A. R. BERMAN

BOOT OR COVERING FOR UNIVERSAL JOINTS OF DRIVE
SHAFTS OF VARIOUS MOTOR VEHICLES

Filed April 27, 1939

2 Sheets—Sheet 2

INVENTOR.

Aaron P. Berman

ATTORNEY.
This invention relates to an improved boot or covering for use in connection with universal joints of drive shafts of various makes of motor vehicles and the main purpose of this invention is to provide a boot or covering, universal in use to all types of universal joints of drive shafts on various makes of motor vehicles.

Another purpose of the invention is to provide a boot or covering constructed of flexible or pliable material such as rubber, particularly synthetic rubber, and one made in the form of a cone in a single wrapping molded or otherwise constructed in a single piece provided with inner and outer heads at the end of the cone, the single piece to engage in annular grooves formed in the two sections of the universal joint of an automobile drive shaft.

Another purpose is to provide a boot or covering constructed of a flexible or pliable material, such as will permit the covering or boot to accommodate itself to any and all types of said universal joints, allowing the boot or covering to contract and expand incident to the movements of the elements of the universal joint. In other words, the material, of which the covering is constructed, may give or stretch in keeping with the movement of the various parts of the joint.

Another purpose is to provide a boot in a single piece of pliable material of such construction as to permit of a single wrapping over the joint, as shown in Figures 1 and 2, and in this event, the outer facing of the single piece of pliable material has molded thereon an extension flap or tab which acts to cover slots in the opposite ends of the covering of a single wrapping to prevent dust and dirt from seeping through the covering or boot.

Another purpose is to provide a boot of a single piece of such flexible or pliable material, so constructed in order to provide a plurality of wrappings over the joint, preferably not more than two, so as to afford a dust proof covering or boot, which is exceedingly durable and of unusual strength.

The boots or coverings now in use are constructed of rawhide or similar material which are more or less stiff and un-pliable and buckle, or break, in a relatively short time and have been found impracticable. Therefore, it is another purpose to avoid these undesirable features.

A further purpose is to provide means at each end of the boot or covering for retaining the boot or covering attached to the adjacent ends of the drive shaft sections, said holding means for the boot being of such construction as to retain the covering securely in place and from detachment from the two sections of the drive shaft.

Another purpose is to provide a boot or covering applicable to any and all types of universal joints.

A still further purpose of the invention is to provide a covering or boot in a single piece of pliable or flexible material having slots such as will permit the covering to afford a plurality of wrappings one upon and in register with each other, as shown in drawings.

It is to be understood that the particulars hereinafter given are in no way limitative, and that while keeping within the scope of the invention, any desired modification of details and proportions may be made in the construction of the appliance according to circumstances.

The invention comprises further features and combination of parts to be hereinafter set forth, shown in the drawings and claimed.

In the drawings:
Figure 1 is a plan view of a boot or covering in a single piece and of a length and a construction whereby a single wrapping may be made around the universal joint of the drive shaft.
Figure 2 is a sectional view crosswise of the wrapping in Figure 1 when the wrapping is rolled.
Figure 3 is a sectional view on line 3-3 on Figure 1.
Figure 4 is a sectional view on line 4-4 on Figure 1.
Figure 5 is a perspective view showing the application of a boot or covering as applied to a universal joint of a drive shaft of a motor vehicle, showing not more than two wrappings.
Figure 6 is a plan view of the boot or covering being of a length and a construction to provide not more than two wrappings.
Figure 7 is a sectional view of line 1-1 on Figure 5.
Figure 8 is a sectional view on line 8-8 on Figure 6.
Figure 9 is a sectional view on line 9-9 on Figure 6.
Figure 10 is a fragmentary view of a universal joint with the boot or covering as applied and being broken away or partly in section, in order to illustrate more definitely the construction and the mounting of the boot.
Referring to Figures 1, 2, 3 and 4, one form of boot or covering is illustrated. In this construction the boot is in a single piece but not continuous and is of a construction or length to provide for a single wrapping around the universal joint. This single piece has opposite ends, and
is provided with inner and outer beads 8b and 8c on its longitudinal curved edges. Adjacent the opposite ends of the single piece in Figure 1, slots 8a and 8b are provided. They have beads 10a to prevent the slots from tearing. The opposite ends of the slot 8b have offset portions 10b which receive the beads 11a around the slots or notches 11b of the opposite end of the boot or covering, when the two ends thereof are connected, as in Figure 4.

