(No Model.) 2 Sheets—Sheet 1.

A. BERTELLI.

SODA WATER APPARATUS.

No. 298,161. Patented May 6, 1884.

Fig. 2

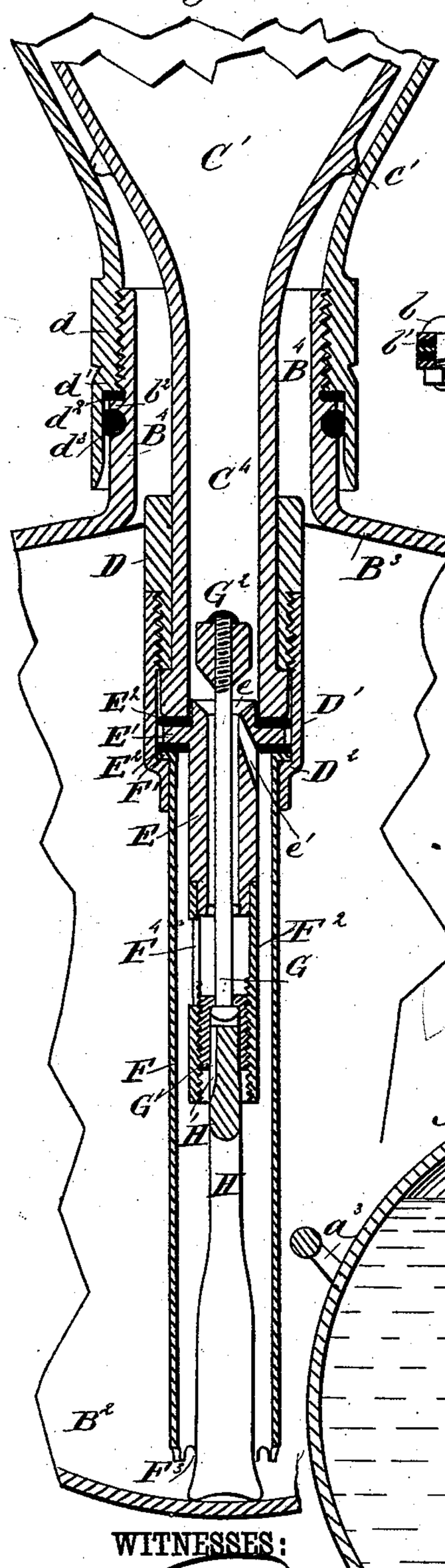


Fig. 1

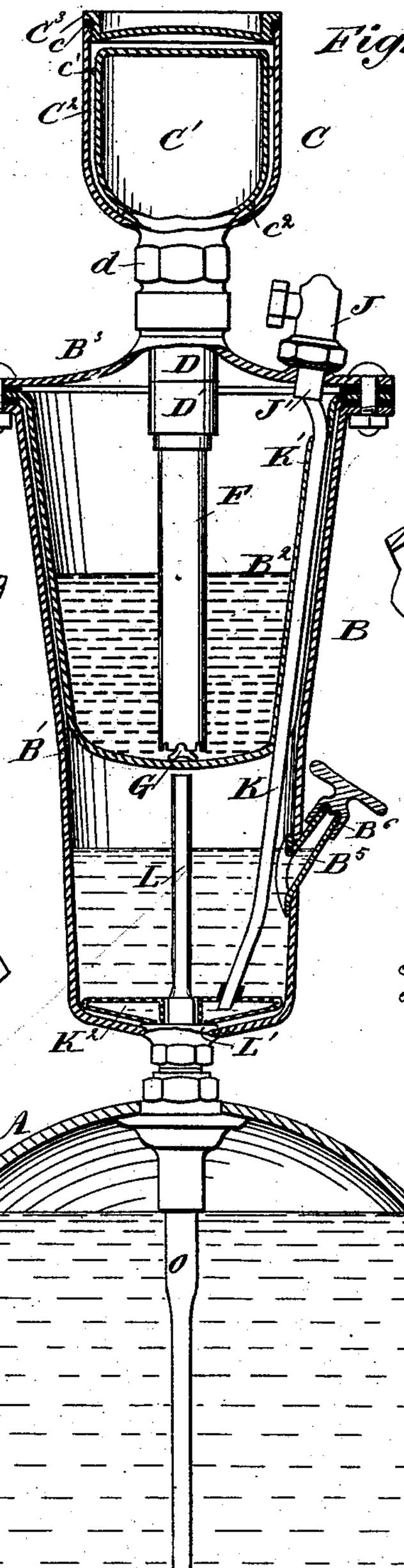


Fig. 4

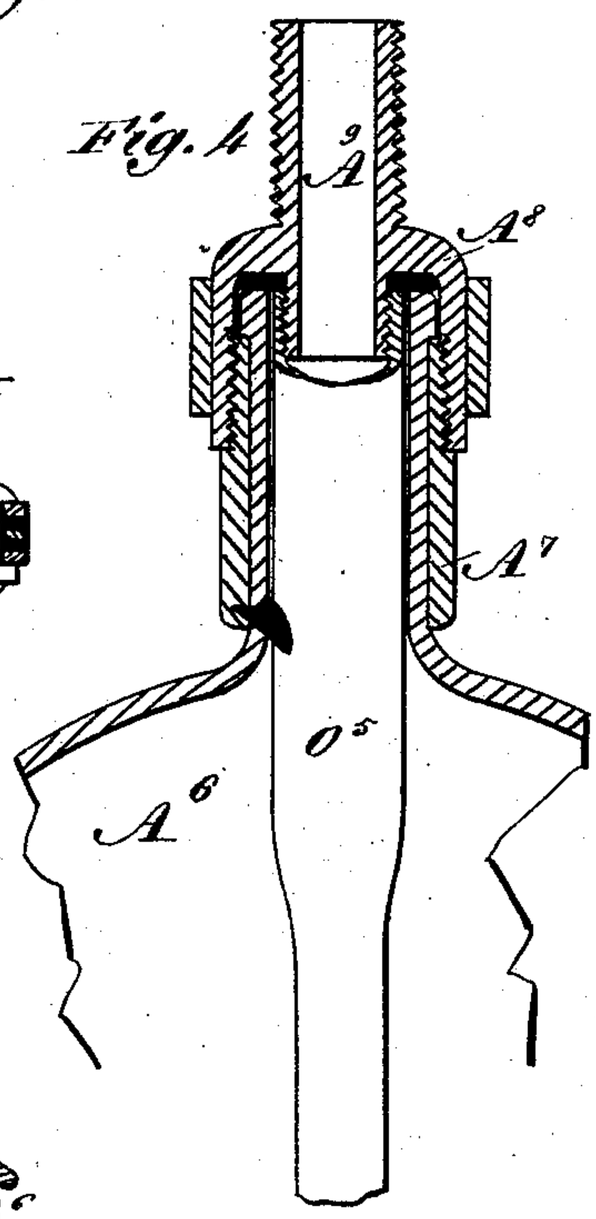
