Jan. 2, 1945. J. E. VALENTINE ET AL 2,366,680

PAD AND METHOD OF MANUFACTURE

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Fig. 1.

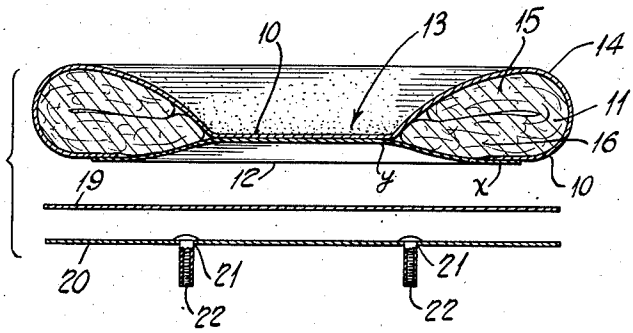


Fig. 2.

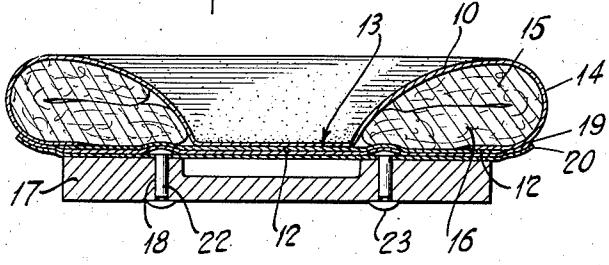


Fig. 3.

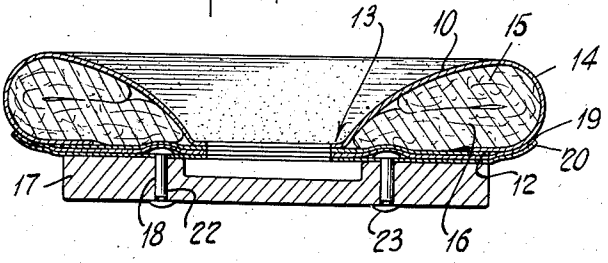
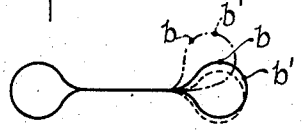


Fig. 4.



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Fig. 5.

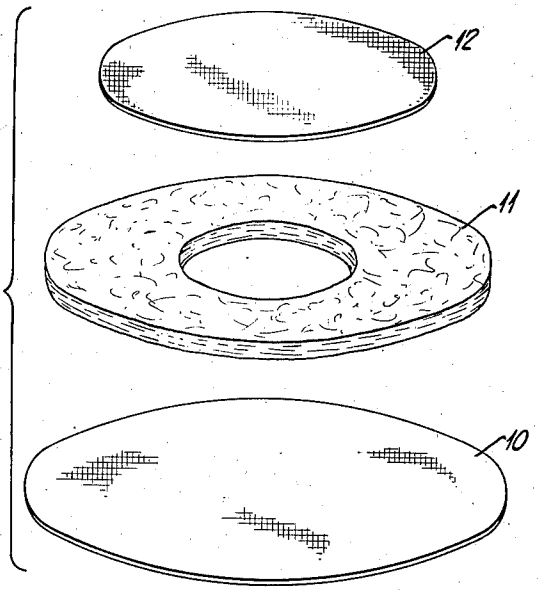


Fig. 6.

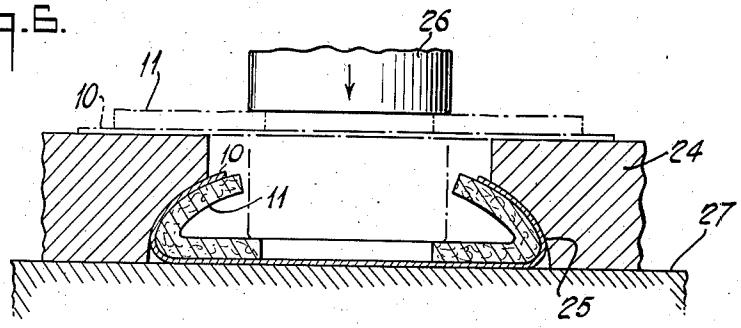
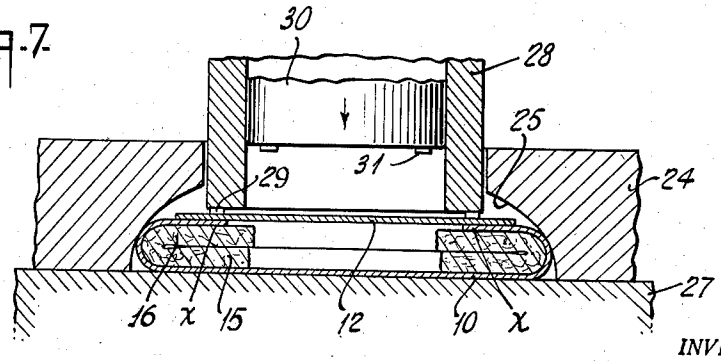


Fig. 7.



