No. 676,408. Patented June 18, 1901.

C. L. BASTIAN.

CARBONATING APPARATUS.

(Application filed Nov. 5, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

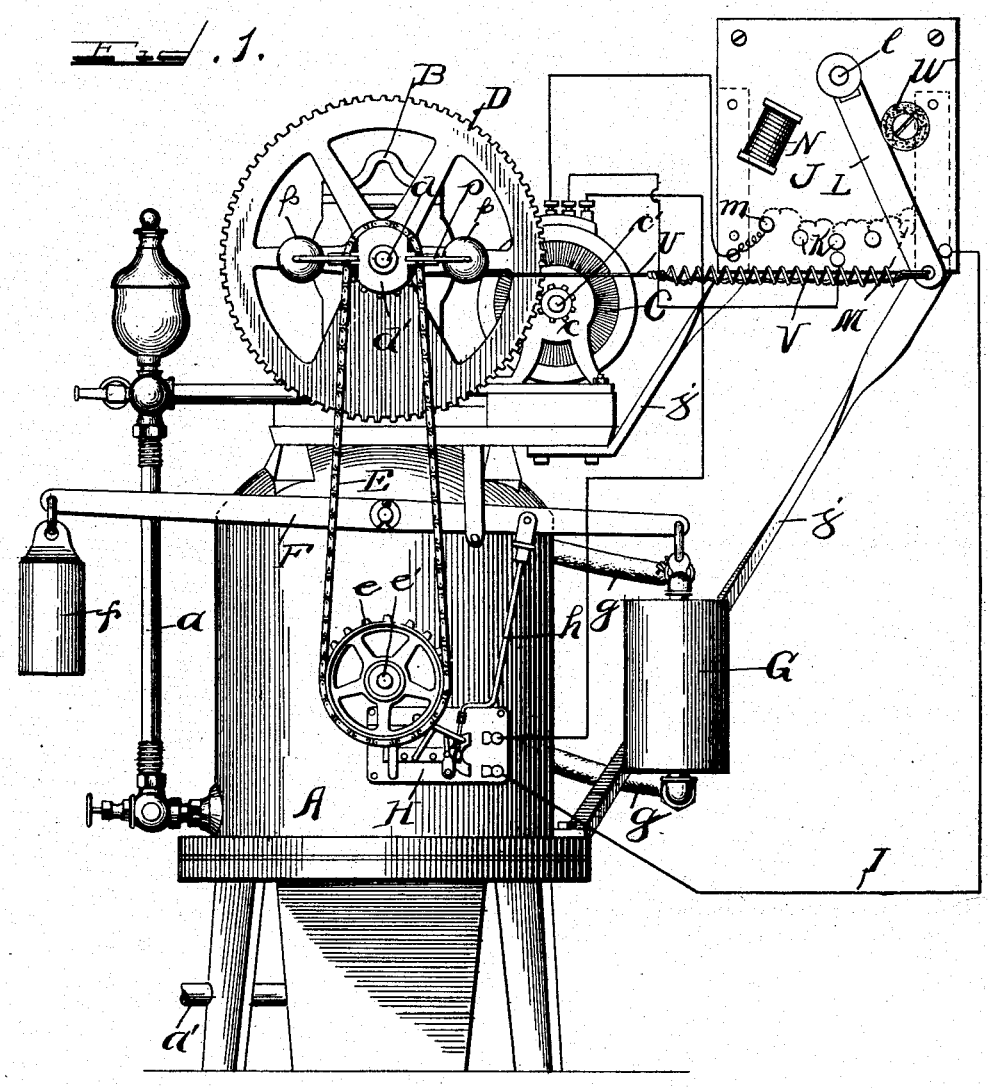

Fig. 2.

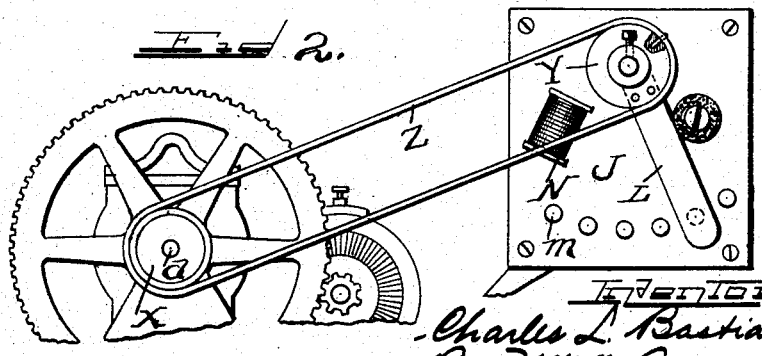

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Fig. 3.

