Aug. 9, 1949. H. D. WHEELER 2,478,648

MASSAGE DEVICE

Filed Sept. 14, 1946 2 Sheets-Sheet 1

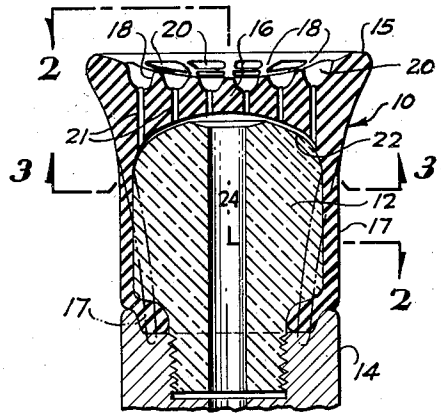

Fig. 1

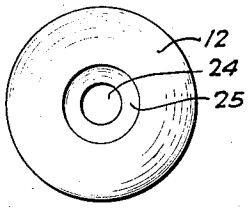

Fig. 4

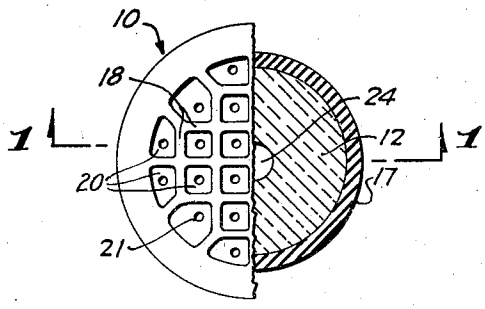

Fig. 2

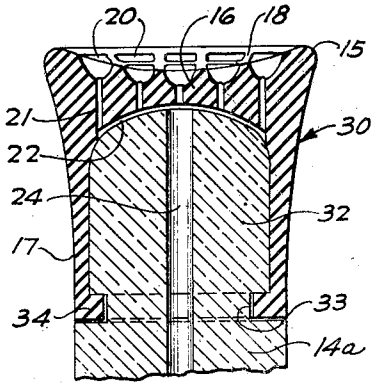

Fig. 5

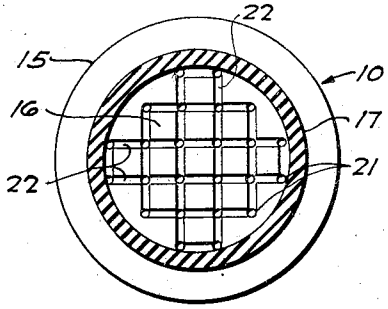

Fig. 3

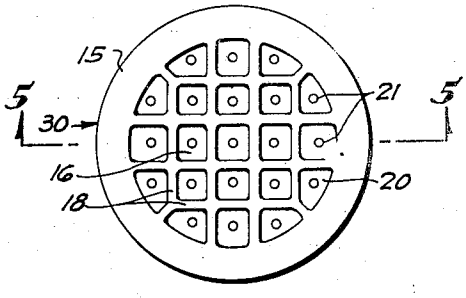

Fig. 6

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MASSAGE DEVICE

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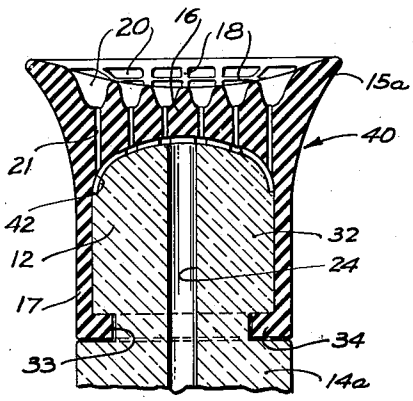

