

(No Model.)

W. E. KARNS.
PACKING RING FOR PUMP PISTONS.

No. 562,540.

Patented June 23, 1896.

FIG. 1.

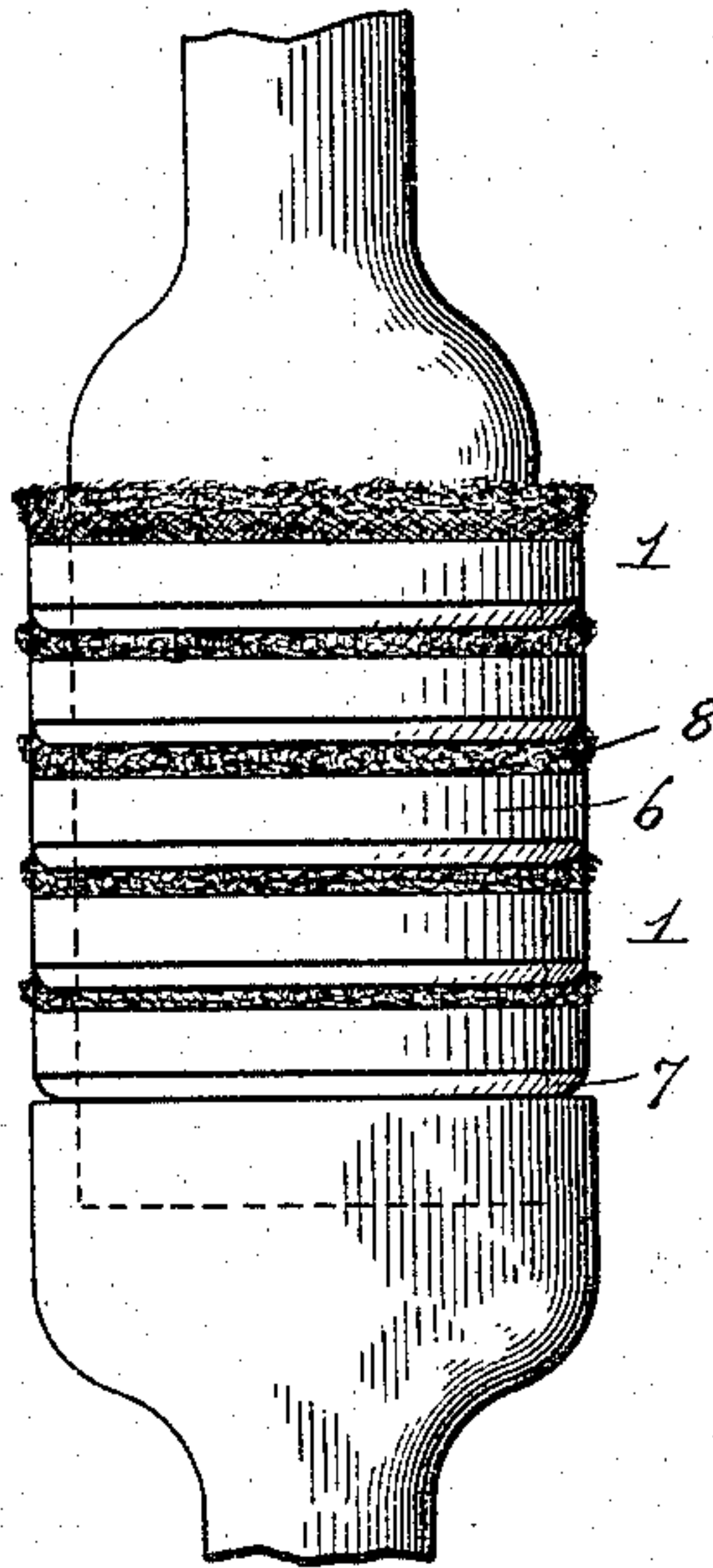


FIG. 2.

