Aug. 16, 1960 S. R. KOOLNIS 2,949,240

THERAPEUTIC SHOWER

Filed March 24, 1955

3 Sheets-Sheet 1

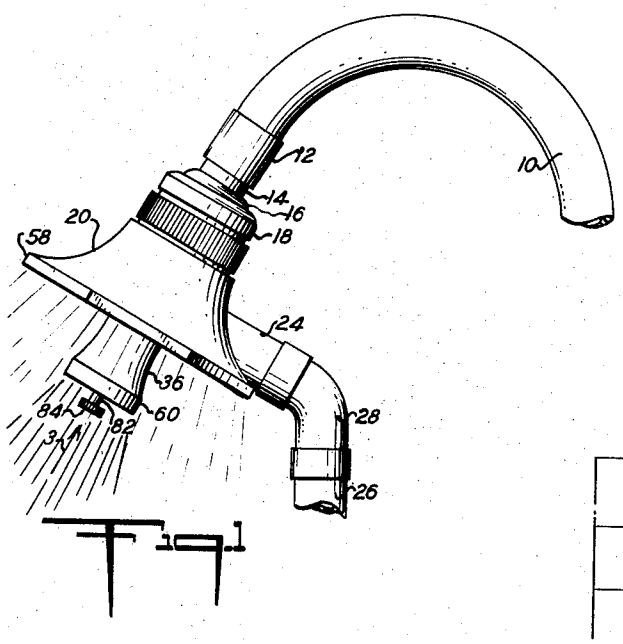


Fig. 1

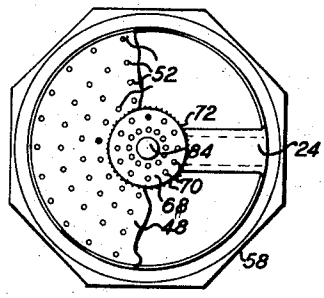


Fig. 3

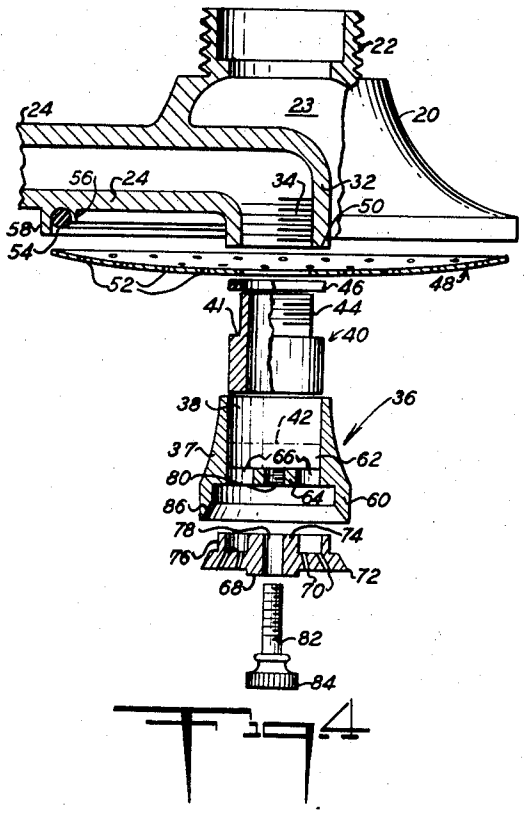


Fig. 4

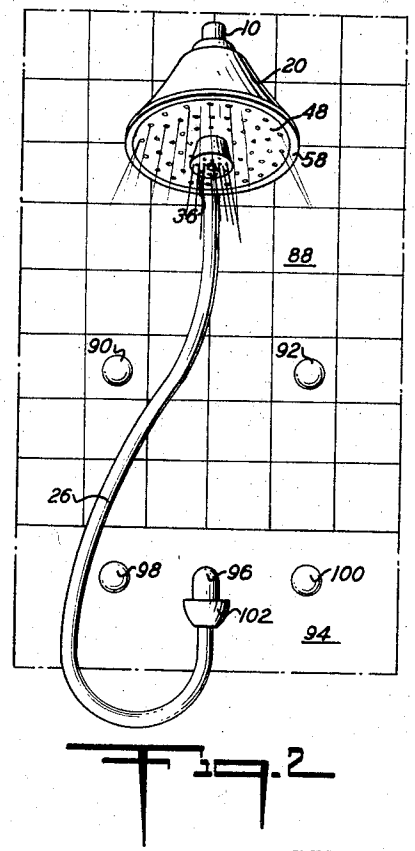


Fig. 2

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THERAPEUTIC SHOWER

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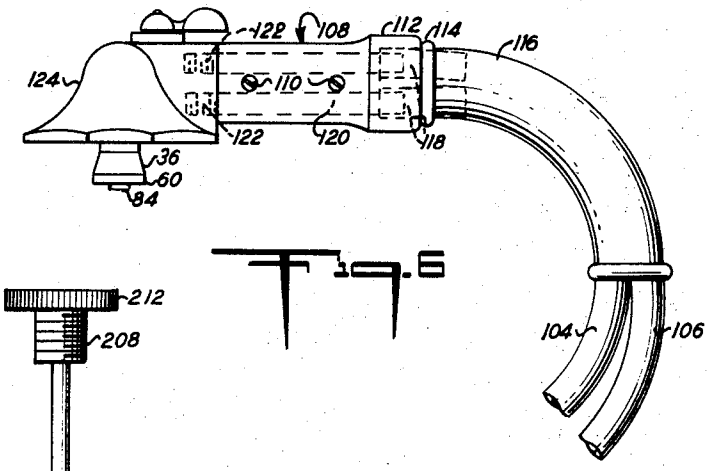