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PAD AND METHOD OF MANUFACTURE

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Application April 20, 1943, Serial No. 483,826

5 Claims. (Cl. 155—184)

This invention relates to a pad-like article adapted to serve as a bearing surface, or a closure means, or both, herein termed a pad, and to a method of making the article.

An object of the invention is to provide a simple, practical, and efficient article and method of making the article, of the above mentioned kind.

Another object of the invention is to provide a pad adapted to be interposed between a rigid member and a non-rigid member, such, for example, as a portion of the human body, and to provide a bearing surface adapted to conform to the surface of the non-rigid member, and to define a shielded area around a portion of said surface.

Another object of the invention is to provide a pad adapted to provide a bearing surface surrounding a concavity the depth of which may be varied without substantially decreasing the width of the concavity.

Another object of the invention is to provide an improved method of forming a pad comprising an annular envelope swingably related to a central web-like member.

Another object of the invention is to provide a pad having a bearing portion, and a non-bearing portion the spacing of which from a given surface is variable due to the ability of said bearing portion to change its line of contact with said surface.

Another object of the invention is to form a pad of the kind described which may be readily attached to or detached from a foundation or backing member.

Another object of the invention is in general to provide an improved article of the above mentioned nature and to provide an improved method of constructing the same. Other objects will be in part obvious or in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, arrangements of parts, and in the several steps and relation and order of each of said steps to one or more of the others thereof, all as will be pointed out in the following description, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings,

Figure 1 is a horizontal cross sectional view of a pad embodying our invention, showing in exploded relation a means for attaching the pad to a backing or carrier;

Figure 2 is a view similar to Figure 1, showing the pad and attachment means assembled to a backing or carrier;

Figure 3 is a view similar to Figure 2, but showing the web portion of the pad provided with a central opening;

Figure 4 is a diagrammatic view illustrating the hinged or swinging action of the bearing portion of the pad relative to the web portion;

Figure 5 is an exploded view, showing in perspective the members comprising the pad shown in Figure 1;

Figure 6 is a vertical cross sectional view showing two stages in the forming of a pad from the members illustrated in Figure 5; and

Figure 7 is another view similar to Figure 6 illustrating a further stage in the formation of the pad.

Our pad comprises the facing member 10, the disk-like pad of filling material 11 which may, if desired, be annular, as shown in Figure 5, and the backing member 12. The material selected for members 10, 11, and 12 may of course vary widely according to the use for which the pad is intended and it is to be understood that we do not intend to limit ourselves to any particular material or materials. If, however, the pad is intended for use as a bearing surface against a portion of the human body, we prefer to use for the facing member a moisture absorbent material since it can be readily asepticized and since a surface on which moisture does not readily condense is more comfortable to the user. Thus, for example, a facing of velour may be employed for a pad intended for such use. The disk-like filling member 11 may preferably be made of a compactible, resilient material, such, for example, as cotton or wool padding, and the backing member 12 may desirably be made of a less expensive material than the facing material, such for example, as coarse cotton cloth. The backing member preferably has a coating of adhesive material, as, for example, a thermoplastic adhesive, on its inner surface for facilitating the assembly of the members into a pad as will be described.

Referring now to Figure 1 the pad which we form with the members 10, 11, and 12, comprises a central web portion 13 having around its periphery an annular envelope 14, which is expanded and given a rounded surface by the inclusion therein of disk-like filling member 11, which is preferably, but not necessarily, annular, and which in the embodiment of the invention illustrated herein is preferably bent over upon itself peripherally within said envelope so that

the portion or arm, 15, is superimposed upon the portion or arm, 16.

The web portion 13 comprises portions of the superimposed facing 10 and backing 12, secured together as at *y*. The laminated, substantially plane surface, thus formed within the area defined by the circular line of union *y*, is relatively thin compared to the envelope portion 14.