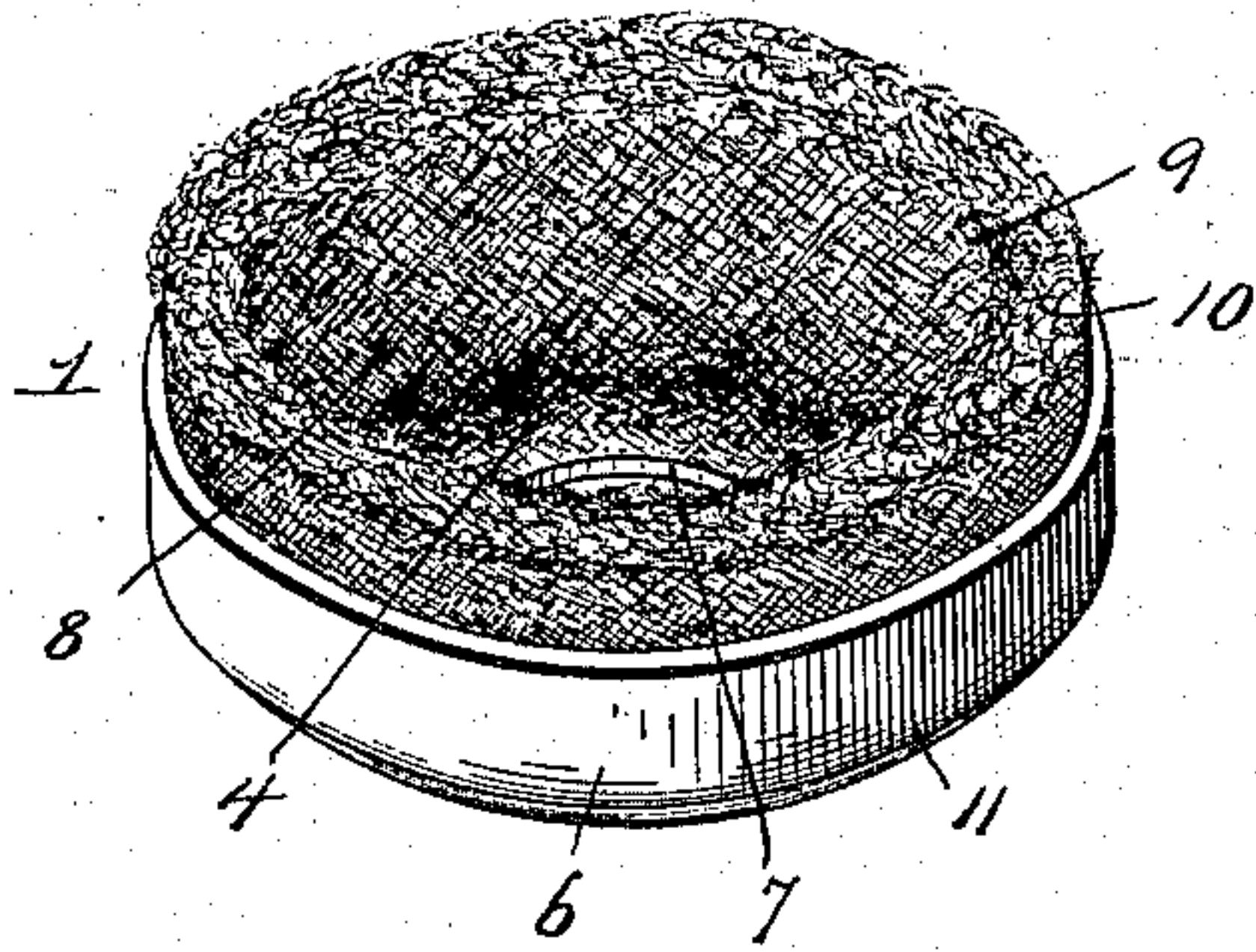


FIG. 3.

