A. CIOLFI.

SYRINGE.

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1,004,369.

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Fig. 1

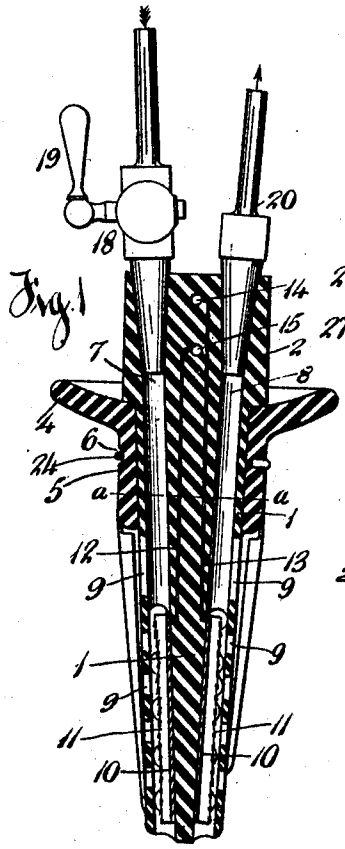


Fig. 4

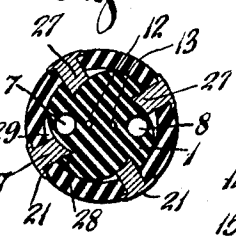


Fig. 2

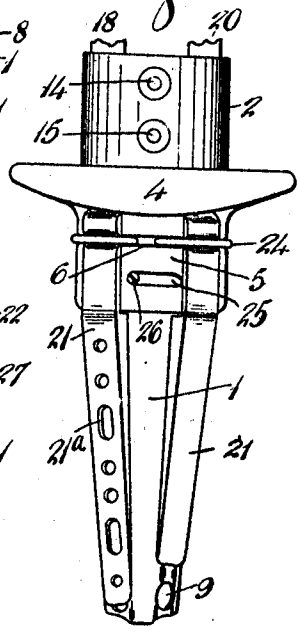


Fig. 3

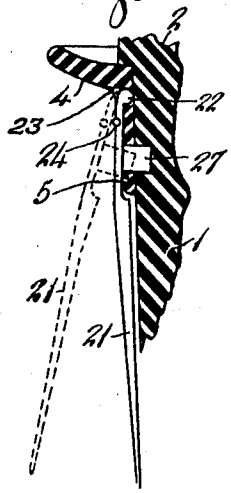


Fig. 5

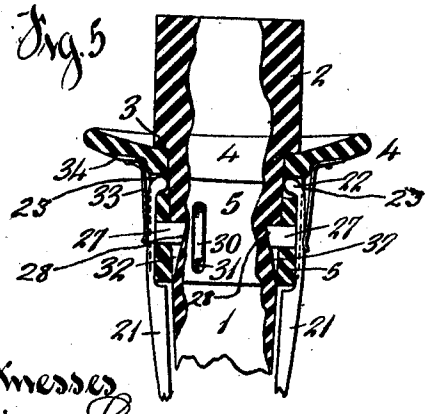
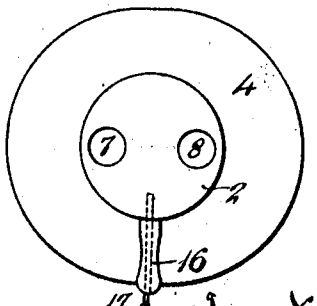


Fig. 6



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UNITED STATES PATENT OFFICE.

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SYRINGE.

1,004,369. Specification of Letters Patent. Patented Sept. 26, 1911.

Application filed December 20, 1909. Serial No. 534,141.

To all whom it may concern:

Be it known that I, ANTONINO CIOLFI, a subject of the King of Italy, and a resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Syringes, of which the following is a specification.

This invention relates to syringes or, more particularly, to cannulæ or similar instruments used in the treatment of internal, diseased tissues, or, still more particularly, to the class of such said instruments as employ a current of electricity to cause a decomposition or an electrification of the fluids injected for the respective treatments.

The object of the present invention herein is to provide a device that has a circulating passage therethrough, electrodes in such circulating-passage, a dam or guard to close the mouth of the cavity to be treated and to limit the entrance of the device therein and a multiple of radially-distending arms or dilators pivotally-held under tension on the stock or body portion of the device and having means to positively operate them for securing the desired expansion or spreading of the internal tissue that is to be placed under electrolytic treatment, resulting in the destruction or extermination of all germs and disease-producing bacteria.

