No. 823,068. PATENTED JUNE 12, 1906.

J. W. MOSLEY.

CLAMP FOR FLEXIBLE TUBES.

APPLICATION FILED JUNE 16, 1905.

Fig. 1.

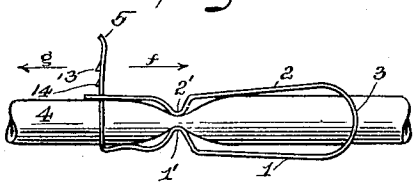


Fig. 2.

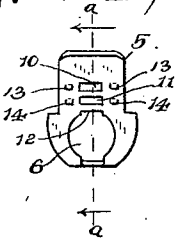


Fig. 3.

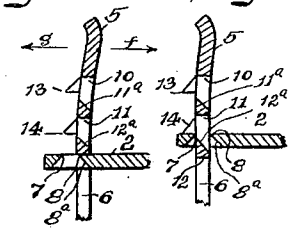


Fig. 4.

Fig. 5.

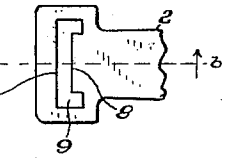


Fig. 6.

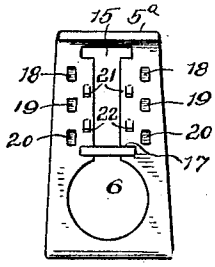


Fig. 7.

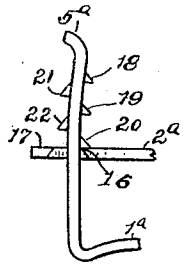


Fig. 8.

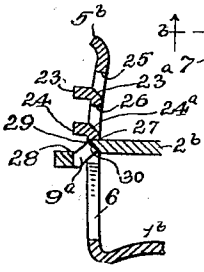


Fig. 9

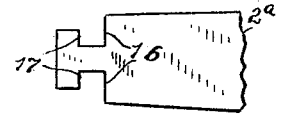


Fig. 10.

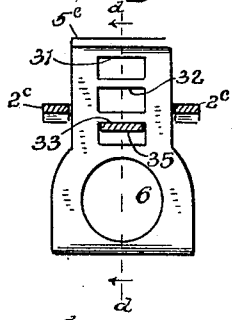


Fig. 11.

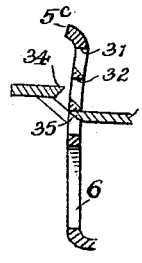


Fig. 12.

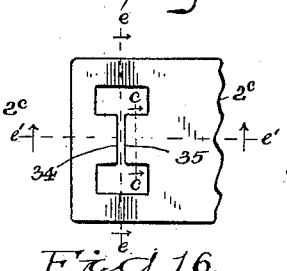


Fig. 14.

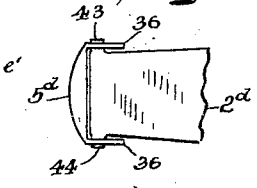


Fig. 16.

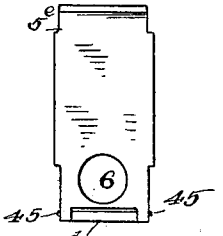


Fig. 15.

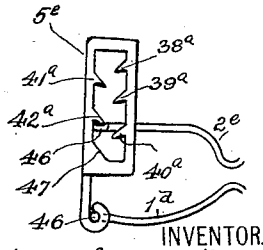


Fig. 13.

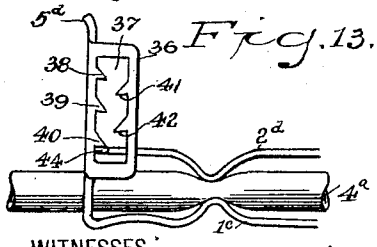


Fig. 17.

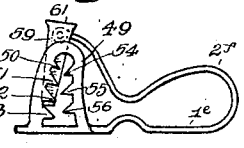
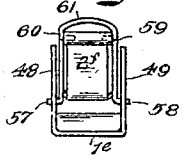


Fig. 18.



WITNESSES.

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UNITED STATES PATENT OFFICE.

JAMES W. MOSLEY, OF BRIDGEPORT, CONNECTICUT.

CLAMP FOR FLEXIBLE TUBES.

No. 823,068. Specification of Letters Patent. Patented June 12, 1906.