Fig. 7

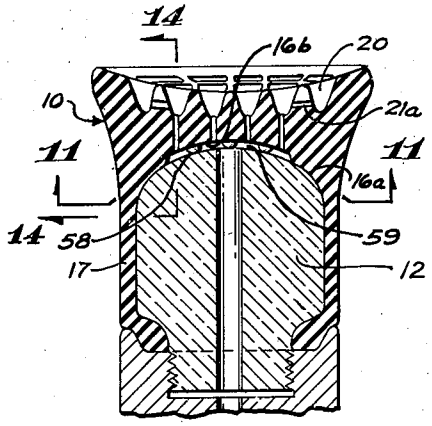

Fig. 10

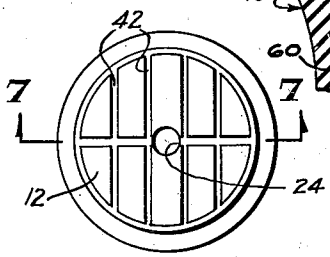

Fig. 8

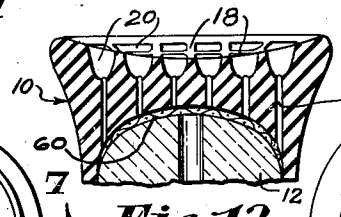

Fig. 12

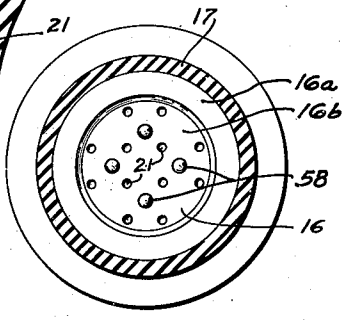

Fig. 11

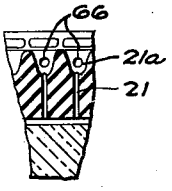

Fig. 14

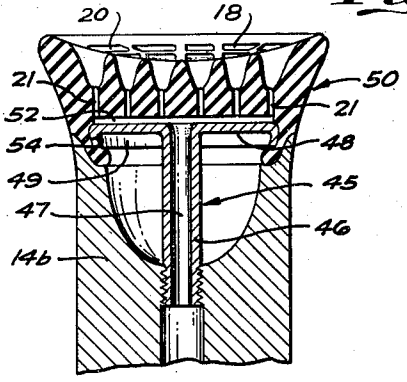

Fig. 9

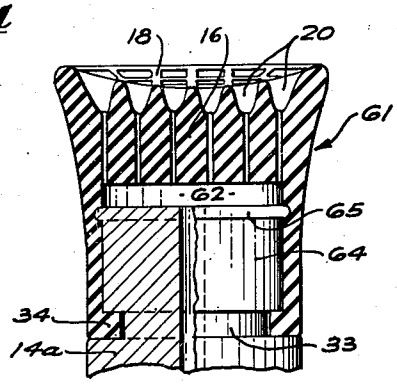

Fig. 13

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UNITED STATES PATENT OFFICE

2,478,648

MASSAGE DEVICE

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Application September 14, 1946, Serial No. 697,007

8 Claims. (Cl. 128—67)

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The present invention relates generally to massage devices of the type used to apply pulsating fluid pressures to tissue and skin areas to be massaged; and more particularly to applicator members for such devices.

A typical massage device of this general class is shown in my previous Patent No. 2,266,931 issued December 23, 1941. My present invention may be used therewith, but is not so limited in its use, for my improved applicator member may be used with any other apparatus that provides a suitable source of pulsating pressure.

Massage devices of this character are used to improve skin conditions and appearance by removing wrinkles and blemishes, and by improving the tone of the underlying tissues. The effectiveness of these devices depends to a large extent upon the operation of the applicator member since it is the latter that actually engages the skin.

Hence it is a general object of my invention to provide an improved applicator that has a better and more effective massaging action on the skin.

It is also an object of my invention to provide an applicator in which the total area to which pulsations are applied is divided into several smaller areas of approximately equal massaging action.

Another object is to provide an applicator member that is soft and flexible to conform to the shape of the surface being massaged but at the same time sufficiently stiff to properly distribute the pulsations to all the relatively smaller areas of massaging action.

The above objects and advantages of my invention, as well as others not specifically mentioned, are attained in a massage device by providing a resilient applicator member formed with a projecting rim portion and a recessed foraminate central portion having web elements arranged in a grid defining a plurality of pressure applying cups. These cups are open at their forward end to the surface to be massaged, and are connected to a source of pulsating fluid pressure by means of suitable fluid supply passages.

