July 21, 1959 HENRI-LOUIS REGLEY 2,895,469

MASSAGING APPARATUS OF THE BALL TYPE

Filed Nov. 15, 1957 2 Sheets-Sheet 1

Fig 1

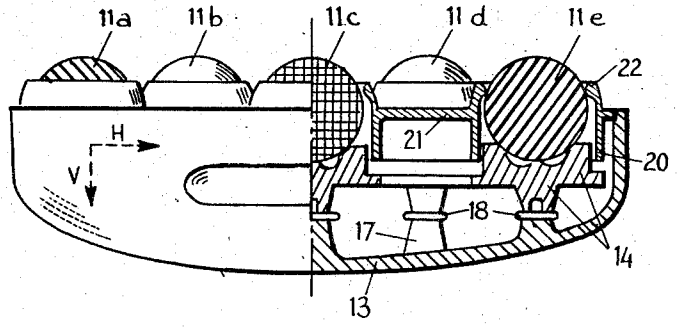


Fig 2

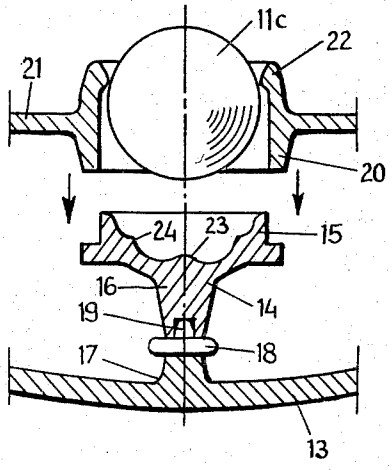
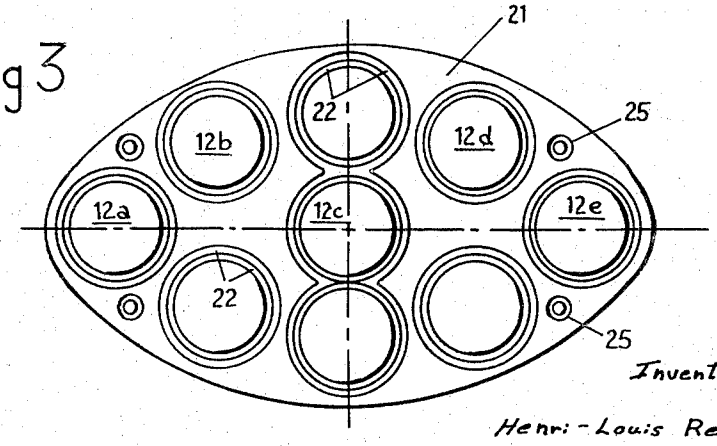


Fig 3



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Fig 9

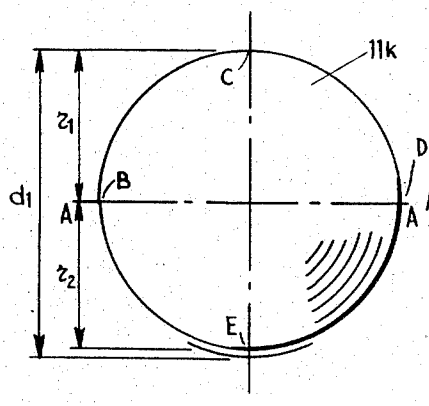
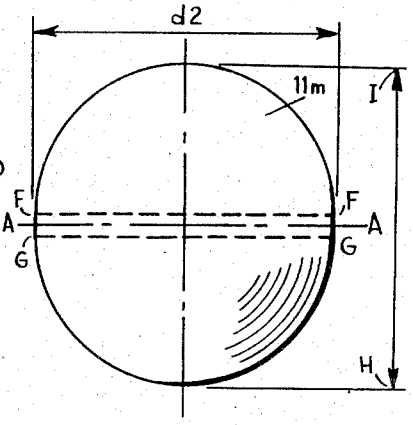


