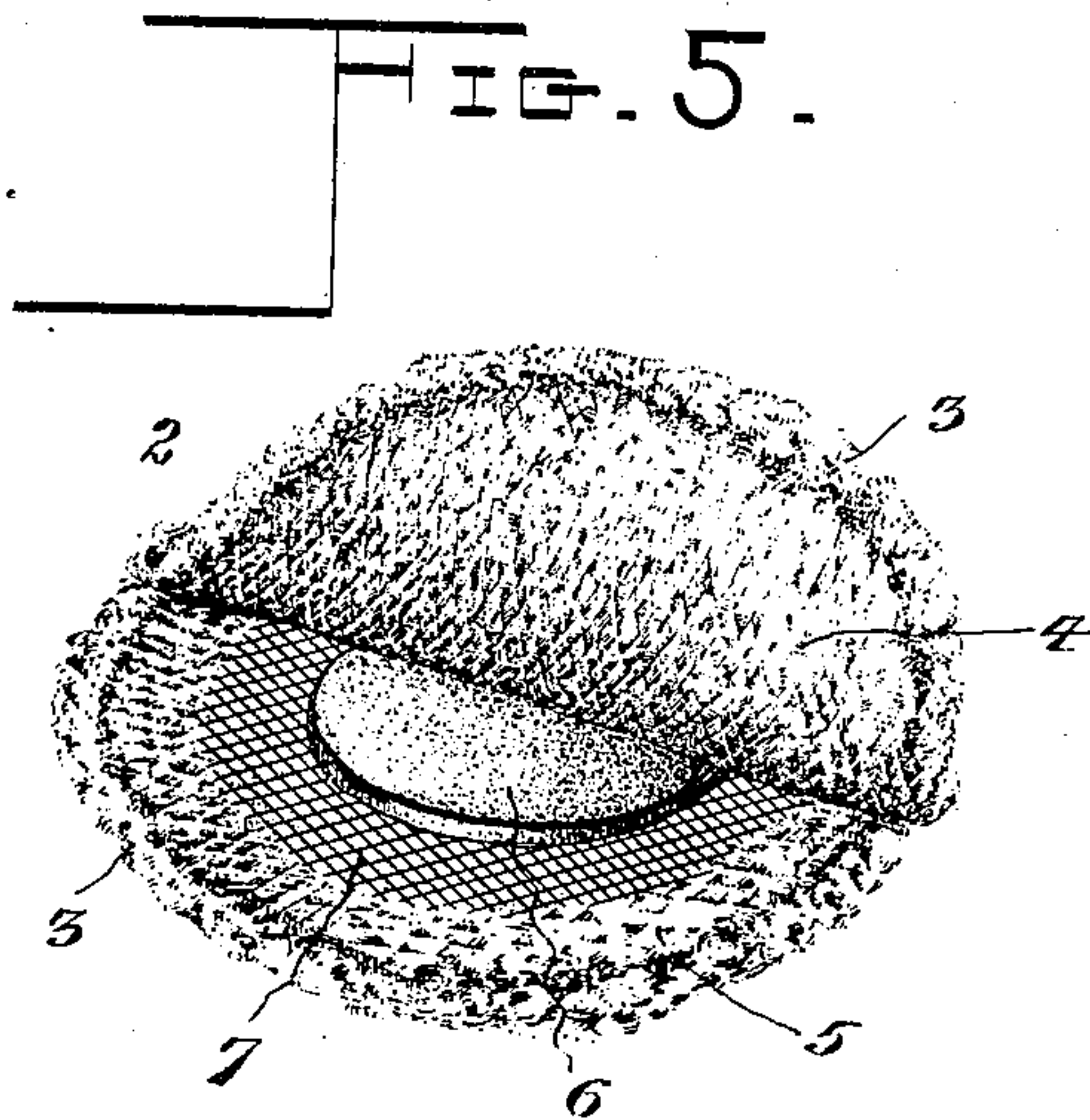
