

E. M. BARNES.
VACUUM CLEANER.

APPLICATION FILED JUNE 17, 1911.

Patented Dec. 3, 1912.

3 SHEETS-SHEET 1.

1,045,931.

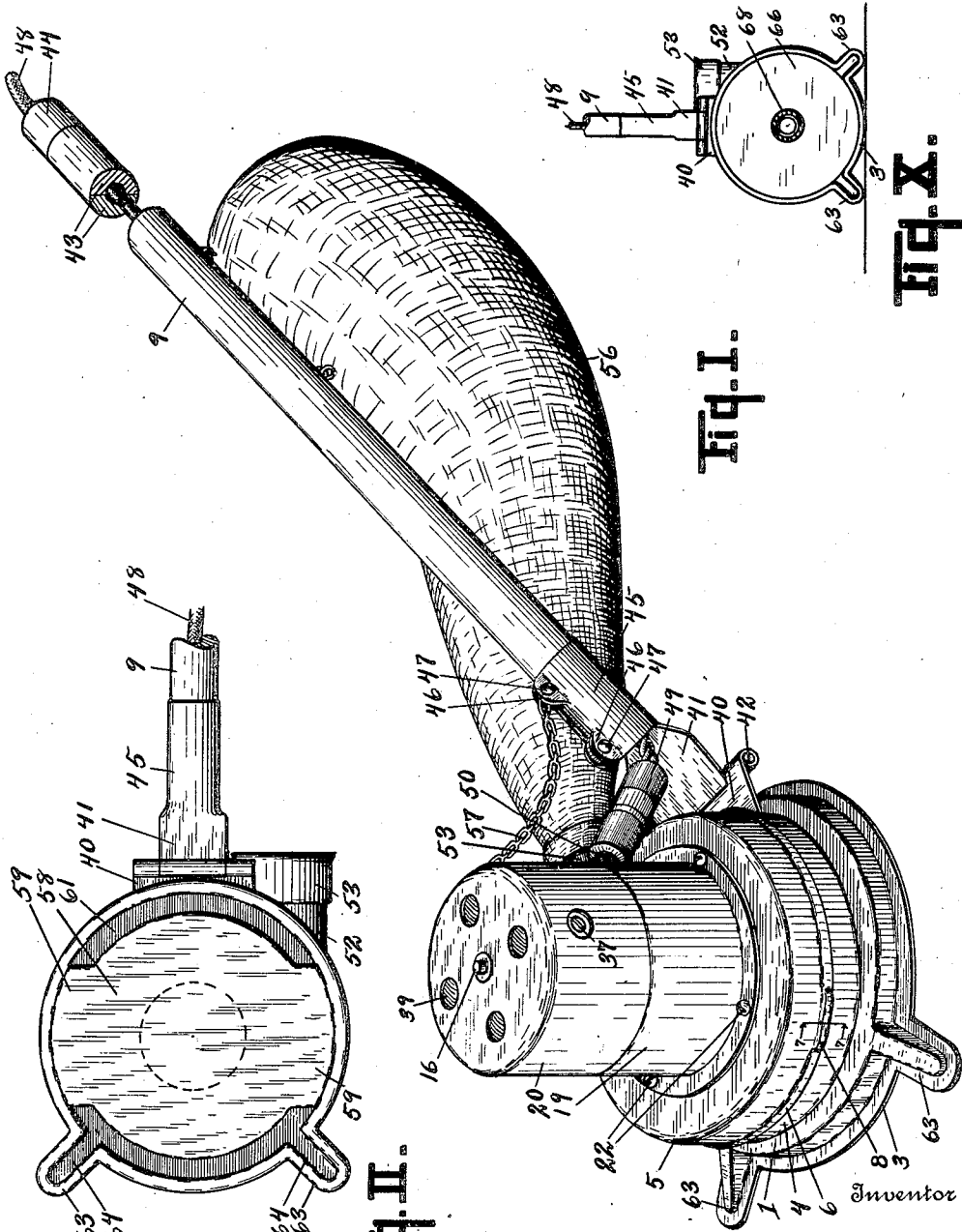


Fig. II.

Fig. I.

Fig. X.

