

[54] **MULTI-JET MASSAGER**

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[58] Field of Search ..... **128/62 A, 66, 230, 128/40**

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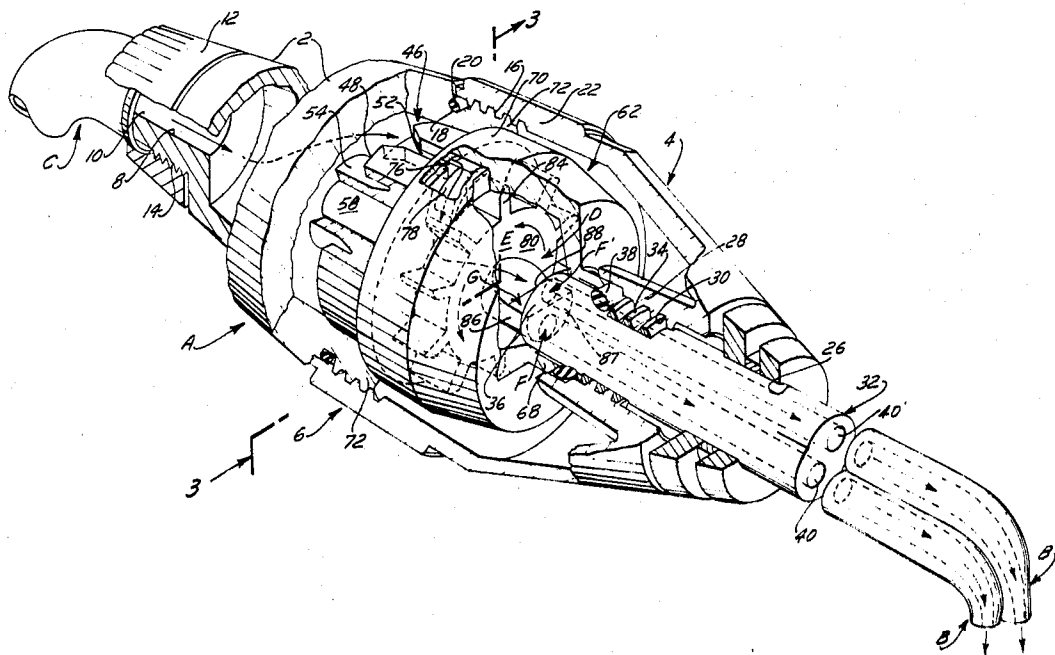
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[57]

**ABSTRACT**

A multi-jet massager particularly well adapted for treatment of the gums, in which a plurality of jet nozzles are provided and in which an impeller-driven rotary valve is utilized to direct fluid sequentially to the several nozzles, thereby to produce successive jet action from the nozzles. The arrangement is such that all of the fluid flowing through the device is utilized in jet-formation, and at the same time all of the fluid contributes to the control action which produces those jets. The device is designed so that it will be self-starting no matter in what position it may stop.