The applicator is preferably relatively thin walled and yielding in all parts to permit exact conformation to the surface being massaged, and is then mounted on a rigid supporting member which supports the central foraminate portion at its rearward face. Considerable variation in the exact relation between the applicator and the rigid support is possible depending on the degree and quality of support required; and also depending on the manner in which the fluid supply passages are formed, as they may be provided in the support to a variable degree.

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How the above and other objects and advantages of my invention are attained will be more readily understood by reference to the following description and the annexed drawings in which:

Fig. 1 is a vertical cross-section of a preferred applicator mounted on a supporting member, the applicator being cut by a plane behind the median plane and the normal position of the unsupported sides being shown in dot-dash lines;

Fig. 2 is a combined plan and section on line 2—2 of Fig. 1;

Fig. 3 is a reflected plan view on line 3—3 of Fig. 1;

Fig. 4 is a plan view of the supporting member alone;

Fig. 5 is a vertical median cross-section of a variational form;

Fig. 6 is a plan view of the applicator shown in Fig. 5;

Fig. 7 is a vertical cross-section, taken similarly to Fig. 1, of another variational form;

Fig. 8 is a plan view of the supporting member shown in Fig. 7;

Figs. 9 and 10 are vertical cross-sections, taken similarly to Fig. 1, of other variational forms;

Fig. 11 is a cross-section taken on line 11—11 of Fig. 10;

Fig. 12 is a fragmentary vertical cross-section of another form;

Fig. 13 is a vertical cross-section, taken similarly to Fig. 1, of another form; and

Fig. 14 is a fragmentary vertical section on line 14—14 of Fig. 10.

Referring to Fig. 1, there is shown an applicator member, generally designated by 10, mounted on a rigid supporting member 12 which is screwed into the end of stem 14, which may be part of any suitable type of apparatus, not shown, that serves as a source of pulsating fluid pressure, such as shown in my patent mentioned above. By the term pulsating fluid pressure I refer to varying fluid pressures that may be at all times either above or below atmospheric pressure, or may fluctuate from above atmospheric to below atmospheric pressure.

Applicator 10 is preferably made of rubber, as rubber gives the desired yielding and elastic properties to the applicator. It is formed with an annular projecting rim 15 surrounding the recessed central portion 16, which is generally concave as viewed in Fig. 1, and with rearwardly extending sidewalls 17. Central portion 16 has

a plurality of elements or webs 18 which are arranged in a grid-like formation, shown in Fig. 2, to form a plurality of separate cups 20.

Although cups 20 are shown as usually being square, this shape is preferred only for the sake of simplicity. However, it is desired that all or at least most of the cups, be of substantially equal area at their open forward or upper ends, as viewed in Fig. 2, which engage the surface to be massaged. It will be noticed in Figs. 2 and 6 that the open ends of cups 20 constitute the major portion of the area surrounded by rim 15; in other words, elements 18 are only a minor fraction of this area.

The lower end of the applicator, as viewed in Fig. 1, is referred to as the rear end; and reference herein to directions as "forwardly" or "rearwardly" will be understood to mean in the direction toward the upper or lower ends respectively of the applicator as viewed in Fig. 1.

Cups 20 are open also at their rear ends, where each cup connects to a fluid passage 21 that extends longitudinally through central portion 16 to the rearward face thereof. Each passage 21 connects at its rearward end with one or more recesses 22 formed in a grid-like pattern in the rearward face of the applicator. (See Fig. 3.)

Support 12 is typically made of a thermoplastic material, and has a cylindrical body, threaded at its rear end for connection to stem 14, and rounded at its front end to conform to the rear face of central portion 16 of the applicator. The rear face of portion 16 and the forward face of support 12 being congruent, the two faces are in contact over the major portion of their area. This engagement with member 12 supports the central portion of the applicator against excessive deformation during the massaging operation, but at the same time allows the use of a relatively soft, flexible material for the applicator that enables the latter to adapt itself easily and completely to the configuration of the surface being massaged.

Fluid passage 24 extends longitudinally of the support, and is flared at 25, at the front end of the support. The flare at 25 insures that fluid pressure pulsations travelling through passage 24 reach directly at least one, but preferably four, of passages 22 and are thereby distributed to all the passages 21. Beyond the periphery of the flared end 25 of its central fluid passage, support 12 closes the open side of recesses 22 in the applicator, and these become supply passages. In this way, the applicator and its support cooperate to provide the massage device with fluid supply passages connecting each cup 20 with passage 24 and through it to the source of pulsating pressure.

