

Dec. 3, 1940.

E. G. PETERSON

2,223,638

BUFFING HEAD

Filed Oct. 5, 1936

2 Sheets-Sheet 1

Fig. 1

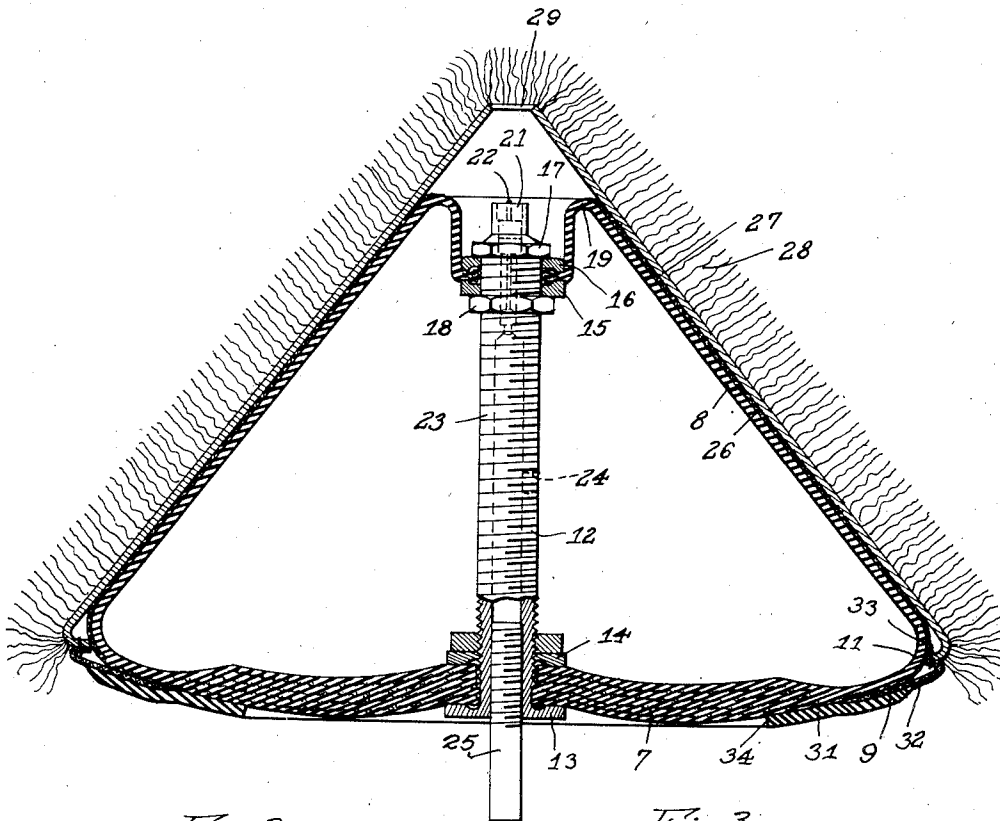


Fig. 2

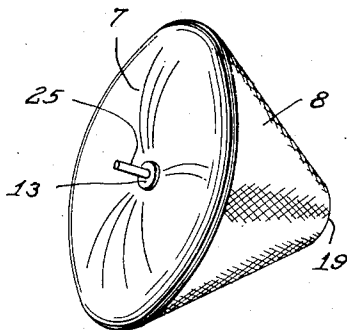
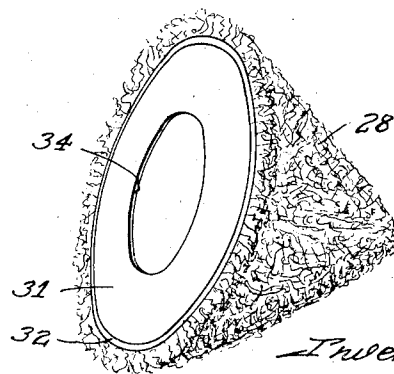