**19 Claims, 6 Drawing Figures**



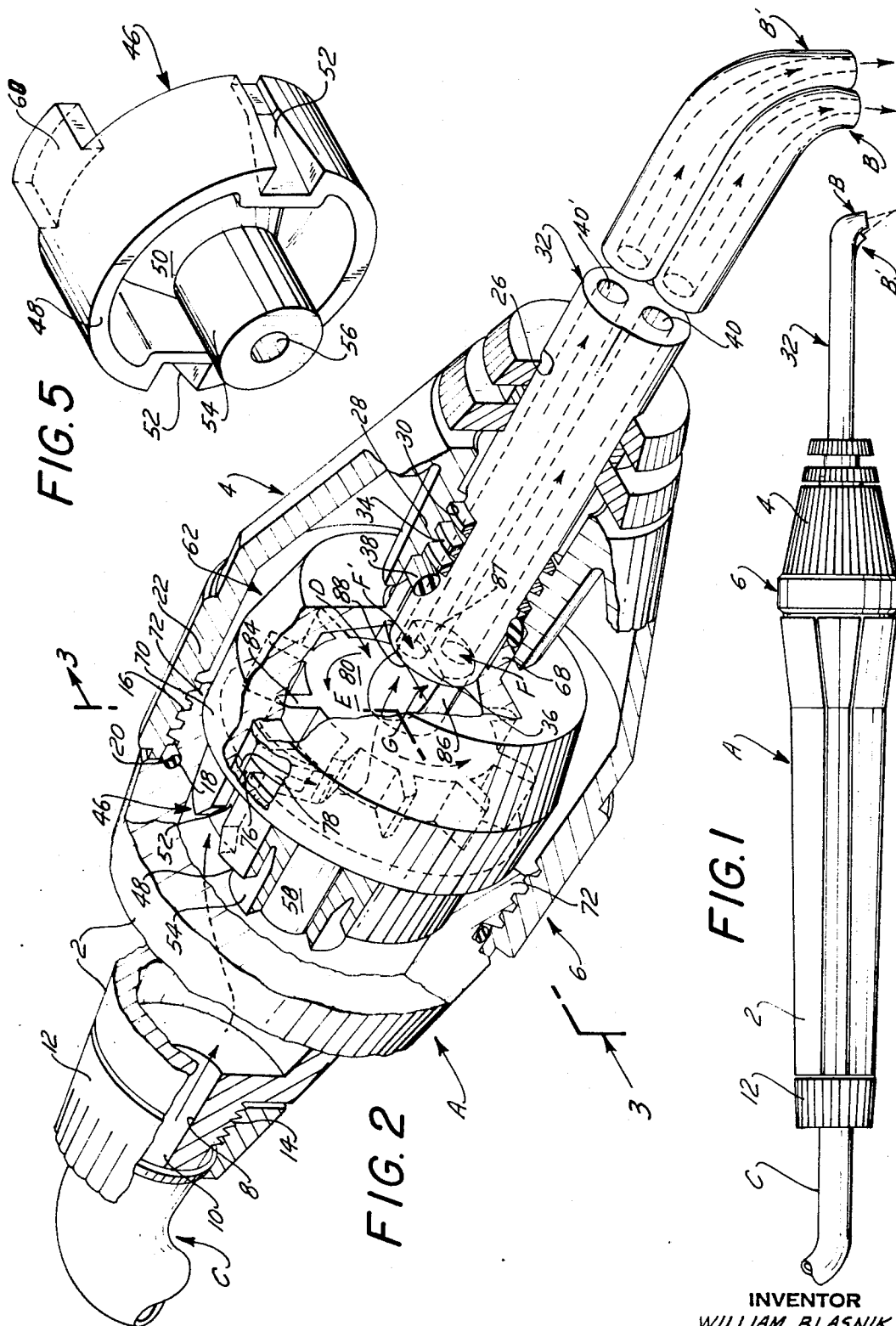
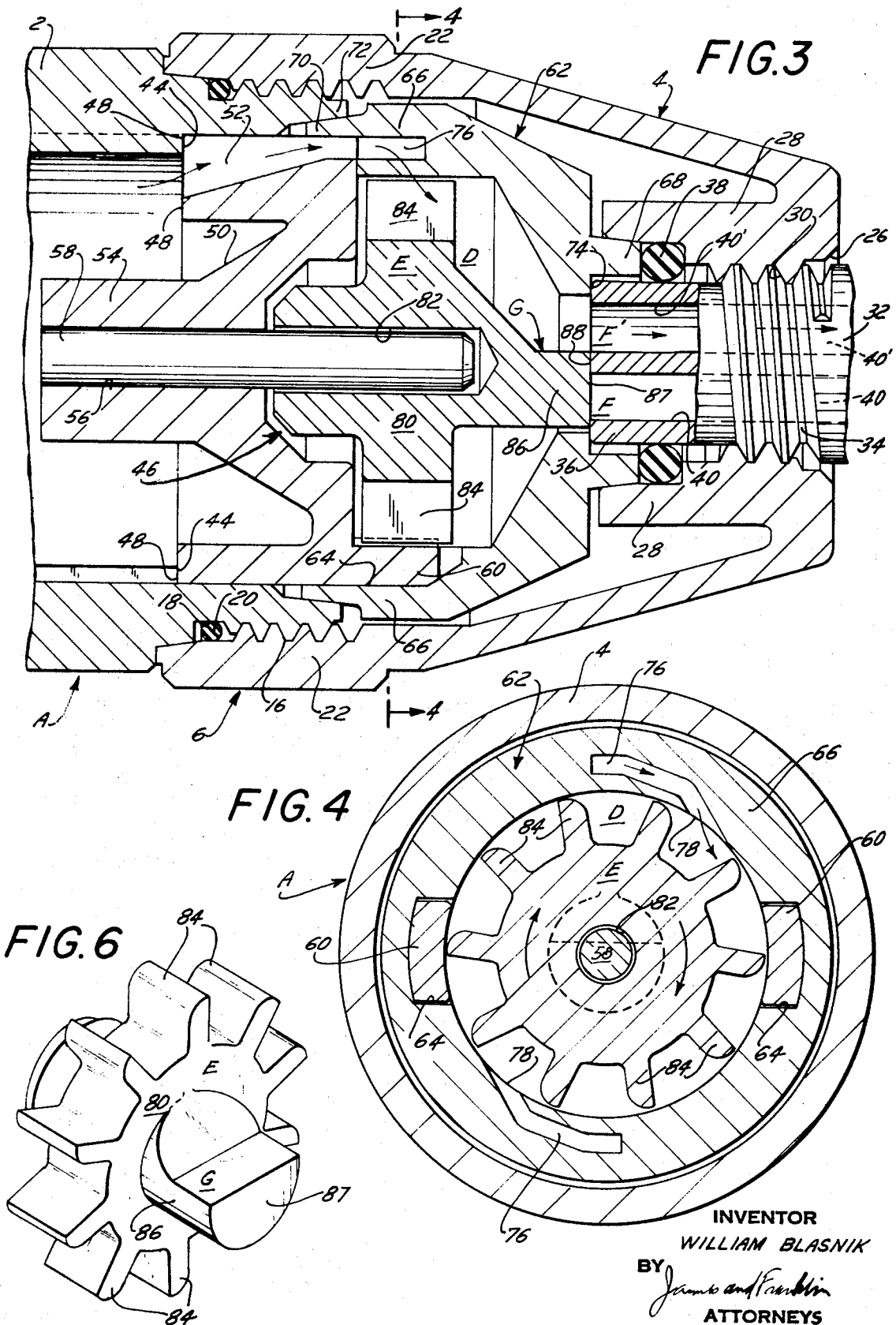