Application filed June 16, 1905. Serial No. 265,553.

To all whom it may concern:

Be it known that I, JAMES W. MOSLEY, a citizen of the United States, and a resident of Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Clamps for Flexible Tubes, of which the following is a specification.

My invention relates to new and useful improvements in clamps or shut-offs for flexible tubes; and it consists in certain details of construction whereby changes of pressure may be quickly and conveniently secured.

While my device is adapted to be used in connection with flexible tubes in general, it is particularly applicable to fountain-syringes where a change of pressure is oftentimes absolutely essential. To this end I employ an escapement mechanism comprising pallets in connection with a series of stops. In releasing the pallet from one adjustment it will automatically engage with the next, representing a different pressure. In other words, it is impossible to pass a point of adjustment without engaging; but the adjustments can be made in such rapid succession that it can be promptly opened to its greatest capacity, and it can be closed with even greater celerity.

To enable others to fully understand my invention, reference is had to the following drawings, in which—

Figure 1 represents a side elevation of the device attached to a section of flexible tubing. Fig. 2 is a detail front elevation of the movable upright carrying the stops. Fig. 3 is an enlarged broken central sectional view of the upright on line *a a* of Fig. 2 and broken central sectional view on line *b b* of Fig. 5, showing the upper pallet-carrying spring-arm engaged with the last notch or stop on the upright. Fig. 4 is a view similar to Fig. 3, showing one of the pallets engaged with the second stop. Fig. 5 is an enlarged broken upper detail plan view of the upper pallet-carrying spring-arm. Fig. 6 is an enlarged front elevation of a modified construction of the clamp in full closed position. Fig. 7 is a side elevation and broken view of the pallet-carrying spring-arm and the lower arm. Fig. 8 is a broken central sectional view of the upright upper spring-arm and lower arm of another modified construction. Fig. 9 is a detail broken upper plan view of the pallet-carrying spring-arm of the modification shown at Figs. 6 and 7. Fig. 10 is a front elevation of the upright of another modification and sectional view of the pallet-carrying spring-arm on lines *c* and *e* of Fig. 12. Fig. 11 is a vertical central sectional view on line *d d* of the upright shown at Fig. 10 and central sectional view of the pallet-carrying spring-arm on line *e'* of Fig. 12. Fig. 12 is a detail broken upper plan view of the pallet-carrying spring-arm shown at Figs. 10 and 11. Fig. 13 is a side elevation and broken view of the pallet-carrying spring-arm and lower arm of another modification clamped to a section of flexible tube, showing one of the pallets engaged with the lowest stop or notch of the upright and the flow through the tube fully shut off. Fig. 14 is an upper plan view of the upright shown at Fig. 13, and a broken upper plan view of the pallet-carrying spring-arm. Fig. 15 is a side elevation and broken view of the pallet-carrying spring-arm and lower arm of another modification of the clamp, showing the upright pivoted to the lower arm. Fig. 16 is a front elevation of the device shown at Fig. 15. Fig. 17 is a side elevation of another modification, and Fig. 18 is a front elevation of the same.

Its construction and operation are as follows:

While I show various modifications of the escapement in the several views, the result whereby a step-by-step movement to control the pressure is automatic in its operation.

Referring to Fig. 1, 1 represents the lower arm, which as a matter of economy is made of one piece with the upper spring-arm 2. Through the rear end or bend 3 a hole (not shown) is formed to admit the tube 4. Depressions 1' and 2' are formed in these arms, adapted to grip the tube to fully or partially shut off the flow of water or other liquid therethrough. 5 is an upright integral with arm 1, and through the lower end of this upright is formed the hole 6, Fig. 2, to admit the flexible tube. The forward and free end of the spring-arm 2 carries, Figs. 3, 4, and 5, the pallets 7 and 8, adapted to be alternately brought into engagement with the stops, presently to be explained, on the upright 5.