Fig. 3



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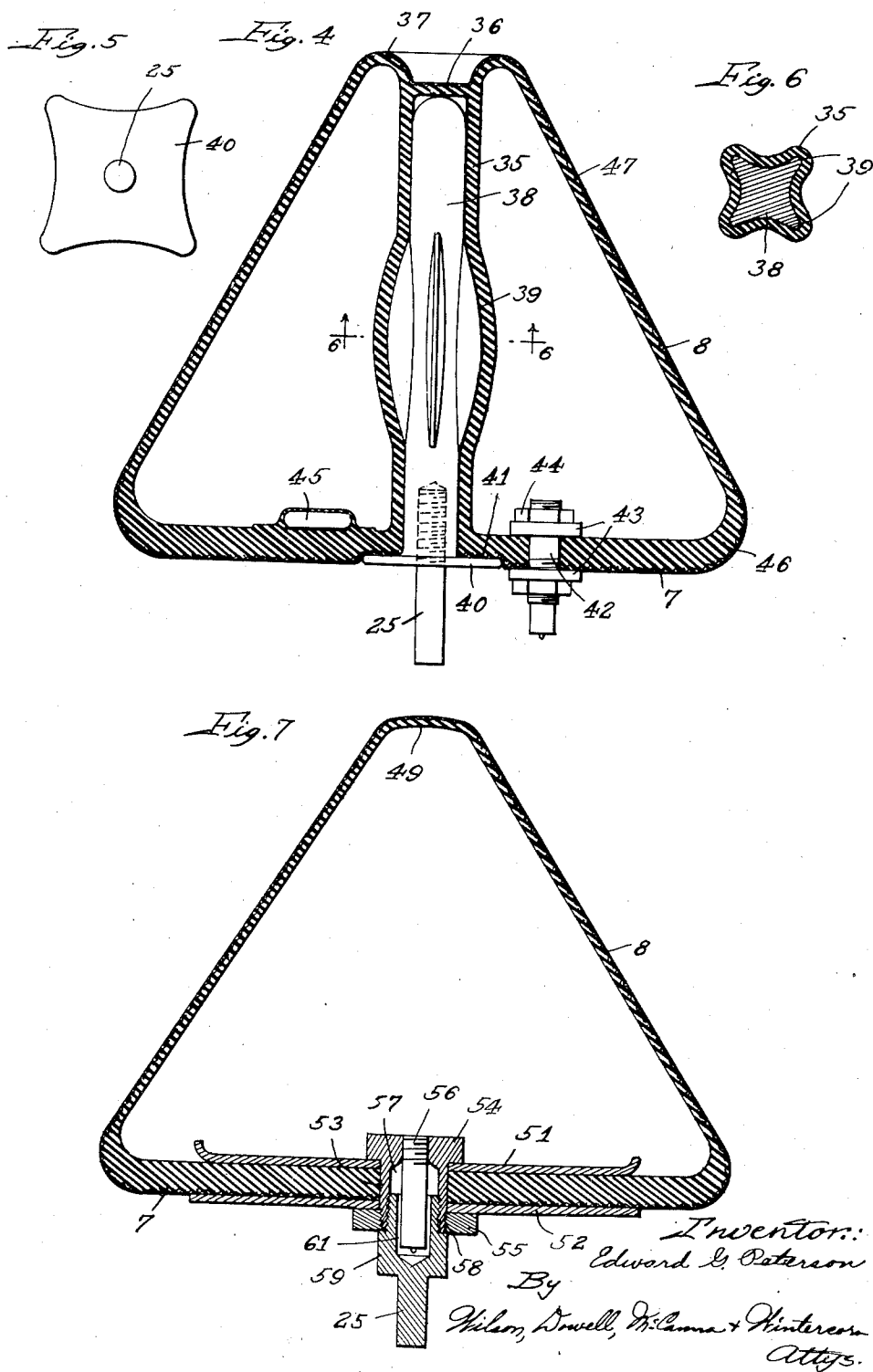
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2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

2,223,638

BUFFING HEAD

Edward G. Peterson, Rockford, Ill.

Application October 5, 1936, Serial No. 103,997

3 Claims. (Cl. 15—230)

This invention relates to buffing devices, and has special reference to a buffing head of improved characteristics.

An object of the invention is the provision of a buffing head having a highly resilient face capable of readily taking the surface configuration of the work, having shape characteristics adapting the head for a wide variety of work, and capable of giving the work a substantially straight line wiping or buffing movement.

Another object of the invention is the provision of a pneumatic buffing head having improved means for inflating and driving the same.

