J. HAHN.

PACKING.

APPLICATION FILED JAN. 10, 1911.

1,068,337. Patented July 22, 1913.

Fig. 1

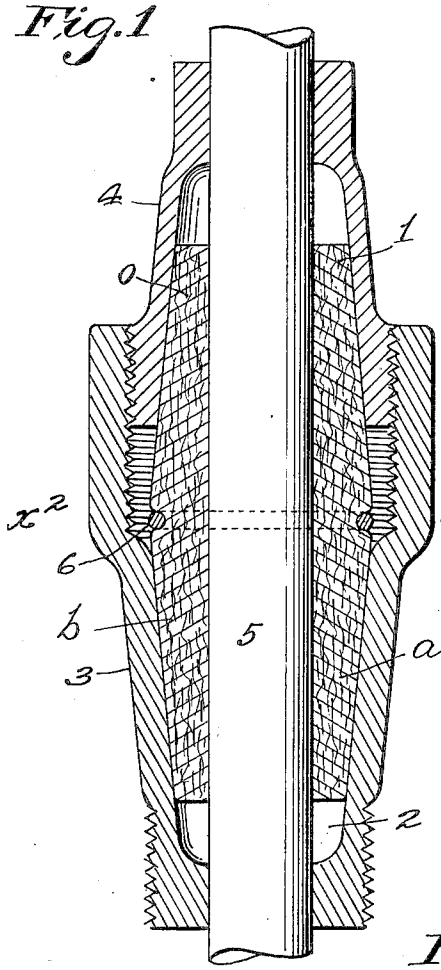


Fig. 7

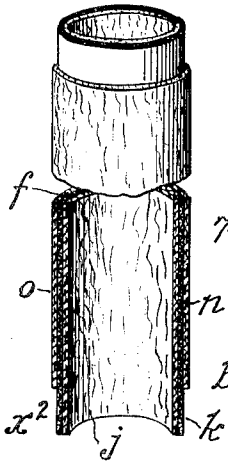


Fig. 3

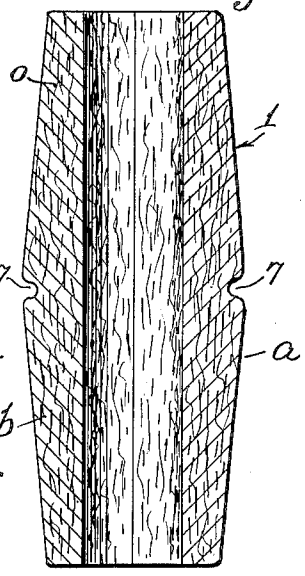


Fig. 4

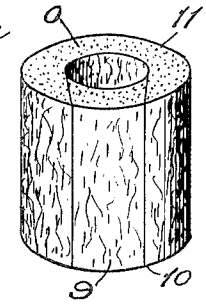


Fig. 5

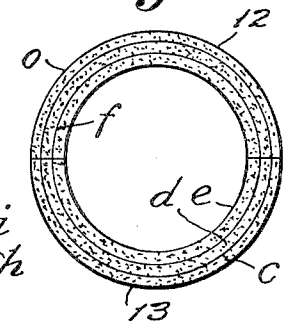


Fig. 6

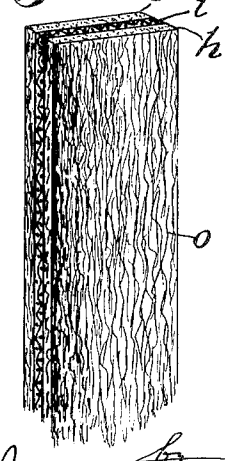
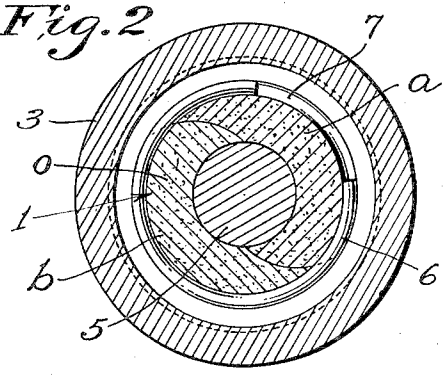


Fig. 2



Witnesses

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UNITED STATES PATENT OFFICE.

JOHN HAHN, OF LOS ANGELES, CALIFORNIA.

PACKING.

1,068,337. Specification of Letters Patent. Patented July 22, 1913.

Application filed January 10, 1911. Serial No. 601,877.

To all whom it may concern:

Be it known that I, JOHN HAHN, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented and discovered a new and useful Packing, of which the following is a specification.

The object of this invention is to provide a superior non-heating, easily applied and homogeneous packing for reciprocatory and rotary parts, such as pistons and piston rods of engines and other kinds of machinery.