9, Fig. 5, is an opening in the end of the spring-arm 2, adapted to embrace the upright 5. The stops on the upright 5 comprise the upper walls of the slots 10 11 and notch 12, adapted to be engaged by the pal-

let 8 of arm 2, while the projection or teeth 13 and 14 are to be engaged by the pallet 7 of said arm. The upright 5 is adapted to spring in either direction longitudinally of the tube 4, but is normally inclined rearward in the direction of arrow *f*, Figs. 1 and 3, so that when the arm 2 is forced downward the pallet 8 will be engaged with some one of the centrally-located stops on said upright, and when said arm is fully compressed with the pallet 8, engaged with the last stop 12, as shown at Figs. 1 and 3, the flow through the tube 4 is completely shut off. To partially relieve the pressure or shut-off on the flexible tube, the upright 5 is pressed forward by means of the thumb in the direction of arrow *g* and instantly released, so that the pallet 8 will engage the next stop above, which in this form of spring-upright is the first adjustment. When the upright is pressed forward, the pallet 7 is temporarily brought into engagement with the stops 14, which stops serve to check the upward movement of the arm 2 and enables the pallet 8 to reëngage with the stop 11 of the upright when said upright springs back to its normal or rearward position.

In Fig. 6 the upright 5^a has the vertical opening 15, adapted to receive the T-shaped free end of the pallet-arm 2^a, as shown at Fig. 9. In this construction the edge 16 constitutes the pallet adapted to engage with the teeth 18 19 20 of the upright shown at Fig. 6, while the pallet 17 engages with the teeth 21 and 22. These teeth may be formed, as shown, by indentations made in the opposite surface of the metal. The operation of this construction and the results obtained thereby are precisely similar to what has already been described.

In the construction shown at Fig. 8 the teeth 23 and 24 of the upright 5^b are formed out of the body of said upright, which also forms the stops 25, 26, and 27 on the upper walls of the openings in the metal from which said teeth are forced out. The free end of the spring-arm 2^b has the opening 9^a similar to the opening 9 of the construction shown at Fig. 5. In the construction shown at Fig. 8 the pallet 28 is adapted to engage with the under side of the teeth 23 and 24, while the pallet 29 will engage the stops 25, 26, and 27. It will be observed that the bevels 23^a and 24^a are formed on the back of said teeth to be engaged by the undercut or beveled face 30 of the pallet 29 when the spring-arm 2^b is depressed, which engagement will automatically force the upright 5^b forward, and thus permit the forward end of said arm to descend. A similar arrangement is shown at Figs. 3 and 4, wherein the inclines 11^a and 12^a are engaged by the incline 8^a of the pallet 8.

In the construction shown at Figs. 10, 11, and 12 the upright 5^c has three openings therein to form the stops 31, 32, and 33, adapted to be alternately engaged by the pallets 34 and 35 of the arm 2^c.

In the construction shown at Figs. 13 and 14 the upright 5^d of the arm 1^c has the two rearwardly-projecting wings 36, and in each of said wings is a vertical opening with teeth on the side walls thereof. In Fig. 13 one of these openings 37 is shown, the opposite one (not shown) being of a similar construction. On the front wall of these slots are the teeth 38, 39, and 40. On the opposite wall and intermediate of the other teeth are the teeth 41 and 42. The arm 2^d, Fig. 14, has the two laterally-projecting pallets 43 and 44, adapted to engage the teeth of the uprights 36. In this construction, as in the other constructions previously described, the normal position of the spring-upright 5^d is rearward, so that the pallets will engage with the last tooth of the series when the rubber tube 4^a is fully compressed. A forward pressure on the upright will disengage the pallets from the teeth 40, and the upward spring of the arm 2^d will bring the pallets into engagement with the teeth 42 on the rear wall. Releasing this outward pressure, the upright will spring back, and the upward spring of arm 2^d will carry the pallets under the teeth 39, and so on throughout the series of teeth until the tube is fully relieved of pressure. As the distance between the points of the teeth on the front and rear walls of the vertical slots 37 is less than the width of the pallets, it is quite evident that it is only by a step-by-step movement through the forward and backward vibrations of the upright that the arm 2^d can travel from its lowest to its highest position. When forcing the arm 2^d down, the under side of the pallets will engage the incline of the first or upper teeth 38 and force the upright forward until said pallets slip off onto the incline of the teeth 30, guided thereon by the teeth on the opposite wall.

