

H. JACOBI.

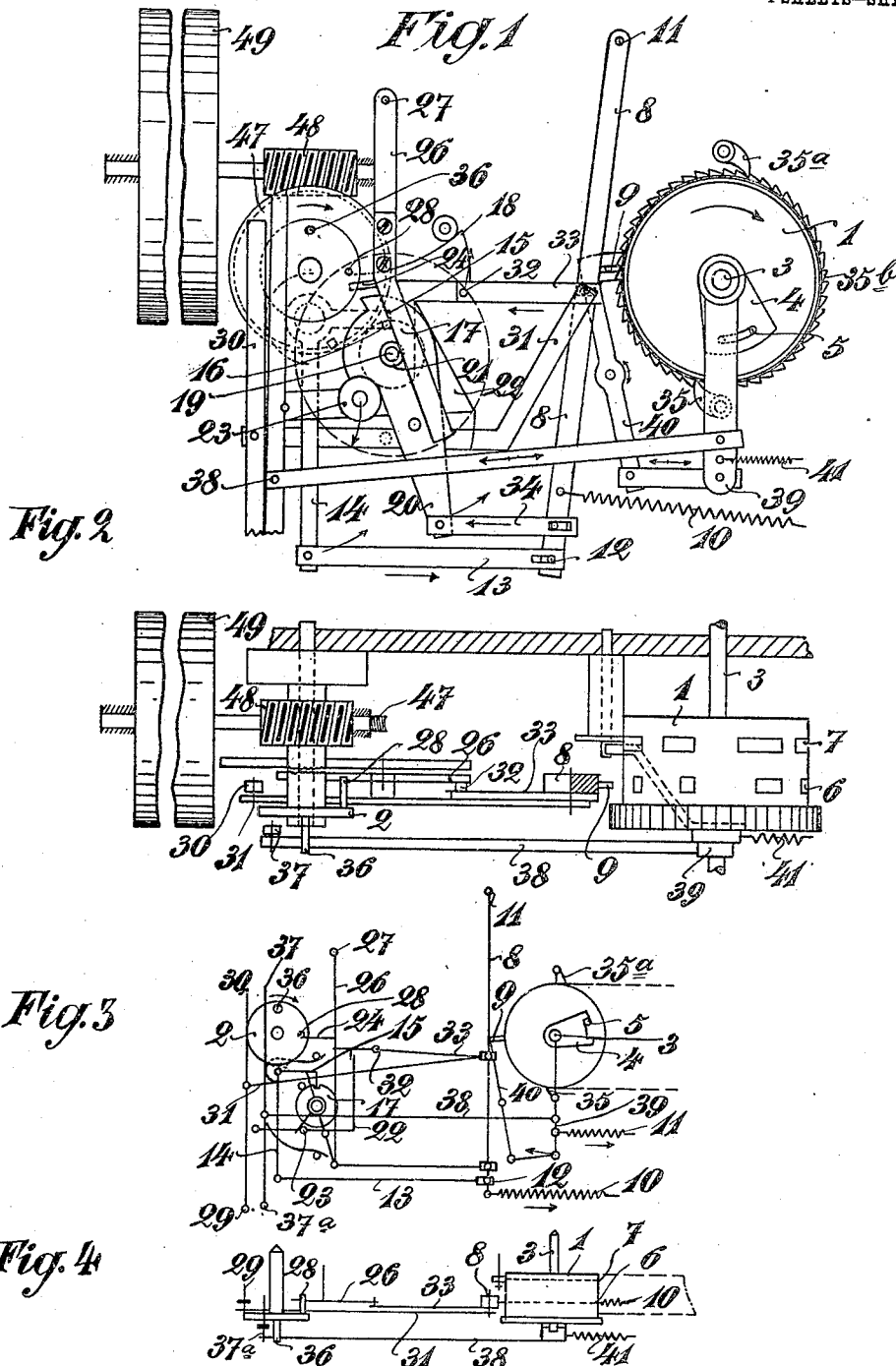
APPARATUS FOR THE AUTOMATIC OPENING AND CLOSING OF PIPES, VALVES, &c., AT FIXED INTERVALS.

APPLICATION FILED JUNE 16, 1906.

957,341.

Patented May 10, 1910.