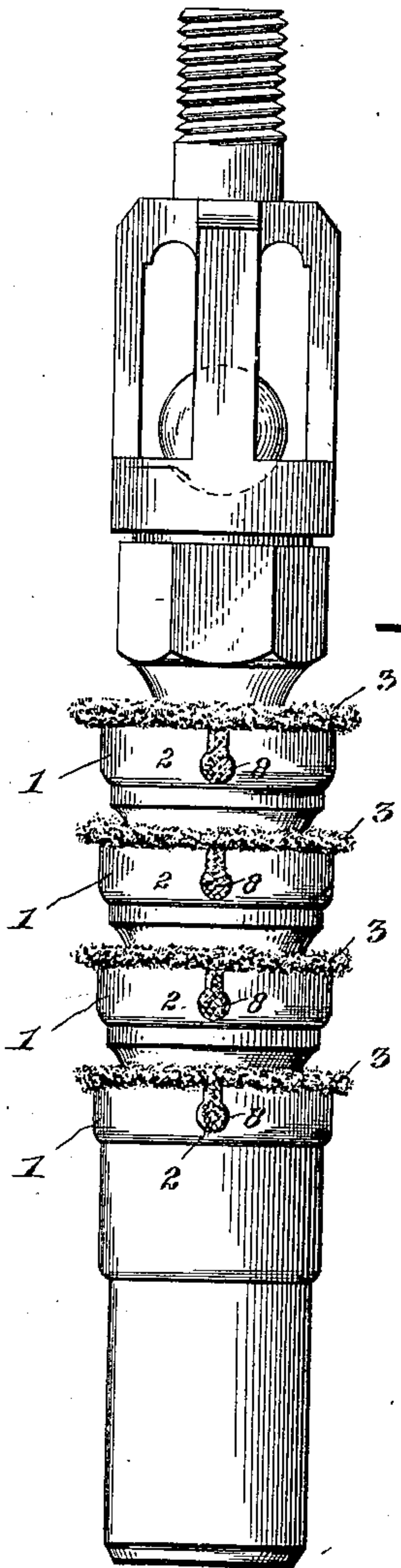