A further object of the invention is the provision of a buffing head adapted to be used with portable driving means for use in the buffing of automobile bodies and similar surfaces.

A still further object of the invention is the provision of an improved buffing cover.

Other objects and advantages will become apparent to those skilled in the art from the following description and the accompanying drawings, in which—

Figure 1 is a section through an inflated buffing head and cover embodying my invention;

Fig. 2 is a perspective view of an inflated buffing head embodying the invention;

Fig. 3 is a perspective of a buffing cover;

Fig. 4 is a section through a modified form of the device, uninflated;

Fig. 5 is a view of the bottom end of the drive shaft shown in Fig. 4;

Fig. 6 is a section on the line 6—6 of Fig. 4, and

Fig. 7 is a section through a modified form of the device, uninflated.

The invention contemplates the provision of a gas cell in the form of a right cone having a base 7 and conical side walls 8, the cell being adapted to be inflated to give the side walls 8 a desired resiliency. The side walls 8 are formed of a resilient substantially gas-tight material such as sheet rubber, and should be relatively thin so as to be capable of ready flexion so that the side of the gas cell may take the configuration of the surface against which it is being pressed.

Referring to Figure 1, the base 7 is formed of a plurality of fabric layers impregnated or covered with rubber so that it is relatively stiff and will remain substantially plane when the gas cell is inflated. In this instance, the thickness of the base is decreased toward the annulus as shown at 9 so that the junction between the base and the side wall will become rounded as shown at 11 under the inflation pressure. A valve stem 12

having a head 13 is positioned at the center of the base and projects perpendicularly therefrom through the gas cell, the stem being attached to the base by means of the head 13 and a nut 14 between which the base is clamped. The opposite end of the valve stem passes through an opening at the point of the cone, the side walls of which are clamped between washers 15 and 16 by means of nuts 17 and 18 threaded onto the valve stem, thereby sealing the gas cell at the point at which the stem passes through. When the cone or cell is inflated the side walls curve upwardly as shown at 19 around the projecting end 21 of the valve stem to form a pocket within which the projecting end of the valve stem is recessed. This projecting end of the valve stem has the conventional air valve 22 communicating with a longitudinal bore 23 and a lateral opening 24 through which air may pass for the purpose of inflating the cone. The opposite end of the bore 23 is closed by a pin 25 which projects perpendicularly from the center of the base and serves as a means for driving the head. This pin is received in a conventional hand motor unit such as used in portable buffing operations which may be a portable motor, a flexible shaft, or other driving means. The outer surface of the gas cell is covered by a layer of fabric 26 which serves to prevent distortion of the rubber side walls 8 away from a fairly true conical shape. I have found that the results of the invention are best obtained when the cone is so shaped that the walls lie at an angle of about 20° to about 70° with respect to the base depending upon the particular type of work.

In service the gas cell or cone is provided with a cover carrying the abrasive, a preferred form being shown in Figs. 1 and 3. In this instance the abrasive is a sheep's wool buffing element which consists of a leather sheet 27 upon which the wool still remains, as shown at 28. This buffing element is cut and sewed in the form of a cone of the same slope as the buffing head leaving a small opening at the point of the cone as shown at 29. This opening is such as to permit access to the projecting end 21 of the valve stem so that the cone may be inflated with the cover in position. At the base of the conical cover a disk 31 of flexible rubber is attached; for example, by vulcanizing the rubber to a piece of fabric 32 extending along the annulus of the disk which is in turn sewed to the sheep's wool portion of the cover as shown at 33. The center of the rubber disk 31 is cut out as shown at 34 so that the gas cell may be inserted into the cover

through this opening or conversely so that the cover may be drawn over the gas cell, the rubber ring 31 stretching out for the passage of the cell. When the cell is accurately positioned within the cover, the rubber disk or ring 31 seats against the base 7 so as to firmly retain the cover in the position shown in Figure 1. The cover cooperates in the same way with those forms of the invention shown in Figs. 4 and 5, and presently to be described.