When molding the single piece of boot or covering, as in Figure 1, an extension flap or tab is vulcanized to the body of the boot. This extension flaps 12a has its vulcanization to the body of the boot for a distance as from a to b shown in Figures 1 and 2. The opposite ends of the extension flap or tab have slots 12b which receive the material c in one end of the boot, when that portion d of the flap or tab is inserted through the slot 9a, that is to say, when the single piece of boot or covering is rolled in a single wrapping, as shown in Figure 2, said wrapping being made on a universal joint of a drive shaft, as shown in Figure 10. Also when the single wrapping in Figure 1 is connected about the universal joint, the end of the boot having the slots 11b is inserted through the slot 9b so that the ends of the slot 11b may engage the opposite ends of the slot 9b, the beads around the slots or notches 11b engaging the offsets 10b. After connecting the opposite ends of the single piece of wrapping, as shown in Figure 2, around the joint, in which event the slots or notches 12b will engage the opposite ends of the slot 9a. In this construction the extension flap or tab prevents dust, dirt or foreign matter from seeping through the slots at the opposite ends of the boot or covering, when the boot or covering is fastened around a universal joint.

Referring to Figures 5 to 10 inclusive, I identifies a drive shaft of a motor vehicle, which may be in two sections, 2, 3 and 4 identifies the universal joint connecting these two sections. The sections 2 and 3 have annular grooves 5, which are semi-circular in cross section as shown in Figure 7 of the drawings.

The boot or covering is in the form of a semi-circular segment as illustrated in Figure 1 of the drawings. In the event that this segment is made of flat material, preferably rubber, is increased in length, the boot may be universal in use to various, any and all types of joints. Furthermore, in the event of increased length, the boot or covering may afford a plurality of wrappings, that is to say, more than two wrappings, as disclosed in the drawings. The single piece constituting the boot or covering has a slot 8 at one end, and slots or notches 7 at the other end, while there are central slots or notches 8, which engage or receive the material at 9 adjacent to the opposite ends of the slot 6, so as to afford a single wrapping. However, in order to provide a second wrapping on the first, the material at 11 engaged to the opposite ends of the slot 6, while the slots or notches 7 receive and engage with the material of the boot or covering. By this construction, the boot or covering I may be wrapped as disclosed in Figures 5, 7, and 10 of the drawings.

The boot of covering 11 may be made of any suitable flexible material, such as rubber, in a blank as shown in Figure 4, preferably molded, and in its construction, it is provided with ribs 15 or beads 12, which engage the grooves 5 of the drive shaft sections, thereby retaining the covering or boot in place. The other half of the boot or covering is provided with ribs or beads 13, which are relatively smaller than the beads or ribs 12, and are formed or molded on the opposite face of the boot or covering so as to appear on the outside surface of the covering or boot. These beads or ribs are being on the outer surface of the covering afford means with which metallic bands or clamps 14, as shown in Figures 1, 2, and 3, engage for the purpose of preventing the covering or boot from slipping from under such clamps. Furthermore, when these bands or clamps are tightened, the beads or ribs 12 are forced into the grooves 5, 15 which action also prevents detachment of the boot or covering. The beads or ribs 12 and 13 are formed around and in conformity to the slots 7 and 8, which act to prevent tearing of the material of which the boot or covering may be constructed.

It is obvious that the walls 7 and 8 may be increased or decreased in width for receiving thinner or thicker material at 5, and for allowing the fitting various diameters of shafts, thereby making the boot universal in use.

The invention having been set forth, what is claimed is:

1. In a device, as set forth, the combination with a motor vehicle drive shaft comprising adjacent shaft sections having a universal joint connecting said sections, of a boot-body surrounding said joint being open therethrough from end to end and constructed of flexible synthetic rubber material, said boot-body prior to its formation consisting of a segmental length, the opposite ends of said length of material being formed with inter-engaging means for retaining said length of material conforming to and surrounding said joint, the adjacent ends of the shaft sections having grooves, the opposite faces of the length of rubber material being formed with inner and outer beads adjacent the edges thereof, the inner beads engaging said grooves of the shaft sections, the outer beads being smaller cross-sectionally than the inner beads and formed for the full circumference of the boot opposite the inner bead, and metallic straps encircling the boot-body adjacent the outer beads with the edges thereof being engaged against said outer beads, said straps being in positions substantially opposite the inner beads retaining them in said grooves, the outer beads acting to prevent the boot-body from pulling from under said straps.

