

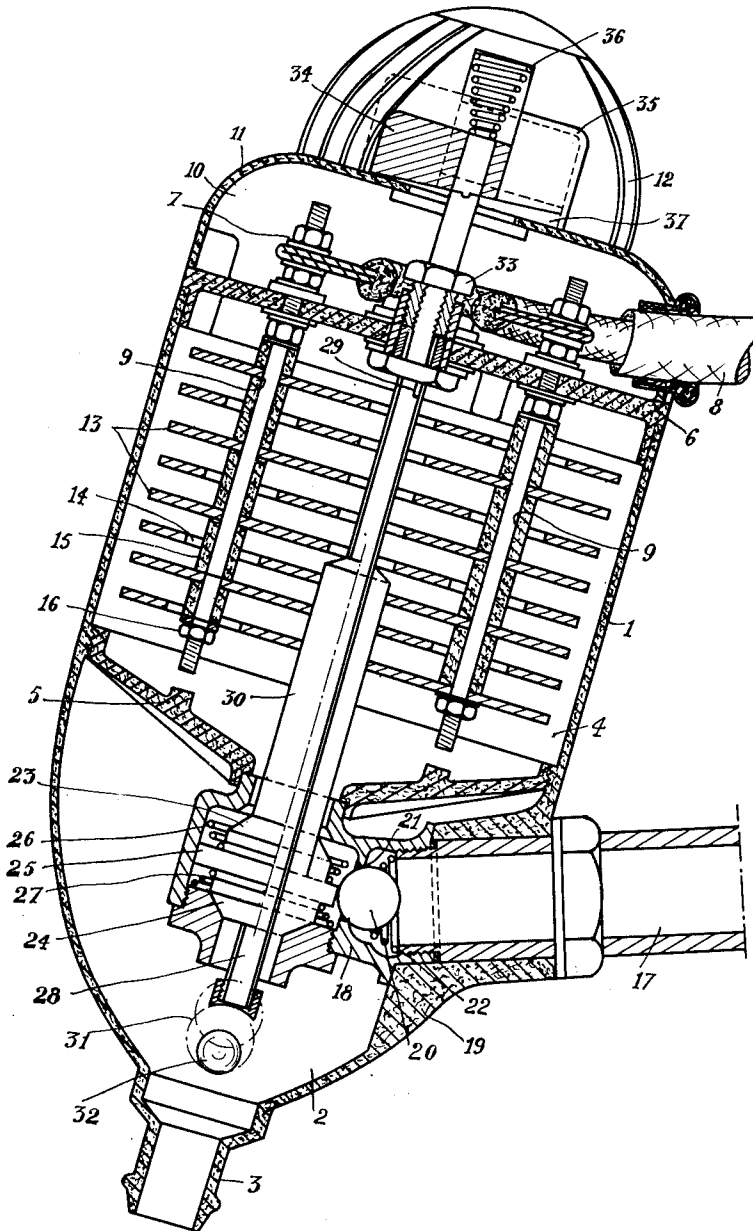
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ELECTRIC WATER-HEATING TAP

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ELECTRIC WATER-HEATING TAP

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My invention relates to the construction of an electro-mechanical tap, the closure members of which always remain water-tight and which is capable of being fitted on all water supply pipes in order to obtain at will cold water or hot water at the desired temperature and rate of flow and with a low voltage electric supply which is adjustable, for example from 24 to 220 volts.

The taps heretofore used have, from the mechanical standpoint, a serious tendency to rapid wear either of the taps themselves or of their water-tight members; furthermore, the adjustment of the rate of flow is generally too abrupt. From the electric standpoint, the existing heating taps incur danger of electrocution, particularly when such taps are constructed in too simple a manner; even if they are made of insulating material, the water heated by the taps remains charged with an electric potential which involves considerable risks for the users. In taps equipped with heating resistances it is necessary to replace said resistances when they are worn out, which is a costly procedure.

The tap according to the invention eliminates these drawbacks and enables the water to be heated instantly, according to requirements and therefore without losses of heat; its cost of manufacture is low in view of the services rendered by the possibility of being able to obtain hot water or cold water without effecting any previous operation.

