Dec. 5, 1933. P L. O'BRIEN 1,938,437

COLLAPSIBLE PRESSURE RING

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Fig. 1

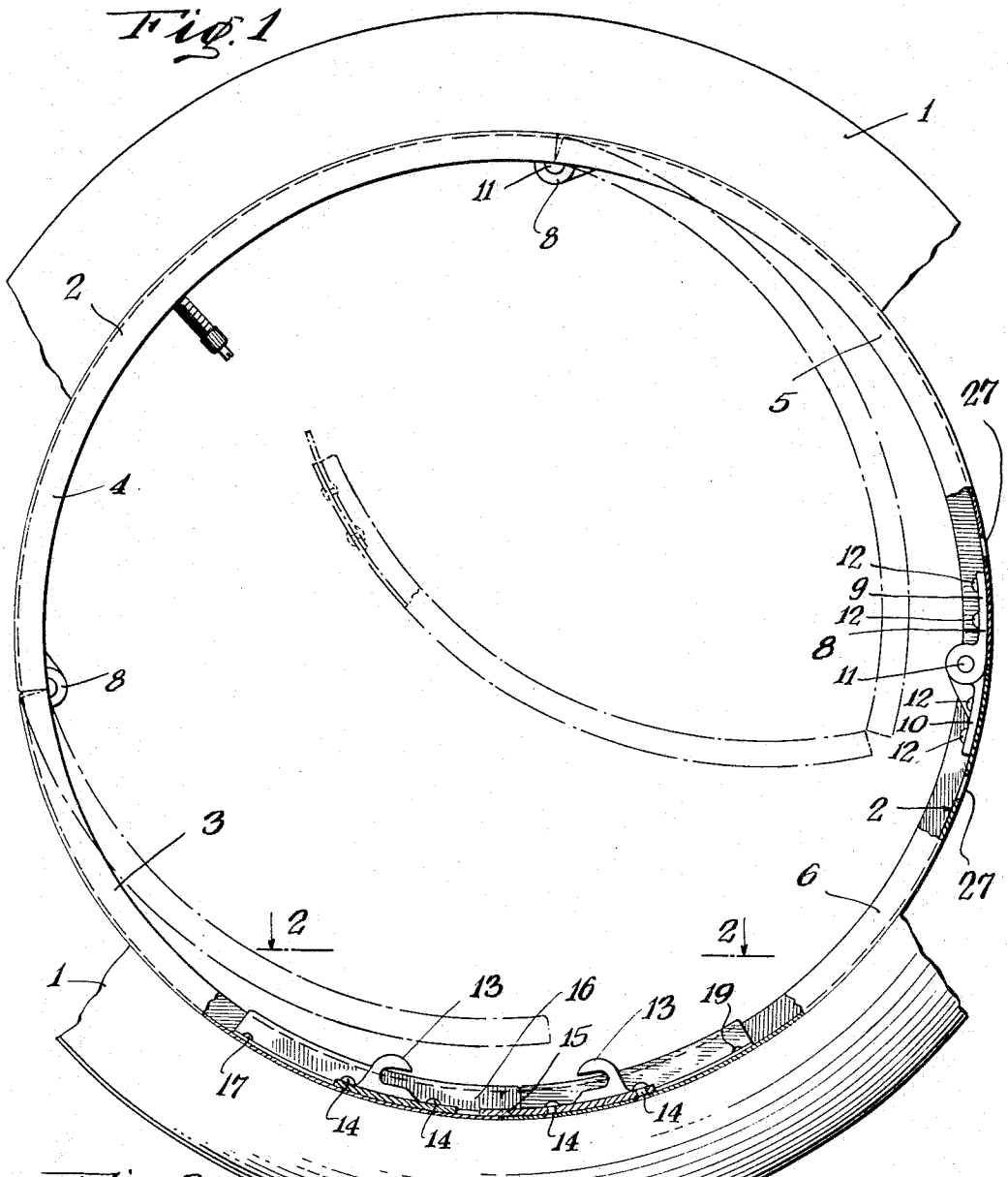
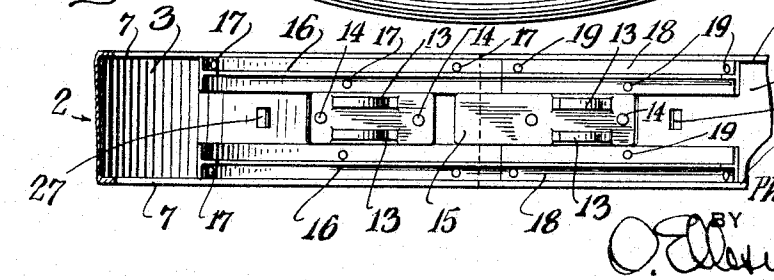