Witnesses

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3 SHEETS—SHEET 2.

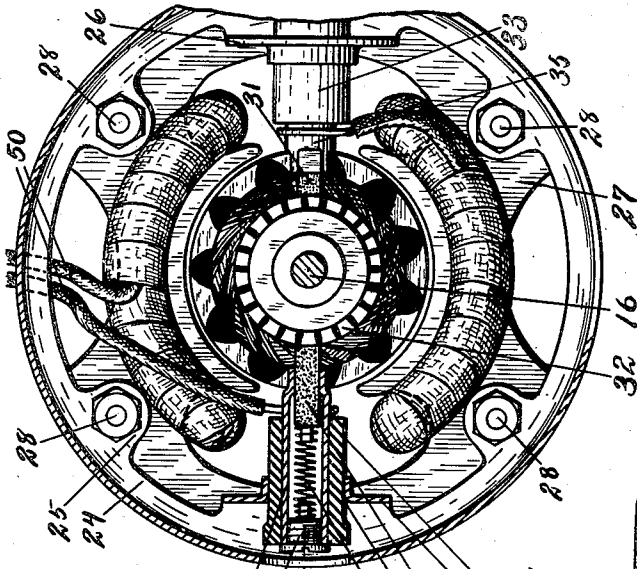


Fig. IV.

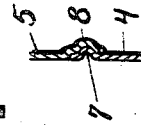


Fig. VII.

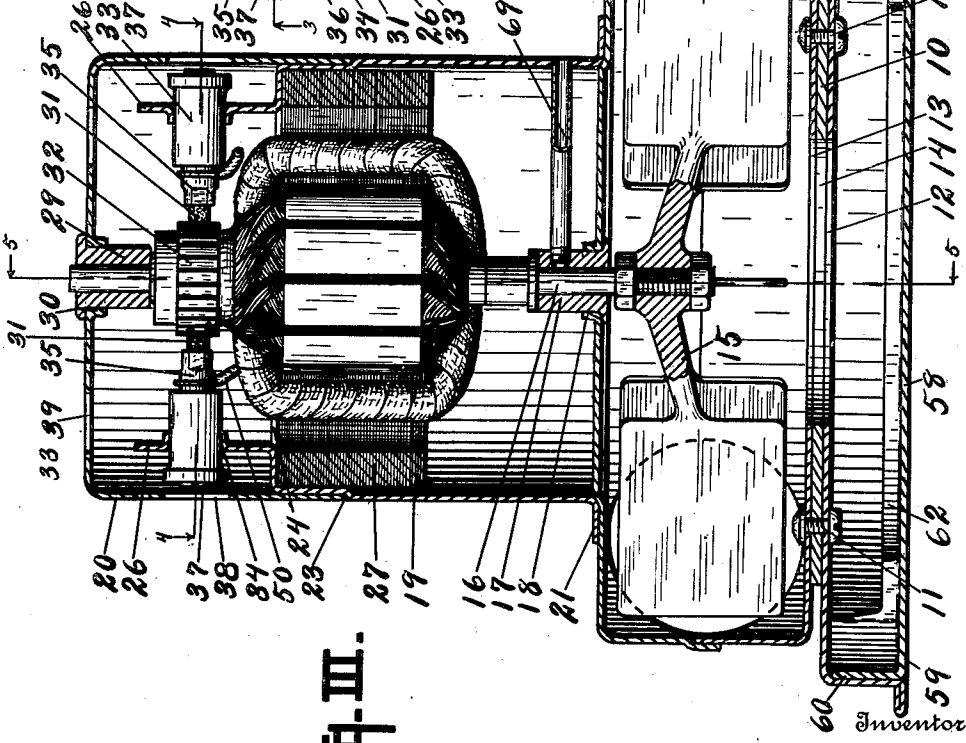


Fig. III.