Fig 10



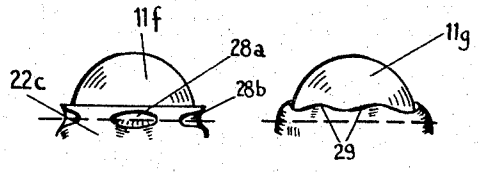


Fig 4

Fig 5

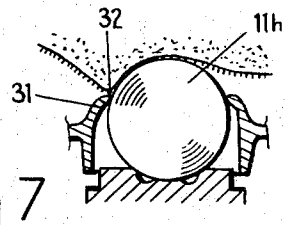


Fig 7

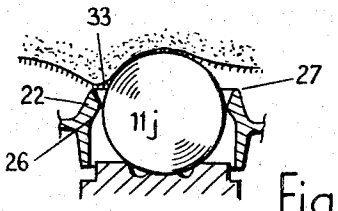
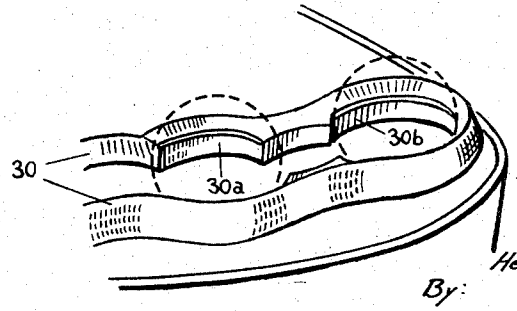


Fig 8

Fig 6



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MASSAGING APPARATUS OF THE BALL TYPE

Henri-Louis Regley, Lille, France

Application November 15, 1957, Serial No. 696,838

Claims priority, application France November 17, 1956

5 Claims. (Cl. 128—57)

My invention has for its object massaging apparatus of the ball type.

Numerous massaging apparatus are known which include striated cylinders, rollers having a wavy outline, rollers with a flexible carrier spindle, strip-carrying balls or rollers provided with suction cups. These apparatus show the drawback of ensuring a somewhat painful massage, since it is very difficult and almost impossible to shift them always in a direction perpendicular to the rotary axis of the different massaging parts. This leads unavoidably to a painful rubbing and drawing along of the skin, not only because the massaging parts are shifted obliquely, but also because the section of the body which is being massaged is never a flat and smooth surface.

It has also been proposed to produce ball-carrying massaging apparatus in which the actual massage is obtained through the action of rotary balls provided on said apparatus. Various embodiments of such ball-massaging apparatus have already been disclosed hitherto. However, I have investigated the matter and provided improvements in ball-massaging apparatus with a view to improving the manner of executing and designing such apparatus and/or to increasing the operative efficiency of said apparatus or the possibility of a pleasant use thereof.

My invention relates to massaging apparatus in which a number of balls revolve in a substantially free manner, as far as the angular setting of their rotary axis is concerned.

According to my invention, and in such a ball massaging apparatus, each of at least a number of said balls is positioned between an individual carrier element and a guiding and ball-holding wall formed in a cover element which is removably secured to the bottom of the massaging apparatus, said cover element carrying a plurality of such guiding and ball-holding wall sections.

According to a further feature of the invention, at least a number of the balls of the apparatus carry engraved or slightly projecting parts forming dots, lines or various areas, or combinations thereof. An advantageous combination of such engraved or projecting parts may be constituted by parallel striations possibly arranged to form two perpendicular sets of parallel striations.

A further improvement consists in establishing the average contact between at least a number of the balls of the apparatus and their individual supports, on the one hand substantially along a circumference and, on the other hand, on a projection or the like provided in the support, so that each ball of said number of balls is subjected during use to small movements differing from a pure rotary movement, as a consequence of the slight irregularities of the ball surface engaging the contacting parts of the support. In a modification, such a projection on the support is replaced by a very small-sized ball which revolves inside a corresponding recess formed in the support.

A still further improvement consists in producing the balls of said massaging apparatus with a deformation of

at least part of their average surface, with reference to a perfectly spherical surface, the average surface considered being in the present case the practically smooth geometrical surface which may be considered as the surface of the ball apart from the small local unevennesses provided on at least some of the balls.