Applicator 10 is preferably manufactured by a moulding process and made with side walls 17 in the initial position shown by the dot-dash lines in Fig. 1. When the applicator is mounted in the rigid support, the side walls are stretched outwardly, and because of the tension in the walls they firmly engage the sides of the support to form an air tight seal. This seal may be rendered more effective by gripping the ends of the side walls between opposing shoulders on stem 14 and support 12, as shown in Fig. 1.

When in use, the applicator rim first engages the surface to be massaged. Additional pressure upon the applicator causes the rim to deform, largely by spreading outwardly, and ribs 18 to move forward into engagement with the skin. The ribs then form a seal around each cup 20, so that each cup operates as a massaging unit all by itself. Each cup being connected to the source of pulsating pressure, conditions are the same in all cups and there is substantially no tendency for air to flow between cups. Consequently ribs 18 do not have to be heavy or rigid to resist such flow. It is obvious that some deformation of the applicator takes place in the massaging operation; but excessive deformation that would close passages 21 or 22, or destroy the effectiveness of the individual cups 20, is prevented by the support furnished by member 12.

Figs. 5 and 6 show a modified form of applicator 30 and supporting member 32. In this form, supporting member 32 is integral with stem 14*a*, and is provided at its base with groove 33 to receive locking flange 34 which is an integral portion of the applicator at the rearward end of sidewalls 17.

The forward end of the applicator is formed as previously described, except that it has five rows of cups 20 instead of six, as in Fig. 2. As a result, two passages 22 intersect at the axis of support 32. Since passage 24 terminates at this intersection, it is not flared outwardly at its forward end. For a given diameter of rim 15, the size and shape of cups 20 differs somewhat in Figs. 2 and 6, but such differences are within the scope of my invention.

Another modification of my invention is shown in Figs. 7 and 8 in which the applicator 40 is generally similar to the one shown in Fig. 5, but two changes will be pointed out. Rim 15*a* is made wider and of greater external diameter, so that, in cross-section as in Fig. 7, a relatively thinner, more flexible lip is provided. This construction brings more of the surface of the applicator into contact with the surface to be massaged, and is advantageous under some conditions.

Another change in this form is the omission of fluid passages 22 in the applicator. Instead, grooves or recesses 42 are formed in the forward end of rigid support 32 as shown in Fig. 8. Recesses 42 are closed on their open top side by the rearward face of applicator portion 16 to form the network of passages that distribute pulsations from central passage 24 to the several passages 21. Again the applicator and its support cooperate to provide a part of the system of fluid passages supplying pulsations to the individual cups.

Fig. 9 illustrates another form of my invention characterized chiefly by making the rigid supporting member of metal and changing its shape. Support 45 has a central tubular portion 46 threaded at one end to screw into stem 14*b* and hollow to provide a fluid passage 47. The forward end of support 45 is spun into a flat disk 48 with a rearwardly turned peripheral flange 49. Corresponding changes have been made in the applicator, designated generally at 50. To be congruent with the forward face of the support, the rearward face of the central portion 16 is flat, and engages disk 48 to support the applicator. Recesses 52 are provided in the rearward face of the applicator to provide, in conjunction with disk 48, a part of the fluid passage means supplying pulsations to cups 20 by connecting passages 21 to passage 47. Obviously, the face of disk 48 can be recessed and the engaging applicator face made smooth, as in the form of Fig. 7, to secure the same result.

In this form of applicator the long side wall 17 is replaced by a short wall 54 which is only long enough to be firmly gripped between flange 49 and the end of stem 14*b* to form an air tight seal.