Fig. 2



INVENTOR
Philip L. O'Brien
BY
O. Merry Edwards
ATTORNEY

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Fig. 3

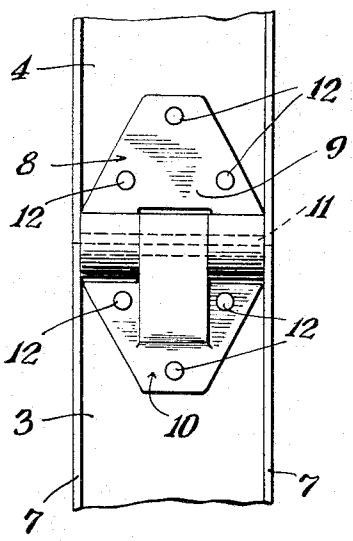


Fig. 4

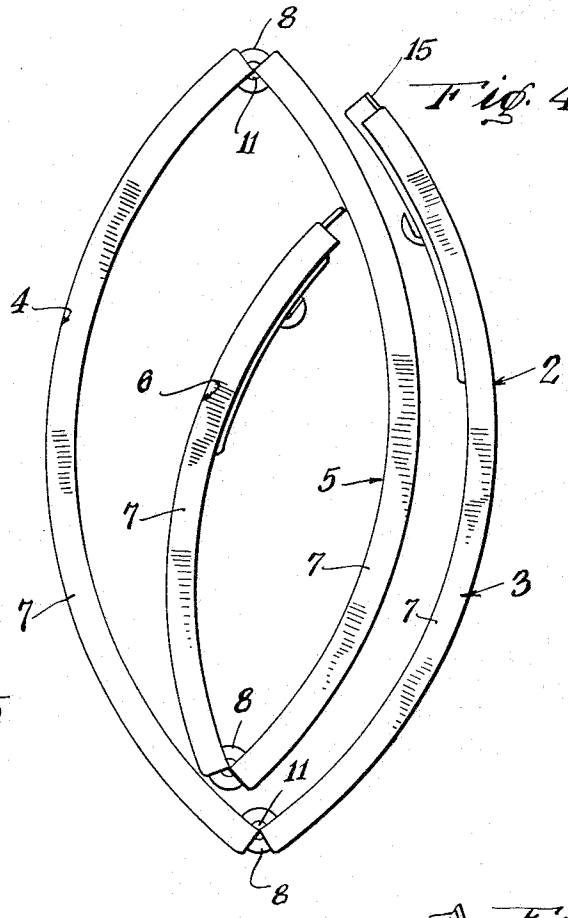


Fig. 5

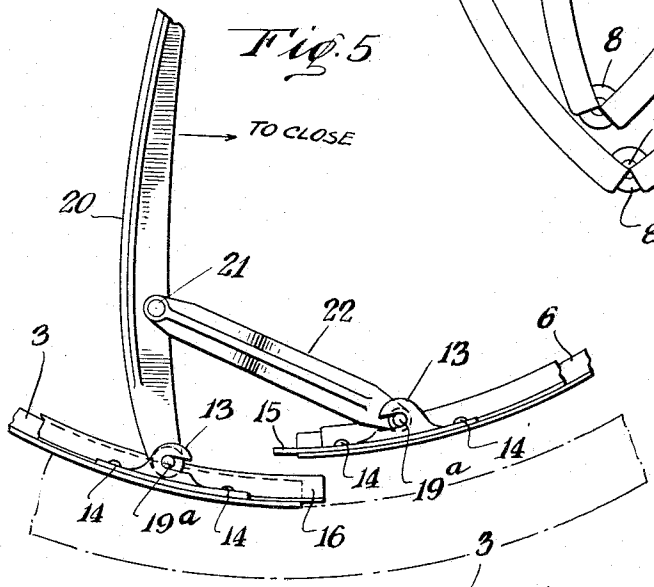


Fig. 6

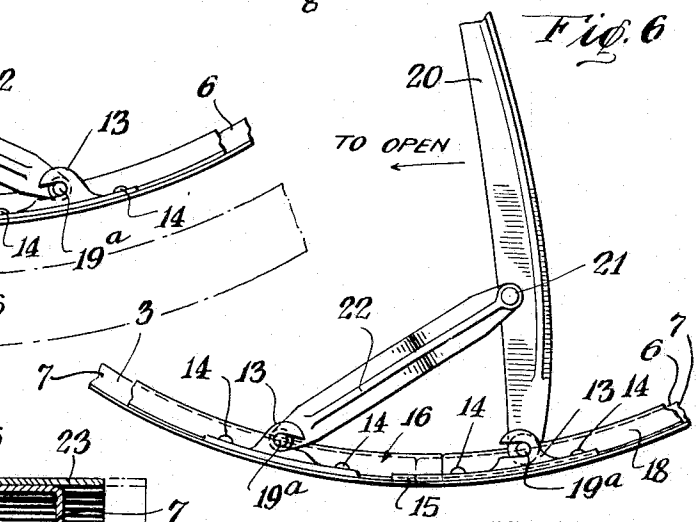
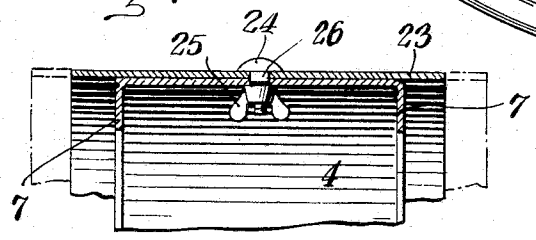


Fig. 7



INVENTOR

Philip L. O'Brien

BY

O. Allen Edwards

ATTORNEY

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UNITED STATES PATENT OFFICE

1,938,437

COLLAPSIBLE PRESSURE RING

Philip L. O'Brien, Chelmsford, Mass.

Application February 5, 1930. Serial No. 425,931

4 Claims. (Cl. 18—18)

The object of my invention is to provide a suitable collapsible ring which is circular on its periphery and adapted to receive a D shaped air bag of the conventional kind which forces a tire, which is being retreaded, against the corresponding part of the mould known as a matrix. Heretofore such rings have given great trouble because either they have collapsed when in use or they have been exceedingly difficult to insert or remove. The object of my invention is to provide a ring of this character which is both easy to insert and easy to remove, and a further object is to make the ring so that it will be strong enough to withstand all the stresses without injury. Yet another object is to provide such a ring which can be provided with attachments which permit it to be used with any of several sizes of tires. These and other objects are accomplished by my invention, one embodiment of which is hereinafter more particularly set forth.

For a more detailed description of my invention, reference is to be had to the accompanying drawings, forming a part hereof, in which

Figure 1 shows my improved ring with a portion of an air bag resting thereon, it being understood that when in use, such a bag extends entirely around the circumference;

Figure 2 is a sectional view taken on the line 2—2 of Figure 1, looking in the direction of the arrow;

Figure 3 shows a hinge;

Figure 4 shows the ring in its folded condition;

Figure 5 shows a tool operating to close the ring so as to lock the same in the bag;