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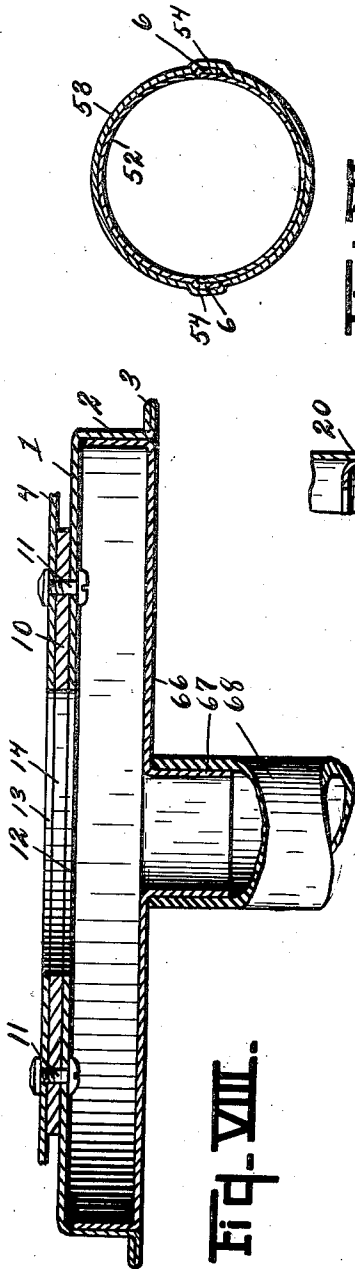


Fig. VIII.

Witnesses
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Fig. VI.

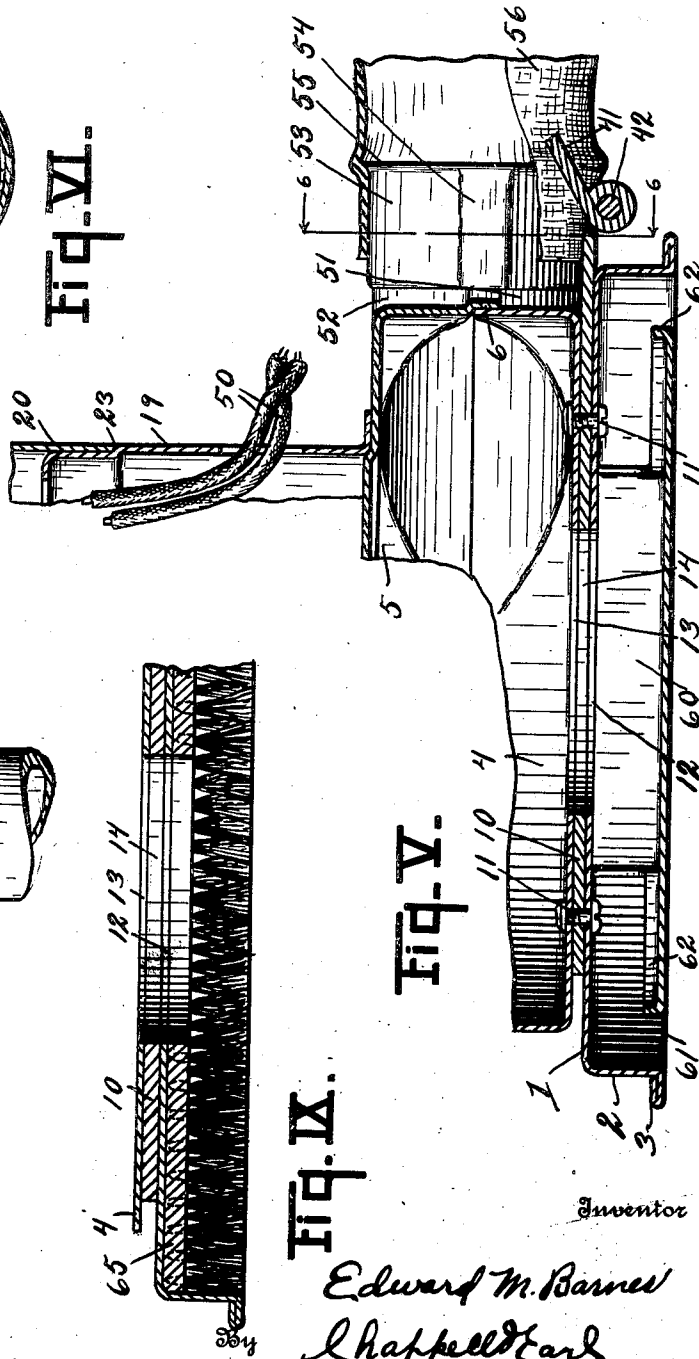


Fig. V.