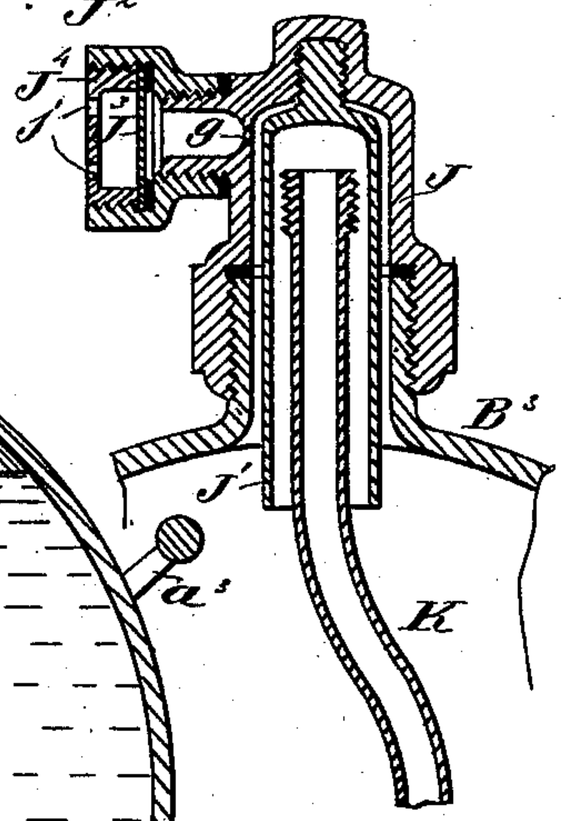


Fig. 3



WITNESSES:

C. Neveux

C. Sedgwick

INVENTOR:

A. Bertelli

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(No Model.)

2 Sheets—Sheet 2.

A. BERTELLI.

SODA WATER APPARATUS.