Figs. 10 and 11 illustrate a modification of the invention from the showing in Fig. 1, with respect to the fluid passage means. The forward rounded surface of support 12 is smooth, as in Fig. 1; but the rearward surface of central portion 16 has been divided into two zones. The outer zone at 16*a* is annular in shape, smooth, and in direct bearing engagement with the forward surface of support 12. The inner zone at 16*b* is circular and located centrally. Its surface is likewise smooth, except for a plurality of small projections 58 on the applicator surface that hold the surfaces on support 12 and on portion 16 at 16*b* in spaced relation. Projections 58 support a part of central portion 16 upon the rigid member 12, and are located to accomplish this. The space 59 between the two surfaces provides a fluid distributing passage connecting central passage 24 with all passages 21, thus forming part of the passage means supplying pulsating fluid pressure to each of cups 20. The cylindrical portions of support 12 and side walls 17 engage, as before, to seal off space 59 around the edge.

Another change consists in providing cross-passages 21*a* in web 18 connecting each of the outermost cups 20 with a cup 20 nearer the center, in place of a passage 21 to each of the outermost cups. All cups 20 are connected to a source of pulsating fluid pressure, but passages 21*a* become a part of the passage means connecting some of the cups. This connection is, of course, not fully effective until the open end of the inner cups are closed, as occurs when the skin of the person being massaged is engaged.

In some processes of making applicators, the portion of the mould that forms a passage 21*a* must be withdrawn through the web. To permit this, that portion of the mould is supported by a thin metal sheet that divides the web into two parts that normally contact each other along line 66. Normal pressure on the web during massaging holds the parts in engagement and makes the web act in the same way as if it were continuous, as previously described.

Fig. 12 illustrates a modification in which a piece of wire cloth screen 60, or like foraminous member, is substituted for projections 58. Screen 60 performs the dual function of supporting central portion 16 on the rigid member 12 by engagement with both, and of holding in spaced relationship the central portion of the applicator and the forward end of the applicator support, as in Fig. 10. Fluid will flow freely through the foramina of the screen, so that the space occupied by the screen is the fluid supply passage connecting central passage 24 with passages 21.

Fig. 13 illustrates another modification of my invention in which the applicator, generally designated at 61 is generally similar to the form illustrated in Fig. 7, but differs therefrom primarily in the fact that central portion 16 of the applicator is of sufficient thickness, from front to rear, to prevent excessive deformation of the applicator when in use. It will be seen by comparison with the other forms, the thickness of material from the base of cups 20 to the rearward face of central portion 16 is considerably greater in the form illustrated in Fig. 13. The additional thickness of material enables fluid distributing space 62 to be maintained between the rearward face of central portion 16 and the forward face of supporting member 64. These two faces are here shown as being flat and parallel to each other; but it is not necessary that they always bear this relationship to each other, since one or both faces may be curved if desired.

Rigid supporting member 64 is integral with stem 14*a*, in the manner previously described. At the base of member 64, there is provided a groove 33 to receive flange 34 at the rearward end of the applicator. This construction is similar to that previously described. An additional feature not previously shown, is the provision of a small flange 65 at or near the top of supporting member 64, and a corresponding groove or recess in the inner face of the side wall of the applicator. Flange 65 transmits directly to support 64 a large portion of the load applied to the applicator member during the massage operation, the remainder of the load being transmitted to the support through the applicator side wall and flange 34. Thus it will be seen that flange 65 affords support to the applicator as far forward as possible. It also has the secondary function of improving the air tight sealing necessary around the edges of distribution passage 62.

Having described a preferred improvement of my invention and variational forms thereof, it will be apparent that changes in the details of my invention may be made by persons skilled in the art without departing from the spirit and scope of my invention; and it is therefore to be understood that the above description is to be construed as illustrative of, rather than limited upon, the appended claims.

I claim:

1. A massage device for application of pulsating fluid pressures, which comprises: a flexible resilient applicator member adapted to engage the surface to be massaged and provided with a projecting rim portion, and a recessed foraminate central portion having a plurality of elements defining a plurality of separate pressure applying cups open at their forward ends, said elements being disposed rearwardly of said rim portion; and a rigid supporting member upon which the applicator member is mounted; said device being provided with fluid supply passage means for connecting all of said cups to a source of pulsating fluid pressure.

2. A massage device for application of pulsating fluid pressures, which comprises: a flexible resilient applicator member adapted to engage the surface to be massaged and provided with a projecting annular rim portion, and a generally concave foraminate central portion having a plurality of elements defining a plurality of separate pressure applying cups of substantially equal area open at their forward and rearward ends, said elements being disposed rearwardly of said rim portion; and a supporting member upon which the applicator member is mounted; said device being provided with fluid supply passage means for connecting each of said cups at its rearward end to a source of pulsating fluid pressure.