In the construction shown at Figs. 15 and 16 the upright 5^e is pivotally supported on the ears 45 of the arm 1^d. Owing to the pivotal connection between the upright and the lower arm 1^d, the upright is free to be pressed back and forth by the thumb resting on the top of the upright. To counteract any tendency to accidental disengagement of the teeth and pallets, the upper surface of the pallets, one, 46, being shown at Fig. 15, is concaved, and so, too, are the under side of the teeth 38^a, 39^a, 40^a, 41^a, and 42^a. To insure an engagement of the pallets with the last tooth, the incline 47 is provided on the opposite wall and at the bottom thereof, so that when forcing down the pallet-carrying spring-arm 2^e the pallets on said arm will engage this incline and force the upright forward and permit the pallets to spring under the last tooth on the opposite wall. While I

show three teeth on the rear wall and two teeth on the front wall of the vertical slots of the upright, this arrangement could be reversed, in which case the incline 47 would be at the base of the rear wall. With the exception of the concave pallets, hooking-teeth, and incline 47 the construction just described is similar to that shown at Fig. 13.

In the construction shown at Figs. 17 and 18 there are two uprights, 48 and 49, projecting from the lower arm 1^e. These uprights have each an opening therein, with teeth on each vertical wall thereof. As a side elevation of only one of these uprights is shown, a description of this will suffice. On one of said walls are the teeth 50, 51, 52, and 53, and on the opposite wall are the teeth 54, 55, and 56. In this construction the pallets 57 and 58 are carried at the free ends of the arms 59 and 60 of the U-shaped piece 61, pivotally supported at the free end of the spring-arm 1^e, so that when the piece 61 is tilted on its pivotal support to disengage the pallets from the lowest teeth the upward spring of the arm 1^e will cause them to engage with the teeth next above on the opposite wall.

In the construction shown where the upright is forced in one direction and then permitted to spring back to its normal position one pallet simply engages a stop to check the upward spring of the arm to which said pallet is connected, so that when the upright springs back the other pallet will engage a stop that serves the purpose of an adjustment. In the constructions where the upright is pivotally supported the teeth on both sides of the vertical slot are engaged by the pallets to form an adjustment.

The advantages of my improved clamp are apparent from the fact that the various adjustments can be secured and the flow of liquid regulated automatically. In other words, the operator can change from one pressure to another without exercising care that not more than one adjustment or opening is made at a time. If desired, the adjustments, as before mentioned, can be made in such rapid succession that the clamp can be fully and rapidly opened to its fullest capacity and closed with even greater celerity. As a further advantage it may be mentioned that the clamp is not liable to be accidentally unlocked by suddenly being brought in contact with an object.

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

1. A clamp or shut-off for flexible tubes having arms adapted to have a flexible tube passed between them, with means on said arms to engage the tube, an escapement mechanism connected with said arms comprising pallets and oppositely-located stops whereby said clamp is adapted to be operated by a step-by-step movement, for the purpose set forth.

2. A clamp or shut-off for flexible tubes having arms adapted to have a flexible tube passed between them, with means on said arms to engage the tube, one of said arms carrying an upright with oppositely-located stops, the other arm carrying pallets adapted to forcibly engage with said stops whereby the clamp is adapted to be operated by a step-by-step movement, for the purpose set forth.

3. A clamp or shut-off for flexible tubes having arms adapted to have a flexible tube passed between them, with means on said arms to engage the tube, one of said arms carrying a movable upright with oppositely-located stops thereon, the other arm carrying pallets adapted to be alternately and automatically brought into forcible contact with said stops so that, said clamp is adapted to be operated by a step-by-step movement, for the purpose set forth.

4. A clamp or shut-off having arms to embrace a flexible tube, a movable upright on one of said arms, a series of stops on said upright, oppositely-located pallets on the other arm to engage said stops so that, when the upright is moved to release one of said pallets, the opposite pallet will automatically engage the next stop of the series and thereby effect a gradual release of pressure on the tube, for the purpose set forth.

5. A clamp or shut-off for flexible tubes having arms adapted to have a flexible tube passed between them, said arms carrying escapement mechanism comprising oppositely-located pallets carried by one arm, and the other arm carrying a series of stops adapted to be automatically and alternately engaged by said pallets, means to bring about such engagement so as to effect a gradual release of pressure on the tube and, at the same time, prevent a full opening of the clamp when shifting from one stop to another, for the purpose set forth.

Signed at Bridgeport, in the county of Fairfield and State of Connecticut, this 13th day of June, A. D. 1905.

JAMES W. MOSLEY.

Witnesses:
F. B. FELTON,
STUART BEEBE.