United States Patent

Stipanovic et al.

[15] **3,638,503**

[45] **Feb. 1, 1972**

[54] DUST BOOT FOR TREAD BRAKE UNITS

[72] Inventors: **Joseph G. Stipanovic**, McKeesport; **Earl E. Allan**, Monroeville, both of Pa.

[73] Assignee: **Westinghouse Air Brake Company**, Wilmerding, Pa.

[22] Filed: **Oct. 3, 1969**

[21] Appl. No.: **863,550**

[52] **U.S. Cl.** .....**74/18**, 24/201 C, 74/18.2, 188/202

[51] **Int. Cl.**.....**F16j 15/50**

[58] **Field of Search**.....74/18.2, 18; 188/198 S, 203 S; 24/201 C; 64/32 F

[56] **References Cited**

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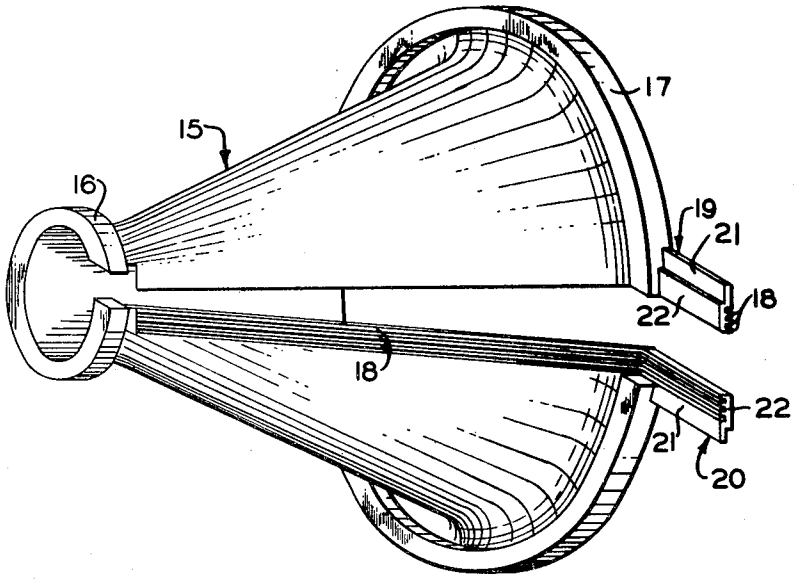
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Primary Examiner—William F. O'Dea
Assistant Examiner—F. D. Shoemaker
Attorney—Ralph W. McIntire, Jr.

[57] **ABSTRACT**

A split- or seam-type cone-shaped replaceable dust boot for surrounding the brake rod of a tread brake assembly wherein the boot is disposed in surrounding relation to the brake rod so as to be readily removable and replaceable without disassembly or removal of the associated brake assembly parts. This seam-type dust boot is installed in surrounding relation to the brake rod while the edges of the split seam are separated, following which these edges are secured together in a sealed relationship by overlapping and interlocking ribs on the mating edges. If desired, a slide-fastener element may be employed to effectuate the interlocking of the ribs on the mating edges.