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Fig. 9

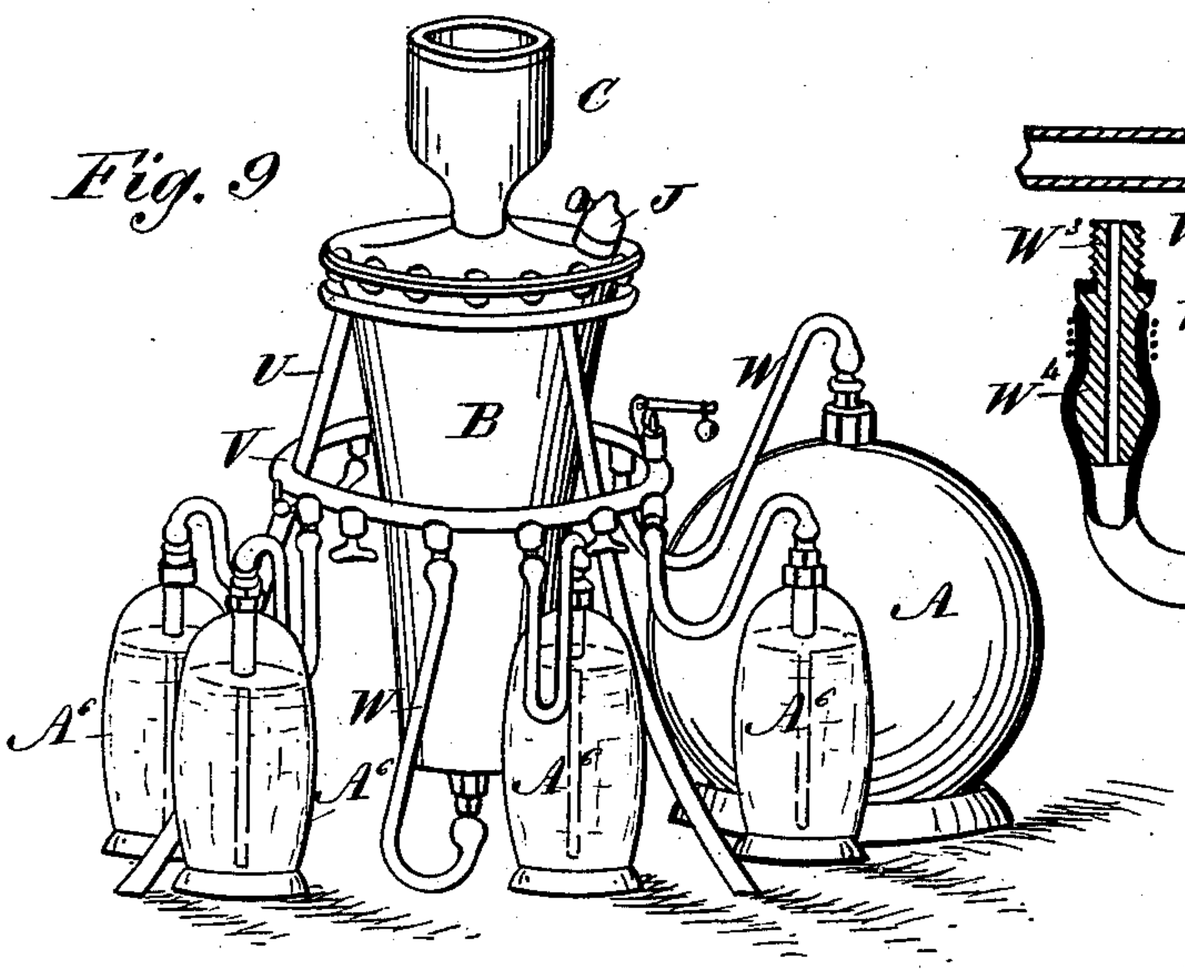


Fig. 10

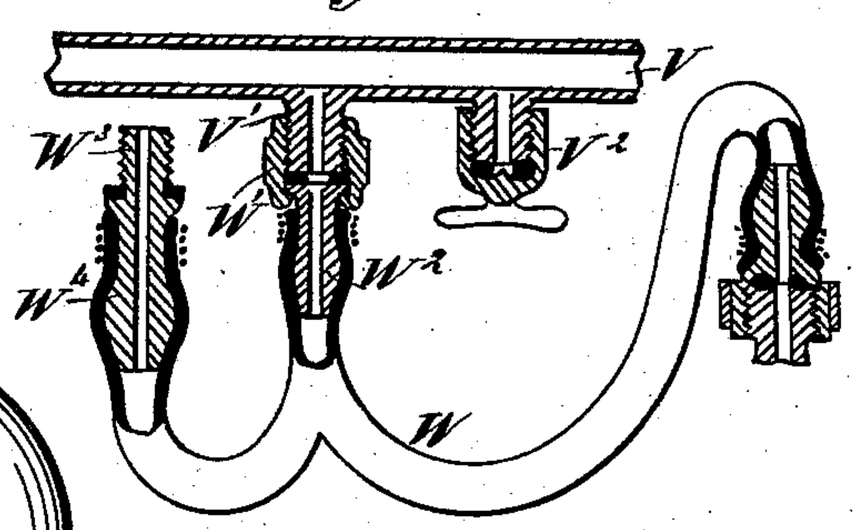


Fig. 6

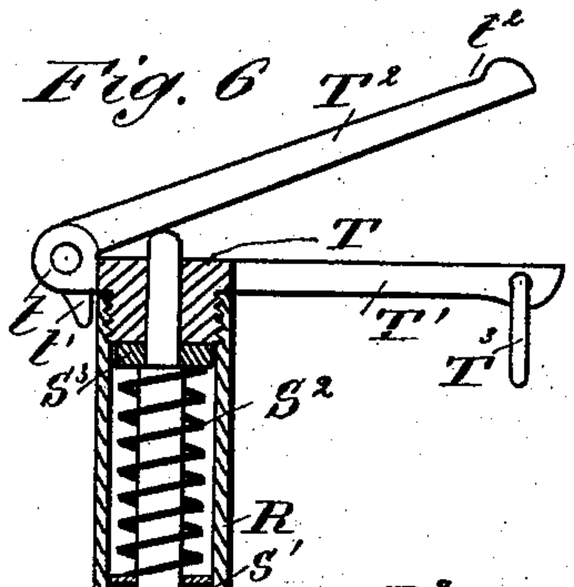