FIG. 1

FIG. 2

FIG. 5

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## MULTI-JET MASSAGER

The present invention relates to a multi-jet massaging device particularly well adapted for use in the therapeutic treatment of human gums.

The use of fluid in motion, including fluid jets, for massage purposes has long been known. In the past the apparatus which has been used for producing such fluid-induced massage has been relatively bulky and expensive, and has been primarily adapted for use with large body organs such as legs, arms, torsos and the like. More recently, the desirability of fluid jet massage for the human gums has become well recognized and several devices have become available to produce fluid jets for that purpose. In general they are adapted for home use, and are therefore designed to be used in conjunction with readily available water taps in the home, the water from those taps, used either directly or by being placed in an appropriate receptacle, constituting the medium which produces the massage. Since the gum tissues are tender, the massage must be gentle, but in order to be effective it must be extensive. Hence rapid jet action is generally considered to be desirable. Rapid jet action has the added advantage that it serves effectively to dislodge and wash away particles of food and the like which may have accumulated between adjacent teeth or between the teeth and the gums.

Devices of the type in question must be small and light, so that they can be handled by children, invalids and the like. At the same time mechanism must be provided which is effective to produce the rapid jet action. These two considerations have in the past been relatively antithetical, and as a result in most installations the jet-producing mechanism has been provided in one relatively bulky unit, while the nozzle which applies the fluid jet to the gum tissue is provided in a separate unit adapted to be handled and manipulated. This makes for bulk, complexity and expense.

The massage effectiveness of devices of the type under discussion is enhanced if more than a single jet is utilized, but it has been thought that the mechanism required to provide jet action for a plurality of jet nozzles would be prohibitively more complicated, bulky and costly than when a single jet nozzle is involved. In one prior art embodiment a separate reciprocating pump construction is provided to produce those jets, but reciprocating pump constructions are highly undesirable not only because of their bulk and complexity, as mentioned above, but also because of their relative unreliability and short life. Moreover, reciprocating pump constructions, particularly those which must operate at high speeds and therefore must have light parts, are especially subject to damage from impact or shock, and since devices of the type here under discussion are ordinarily employed in bathrooms, where they are very likely to be knocked from the shelf or sink surface on which they are mounted, the undesirability of utilizing such constructions for producing jet action is clearly evident.