According to a still further improvement relating to a massaging apparatus of the ball type in which the balls project beyond one of the surfaces of the casing, through openings provided in the wall of the latter, it is possible to line at least partly the edges of said openings by a collar or the like projecting outwardly and designed so as to appear as at least locally flaring from the inside to the outside, preferably beyond a line lying at a certain distance from its free edge, in a manner such that said free edge may be located at a distance of at least 15 tenths of a mm. from the cooperating ball which projects in fact substantially beyond said collar.

In a preferred embodiment, the balls are made of molded synthetic material.

My invention will be better understood through the reading of the following detailed disclosure, which disclosure is made with reference to the accompanying drawings wherein:

Fig. 1 is a partly sectional partly elevational view of a massaging apparatus according to my invention.

Fig. 2 is a detail view on a larger scale of one of the balls of the apparatus illustrated in Fig. 1 and of various sections of the latter associated with the ball.

Fig. 3 is a view from above of the cover of the apparatus of Fig. 1.

Figs. 4 to 6 illustrate modifications of the collars or flanges engaging the balls of my improved apparatus.

Fig. 7 illustrates how the collar of a precedingly proposed apparatus risks pinching the patient's skin and Fig. 8 shows how my invention allows cutting out said risk.

Figs. 9 and 10 are two diagrammatic views of balls executed with a general deformation according to my invention, said balls being drawn on a scale larger than unity.

It should be furthermore understood that said drawings and the corresponding description are given merely by way of exemplification and by no means in a binding sense. Furthermore, for sake of clarity, the sizes of certain details have been purposely exaggerated and are out of scale chiefly as concerns the deformation of the balls in Figs. 9 and 10.

As illustrated in Fig. 1, the massaging apparatus includes nine balls of which five (**11***a*, **11***b*, **11***c*, **11***d*, **11***e*) are shown, the locations of the nine balls corresponding to the nine recesses **12***a*, **12***b*, **12***c*, **12***d*, **12***e* . . . of Fig. 3.

The bottom **13** of the casing of the massaging apparatus is also shown, which bottom is integral with the side wall of the apparatus casing.

The different balls are arranged in the apparatus each in its own carrier support **14**, the average geometrical carrier surface for the balls considered as a whole being however preferably substantially flat whereas the lower surface of the bottom **13** of the apparatus is advantageously incurved, as clearly shown in Fig. 1.

The balls are held furthermore inside the apparatus, after complete assembly by collar-forming annuli **22** constituted by the edges of the recesses in ball-holding walls forming together a cover **21** which may, in fact, be subdivided into several elements, if required. Said cover **21** is secured to the bottom **13** of the massaging apparatus for instance through screws extending through openings **25** (Fig. 3) in the cover and engaging tappings which are not illustrated and are formed, for instance, in rein-

forced sections of the bottom **13**, which sections are similar to the inner projecting base **17** illustrated in Fig. 2 and referred to hereinafter.

Each ball rests according to the embodiment illustrated on a support **14** which is removable so that, when the cover of the apparatus has been removed, said support may also be removed.

Each ball support is provided in its upper section (Fig. 2) with an area which I will term hereinafter a dished area **15** while the lower section of the ball support will be termed the foot **16** of said support.

The dished section **15** receives the ball considered, the ball **11***c* in the case illustrated in Fig. 2, and engages it primarily along a circular ridge, as well be disclosed hereinafter.

As to the foot **16** of the support, it rests on a section of the bottom **13**, which section **17** has been referred to already as the projecting base. However, according to an improvement, an elastic member **18** may be fitted between said projecting base and the foot **16** of the support. Said elastic member **18** allows the corresponding balls to be slightly depressed towards the bottom **13** of the apparatus or else to be shifted slightly away from it together with the support elements **15—16**, in conformity with the magnitude of the pressure exerted on said ball during the massaging. Said elastic member acts therefore as a damping member and it is advantageously constituted by a part made of natural or artificial rubber. It is also possible to use for this purpose rubber parts which may be found in trade as sold for other purposes, such as the small plugs closing flasks. In this case, a recess is provided either in the foot **16** of the carrier or in the projecting base **17** for receiving the central tail-end of such a plug, whereby the latter is suitably held in position.

As concerns the individual supports **14, 15, 16** of each ball in the case of the embodiments illustrated in Figs. 1 to 3, it is of advantage to hold them against untimely shifting during the use of the apparatus.