Natural vegetable structures heretofore in use as packings are deficient in pliability, hardness and toughness and have a comparatively low degree of absorptive and retentive power so that such packings heat and consequently carbonize and rapidly disintegrate.

It has been proposed to use artificial structures of woody fiber and asbestos in a surrounding flexible case, but such artificial structures besides being more expensive to produce than natural vegetable structures are subjected to more or less rapid disintegration because of the non-homogeneity of such artificial structures.

Packings heretofore known were manufactured from wood and wood is formed of xylem fibers or in other words those vegetable structures having a large amount of incrusting matter on the fibers of the structure as is evidenced by the fact that such incrusting-matter had to be removed by high pressure steam in order to obtain elasticity of the packing. It is obvious that vegetable structures composing such steam-treated packings must have contained substantially straight, parallel fibers since the incrusting-matter is most prominent in those structures and that such arrangement of the fibers would not produce requisite resiliency of the packing so as to contract at all points upon the body against which the packing is placed.

I have discovered that, in order to obtain requisite resiliency and pliability of the packing, the packing must be composed of resilient fibers arranged other than straight and parallel, and that the resilient fibers should preferably be interlaced in all directions as for instance in the *Yucca brevifolia*, which is the best-known example of such naturally interlaced bast fibers; and that by filling the interstices of such a structure with lubricant such as hereinafter set forth, a packing having superior wearing, lubricating, anti-corrosive and leak-preventing qualities is formed.

In order to avoid the foregoing imperfections and difficulties, I have produced a packing formed of a natural homogeneous and tough substance having interlaced fibers of such substance and have thereby produced a highly flexible and durable packing.

The natural vegetable structure I have discovered to fulfil the above conditions is pleurenchyma tissue or bast fiber and I have discovered that the stems of *Yucca brevifolia* which contain and in fact are practically entirely formed of bast fiber uniformly distributed from center to circumference of the tree stem and uninterrupted by pithy portions such as are usual in tree stems rich in bast fiber, will form durable, one or two-piece, non-heating and pliable packing capable of being treated and associated with a filler, so as to conserve and greatly increase the natural hardness, toughness and pliability of its interlacing fibers and so as to retain its absorbent nature to form a good lubricant holder. Such treatment and fillers may be various to meet the particular service to which the packing is to be subjected and consequently I do not limit myself to the particularized formulæ hereinafter set forth.

Packings made in accordance with the broad scope of this invention will not disintegrate as is the case with packings made of artificial combinations employing vegetable and mineral fibers; and are non-heating, consequently they do not require the addition of asbestos, or other mineral fibers and the like to protect the vegetable fiber; and the hardness and porosity of such treated and filled vegetable fiber having its natural structure results in the production of a uniform and perfectly lubricated bearing surface subjected to but slight wear. The invention in this perfected form is also valuable for many kinds of bodies subjected to wear, such for instance, as floor coverings.

The invention is capable of use in various ways and illustration of all such ways will not be attempted.

Reference is made to the accompanying drawings.

Figure 1 is a view of a pump rod stuffing box provided with this newly invented packing, in place on the polishing rod of an oil

pump. Fig. 2 is a plan section of the same on line x^2, Fig. 1. Fig. 3 is a longitudinal section of the packing shown in Fig. 1 detached. Fig. 4 is a perspective view of another form of packing. Fig. 5 is a plan view of packing for use between a shaft and its boxing. Fig. 6 is a fragmental view of packing made in accordance with this invention and adapted for a slide or for other uses where flat packing may be employed. Fig. 7 is a fragmental perspective view of a packing sleeve made in accordance with this invention and adapted for use as a fluid packing sleeve for deep well pumps.

I have discovered that by saturating the natural vegetable structure of *Yucca brevifolia* with a lubricating material said structure becomes a superior material for resisting the effects of friction and wear, and that the same is superior not only for the bearings of journal boxes, but also as packing for stuffing boxes and pumps. In some instances, the vegetable structure may be saturated with a very light lubricant, as for instance, by the steam from the cylinder of a steam engine where the *Yucca brevifolia* is applied as a packing around the piston rod of such engine. In other instances, the lubricating filling may be water, as around the polishing rod of a water pump; or around the shaft of a centrifugal pump. In other instances, the lubricant may be oil, as in case where the packing is employed around the polishing rod of an oil pump. In other instances, the lubricant may be hard, solid material that forms a filler for the interstices of the natural structure of the *Yucca brevifolia*, said filler being capable of application in fluid form. The lubricant which I have used for this purpose is chlorid of calcium and the packing containing the same preferably made by immersing the *Yucca brevifolia* in a 10% solution of chlorid of calcium for half an hour, more or less, then allowing to dry; and then staining by immersing the body in creosote for five minutes, more or less. This form of lubricant is practically water, steam, air and heat and rust proof, and the *Yucca brevifolia* containing the filler thus provided is very hard but is flexible and has great wear-resisting qualities. A stronger or weaker solution of calcium chlorid may be used within the judgment of the manufacturer.