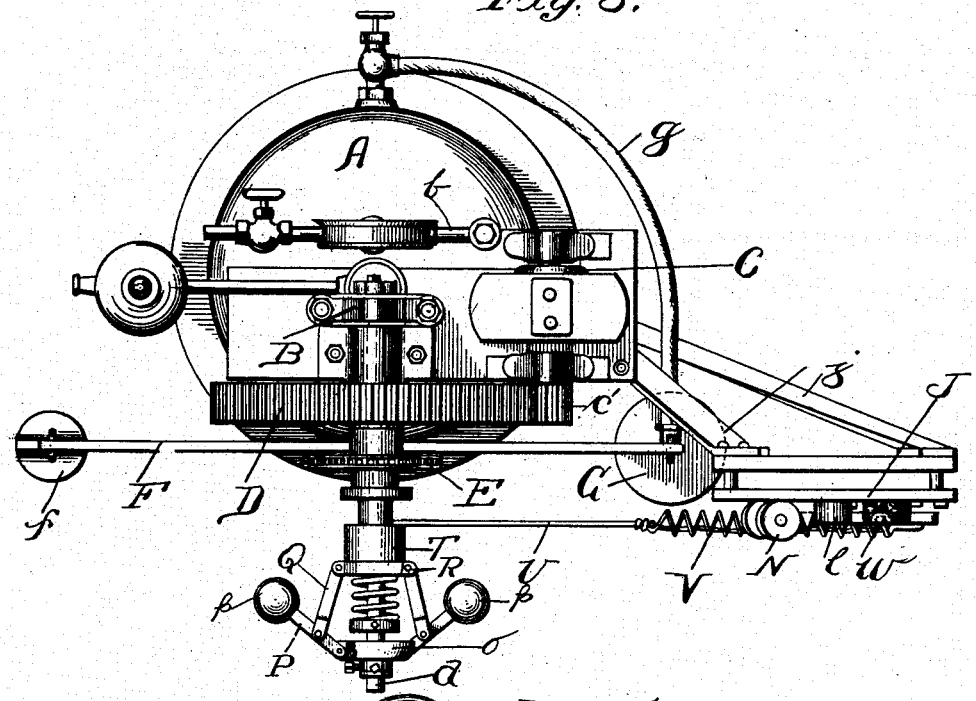
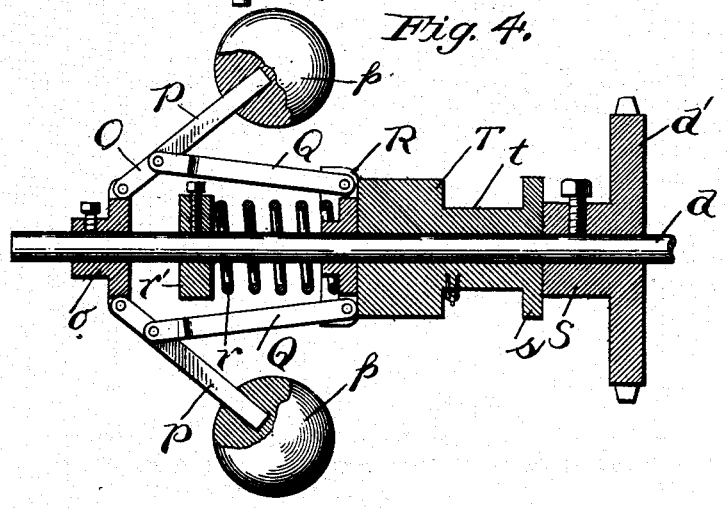


Fig. 4.



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UNITED STATES PATENT OFFICE.

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CARBONATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 676,408, dated June 18, 1901.

Application filed November 5, 1900. Serial No. 35,471. (No model.)

To all whom it may concern:

Be it known that I, CHARLES L. BASTIAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Carbonating Apparatus, of which the following is a specification.

My invention relates to certain new and useful improvements in carbonating apparatus; and its object is to provide means for automatically regulating the supply of liquid to be carbonated, so that a given quantity of carbonated liquid may be constantly maintained, and for effecting such regulations by starting and stopping the machine automatically as occasion requires and applying the power to the machine when starting it in gradual steps until the maximum desired is reached.

The invention is particularly adapted to carbonating apparatus operated by an electric motor, one type of which forms the subject of my application filed April 9, 1900, Serial No. 12,145; and this invention has for its especial object to apply the electric current in such a way that the motor is always started slowly and its speed gradually and automatically increased until the maximum is reached, and a further object is to provide means controlled and operated by the supply of carbonated liquid for starting the electric motor and associated means operated by the motor itself for gradually increasing the current applied thereto.

My invention has other ends in view, which will appear in connection with the detailed description thereof with reference to the accompanying drawings, in which—

Figure 1 is a front elevation of an apparatus embodying my invention. Fig. 2 illustrates a modified construction of the devices for gradually increasing the current to the motor. Fig. 3 is a top view of the apparatus shown in Fig. 1. Fig. 4 is a detail sectional view of the parts carried by the shaft *d*.