Fig. 5

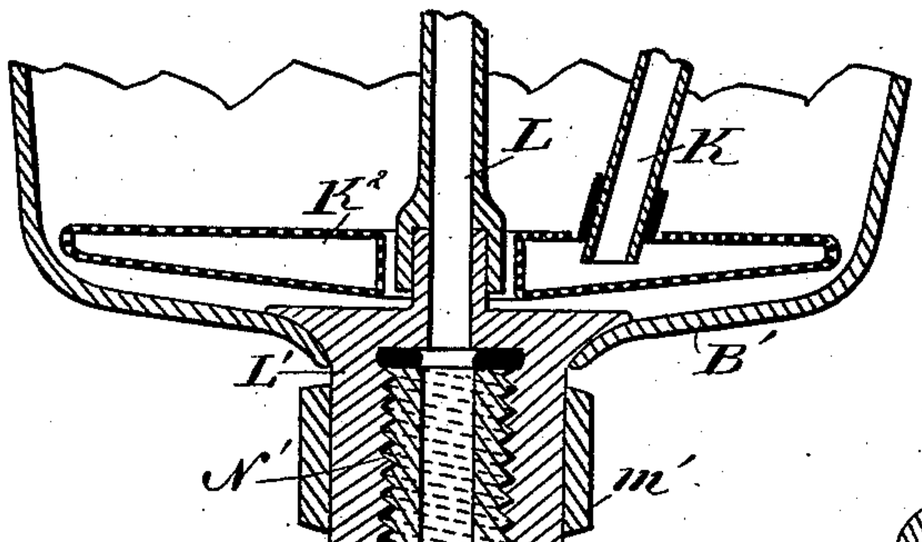


Fig. 11

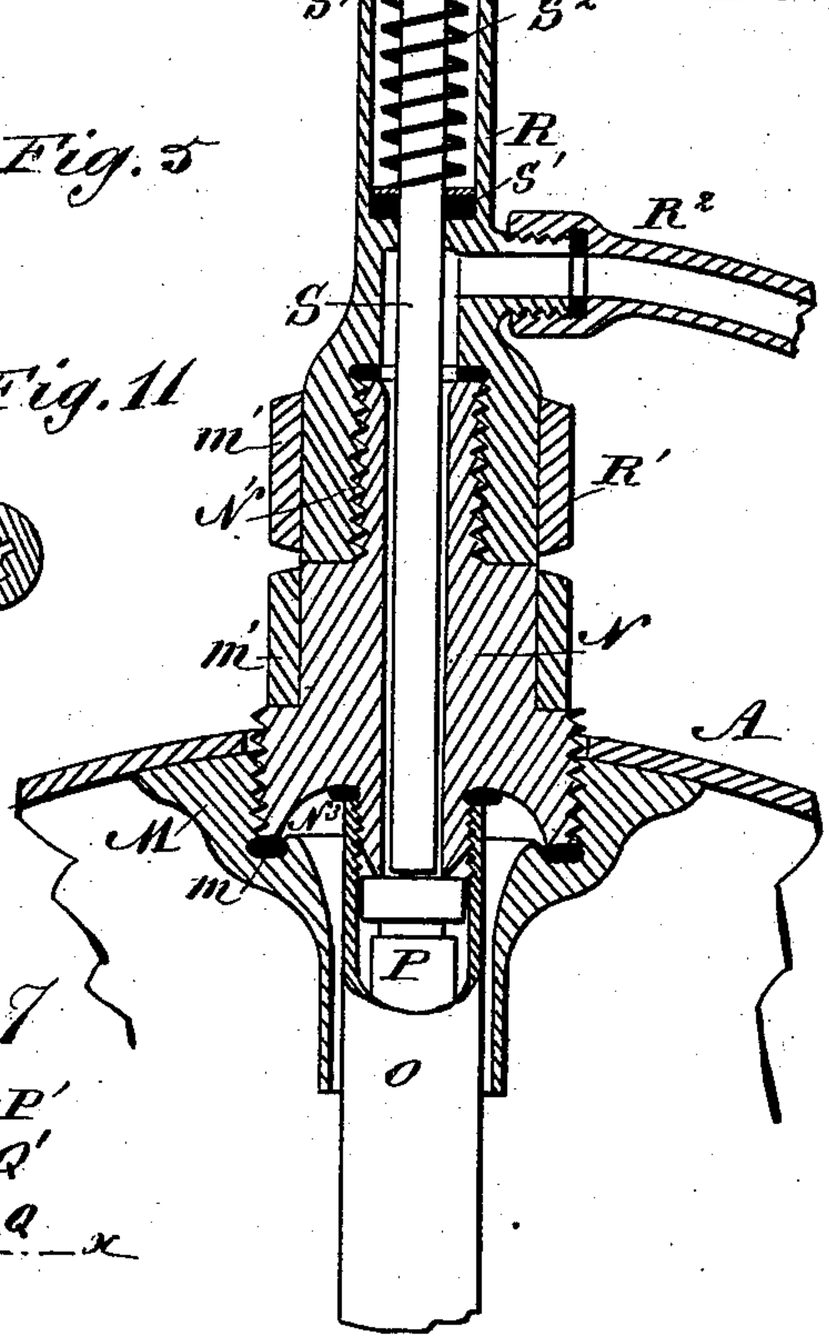
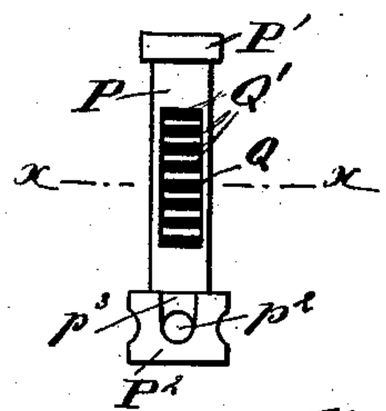
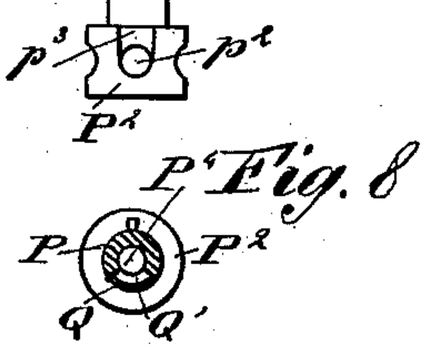