This securing of the individual supports may be obtained as shown in the embodiments referred to, by the lower section **20** of a cylindrical sheath, the axis of which is perpendicular to the plane of the cover **21** (Fig. 3) of the apparatus. The upper section of said cylindrical sheath is preferably designed in a special manner to be disclosed hereinafter with further detail. In all cases, the upper section of the corresponding ball projects beyond said upper section **22** of the cylindrical sheath forming the abovementioned annulus in the ball-holding wall.

The average contacting surface between the ball arrangement and the section of the body to be massaged is either substantially flat or slightly concave or convex.

It will be readily apparent that in a massaging apparatus thus executed, the balls roll in their recesses with a small frictional area; consequently, when such an apparatus serves for massaging a section of the body, this produces on the skin no substantial objectionable tearing or pinching effect. The apparatus acts chiefly through the rolling of the balls in any direction in which the latter are shifted as a consequence of a reciprocatory movement and/or of various turning movements.

According to a still further improvement of my invention, at least some of the balls used in such an apparatus include engraved or slightly projecting points, lines or areas of any shape. As mentioned, it is possible to resort to parallel striations as shown on the balls **11***a* and **11***e* which are illustrated in elevational view in Fig. 1. It is also possible to provide on at least some of the balls two perpendicular sets of striations as illustrated on the ball **11***c* also shown in elevational view in Fig. 1. This arrangement results in that the corresponding balls have a tendency to slightly engage the skin within the limits however of convenient action, while they are thus better driven into rotation.

In my improved massaging apparatus, it is possible to use balls which are all identical or else balls of which some are provided with possibly different superficial engraved or slightly projecting elements, while other balls are smooth or carry a different type of engraved or slightly projecting elements. Similarly, at least a number of the balls of the apparatus may possibly have a size different from that of other balls forming part of the apparatus.

Another improvement illustrated in the embodiment of Figs. 1 to 3 relates to the manner in which at least some balls of the massaging apparatus of the type considered are fitted on their support **14**.

According to said improvement, the contact between a ball and its individual carrier is established, on the one hand, substantially along a circular line and on the other hand, through a projection such as **23**, or the like part positioned inside the support. The circular line or geometrical circumference which forms one of the contacting areas may engage a corresponding line formed either near the upper edge of the dished section **15** of the support, or else, lower down in said section for instance as shown along the circular ridge **24** of Fig. 2. In a modification, the projection **23** in the support is replaced by a small-sized ball revolving inside a recess provided for this purpose in the individual support.

This arrangement results in that, during the massage, each ball is subjected, by reason of its being carried at various points or along different areas, to small movements different from a pure rolling movement by reason of the passage of slight irregular sections of the ball surface over these different contacting points or areas.

The different parts of my improved massaging apparatus are made of any suitable material. It seems however of advantage to establish a large number of these parts, such as the bottom which is in one with the side wall, the cover, the different supports and the actual balls of molded synthetic material, such for instance as acetate of cellulose and polystyrene. The balls may be also made of wood, chiefly box-wood although it is of a particular interest to make them of molded synthetic material.

The upper surface of the annuli or collars **22** holding the balls is advantageously designed according to an improved arrangement in a manner such that the outer part of each collar flares outwardly. Such a flaring may be designed in various manners, chiefly as a function of the thickness which it may be desired to give the collar at the lower end of the latter.

In the example illustrated, each collar or the like part serves primarily for holding the corresponding ball in position. To this end (Fig. 8), the inner diameter **26** of the collar at a predetermined level of the latter is smaller than the diameter of the ball so that the latter, when it has been positioned on the inner side of the collar section at **26**, can no longer pass through the latter.

Consequently, in the embodiment described, the collar flares outwardly starting from said section **26** towards its free edge defined by the terminal annular ridge **27**.

The horizontal spacing in the direction H of Fig. 1, between the upper ridge **27** of the collar thus designed and the ball is above 15 tenths of a millimeter, while the vertical distance between the upper ridge **27** of the collar and the inner ridge **26** which is in substantial direct contacting relationship with the ball is also higher than 15 tenths of a millimeter. Consequently, the skin of the person who is being massaged runs no risk of being pinched, as disclosed hereinafter with further detail. Preferably, the horizontal spacing and the vertical distance referred to are both equal to a value ranging between 2 and 2.5 mm.