Another factor involved in the design of jet massagers is the efficiency with which the fluid (water in the case here under discussion) is utilized. It is most desirable that all of the water flow be used for massage production, and that none of it be wasted. This is not an economic matter, since the cost of the wasted water is not appreciable. It is much more an aesthetic matter — a system in which a steady flow of water into the sink

accompanies the action of the system is undesirable from a sales-appeal point of view.

It is the prime object of the present invention to provide a multi-jet gum massager the construction of which is simple and sturdy.

It is a further object of the present invention to provide such a massager in which the several nozzles and the jet-producing mechanism can all be incorporated into a single mechanical unit readily capable of being held in the hand of and appropriately manipulated by even a juvenile user.

It is another object of the present invention to devise a multi-jet gum massager and/or the like which is easily and inexpensively manufactured, and which will be exceedingly reliable and long-lived in operation.

It is a still further object of the present invention to devise such a massager in which the speed of the jet production is under the ready and facile control of the user.

It is yet another object of the present invention to devise such a jet massager in which all of the fluid which passes through the device is utilized in jet-formation, with that fluid also inherently performing the function of jet control and production.

It is an additional object of the present invention to devise such a jet massager which will be reliably self-starting in operation no matter in what position it may have stopped.

To these ends, I have provided a multi-jet gum massager in which the nozzles from which the jets emanate are mounted on a housing within which the jet control mechanism is enclosed. That jet control mechanism is provided by an impeller wheel which is rotated by the passage of the massaging fluid through the device. That impeller wheel, as it rotates, moves a part which alternately opens and closes ports to the individual nozzles from which the fluid jets emanate. The water is thus first directed through one nozzle, then the other, then back to the first, and so on, producing jet action at each nozzle and producing an overall jet action having a frequency which is a multiple (twice when two jets are involved) of the frequency of jet production at any given nozzle. The jet fluid (hereinafter termed "water" for purposes of ready explanation) merely flows through the housing of the device, and in so flowing causes the impeller wheel to rotate. The arrangement is such that the port to one nozzle or the other is always open at least to some degree, and hence there is no "dead center" position of the impeller wheel. Whenever water is forced through the system it will start and function. The water source may be a bathroom spigot from which water of any desired temperature may be caused to flow at any desired velocity by suitably manipulating the control handles of the bathroom fixture. The faster the water is caused to flow from the tap, the faster will the impeller wheel rotate, and hence the greater will be the frequency at which the water jets are produced. Thus the frequency of jet production is under the control of the user.

The impeller wheel and the port control element which it moves, preferably although not necessarily in rotation, constitutes the only moving part of the device. Since it moves in rotation, vibration is greatly minimized, size is likewise minimized, and sturdiness and resistance to impact and shock are maximized. The same part which produces jet action from a continuously flowing body of water also serves alternately to

direct that water to one jet and then the other, thus enabling each jet to perform an independent massage action, the massage actions of the two jets cooperating to produce a highly effective therapeutic result.

To the accomplishment of the above, and to such other objects as may hereinafter appear, the present invention relates to the construction of a multi-jet gum massager, as defined in the appended claims and as described in this specification, taken together with the accompanying drawings, in which:

FIG. 1 is a side elevational view of a typical embodiment of the present invention;

FIG. 2 is a fragmentary three-quarter perspective view on an enlarged scale, with parts broken away, of the device of FIG. 1;

FIG. 3 is a vertical cross-sectional view, on an enlarged scale, of the front portion of the device from which the nozzles extend, taken along the line 3—3 of FIG. 2;

FIG. 4 is a cross-sectional view taken along the line 4—4 of FIG. 3;

FIG. 5 is a three-quarter perspective view of one of the interior parts of the device; and

FIG. 6 is a three-quarter perspective view of the impeller wheel and the hub part mounted thereon which is effective to cause fluid flow alternately to one of the nozzles and then the other.