Fig. IX.

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UNITED STATES PATENT OFFICE.

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VACUUM-CLEANER.

1,045,931.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, EDWARD M. BARNES, a citizen of the United States, residing at Hastings, county of Barry, and State of Michigan, have invented certain new and useful Improvements in Vacuum-Cleaners, of which the following is a specification.

This invention relates to improvements in suction cleaners.

10 The main objects of this invention are, first, to provide an improved suction cleaner which is efficient and at the same time simple and economical in structure. Second, to provide in a suction cleaner, an improved casing formed mainly of sheet metal, which is very light and compact. Third, to provide in a suction cleaner, an improved casing in which the parts are sheet metal stampings and are simple in form and easily produced and assembled. Fourth, to provide in a suction cleaner an improved casing by which the motor is effectively incased and supported. Fifth, to provide in a suction cleaner an improved casing structure which can be readily disassembled if occasion requires to afford access to the motor or the fan and easily reassembled. Sixth, to provide an improved suction cleaner which is adapted for use as a sweeper,—that is, one which is moved bodily across the rug or other article to be cleaned, or is readily adapted for use with attachments.

Further objects relating to structural details, will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification. The invention is clearly defined and pointed out in the claims.

40 A structure which is a preferred embodiment of my invention is clearly illustrated in the accompanying drawing, forming a part of this invention, in which:

Figure I is a perspective view of a structure embodying the features of my invention, a portion of the handle being broken away. Fig. II is an inverted view of the structure appearing in Fig. I, the dust collecting bag being omitted. Fig. III is a vertical central section taken on a plane corresponding to line 3—3 of Fig. IV. Fig. IV is a horizontal section taken on a plane corresponding to line 4—4 of Fig. III. Fig. V is a detail vertical section taken on a plane corresponding to line 5—5 of Fig. III. Fig. VI is a detail vertical section taken on a

plane corresponding to line 6—6 of Fig. V, showing the delivery nipple of the fan chamber. Fig. VII is a detail section taken on a plane corresponding to line 7—7 of Fig. I, showing details of the joint for the sections of the fan chamber. Fig. VIII is a detail section showing suction tube attachment. Fig. IX is a detail vertical section showing a brush attachment. Fig. X is a bottom view of my improved suction cleaner arranged for the use of attachments.

In the drawings, similar reference characters refer to similar parts throughout the several views, and the sectional views are taken looking in the direction of the little arrows at the ends of the section lines.

Referring to the drawing, the base or shoe 1 is preferably cylindrical as shown and comprises a circular plate provided with a downwardly projecting flange 2. The lower edge of the flange 2 is turned outwardly and then back upon itself to form a rim-like shoe tread 3. This base or shoe is formed of sheet metal and is shaped like an inverted shallow pan. Mounted on the base or shoe is a fan casing formed of a pair of pan-like sections 4 and 5. The bottom section 4 is secured to the shoe 1, while the top-section 5 is mounted on the section 4. To secure a good joint between the sections and rigidly support the parts, the top section 5 is offset or shouldered at 6 to receive the edge of the section 4, and the section 4 is provided with lugs 7, which are struck up therefrom, as shown in Figs. I and VII, while the section 5 is provided with coacting seats 8, the seats being struck out from the offset portions 6. As the sections are forced together, the lugs 7 snap into their seats 8. If desired, in order to insure an air tight joint between the sections 4 and 5, some sealing material may be used in the joint, as will be readily understood. To afford an effective means of attaching the handle 9, and to reinforce the parts and connect the shoe 1 with the fan casing, I interpose a plate 10 between the base and the casing, as clearly shown in Fig. III. The shoe, plate and bottom section 4 of the fan casing are connected by bolts 11. The shoe 1, the bottom member 4 and the plate 10 are provided with registering central openings 12, 13 and 14, respectively, which connect the suction chamber in the shoe with the fan chamber.

The fan 15, which is shown mainly in conventional form, as its structural details

form no part of my present invention, is mounted on the lower end of the vertically-disposed shaft 16 of the motor. The bearing 17 for the lower end of the shaft 16 is mounted on the top section 5 of the fan casing, the section 5 being provided with a central opening having supporting flanges 18 for the bearing.