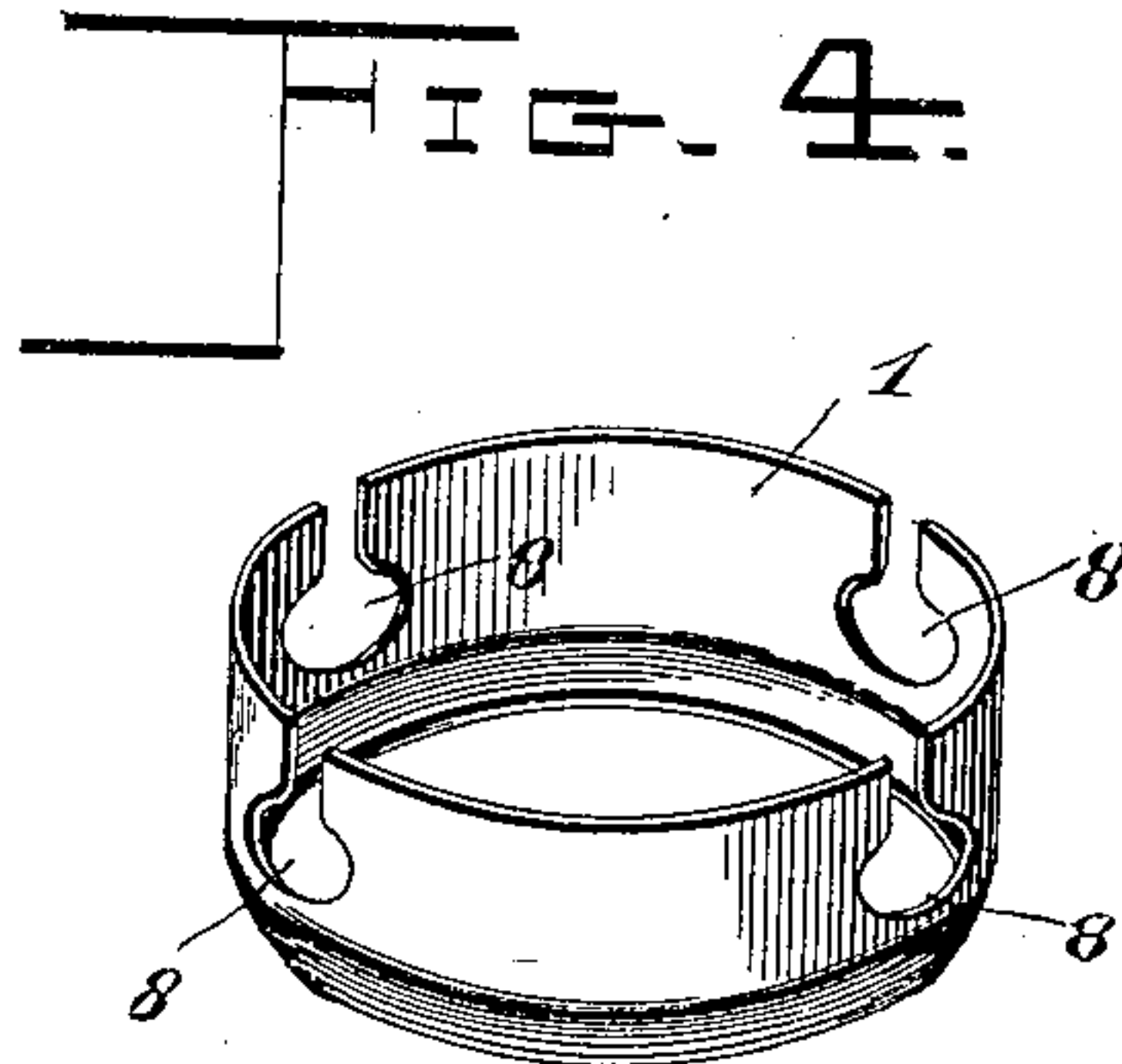
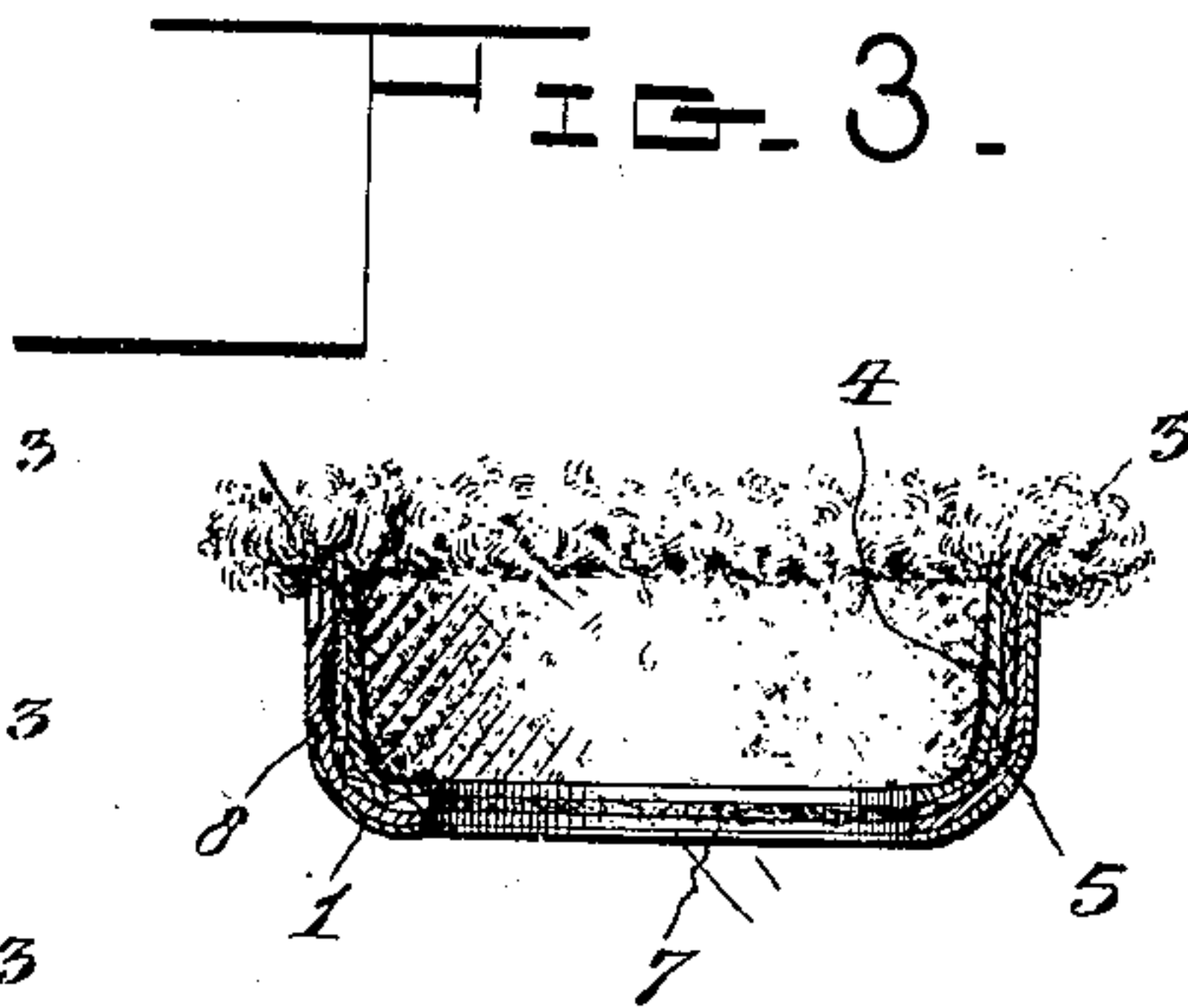
