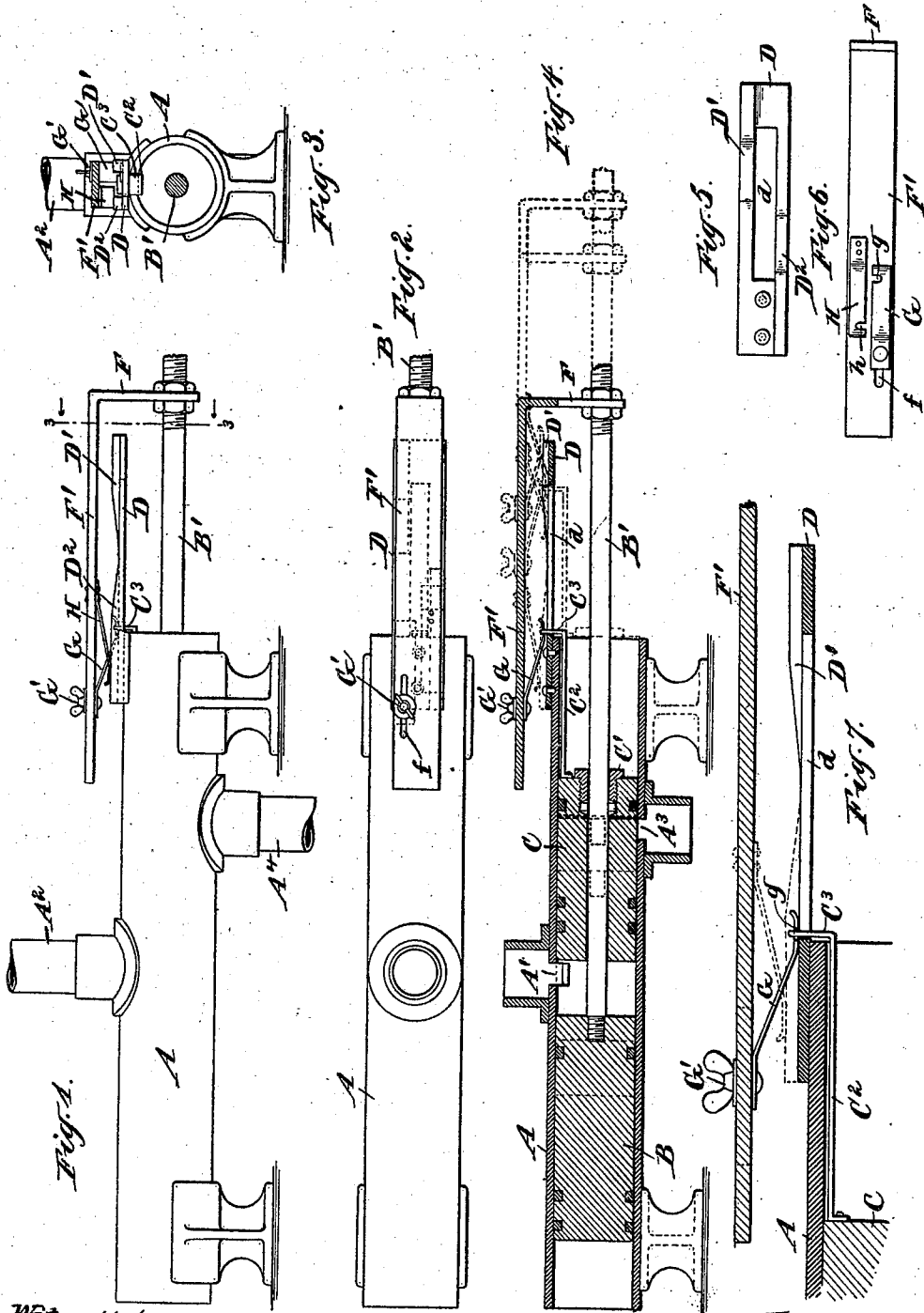


A. JACOBSON.  
 APPARATUS FOR DELIVERING LIQUID IN MEASURED QUANTITIES.  
 APPLICATION FILED MAR. 9, 1911.

1,001,853.

Patented Aug. 29, 1911.



Witnesses:  
 F. J. Greene.  
 L. H. Wilkerson.

Inventor:  
 Andrew Jacobson,  
 by his attorney  
 Charles R. Seale.

# UNITED STATES PATENT OFFICE.

ANDREW JACOBSON, OF COUNCIL BLUFFS, IOWA.

APPARATUS FOR DELIVERING LIQUID IN MEASURED QUANTITIES.

1,001,853.

Specification of Letters Patent. Patented Aug. 29, 1911.

Application filed March 9, 1911. Serial No. 613,448.

To all whom it may concern:

Be it known that I, ANDREW JACOBSON, a citizen of the United States, residing at Council Bluffs, in the county of Pottawattamie and State of Iowa, have invented a certain new and useful Improvement in Apparatus for Delivering Liquid in Measured Quantities, of which the following is a specification.