2. The combination with a motor vehicle drive shaft comprising adjacent shaft sections having a universal joint connecting said sections, of a boot-body consisting of a length of synthetic rubber material formed at its ends and at the center with means comprising inter-engaging slots near the ends and adjacent the center of the length of material to retain the boot-body conforming to and in surrounding relationship to the universal joint and one half the length of said material on one face thereof adjacent the edges of the material having inner beads conforming to the center slots, the other half of said length of material on the opposite face thereof adjacent the edges of the material having outer beads conforming to the end slots, the slots of the shaft sections having grooves receiving the inner beads, the outer beads being positioned opposite the inner beads for assisting to retain the inner beads in said grooves, and metallic straps encircling said boot-body at its ends thereof.
being substantially opposite the inner beads for further assisting in retaining the inner beads in said grooves, said metallic straps having certain of their edges engaged with the outer beads to prevent the boot-body from disengaging from under said straps.

3. In combination, a boot for a universal joint of a motor vehicle drive shaft, comprising a boot body adapted for surrounding relation on said joint and consisting of a segmental length of flexible resilient material, the opposite ends of said material being formed with inter-engaging means for retaining said boot in position and conforming it to and surrounding said joint, the opposite faces of the material being formed with inner and outer beads adjacent the circumferential edges thereof for substantially the full circumference of the boot, and a drive shaft comprising shaft sections having grooves at their adjacent ends to receive the inner beads, the outer beads assuming positions opposite to and overlying the inner beads and cooperating somewhat therewith to retain said inner beads in said grooves, metallic straps encircling the boot body at its ends adjacent the outer beads with the edges of the straps engaged against the outer beads, the outer beads acting to prevent the boot body from pulling from under said straps.

4. In combination, a boot for a universal joint on a motor vehicle drive shaft comprising a boot body, said boot body consisting of a single length of flexible material of segmental formation, said formation and construction of which permitting the boot body to assume a surrounding relationship with and on said joint, the opposite ends of said segmental piece of material being provided with inter-engaging means including an extension cover flap, said means and extension flap acting to retain said boot in its prescribed shape in position and conforming to said boot to and in surrounding relationship on said joint, the opposite faces of the segment of material substantially for the full circumference of the boot having inner and outer beads adjacent the circumferential edges of the segment, and a drive shaft consisting of shaft sections with certain of their ends adjacent each other, said adjacent ends having grooves for the reception of said inner beads, the outer beads assuming positions approximately adjacent thereto and oppositely and overlying the inner beads and cooperating somewhat therewith to retain said inner beads in said grooves, and metallic straps encircling the opposite end portions of the boot body adjacent to and with certain of their edges engaged against the outer beads, thereby the outer beads act to prevent the end portions of the boot body from pulling from under said straps.

5. In combination with a motor vehicle drive shaft, a boot for a universal joint on a motor vehicle drive shaft comprising a boot body, said boot body consisting of a single length of flexible synthetic rubber material of segmental formation, said formation and construction of which permitting the boot body to assume a surrounding relationship with and on said joint, the opposite ends of said segmental piece of material being formed with inter-engaging means acting to retain said boot in its shape in position and conforming said boot to and in surrounding relationship on said joint, the opposite faces of said segment of material, substantially for the full circumference of the boot having inner and outer beads adjacent the circumferential edges of said segment, said inner beads engaging grooves on adjacent ends of sections composing said vehicle drive shaft, the outer beads assuming positions substantially adjacent to and oppositely and overlying the inner beads and cooperating somewhat therewith to retain said inner beads in said grooves, and metallic straps encircling the opposite end portions of the boot body adjacent to and with certain of their edges engaged against the outer beads, thereby preventing said end portions of the boot body from pulling from under said straps.

AARON R. BERMAN.