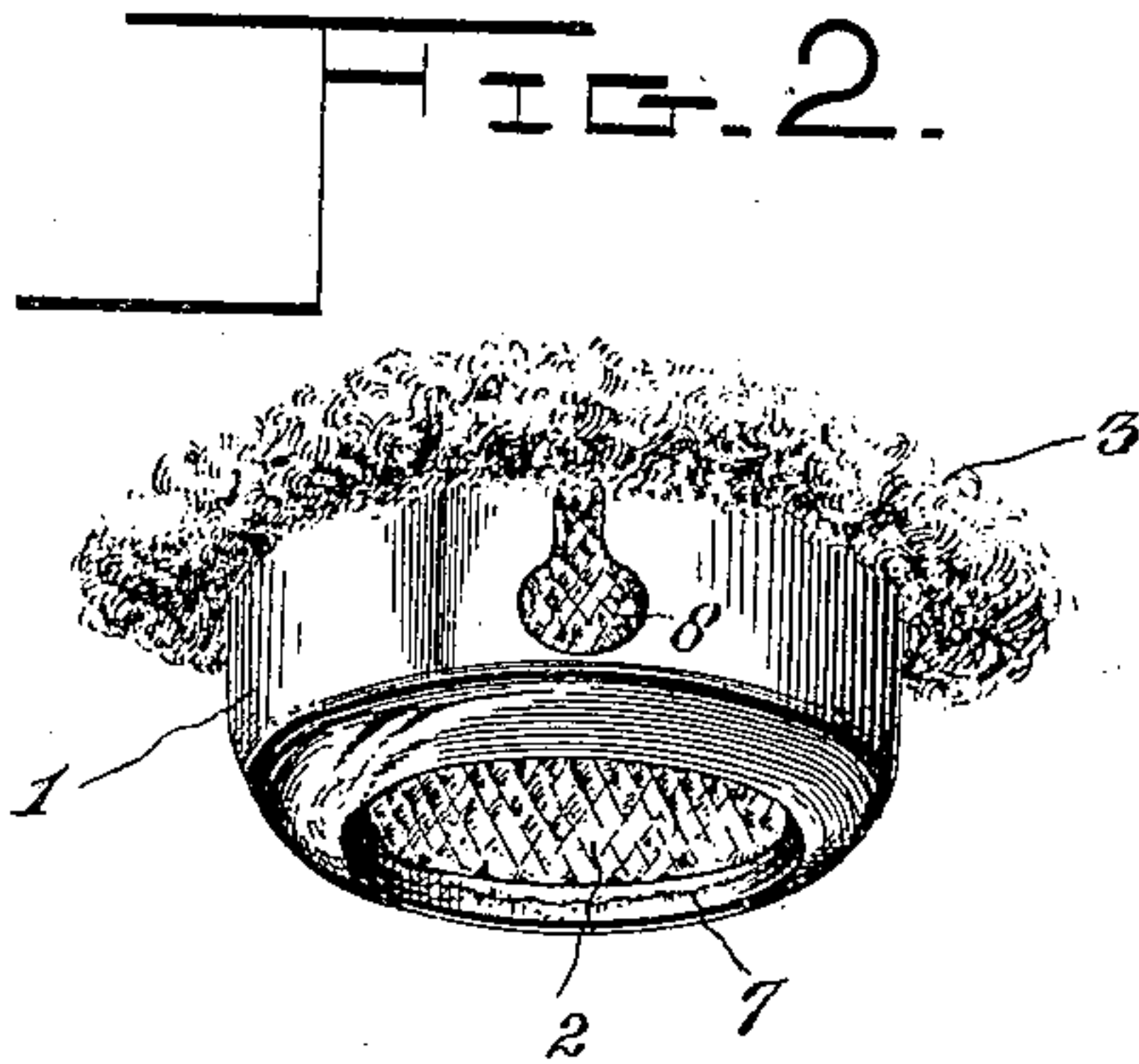