Fig. 6

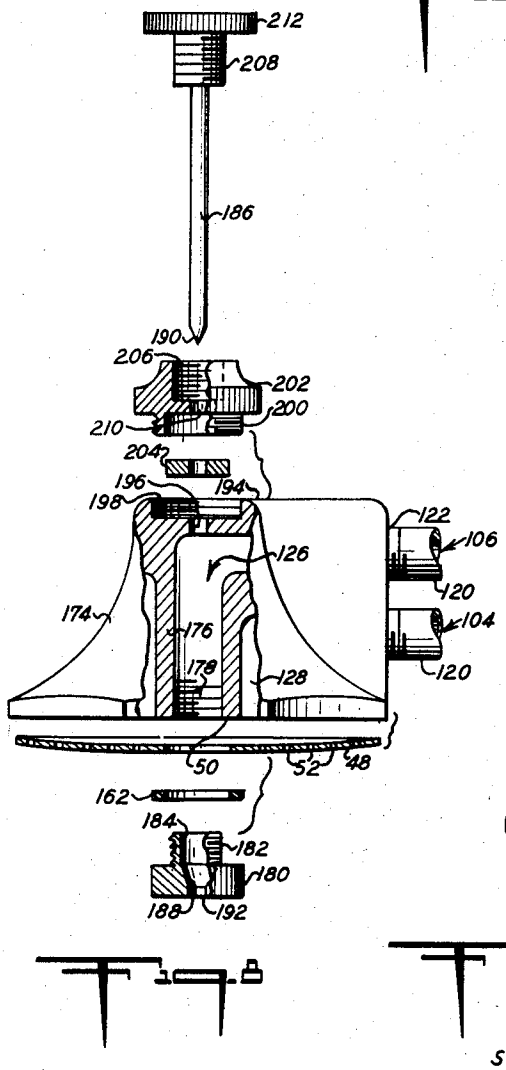
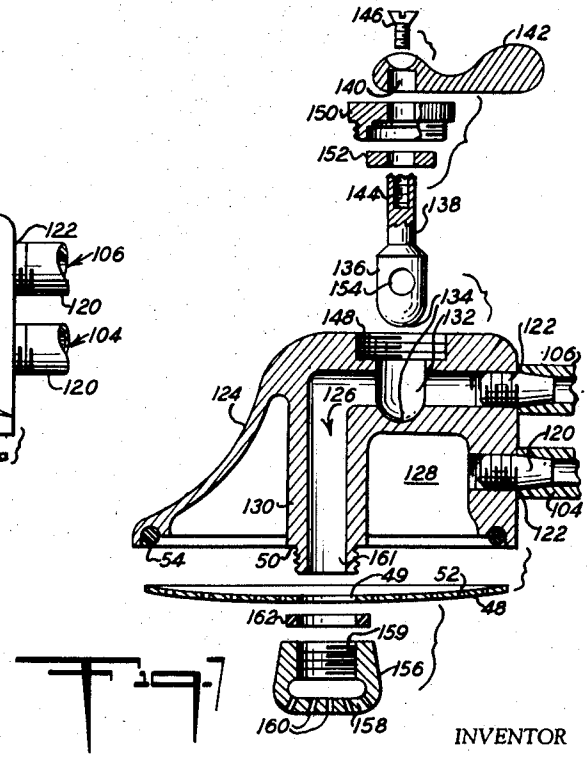


Fig. 7



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THERAPEUTIC SHOWER

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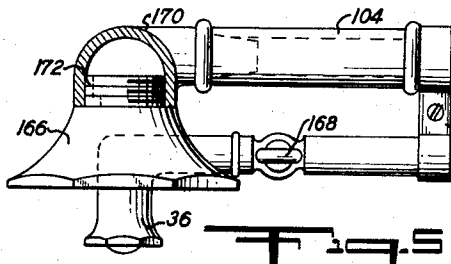


Fig. 5

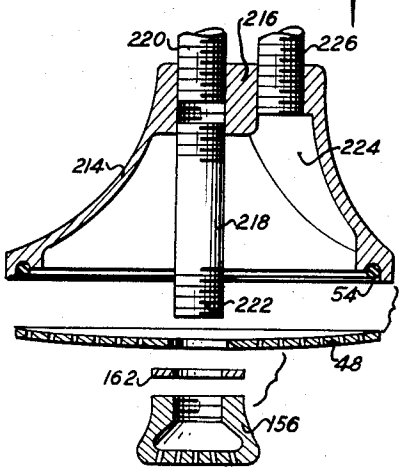


Fig. 9

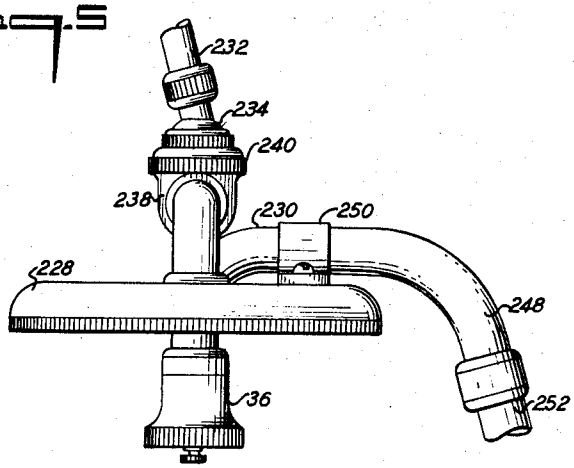


Fig. 10

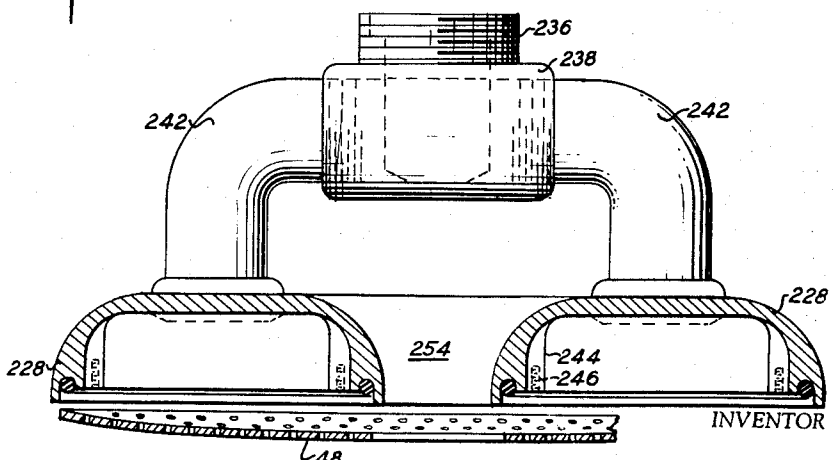


Fig. 11

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United States Patent Office 2,949,240 Patented Aug. 16, 1960

2,949,240

THERAPEUTIC SHOWER

Stanley R. Koolnis, New York, N.Y., assignor, by mesne assignments, to Duo-Temp Manufacturing Corp., Hohokus, N.J., a corporation of New Jersey

Filed Mar. 24, 1955, Ser. No. 496,529

7 Claims. (Cl. 239—200)

This invention is a continuation-in-part of my copending application Ser. No. 328,950, filed December 31, 1952 and relates to an improved human body stimulating method and apparatus wherein hot and cold fluid is applied to the body surface in simultaneously applied jets to independent but closely related areas of the skin.

More particularly, as pointed out in my parent application, the invention is outstandingly useful as a hydrotherapy to impart a stimulating effect to the skin surface by spraying fine needle-like jets simultaneously of hot and cold liquids to closely adjacent areas of the skin which liquids can mix and will exchange heat to come to a common temperature only after impacting upon the surface of the skin of the person treated therewith and imparting thereto two independent and simultaneously applied hot and cold stimuli.

In operation of the method and apparatus of this invention, fluids such as liquids or gases, preferably water or air are treated as separate portions. One portion is heated and applied to the body by hot jets at a relatively high temperature in a range from what would be comfortably hot water to the extreme to which the body could tolerate even instaneously, such as between 100 to 170° F., and the other portion of the fluid would be applied to the body cold, and if desirable cold water is not otherwise available, refrigerated to a temperature ranging from 32° to about a usual cold water temperature of about 50° F. The two fluids hot and cold are applied to the body in simultaneous sprays of needle-like jets, the jets being adjusted to strike the body at any desired pressure as independent jets without substantial admixture and temperature modification of one jet with the next, prior to striking the body. The net effect is both a tingling and stimulating effect upon the skin and as the fluids immediately mix after striking the skin, there is a heat exchange and neutralization of temperature extremes to a common temperature of the mixture upon the skin after impingement by fluid jets thereon which is comfortably warm, hot, or cool, whichever is desired. It will be apparent that the fluids preheated and precooled may be extra hot and extra cool beyond what would normally be applied as a shower to the human body, since the extremes of temperature after striking the body become quickly modified by admixture upon the skin.

It will be understood that the stimulating effect upon the skin primarily results from the temperature differential of two fluids simultaneously striking adjacent areas to give opposite temperature stimulating effect to the skin. For this purpose, the primary characteristic to effect stimulation is that there be a substantial temperature differential between the fluids which should be of the order of 10° to 40° F. and preferably greater. A greater stimulation results, of course, when the temperature differential between the fluids is substantially greater and the maximum stimulation would result when the hot fluid is at an extremely high temperature and the cold fluid is at an extremely cold temperature. In the case of water, for example, the cold fluid may be at the freezing point and the hot fluid, inasmuch as the temperature is quickly neutralized between the two fluids immediately after striking the skin may be even hotter than the body would normally tolerate, since the impingement of an extremely hot jet is merely momentary and will strike the skin surface which immediately after beginning will have been wet by water at an intermediate comfortable temperature. Thus the hot fluid may be as high as 170° F., a limit which will vary somewhat with individuals whose skin is more or less sensitive to temperature extremes. Moreover, within these temperature extremes of separate hot and cold jet impingement upon the skin, the quantity of fluid supplied by each type of jet, hot or cold, may be varied each with respect to the other, so that the resulting temperature of the fluid upon the skin after admixture of jets is any desirable resultant temperature, hot, moderate, or cool. However, whatever the final temperature of the admixed fluids upon the skin, the stimulating effect will result from the temperature differential originally applied before admixture upon the skin.

The individual jets, as described in my parent application, are spaced close enough to strike the skin in relatively close adjacent skin areas usually with not over one inch in spaced position of impact upon the skin, and desirably less, such as ⅛ to ½ inch in separate spacing so as merely to allow the hot and cold jets to be independently projected without substantial admixture and heat exchange therebetween prior to striking the skin.

Thus, as described and illustrated in my parent application, the jets of fluid are distributed homogeneously and alternately whereby there is impinged upon the surface of the skin a hot jet and a cold jet in an even pattern throughout the plural jets comprising the overall spray. The present invention is an improvement in that the cold jets are placed at the center of a shower head and surrounded by a ring of jets comprising a group at the opposite temperature. Thus a larger cold impact of fluid comprising many small jets in a center portion of a fluid shower or spray is surrounded by many hot jets in concentric cones. This allows an even greater stimulating effect in that the contrasting temperatures each produced by numerous jets, as a large battery of separate concentric sprays each at different temperature extremes, can actually be sensed by the body receiving the shower. This is in contrast to the effect of the embodiments described in the parent application wherein while the temperature differential was present in the even pattern of small jets, a contrasting temperature was not sensed, the overall effect being merely a stimulation.

Thus, according to the present improvement, sufficient jets of cold temperature are combined in a spray to impact the body with a plurality of jets at that temperature immediately surrounded by another spray containing a plurality of jets at the opposite high temperature extreme. The body will move while being impinged with a shower of both types of jets simultaneously to distribute the cold and hot in a sequence while being continuously wet. The temperature differential in the present modification can readily be sensed by the body. Thus the hydrotherapeutic benefits are not only obtained by the present modification, but also by actual sensing of the temperature differences, the shower is more pleasing to the user. The modified structures to produce the improved effect of the present invention are illustrated in the drawings in several forms as follows:

Fig. 1 is an assembly in side elevation of the modified shower head hereof;

Fig. 2 is a front elevation of the same shower head

showing its manner of attachment in a typical shower bath installation;

Fig. 3 is a bottom view of the shower head with the spray plate broken open taken in the direction of the arrow 3 of Fig. 1;

Fig. 4 is a side elevation of the shower head of Figs. 1, 2 and 3 on an enlarged scale with parts disassembled and in section to show manner of assembly and internal construction;

Fig. 5 is a modification of the structure shown in Figs. 1 to 4 for portable adaptation;

Fig. 6 is another modified portable type shower head combined with a manually controlled valve in the portable head;

Fig. 7 is the same shower head as shown Fig. 6 with the parts disassembled in section to show manner of assembly and internal construction;

Fig. 8 is a further modification of the type of valve shown in Figs. 6 and 7 with needle type valve control, the parts being shown arranged in position for assembly and in section showing internal construction;

Fig. 9 is a further modification of the manner of supplying separate fluids to the shower head to eliminate a right angle bend of supply ducts;

Fig. 10 is a side elevation of a further modification of a larger type of shower head adapted for permanent installation embodying the same principle as Fig. 1;

Fig. 11 is a front view of the shower head shown in Fig. 10 with a portion thereof in section to show internal construction;

As shown in my parent application fluid, such as water, may have a source of heating for supply of heated fluid to one duct which leads to a shower head for spray thereof in a plurality of small jets. A second duct is provided in which cold water is supplied to the same shower head for independent spray which may have a means for cooling the water prior to supply. Both hot and cold fluids are independently sprayed without admixture from the same shower head. The water supplied to the hot fluid jets may be modified in temperature to the desired hot spray temperature from whatever temperature it may be initially heated by some admixture with cold water as in a typical shower. Constructions for separate heating and cooling are illustrated in detail in my parent application and such details are not repeated, but will be understood to be incorporated herein by reference.

While as shown in the several figures illustrating fluid ducts, the fluid of either temperature extreme, hot or cold, may be supplied through either duct for independent spray so that the outermost cone portions are hot fluid and the central portion of the spray is cold fluid.

Moreover, while the shower spray hereof of fluid in unmixed temperature extremes is supplied as a plurality of individual jets, it is not essential that all of the jets comprise the same volume of fluid or that they be supplied at the same impact velocity. For example, in some of the modifications herewith the outer portion of the conical spray may be formed into a plurality of small jets of varying velocity. The fluid may be sprayed with a minimum force merely to maintain the conical shape of the spray so that the impact force of jets against a body in the shower is mild, and the spray of contrasting cold temperature at the inner ring portion may be of similar impact force. It is also within the scope of this invention to supply the fluid at the innermost portion as a single composite of several cold jets, i.e. a central heavy flow of cold fluid in a stream of contrasting temperature simultaneously surrounded by a plurality of fine jets of opposite high temperature comprising the outer conical portion. Again that central group of jets may be sub-divided into a plurality of cold jets of the same character as the outermost jets of the cone of contrasting high temperature, but may be supplied with greater impact force and be of a contrasting needle-jet type.

Thus, the modifications of this invention illustrate these several variations in shower head construction wherein fluid is supplied not only in contrasting temperature but may be supplied in contrasting jet character and body impact force to enhance the sensible stimulating effect upon the body, either by the temperature contrast in jets merely varying in temperature between hot and cold extremes or by both contrasting temperatures and contrasting impact force.

As illustrated in Figs. 1 to 4 a permanent or semi-permanent type installation is provided whereby the shower head is adapted to supply fluid at contrasting temperatures simultaneously in a shower, used as a substitute for the typical shower head in common use in baths of present day standard construction. Such baths usually have a shower head secured to and supported by a metal pipe or duct 10 through a screw threaded union 12 either fixedly by a threaded fitting 14 or adjustably in angular shower position by way of a universal joint comprising a ball-type rounded cup 16 and complementary collar 18. These together form a ball and socket joint for adjusting the angular spray position of the shower head secured thereto by screw threading the shower head into the collar 18 for firm support at any desired angle.

The shower head of the invention for contrasting temperature sprays comprises a cast bell-shaped body 20 depending from a threaded boss 22 (Fig. 4) for threaded securement to the collar or socket 18 for support of the shower head in conventional manner. The casting 20 encloses a chamber 23 in which fluid passes and is distributed by widening for passing outwardly in a flared rose or bell shaped spray head. Integrally cast into the body of the shower head 20 is an independent duct 24 which passes outwardly through one side of the spray head and to which an independent tubular duct 26 is connected through a suitable fitting 28 which may be rigid or flexible. The tubular duct 26 is usually flexible rubber tubing, but for permanent installation may be metal pipe. The inner end of the duct 24 within the shower head 20 is bent with a right angle elbow bend 32 to open downwardly at the center of the shower head 20 and is internally threaded at 34 for fastening therein a separate spray assembly 36.

The spray assembly 36 comprises a relatively small jet housing 37 which for convenience of construction has an enlarging securing bore 38 in which is fitted a supporting ferrule 40 which has a complementary sized shank portion for fit within the bore 38 to a depth corresponding to the dotted line position 42 of the body 36. The fit of the ferrule within the bore 38 is threaded, but it may be a shrink fit or it may be press fitted over a rubber sheath (not shown) but preferably in practice, the fit is a frictionally tight fit which may be secured at the upper peripheral edge 41 by soldering or welding. The ferrule 40 has an extending fitting portion 44 threaded for securement into threaded portion 34 within the elbow 32. For fluid tight completion of the duct a rubber washer 46 is usually interposed in the joint thus formed. An annular shower plate 48, bored at its center for receiving the threaded portion 44 of ferrule 40, is supported between the shoulder 41 and the end 50 of the down turned elbow 32. The shower plate 48 is perforated with numerous small holes 52 for dividing fluid independently within chamber 23 into numerous small jets of the same temperature passing from the chamber 23 through the tiny ducts 52 in a conical spray as shown diagrammatically in Fig. 2.

The plate 48 may have a slight arcuate curvature whereby its peripheral edges are supported in fastening position above the plane of its central fastening to press against a soft rubber ring 54 mounted within a groove formed between an inner circular flange 56 and the circular lower lip 58 of the bell shaped housing whereby to confine all fluid emitted from the chamber 23 to pass as jets through the openings 52 in the spray plate 48.

The centrally mounted inner spray head assembly 36 although much smaller as to comprise only a fraction of the bell shaped spray head housing 20 in the spray sur-

face cross sectional area, is also bell shaped terminating in a slight flaring end 60. The flared portion 60 is separated from a plenum portion 62 by a partition 64. The partition is bored first in a ring of holes 66 for division of fluid passing from the plenum 62. For primary fluid distribution a small spray rose or spray plate 68 is bored with several small centrally distributed holes 70 and further has a serrated edge 72 cut with numerous fine serrations around its periphery. The plate 68 further has central bosses 74 extending vertically from both sides as shown for bearing against the center of the partition 64 and securing thereto by a bolt. An annular flange 76 is further mounted integral with the plate 68 about the boss 74 and concentric therewith to the same vertical height so that it too lies against the partition 64 when the plate 68 is tightly fastened thereto, the upper edge of the boss 74 and flange 76 lying in the same plane of the partition 64 when thus assembled. The plate 68 is bored through its center at 78 and the partition 64 is bored through its center and further threaded at 80. This allows securing the plate 68 in position with the boss 74 and flange 76 bearing against the underside of the partition 64 by insertion of a screw threaded fastening bolt 82 having a knurled head 84 for manual fastening of the threaded shank portion 82 into the threaded central bore 80 of the partition 64 thereby securing the plate 68 thereto in varying degrees of fluid resistance by manually adjusting the tension of the bolt 82 by turning the knurled head 84 as desired.

The lower lip of the flared bell portion 60 has an inner tapered wall 86 and the serrated edge 72 of the plate 68 is tapered to a complementary angle. When the plate 68 is assembled within the lower chamber provided by the flared portion 60 by means of the screw threaded fastener 82, and when that fastener is twisted for tight fastening, the flange 76 bears tightly against the partition wall 64 so that fluid passing through the small holes 66 from the chamber 62 is confined to the inner portion of the annular flange 76 which thereby forms a vertical partition around the fluid passing through the partition 64, and thereby diverts substantially all of the fluid flow through the several inner jet-forming perforations 70 in the plate body 68 for only slightly angular to relatively vertical downward projection. By loosening the knurled head 84 and thereby the plate 68 from its position with the flange 76 lowered slightly from its position against the partition 64, aided by the pressure of fluid passing therethrough, some of the fluid may pass over the top barrier flange 76 and thence outward between the serrated edge peripheral portion 72 and the tapered lip 86 whereby a portion of the fluid may be diverted somewhat more angularly downward in a small thin sheet-like conical spray. Thus the character of the jet produced by the inner jet-forming assembly 36 may be varied by adjusting the knurled head 84.

The shower head assembly as thus described in Figs. 1 to 4 provides an assembly of two independent spray means one concentric within the other with some degree of adjustment of the character of the inner spray. It is adapted to supply fluid at one temperature through a permanent duct 10 and fluid at a contrasting temperature extreme through either a permanent or semi-permanent, such as a flexible rubber hose, duct 26 for simultaneous spray. In most usual practice, and herein preferred, cold water is supplied through the duct 26 and hot water through the duct 10 although the reverse practice may be used if desired of passing cold water through the duct 10 and hot water through the duct 26. In the preferred use, the shower head is adapted for substitution of that conventionally mounted in a typical shower bath. For that purpose, as shown in bath mounted position in Fig. 2, it is assumed that such typical shower bath would have a usual shower head supporting permanent duct 10 fixedly mounted of metal to or within a shower bath wall 88 and supplied as conventionally with both hot and cold water, controlled respectively by a hot water valve 90 and a cold water valve 92 for supply of relatively hot water blended to a desired temperature by manipulation of these valves to form water of desired temperature passing as a blend through duct 10. It is further assumed that such conventional shower usually mounted in combination with a bath tub 94 would also have a spigot outlet 96 wherein both hot and cold water are conventionally supplied as controlled by independent valves 98 and 100 respectively for usual supply of water at the desired temperature for filling the bathtub 94.

To substitute the present shower head in such conventional bath construction the flexible duct 26 has an adapter 102 which is of conventional construction and fits over the spigot 96, through the duct 26, and thence to the independent spray assembly 36. Simultaneously hot water of desired temperatures as adjusted by valves 90 and 92 is pressed through duct 10 for a conical spray by passing outward through the several holes 52 in plate 48 as a large conical spray. Thus, an outer conical spray of hot water is formed having an inner small conically concentric concentrated spray comprising a plurality of jets of contrastingly cold water. With this arrangement it will be apparent that much colder water than normally comfortable may be supplied to the inner jet and much hotter water than would normally be used, may be supplied to the outer peripheral portions of the conical spray for optimum stimulating effect as described.

Of course, the present type of shower head may be permanently installed wtih piping such as described in my parent application and the cold water source may have interposed means for applying more positive refrigeration thereto for obtaining water at a temperature lower than naturally available in conventional water supply at ambient temperatures. Moreover, where the bath commonly available does not have four independent valves separately controlling a bath tub and a shower as shown in Fig. 2, or where the bathroom has no bathtub at all but is merely equipped with single stall-type shower facilities, the flexible duct 26 and the suitable adaptor 102, or other type of coupling means as necessary, may be affixed to some other extraneous source of cold water supply in the bathroom, such as the washstand spigot.

It is sometimes desirable to use a shower head of this character in a portable form so that the shower head itself may be held in the hand of the user, or that of an attendant, and moved about freely for directing a spray at various parts of the body to give a greater degree of flexibility in applying the shower not available in the shower head of Figs. 1 to 4. Such portable type shower head is shown in Figs. 5 to 7.

For this purpose, inlet ducts 104 and 106 are flexible tubing such as rubber or plastic hose for respective fastening to separate hot and cold fluid sources such as separate hot and cold water spigots through suitable adaptors 102 (of the type shown in Fig. 2). As shown in Fig. 6, a handle gripping member 108 of metal or plastic is formed of two separable halves secured together by bolts 110. The handle 108 has a slightly flared inlet portion 112 which frictionally grips the end 114 of a resilient sheathing member 116 in which ends of both rubber tubes 104 and 106 are encased. The end portion 114 of the sheathing may be of rubber molded about the ends of tubes 104 and 106 which terminate in duct-like openings 118 each aligned with the rubber pipes 104 and 106 for fixed orientation of outlet flows from each tube into the handle member 108. The handle member 108 further encloses between its halves ducts 120 which are short metal pipe lengths such as nipples and which are threaded at their outer ends at 122 for securement to a shower head body 124 in fluid tight relationship when the two halves of the handle member 108 are assembled. The opposite inner ends of the ducts 120 need only be tapered for frictional securement within pipe

ends 118. Thus fluid is directed respectively through each outlet 118 from the respective pipes 104 and 106 through each duct 120 formed in the handle member 108 and thence respectively into the shower head body 124.

While Fig. 6 shows a handle member generally comprising a stiffening sheathing formed about both flexible pipe ends at their juncture with the shower head body 124, that handle member as shown in Fig. 7 may be omitted. Thus the flexible pipe ends are merely frictionally coupled to short nipples 120 by pressing the rubber tubes elastically over tapered ends. In Fig. 8 the nipples 120 are simularly metallic but longer as in Fig. 6 so that these may serve as a handle or gripping means, but the outer sheathing shown in Fig. 6 is omitted. The inner ends (not shown) will be similarly tapered as in Fig. 7 to receive the flexible tubes 104 and 106.

The shower head body 124 in Figs. 6, 7 and 8 is empirically similar to that described in Figs. 1 to 4 in general construction, but it is modified in several ways. The cold fluid duct 106 leads to an internally cast duct 126 which by way of a right angle bend, bends downwardly centrally to lead the cold fluid into a central spray nozzle assembly 36 which as shown in Fig. 6 in outline may be of the same construction as shown in Figs. 1 to 4. The body portion 124, however, is different in that the cold water passage way 126 is adjacent the top of the shower head and therein provides less exposure to fluid at the opposite temperature and thereby less heat exchange from fluid passing through chamber 128 in the body of fluid surrounding only the vertical portion 130 of passage way 126.

There is another and equally important advantage in disposing the inlet cold fluid duct near the top in that this construction allows mounting of a valve in the passage way 126 for hand control of one fluid such as cold water passing through the portable shower head. For this purpose housing body 124 is bored through the top at right angles to the passage way 126 at the portion 132, the bottom of the bore being rounded at 134 to receive a lower complementary rounded plug end of a rotary valve plug 136. The plug 136 is tapered into a lesser diameter valve stem 138 which continues into a rectangular shaped end (not shown) to fit in the rectangular or splined cut portion 140 of a valve handle or lever member 142. The upper end of the valve stem 138 is bored and threaded at 144 for securing the lever to the valve stem by a screw 146. The upper wall of the valve body 124 is further bored in an enlarging bore 148 and threaded for receiving a securing valve bonnet nut 150 to hold the valve stem within the bore 132 for rotation of the plug 136 in fluid tight manner through an intermediate rubber washer 152. The lower plug end of the valve stem is cross-bored at 154 at right angles to the axis of the valve plug 136 to complete the fluid passage through the plug for control of fluid therethrough by rotation of the stem, as will be apparent. The hot fluid through its duct 120 will enter the surrounding hot fluid chamber 128 which operates as a plenum chamber for distribution of the fluid through a spray plate 48 similar to that shown in Figs. 1 to 4 which is similarly bored with small holes 52 and through which hot fluid is distributed in a plurality of jets surrounding the cold water jets produced by the inner spray head 36.

As shown in Fig. 7, the inner spray head may be modified to a simpler type of spray head wherein fluid is divided into a number of jets, but the inner spray is not manually adjustable but fixed by a cap portion 156 which has a lower wall 158 bored with numerous tiny holes 160 through which fluid passing from duct 126 is sprayed in numerous jets. This cap portion 156 is internally threaded at 159 to fit about a male threaded portion 161 extending as a continuation of the duct 130. That cap fastening also secures about the extending portion the plate 48 which is centrally bored at 49 to fit about the extending portion 161 and held against a shoulder 50 through an intermediate washer 162. Where the type of adjustable inner jet assembly 36 is to be used, the lower end of the duct 130 will be internally threaded and shaped as shown in Fig. 4. Thus for the portable shower head, a manually controlled valve preferably of rotary plug type is mounted in the head as shown and various types of spray outlets for that manual control of the central spray portion may be supplied.

The modification shown in Fig. 5 omits a handle portion while allowing portable use, but is of considerably simpler and therefore economical construction. The flexible ducts 104 and 106 are simply bracketed together by bracket clamps 164 for easy handling, the bracketed construction stiffening the two flexible ducts to serve as a handle portion. In a manner similar to the construction shown in Figs. 1 to 4, the central fluid duct passes through the lower end with a right angle bend, terminating in a central spray assembly 36 which secures the perforated spray plate 48 to the shower head housing 166 as shown in Figs. 1 to 4. A simple plug valve 168 is mounted in the duct 106 for control of fluid flow manually to the center jet assembly 36. The fluid from duct 104 passes through the open top of the housing 166 through a cup-shaped fitting 170 threaded to a boss 172 which is integral with and extending upward from the open top of the housing 166.

As shown in an alternate construction in Fig. 8, it may be desirable to control the flow of fluid through the center duct in a manner whereby the valve control operates directly upon the spray ejected from the center duct. Such valve control allows the production of a spray which may vary from an inner conical sheet to a relatively solid body of water as contrasted to numerous independent fine jets. Thus, in this modification, the center spray is a heavy integral flow of fluid in contrast to the fine jets of the conical spray thereabout of fluid of opposite temperature. Variation is also possible with the construction shown in Fig. 8 to vary the force of such solid jet for high pressure impact at the center of the conical spray. For this purpose the valve control is a needle or other means for varying the volume and character of the spray by means of a nozzle fixed upon the center depending duct of the shower head. The construction is generally similar to that of Figs. 6 and 7, but a needle valve is substituted for the rotary plug valve 136. Thus the construction shown in Fig. 8 comprises a similar spray head body 174 generally shaped and internally constructed to supply fluid as in Figs. 6 and 7, and has a duct-like pipe end 120 connected by threading 122 leading to a central duct 126 which bends into a right angle vertical tube 176 at the center, which terminates at a flat shoulder 50 and the end is internally threaded at 178 to receive a spray nozzle fitting 180 having a threaded shank portion 182 for mating with the threaded inner end portion 178. The inner portion of the fitting is bored first cylindrically at 184 to receive the sliding end of the needle valve shank 186 and then bored in a tapered portion 188 to cooperate with the tapered point of the needle control 190. The fitting 180 is finally bored at its outlet center with an opening 192 in which is centered the tapered point of the needle 190 for final closure of the opening 192, that opening 192 being of smaller diameter than the shank 186 of the needle valve. Concentric with the vertical portion of duct 126 and with the opening 192, the upper wall 194 of the housing 174 is further bored at 196 to receive in close sliding fit the shank 186 of the needle valve. The upper wall surrounding the opening 196 has a much wider bore 198 which is threaded for securing the threaded end 200 of a valve bonnet fitting 202 through an intermediate rubber washer 204 for fluid tight securement of the body 202 to the housing 174. The upper

end of the fitting **202** is bored and threaded at **206** to receive the threaded collar **208** of the valve needle. The bored section **202** terminates in a narrow bore **210** through which the needle body **186** passes in sliding fit. The outer end of the threaded collar **208** has integrally mounted therewith a knurled knob **212** for manually rotating the threaded collar portion **208** within the threaded bore **206** for vertically adjustably raising and lowering the needle point **190** from its closure position within the lower outlet **192** when assembled. Accordingly, as shown, fluid passing through duct **120** from a source **106** will pass out of the outer opening **192** in a conical spray or a solid fluid jet of considerable volume and under variable pressure as manually controlled by adjusting by twisting the knurled knob **212** of the needle valve. As in other figures fluid at the opposite temperature passes through the lower duct **120** through any source pipe **104** filling plenum **128** and being sprayed through perforations **52** of plate **48** held against the underside of the shower head by the fitting **180** as described in other figures.

Fig. 9 illustrates a modification wherein the shower head may be fixedly or portably mounted with both fluids admitted, one centrally and the other parallel in direction but laterally disposed near one side of the bell shaped housing **214** both entering through the top **216** thereof. That type of construction is most economical in that the simple housing casting **214** is merely a bell shaped casting and allows passage of fluid of opposite temperature sources through fittings mounted in said housing **214** which are standard piping fittings. For example the center duct may be an ordinary pipe nipple **218** threaded at both ends, the upper end of which may be connected to another standard pipe fitting **220** which may carry a ferrule for fastening to a rubber hose frictionally in the manner shown in Fig. 7 and the opposite end **222** is the standard threaded end over which may be slipped the perforated spray plate **48** and secured by a spray cap **156** as also described and shown in Fig. 7. The central duct pipe nipple **218**, passes through the contrasting fluid temperature plenum chamber **224** which is supplied fluid through the upper end by another fitting such as a pipe nipple **226** which similarly connects to a rubber hose **104** for fluid supply thereto. It will be understood that both fittings **218** and **226** may alternatively be joined to permanent metal piping for permanent mounting; or to rubber tubes for portable use; or one supply duct may be permanent and the other have rubber tubing as shown in Fig. 2.

Figs. 10 and 11 illustrate a modification adapted for permanent or semipermanent installation wherein better separation is possible between the hot and cold fluids being sprayed to prevent heat exchange at the spray head. For this purpose the spray housing **228** is a large annulus, or donut-like hollow body which has a donut type hole **254** in the middle through which a duct **230** is slidably fitted and which terminates in the central spray head assembly **36** which may be of any construction hereinbefore described, shown specifically in Fig. 10 as the same as that of Figs. 1 to 4. For this construction the housing **228** is usually of substantially larger diameter than the other modifications described. Fluid at one temperature such as hot water is supplied through a metal duct **232** through a universal ball and socket joint **234** coupled to the male threaded center portion **236** of a T shaped fitting **238** by means of the female coupling member **240**. Both other openings in the fitting **238** are internally threaded to receive opposite elbows **242** which bend in right angles into diametrically opposite openings in the top of the donut shaped housing **228** for even supply of hot water to its diametrically opposite sides. A similar plate **48** with a somewhat larger central bore may be secured to the bottom of the housing **228** by the inner spray head **36** in the manner described for other figures but preferably the plate **48** in this instance will be further bored for securement by numerous small threaded bolts placed near the outer and inner edges for independent fastening to the lower end of the housing **228**. For this purpose several thickened portions **244** of the inner housing wall are provided into which holes **246** may be bored and threaded for receiving the bolts.

For supply of fluid to the center spray device **36** a duct **248** is provided which may be clamped at **250** to fixed position relative to the housing **228** leading into or integral with the duct **230** which terminates by suitable fittings in the spray assembly **36**. The outermost duct **252** for permanent installation may be of metal or flexible rubber as desired. The inner duct **230** which arcuately bends downward to centrally support the spray head **36** may be of metal for holding the support **36** in a right angle position for spray at the center of the cone of spray formed by the large surrounding housing **228** or may be fixed slightly angular thereto if desired. The center opening portion **254**, the "hole of the donut," is desirably sized to frictionally secure in sliding fit the duct **230** which may further (not shown), if formed of metal, be wrapped with insulating sheet such as asbestos to minimize heat transfer between the fluid passing through inner duct **230** and the housing **228** while frictionally supporting the duct in central spray position.

As noted above the advantages of the several modifications hereof over my parent application are that fluid of one temperature extreme may be applied simultaneously with fluid of the opposite temperature extreme relatively concentrated, and as shown in Figs. 1 through 11 described hereinabove, the fluid of opposite extreme is placed at the center of a conical total spray, that center portion at one temperature being surrounded by a ring of jets at the opposite temperature extreme. However, sometimes it is desirable to supply fluid at the opposite temperature extremes but distributed in an intermediate manner as a series of concentric cones of jets whereby although the different temperatures may be sensed by the body according to the principle of the improved invention hereof, the sense is not so great as in the modifications described in Figs. 1 through 11. For this purpose, as shown in Figs. 12 and 13, a plurality of concentric conical rings of jets are sprayed, one within the other, alternating as concentric cones of spray, the first being at one temperature and the next at a contrasting temperature in several alternations, i.e. from outside inward, a hot cone, then a cold cone, again a hot cone, and centrally a cold cone, etc.

Certain modifications will occur to those skilled in the art and accordingly it is intended that the several modifications herein above described are intended to be illustrative and not limiting except as defined in the claims appended hereto.

I claim:

1. In a shower head the combination of means for independently but simultaneously spraying hot and cold fluids in substantially concentric sprays comprising a plurality of small fluid jets, the hot fluid being sprayed from an annular housing having a perforated outlet wall whereby to emit hot fluid therefrom in a plurality of jets from the several perforations as a hollow conical spray, said annular housing surrounding and supporting a centrally mounted duct adapted to conduct cold fluid to the center of the said hollow conical spray, said centrally mounted duct having an independent spray means for spraying cold fluid passing therethrough in a central jet independently of the surrounding hot conical spray comprising jets of fluid emitted from the surrounding annular housing, the plane of fluid projection from said central spray means being disposed substantially below the plane of said perforated outlet housing wall.

2. Device as defined in claim 1 having means for permanently supporting said combined shower head as a bathroom fixture in relatively fixed support position

and a universal joint connecting said shower head to said support means for adjusting the direction of both sprays emitted therefrom.

3. In a shower head the combination of spray means as defined in claim 1, the said spray means for spraying cold fluid concentrically within said hollow spray cone of hot fluid jets being disposed centrally of the shower head and having a rotary plug valve mounted in said shower head to control the quantity and velocity of fluid emitted centrally of the spray.

4. In a shower head as defined in claim 1, said cold fluid spray means comprising a nozzle having a single central bore adapted to emit fluid as a single jet of fluid concentrically within said hot fluid hollow conical spray means and below the spray plane thereof, and needle valve means adjustably slidable within said bore for varying the impact velocity of the cold fluid jet emitted from said nozzle.

5. The combination as defined in claim 1 wherein the duct means for supplying said cold fluid is flexible tubing having an adaptor mounted on the end for affixing the flexible duct to a spigot.

6. A shower head as defined in claim 1 wherein both said duct means conveying hot fluid to said housing chamber and cold fluid to said independent duct passing through the center of said chamber are flexible tubing, whereby said shower head is manually portable to freely direct a conical shower to desired portions of a body to be sprayed.

7. In a shower head as defined in claim 1, said means for spraying cold fluid having means for manually adjusting the impact velocity of its spray, a rigid fluid duct connected to said hot fluid spray means connected to a source of hot fluid and adapted to lead said fluid to the said hot spray means and to support the entire combination in shower spray position and independent duct means connected to said centrally mounted cold fluid spray means for supplying cold fluid thereto.

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