No. 896,850. PATENTED AUG. 25, 1908.

S. MUNDEY.

PUNCTURE CLOSING DEVICE.

APPLICATION FILED SEPT. 30, 1907.

Fig. 1.

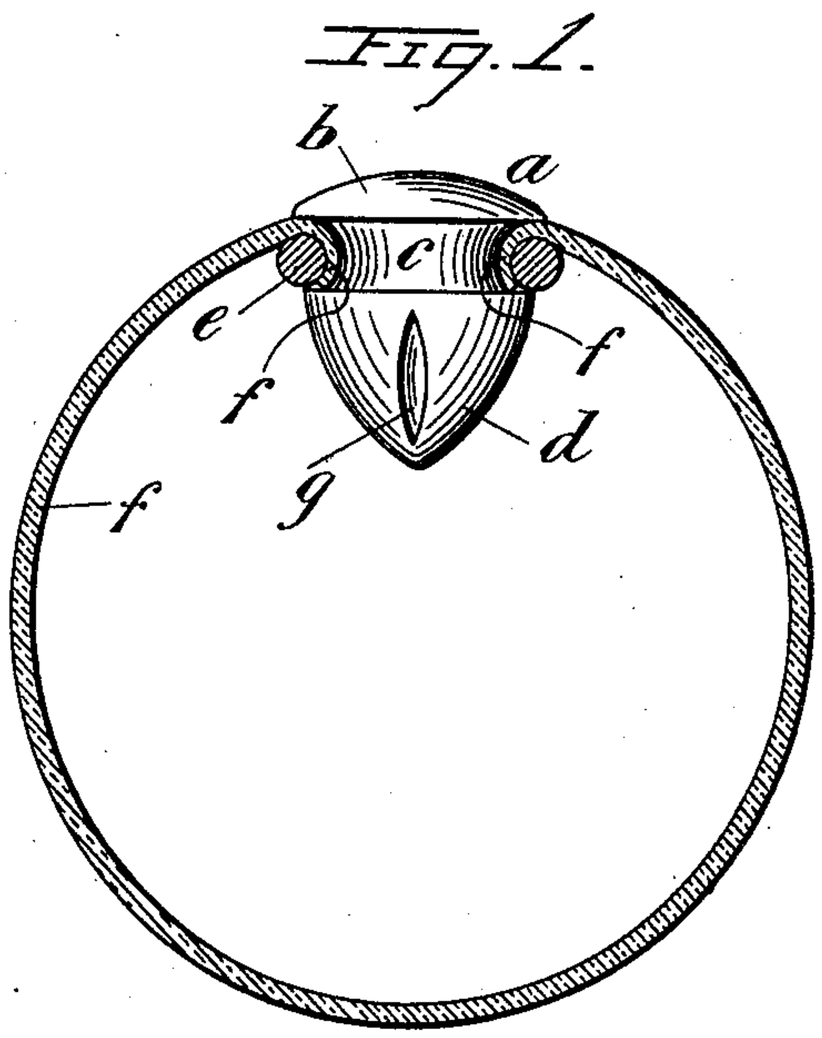


Fig. 2.

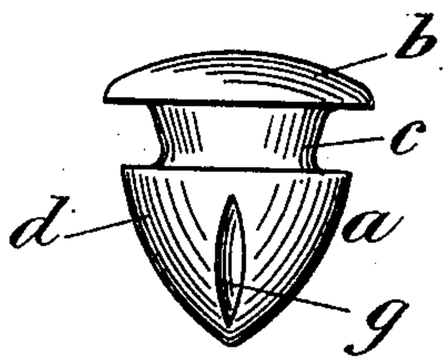


Fig. 3.

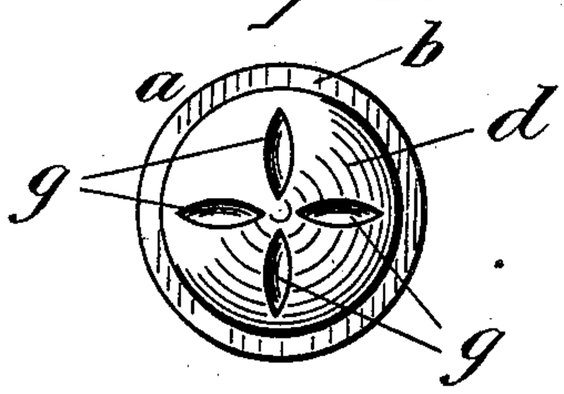


Fig. 4.