Referring to the drawings, in which like letters of reference denote corresponding parts in all of the figures, A designates a mixing-tank, which may be of any form and character and provided with a water-inlet pipe *a*, a discharge-pipe *a'*, and a gas-pipe *b*, and B is a pump operated by an electric motor C, both of which may be mounted on the mixer in the manner shown. Power is communicated from the motor by means of a pinion *c*, carried by the motor-shaft *c'* and meshing with a gear-wheel B on the shaft *d*, which is by suitable intermediate mechanism adapted to operate the pump. The shaft *d* also carries a sprocket-wheel *d'*, and a sprocket-chain E is trained around this sprocket and a sprocket *e* on the shaft *e'*, carrying an agitator within the mixer. The foregoing parts of my improved apparatus may be varied in construction and arrangement without departing from the spirit and scope of the invention, which consists, essentially, in means for automatically turning on the current to the motor and in applying the current gradually by regular steps. A balance-lever F is pivotally secured on the mixer, and it carries a weight *f* at one end and a balance-tank G at its other end, which tank is connected with the mixer by flexible pipes *g*, so that the liquid will rise to the same level in the tank as in the mixer. A switch device H is fastened on the side of the tank or in some other convenient location and operated by means of a shifting-rod *h*, connected with the balance-lever, so that when the supply of carbonated liquid becomes diminished and the weight *f* rocks the lever and raises the balance-tank the shifting-rod will be operated to throw the switch and close the electric circuit I and in this way cause the motor to start in operation.

It is not necessary to go into a detail description of the switch device, as I may employ any device of this character which can be operated in the manner set forth and accomplish the usual result.

If the full current is turned on instantly upon the closing of the circuit, the pump and agitator will be started up at once at full speed and in a manner which is very liable to injure the motor and the other parts of the apparatus. I have therefore provided an electric starter J, which is suitably mounted on arms *j*, adjacent to the motor or in any other desired position and connected in the circuit I with the switch and the motor. This starter may be of any preferred construction now in general use and provided with any number of stops or divisions K, forming contact-points.

In order to move the lever L of the starter

pivoted at *l* from the low-current step M up to the maximum step *m*, where it is held by the magnet N as long as the electric current is closed, I provide devices on or connected with the shaft *d*, the preferred form of which is illustrated in Figs. 3 and 4, so that the initial and comparatively slow movement of the motor-shaft, imparted thereto by reason of the low current at first turned on when the switch is closed, will cause these devices to be operated to move the lever L successively over the several steps of the starter until it reaches the last step *m*, when the maximum current will be turned on, and at which point it is held by the magnet until the circuit is broken, whereupon the lever is returned to its normal position by means of a spring at its pivot. (Not shown.)

I extend the shaft *d* beyond the sprocket *d'* and mount thereon a governor O, which comprises an adjustable collar *o*, secured to the shaft, the arms P, pivoted to the collar and carrying ball-weights *p* at their outer ends, and links Q, connected with the arms P and a movable collar R on the shaft. A spring *r* is arranged to bear against the movable collar R and an adjustable stop *r'*, arranged on the shaft between the fixed collar *o* and said movable collar. This is a suitable and simple form of governor for the purpose; but I do not restrict myself to the exact construction thereof, as it will be apparent to those skilled in the art that other forms may be used with good results.

The sprocket *d'* is provided with an enlarged hub S, constituting a fixed stop, and between this hub and the movable collar R of the governor I arrange a spool T, which is loosely mounted on the shaft *d*, but part of the time held in frictional contact with the hub S and the movable collar R by the spring *r*, so that it will revolve with the shaft *d*, Fig. 4. A cord U is connected at one end to the spool T, preferably in the circular groove *t*, and to the end of a spring V, which is connected with the free end of the lever L, Fig. 1, the cord, however, extending loosely through the spring and being fastened to the free end of the lever.

The arrangement of the several parts is such that when the switch is operated to close the circuit the motor will be started at a low speed, because the lever L of the starter is then on the low-current step M and against the stop W, and as the power is communicated from the motor to the shaft *d* and the latter is revolved first at a low speed the spool T will revolve also with the shaft, being held frictionally between the collar R and the hub S. As the spool revolves the cord U will be wound up thereon and in this way move the lever L successively over the several steps of the starter until it reaches the last step *m*, where it is held by the magnet N, and at which time the full electric current will be turned on. The shaft *d* will then be revolving at such speed as to cause the governor to move the collar R away from the spool, and then the spool will be loose on the shaft, whereupon the spring V will draw on the cord to revolve the spool in the reverse direction and unwind the cord. If the governor fails to release the spool at the proper time, the spring V will be extended until the slack of the cord therein is taken up, and the cord being then taut from the lever to the spool will cause the spool to slip on the shaft until the spring V returns it to unwound position, as before described. I thus provide in my improved apparatus an automatic device for gradually increasing the amount of current to the motor, which is thrown into operation by the initial movement of the motor-shaft, and the full force or any desired amount of current can be turned on and maintained until the circuit is broken by automatic devices controlled by the liquid in the mixer. The shaft *d* operates the pump, and in this way the liquid supplied to the mixer is regulated and is turned on gradually until the maximum flow is attained.