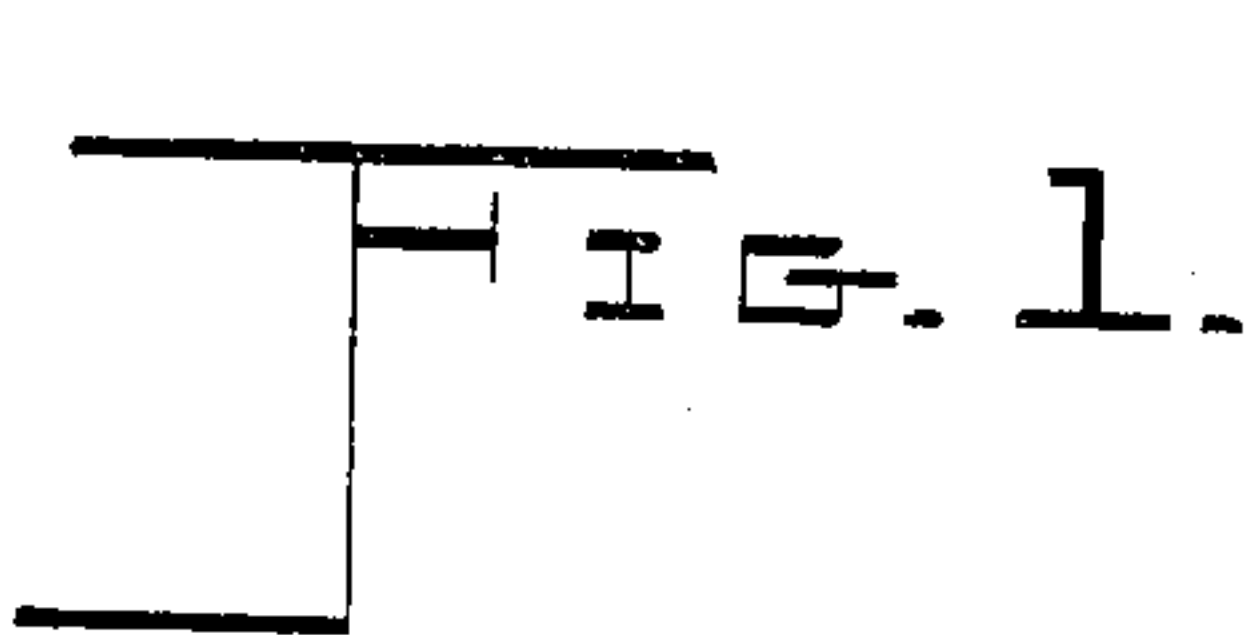


