and lubricant, and a tubular textile netting around said body covering only an infinitesimal portion of its area.

9. A process of manufacturing packing rope comprising the steps of forming a dough

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embodying long staple fibre, forming the fibre-carrying dough into single-strand rope, and twisting said fibre-carrying dough incident to forming said strand, providing a strongly bonded product.

In testimony whereof I have hereunto affixed my signature.

HERBERT STANLEY WALKER.

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