The motor casing consists of a base section 19 mounted upon the fan casing section 5, and the top section 20 mounted upon the section 19. Both of these motor sections or members 19 and 20 are sheet metal stampings. The motor casing section 19 is provided at its lower end with an out-turned flange 21, which rests upon and is secured to the top section 5 of the fan casing by means of the bolts 22. At its upper end, the section 19 is shouldered at 23 to receive the top section 20 and is provided with an inturned top flange 24. This flange 24 is provided with ears 25, on which the fields of the motor are mounted, and with upwardly-projecting arms or brackets 26 in which the brush holders are mounted. See Figs. III and IV. The fields 27 are arranged under the flange 24 and secured to the ears 25 by means of the bolts 28, and are thus very securely supported. I do not describe the structural details of these fields, as they form no part of my present invention. The upper end of the motor shaft 16 is supported by the bearing 29 carried by the casing section 20, which is provided with bearing supporting flanges 30. The brushes 31 coast with the commutator 32 on the armature shaft. The tubular brush holders 35 are provided with tubular insulating sleeves 33 arranged through suitable flanged openings 34 in the arms 26. The brushes 31 are slidingly mounted and yieldingly supported in the holders 35 by the springs 36, the inner ends of the springs engaging the brushes while the outer ends of the springs engage the plugs 37 threaded into the holders. The top motor casing section 20 is provided with openings 38 through which the brushes may be inserted or removed. The top section 20 also has ventilating openings 39 in its top. With the parts thus formed and arranged, the parts of the motor are incased and protected and effectively supported so that they are kept in alinement and no additional brackets or supporting parts are required, other than the bearings described and the parts formed on the casing.

The plate 10 is provided with a hinge member extension 40 at one side to which the hinge member 41 of the handle is connected by means of the pintle 42. The handle 9 is tubular, being formed of longitudinal sections 43, which are glued together, and further retained by the ferrule 44 at the outer end of the handle and the ferrule

45 at the inner end, the ferrule 45 being formed integrally with the handle hinge member 41. The ferrule 45 is split and provided with pairs of ears 46, and with clamping screws 47. The circuit cord 48 is arranged through the hollow handle, as shown, and connected by a coupling 49 to the motor wires 50.

The fan casing sections 4 and 5 are provided with integral nipple extensions 51 and 52, respectively, which are joined together in the manner described. A ferrule or sleeve 53 is slipped over these nipple sections, the ferrule being provided with channels 54 on its sides adapted to receive the seams formed by the joint of the sections. This ferrule serves as a lock for the fan casing sections. The sleeve or ferrule 53 is provided with a flange 55 at its outer end over which the mouth of the dust bag 56 is arranged. The bag 56 is suspended from the handle. A supporting chain 57 is provided for the handle, one end of the chain being connected to the motor casing.

The shoe plate 58 is provided with opposed segmental portions 59 having upturned flanges 60 at their edges adapted to fit into the flange of the shoe 1, as shown in Figs. II and III. The front and rear edges of the shoe plate are spaced from the flange of the shoe 1, leaving segmental openings 61 at the front and rear thereof for the entrance of the dust. The shoe plate is provided with upturned flanges 62 at its front and rear edges. The shoe is preferably provided with arm-like extensions 63 having channels 64 therein opening into the base. These extensions are radially disposed on the front side of the casing, the distance between their ends being about the diameter of the base. In using the machine, these extensions may be run into corners or other places which could not otherwise be cleaned without the use of attachments. When desired, the shoe plate 58 may be removed and a brush 65 inserted in lieu thereof, or when it is desired to use an attachment, the base plate 58 is removed and the attachment plate 66 substituted therefor, the plate having a nipple 67 for an attachment tube 68. The plate 66 entirely closes the shoe or suction chamber.

When the device is intended for use with an attachment, it is laid on its front side, the arms 63 forming supports. See Fig. X.