4 Claims, 6 Drawing Figures



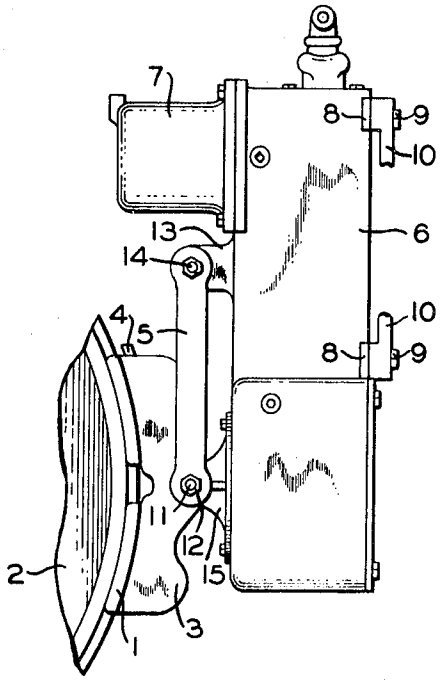


Fig.1

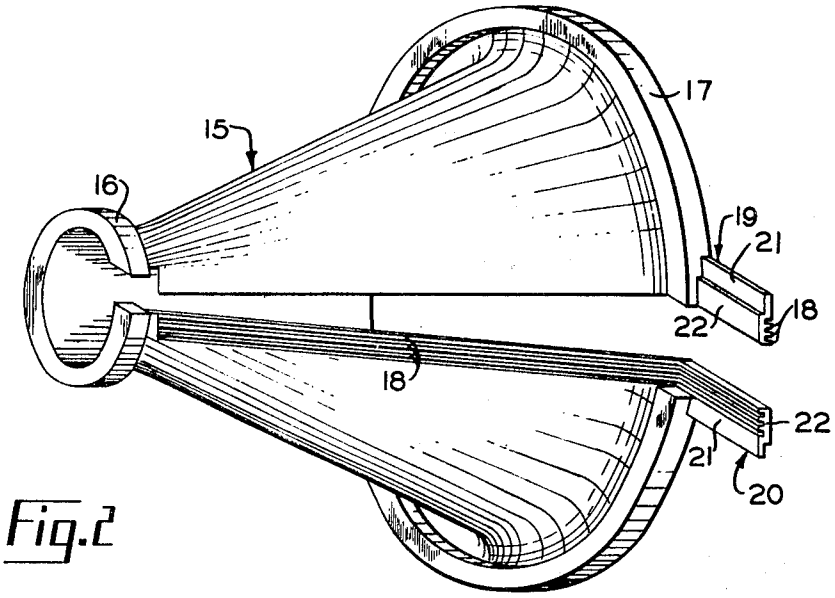


Fig.2

INVENTOR.
JOSEPH G. STIPANOVIC
EARL E. ALLAN
BY Ralph A. McIntire, Jr.
ATTORNEY

Fig. 3

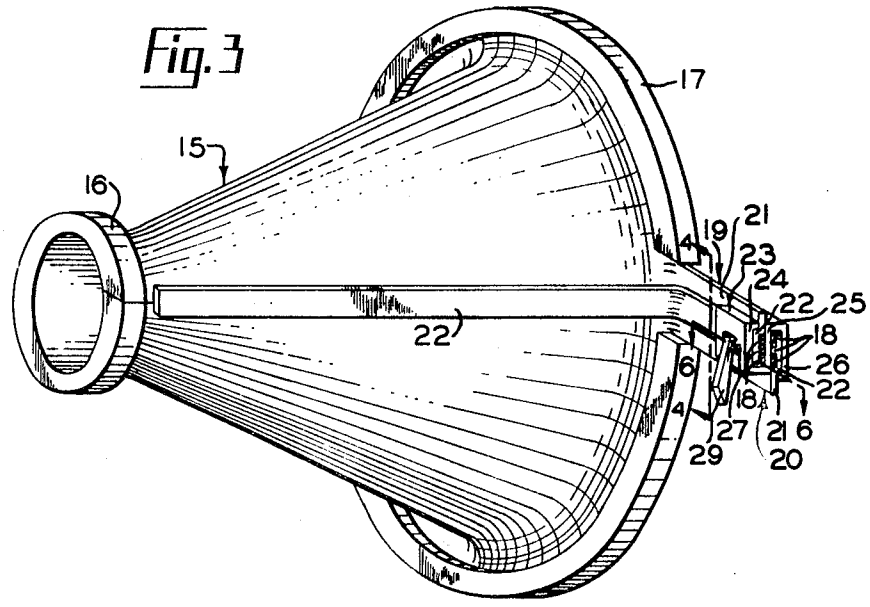


Fig. 4

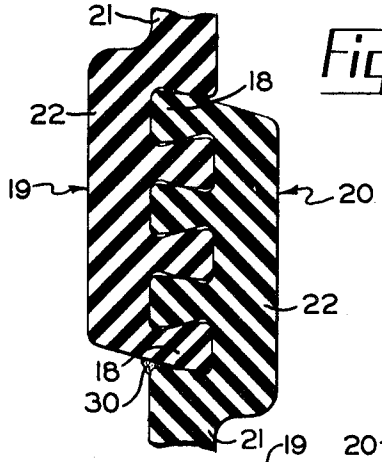


Fig. 5

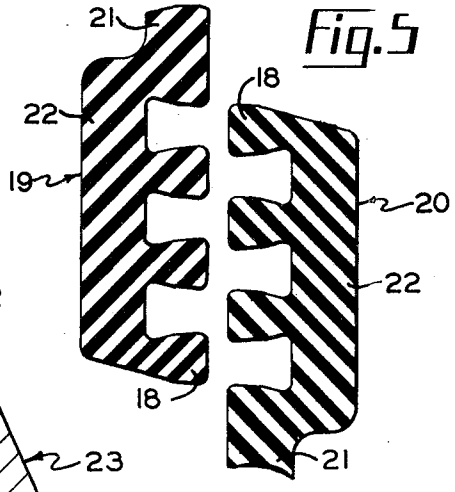
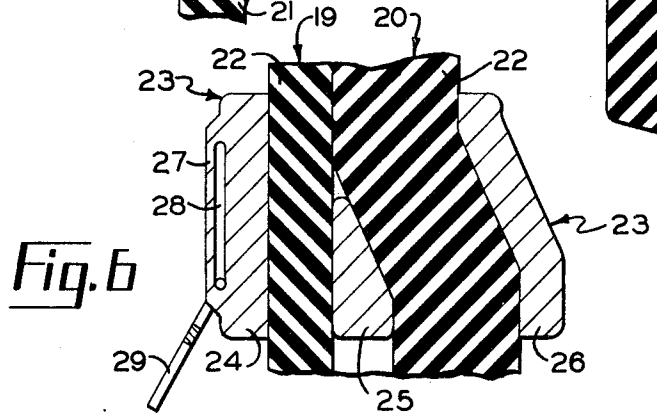


Fig. 6



INVENTOR.
JOSEPH G. STIPANOVIC
EARL E. ALLAN
BY Ralph W. McIntire, Jr.
ATTORNEY

DUST BOOT FOR TREAD BRAKE UNITS

BACKGROUND OF INVENTION

Tread brake assemblies presently in use on American railroads are provided with a cone-shaped seamless boot that is disposed in coaxial surrounding relation to the brake rod of the assembly with its smaller end sealing on the brake rod whereas its larger end has an out-turned flange which is secured in abutting sealing relationship to the exterior of the brake assembly. The boot thus serves to prevent the accumulation of ice and snow on the periphery of the brake rod during cold weather and also the entrance of dirt, and moisture to the interior of the casing. To replace a worn or defective seam interior less-type dust boot, it is often necessary to disconnect the brake rod and brake head from the brake hanger by removing the pin or bolt that secures these parts together which of course is both troublesome and time consuming. In some tread brake assembly installations where clearance is at a minimum, the complete tread brake assembly must be removed from the truck frame before a defective dust boot can be replaced.

Accordingly, it is the purpose of this invention to provide a split or seam-type dust boot that lends itself to easy, rapid installation or replacement, without removal of the tread brake assembly or parts thereof.

SUMMARY OF INVENTION

According to the present invention, a novel split-type dust boot is provided wherein there is formed along the mating edges at the seam of the boot a plurality of spaced longitudinal interlocking ribs so arranged that when one edge is placed in overlapping relation to the other, the two mating edges may be pressed into an interlocking sealed relationship. If desired, interlocking of the ribbed mating edges may be effected by the aid of a slide element moved along these edges from an open to a closed position. When the mating edges are sealingly interlocked passage of dirt, snow and water to the interior of the boot is effectively prevented.