Fig. 7



E

Fig. 8



WITNESSES:

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C. Sedgwick

INVENTOR:

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ATTORNEYS.

UNITED STATES PATENT OFFICE.

ACHILLE BERTELLI, OF SAN FRANCISCO, CALIFORNIA.

SODA-WATER APPARATUS.

SPECIFICATION forming part of Letters Patent No. 298,161, dated May 6, 1884.

Application filed August 30, 1883. (No model.)

To all whom it may concern:

Be it known that I, ACHILLE BERTELLI, of San Francisco, in the county of San Francisco and State of California, have invented a new and Improved Soda-Water Apparatus, of which the following is a full, clear, and exact description.

The object of my invention is to provide a new and improved apparatus for making carbonic-acid gas and mixing the same with water, for the purpose of making aerated waters.

The invention consists in an apparatus for generating carbonic-acid gas, which apparatus is adapted to be placed directly on a fountain, or can be coupled with a series of fountains for charging the water in the fountains with gas.

The invention also consists in numerous parts and details of construction of a generator, as will be fully described and claimed hereinafter.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a longitudinal sectional elevation of the generator and washer, the fountain, and the acid box. Fig. 2 is an enlarged detail longitudinal sectional elevation of the tube in the gas-generator. Fig. 3 is an enlarged detail sectional view of the safety-valve of the generator. Fig. 4 is an enlarged sectional view of one of the plugs of the fountain. Fig. 5 is an enlarged detail sectional view of the lower part of the gas-washer and the upper part of the fountain. Fig. 6 is a like view of the upper part of the fountain-spout and the fountain after the fountain has been detached from the washer and generator. Fig. 7 is a detail elevation of the valve of the fountain. Fig. 8 is a sectional plan view of the same on the line *x x*, Fig. 7. Fig. 9 is a general perspective view of the apparatus, showing a modified arrangement for charging the fountain. Fig. 10 is a detail longitudinal sectional view of the gas-pipes and their couplings. Fig. 11 is a detail view of the valve E.

The fountain A is made of two sections, A′ A², tinned on the inside, and provided with flanges *a*, which are bolted together by bronze bolts *a′*, gutta-percha packing-strips *a²* being placed between the flanges. The flange of the bottom section, A², is bent down at the outer edge to form a base for the fountain. The fountain is provided with suitable bronze handles, *a³*.

The generator and washer B consists of a copper vessel, B′, lined with tin, and provided at its upper end with an outwardly-projecting flange. A smaller copper vessel, B², of about half the depth of the vessel B′, is also provided at its upper end with an outwardly-projecting flange, the vessel B² being within the vessel B′, and the vessel B² being lined with lead and covered on the outside with tin. The generator B is provided with a bronze cover, B³, resting on the flange of the vessel B², the said cover being held on the generator by bolts *b*, passed through the cover and through the flanges of the vessels B′ B², suitable packing-rings, *b′*, being interposed between the cover and the flanges, as shown.

The acid box C consists of a heavy bottle-shaped leaden vessel, C′, contained in a bronze cup-shaped vessel, C², provided with a slightly-concave screw-cover, C³, between which and the upper edge of the vessel C² a packing-ring, *c*, is interposed. The leaden vessel C is provided in its bottom with small projections *c²*, which are to prevent the bottom of the leaden vessel from coming in contact with the outer bronze vessel, C². The vessel C² terminates at the bottom in a screw-collar, *d*, which is not screw-threaded to the end, but is left plain for about half its length—that is, from the middle to the lower end, the part which is not screw-threaded having a greater internal diameter than the screw-threaded part. Where the threaded part and the plain part meet a shoulder, *d′*, is formed. The cover B³ of the generator B is provided with a neck, B⁴, the upper part of which is screw-threaded, and the lower part is left plain and of a larger diameter, a shoulder, *b²*, being formed where the screw-threaded part and the plain part meet. A packing-ring, *d²*, of gutta-percha, rests on the shoulder *b²*, and a packing-ring, *d³*, of a circular cross-section, is placed in an annular groove in the plain part of the neck B⁴, directly below the shoulder *b²*, so that when the collar *d* is secured on the neck B⁴, the plain part of the collar *d* will compress and flatten the ring *d³*, as shown. The leaden bottle-shaped vessel C′ is provided with a downwardly-projecting neck, C⁴, on the lower end of which a tin screw-collar, D, is fitted, which rests on an annular flange at the lower end of the neck C⁴. The lower end of the neck is closed by a tubular leaden valve,