Preferably also the ridge **26** when it exists is provided at a small vertical distance in the direction V from the equatorial plane of the ball, so that the plane of the line **27** is in its turn at a substantial distance underneath the upper pole of the ball. For instance, for balls having a diameter of 25 mm., the ridge **26** should be located advan-

tageously at about 25 tenths of a millimeter above the equatorial plane of the ball, while the plane of the line **27** is located at about 7 mm. from the upper pole of the ball.

Fig. 4 shows an embodiment of a collar **22***e*, the upper part of which is thinner than in the case illustrated in Figs. 1 and 2, the retaining of the ball **11***f* being obtained through a throttling at the points **28***a*—**28***b* as provided for instance through stamping at raised temperature or through molding, on the collar.

Among the different types of annuli or collars which may be provided in accordance with the above arrangement, certain collars have a flat upper edge as in the case of Figs. 1 and 4. However, some of the collars may have a discontinuous or sinuous edge. Fig. 5 shows how such an arrangement according to which the upper edge **29** of the collar is sinuous, the ball being shown at **11***g*. In a further modification, the collar is common to a system of two or more balls of the massaging apparatus. Such an embodiment is illustrated in Fig. 6 in which the balls have not been shown otherwise than by dotted circles. In said figure, the collar **30** is provided in accordance with the invention but it is common to several balls. Said collar includes segments **30***a*—**30***b* of which each cooperates with the corresponding ball of the apparatus so as to hold the latter in position.

The protecting action of a collar or the like part incorporated in a massaging apparatus of the ball type in association with the flaring shape given to it as described is shown more particularly in Fig. 8 to be compared with a similar view (Fig. 7), relating to a collar **31** of a non-flaring type. In certain circumstances, it may occur in the case of Fig. 7, that the skin of the massaged person is pinched at **32** in the very narrow gap left between the upper edge of said collar **31** and the corresponding ball **11***h*. In other massaging apparatus which are not provided with a collar a similar pinching would be produced directly between the edge of the opening carrying the ball and the latter. In contradistinction, when the ball **11***j* is fitted inside a collar **22** of the improved type referred to, the space provided between the outer edge **27** of the collar and the ball **11***j* cuts out any risk of pinching the skin at **33** (Fig. 8).

Figs. 9 and 10 relate to another improvement of the invention. According to said improvement, the average surfaces of the balls are subjected to a deformation throughout their area with reference to a perfectly spherical surface.

Turning to Fig. 9, the ball **11***k* illustrated includes chiefly two spherical caps which are very near half-spheres and the diameters of which are slightly different, said caps lying to either side of the line A—A. For instance, the upper hemisphere B—C—D is constituted approximately by a half-sphere the radius *r*1 of which is 12.5 mm. in the present case, while the lower hemisphere D—E—B is substantially a half-sphere the radius *r*2 of which is equal in the present case to 12.2 mm. so that the thickness of the ball from C to E is equal to 24.7 mm. whereas the diameter *d*1 of the sphere inside which the ball is geometrically inscribed is equal to 25 mm.

In the areas round the points B—D where the two half-spheres of different diameters engage each other, the surfaces are slightly deformed so as to merge into each other without any discontinuity.

In the embodiment illustrated in Fig. 10, the ball **11***m* includes also fractions of a sphere, said fractions being constituted in this example by two half-spheres identical with each other. There is inserted between said identical half-spheres a cylindrical slice or possibly a spherical segment, the height of which is equal to the distance between the lines F—F and G—G terminating the half-spheres in said Fig. 10. Thus if the diameter *d*2 of each sphere is equal to 24.7 mm. for instance in the practical embodiment illustrated, the cylindrical slice extending between F—F and G—G may have a height of 0.3 mm. so that the total height H—I of the ball will be equal to 25 mm.

As concerns the manner of producing such balls, it is possible to operate in various manners; in particular it is of advantage to make such balls of a synthetic material which, according to circumstances and to the particular intended use of the apparatus, may be either of a thermoplastic or of a thermosetting type.