In the accompanying drawings:

FIG. 1 is a side elevational view of a brake assembly embodying the invention, showing the exterior elements of the brake assembly in their brake applied position.

FIG. 2 is an isometric view showing the dust boot of the brake assembly shown in FIG 1, the boot being illustrated in an open position.

FIG. 3 is an isometric view showing a second embodiment of the invention wherein the dust boot embodies a slide fastener for effecting the opening and closing thereof, the boot being illustrated in an closed position.

FIG. 4 is a cross-sectional view, taken along the line 4—4 of FIG. 3 and looking in the direction of the arrows, showing the locked position of the two sets of interlocking fingers or ribs that constitute the seam of the boot.

FIG. 5 is a cross-sectional view similar to FIG. 4 but showing the two sets of fingers or ribs in their unlocked position.

FIG. 6 is a cross-sectional view, taken along the line 6—6 of FIG. 3 and looking in the direction of the arrows, showing certain details of the slide fastener not shown in FIG. 3.

As shown in FIG. 1 of the drawings, a pneumatic tread brake assembly, one of which is provided for each wheel of a railway passenger car truck, is secured, as by several capscrews to a pair of angle brackets which are attached as by welding to the center sill of the passenger car truck frame.

The brake assembly shown in FIG. 1 comprises a brakeshoe 1 for movement into braking contact as shown with the tread of a wheel 2 of a car truck, a brakehead 3 to which the brake shoe 1 is secured, as by a key 4, an external brakehead hanger 5, and a sectionalized casing comprising a main casing section 6 and a brake cylinder section 7.

Formed integral with the main casing section 6 is a pair of bosses 8 provided with several spaced-apart threaded bores (not shown) for receiving a like number of capscrews 9 whereby the main casing section 6 is rigidly secured to a pair of angle brackets 10 attached as by welding to a center sill (not shown) of a passenger car truck frame.

Slidably operable in a bore (not shown) in the casing section 7 is a fluid actuated brake-applying piston (not shown) that is connected through a suitable lever arrangement (not shown) to a brake rod (not shown) that at the end thereof exterior of the casing section 6 is pivotally connected to one of the brakehead hanger 5 and the brakehead 3, as by a bolt 11 and a nut 12. The brakehead hanger 5 comprises two identical parallel links, only one of which is shown, disposed respectively on the opposite sides of a bracket 13 integral with the main casing section 6, and suspended from the bracket 13, as by means of a bolt 14.

In order to prevent the entrance of water, ice, and dirt to the interior of the casing section 6, one end of a split or seam-type cone-shaped replaceable dust boot 15, constituting a first embodiment of the present invention, surrounds an opening (not shown) in the main casing section 6 through which the above-mentioned brake rod extends.

As shown in FIG. 2 of the drawings, the cone-shaped dust boot 15 is split along its conical surface, preferably along its slant height, as shown, from a flange 16 formed integral therewith at its smaller end to a flange 17 formed integral therewith at its larger end, it being seen from FIG. 2 that the split extends through these flanges. Accordingly, it is apparent that this split provides for the boot 15 being disposed in detachable surrounding relationship to the above-mentioned brake rod of a tread brake assembly so as to be readily removable and replaceable without disassembling the associated brake assembly or removing the assembly from the car truck.