By forming the parts of the casing as I have illustrated and described, they may all be produced by drawn or die work, and each so formed that the structure is very compact and light in weight. Each section or member of the casing is, owing to its shape, reinforced so that, while light material is used, the casing is very strong and rigid. For instance, the motor casing section 19 is reinforced by the flange 21 at its base, the

shoulder 23 and the flange 24 at the top. The casing section 20, owing to its cup form, and being pressed upon the section 19, is also made very rigid. The pan-like shape of the shoe 1 and the fan casing or sections 4 and 5 and their joints render these parts very rigid. The plate 10, to which the handle is connected, reinforces these parts and provides a connection for the handle thereto which minimizes the strain thereon.

Lightness in weight, as will be readily appreciated, is of great advantage in the use of the apparatus, as well as in reducing the cost of materials. The parts are easily assembled, and are so constructed that they may be assembled by unskilled workmen, which effects another saving in the cost of manufacture, and this, of course, is of very great advantage in the case of its being necessary to disassemble the device for purposes of repair.

The bearings of the motor may be effectively lubricated, the upper bearing directly, and the lower bearing through the oil conduit 69.

I have illustrated and described my improved suction cleaner in the form in which I have embodied it. I am aware that considerable variations in structural details are possible, but as such variations will no doubt be readily understood by those skilled in the art to which this invention relates, I have not attempted to illustrate or describe the same herein. I desire to be understood as claiming the same specifically in the form illustrated, as well as broadly within the scope of the appended claims.

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

1. In a suction cleaner, the combination of a shoe comprising a circular plate having downwardly projecting flange at its edge and channeled arms, said arms being extensions of said flange, said flange and arms being provided with a rim-like tread; and a removable shoe plate having upturned flanges at its side edges telescoping with the flanges of said shoe, there being a space between the front and rear edges of said plate and said flanges.

2. In a suction cleaner, the combination of a shoe comprising a circular plate having downwardly projecting flange at its edge; and a removable shoe plate having upturned flanges at its side edges telescoping with the flanges of said shoe, there being a space between the front and rear edges of said plate and said flanges, the front and rear edges of said shoe plate being provided with narrow upturned flanges.

3. In a suction cleaner, the combination of a shoe comprising a circular plate having

a downwardly projecting flange at its edge; and a removable shoe plate having upturned flanges at its side edges telescoping with the flanges of said shoe, there being a space between the front and rear edges of said plate and said flanges.

4. In a suction cleaner, the combination of the fan and motor casings; and a cylindrical chambered suction shoe on which said fan and motor casings are mounted, having channeled arms opening into the shoe chamber, and terminating in a plane tangential to said shoe and thus coacting to support the structure when it is arranged on its side.

5. A suction cleaner comprising a shoe having a downwardly projecting cylindrical flange at its edge; and a pair of radially disposed channeled arms, the distance between the outer ends of said arms being substantially the diameter of the shoe.

6. In a suction cleaner, the combination of a sheet metal shoe having a flat top wall and a superimposed sheet metal fan casing having a flat bottom wall; a reinforcing plate arranged between said shoe and fan casing and secured to said walls thereof, said walls and plate being provided with central registering openings; a handle; a hinge member on said handle, said reinforcing plate being provided with an integrally formed hinge arm projecting beyond the sides of said shoe and fan casing and having a hinge knuckle at its outer end coacting with the knuckle of said handle; and a pintle for said knuckles.

7. In a suction cleaner, the combination of a shoe; a superimposed fan casing; a reinforcing plate arranged between the top wall of said shoe and the bottom wall of said fan casing and secured to said walls, said walls and plate being provided with registering openings whereby the shoe is connected to said fan casing; and a handle hinged to said reinforcing plate.

8. In a suction cleaner, the combination of a shoe comprising a circular sheet metal plate having an integral downwardly-projecting flange at its edge and channeled arms, the flange being extended to provide the arms.

9. In a suction cleaner, the combination of a shoe comprising a plate having a downwardly-projecting cylindrical flange at its edge and forwardly-projecting channeled arms opening into the shoe, the arms being extensions of the flange.

In witness whereof, I have hereunto set my hand and seal in the presence of two witnesses.

EDWARD M. BARNES. [L. s.]

Witnesses:

ARTHUR A. CROTHERS,
ROY W. CHANDLER