In the accompanying sheet of drawings I show several forms of the device that for all practical purposes may both be considered as coming within the scope of the claims that immediately follow the description of the several views of said sheet of drawings.

In the drawings, Figure 1 is an axial section partly in elevation, of one form of my device; Fig. 2, an elevation of the device seen in Fig. 1, but with the inlet and outlet elastic-tube attachments broken off close to the shank or head end of the syringe; Fig. 3, a fragmentary section showing the nozzle, the guard or dam and one of the expanding arms or spreaders, the latter being in elevation along one side edge thereof; Fig. 4, a transverse section taken on the dotted-line *a*, *a*, of Fig. 1, showing the body portion of the nozzle, the circulating-passages therethrough, the eccentric notches or recesses in the outer face of said body portion of the nozzle, the sleeve or flange portion of the guard or dam and the pivotal end of each of the spreaders or dilators that contains the inner projections or inclined lugs that engage the said eccentric notches or recesses in said body portion of the nozzle; Fig. 5, a view similar to Fig. 1, but showing the device partly in section and partly in elevation and with another form of spring-tension on the dilators or spreaders and, also, showing the manner in which the device is capable of lengthwise adjustment on the nozzle within the guard-sleeve or flange instead of the rotative adjustment of said nozzle within the guard-sleeve seen in the previous four views; and Fig. 6, a plan view of the device seen in Fig. 2 but with the electric plug inserted and without the elastic-tube inlet and outlet nipple attachments.

In describing the several views of the drawings, I shall first take up all but Fig. 5 and then follow with its description.

1 indicates the barrel or body portion of the distributing-nozzle, having a head or shank 2 at its upper end and being made somewhat tapering toward its fore end. A circumferential shoulder 3 is provided on the nozzle against which the guard or dam 4 engages, such guard or dam being placed on the nozzle from its said fore end.

5 is a sleeve or hub projecting from the dam or guard 4 toward the said fore end of the nozzle, a circumferential groove 6 being made in said sleeve or hub near the guard.

7 and 8 indicate vertical passages leading from the top of the shank or head 2 to the said fore end of the nozzle, a triple vertical series of perforations 9 being made at either side the nozzle and leading to the said passages 7 and 8, as best seen in Fig. 1.

10 indicates a metal plate or bar, preferably platinum, suitably held within the lower end of each of the passages 7 and 8. These plates are made arc-shape in cross-section and are preferably toothed or serrated or slitted along their opposite edges, as shown at 11 in Fig. 1 and they are buried or placed sufficiently deep in the lower ends of the passages 7 and 8 to avoid direct contact with the tissue under treatment.

12 and 13 indicate internal wires or conductors leading from sockets 14 and 15 made in the shank or head 2, as best seen in Figs. 1 and 2, and connecting said sockets with the upper ends of the bars or plates 9, the latter forming suitable electrodes when a current supply is afforded through the plug 16 and its connecting-wires 17, the latter

leading to any suitable source of electric-current.

18 indicates an inlet nozzle-attachment whose lower, tapering end engages the upper end of the inlet-passage 7 and whose outer end is adapted to be engaged by a rubber hose or the like (not shown) leading to a receptacle containing the supply of fluid to be used in the treatment. A controlling-valve 19 is provided in the nozzle-attachment 18 for regulating or shutting off the fluid passing through the device into the cavity.

20 indicates an outlet nozzle-attachment whose lower, tapering end engages the upper end of the outlet-passage 8 and whose outer end is also adapted to be engaged by a rubber hose or the like (not shown) similar to the hose used on the inlet-nozzle 18 and forming a drain-tube for the device.

21 indicates each of a multiple of four arms whose upper ends are rounded, as shown at 22 in Fig. 3, for providing a suitable bearing on which each one of the arms 21 pivot in a recess 23 made in the sleeve or hub 5 just beneath the guard or dam 4.

24 indicates a spring-ring whose opposite ends are slightly spaced apart, as shown in Fig. 2, and provided for engagement with the groove 6, one end of such ring being preferably bent or hooked inwardly to engage a shallow socket or opening in the hub 5 so as to sustain the ring in place in the groove and prevent its accidental turning or disengagement. Said ring 24 also engages grooves made in the upper ends of the arms 21 and is adapted to place said arms under tension in a closed position along the main nozzle 1. The lower or outer ends of the arms 21 are preferably flared inwardly beginning at a point just below the lower end of the hub 5, as best seen in Fig. 1, thus providing for the corresponding taper in the lower or main portion of the nozzle 1 and facilitating the entrance of the device into position for use. In Figs. 1 and 2, I show the arms 21 as extending almost the entire length of the nozzle 1 down to its fore end and, also, several of the arms as extending a lesser distance downwardly toward the said fore end of the nozzle, the object of such difference between the lengths of such arms being for the purpose of using the shorter arms in avoiding contact with any protruding parts that might be injured by such contact. This feature is quite an important one of my invention herein, although not necessarily an essential one, for the reason that the arms might all be made the same length so as to extend down to the said fore end or tip of the nozzle.