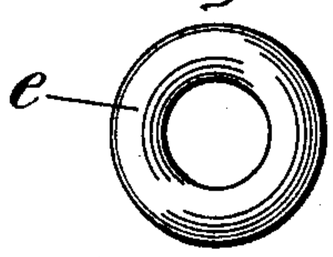


Fig. 5.

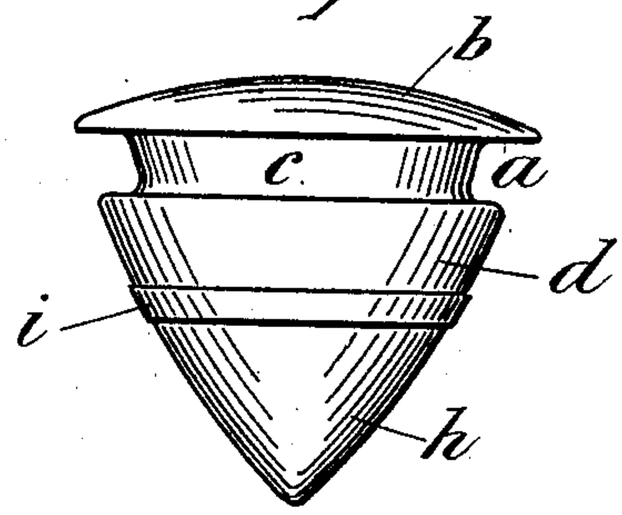


Fig. 6.

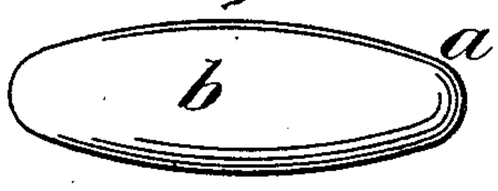
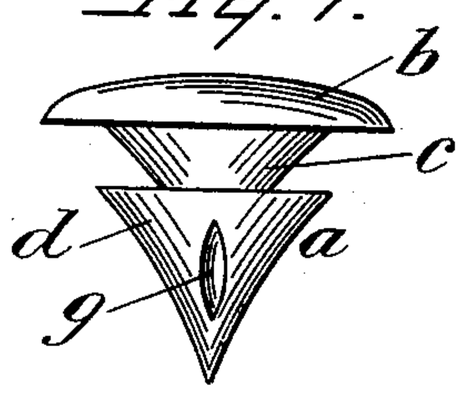


Fig. 7.



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UNITED STATES PATENT OFFICE.

STANLEY MUNDEY, OF LONDON, ENGLAND.

PUNCTURE-CLOSING DEVICE.

No. 896,850. Specification of Letters Patent. Patented Aug. 25, 1908.

Application filed September 30, 1907. Serial No. 395,273.

To all whom it may concern:

Be it known that I, STANLEY MUNDEY, a subject of the King of England, residing at London, W., England, have invented a certain new and useful Puncture-Closing Device, of which the following is a specification.

This invention relates to improvements in means for closing apertures or punctures in flexible air chambers, particularly adapted for use in repairing punctures in the rubber air tubes of pneumatic tires.

The invention essentially consists of a plug or stopper inserted in the puncture or aperture so formed as to entirely close said puncture and a co-acting ring or cap located within the air chamber and adapted to retain the plug in place so that same is prevented from removal by the pressure of air within the chamber.

To these ends a suitable embodiment of the invention is as follows: I use a plug or stopper of cork, rubber, or other compressible or suitable material, this plug being somewhat larger at one lower end than the other and split or otherwise formed at said lower end to give same an elastic or spring action.

The ring or cap referred to may consist of similar material to the plug and if necessary be bound outwardly by such material as to give it sufficient resistance and strength and be of such size that the plug may fit tightly thereinto and be held therein by the elastic or spring action of the plug end.

The accompanying drawing shows some forms of the improved device, Figure 1 being a sectional elevation showing the application of a plug and ring to close a puncture in the air tube of a pneumatic tire. Fig. 2 is an elevation of the plug alone. Fig. 3 is a plan view thereof from below and Fig. 4 is a plan view of the ring used in conjunction with the cap. Figs. 5 and 6 are respectively an elevation and plan view of a form of plug used for closing elongated holes or punctures and also used in conjunction with a ring as in the form shown in Figs. 1 to 4 and Fig. 7 shows a plug of modified form.

