

No. 886,790.

PATENTED MAY 5, 1908.

G. B. FRANK.  
EAR STOPPLE.

APPLICATION FILED JULY 3, 1907.

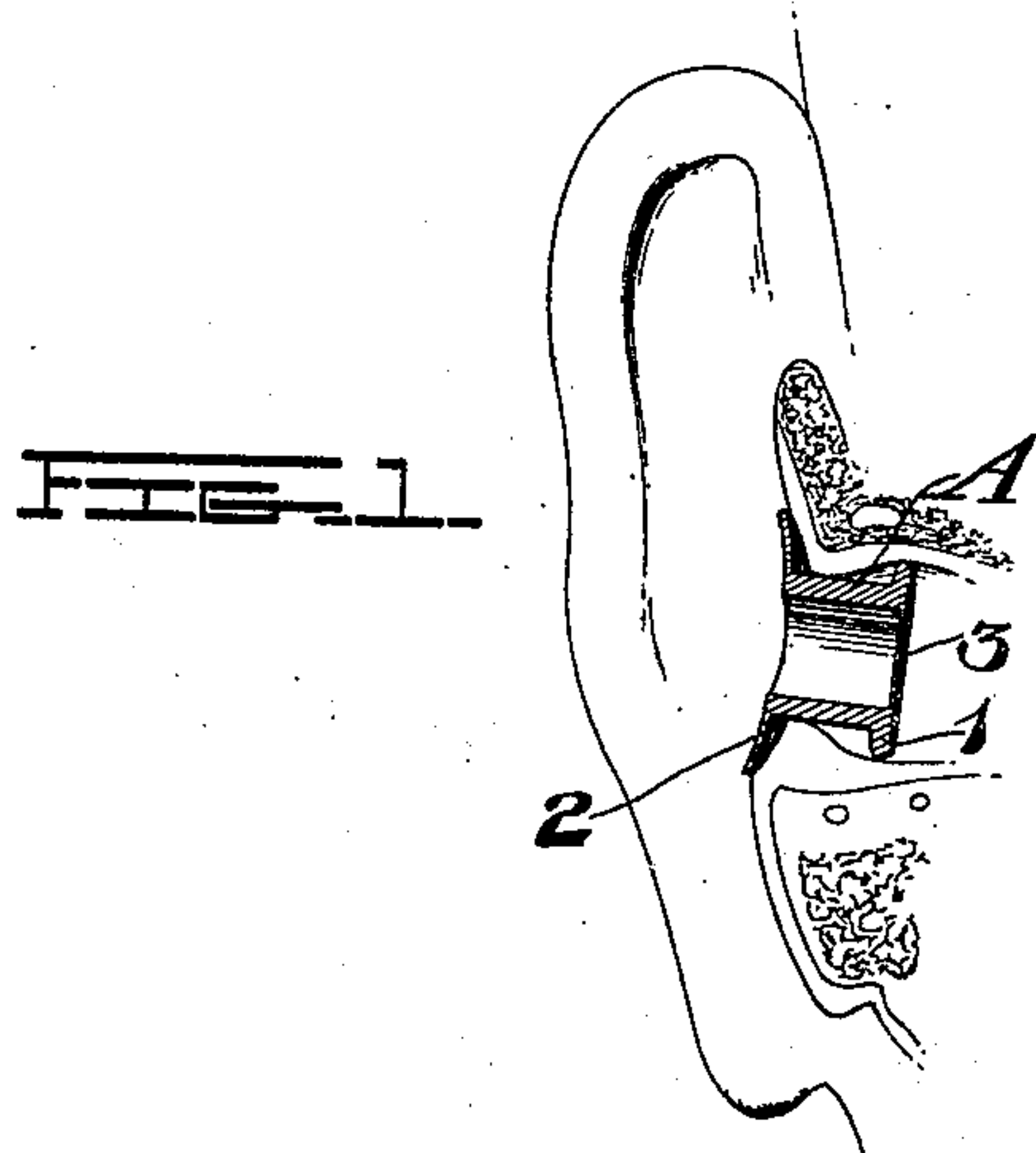


FIG. 2.