Figure 6 is a corresponding view with the tool reversed showing the position it occupies just prior to being used for opening the joint between two parts of the ring whereby it may be removed from the ring; and

Figure 7 is a sectional view showing how a device may be attached for widening the ring so that it may be used on a tire of different cross section.

Throughout the various views of the drawings, similar reference characters designate similar parts.

1 is a bag of any suitable size according to the interior of the tire it is to fit. It is well known in the trade as a D shaped bag, because in cross section it is in the form of the letter D. 2 is my improved ring which will now be described in detail.

This ring 2 has four sections in the embodiment shown which will be designated by the characters 3, 4, 5, and 6 respectively. More or less of these sections may be used as desired, although in the preferred embodiment four are employed.

It is of importance that these sections be of different lengths so that they will fold together as indicated in Figure 4, where 4 is the longest and 5 is the next in length. 6 is the shortest and 3 comes between 5 and 6 in length. Each of these sections consists of a segment of a circle with inwardly projecting flanges 7 which structure results in a very rigid construction with a minimum amount of metal. This is of great importance because of the extreme pressures to which these rings are subjected, such as 150 pounds per square inch and even more, and this is the ordinary working pressure for a ring of the diameter of twenty-five to twenty-seven inches and it is obvious that great strength is required as the ultimate pressure on this ring is very great indeed.

The sections are connected by identical hinges so that a description of one will answer for all. These hinges 8 have two leaves 9 and 10 connected by a pin 11, which has its axis at the inner edges of the flanges 7, and these parts are very sturdy and strong and securely riveted in place by rivets 12. These hinges are made and set true so that the parts will properly coact when the ring is expanded and in place.