In the form shown in Figs. 4 to 6, inclusive, is shown a structure wherein the driving means does not pass through the gas chambers and the only opening into the gas chambers is that necessary for the insertion of the air valve. This materially reduces the opportunity for leakage. In this form the side walls 8 of the gas cell are carried downward from a point adjacent the apex of the cone as shown at 35 to form a central bore perpendicular to the center of the base 7, the walls of the bore being attached to the base. The top of the bore is closed by a wall 36 which is spaced inward from the end of the bore to form a recess having an annular soft edge 37 which permits the side of the cell in contact with the work to flatten without the exertion of undue pressure at the end of the cell. A shaft 38 is received in the bore and is of such size as to fit tightly therein. The shaft has annularly spaced longitudinally extending ribs 39 which terminate short of the ends of the shaft. These ribs normally prevent movement of the shaft with respect to the bore either longitudinally or rotatively. Preferably the shaft is placed in position in the bore prior to the time the raw rubber is vulcanized so that the bore is caused to seat against the shaft intermediate the ribs as shown in Fig. 6. Furthermore, when the cell is inflated the walls 35 are pressed against the shaft. The upper end of the shaft substantially abuts against the wall 36 while the lower end of the shaft is flanged as shown at 40, the flange being of the general shape shown in Fig. 5. This flange is seated in a recess 41 in the base 7 formed by inserting the drive shaft in place prior to the vulcanization of the raw rubber so that the rubber takes a form complementary to the flange during the vulcanizing operations. Further driving connection between the gas cell and the shaft is therefore established through the complementary relationship of the flange and the base, the general rectangular form of the flange preventing slippage of the base with respect thereto. The driving pin 25 is threaded into the lower end of the shaft for attachment of the buffing device to suitable driving mechanism. A valve stem 42 passes through the base 7 and is secured therein against leakage by the customary washers 43 and nuts 44. A counterbalancing weight 45 is positioned on the base 7 within the cell, this weight constituting a piece of lead or other material embedded directly within the body of the base. It will be observed that in this form the central form 38 serves to lend stability and balance to the buffing head for high speed operation. The walls of the cell are in this form formed of molded rubber, the thickness being gradually increased at the junction between the base 7 and side walls 8 as shown at 46 so that when the cell is inflated some additional curvature will be taken on in this area due to the air pressure but that the base shall be considerably stiffer than the side walls so that under moderate inflation pressure the cell will retain its general conical shape. The outer surface of the cone is preferably covered with a layer of fabric as shown at 47. It will be understood that the figures do

not necessarily show the relative thickness of the fabric layer and of the rubber layer since the fabric is intended to give the cell strength and shape while the rubber need only be sufficient to make the cell gas-tight.

In Fig. 7 I have shown a further form wherein the side walls 8 meet at a point substantially at the apex of the cone though the cone is slightly truncated as shown at 49 partly due to the effective inflating of the cell. In this form a circular plate 51 is positioned against the inner side of the base 7 and a plate 52 is positioned against the outer side, the base being gripped between these two plates. At the center of the base is a sleeve 53 having a head 54 which abuts against the plate 51. A nut 55 on the sleeve abuts against the plate 52 and is threaded onto the sleeve to an extent sufficient to firmly grip the base 7. A valve stem 56 is threaded into the head 54 and projects longitudinally in the bore 57 of the sleeve 53, the bore being considerably larger than the stem. The bore 57 is threaded as shown at 58 for the reception of a driving element 59 which is provided with a bore 61 for the reception of the outwardly projecting end of the valve stem 56. The driving member 59 carries the pin 25 through which driving connection is established with a motor or other driving element as heretofore described. It will be seen that the gas cell in this instance inflated by threading the driving element 59 out of the bore 57, leaving the free end of the valve stem 56 exposed. Likewise, it will be noted that this driving element protects the valve stem during the use of the buffing head.