3. A massage device for application of pulsating fluid pressures, which comprises: a flexible resilient applicator member adapted to engage the surface to be massaged and provided with a projecting rim portion, and a recessed foraminate central portion having a plurality of elements defining a plurality of separate pressure applying cups open at their forward ends, and having a plurality of fluid passages of relatively smaller cross-sectional area than said cups extending from the cups to the rearward face of the central portion, said elements being disposed rearwardly of said rim portion; and a rigid sup-

porting member provided with a fluid passage adapted to connection with a source of pulsating fluid pressure; the applicator and supporting members cooperating to provide fluid passage means connecting the first-mentioned fluid passages with the fluid passage in the supporting member.

4. A massage device for application of pulsating fluid pressures, which comprises: a flexible resilient applicator member adapted to engage the surface to be massaged and provided with a projecting rim portion, and a recessed foraminate central portion having a plurality of elements defining a plurality of separate pressure applying cups open at their forward ends and having a plurality of fluid passages extending from the cups to the rearward face of the central portion, said elements being disposed rearwardly of said rim portion; and a rigid supporting member provided with a fluid passage adapted to connection with a source of pulsating fluid pressure; and a foraminous member interposed between and engaging both the applicator member and the supporting member to support the central portion of the applicator member and to provide fluid passage means connecting the first mentioned fluid passages with the fluid passage in the supporting member.

5. A massage device for application of pulsating fluid pressures, which comprises: a flexible resilient applicator member adapted to engage the surface to be massaged and provided with a projecting rim portion, and a recessed foraminate central portion having a plurality of elements defining a plurality of separate pressure applying cups open at their forward ends and having a plurality of fluid passages extending from the cups to the rearward face of the central portion, said elements being disposed rearwardly of said rim portion; and a rigid supporting member provided with a fluid passage adapted to connection with a source of pulsating fluid pressure; the central portion of the applicator member being of sufficient thickness from front to rear to prevent excessive deformation when in use and to maintain a fluid distributing space between the applicator member and the supporting member adapted to transmit fluid pressures to the first mentioned fluid passages from the fluid passage in the supporting member.

6. A flexible, resilient applicator member for use in a message device which applies pulsating fluid pressures to a surface to be massaged, comprising: a projecting annular rim portion; and a generally concave foraminate central portion surrounded by said portion and having a plurality of elements defining a plurality of separate pressure applying cups of substantially equal area open at their forward ends; all said elements being adapted to engage the surface to be massaged after the rim portion has been deformed by engagement with the surface.

7. A flexible, resilient applicator member for use in a massage device which applies pulsating fluid pressures to a surface to be massaged, comprising: a projecting annular rim portion; and a generally concave foraminate central portion surrounded by said rim portion and having a plurality of elements defining a plurality of separate pressure applying cups of substantially equal area open at their forward and rearward ends; said elements being adapted to engage the surface to be massaged after the rim portion has been deformed by engagement with the surface; and the central portion of the applicator member being provided with fluid passage means adapted to connect each of the cups with a source of pulsating fluid pressure, said passage means comprising a plurality of passages each extending from one of the cups to the rearward face of said central portion and a plurality of recesses in said rearward face connecting together all of said last mentioned passages.

8. A flexible, resilient applicator member for use in a massage device which applies pulsating fluid pressures to a surface to be massaged, comprising: a projecting annular rim portion; and a recessed foraminate central portion surrounded by said rim portion and having a plurality of elements arranged in a rectangular grid formation defining a plurality of separate pressure applying cups open at their forward and rearward ends, the aggregate area of the cups at their forward ends comprising the major portion of the area within the projecting rim; said elements being disposed rearwardly of said rim portion and having their forward faces lying in a smoothly curved surface which when extended includes the face of the projecting rim portion whereby the elements progressively engage the surface to be massaged after engagement thereof by the rim portion.

HAROLD D. WHEELER.

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The following references are of record in the file of this patent:

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Number	Name	Date
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