The dust boot 15 is constructed of any suitable resilient material such as, for example, rubber. Adjacent each edge of the longitudinal split there is provided a plurality of longitudinally extending spaced-apart fingers or ribs 18, the ribs along the lower side of the split being formed on the exterior surface of the boot 15 and the ribs on the upper side being formed on the interior surface thereof. As can be seen from FIG. 2 of the drawings, these ribs 18 extend from a point adjacent the right-hand side of the flange 16 along the exterior and interior surfaces of the boot 15 to the ends of a pair of short outwardly extending tabs 19 and 20 which are formed integral with the flange 17 and are disposed on the opposite sides of the split that extends therethrough. These tabs 19 and 20 each comprise two integrally formed rectangular-shaped elements 21 and 22, the thickness of the elements 22 being substantially twice the thickness of the elements 21 in order to provide for the ribs 18 which extend along their respective opposite sides to the outer ends thereof, it being understood that the size and spacing of one set of ribs is the same as that of the other.

Assume that a tread brake assembly without a dust boot 15 has been secured to the angle brackets 10 by the capscrews 9, as shown in FIG. 1. Accordingly, subsequent to securing the brake assembly to the angle brackets 10 and effecting a brake application, a split or seam-type boot 15, as shown in FIG. 2, may have its adjacent edges gripped by the hands of a workman and then moved in opposite directions until the gap formed therebetween is of sufficient width to enable the brake rod of the tread brake assembly to pass therebetween. With the adjacent edges of the dust boot 15 held in this spread apart position by the workman, he can then slip the boot over the brake rod. Thereafter, he will move the boot to a position coaxial with the brake rod and then release his grip from the edges of the boot.

Next, the workman will move the upper tab 19 of the boot and the ribs 18 thereon, which are coextensive with the ribs formed on the interior surface of the boot adjacent the upper edge of the seam or split, to a position, as viewed in FIG. 5, in which this upper tab 19 is disposed in front of or so as to overlap the left-hand side of the lower tab 20. It will be understood that when the upper tab 19 is moved to this position by the workman, the ribs 18 formed on the interior of the boot 15 ad-

jacent the upper edge of the split are disposed in front of the recesses or indentations between the ribs 18 formed on the exterior of this boot adjacent the lower edge, as illustrated in FIG. 5.

Now, the workman will release the tab 19 and thereafter secure the flange 17 at the right-hand end of the boot 15 against the exterior surface of the main casing section 6 by means of the usual boot retainer ring and capscrews which extend through smooth bores formed in this retainer ring and have screw-threaded engagement with corresponding screw-threaded bores provided in the casing section 6.

It will be noted that as these capscrews are tightened, the retainer ring is rendered effective to push that portion of the two sets of overlapping ribs formed between the adjacent ends of the flange 17 into interlocking relationship one with the other, or, in other words, from the unlocked position shown in FIG. 5 to the interlocked position shown in FIG. 4 in which each set of ribs is disposed in the recesses between the ribs of the other set, it being noted that the width of each rib at its outer end is slightly greater than the width of the outer end of the corresponding recess and the taper of one portion of each side of each rib is different than the taper of the other portion of said sides. As clearly shown in FIG. 5, the outer taper of the base portion of each rib 18 is greater than the outer taper of the outer end portion of these ribs. Referring to FIG. 4, it will be seen that this structure of the ribs 18, while in their interlocked position, provides a reasonably small area of contact between each adjacent pair of ribs which actual experience has shown constitutes a better seal than is obtained when this area of contact is overly large. Accordingly, applicants' structure possesses a distinct advantage over heretofore used structures.

It will be remembered that the brake rod is now in its brake-applied position. Consequently, it will be understood that; (1) the boot 15 occupies its stretched position as shown in FIG. 2, (2) the flange 16 surrounds the brake rod adjacent the bolt 11 (FIG. 1), (3) the boot retainer ring secures the flange 17 of the boot against the exterior surface of the casing section 6 and (4) the plurality of ribs 18 formed on the interior of the boot and extending between the flanges 16 and 17 are disposed in front of the recesses between the ribs 18 formed on the exterior of the boot substantially as illustrated in FIG. 5. Since the boot now occupies a stretched position, the set of ribs on the interior of the boot can be manually pressed into interlocking and sealing engagement with the set of ribs formed on the exterior of the boot as the workman applies pressure by means of his forefinger and moves it along the split seam from either of the flanges 16 or 17 to the other. Likewise, the ribs 18 on the portion 22 of the tab 19 can be moved into interlocking and sealing relationship with the corresponding ribs on the portion 22 of the tab 20 by the workman applying pressure by means of his forefinger to the portion 22 of tab 19 and moving this finger therealong from the end thereof adjacent the flange 17 to the outer end.