An important phase of the invention is the shape of the air cell. By forming this cell in the general or appropriate shape of a cone or a truncated cone, numerous advantages are obtained. One of these is the fact that it permits of substantially straight line buffing motion together with a relatively wide buffing area and a shape characteristic which permits of access into openings of limited size. In the past, two types of buffing heads have been common, one comprising an arcuate pad operated with the axis of rotation perpendicular with respect to the work. This type of head gave a circular buffing motion to the work and in fine work left circular swirls or buffing marks. The second type is in the form of a cylinder in which the axis of rotation is parallel to the work. This type of head gives a straight line buffing motion but permits of only a relatively small area of contact between the work and the abrasive. When the size becomes large it is then impossible to have access to surfaces having a limited amount of head room or space thereabove. On the other hand, when the cylinders are made small it is necessary to use a rigid central shaft in order to prevent the extreme end of the cylinder from wobbling at high speed. By means of the shape characteristics herein described, the buffer produces a straight line buffing motion, the radius of the base of the head is relatively great so that a relatively great area of contact is obtained between the work and the abrasive while the tip of the buffing head is of such size that it may be inserted into openings of limited space. A further advantage of this shape is the fact that the head may be rotated at high speeds since the tip is held in alignment by the relatively large base.

A still further advantage of this shape is the fact that the buffing head or tool does not tend to jump or bound on the work as is common with cylindrical buffing tools. This results from the angularity of the shaft of the tool with respect

to the work and from the high degree of resiliency of the buffing head. This further eliminates any tendency of the buffing head to form buffing marks on the work.

5 Another feature of the invention is the fact that the walls of the air cell are relatively thin material and are backed solely by pneumatic pressure which permits of adjustment of the resiliency of the head so that the buffing surface
10 readily takes the shape of the work. Through this means uniform operation is obtained on work of irregular surface shape such as the curved body surfaces of automobiles and the like, or portions of automobile bodies having ribs or other
15 abrupt changes in the otherwise plane surface.

Another feature of the invention is that when the operator forces the side of the buffing head down against the work the cell flattens in the direction of its motion so as to give a greater flat
20 area in contact with the work. This can be regulated to a considerable degree by the amount of pressure in the gas cell. This action is greatly facilitated by the thin side walls which flex rapidly under the rotation, the walls being backed up
25 by gas which is sufficiently fluid to move freely ahead of the deformation in the gas cell. This is also facilitated by the semi-rigidity of the base of the cone.

Another feature of the invention is the resiliency of the head along the edges of the buffing surface, that is, at the tip of the cone and at the
30 junction between the side walls 8 and the base 7. Because of the softness, flexibility, or resiliency at these points, there is no tendency for an uneven buffing effect along the buffing surface.
35 Furthermore, this permits of a considerable variation in the pressure within the cell so that the softness of the buffing head may be varied within wide limits without producing an uneven buffing effect.

40 Another advantage of the invention is in the fact that the cover requires no fastening means for securing the same in place and may be rapidly stripped off and replaced for change in the type of abrasive as the work may require.

45 It will also be observed that the invention per-

mits of a central supporting shaft through the air cell without substantially interfering with the resiliency of the working surface.

While I have thus described and illustrated specific embodiments of the invention, I do not
5 wish to be limited except as required by the prior art and the scope of the appended claims, in which—

I claim:

1. The combination in a buffing head of a gas
10 cell of thin walled resilient material in the approximate form of a truncated right cone, said cell having a central tubular portion defining therein a bore extending perpendicular to the center of the base, said base having a recess of
15 non-circular shape annularly of the center of said tubular portion, a shaft positioned in said bore having a plurality of circumferentially spaced longitudinal ribs intermediate its ends and an outwardly flared end complementary to said
20 recess seated in the recess of the base, and a spindle on said shaft positioned perpendicularly to the center of said base for driving the buffing head.

2. The combination recited in claim 1, where-
25 in the side walls of said cone curve inward and downward at the apex of the cone under inflation pressure to merge with the end of the tubular portion to provide an annular pneumatic ring above the end of the shaft. 30

3. The combination in a buffing head of an approximately conical gas cell of thin walled resilient material, said cell having a central tubular portion defining therein a bore extending there-
35 through perpendicular to the center of the base, a shaft positioned in said bore having an outwardly flared end seated against the base of the cone, a spindle on said shaft projecting perpendicularly to the center of said base for driving the buffing head, a valve stem for inflating said
40 cell electrically positioned on said base, and means on the base for counterbalancing said valve stem.

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CERTIFICATE OF CORRECTION.

Patent No. 2,223,638.

December 3, 1940.

EDWARD G. PETERSON.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, second column, line 41, claim 3, for the word "electrically" read --eccentrically--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 14th day of January, A. D. 1941.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.