E, provided at its upper end with a funnel-shaped recess, *e*, from which a vent, *e'*, is inclined downward toward the outer surface of the tubular valve. At its upper end the tubular valve E is provided with an annular ridge, E', on the top and bottom of which asbestus packing-rings E^2 are held. A tin screw-collar, D', is screwed on the lower end of the collar D, and is provided with a shoulder, D^2, on which an annular flange, F', rests, which is formed on the upper end of a leaden tube, F, whereby, by screwing the collar D' on the collar D, the flange F' at the upper end of the tube F will press against the bottom packing-ring E^2 of the annular ridge E' on the valve-tube E, and will press the top packing-ring, E^2 against the bottom edge of the neck C' of the leaden vessel C'. A silver tube, F^2, is soldered to the lower end of the leaden valve-tube E, which silver tube F^2 is provided with a vertical longitudinal slot, F^1, and has its lower end screw-threaded internally, in which screw-threaded part a silver screw-cap, G', is screwed, in the upper end of which a silver-plated copper rod, G, is held by a ball and-socket joint, which rod extends up through the valve-tube E, the inner diameter of which is greater than the diameter of the rod G, except at bottom of the valve-tube E, which bottom opening is of such size that the rod G fits closely therein. In the bottom of the valve-tube E vertical slots are formed, as shown in Fig. 11. A leaden ball, G^2, is secured on the upper end of the rod G, and fastened by a drop of solder. The silver screw-cap G' is soldered on the upper end of a leaden rod, H, which is provided with a channel, H', by which communication is established between the exterior and the interior of the said silver cap G'. The bottom of the leaden tube F does not rest on the bottom of the vessel B^2, but terminates a short distance above the same, and the said bottom edge of the tube F is provided with a series of washers, F^3.

On a neck formed on the cover B^3 of the generator an internally-tinned bronze cap, J, is secured, and in the cap J an inverted copper cup, J', is screwed in such a manner that the opening of the cup will be at the bottom, and a small space will be left between the inner side of the cap J and the outer side of the cup J'. On a tubular arm of the cap J a screw-cap, J^2, is screwed, which forms a safety-valve, in which cap J^2 a silver plate, J^3, is held by a plug, J^4, provided with two apertures, *j*. A needle-hole, *g*, establishes communication between the space formed in the interior of the tubular arm of the screw-cap J and the space between the screw-cap J and the cup J'.

The generator-fountain and the acid-box must always be so constructed that they can resist a pressure of twenty-five atmospheres, and the silver plate J^3 must be so constructed that it can resist a pressure of fifteen atmospheres. The cap J, the plug J^4, and the cup J' are all provided with suitable packing-rings. A tin pipe, K, is provided at its upper end with an external screw-thread, the upper end of the pipe K projecting into the cup J'. The pipe K is soldered in a longitudinal recess or groove, K', formed in the vessel B^2, and its lower end is soldered to a perforated tin box, K^2, on the bottom of the vessel B', and provided with a suitable aperture through which a tin pipe, L, passes, which is soldered to the upper end of an internally-threaded neck, L', passed into and projecting from the bottom of the vessel B', as shown in Fig. 5. A bronze spout, B^5, tinned inside, projects upward from the side of the vessel B', and is closed by a screw-plug, B^6, provided with a suitable handle. An internally-threaded circular tin block, M, is secured to the under side of the top of the fountain, which block tapers toward the bottom and terminates in a downwardly-projecting neck, M'. At the upper end of the neck an annular groove is formed, in which a gutta-percha packing-ring, *m*, is placed. A circular tin block, N, is screwed in the block M, and is provided at its top with an externally-threaded neck, N', which is screwed in the threaded aperture of the neck L', provided on the bottom of the vessel B', a packing-ring being placed on the upper end of the neck N'. Bronze rings *m'* are passed around the neck M' of the block M and around the neck L'. The block N is provided with a longitudinal central aperture, N^2, which is adapted to communicate with the tin tube L in the vessel B'. The block N is provided in its bottom with a circular recess, N^3, into which an externally-screw-threaded neck, N^4, of block N extends, on which the upper end of a tin pipe, O, is screwed, which is contracted a short distance below its upper end and forms a shoulder, O', the said pipe O extending to within a short distance of the bottom of the fountain. In the wider upper part of the pipe O a cylinder, P, is contained, which is provided with a head, P', at the top and a head, P^2, at the bottom, the diameter of the cylinder P being less than the internal diameter of the wider part of the tube O. The upper head, P', of the cylinder P is covered by a rubber cap, P^3, provided with a central aperture, *p*, which is directly above a longitudinal aperture, P^4, in the middle of the cylinder P, the said aperture P^4 extending down to within about one-third of the length of the cylinder from the lower end of the said cylinder. A vertical segmental recess, Q, is formed in the outer edge of the cylinder P, and from the said recess a series of horizontal apertures, Q', extend to the longitudinal aperture P^4 of the cylinder, thus establishing communication between the exterior and interior of the cylinder. An india-rubber tube, Q^2, is passed around the outside of the cylinder P, and extends about one-eighth of an inch beyond the ends of the recess or groove Q, and is held in place by tin buttons Q^3, projecting from the cylinder P at the ends of the rubber sleeve or tube Q^2. The rubber sleeve Q^2 must not fit too tightly, nor too loosely, so that the slightest pressure of air from the in-