Should the boot 15 become defective, so that it is necessary to replace it with a new boot, it can be removed in the following manner:

Subsequent to effecting a brake application to position the boot 15 in its stretched position, the capscrews securing the boot retainer ring to the casing section 6 are removed. Then, this retainer ring is moved from the position in which it abuts the flange 17 in the direction of the left hand until it strikes the brake hanger 5 (FIG. 1). It can then be released so that it is supported by the conical portion of the boot adjacent the flange 16.

The seam formed by the two sets of interlocking ribs 18 can now be opened by the workman in the following manner:

He will grip the portion 21 of the tab 19 with his fingers and thereafter exert a pull thereon in the direction of the left hand, as viewed in FIG. 2, or, in other words, in a direction away from the rectangular-shaped element 22 of the tab 20. This force exerted on the tab 19 is effective to pull the ribs 18 thereon out of interlocking engagement with the corresponding ribs on the tab 20, or, in other words move these ribs from the interlocked position shown in FIG. 4 to the unlocked position shown in FIG. 5.

Subsequent to thus unlocking the tabs 19 and 20, the remainder of the split seam may be unlocked or open by the workman exerting a pressure by means of his finger between or against the two overlapping portions of the seam and moving this finger therealong toward and to the flange 16 thus causing withdrawal of one set of ribs from interlocking engagement with the other set thereby opening the seam.

Subsequent to thus opening the seam, the adjacent edges can be manually spread apart and the boot 15 then removed from surrounding relationship with the brake rod.

A new boot may now be installed in the manner hereinbefore explained.

According to a second embodiment of the invention shown in FIG. 3, a dust boot identical to the boot 15 of the first embodiment is provided with a slide-fastener element 23 which is employed to effectuate the interlocking and unlocking of the ribs on the mating edges of the boot. Accordingly, like reference numerals have been used to designate the structure shown in FIG. 3 which is identical with that shown in FIG. 2 and already described. Only such features of the structure shown in FIG. 3 which is identical with that shown in FIG. 2 and already described. Only such features of the structure of the embodiment of FIG. 3 which differ from that of the embodiment shown in FIG. 2 will be hereinafter described.

According to the embodiment of the invention shown in FIG. 3, the one set of the ribs 18 is moved, into or out of interlocking and sealing engagement with the other set accordingly as the slide-fastener element 23 is moved in one direction or the other along the split seam.

The structural details of the slide-fastener element 23 are shown in FIGS. 3 and 6 of the drawings, one end of this slide-fastener element 23 appearing in FIG. 3. This end of element 23 resembles somewhat the letter S and comprises three parallel spaced-apart metallic strips 24, 25, and 26, the center strip 25 being disposed from each of the two outer strips a distance substantially equal to the thickness of the rectangular-shaped element 22 of the tabs 19 and 20 which elements are disposed therebetween. At the right-hand end of the slide-fastener element 23, as shown in FIG. 3, the top edge of the center strip 25 is integrally connected by a short strip to the adjacent top edge of the right-hand outer strip 26. Likewise, the bottom edge of the center strip 25 is integrally connected by a second short strip to the adjacent bottom edge of the left-hand outer strip 24, it being noted that these two short strips are parallel and form a right angle with each of the two strips which are respectively connected thereby. It will be further noted from FIG. 3 that the free ends of the two outer strips 24 and 26 are bent through an angle of 90°, and that these bent ends are disposed away from the center strip 25 a distance substantially equal to the thickness of the rectangular-shaped elements 21 of the tabs 19 and 20 which elements are disposed therebetween. From the foregoing, it is apparent that while the slide-fastener element 23 occupies the position shown in FIG. 3 the end thereof shown provides two parallel tracks for the exterior ends of the tabs 19 and 20.