10 The invention relates to flow regulators or apparatus for feeding predetermined volumes of liquid, as for example, the addition of purifying solutions to the water delivered by the pumps in municipal water-supply  
15 plants, or analogous situations.

The object of the invention is to provide means whereby the purifying solution is automatically fed in direct proportion to the volume of water delivered at each reciprocation of the pump plunger, and also to provide adjustments by which the quantity of solution delivered may be varied as required, and means for insuring the positive reception and delivery of the full charge for  
25 which the apparatus is adjusted.

The invention consists in certain novel features and details of construction and arrangement by which the above objects are attained, to be hereinafter described and  
30 pointed out in the claims.

The accompanying drawings form a part of this specification and show an approved form of the invention.

35 Figure 1 is a side elevation of the apparatus. Fig. 2 is a plan view. Fig. 3 is an end view, certain portions being shown in vertical transverse section, taken on the line 3—3 in Fig. 1 and seen in the direction indicated by the arrows. Fig. 4 is a longitudinal vertical section, taken on the axial line, and partly in elevation. Fig. 5 is a plan or top view showing a portion removed. Fig. 6 is a view of the under portion of another portion alone. Fig. 7 is a vertical axial section, corresponding to a portion of Fig. 4  
45 but on a larger scale.

Similar letters of reference indicate the same parts in all the figures.

50 A is a cylinder shown as open at both ends, receiving a plunger B attached to and reciprocated by a plunger-rod B<sup>1</sup> moved synchronously with the pump rod of a pump, not shown, and which for the purposes of this description may be understood

to be a continuation or extension of such  
55 pump rod.

A loose piston C in the cylinder is bored axially to receive the plunger-rod and to move horizontally relatively thereto, and is provided with a stuffing-box C<sup>1</sup> to prevent  
60 leakage around the inclosed rod. On the outer face of the loose piston is a bar C<sup>2</sup> extending beyond the open cylinder end and upturned to form an arm C<sup>3</sup> by which the  
65 loose piston is reciprocated. The arm C<sup>3</sup> is received in a longitudinal slot *d* in a frame D fixed on the cylinder and projecting therefrom, above and parallel with the plunger-rod B<sup>1</sup>.

Attached to the plunger-rod at any convenient point beyond the cylinder end is a bar F extending vertically and bent to form a horizontal plate F<sup>1</sup> lying parallel with the frame D and above the latter, and is reciprocated relatively to the frame by the movements of the plunger rod. On the under  
75 face of the plate F<sup>1</sup> are two spring-pawls G and H lying parallel with and close to each other and extending in opposite directions side by side; each has a notch *g*, *h* in the  
80 edge adjacent to the other, adapted under conditions to be described, to engage the end of the arm C<sup>3</sup> protruding through the slot *d* in the frame D.

The pawl G is adjustable longitudinally  
85 of the plate F<sup>1</sup> by means of a bolt in the slot *f* held by a thumb-nut G<sup>1</sup>, the pawl H may be similarly mounted but as its function is positive it is preferably riveted in place on  
90 the plate.

At each end of the frame D and on opposite sides of its upper face are cam surfaces or swells D<sup>1</sup> D<sup>2</sup> of less width than the pawls and serving each to lift one of the latter when the pawls are drawn into contact  
95 therewith near the termination of the movement of the plate F<sup>1</sup> in each direction.

A<sup>1</sup> is an inlet port for the cylinder, receiving through the pipe A<sup>2</sup> the liquid to be measured and delivered, and A<sup>3</sup> is the delivery port located in advance of the inlet  
100 and having a delivery pipe A<sup>4</sup>.

With the parts conditioned as shown by the full lines in Fig. 4, as obtains at the termination of the inward stroke of the  
105 plunger-rod B<sup>1</sup> corresponding to the end of the outward stroke of the pump rod, not shown, the operation of the apparatus is as

follows:—The plunger B is at one side of the inlet port A<sup>1</sup> and the loose piston C at the other side of the same, the space between being the measure of liquid received from the inlet port to be transferred and delivered. The notch *g* in the pawl G is engaged with the arm C<sup>3</sup> and the outward movement of the plunger-rod carries the plunger B and piston C forward together in the same relative positions, to the delivery port A<sup>3</sup>, as indicated by the light dotted lines in Fig. 4, thus closing the inlet port. In this position the pawl G has ridden upon the swell D<sup>1</sup> and been lifted from engagement with the arm C<sup>3</sup>. The movement of the piston C is then arrested, or if continued by the friction of the stuffing-box C<sup>1</sup> is arrested by the contact of the arm C<sup>3</sup> with the stop formed by the outer end of the slot *d*. A further outward movement of the plunger-rod draws the plunger to or against the inner face of the piston so that the latter is carried along until arrested by the above mentioned stop with the inner face of the piston in line with the outer edge of the delivery port A<sup>3</sup>, in the position indicated by the heavy dotted lines in Fig. 4, and forces all the transferred liquid through the delivery port A<sup>3</sup>. During the main portion of this outward movement the pawl H has descended the swell D<sup>2</sup> and traveled idly to the outer end of the frame D and in the extreme latter part of its travel has ridden upon the arm C<sup>3</sup> and engaged it in the notch *h* ready for the return stroke. The plunger B and piston C thus make the return stroke with their adjacent faces in contact or close together until the arm C<sup>3</sup> is released by the rise of the pawl H on the swell D<sup>2</sup> and further movement of the piston is arrested by the contact of the arm C<sup>3</sup> with the stop formed by the inner end of the slot *d*; the plunger-rod continues its inward movement, separating the plunger from the piston and again engaging the pawl G with the arm C<sup>3</sup> ready for the next reciprocation with a succeeding charge of liquid.