side can escape through the apertures Q′ to the outside, and the slightest pressure from the outside perfectly closes the rubber against the groove and prevents the air from passing into the interior of the cylinder. The bottom head, P^2, of the cylinder P fits loosely in the wide part of the tube O, and is provided with a central vertical aperture, p', and with two transverse channels, p^2, crossing each other, and at the end of each transverse channel p^2 a vertical slot, p^3, is formed. The bottom surface of the bottom head, P^2, of the valve-cylinder P rests upon a series of elastic perforated india-rubber rings, O^3, of which the lower one rests on the shoulder O′, formed in the tube O. The lever-spout (shown in Fig. 6) consists of a tubular casing, R, made of tin, having its lower end widened, internally screw-threaded, and surrounded by a bronze ring, R′, to protect the tin when screwing the spout on the neck N′ of the fountain. A spout, R^2, made of pure tin, is screwed on a tubular arm of the casing R. A tinned brass rod, S, passes centrally through the casing R and through a stuffing-box, S′, held in the casing directly above the spout projection, which stuffing-box is formed of a series of rings of rubber, on which a tinned brass washer rests. The end of the rod S projects through a tin screw-plug, T, screwed in the upper part of the casing R. A spiral spring, S^2, surrounding the rod S, rests on or is held between the stuffing-box S′ and a disk, S^3, mounted on the upper part of the rod S. The screw-plug T is provided with a rigid arm, T′, on the outer end of which a ring, T^3, is held loosely. A lever, T^2, is pivoted to jaws *t*, projecting from the screw-plug T, diametrically opposite the arm T′, and the said pivoted lever T^2 is provided at the pivoted end with a check-lug, *t′*, adapted to strike against the casing R, to prevent the arm T^2 from being raised too high. The arm T^2 is provided with a notch, t^2, in the upper end of the free end, into which notch the ring T^3 can be passed.

If desired, several fountains can be filled from one generator. In this case the generator B is placed on a tripod, which is provided with brackets supporting a circular tin tube, V, which is provided with a series of downwardly-projecting threaded spouts, V′, some of which are closed by screw-caps V^2, and to others strong rubber tubes W are coupled by means of screw-collars W′, held on tubular blocks W^2, on which the ends of tubes are fastened by wire or in any other suitable manner, packing-strips being being interposed between the blocks W^2 and the spouts V′. One of the tubes is provided with a block, W^4, having a threaded neck, W^3, adapted to be screwed into the internally-threaded aperture in the block L′ in the bottom of the generator. The ends of the tubes W are then coupled to the fountains A or A^6, which can be made spherical, elliptical, or cylindrical in the usual manner. The said fountains A^6 are provided with a neck surrounded by a threaded sleeve, A^7, which is held on the neck by an outwardly-projecting flange of the neck, and on the said sleeve A^7 a screw-threaded cap, A^8, is screwed, which is provided with an upwardly-projecting threaded neck, A^9, and with a downwardly-projecting threaded neck, on which a tube, O^5, which extends almost to the bottom of the fountain, is secured.

The operation is as follows: The block N of the fountain A is removed and the fountain is filled with water. When the level of the water rises to the bottom tubular extension, M′, of the block M, no more water can be poured into the fountain, thus leaving a space in the upper part of the fountain, to permit shaking the water and mixing it with the gas which accumulates above the water. The fountain is then closed and is securely coupled with the bottom of the generator-vessel B′, into which a quantity of water is poured through the spout B^5, which is then closed very tightly. As the spout is located near the bottom and at the side of the vessel B′, the vessel B′ may only be filled with water to a certain height. A mixture of water and bicarbonate of soda, in the proportion of one pint of water to one pound of bicarbonate of soda, is poured through the neck B^4 of the cover B^3 into the vessel B^2. Commercial sulphuric acid of 66° is then poured into the acid-bottle C′. The leaden valve-tube E is placed on the end of the neck C^4 of the leaden bottle C′, and the ball G^2 is so adjusted that it closes the upper opening of the said valve-tube E. Then the cap or screw-collar D′ is screwed on to hold the tubular valve E against the neck of the bottle. Then the acid-box is screwed on the generator, the tube F passing into the vessel B^2. As the acid-box is screwed down, the rubber ring d^3 is gradually compressed and effectually closes and packs the joint before the lower end of the rod H has struck the bottom of the vessel B^2. As the operator continues to screw down the acid-box, the rod H strikes the bottom of the vessel B^2, and cannot turn. Thereby the cap G′ will be screwed upward into the sleeve F^2 and will raise the rod G, thereby raising the leaden ball G^2, which closes the upper end of the valve-tube E. Now the acid begins to flow down through the tubular valve E and through the slot F^3, and finally mixes with the mixture of bicarbonate of soda and water, and thereby generates carbonic-acid gas. The air passing up through the vent *e′* bubbles up through the sulphuric acid. The tube F is always filled with gas, so that the pressure on the valve E is equal on the inside and outside. The gas in the generator passes into the cup J and through the pipe K down through the perforated tin box K^2, and passes from the same through the water in the vessel B′, through which water it bubbles, and is thereby washed and cleaned and deprived of any traces of sulphuric acid. It then passes through the tin pipe L, and by its pressure it is forced downward and enters the aperture P^4 of the valve-cylinder P, then passes through the slots Q′,