The preferred form of using my distending-arms or dilators, after the nozzle has been duly inserted in the cavity under treatment, is shown in said first four views of the drawings, in which the guard 4, with its hub 5 are rotated the length of the horizontal slot 25 made in the said hub 5, as best seen in Fig. 2, a screw-stop 26 being used in said slot 25 to limit the said rotary movement of the hub and guard. On the inner face of the upper end of each of the arms 21, I provide an inwardly-projecting lug 27 having an inclined inner face 28 that engages the eccentric-bottom of the notch 29 made in the body portion 1 of the nozzle. In Fig. 4 is best shown the horizontal series of the eccentric-bottomed notches 28 and inclined lugs 27 that engage same, the said lugs being engaged at the innermost ends of the several notches 29, which is the position assumed when the arms 21 are in their normal positions for the entrance and withdrawal of the device to and from use.

In the operation of the device, after the same has been placed in the cavity for a treatment, the arms 21 are readily spread outward by simply turning the head or shank 2 with one hand while holding the guard or dam 4 with the other hand, whereby the walls of the cavity are stretched so as to receive the full treatment over the entire surface thereof, such treatment including the use of a medicated liquid that has been electrified by the current passing from the electrodes 10 and thereby setting up an electrolytic action calculated to effectually destroy the disease germs or bacteria causing the ailments within the cavity. The device can be used for flushing with other than medicated fluids and without the use of the electric-current if desired, which is quite obvious and will need no detail description herein.

In the device shown in Fig. 5, the guard or dam 4 and its hub or sleeve 5 do not rotate around the shouldered body portion 1 of the nozzle, but they are adapted to slide lengthwise along said body portion 1 toward the fore end of the latter and thereby cause the dilator-arms 21 to spread outwardly. A vertical slot 30 is made in the hub 5 and a screw 31 is used in said slot to limit the lengthwise-movement of the said hub and the accompanying guard or dam along the nozzle 1, such limiting movement being determined by the extent of desired spread or expansion of the dilators 21. Instead of the eccentric-bottomed notches 29, used in the device shown in the previously-described views, vertical notches having inclined bottoms 32 are used and the lugs 27 on the backs of the upper ends of the arms 21 are inclined vertically to coincide with said inclined bottoms 32, the latter causing the arms 21 to spread outwardly on their pivots 22 when the guard or dam 4 slides lengthwise toward the fore end of the nozzle. A vertical, plate spring or elastic arm 33 is used to exert the desired tension on

each of the arms 21, instead of the spring-ring 24 described in connection with the said preceding views. These spring-arms 33 retain the arms 21 in hinged position with the lugs 27 in engagement with the inclined faces 32 and have angular supporting ends 34 that are secured in notches made in the bottom of the dam 4. This form of device shown in Fig. 5 is not considered as convenient to handle as the other with a rotatory movement shown in the preceding views, but it is believed well to incorporate same herein. In use, this form of device is held by the guard or dam while the shank end of the nozzle is drawn outwardly to spread the arms 21.

It will be observed that a distinct advantage is gained by having the several spreader-arms or dilators detachably-hinged in place so that either one or all of them can be removed for use in full number or in a less number to suit the ailment under treatment. The spring-ring form of tension for such spreader-arms and, also, the spring-arm form of tension are both adapted to sustain the said spreader-arms in closed position over the nozzle and to permit either one of such spreader-arms to be readily removed and replaced. This readily detachable form of mounting the spreader-arms in the device also facilitates the very ready cleaning thereof which is a very necessary element in its use for the very serious reason that disease germs lurk in parts or joints that are rigid or that cannot be readily separated. Besides, said detachable-mounting of the spreader-arms enables the entire removal thereof when it is desired to use the nozzle as an ordinary irrigator or flusher that frequently occurs.

The serrated or toothed edges of the electrodes are especially adapted to present a greater contacting surface than would a plain electrode and, also, to deliver the electric current into many points of contact with the fluid used, thus resulting in a better impregnation or saturation of said current in producing the desired electrolysis for killing and destroying the disease germs.