As may best be seen from FIGS. 1 and 2, the device of the present invention comprises a hand-held casing generally designated A from which a pair of nozzles B and B' extend. The rear of the casing A is provided with a flexible hose or the like, generally designated C, which is adapted to be connected to any suitable source of water or other jet-producing fluid. It will be understood that the tube C may be provided with a fitting or adapter which can be placed over the tap of a conventional water outlet at a sink, so that water may be supplied into the device from the sink outlet at any temperature and at any intensity of flow desired by the user of the device. That water will flow into the casing A through the tube C and then, by means of mechanism about to be described, will be alternately directed first to the nozzle B and then to the nozzle B' and then back again to the nozzle B and so on, thereby producing alternate fluid jets emanating from the nozzles B and B' respectively. The casing A and the nozzles B and B' constitute a unitary structure which is small and light, and therefore very readily manipulatable. In use the user will hold the casing A and direct the nozzles B and B' toward that portion of his gums where massage is to be applied, and then, through control of the water flow from the sink tap, will control the frequency of jet production and the temperature of the water producing the massage action.

The casing A is provided with an inner chamber generally designated D, and in that chamber a rotary impeller wheel generally designated E is mounted, the water flowing from the tube C passing into the chamber D and causing the impeller wheel E to rotate. The nozzles B and B' are operatively connected to ports F and F' respectively, which ports open into the chamber D. The impeller wheel E is provided with a control means generally designated G which is moved as the impeller wheel E rotates and which acts to alternately obstruct and open the ports F and F', thereby alternately to produce jet action at the nozzles B and B' respectively. The control means G is so shaped that no matter in

what position the impeller wheel E may stop at least a portion of one of the ports F or F' will be exposed, so that when it is desired that the device resume operation and the water supply is turned on a path will be provided for the flow of fluid through the device, that flow then causing the impeller wheel E to rotate, thereby to produce alternate jets at the nozzles B and B' as described.

The casing A is formed of a rear housing part 2 and a front housing part 4 connected together at 6. The rear housing part 2 comprises a generally cylindrical hollow tapering structure provided at its rear end with an opening 8 extending to a nipple-like part 10 over which the end of the tube C is adapted to be received, a coupling nut 12 being received over the tube C and being threadedly engaged with the nipple-like part 10 at 14 in order to retain the tube C sealingly in position on the rear housing part 2. The forward end of the rear housing part 2 is externally threaded at 16 and is provided with a groove 18 in which a sealing ring 20 is adapted to be received. The front housing part 4 is generally hollow and conical in shape, and is provided with a rear internally threaded flange portion 22 threadedly received on the externally threaded portion 16 of the rear housing section 2, and when thus threadedly engaged compressing the sealing ring 20 so as to provide a fluid-tight connection between the housing sections 2 and 4. The section 4 is provided at its front end with an axially extending opening 26 which proceeds through a reentrant flange portion 28, internally threaded at 30, to the interior of the space inside the front housing section 4.

The nozzles B and B' are formed at the end of a single longitudinally extending part 32, that part being externally threaded at 34 so as to be received in and threadedly engageable with the internally threaded portion 30 of the front housing section 4. When the nozzle part 32 is thus engaged its rear end 36 extends into the space inside the front housing section 4, and a sealing ring 38 is compressed between the housing part 28 and the nozzle part 32, thereby to sealingly mount the nozzle part 32 on the casing A. Passages 40 and 40' are provided through the nozzle part 32, those passages extending between the nozzle tips B and B' respectively and the ports F and F' respectively, the ports F and F' being inside the casing A and the nozzle outlets B and B' being exposed outside the casing A.

The interior of the rear housing section 2 adjacent its forward end is provided with a ledge or abutment surface 44 (see FIG. 3). A stator structure generally designated 46 is received within the rear housing section 2 and is provided with a rear surface 48 which abuts against the housing surface 44. The stator 46 is provided with a transverse wall 50 which closes the forward end of the rear housing section 2, except for channels 52 formed in the stator 46 at diametrically opposed portions on the periphery thereof, those channels 52 constituting water flow passages. Centrally located on the wall 50 is a rearwardly extending sleeve-like portion 54 having a central opening 56 within which a shaft 58 (see FIG. 3) is firmly received, that shaft 58 extending forwardly from the wall 50. The stator 46 is also provided with a pair of diametrically opposed forwardly extending peripheral flanges 60.