The tap essentially comprises an electrode chamber extended by a collector and a nozzle from which said chamber is separated by a water-tight partition provided with an opening at its centre; an insulating plate closes the upper part of the chamber and acts as a support for terminals for the electric connections that extend to said terminals in a connection chamber protected by a hood which in turn acts as a support for an actuating knob; two vertical electrode rods are fixed to the terminals by mounting under the insulating plate in the electrode chamber and are alternately connected to superposed perforated flat metal discs. A closure member bears, in the collector, against a shoulder of the body of the tap and is provided, opposite a water inlet fitted to the closure member, with a seat on which is pressed a ball adapted to be urged away from its seat by a cam against which bear two oppositely located valves; each of which is urged by a retracting spring. A central rod, which is hollow at its centre, actuates the system comprising the valves and the intermediate cam, passes through the entire length of the tap and is fixed to an actuating finger which is housed in a recess in the actuating knob and which bears against a helical boss at the upper part of the hood of the connection chamber.

The flat discs are kept a rigid distance apart from one another by solid bushes that surround

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the electrode rods but the distance between said discs may be rendered variable by means of a set of normally compressed springs.

The lower end of the central rod is terminated by a metal comb which is constantly grounded so as to neutralize the residual voltage of the water and prevent any danger of electrocution.

A preferred embodiment of the invention is illustrated by way of example in the accompanying drawings in which:

The figure is a vertical section of the tap constructed according to the invention.

The tap comprises a body 1 of any suitable shape, made of metal, for example plastic material. The body 1 is provided at the lower part thereof with a water collector 2 terminated by a nozzle 3 of suitable cross-section, and at the upper part thereof with an electrode chamber 4 separated from the collector 2 by a water-tight partition 5 of plastic, provided with an opening at its centre.

The body 1 of the tap is closed at its upper part by an insulating plate 6 provided with terminals 7 for connecting, on the plate 6, electric conductors 8 which are connected to an electric supply system or to any other source of current. To the terminals 7 are electrically connected vertical electrode rods 9 which are mounted in the chamber 4, under the plate 6. The terminals 7 are housed in a connection chamber 10 closed by a hood 11 which is fitted over the plate 6 and acts as a support for an actuating knob 12.

The electrode rods 9 are alternately connected in a suitable manner to flat metal discs 13 which are perforated at 14 so as to ensure a suitable turbulence of the water while it is being heated. Said discs 13, which are made of cast-iron or any other material, are superposed in the chamber 4 as shown in the drawing and are kept the desired distance apart by means of solid bushes 15 which form spacing members between two non-successive discs 13 and surround the rods 9. But said bushes may be replaced by a set of springs which are normally compressed and which, when the terminal nuts 16 at the free ends of the rods 9 are loosened, can expand and carry the discs with them in their movement, thereby rendering the spacing between said discs variable.

The mechanical portion of the tap comprises a water inlet 17 which is adapted to be fitted directly on any pipe and which is fitted, by screwing or otherwise, to a closure member or valve body 18 by bearing against the body 1 by means of a shoulder 19 of same. The closure member 18 has a ball 20 which bears against a seat 21 provided on the closure member; a retracting spring 22 can, if necessary, be used in case of low pressure for urging the ball 20 against its seat 21.

The closure member furthermore has two valves 23, 24 which are located opposite one another and each of which bears against an open-

ing cam 25. Said valves are adapted to direct the water either towards the top or towards the bottom of the tap and are respectively urged towards a neutral position by retracting springs 26, 27, for example made of stainless steel. The system comprising the valves 23, 24 and the cam 25 bears against a central rod 28 which is hollow at its centre and which is connected to the chamber 4 through an opening 29 provided at the upper part of the rod or stem 28. Said rod 28 is heat-insulated at its base by means of an insulating sleeve 30 and passes, with a certain clearance, through the central opening of the partition 5.

The lower end of the rod 28 is terminated by an electric comb 31 of perforated metal, which is connected to ground and inside which may optionally be placed a ball of cork 32 (valve on water return).