In carrying out this invention for some uses and to increase the strength and flexibility of the packing sheets or bodies I cement veneers of *Yucca brevifolia* together, sometimes introducing a layer of canvas or other fabric between the layers of *Yucca brevifolia*. The cement which I use is preferably made of glue of a very clear quality, fish glue preferred, and silicate of soda combined practically in proportions as follows:—Boil one-half pound of glue in one quart of water until the glue is dissolved, then add to the hot glue solution $3\frac{1}{2}$ ounces of silicate of soda. The cement thus formed is applied while hot to the surfaces to be united and is allowed to set for twenty-four hours, more or less. After the layers of *Yucca brevifolia*, either with or without the canvas, have thus been united and set, the sheet or body thus formed may then be treated with the chlorid of calcium and may then be stained with creosote as above directed.

Referring now to the drawings: in Figs. 1 and 2, 1 designates a packing body reversely tapering from the middle and made of *Yucca brevifolia* saturated to a greater or less extent with crude hydrocarbon oil, a body 2 of which is shown in one of the members 3, 4, of the stuffing box which members are screwed together around the body 1, that is applied to the polishing rod 5 of an oil pump, and is provided with a spring band 6 of steel or other suitable material that fastens together the segments *a*, *b*, of the packing body; said band being let into a notch 7 cut around the packing body.

In the form of packing shown in Figs. 1, 2 and 3 the packing sleeve is made in two sections *a*, *b*, which fit inside the conical chambers formed by the members 3, 4; and the wire band 6, which is of resilient material, is applied in the central peripheral groove 7 between the conical chambers to hold the parts together and compress them upon the polishing rod 5.

In the form shown in Fig 4 a dovetailed segment 9 fits in a slot 10 that is wide enough to receive the polishing rod, or other rod or shaft, to which the packing is applied; the main body 11 of the packing being a slotted cylinder of *Yucca brevifolia*.

In Fig. 5 two segments 12, 13, built up of layers *c*, *d*, and *e* united by cement *f* is employed.

In Fig. 6 a flat body is shown formed of two layers *g*, *h*, of *Yucca brevifolia* and an intermediate layer *i* of a fibrous fabric as canvas, asbestos, or the like, all being filled with a calcium chlorid solution of about 10% strength, more or less, substantially as stated; the whole also being saturated with a hydrocarbon, such as creosote.

In Fig. 7 the inner layer *j* is of *Yucca brevifolia*, the intermediate layer *k* is of canvas and the outer layer *n* is of *Yucca brevifolia;* the several layers are cemented together by cement *f* and are filled with calcium chlorid solution and saturated with creosote.

The sleeve here shown is designed to serve as a flexible fluid packing for the pistons of plunger pumps and the canvas is exposed for a short distance at each end for the purpose of binding the sleeve to the metal portions of the piston, not shown.

It is understood that it is preferable to fill the porous *Yucca brevifolia* structure with a permanent heat resisting filler as calcium chlorid, but I do not limit myself to such a filler and I may use other known fillers which may serve the purpose of the calcium chlorid filler, and substitutes for the creosote may be employed without departing from the broad spirit of this invention.

While I have specified a cement that serves the purpose in the best manner at present known to me, I do not limit myself to the use of the specific cement stated.

In order to conserve to a maximum degree the interlacing nature of the fibers *o*, the vegetable structure of the *Yucca brevifolia* is carefully cut in a plane substantially parallel to the general trend of the fibers so as to sever as few fibers as possible. It is understood that the vegetable structure so cut may be used without the addition of a filler, the liquid in the apparatus with which the vegetable structure is used readily flowing into and filling the interstices formed by the fibers *o* thus lubricating the fibers and producing great flexibility of the entire vegetable structure.

I claim:—

1. A body of the character described comprising vegetable structure having interlaced fibers, said vegetable structure being cut in a plane parallel to the general trend of the fibers so as to conserve to a maximum degree the interlacing nature of the fibers.

2. A body composed of layers of interlaced vegetable fibers cemented together.

3. A body composed of layers of naturally interlaced vegetable fibers and canvas cemented together.

4. A body composed of layers of natural interlaced vegetable fibers and canvas cemented together, and a hydrocarbon filler.

5. A packing body composed of layers of natural interlaced vegetable fibers and canvas cemented together, and a filler of calcium chlorid.

6. A packing sleeve composed of layers of natural interlaced vegetable fibers and canvas cemented together, and a filler of calcium chlorid; said sleeve being saturated with a hydrocarbon.

7. A packing body composed of interlaced vegetable fibers and formed in sections tapering toward their ends, and members forming conical chambers to compress the sections together.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 4th day of January 1911.

JOHN HAHN.

In presence of—
JAMES R. TOWNSEND,
L. BELLE RICE.