A swirl stator part 62 is mounted on the front end of the stator part 46 with the forwardly extending flanges 60 of the latter extending into appropriately shaped diametrically opposed recesses 64 formed in the rear-

wardly extending wall 66 of the swirl housing 62. The forward portion of the swirl stator 62 terminates in a nose part 68 which is received within the part 28 extending rearwardly from the forward tip of the front housing section 4, the nose part 68 engaging the sealing ring 38. The rear end of the swirl stator 62 is defined by a tapered flange part 70 which is snugly received between a correspondingly internally tapered portion 72 of the rear housing section 2 and the outer surface of the stator section 46. The stator section 46 and the swirl stator 62 define within themselves the chamber D and the shaft 58 extends into that chamber.

The inner end of the nozzle part 32 engages the end surface 74 of the swirl stator 62, with its ports F and F' exposed to the interior of the chamber D. The swirl stator 62 is provided with a pair of internal passages 76 the initial portions of which are oriented fore and aft and line up respectively with the passages 52 in the stator section 46 and which terminate in tangentially oriented outlet openings 78 exposed to the chamber D adjacent the outer periphery thereof.

The impeller wheel E is mounted in the chamber D on the shaft 58. It comprises a body portion 80 having an axially elongated aperture 82 adapted to be freely received over the projecting end of the shaft 58. Vanes 84 extend out radially from the body 80, and are located in registration with the outlet openings 78 in the swirl stator 62. A substantial clearance is provided between the impeller body 80 and the forward portion of the chamber D. Extending forwardly from the impeller wheel E, and preferably integrally formed therewith, is the control means G, that being defined, in the structure here specifically disclosed, by a hub-like part 86 which is approximately semi-cylindrical in cross-section. This part 86 extends forwardly from the body 80 sufficiently so that its forward end surface 87 is engageable with the end surface 88 of the nozzle part 32 in which the ports F and F' are formed.

Fluid flow through the device here described is indicated by directional arrows in the figures. Water enters the rear housing section 2 from the tube C. The forward end of that housing section is blocked except for the channels 52 formed in the periphery of the figure 46, and hence the water flows through those channels 52 and into the registering passages 76 in the swirl stator 62. The passages 76 change the direction of fluid flow from axial to circumferential (hence the name "swirl stator"), and the water circumferentially escaping from the outlet openings 78 impinges upon the vanes 84 of the impeller wheel E, causing the latter to rotate. The water then moves from the spaces between the vanes 84 into the forward end of the chamber D and then out through the ports F and F' to the nozzle tips B and B' respectively. However, the action of the hub-like part 86 defining the control means G will be such as to obstruct first the port F and then the port F' as the impeller wheel E rotates, thereby causing the water to flow out through the unobstructed port or port portions. As a result, a jet will be produced first at nozzle B and then at nozzle B', then again at nozzle B, and so on, as the impeller wheel rotates, the frequency of the jets being determined by the rotational speed thereof, and that in turn is dependent upon the force with which water is caused to flow into the device.

The ports F and F' and the hub-like part 86 are so co-operatively shaped that no matter in which position the impeller wheel E, and hence the hub-like part 86, may

come to rest, at least a portion of one of the ports F or F' will be exposed. Hence when the water is next turned on there will be a path for the fluid to flow through in order to escape from the chamber D, and hence the device will start to function.

Because the water flow through the device is from left to right as viewed in the drawings, and because the impeller wheel E is loosely rotatably mounted on the shaft 58, the water in flowing through the device will not only exert a circumferential force on the impeller E causing it to rotate, as has been previously described, but will also exert an axial force on the impeller E, causing it to move from left to right, and thus causing the end surface 87 of hub-like part 86 to be pressed up against the end surface 88 of the nozzle part 32 with sufficient force to produce an adequate seal between the rotating part 86 and the stationary nozzle part 32, thus enabling the part 86 to perform its control means function of alternately blocking and opening the ports F and F' respectively.

Each of the parts of which the device of the present invention is made may be inexpensively formed from molded plastic material. Thus the cost of the device will be minimal. There is only a single moving part - the impeller wheel E together with the integral hub-like part 86 which constitutes the control means G - and that part rotates. Hence vibration is minimized and reliability is assured. The fluid which flows through the device produces a self-lubricating action, so that maintenance is virtually not required. The device can be light and small but still sturdy and thoroughly reliable. It can be readily manipulated even by juveniles so as to direct the jet action at the particular areas of the gum tissue where that action is desired, and the jet action is produced with a true minimum of vibration. It is entirely self-powered.