It will be noted that the separation of the plunger and piston is at the termination of the inward stroke and insures the intake of a full charge at the inlet port, and the approach of the same parts at the termination of the outward stroke insures the complete delivery of the charge thus taken.

By the employment of this apparatus an exact predetermined quantity of purifying solution or other liquid is delivered at each reciprocation of the pump, not shown, which also delivers an exact though much larger volume, so that the proportion of solution thus automatically added to the water to be purified is always in exact ratio to the latter and is always uniform regardless of the speed at which the pump may be driven.

By shifting the pawl G in the slot *f* the volume of solution may be varied as required without otherwise affecting the action.

Although the apparatus is described as applied to the introduction of purifying solution to the water of a supply plant it will be understood that it will serve successfully for other purposes and in other situations to which it may be adapted, and modifications may be made in the forms and proportions of the parts without departing from the invention in making such adaptations.

The plunger-rod may be driven from any portion of the pump mechanism which will give the required stroke and act synchronously therewith, and it is not essential that a delivery from the apparatus be made at each stroke of the pump. It may be so connected and timed with the pump mechanism as to make a delivery for every two, three, or other number of pump reciprocations.

The feed is entirely automatic, commencing when the pump is started and ceasing when the pump is stopped.

I claim:—

1. In an apparatus of the character described, a cylinder having separated inlet and discharge ports, a plunger in said cylinder and a plunger-rod therefor, a loose piston in said cylinder and inclosing said rod, means actuated by the reciprocations of said rod for moving said piston, and stops limiting the movements of said piston, whereby a quantity of liquid received between said plunger and piston at said inlet port is transferred to and discharged from said discharge port, all substantially as and for the purpose set forth.

2. A cylinder having separated inlet and discharge ports, a plunger in said cylinder and a plunger-rod therefor, a loose piston in said cylinder and inclosing said rod, an arm on said piston extending to the exterior of said cylinder, means actuated by the reciprocations of said rod for engaging said arm and thereby moving said piston, and stops in the path of said arm for arresting the movements of the latter and said piston in both directions before the termination of the plunger strokes in the same directions.

3. A cylinder having separated inlet and discharge ports, a plunger in said cylinder and a plunger-rod therefor, a loose piston in said cylinder and inclosing said rod, an arm on said piston extending to the exterior of said cylinder, a fixed frame having a slot therein receiving the free end of said arm and serving to limit the movements of said piston, a plate on said rod, pawls carried by said plate and arranged to engage said arm, and means for disengaging said pawls.

4. A cylinder having separated inlet and

discharge ports, a plunger in said cylinder and a plunger-rod therefor, a loose piston in said cylinder and inclosing said rod, an arm on said piston extending to the exterior of  
 5 said cylinder, a fixed frame having a slot therein receiving the free end of said arm and serving to limit the movements of said piston, a plate on said rod, pawls carried by said plate and arranged to engage said arm,  
 10 and cam-surfaces on said frame arranged to disengage said pawls.

5. A cylinder having separated inlet and discharge ports, a plunger in said cylinder and a plunger-rod therefor, a loose piston in  
 15 said cylinder and inclosing said rod, an arm on said piston extending to the exterior of said cylinder, a fixed frame having a slot therein receiving the free end of said arm and serving to limit the movements of said  
 20 piston, a plate on said rod, pawls carried by said plate and arranged to engage said arm, means for disengaging said pawls, and means

for holding one of said pawls in adjustment relatively to its disengaging means and to  
 25 said arm.

6. A cylinder having separated inlet and discharge ports, a plunger in said cylinder and a plunger-rod therefor, a loose piston in said cylinder and inclosing said rod, an  
 30 arm on said piston extending to the exterior of said cylinder, a fixed frame having a slot therein receiving the free end of said arm and serving to limit the movements of said  
 35 piston, a plate on said rod, spring-pawls having notches for engaging said arm, and cam-surfaces on said frame arranged to disengage said pawls.

In testimony that I claim the invention above set forth I affix my signature, in presence of two witnesses.

ANDREW JACOBSON.

Witnesses:

PAUL W. BRADSHAW,  
 FRANK S. HANS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,  
 Washington, D. C."