No. 629,693.

Patented July 25, 1899.

W. E. KARNS.  
PISTON PACKING RING.  
(Application filed Sept. 23, 1898.)

(No Model.)



Witnesses

John F. Deffenhard  
[Signature]

By His Attorneys.

William E. Karns Inventor

Chas. H. Snow & Co.



# UNITED STATES PATENT OFFICE.

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

## PISTON PACKING-RING.

SPECIFICATION forming part of Letters Patent No. 629,693, dated July 25, 1899.

Application filed September 23, 1898. Serial No. 691,725. (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 Piston Packing-Ring, of which the following is a specification.

My invention relates to oil-well pumping apparatus, and particularly to a packing-ring for the pump piston or plunger; and the object in view is to provide an improved expansible packing-ring having a metallic shell or bearing-surface for contact with the inner surface of the working barrel or cylinder, said ring being provided with an absorbent selvage for contact with the surface of the barrel.

A further object of my invention is to provide simple and efficient means for securing an interlocking connection between the metallic sheath or shell and the lining, and, furthermore, to provide an improved construction of lining of which the center is adapted to be stamped out to receive the body portion of the pump piston or plunger.

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

In the drawings, Figure 1 is a side view of a pump piston or plunger provided with a plurality of packing-rings constructed in accordance with my invention. Fig. 2 is a detail view in perspective of the packing-ring detached. Fig. 3 is a central sectional view of the same. Fig. 4 is a detail view of the sheath or shell of the packing-ring detached. Fig. 5 is a detail view of the parts of the lining prior to the compression thereof into the cup-shaped shell.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

In the construction of the packing-ring forming the subject-matter of my present invention I have had in view not only the provision of an efficient ring adapted to expand sufficiently to form a complete packing without unnecessary friction upon the surface of the pump-barrel, but also the cost of manufacture of the article, it being obvious that a device of this class must be adapted for manu-

facture at a reasonable cost, whereby the replacing of the article when worn may not involve a heavy expense to the purchaser.

I am aware of the fact that expansible metallic packing-cups are not broadly new and also that packing-rings have been constructed heretofore with vulcanized body portions having a projecting selvage for contact with the inner surface of a pump-barrel; but I am not aware that packing-rings as heretofore constructed have embodied both of these features—namely, an exterior expansible metallic shell and an inclosed vulcanized lining, including webbing which projects at its edges to form a selvage.

In the drawings I have illustrated one embodiment of my invention, wherein 1 designates a cup-shaped shell having in its bottom a central opening for the reception of the body portion of the pump piston or plunger, and 2 represents a vulcanized lining which is forcibly compressed into the cup-shaped shell and includes one or more layers of webbing, of which the edges project to form a loose selvage 3. This vulcanized lining as preferably constructed, however, consists of twin outer and inner layers 4 and 5 of webbing, between which is arranged the rubber 6, (see Fig. 5,) together with a layer or sheet 7 of wire-gauze, constituting a strengthening-web.

In the process of constructing the packing-ring embodying my invention two disks of the webbing are employed, as indicated in Fig. 5, a suitable quantity of the rubber and a small disk of the strengthening-gauze being interposed between said disks of fabric, and this combination of elements is compressed forcibly into the cup formed by the shell and the whole is vulcanized to insure the maintenance by the parts of the shape which they receive under compression. Subsequently the central opening in the ring is stamped out by means of a suitable die, and I have found that by the use of the strengthening-layer of wire-gauze or analogous material I am enabled to stamp out this opening from the inside of the cup, whereas without this gauze it has been necessary by reason of the yielding quality of the lining to stamp out the said opening from the outer side, the latter process being objectionable for the reason