It will be understood that while this device has been here described specifically for use in conjunction with producing jets for gum massage, and producing two such jets by means of water flow through the device, this has been done solely for purposes of ready explanation. The device may be used with fluids other than water, it may be used for purposes other than gum massage, it may have different numbers of jets, it may be made in various sizes, weights and shapes, and its details of construction may be varied from those here specifically shown, all within the scope of the instant invention as defined in the following claims.

I claim:

1. A jet massage device comprising a housing having a chamber, fluid inlet means to said chamber, fluid outlet means from said chamber, said fluid outlet means comprising a first and a second outlet port exposed to said chamber and a first and second fluid nozzle, each of said ports being in fluid communication with a different one of said nozzles, rotary means in said chamber effective to be rotated by fluid passing through said chamber from said inlet means to said outlet means, and control means operably connected to and driven by said rotating means, said control means comprising an element attached to said rotary means and operably communicating with said outlet ports, said element having a surface portion shaped to obstruct said ports alternately but not to completely obstruct both ports simultaneously as said control means is driven by said rotary means.

2. The device according to claim 1 wherein said surface portion sealingly engages said outlet means to prevent fluid entrance into a port which is completely obstructed from said chamber by said surface.

3. The device of claim 2, said housing carrying a sealing member in said opening, said fluid outlet means member engaging said sealing member when said fluid outlet means member is received in said opening.

4. The device of claim 3, in which said member terminates in a surface directed into said chamber, said ports being on said surface, said control means element engaging and sliding over said surface as said control means rotates.

5. The device of claim 4, in which said rotary means comprises a body and a hub extending therefrom toward said member surface and comprising said element which engages and slides over said surface as said control means rotates.

6. The device of claim 5, in which said ports are contained within a given area, said hub element where it engages said surface having a cross sectional area less than said given area.

7. The device of claim 3, in which said rotary means comprises a body and a hub extending therefrom toward said conduit ports and engaging and sliding over said ports, thereby to comprise said control means.

8. The device of claim 7, in which said ports are contained within a given area, said hub where it engages and slides over said ports having a cross sectional area less than said given area.

9. The device of claim 1, in which said housing is provided with an opening communicating with said chamber, said fluid outlet means comprising a member sealingly received in said opening, exteriorly operatively connected to said nozzles, and having separate conduits for each of said nozzles respectively, each of said conduits terminating in a separate port exposed to said chamber, said control means comprising an element operatively connected to said rotary means and moved thereby over said ports to alternately obstruct and open said ports.

10. The device of claim 9, said housing carrying a sealing member in said opening, said fluid outlet means member engaging said sealing member when said fluid outlet means member is received in said opening.

11. The device of claim 9, in which said member terminates in a surface directed into said chamber, said ports being on said surface, said control means element

engaging and sliding over said surface as said control means rotates.

12. The device of claim 11, in which said rotary means comprises a body and a hub extending therefrom toward said member surface and comprising said element which engages and slides over said surface as said control means rotates.

13. The device of claim 12, in which said ports are contained within a given area, said hub element where it engages said surface having a cross sectional area less than said given area.

14. The device of claim 9, in which said rotary means comprises a body and a hub extending therefrom toward said conduit ports and engaging and sliding over said ports, thereby to comprise said control means.

15. The device of claim 14, in which said ports are contained within a given area, said hub where it engages and slides over said ports having a cross sectional area less than said given area.

16. The device of claim 1, in which said chamber is defined between a front wall, a rear wall and a substantially cylindrical side wall, said fluid inlet means entering said chamber adjacent said side wall, said rotary means comprising a vaned body operatively connected to a mounting shaft extending out therefrom at one end and having a hub extending out therefrom at the other end, said shaft being mounted on said rear wall, said hub extending toward said front wall, said front wall having an opening therethrough opposite said hub, said fluid outlet means having a surface exposed to said chamber by said opening and having first and second ports in said surface communicating with said nozzles respectively, said hub being located opposite said surface and being shaped to alternately obstruct and open said ports respectively as said vaned body rotates in said chamber, thereby to define said control means.

17. The device of claim 16, in which said hub engages and slides over said fluid outlet means, thereby to be axially located within said chamber.

18. The device of claim 17, in which said ports are contained within a given area, said hub where it opposes said surface having a cross sectional area less than said given area.

19. The device of claim 16, in which said ports are contained within a given area, said hub where it opposes said surface having a cross sectional area less than said given area.

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