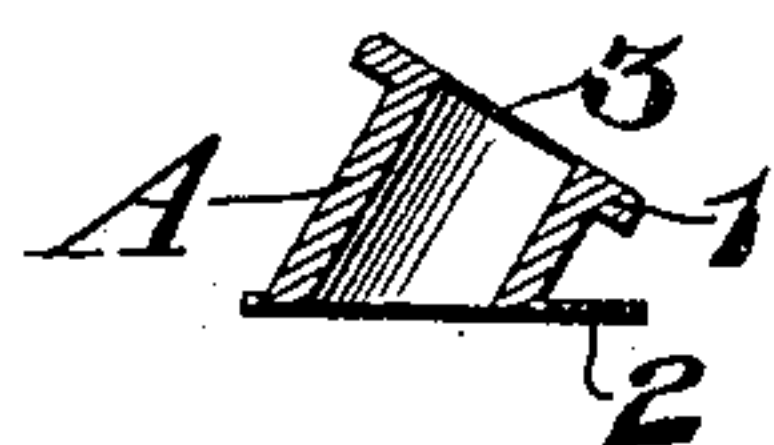
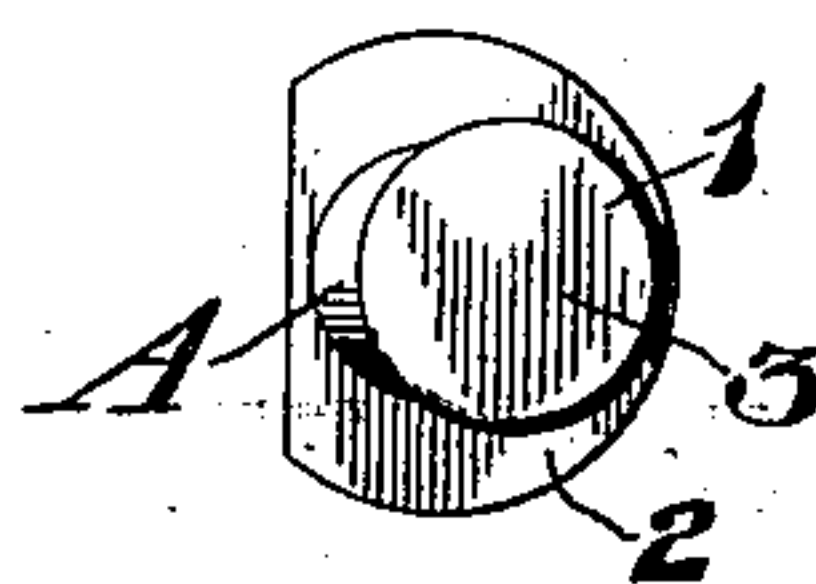


FIG. 3.



Witnesses

Lloyd W. Patch  
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# UNITED STATES PATENT OFFICE.

GEORGE B. FRANK, OF TOLEDO, OHIO.

## EAR-STOPPLE.

No. 886,790.

Specification of Letters Patent.

Patented May 5, 1908.

Application filed July 3, 1907. Serial No. 382,097.

*To all whom it may concern:*

Be it known that I, GEORGE B. FRANK, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Ear-Stopples, of which the following is a specification.

My invention relates to an improvement in ear stopples, and the object is to exclude water and particularly fine particles carried in suspension by water, and salt water more than fresh water, for the reason that it contains particles liable to adhere to the wax in the ear, and cause irritation, inflammation, abscesses or other disturbances of the ear or the eustachian tube.

With the foregoing objects in view, my present invention comprises a rubber stopple having a hollow cylindrical central portion, the inner end of which is closed by a very thin diaphragm of rubber, and the outer of which is provided with a thin, flexible semi-circular rim disposed preferably at an angle to the diaphragm and adapted to rest on the surface of the outer ear adjacent to the auditory canal.

My invention still further consists in certain novel features of construction, and combinations of parts which will be hereinafter described and pointed out in the claims.

In the accompanying drawings:—Figure 1 is a view showing the stopple inserted in the ear, the stopple itself being shown in section. Figs. 2 and 3 are different views of the stopple.

In a former patent granted to me, namely No. 797,509, dated August 15, 1905, two forms of stopples were shown, one in which the cylinder was solid, and another in which it was hollow but closed at both ends. My present invention is an improvement on that form of stopple, and the improvement consists mainly in the fact that while the central portion is hollow, it is open at the outer end and closed at the inner end, by a very thin, flexible diaphragm or oscillating center which readily responds to both sound and light waves.

A, represents the hollow cylindrical central portion, the inner end of which is enlarged somewhat as at 1, to engage the enlarged portion of the auditory canal whereby to hold the stopple in place, while at the outer end there is a thin, flat, flexible, semi-

circular rim 2, which engages the outer ear just adjacent to the auditory canal. The inner end of the hollow cylindrical central portion is covered with a very thin diaphragm 3 of rubber, or similar material. This is so thin that it readily vibrates and oscillates so that external sound waves may be transmitted to the tympanum through this diaphragm or oscillating center. By being thin and transparent, it permits both light and sound waves to enter the auditory canal, so that while it prevents the entrance of water, it does not materially impair the hearing.

The device is light and thin, and is easily and quickly applied, and its presence is scarcely noticeable in the wearer's ear. At the same time it affords an effectual means of protecting the interior of the ear, against entrance of anything objectionable from the outside.

It might be mentioned that these stopples are especially advantageous for marine divers or workmen wherever compressed air is used, and the fact might be mentioned that this present invention has the decided advantage over my former invention in that bathers in the surf will not wear ear stopples which will not permit of conversation being heard in the ordinary tone.

It is evident that slight changes might be made in the form and arrangement of the several parts described without departing from the spirit and scope of my invention, and hence I do not wish to limit myself to the exact construction herein set forth, but:

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. As an article of manufacture, an ear stopple comprising a hollow central portion open at the outer end and having a thin diaphragm over its inner end.

2. As an article of manufacture, an ear stopple comprising a hollow central portion open at the outer end, and enlarged and closed at the inner end by means of a thin, oscillating diaphragm.

3. As an article of manufacture, an ear stopple having a hollow compressible central portion open at the outer end and provided with a thin, flexible rim at the outer end, and having a thin, flexible diaphragm over its inner end.

4. As an article of manufacture, an ear  
stopple having a hollow compressible central  
portion open at the outer end and provided  
with a thin, flexible rim at the outer end, and  
5 having a thin, flexible diaphragm over its in-  
ner end, said rim and diaphragm disposed at  
an angle to each other.

In testimony whereof I have signed my  
name to this specification in the presence of  
two subscribing witnesses.

GEORGE B. FRANK.

Witnesses:

GEO. A. BASSETT,  
ROY H. S. SPENCER.