When said balls are thus made of synthetic material, it is of advantage to operate through molding inside a mold the two sections of which are assembled in the plane passing through the line A—A, said two sections having exactly the final shape it is proposed to give the ball.

However, according to other embodiments, it is also possible to proceed as follows:

Either by molding the balls which are perfectly spherical and then providing a deformation with reference to sphericity through a further operation following the first molding, for instance through grinding or the like.

Or again by producing balls of a material other than synthetic material such as box-wood as was often practiced hitherto, while giving the desired deformation with reference to a perfectly spherical shape of its average surface. In the case of box-wood and the like wooden balls, such a deformation may be obtained for instance by speeding up the drying during the manufacture. In the same case of wooden balls, it may be of interest to coat the latter with an outer layer of synthetic material, for instance, with a view to increasing the polish of the surface and to protecting the balls against the action of moisture.

A massaging apparatus of the ball type according to my invention shows furthermore considerable advantages and in particular as follows, depending on the embodiment selected:

A greater smoothness together with a greater efficiency for massaging purposes, said advantage being particularly apparent in the case where elastic damping means such as those described hereinabove are inserted between the balls and the bottom of the apparatus.

The absence of any risk of pinching of the skin between a ball and the collar or annulus holding it in position.

A greater efficiency of the massage, which is particularly apparent firstly in the case where the balls are provided with slightly projecting or engraved elements with the consequence that the balls engage slightly and favorably the skin and, secondly, when the ball-supports show such local unevennesses of a generally small amplitude with reference to an average surface adapted to be inscribed over a sphere, said unevennesses being arranged along various lines or areas; furthermore, and thirdly, this efficiency is also increased when some balls at least are provided with certain general unevennesses of their average surface which produce during each massaging movement, palping or the like effects as also the effects of a certain unevenness in the rotary movements, which palping and further effects appear often as highly favorable.

Lastly, the production and assembly of the apparatus is easier.

As already mentioned, my invention is by no means limited to the applications and embodiments of the different parts of the apparatus which have been more particularly described and it covers in contradistinction all the modifications thereof falling within the scope of the accompanying claims.

What I claim is:

1. A massaging apparatus, comprising a plurality of balls, an individual support for each ball inside which said ball revolves freely round undefined axes, a bottom member carrying the different supports, an elastic member inserted between at last one ball-support and the bottom member of the apparatus, a guiding wall hold-

ing each ball against movement out of its support, and a cover element fitted removably over said bottom member and to which the different guiding and ball holding walls are rigidly secured.

2. A massaging apparatus comprising a plurality of balls, the surface of at least some of said balls being provided with elements of modified radii, an individual support for each ball, inside which said ball revolves freely round undefined axes, a bottom member carrying the different supports, a guiding wall holding each ball against movement out of its support, and a cover element fitted removably over said bottom member and to which the different guiding and ball-holding walls are rigidly secured.

3. A massaging apparatus comprising a plurality of balls, an individual support for each ball, inside which said ball revolves freely round undefined axes, each support engaging the corresponding ball along an annular line of said ball, a projection carried by said support engaging a point of the ball in substantial coaxial relationship with the cap defined by said annular line, a bottom member carrying the different supports, a guiding wall holding each ball against movement out of its support, and a cover element fitted removably over said bottom member and to which the different guiding and ball-holding walls are rigidly secured.

4. A massaging apparatus comprising a plurality of balls, at least one of the balls having an average surface which is deformed with reference to perfect sphericity, an individual support for each ball inside which said ball revolves freely round undefined axes, a bottom member carrying the different supports, a guiding wall holding each ball against movement out of its support, and a cover element fitted removably over said bottom member and to which the different guiding and ball holding walls are rigidly secured.

5. A massaging apparatus including a carrier provided with a plurality of openings, a plurality of ball supports rigid with said carrier and a plurality of balls each revolubly carried by a corresponding ball-support and projecting outwardly through the corresponding opening of the carrier, the edge of each opening engaging the corresponding ball along a circular line and projecting beyond same as an outer section flaring outwardly towards a free terminal annular line located at a distance of at least 5 tenths of a millimeter from the cooperating ball.

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