In Fig. 2 I have illustrated a different connection between the starter and the shaft for accomplishing the same result, in which the shaft *d* is provided with a pulley X, and another pulley Y is arranged on the pivot of the lever L, a belt Z being trained over these pulleys. The belt is preferably fastened to the pulley Y, so that when the shaft *d* and the pulley X thereon have caused the pulley Y to revolve far enough to carry the lever L up to the last step *m* the belt may then slip on the pulley X; but other means may be employed for limiting the movement of the belt, or it may be adjusted with such a degree of fineness that in some cases it may slip on both pulleys.

I am aware that changes in the form and arrangement of different parts of my improved apparatus may be made without departing from the spirit or sacrificing the advantages thereof, and it will also be apparent that I may combine the essentially novel features of this apparatus with different kinds of the older features, such as the mixer and pump, and I would therefore have it understood that I reserve the right to make all such changes and combinations as fall within the spirit and scope of the invention.

The spool T is provided with a flange *s* to retain the cord in place thereon, and in order to increase the frictional contact between the spool and the hub S, I may remove the flange or move it farther up on the spool and then hollow out the hub and turn down the end of the spool to fit in the hub, or vice versa, so that a frictional engagement will be provided on the sides as well as on the face.

Having thus fully described the invention, what I claim, and desire to secure by Letters Patent, is—

1. In a carbonating apparatus, the combination with a mixer and a pump, of a pump-shaft, an electric motor for operating said shaft, a switch device for turning the electric

current to the motor on and off, an electric starter, a spool loosely mounted on the pump-shaft, and held rigid therewith a part of the time, and a connection between the starter and the spool whereby the starter is operated while the spool revolves with the pump-shaft to gradually increase the electric current to the motor.

2. In a carbonating apparatus, the combination with a mixer and a pump, of a pump-shaft, an electric motor for operating said shaft, a switch device for turning the electric current to the motor on and off, an electric starter, a spool loosely mounted on the pump-shaft, a governor on the shaft for engaging and holding the spool so that it will revolve with the shaft a part of the time, and a connection between the starter and the spool whereby the starter is operated while the spool revolves with the pump-shaft to gradually increase the electric current to the motor.

3. In a carbonating apparatus, the combination with a mixer, and a pump, of a pump-shaft, an electric motor for operating said shaft, a switch device, an electric starter, a spool on the shaft, and a cord connected with said spool and starter whereby the starter is operated when the spool revolves with the shaft, substantially as described.

4. In a carbonating apparatus, the combination with a mixer and a pump, of a pump-shaft, an electric motor for operating said shaft, a switch device, an electric starter, a spool on the shaft and an elastic connection between the spool and the starter whereby the starter is operated when the spool revolves with the shaft, substantially as described.

5. In a carbonating apparatus, the combination with a mixer, an electric starter, a motor and a shaft operated by the motor, of a spool on the shaft, and an elastic connection between the spool and starter comprising a cord and a spring, whereby the starter will be operated by the spool when the latter revolves with the shaft.

6. In a carbonating apparatus, the combination with a mixer and a pump, of a pump-shaft, an electric motor for operating said shaft, a switch device, an electric starter, a spool on the shaft and a connection between said spool and the starter comprising a cord and a spring, the cord being connected at its ends to the spool and the starter and the spring being connected at one end to the starter and at its other end to the cord so that a portion of the cord between its connection with the spring and the starter will normally lie slack, substantially as described.

7. In a carbonating apparatus, the combination with a mixer, an electric starter, a motor and a shaft operated by the motor, of a governor and a stop on the shaft, a spool frictionally held between the governor and the stop a part of the time to revolve with the shaft, and an elastic connection between the spool and starter whereby the starter will be operated by the spool when the latter is revolved.

8. In a carbonating apparatus, the combination with a mixer and a pump, an electric starter, a motor and a shaft operated by the motor, of a governor and a stop on the shaft, a spool arranged loosely on the shaft between the stop and the movable collar of said governor and adapted to revolve a part of the time with the shaft, and a combined cord and spring connection between the spool and the starter whereby the starter is operated when the spool revolves with the shaft and winds the cord thereon, substantially as described.

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