The envelope portion of said pad similarly comprises portions of facing member 10 and backing member 12, the superimposed peripheral portions of which are interengaged as at *x*, but it is of substantially greater thickness than the web portion 13 due to the inclusion therein of filling member 11, which, as bent over and compacted therein, is substantially U-shaped in cross section.

As illustrated diagrammatically in Figure 4, the bearing surface of the pad, due to the hinge-like connection between the envelope portion 14 and the web portion 13, may swing from the plane of the web to a position substantially normal to the plane of the web and in so doing increases the lateral displacement of the web from the bearing surface of the pad. As the envelope portion swings inwardly its line of contact with a surface against which the pad is presented, moves outwardly around the rounded bearing surface, as, for example, from *b* to *b'*, Figure 4, and it will be noted that when the envelope is substantially normal to the web the line of contact indicated by *b'* is in substantially the same plane normal to the web as the previous line of contact *b*, indicating that while the depth of the concavity defined by the pad is increased the perimeter of its line of contact remains substantially the same.

The above described pad-like member may be readily attached to a carrier, which may take the form of a rigid member 17, as shown in Figures 2 and 3, and which is provided with the apertures 18. In Figure 1, we have shown, in exploded relation to the pad, two disk-like members 19 and 20, of any suitable material such for example as cotton cloth, which may be successively superimposed on backing 12. The outer member 20 may be apertured at 21, and adapted to register with the apertures 18 of the carrier 17, to receive the shank portion of the internally screw threaded members 22, the head portions of which are interposed between members 19 and 20. After the members 19 and 20 have been superimposed on backing 12 the shank portions of the internally threaded members 22 may be inserted through apertures 18 in carrier 17, and detachably secured therein by means of the externally screw threaded members 23 which are adapted to engage in said internally screw threaded members 22.

We prefer to position the means for attaching the pad and carrier adjacent to the hinge-like connection between the web and envelope portions of the pad, so that a substantial portion of envelope 14 will be able to swing inwardly, thus presenting a different line of contact to a surface against which it is presented, as pointed out above in connection with Figure 4, and thus moving the web portion 13 and the carrier 17 away from said surface, and increasing the depth of the enclosed space defined by said pad and surface, without substantially lessening the perimeter of the line of contact between said envelope and surface.

By making the carrier 17 of a diameter less than the maximum diameter of envelope 14 the latter may be given a cantilever action and swung around the periphery of the carrier, as illustrated by the dotted lines in Figure 4, thus lessening the lateral displacement between the web and the line of contact of the bearing surface.

In making the pad illustrated in Figures 1, 2, and 3, we employ an annular mold 24 having a circular inner face forming a mold cavity the lower portion of which is outwardly curved as at 25 forming a chamber of progressively increasing diameter. We first place the member 10 across the top of the cavity defined by the mold, the diameter of which is substantially less than the diameter of facing member 10 so that a substantial portion of member 10 extends radially beyond the mold opening. We next place the disk-like filling member 11 on top of facing member 10, and center it thereon, said member 11 being also of a diameter greater than the diameter of the mold cavity so that a portion of said member, on the order of one-half of the width thereof, will extend radially beyond the mold cavity. We then force the superimposed members 11 and 10 downwardly into the mold cavity, as by means of the die or plunger 26, the diameter of which is preferably substantially less than the diameter of the mold cavity, until they reach the bottom thereof, which, as illustrated herein, may be defined by the horizontal surface 27.

During the downward stroke of die or plunger 26 it will be understood that the peripheral portions of the members 10 and 11, which extend radially beyond the periphery of the mold cavity, will be bent upwardly substantially at right angles to the portion of said members 10 and 11 which are substantially of the diameter of the mold cavity. When said upwardly extending peripheral portions of members 10 and 11 reach the part of the mold cavity of increased diameter, defined by the curved portion 25 of the mold wall, the sharp angle between the horizontal center portions and the vertically extending peripheral portions respectively tend to round and the peripheral portions are simultaneously drawn down and bent inwardly, "mushrooming" into the increased space provided by the outwardly expanding mold wall and assuming substantially the position shown at the bottom of Figure 6.