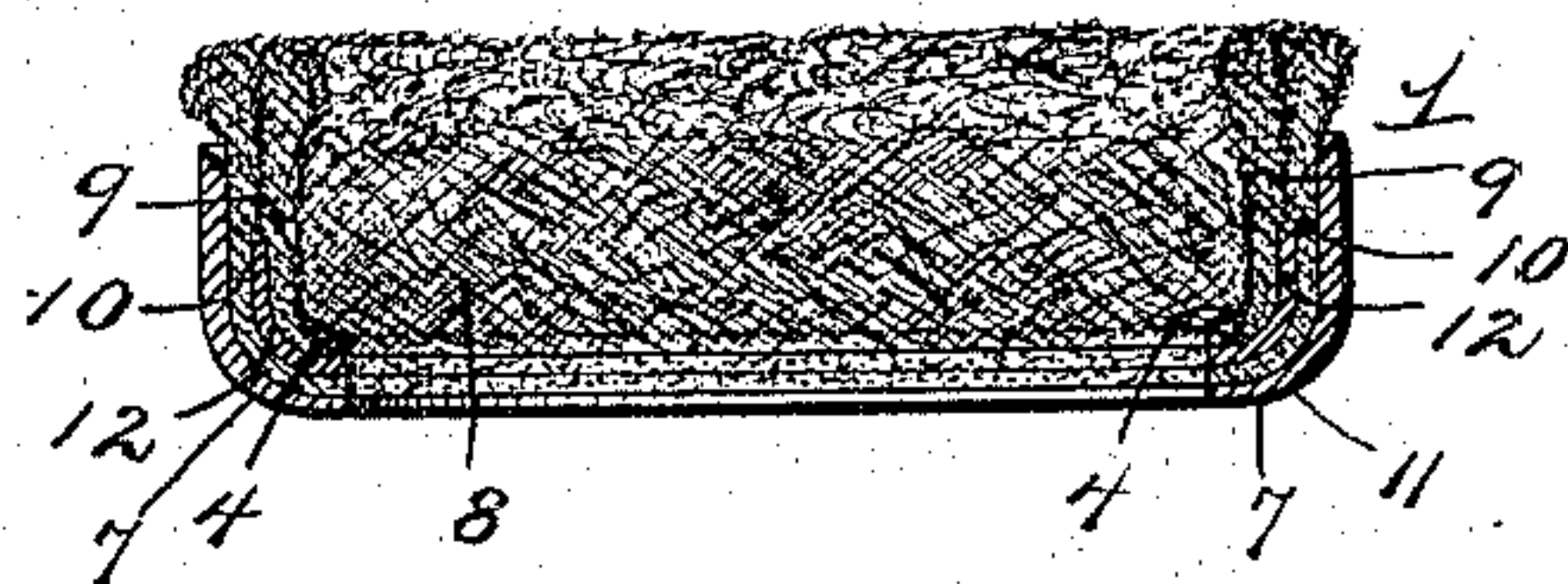


FIG. 5.

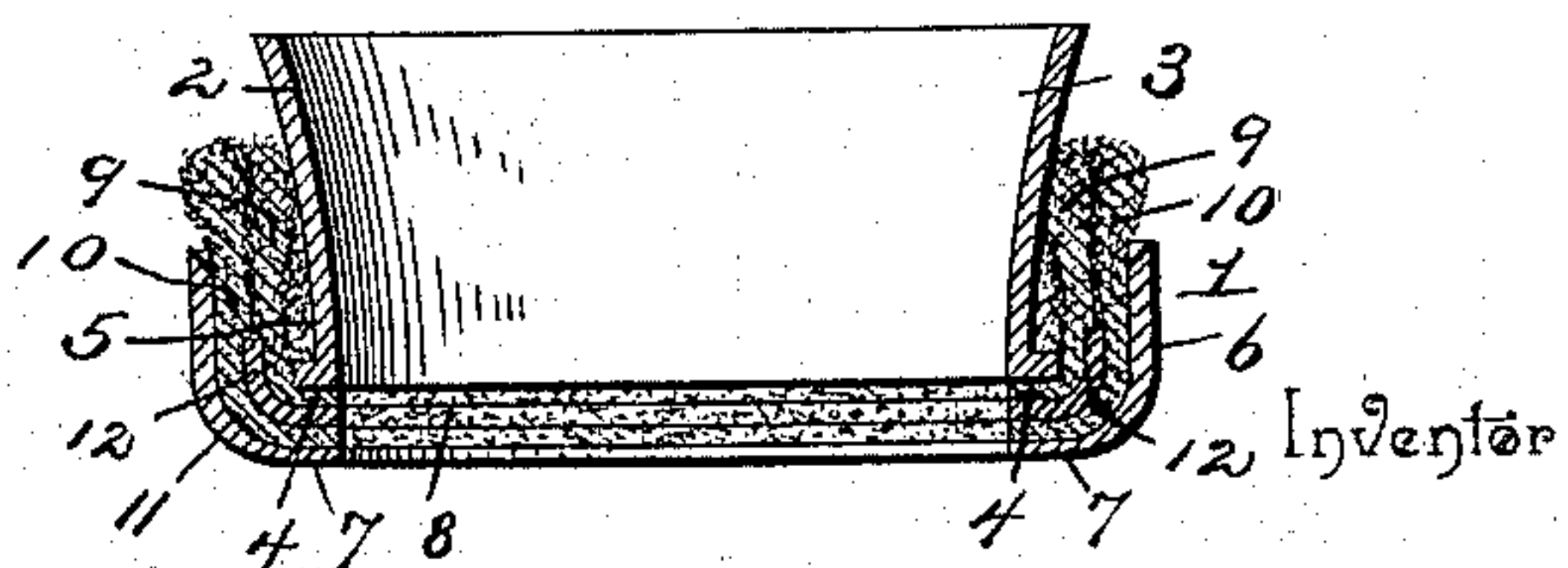
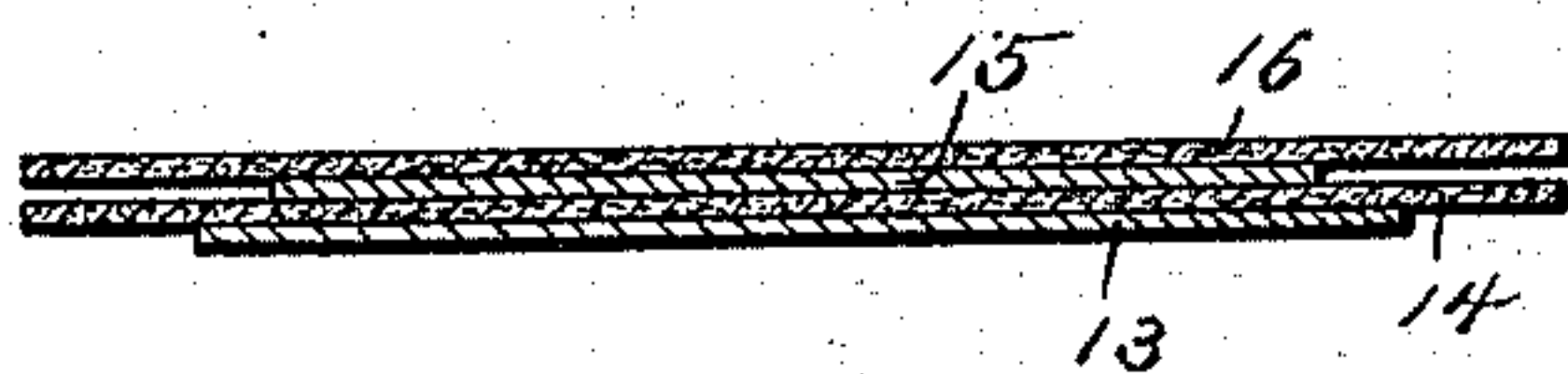