As can be seen from FIG. 6 of the drawings, the length of the center metallic strip 25 is less than that of the two outside strips 24 and 26. Furthermore, as viewed in FIG. 6, the upper end of the center strip 25 is tapered to form a wedge which, as shown, is disposed between the element 22 of the tab 19 and the element 22 of the tab 20.

As shown in FIGS. 3 and 6, formed integral with the strip 24 and extending outward therefrom is a web 27 having therein an elongated slot 28 into which extends the ends of two parallel spaced-apart fingers formed at one end of a handle 29 it being understood that the ends of these fingers are bent so as to form a right angle and extend into the slot 28 from the respective opposite sides of the web 27. The handle 29 serves as a means by which the slide-fastener element 23 can be moved in one direction or in an opposite direction to open or close the seam in the boot 15 in a manner now to be described.

Assuming that the seam in the boot **15** shown in FIG. **3** is closed and that the slide-fastener element **23** occupies the position shown, the seam in the boot may be opened by a workman grasping the handle **29** between his forefinger and thumb and then exerting a pull on this handle in the direction to transmit a force to the slide-fastener element **23** via the web **27** so as to act on element **23** in the direction of the left hand, as viewed in FIG. **3**, or in an upward direction as viewed in FIG. **6**. It will be understood that the magnitude of this force is sufficient to effect movement of the slide-fastener element **23** relative to the tabs **19** and **20**.

Referring to FIG. **6**, it can be seen that as the slide-fastener element **23** is moved in an upward direction, the center metallic strip **25**, which is disposed between the element **22** of the tab **19** and the element **22** of the tab **20**, is effective to pull the ribs **18** on the element **22** of the tab **20** out of the corresponding recesses or indentations between the ribs **18** on the element **22** of the tab **20** or, in other words, to move the element **22** and ribs **18** of the tab **20** relative to the element **22** and ribs **18** of the tab **19** from the interlocked and sealed position shown in FIG. **4** to the unlocked and unsealed position shown in FIG. **5**.

From the foregoing it is apparent that the seam in the boot **15** shown in FIG. **3** can be opened by the workman moving the slide-fastener element **23** from the position in which it is shown in the direction of the left hand or toward the flange **16** until this slide-fastener element **23** is moved past the left-hand end of the outside element **22** shown in FIG. **3** and likewise past the left-hand end of the inside element **22** which does not appear in FIG. **3**. With the slide-fastener element **23** in this left-hand position, the workman can remove the slide-fastener element **23** from the split boot **15**.

It will be understood from the foregoing that the inside ribs **18** along the upper side of the longitudinal split are now withdrawn from the recesses between the outside ribs **18** along the lower side of this longitudinal split. Accordingly, the two longitudinal edges of the split seam are now separated. Assuming that a brake application has been effected, the dust boot **15** can now be placed in coaxial surrounding relation to the brake rod in the same manner as hereinbefore described.

With the upper tab **19** of the boot **15** disposed in front of or overlapping the lower tab **20**, the workman will place the slide-fastener element **23** between the right-hand side of the flange **16** and the left-hand end of the inside and outside elements **22**. Then, with these elements **22** spread apart a distance equal to the thickness of the strip **25**, he will exert a pull on the handle **29** of the slide-fastener element **23** so as to move it in the direction of the right hand as viewed in FIG. **3**, so that the lower end of the center strip **25**, as viewed in FIG. **6**, passes between the two elements **22**.