Two hooks 13 are also used and these are placed at adjacent ends of the parts 3 and 6 and these hooks have their openings facing each other when the parts are in the positions shown in Figures 5 and 6. These hooks are preferably shaped substantially as shown and made very firm and strong and fixed to their respective segments by suitable rivets 14. The base of the hook 13 on the segment 6 is projected beyond this segment for about three-quarters of an inch as indicated at 15 and passed between the ends of two angle-irons 16 on the segment 3. These angle-irons 16 may be given any suitable cross section, but are preferably made of section known as T iron, and these are held by suitable rivets 17. Corresponding irons 18 held by rivets 19 are fixed to the part 6, but stop short of the end so as to abut against the irons 16, when the parts are assembled as shown in Figures 1 and 3. These parts, when assembled as above described, have a firm tongue and groove joint which locks these parts together with sufficient firmness, it being understood that all the working pressure on the ring is exerted from the bag 1 and towards the centre. The stresses are all com-

pressing stresses. These angle-irons 16 and 18 give the essential strength at the joint, and also facilitate in the locking, above described.

The means for locking and unlocking will now be described. The hooks 13 are shaped so as to receive pins 19a which are located at the ends of a hand lever 20 which is pivotally connected at 21 to a link 22 so that when it is desired to close the ring, the parts are assembled as shown in Figure 5 and the lever is thrown as indicated by the arrow, and thereafter the ring is expanded until the tongue 15 and angle-iron 16 can clear the opposing parts, and thereafter the pressure of the bag is exerted to draw all parts together to the position indicated in Figure 6, the bag being slightly stretched for this purpose. When the ring is to be opened with a view to its removal, the lever 20 is put in reverse position, as shown in Figure 6, and then the movement is reversed and the tongue 15 and angle-irons 16 are again cleared with a reverse movement when the lever is thrown as indicated by the arrow. It is important that the fulcrum 21 should be nearer the pin 19 on the lever 20 than it is to the pin 19 on the link 22, because this structure gives a leverage favorable to the operation as above described. The best results are obtained with proportions about as shown.

In view of the foregoing, the operation of my device will be readily understood, assuming the parts to be constructed and used as above indicated. The bag 1 is deflated, if this has not yet been done, and put into the shoe or casing which is to be vulcanized and retreaded, and then the ring is put inside the shoe and locked, as above described so as to back up the bag. Thereafter, when the tire is placed in the mould and on the lower part of a matrix where it rests, the upper part of the matrix is then put in place and clamped. Thereafter, the air bag 1 is inflated to the requisite pressure, say one hundred pounds per square inch, and thereafter the heat which is on the vulcanizer begins to function and vulcanizes the new rubber for the necessary time. After this vulcanization is completed, the bag is deflated, the clamps are removed and the upper part of the matrix is removed, and then the shoe with the bag and ring therein are removed and the ring is then collapsed as above described and taken out of the bag and shoe and thereafter the bag is removed and then this operation may be repeated on another shoe.

It is sometimes desirable to operate with tires of the same diameter but of greater cross section and then it is necessary to re-enforce the correspondingly enlarged bag which is employed. This is done by putting a cylindrical circle 23, as indicated in Figure 7, on the periphery of the segments, each of these being bent into an arc of the right shape and length and given the width desired and each is held in place by means of a bolt 24 which is preferably provided with a wing nut 25 and in the preferred embodiment of my invention this bolt has a square shank 26 which fits in a correspondingly square hole 27 found in each of the segments above described.

While I have shown and described some embodiments of my invention, it is obvious that it is not restricted thereto, but that it is broad enough to cover all structures that come within the scope of the annexed claims.

Having thus described my invention, what I claim is:

1. A collapsible pressure ring composed of a number of segments hinged together with two free ends and means for causing said ends to lock or interlock and cylindrical plates, one on each segment, and means for locking the plates to their respective segments.

2. A collapsible pressure ring having a plurality of segments hinged together, two of the segments having free ends for interengagement to hold the various segments together in the form of an annulus, one of the free ends having a groove defined by spaced plates projecting from its concave face, the other free end having a projecting tongue for entry into said groove, each of the ends having a hook member disposed on its concave face for engagement by a tool to force the tongue and groove into interlocking relationship.

3. A collapsible pressure ring having a plurality of segments hingedly connected, two of the segments having free ends for interengagement to hold the various segments together in the form of an annulus, one of the free ends having spaced arcuate plates secured to its concave face, said plates forming a groove between them, the other free end also having spaced arcuate plates and a tongue located between them and adapted for entry into the groove in the other free end, and means for receiving a tool by which the tongue and groove may be forced into interlocking relationship.

4. A collapsible pressure ring having a plurality of segments hingedly connected, two of the segments having free ends for placement together in interlocking relationship to hold the various segments in the form of an annulus, one of the free ends having spaced arcuate plates secured to its concave face, said plates forming a groove between them, the other free end also having spaced arcuate plates and a tongue located between them and adapted for entry into the groove in the other free end, a hook shaped member projecting from the tongue, and a hook-shaped-member located in the groove, said hook-shaped members receiving a tool by which the tongue and groove are forced together into interlocking relationship.

PHILIP L. O'BRIEN.