FIG. 4.



Witnesses

Harry L. Amer.
[Signature]

By his Attorneys.

William E. Karns.

[Signature]

UNITED STATES PATENT OFFICE.

WILLIAM E. KARNS, OF PARKER'S LANDING, PENNSYLVANIA.

PACKING-RING FOR PUMP-PISTONS.

SPECIFICATION forming part of Letters Patent No. 562,540, dated June 23, 1896.

Application filed January 19, 1895. Serial No. 535,540. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. KARNS, a citizen of the United States, residing at Parker's Landing, in the county of Armstrong and State of Pennsylvania, have invented a new and useful Packing-Ring for Pump-Pistons, of which the following is a specification.

My invention relates to packing-rings adapted for use in connection with pistons of oil-well pumps, the same being an improvement upon the construction set forth in a former patent granted to me on May 29, 1883, No. 278,557.

I have found by experience that in pumping deep wells the strain upon the lower portions or bottoms of the walls of the packing-rings causes them to wear and break at their outer angles, thus making it desirable to provide means for strengthening the cups which form the rigid portions of the rings at this point; and, furthermore, it is found by experience that the outer cups or shells, which come in contact with the inner surface of a pump-barrel, are not as durable when constructed of metal as when they are made of a material such as dental rubber, and hence it is a further object of my invention to so combine an outer casing of dental rubber with other features that the durability and efficiency of the packing-rings will be increased without adding to the cost of manufacture and maintenance.

Further objects and advantages of the invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claim.

In the drawings, Figure 1 is a side view of an oil-well-pump piston provided with packing-rings constructed in accordance with my invention. Fig. 2 is a detail view, in perspective, of a packing-ring detached. Fig. 3 is a vertical transverse section of the same. Fig. 4 is a detail sectional view of the blanks from which the packing-ring is constructed, the same being arranged in the positions which they occupy prior to the application of the hydraulic dies. Fig. 5 is a detail sectional view to show the relative positions of a packing-ring and a spacing-ring.

Similar numerals of reference indicate cor-

responding parts in all the figures of the drawings.

In Fig. 1 I have shown a piston provided with a series of packing-rings 1, constructed in accordance with my invention, and held at the desired intervals by the interposed spacing rings or spools 2, the latter being substantially of the ordinary construction, with their upper extremities cupped or concaved, as shown at 3, to receive the lower rounded portions or bottoms of the packing-rings, and their lower ends of smaller diameter than their upper rings to fit within the bores of the packing-rings and bear upon the inturned flanges 4 thereof. The intermediate portions of these spacing rings or spools are reduced, as shown at 5, to allow fluid to fill the annular spaces or cavities between such reduced portions or necks and the inner surfaces of the webbing forming flexible members of the packing-rings, whereby the free edges of such flexible members are forced outward into contact with the inner surface of the pump-barrel. (Not shown).