Referring to the form shown in Figs. 1 to 4 the device comprises the plug *a* which is preferably formed of soft rubber of superior quality and is provided with a shallow curved head *b*, a reduced neck or shank portion *c* and an enlarged conical lower end *d*. Co-acting with said neck or shank portion is an elastic ring *e* which may be formed of the same material as the plug and is preferably of the relative size shown in Fig. 4 in comparison with Fig. 2 to enable same to strongly grip the material of the air chamber *f* at the edge of the puncture or aperture as shown in Fig. 1. It is of advantage to provide the lower end *d* of the plug with slots or recesses *g* for facilitating the forcing of the ring *e* over the conical end *d* to the neck or shank *c*. The cross-section of the plug in plan is preferably circular as shown but it may also be polygonal or of other form if desired.

In the form shown in Figs. 5 and 6 the cross-section in plan is elliptical, but it may also be rectangular or of similar form if desired, and is used for the purpose of plugging elongated apertures or punctures in the air chamber. In this form the conical portion of the plug may be made in two pieces the lower portion *h* being easily detachable from the main portion for example by being sprung into a sheet metal or other ring *i* secured to the part *d*. This is for the purpose of easily removing said portion *h* after insertion of the plug since in plugs of comparatively long length the apex of the cone extends for an undesirable distance into the air chamber and might even extend to the opposite side thereof in chambers of narrow diameter if the portion *h* were not made detachable as described.

The length of the neck is immaterial and in some cases the head *b* may be much closer to the point *d* than shown. As shown in Fig. 7 also the sides of the neck *c* may flare prominently in an upward direction to increase the grip of the material between the neck and ring. If found desirable a thin band or coating of gelatin or the like may be applied between the head of the plug and the chamber material and moistened before use to render the joint still more airtight.

When repairing a puncture the aperture is cut by a suitable implement to a symmetrical circle or other figure and a plug of suitable size is chosen. The ring is then passed into the interior of the tube and held while the lower end of the plug is passed through the aperture up to its head. The ring is then brought opposite the apex of the conical part of the plug and worked or forced over same until it reaches the neck or shank and firmly grips the edge of the material at the edge of the puncture between itself and the shank as shown in Fig. 1. The ring is held securely on the plug by its elasticity and the aperture completely closed, the head or upper end of

said plug being practically flush with or only slightly raised above the surface of the tube as shown.

In order to prevent undue friction between the head of the plug and the outer cover of the tire I may apply a patch of rubber or like material and cement same over the plug in the manner usually employed in repairing punctures in tires. The plugs, rings, disks, or caps may be used for the repairing or closure of apertures in any other air chambers for which they may be adapted.

I do not claim broadly the use of two interconnectible disks or plugs adapted to be placed one inside a tube and the other outside to grip between them the material around a puncture to air-tightly close the latter, but

What I claim as my invention and desire to secure by Letters Patent of the United States is:—

1. A puncture closing device for air chambers comprising in combination a flexible plug having a reduced neck portion and an extensible ring adapted to surround said neck portion to grip air chamber material between itself and said neck.

2. A puncture closing device for air chambers comprising in combination a plug of flexible material having a head portion, a reduced neck or shank and a conical end portion, and an elastic ring adapted to be forced over said end portion and surround said neck portion to grip air-chamber material between itself and said neck.

3. A puncture closing device for air chambers comprising in combination a plug of flexible material having a head portion, a reduced neck or shank and a conical end portion formed of a plurality of readily detachable parts and an elastic ring adapted to be forced over said end portion and surround said neck portion to grip air-chamber material between itself and said neck.

4. A puncture closing device for air chambers comprising in combination a plug of flexible material having a flattened convex head a conical end having recesses in its surface, and a reduced neck or shank intermediate said head and end, and an elastic ring adapted to be extended and passed over said end and to contract around the shank to grip air-chamber material between itself and said shank substantially as described.

In witness whereof I have signed this specification in the presence of two witnesses.

STANLEY MUNDEY.

Witnesses:

H. I. HADDAN,

A. E. MELHINSH.