Since the strips **25** and **26** of the slide-fastener element **23** are tapered, as shown in FIG. **6**, it will be understood that if the slide-fastener element **23** is now moved by the handle **29** downward, as viewed in the FIG. **6**, or in the direction of the right hand, as viewed in FIG. **3** until this element **23** reaches the position shown in FIG. **3**, the ribs **18** of the tab **20** will be forced into the corresponding recesses between the ribs **18** of the tab **19**, or, in other words, from the position shown in FIG. **5** to the position shown in FIG. **4** in which one set of ribs **18** are in interlocking and sealing engagement with the other set.

The flange **17** at the right-hand end of the boot **15** can now be secured against the exterior surface of the main casing section **6** of the tread brake assembly by means of the usual boot retainer ring and capscrews in the manner hereinbefore described for the first embodiment of the invention.

From the foregoing, it is apparent that should the boot become defective so that it is necessary to replace the defective boot with a new boot, the defective boot can be removed by removing the capscrews from the boot retainer ring, then moving this ring to a position in which it abuts the brake hanger **5** and is supported on the conical portion of the boot adjacent the flange **16**. Thereafter, the slide-fastener element **23** can be moved from the position shown in FIG. **3** in the direction of the left hand until it reaches the position in which it can be removed from the boot in the manner hereinbefore explained. The defective boot can then be removed from coaxial surrounding relation to the brake rod and a new boot installed in its place in the manner hereinbefore explained.

In order to provide a more perfect seal between the two sets of interlocking ribs **18** forming the seam in the boot **15**, subsequent to closing the seam by moving the slide-fastener element **23** to the position shown in FIG. **3**, a cement or bonding agent, such as, for example, room temperature vulcanization silicone rubber may be applied along the length of the seam at the location denoted by the numeral **30** in FIG. **4** of the drawings.

Subsequent to the hardening of this cement or bonding agent, the seam cannot be opened by means of the slide-fastener element **23**. Accordingly, upon the boot becoming defective, in order to remove the boot from surrounding relation to the brake rod, a longitudinal seam would have to be cut from one end of the boot to the other by suitable means, such as, for example, a sharp knife, it being understood that this cut or slit extends through the flanges **16** and **17**.

Having thus described the invention, what we claim as new and desire to secure by Letters Patent, is:

1. A hollow truncated cone-shaped resilient boot having two opposing ends and a radially outwardly extending flange at each of said ends, wherein the improvement comprises:

a. the development of said hollow truncated cone-shaped boot constitutes a sheet of material perimetrically defined by said two opposing ends and a pair of opposing edges each having a tab disposed as an extension of the respective edge and extending through said flange on one of said ends, and

b. releasable locking spaced-apart ribs on each of said opposing edges terminating at one end at the exterior end of the corresponding tab and at the opposite end adjacent the flange at the other of said pair of ends, said ribs on each of said opposing edges movable into releasable interlocking engagement with said ribs on the other opposing edge to form said hollow truncated cone-shaped boot and comprise a seam extending from one of said opposing ends to the other and through said flanges.

2. A hollow truncated cone-shaped flexible boot, as recited in claim **12**, further characterized in that one-half the width of said tabs is substantially twice the thickness of the other half, and said one-half of said tab width includes parallel grooves forming therebetween said plurality of ribs.

3. A hollow truncated cone-shaped flexible boot, as recited in claim **2**, further characterized by a slide-fastener element movable in one direction to effect interlocking engagement of the ribs on one of said edges with the ribs on the other edge and movable in the opposite direction to effect disengagement of said ribs on said respective edges.

4. A hollow truncated cone-shaped flexible boot, as recited in claim **2**, further characterized in that the height of said ribs is substantially equal to the thickness of said other half of said tabs.

* * * * *

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,638,503 Dated February 1, 1972

Inventor(s) Joseph G. Stipanovic and Earl E. Allan

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 6, line 52, numeral "12" should be --1--

Signed and sealed this 25th day of July 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents