United States Patent

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[54] **ORAL HYGIENE CENTER**
6 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** **128/66**
[51] **Int. Cl.** **A61h 9/00**
[50] **Field of Search** 128/62, 66, 24.1, 24.2, 229

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ABSTRACT: Speed controlled structure for driving a toothbrush or a gingival stimulator and which can supply a pulsating jet of temperature controlled water at a desired pressure for use as a tooth irrigator and gum stimulator, the structure being driven hydraulically by water main pressure.

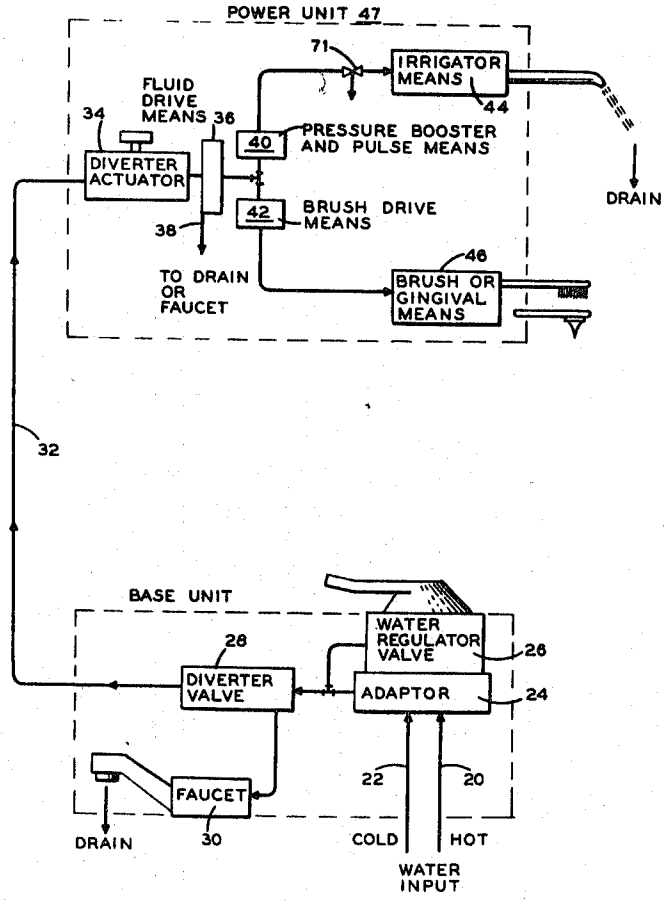
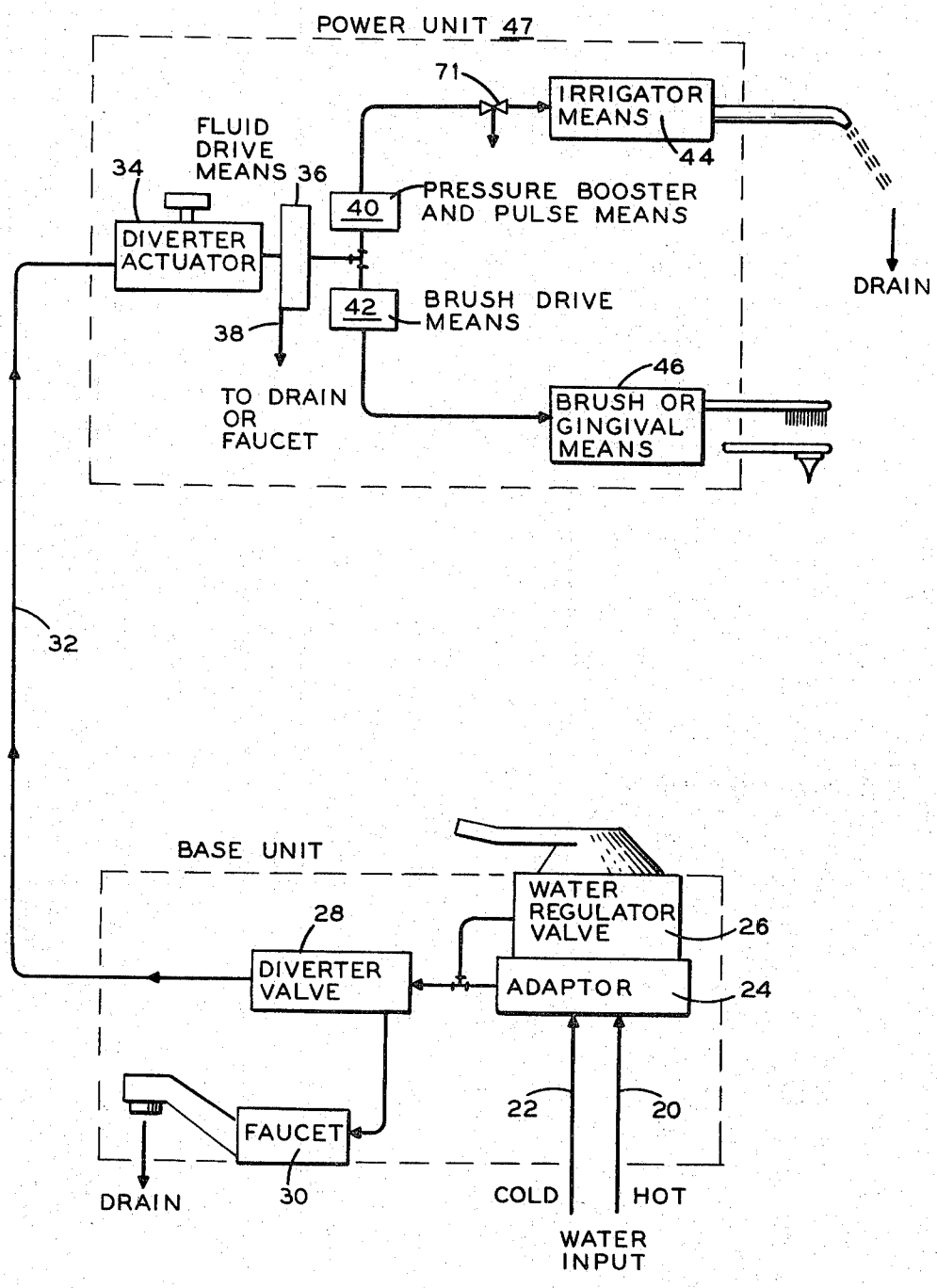


FIG. 1



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FIG. 2

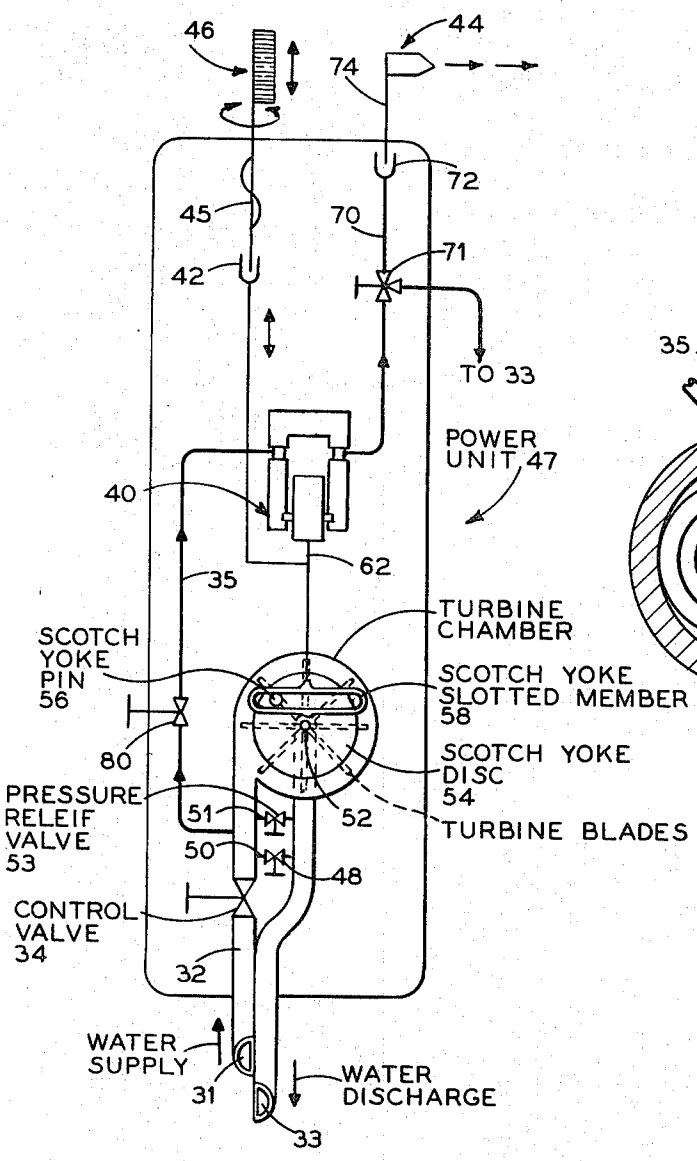

46
44
74
72
45
70
71
42
TO 33
POWER UNIT, 47
40
62
35
TURBINE CHAMBER
SCOTCH YOKE PIN 56
SCOTCH YOKE SLOTTED MEMBER 58
80
SCOTCH YOKE DISC 54
PRESSURE RELEIF VALVE 53
51
52
TURBINE BLADES
50
48
CONTROL VALVE 34
32
WATER SUPPLY
31
WATER DISCHARGE
33

FIG. 3

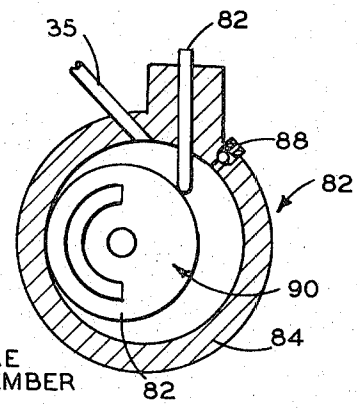

35
82
88
82
90
84
82

FIG. 5

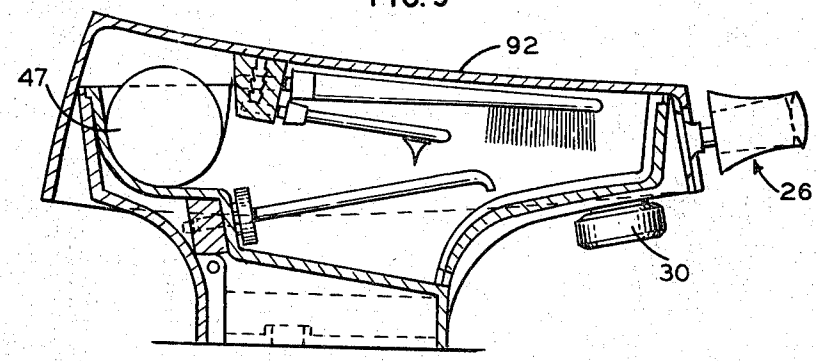


FIG. 6

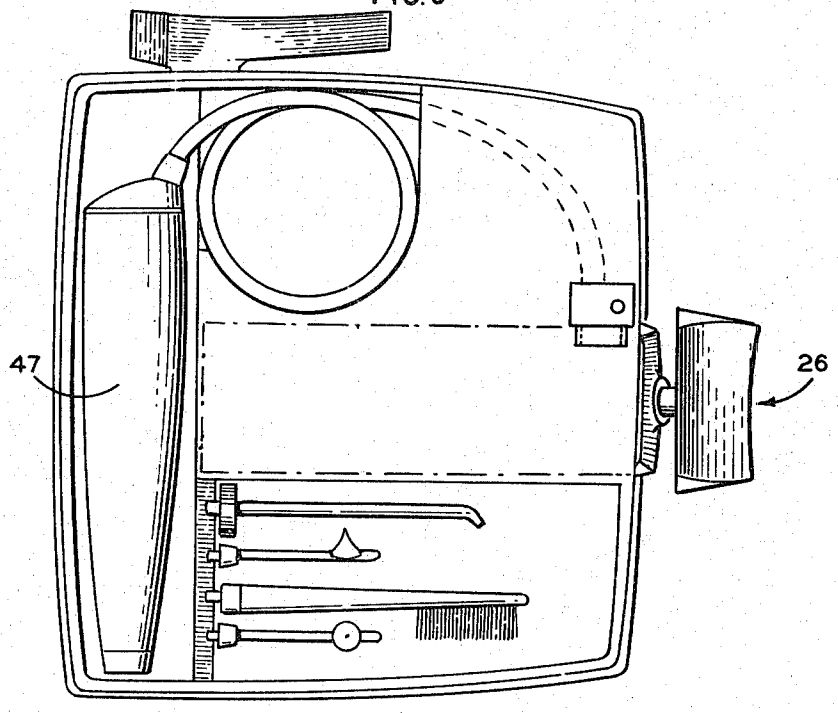
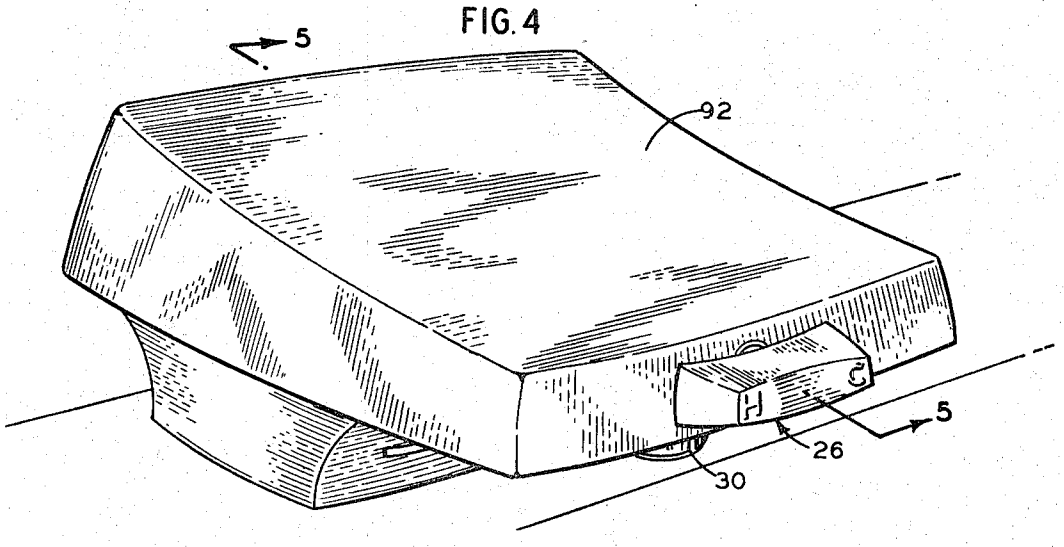


FIG. 4



ORAL HYGIENE CENTER

This invention relates generally to a fluid powered implement for use when following good oral hygiene practice and, more particularly, to hydraulically powered apparatus which can be used for dental care and to stimulate and massage the tissues of the guns either mechanically and/or hydraulically.

It is estimated that a vast majority of people have experienced tooth decay and/or problems involving their gums. It is generally accepted that a conscientious effort directed towards maintaining clean teeth, removal of particles of food from between teeth and stimulating the gum tissues will aid in the reduction of cavities of the teeth and help promote healthy gum tissues.

Accordingly, it is an object of this invention to provide a hydraulically driven power toothbrush.

It is another object of this invention to provide a power toothbrush having a variable speed.

It is still another object of this invention to provide a hydraulically driven power gingival stimulator.

It is also an object of this invention to provide a power gingival stimulator having a variable speed.

It is an additional object of this invention to provide a pulsating water jet tooth irrigator and gum stimulator.

It is another object of this invention to provide a device which permits the rate of the pulsations of a water jet to be varied.

It is still another object of this invention to provide a pulsating jet of water having a desired temperature.

It is another object of this invention to provide a device which is reliable in operation and economical to build.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the apparatus becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein: a duct **51** containing a pressure relief valve set to open at pressures above a predetermined valve can be provided between hose **31** and hose **33**.

FIG. **1** is a schematic in accordance with the principles of the invention;

FIG. **2** is a view in section of the power handle in accordance with the principles of the invention;

FIG. **3** is a view of a rotary type of pump in accordance with the principles of the invention;

FIG. **4** is a view in perspective of a housing of the invention;

FIG. **5** is a view along the line **5–5** of FIG. **4**;

FIG. **6** is a top view of the housing with the cover removed.

Similar reference characters refer to similar parts throughout the several views of the drawings.

Referring to FIG. **1**, there is illustrated structure in accordance with the principles of this invention. Two water feed pipes, a hot water pipe **20** and a cold water pipe **22** which may be of copper, bronze, galvanized or, in some instances, plastic, are secured in a leak resistant manner to an adapter **24** which is connected to a water flow control valve **26**. The flow control valve **26** can be two separate water control valves, one for the hot water line and one for the cold water line, or it can be of the single lever type similar to that manufactured by American Standard wherein a single control knob or lever regulates the flow of the hot water and the cold water to provide a regulated flow of water having a desired temperature.

The regulated flow of water having a desired temperature flows from the control valve **26** to a diverter valve **28** having two outlets. One outlet is coupled to a faucet **30**. The other outlet is coupled through a flexible hose **32** to a diverter actuator control valve **34**.

A fluid drive means **36** such as a turbine or the like is coupled to receive water under pressure from the diverter actuator control valve **34**. A return hose **33** which can be an integral part of hose **32** collects the water used to drive the fluid drive means **36** and directs it either directly to a drain or to the faucet **30**. The fluid drive means drives a pressure booster and pulser means **40** and a brush drive means **42**. The pressure booster and pulser means **40** provides pulsating pressurized water to an irrigator means **44**; and, the brush drive means **42** provides powered motion to a brush or gingival means **46**.

The adapter **24** is designed to permit connections to be made to hot and cold water pipes of different types having various spacings. The flow control valve **26** is coupled directly to the adapter **24** and mixes the hot and cold water to provide a regulated flow of water having a desired temperature. The diverter valve **28** which can be of the type manufactured by the Modern Faucet Company permits the regulated flow of water having a desired temperature to be directed from the flow control valve **26** through the faucet **30** or the fluid drive means **36**. During normal operation, the diverter actuator control valve **34** is conditioned to block the flow of water and pressure builds up in hose **32**. This build up of pressure in hose **32** conditions the diverter valve **28** to feed water from the flow control valve **26** to the faucet **30**. Upon activation of the diverter control valve, that is, conditioning the valve **34** to pass water to the fluid drive means **36**, the pressure in the hose **32** drops and the diverter valve **28** diverts the water from the faucet through to the hose **32** and fluid drive means.

The fluid means **36** can be of the piston type or turbine type of structure designed to operate with a fluid supply pressure wi which can vary from **20** psi to **120** psi.

Referring to FIG. **2**, there is illustrated a power unit **47** sized to fit conveniently in a user's hand and containing the diverter actuator control valve **34**, a turbine type of fluid drive means **36**, a piston type of pressure booster and pulse pulser means **40**, the brush drive means **42**, the irrigator means **44**, and the brush or gingival means **46**.

The hose **32** can be of the two compartment type; one passageway **31** being provided to conduct water under pressure to the turbine; and, the other passageway **33** being provided to conduct water away from the turbine. The diverter actuator control valve **34** is positioned within passageway **31** to permit or inhibit the flow of water through to the turbine.

A throttle valve **48** positioned within bypass duct **50** controls the speed at which the turbine rotates by controlling the flow of water fed to the turbine. Ordinarily, the throttle valve **48** could be positioned within the passageway **31** to control the flow of water fed to the turbine. However, under certain circumstances when the flow of water through the passageway **31** is throttled down to obtain slow rotational speeds of the turbine, the fluid pressure in passageway **31** can increase and urge the diverter valve to direct water through the faucet. After a short interval of time, because of the gradual decrease of pressure in hose **31** due to open valve **34**, the diverter valve will again operate to feed water from the faucet to the hose **31**. Thus, the diverter valve hunts. The use of the bypass duct was found to eliminate this hunt condition. However, if the pressure operated diverter valve **28** is replaced by a manually controlled valve, then the throttle valve can be positioned within the passageway **31** and the bypass duct **50** can be eliminated. Under normal circumstances the water pressure in a home can vary over a wide range. To provide a device which is practically independent of variations in water pressure,

The shaft **52** of th the turbine is secured either directly or through gearing to a disc **54**, the disc **54** supporting a rod **56** on which is a roller or roller bearing. A Scotch yoke mechanism having a slotted member **58** positioned around and driven by the rod **56** is secured to drive a pump piston **60** through a connecting rod **62**. Rotation of the disc **54** rotates the rod **56** about the shaft **52**. The rod **56** in combination with the slotted member **58** drives the connecting rod **62** forward and reverse for each revolution of the rod as it is rotated through a complete revolution by shaft **52**.

The connecting rod **62** is connected to urge the piston of the pressure booster and pulser back and forth within the chamber **64**. Partial withdrawal of the piston from the chamber permits water having a desired temperature to be fed from the passageway **31** through passageway **35** and the fluid input valve **66** to the chamber **64**. Movement of the piston into the chamber exerts a force upon the water in the chamber **64** and forces it out of the exhaust valve **68**. If desired, valve **68**

can be spring loaded to remain closed until the water in the chamber reaches or exceeds a predetermined pressure.

A tube **70**, connected to receive the pulsating pressurized supply of water from the chamber **64** through the exhaust valve **66** supports a coupling **72** designed to accommodate a tube **74** which can be made of plexiglass; glass or the like having a jet producing orifice. The tube **74** can be slidably secured to the fitting **72** to permit the tube **74** to be easily inserted and removed thus enabling each member of a family to use a different irrigating means. Under certain conditions such as high speed operation of the turbine and pump, a condition can result where the pump supplies water under pressure faster than it can be passed by the orifice in the irrigator. The result is that the water issuing from the irrigator means has a pressure which is higher than desired. A pressure regulator valve **71** such as a spring loaded valve coupled to tube **70** will prevent the pressure of the water in tube **70** from exceeding a desired value. The water passed by the valve **71** can be fed through a tube or hose to hose **33**.

If desired, a mouth wash solution can be introduced into and mixed with the water fed to the group. This can be accomplished by connecting tube **35** directly to a container having the mouth wash solution or by metering a mouth wash solution, in concentrated form if desired, into tube **35**.

a connecting link **76** coupled to and driven by the connecting rod **62** supports a coupling **78** which accommodates and can be removably locked to a rod having, at its end, either a toothbrush or a conical shaped rubber tip gingival means.

A control valve **80**, positioned within passageway or tube **35** controls the flow of water to the chamber **64**. During use of the irrigator means, the valve **80** is open and water flows from the passageway **31** through tube **35** to the chamber **64**. When the irrigator means is not being used, the valve **80** is closed to block the flow of water, to the chamber **64**. At the same time, the tube **35** and chamber **64** is opened to the atmosphere to prevent the formation of a partial vacuum within the chamber **64**.

Referring to FIG. **3**, there is illustrated a rotary pump which can be substituted for the reciprocating pump to provide a pressure booster and pulser means **40**. The pump **80** consists of an eccentric rotor **82** which revolves within a close-fitting cylinder **84**, a vane **86** being held tightly against the rotor by a spring, to separate the inlet tube **35** from the outlet port **88**. During each cycle the crescent shaped space **90** fills with water, and as the rotor turns, this water is forced through the outlet valve and port **88**.

If desired, a pin attached to link **76** and riding in a spiral channel **45** can provide a twisting motion to the reciprocating motion of the brush or gingival means.

When a rotary pump is used in place of a reciprocating pump, the shaft of the rotary pump can be connected either directly to or through gearing to the shaft of the turbine; and, the disc **54**, rod **56** and Scotch yoke mechanism, the brush drive means, is used to provide the motion for the brush and gingival means.

FIG. **4** illustrates a view in perspective of a housing of the invention showing the nozzle of the faucet **30** and knob of a single lever water flow and temperature controlling valve **26**. Surrounding the top and upper sides of the unit is a hinged cover **92**.

FIG. **5** is a view along line **5–5** of FIG. **4** showing the positioning of the power unit **47**, the irrigator means **44**, the brush means and the gingival means. The irrigator means, brush means and gingival means can be color coded to avoid confusion when more than one member of a family uses this invention.

FIG. **6** is a view of the structure of FIG. **4** with the cover **92** in its open position. The flexible hose **32** containing two passageways **31** and **33** can be manufactured to contain a curl memory to facilitate its storage.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is, therefore, to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

We claim:

1. An apparatus for oral hygiene comprising a pressure booster and pulser means, a brush drive means, fluid drive means coupled to drive said pressure booster and pulser means and said brush drive means, irrigator means fed by said pressure booster and pulser means, brush means driven by said brush drive means, valve means to regulate a flow of water, a faucet, a diverter valve interposed between said valve means, said faucet and said fluid drive means to selectively direct the flow of water from said valve means to said faucet or said fluid drive means, and a diverter valve actuator interposed between said diverter valve and said fluid drive means to operate said diverter valve by selectively passing or blocking the flow of water to said fluid drive means.

2. An apparatus for oral hygiene comprising a fluid drive means, pressure booster and pulser means driven by said fluid drive means, irrigator means fed by said pressure booster and pulser means, valve means to regulate a flow of water, a faucet, a diverter valve selectively controlled by water pressure interposed between said valve means, said faucet and said fluid drive means to selectively direct the flow of water for said valve means to said faucet or said fluid drive means, and a diverter valve actuator coupled to operate said diverter valve by selectively passing or blocking the flow of water to said fluid drive means.

3. An apparatus for oral hygiene comprising a turbine, a piston pump driven by said turbine, irrigator means fed by said piston pump, pressure regulator means interposed between said irrigator and said piston pump, valve means to regulate a flow of water, a faucet, a diverter valve selectively controlled by water pressure interposed between said valve means, said faucet and said turbine to selectively direct the flow of water from said valve means to said faucet or said turbine, and a diverter valve actuator coupled to operate said diverter valve by selectively passing or blocking the flow of water to said turbine.

4. An apparatus for oral hygiene comprising a fluid drive means, brush drive means driven by said fluid drive means, a valve means to regulate a flow of water, a faucet, a diverter valve selectively controlled by water pressure, interposed between said valve means, said faucet and said fluid drive means to selectively direct the flow of water from said valve means to said faucet or said fluid drive means, and a diverter valve actuator coupled to operate said diverter valve by selectively passing or blocking the flow of water to said fluid drive means.

5. An apparatus for oral hygiene comprising a turbine, a linkage to convert rotary motion to reciprocal motion driven by said turbine to drive a brush, rotating drive means to rotate the brush, valve means to regulate the flow of water, a faucet, a diverter valve interposed between said valve means, said faucet and said turbine to selectively direct a flow of water from said valve means to said faucet or said turbine, and a diverter valve actuator interposed between said diverter valve and said turbine to operate said diverter valve by selectively passing or blocking the flow of water to said turbine.

6. An apparatus for oral hygiene comprising a fluid drive means, drive means driven by said fluid drive means, gingival means, driven by said drive means valve means to regulate a flow of water, a faucet, a diverter valve interposed between said valve means, said faucet and said fluid drive means to selectively direct the flow of water from said valve means to said faucet or said fluid drive means, and a diverter valve actuator interposed between said diverter valve and said fluid drive means to operate said diverter valve by selectively passing or blocking the flow of water to said turbine.