that it causes the inward rolling or beading of the metal adjacent to the opening. By stamping the opening from the inside the web is first cut and the metallic shell subsequently, and the strengthening-web of wire-gauze maintains the edge of the lining contiguous to the opening in a proper firm condition. In order to secure the necessary expansion of the shell, it being obvious that the lining is also expandible by reason of its construction of webbing and vulcanized rubber, I preferably provide said shell with slits or cut-away portions extending downwardly from the upper edge of the cup, but terminating short of the opening in the lower side or bottom of the cup. In practice I preferably cut away a portion of the metal at each slit to form an opening 8, and the form of opening which I prefer to construct is enlarged toward its lower end or reduced toward the upper edge of the cup. My object in thus constructing a dovetailed or upwardly-tapered opening of which the sides are separated to a considerable extent is to provide for the outward forcing of the lining into said openings, whereby an interlocking connection is provided between the lining and the shell. Inasmuch as these openings as preferably constructed are reduced toward their upper ends and inasmuch as the only proper displacement of the shell from the lining is upward, it will be seen that the projecting portions of the lining arranged in said openings constitute keys which securely lock the lining in place and maintain the elements of the packing-ring in their proper relative positions during shipment and until the ring is applied properly to the pump piston or plunger. Thus it will be seen that I have provided a flexible vulcanized lining embodying one or more layers of webbing, together with the necessary quantity of rubber, and a strengthening-web, together with an exterior expandible shell, inclosing the lining and forming a wearing-surface for contact with the barrel of the pump, said lining and shell having an interlocking connection or being provided with complementary interlocking elements, of which the lining carries a projection to fit in a recess or opening in the shell, and in the course of construction of the packing-ring embodying my invention this interlocking connection is accomplished without special manipulation. In other words, the compression of the lining into the cup formed by the shell forces the contiguous portions of the lining into the upwardly-reduced or dovetailed openings in the shell and brings the exterior surface of the lining within the openings to a position flush with the exterior surface of the shell, whereby when completed the exterior surface of the ring is smooth and unobstructed and presents a uniform wearing-surface for contact with that of the pump barrel or cylinder. The termination of the metallic stiffening-web below the plane of the

upper edge of the side wall of the exterior shell allows the upper edge of the latter to expand when affected by the pressure of the liquid in the pump-barrel, and at the same time said stiffening-web serves to strengthen the cup at the junction of its side wall and bottom or the intumed flange forming the portion of the bottom around the central opening, said stiffening-web being interposed between the members of the multiple-layer vulcanized lining.

It will be understood that in practice 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.

Having described my invention, what I claim is—

1. A piston packing-ring having a metallic shell, and an inclosed flexible lining having an interlocking connection with said shell, substantially as specified.

2. A piston packing-ring having an exterior expansion-shell and an inclosed vulcanized lining, one of which elements is provided with openings and the other with projections fitting in said openings, substantially as specified.

3. A piston packing-ring having an exterior expansion-shell and an inclosed vulcanized lining, one of which elements is provided with dovetailed openings and the other with projections fitting in said openings, substantially as specified.

4. A piston packing-ring having an expansion metallic cup-shaped shell split inwardly from its free edge and cut away to form openings having separated side edges, and an inclosed vulcanized lining arranged within said shell and projecting into said openings to form an interlocking connection between the lining and the shell, substantially as specified.

5. A piston packing-ring having a cup-shaped metallic shell split inwardly from its free edge to provide for lateral expansion, and being cut away to form openings enlarged toward their inner ends, and an inclosed vulcanized lining projecting outwardly into said openings to form an interlocking connection between the lining and the shell, substantially as specified.

6. A piston packing-ring having an exterior expandible metallic shell, of cup shape, the wall of the shell being provided with inwardly-enlarged openings extending from the edge of said wall, and a lining fitted in said shell, and projecting outwardly through said openings to the exterior surface of the shell, 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. KARNS.

Witnesses:

JOHN H. SIGGERS,  
HAROLD H. SIMMS.