The upper end of the rod 23 is extended through the plate 6 and the connection chamber 10 through a stuffing box 33 into the chamber 10 and then through the hood 11 where it is fixed to an actuating finger 34 housed in a suitable recess 35 of the actuating knob 12. Said finger 34 is adapted to press, by the action of a compression spring 36, against the upper part of the hood 11 which is provided with a helical boss 37 of elongated pitch and the dimension of which is equal to the travel of the valves 23, 24. Said boss 37 is so calculated as to provide a suitable slope for the satisfactory operation of the finger 34 and of the tap.

The device operates as follows: In normal use for the supply of cold water, the knob 12 is actuated so as to turn in a predetermined direction, thereby lifting the system comprising the valves 23, 24 and the cam 25 by means of the rod 28 actuated by the finger 34; the cam 25 pushes back the ball 20 and the water from the inlet 17 penetrates into the closure member 18 and is directed towards the lower part of same, whence it flows out through the nozzle 3. The actuation of the knob 12 in the opposite direction returns the valve and cam system to its original position and stops the flow of water because the ball 20 returns on to its seat 21.

For the supply of hot water, the knob 12 is actuated in the opposite direction so as to cause the valve and cam system to move downwards into the position shown in the drawing; the ball 20 is again pushed back by the cam 25 and the water from the inlet 17 penetrates into the closure member 18 and can only flow into the electrode chamber 4, in which it slowly rises and closes the electric circuit through the discs 13. The water is instantly heated and accumulates in the upper part of the chamber 4, and then flows through the opening 29 into the central rod which conveys it to the collector 2, after it has passed through the electric comb 31, whence it flows out through the nozzle 3.

The actuation of the knob 12 in the opposite direction shuts off the supply of cold water owing to the return of the ball 20 on to its seat 21 caused by the upward movement of the cam 25 into its original position. The valves 23, 24, which are urged into the neutral position by the action of the retracting springs 26, 27, return to an inner position and the scouring of the calcareous deposits is automatically effected by emptying the water that remains in the chamber 4, first into the collector 2 and then through the nozzle 3.

The tap can be mounted in the place of any ordinary tap and only requires the fitting of an electric plug which need never be disconnected, thus eliminating any switch. Since the whole of the metal portion of this tap is permanently grounded through the water supply pipe, no danger of electrocution need be feared.

For water pipes which are badly grounded (cases of tanks, iron piping, and the like), a complementary precaution consists in grounding the tap by means of a special wire, so that it thus becomes neutral to any external manifestations of an electric nature.

Various modifications of detail may be made in the construction of the tap illustrated, as regards the nature, the shape and the number of its component members, the method of effecting their electric and mechanical connections, and the like, without exceeding the scope of the invention.

What I claim is:

1. An electric water heating tap for furnishing at will hot or cold water and comprising a hollow body enclosing in its upper part an electrode chamber and including an apertured watertight partition below the electrode chamber and enclosing in its lower part below the partition a collector chamber, and having an outlet from the collector chamber, and also having an inlet, a valve body in the collector chamber and communicating therewith and mounted in the partition aperture and thereby communicating with the electrode chamber and including a seat and thereby communicating with the body inlet, a ball urged to the seat, a cam engaging the ball and on rotation moving it from the seat, a pair of valve members mounted on the cam and on opposite sides thereof and movable to either of two positions closing the communication of the valve body with the collector chamber or electrode chamber, spring means urging the valve members to an intermediate position establishing communication with both chambers, an insulating plate closing the upper end of the body and electrode chamber, a hood above the insulating plate, rods mounted on the insulating plate and in the electrode chamber, electrical connections within the hood and connected to the electrode rods, electrodes mounted on the rods, a stem secured to the cam and valve member and extending through the valve body, the partition aperture, insulating plate and the hood, a helical boss above the hood and surrounding the stem, and a finger slidable on and urged to the boss and rigid with the stem.

2. The tap according to claim 1 and also comprising grounded electric comb within the collector chamber and affixed to the end of the stem and enclosing a bell of cork.

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