raises the rubber sleeve Q^2, passes into the space between the valve-cylinder P and the tube O, then passes through the vertical slots p^3, the transverse channels p^2 of the bottom head, P^2, through the bottom aperture, p', and through the tube O to the bottom of the fountain, and then rises and is absorbed by the water. In about a quarter of an hour all the gas is developed. Then the cap J^2 is unscrewed and the gas escapes through the needle-hole *g*. When the hissing sound ceases, the cap J is unscrewed and the threaded valve or cap J^2 is screwed on the pipe K, so that no water or sulphate-of-soda mixture can get into the said pipe. Then the acid-box C is unscrewed from the generator and well washed, and then the fountain is unscrewed from the generator. While doing this there is no danger of unscrewing the block N, as the threads of the block N are made very flat, and those by which the generator is secured to the fountain are made very steep or oblique. The sulphate-of-soda solution is then poured off and the generator washed. The fountain is well shaken, so as to mix the gas with the water, and then the lever-spout (shown in Fig. 6) is applied. If the lever T is pressed downward, the rod S presses the valve-cylinder P downward, and thus permits the carbonic-acid water to rise in the pipe O and through the bottom of the aperture N^2 in the block N. The carbonic-acid water then rises to the spout R^2, and can be conducted to any desired place, to be filled into bottles or the faucet of a soda-water fountain, &c.

The above-described apparatus may be made for one or more gallons of soda-water, and the fountains can be of glass surrounded by wire; or if they are of larger size they can be made of copper and lined with glass, or of any other suitable material. If the fountain is silvered on the inside and the other parts properly protected, wine, cider, beer, &c., can be charged with carbonic-acid gas.

By means of the device shown in Figs. 9 and 10, several fountains can be coupled with a generator and all charged at the same time.

If the several parts of the apparatus are all enlarged correspondingly, marble-dust or whiting can be used in place of bicarbonate of soda.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination of the generator B, consisting of the outer vessel, B′, inner vessel, B^2, and cover B^3, securely held to the upper edges of said vessels, with the acid-box C, consisting of an outer vessel, C^2, secured to said top, and an inner vessel communicating with vessel B^2, and a suitable cover to said acid-box, substantially as set forth.

2. In a carbonic-acid-gas generator, the combination, with the vessel B′, of the vessel B^2 therein, and the acid-box C, held on the cover of the generator, and provided with a tube extending to near the bottom of the vessel B^2, substantially as herein shown and described.

3. In a carbonic-acid-gas generator, the combination, with the vessel B′, of the vessel B^2 therein, the acid-box C, and the tube F, extending to near the bottom of the vessel B^2, and provided with a valve for closing the lower end of the acid-receptacle, substantially as herein shown and described.

4. In a carbonic-acid-gas generator, the combination, with the vessel B′, of the vessel B^2, the acid-box C, the leaden bottle C′, the valve-tube E, and a valve-plug attached to a rod extending down through a tube extending nearly to the bottom of the vessel B^2, substantially as herein shown and described.

5. In a carbonic-acid-gas generator, the combination, with the vessel B′, the vessel B^2, and the acid-box C, of the leaden bottle C′, the valve-tube E, the rod G, the leaden ball G^2, the tube F, the sleeve F′, the rod H, the sleeve F^2, soldered to the lower end of the tube E, and the screw-cap G′, in which the rod G is held, substantially as herein shown and described.

6. In a carbonic-acid gas generator, the combination, with the vessels B′ B^2 and the acid-box C, of the tube F, the valve-tube E, provided with an annular ridge, E′, the sleeve F^2, the rod G, the leaden ball G^2, the screw-cap G′, and the rod H, held in the screw-cap G, substantially as herein shown and described.

7. In a carbonic-acid-gas generator, the combination, with the vessels B′ B^2 and the leaden acid-bottle C′, of the tube F, the screw-cap J, and the pipe K, extending from the same through a perforated tin box, K^2, on the bottom of the vessel B′, substantially as herein shown and described.

8. In a carbonic-acid-gas generator, the combination, with the vessels B′ B^2, and the leaden acid-bottle C′, of the tube F, connecting with the same, the screw-cap J, carrying the safety-valve J^2, the cup J′ in the cap J, and the pipe K, extending from the cap J down to a perforated tin block, K^2, in the bottom of the vessel B′, substantially as herein shown and described.

9. In a carbonic-acid-gas generator, the combination, with the vessels B′ B^2 and the leaden acid-bottle C′, of the tube F, connected with the same, the screw-cap J, carrying the safety-valve J^2, the cup J′ in the cap J, the pipe K, extending from the cap J down to a perforated tin block, K^2, in the bottom of the vessel B′, and of the tube L, projecting upward from the bottom of the vessel B′, and connected with an internally-threaded neck projecting from the bottom of the said vessel, substantially as herein shown and described.

10. The combination, with a carbonic-acid-gas generator, of a ring surrounding it and connected with the generator, and of a series of tubes for conducting the carbonic-acid gas from the generator into the fountain, substantially as herein shown and described.

ACHILLE BERTELLI.

Witnesses:
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ATONIO CASAROTTE.