In order that the spreader-arms or dilators 21 may not materially interfere with the contact of the treatments when the device is in operating position in the cavity, I prefer to construct each spreader-arm or dilator with a series of perforations or openings 21ª, such as is shown in the series of perforations in the spreader-arm (to the left) in Fig. 2. Otherwise, the broad solid surface of the spreader-arms would interfere to a considerable extent while under dilating action, unless the device is returned to normal position within the cavity and then turned at least the breadth of the respective spreader-arms within said cavity.

I claim:—

1. In a syringe or cannula used for internal medicinal treatments, a nozzle having inlet and outlet passages therein, perforations at the fore end of said nozzle leading to said inlet and outlet passages, a guard or dam having a hub or sleeve portion engaging a shouldered portion of said nozzle adjacent its outer or shank end, a plurality of arms or dilators having hinged connection under tension with the said hub or sleeve of the dam, means comprising lugs on the inner faces of the upper ends of said arms or dilators having inclined faces, notches or recesses in the portion of the body of said nozzle that lies adjacent to said inclined lugs and having inclined bottoms adapted for engagement by the inclined faces of said lugs and means for supplying and draining the said respective passages in said nozzle.

2. In a syringe or cannula used for medicinal and electrical treatments, a shouldered tapering nozzle having a shank or head at one end and perforations in its opposite or fore end, inlet and outlet passages leading through said shank and the body portion of said nozzle to said perforations in the latter, means for supplying and draining said inlet and outlet passages respectively, a dam encircling the shouldered portion of the nozzle, a hub or sleeve forming part of said dam and having a slot therein, a stop or pin engaging said slot to limit the movement of said hub on the nozzle, arms or dilators pivotally-mounted at their upper ends in the said hub, lugs on the inner sides of said arms near their hinged ends and having inclined inner faces, a series of inclined notches or recesses made in the hub and adapted for engagement with the inclined faces of said lugs, elastic means for sustaining said arms or dilators in closed position on the nozzle, electrodes in the perforated passage-ways of the nozzle and wire-conductors leading from the said electrodes to a source of current-supply in the shank of the nozzle.

3. In a syringe or cannula used for medicinal and electrical treatments, a nozzle having a shouldered-shank end and a tapered fore end, perforations in said tapered fore end, inlet and outlet passages throughout the shank and nozzle portions of the syringe and leading to said perforations in the fore end thereof, electrodes in the lower perforated portions of said passages, conductors leading from a source of current-supply in the shank to said electrodes, means in the shank for supplying and draining the said inlet and outlet passages respectively, a guard or dam on the nozzle adjacent the shouldered portion thereof and having a hub or sleeve made integral therewith and both adapted to rotate on said nozzle against its shoulder, a plurality of spreader-arms or

dilators pivotally-held under spring-tension at their upper ends in said hub and closing under said spring-tension along their free portions against said nozzle, a horizonal slot in said hub, a stop in said slot to limit the rotatory movement of said hub and the dam around the nozzle, lugs on the inner faces of said spreader-arms adjacent the pivotal end thereof and having inclined inner faces, and inclined horizontal notches or recesses made in the hub adjacent said lugs and adapted for engagement by the inclined faces of said lugs.

4. In a syringe or cannula for use in giving medical and electrical treatments internally, the same comprising a tapered nozzle having an upper shouldered shank portion, inlet and outlet passages leading throughout the length of the syringe including its shank and nozzle portions, supply and drain attachments leading to the said inlet and outlet passages respectively, perforations leading outwardly from the lower ends of said passage-ways, a hub or sleeve having a guard or dam made integral therewith and both encircling the nozzle beneath the shouldered shank end thereof, spreader-arms or dilators hinged at their upper ends in said hub or sleeve and extending forwardly along the nozzle to its fore end, a spring-ring encircling said spreader-arms to sustain them under elastic tension on said hub at their inner hinged ends and holding the outer free ends of the spreader-arms closed against the nozzle, inclined lugs projecting inwardly from said spreader-arms on a plane below that of the spring-ring, inclined notches or recesses in said hub coinciding with and engaged by the inclined lugs on the spreader-arms, a slot in said hub, a pin or stop engaging said slot to limit the rotatory movement of the hub and its accompanying dam, electrodes in the lower ends of said inlet and outlet passages, wire-conductors leading to said electrodes from the shank of the nozzle and means for supplying electric current to said electrodes.

5. In a syringe or cannula used for internal medicinal and electrical treatments, a discharge nozzle having therein a passage-way extending therethrough and a serrated or toothed electrode mounted in said passage-way.

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Witnesses:
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