We next withdraw the plunger 26 and insert in the mold cavity the backing member 12 which is of a diameter on the order of the diameter of the upper portion of the mold cavity and is thus adapted to extend over the central portion of the superimposed facing and filling members and to overlap the bent over inwardly extending peripheral portion of facing 10 on top of arm 16 of the peripherally bent over filling member 11. We then insert member 12 in the mold cavity, and join it to the upper surface of the facing member 10 around its bent over, inwardly extending peripheral portion, on top of arm 16 of filling member 11, and preferably also to the inner surface of facing member 10, or to the filling material if it is not cut away centrally as illustrated, within the area defined by the inner periphery of the bent over portion of filling member 11.

For performing these steps we prefer to employ a backing member 12 which is coated on its under surface with a thermoplastic adhesive of any suitable, known kind, and to secure it to facing member 10 at the two above mentioned places by employing a hollow die 28, the external diameter of which should be greater than that of die member 26, illustrated in Figure 6, and of a size to substantially fill the upper portion of the mold cavity. The die 28 is of sufficient thickness so that its lower end will extend over the overlapped portions of facing 10 and backing 12, and is pro-

vided with the downwardly projecting contact 29, which is heated, as for example, by an electric circuit, not shown, and serves to soften the thermoplastic adhesive carried by backing member 12 and to thus secure together the peripheral portions of members 10 and 12, as illustrated at x in Figure 1.

The die member 28 has the internal plunger 30 which is adapted to move below the lower end of die 28, and its diameter is preferably less than the diameter of the space defined by the bent over, inwardly extending arm 16 of filling member 11 so that, in the embodiment of the invention shown herein in which the filling member is annular, plunger 30 will carry the central portion of the backing member into contact with the rear surface of facing 10 and, by means of heated contact 31 will cause the backing 12 and facing 10 to be joined together, as for example, along the line y indicated in Figure 1.

It will be understood that by joining the facing member 10 and backing member 12 together along the line y the web portion 13, is formed and the annular envelope portion 14 is sealed, with the peripherally bent over annular filling member 11 compacted therein, with its arm portions 15 and 16 pointing inwardly toward the center of the finished article, and with its bent over or curved portion enclosed by the outer periphery of said envelope so that the tendency of arms 15 and 16 to open, together with the resiliency of the material from which the filling disk 11 is formed, contour the envelope portion 14, giving it a rounded bearing surface projecting laterally from the plane of the web portion 13 of the completed pad.

It will thus be seen that there has been provided by this invention a method, apparatus, and an article in which the various objects hereinabove set forth together with many thoroughly practical advantages are successfully achieved. As various possible embodiments might be made of the mechanical features of the bove invention, and as the art herein described might be varied in various parts, all without departing from the scope of the invention, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

What we claim is:

1. A pad comprising a relatively thin web member having around its periphery an annular envelope of deformable material filled with a resilient, padding member, said padding member being bent over upon itself from its outer periphery inwardly whereby it is adapted to exert an expanding force upon said envelope.

2. The method of making a pad and the like comprising positioning a circular soft, resilient filling on the back side of a disk-like facing material member, inserting the combination into a die chamber having a progressively increasing diameter, thus causing the edge portion of said facing to bend around and over a face of said filling infolding said filling, pressing a backing over the rear face of said filling and over the bent over edge portion of said facing, and securing it to the said bent over edge portion of said facing and also securing the said backing to said facing inside the line defined by the bent over edge of said filling.

3. The method of forming a pad which comprises the steps of superimposing a substantially circular resilient filling member on a disk-like facing member peripherally bending over together the superimposed filling and facing members, superimposing a backing member over the bent over edge portions of said superimposed filling and facing members, and attaching said backing to said facing member at the bent over edge portion thereof and at the central portion thereof inside the line defined by the edge of said superimposed bent over portion of said filling member.

4. A pad and the like comprising, a resilient filling member having a substantially round periphery superimposed on a facing member having a substantially round periphery, said superimposed filling and facing members being bent over peripherally, and a backing member superimposed over the bent over edge portions of said filling and facing members and cooperating with the facing member to form a closure enclosing said filling member said superimposed backing and facing members being joined together along a plurality of radially spaced lines.

5. A pad assembly comprising, a filling member having a substantially round periphery superimposed on a facing member having a substantially round periphery, said superimposed facing and filling members being bent over peripherally, and a backing member superimposed over the bent over edge portions of said filling and facing members and cooperating with the facing member to form a closure enclosing said filling member, said superimposed members being joined together along a plurality of radially spaced lines, and a rigid carrier member detachably secured to the said closure enclosing said filling member and of a size such that a portion of said pad may be bent over the edge of said carrier.

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