The outer shell or cup 6 of the improved packing-ring is preferably constructed of dental rubber, the same being of annular construction, with its lower edge turned in to form a flange 7, and the diameter of the inner periphery of this flange is equal to the bores of the spacing rings or spools, whereby an unobstructed passage through said parts is provided. Within this exterior shell or cup 6 is arranged the webbing 8, which is preferably constructed of duck, duplicate inner and outer layers 9 and 10 of this webbing being employed in the construction illustrated in the drawings. The upper edges of these layers of flexible material extend above the upper edge of the exterior shell or cup 6 around the reduced portion of the contiguous spacing ring or spool, whereby oil or other fluid which enters the annular space surrounding said reduced portion of the spacing ring or spool tends to force the free edges of the webbing-rings outward.

The portion of a packing-ring, constructed essentially as above described, which receives the major portion of the strain in operation, and which therefore wears or breaks and renders the packing-ring useless, is the

rounded angle between the vertical wall of the shell and the flange 7 thereof, such angle being indicated in the drawings at 11, and as one of the essential objects of this invention is to prevent the breaking of the ring at this point, I employ a strengthening-ring or annular disk 12, preferably of metal, which is interposed between the inner and outer webbing-rings 9 and 10, said strengthening-ring being flush at one edge with the inner edge of the flange 7 and extending around the angle and a portion of the distance between the angle and the upper edge of the exterior shell or cup 6. Thus this strengthening-ring protects the angle and receives the pressure of the lower end of the contiguous spacing ring or spool, and relieves the exterior shell or cup of the greater portion of the strain ordinarily sustained thereby.

In Fig. 4 I have illustrated the blanks from which the improved packing-ring is constructed, said blanks being arranged in the positions which they occupy previous to applying the hydraulic dies by which the stamping of the ring is accomplished, and reference to this figure will show that a disk of dental rubber 13, designed to form the exterior shell or cup, is arranged at the bottom of the series, a disk of webbing 14 is disposed upon the lowermost disk, a disk of metal 15 is arranged upon the disk 14 of webbing, said disk of metal being of smaller diameter than the disk of dental rubber, and upon said metal disk is arranged a second disk 16 of webbing. Simultaneously with compressing these various layers or disks into the cup-shaped form illustrated in Figs. 2 and 3, the intermediate portions thereof are cut out to form the usual opening in the packing-ring to register with the bores of the spacing rings or spools.

The above construction is simple and durable, and embodies the protection of that part of the packing-ring which is subjected to the greatest strain and wear without detracting from the efficiency of the device.

The stiffness of the packing-ring shown in my former patent above mentioned, which is provided with a metallic outer shell or cup, is objectionable, and hence I have adopted dental rubber as the material for this shell or cup, but in order to derive the advantage

due to the flexibility or yielding quality of the rubber I have found it necessary to terminate the inner stiffening or strengthening ring 12 below the plane of the upper edge of the shell or cup. This allows the upper edge of the ring to yield, and at the same time the angle between the body portion and the intumed flange of the shell or cup is strengthened to avoid breakage.

It is observed that various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Among the changes which I may find it desirable to adopt is the substitution of wire-gauze, or a similar material, for the metallic strengthening-disk which I have described as being interposed between the rings of webbing, wire-gauze being more readily molded to the desired form than solid or sheet metal.

Having described my invention, what I claim is—

As a new article of manufacture, a packing-ring for pump-pistons, the same comprising an exterior yielding shell or cup 6 constructed of dental rubber and having at its lower edge an intumed flange 7, a ring of webbing 10 arranged within said shell or cup and projecting above the upper edge thereof, a second ring of webbing 9 arranged within the first-named ring 10 and also extending above the upper edge of the exterior shell or cup, and a strengthening-ring of metal interposed between the said webbing-rings, terminating at its upper edge below the plane of the upper edge of the shell or cup to allow the upper edge of the shell or cup to yield and flanged at its lower edge to lie parallel with the flange of said shell or cup, whereby the strengthening-ring lies within and parallel with the angle formed between the body portion of the shell and its intumed flange, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

WILLIAM E. KARNES.

Witnesses:

J. H. SIGGERS,
E. G. SIGGERS.