4 SHEETS—SHEET 1.



Witnesses
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Inventor
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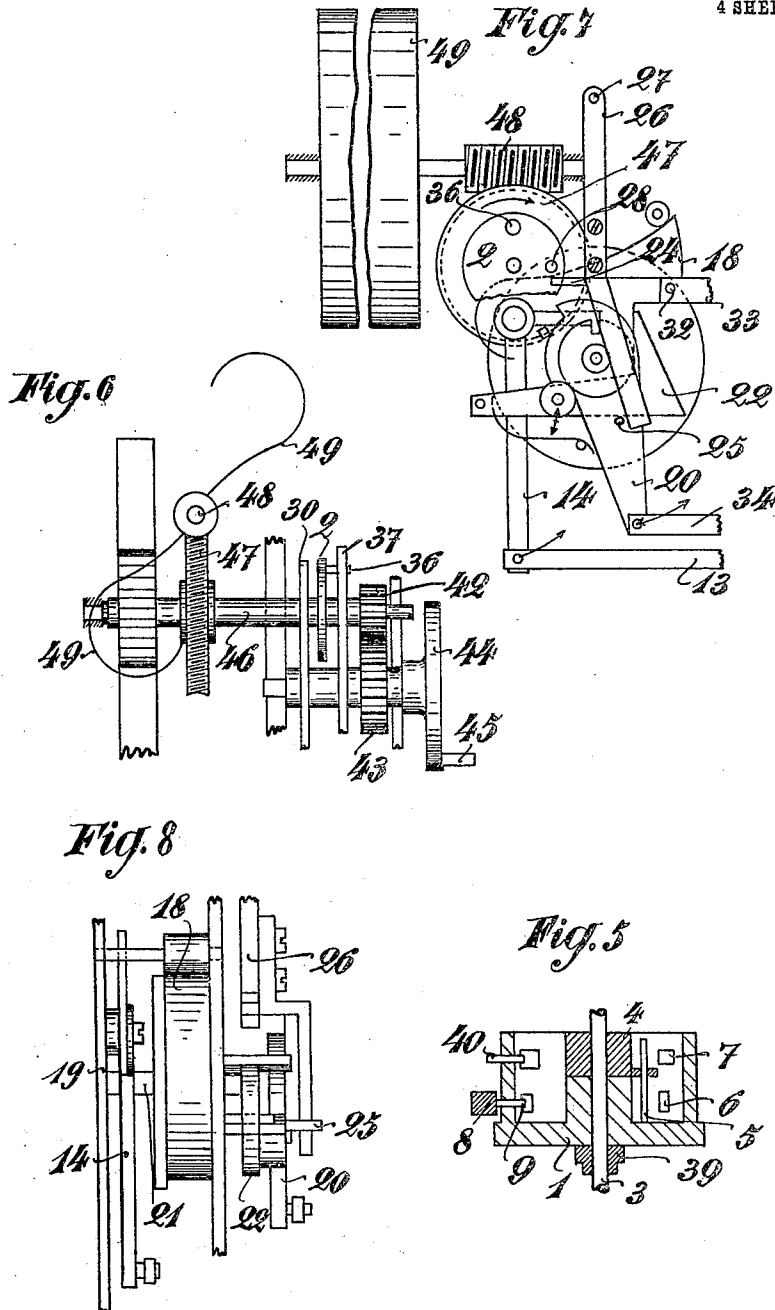
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4 SHEETS—SHEET 2.



Witnesses
H. T. A. H.
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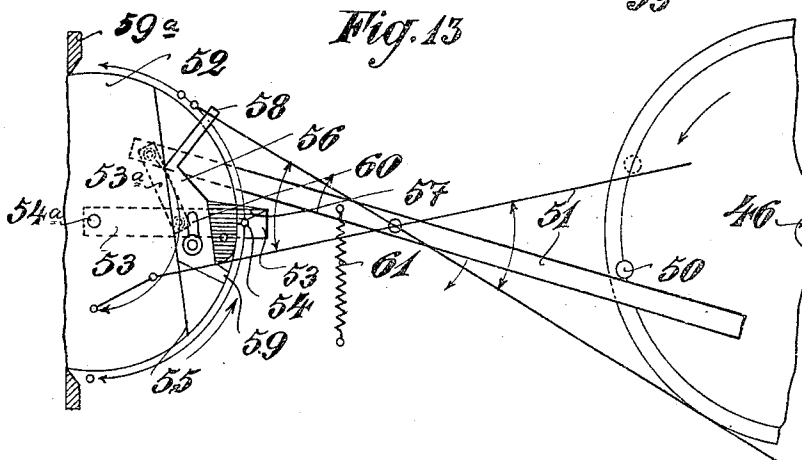
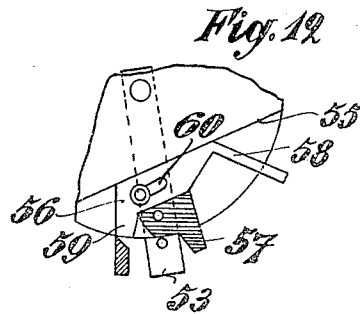
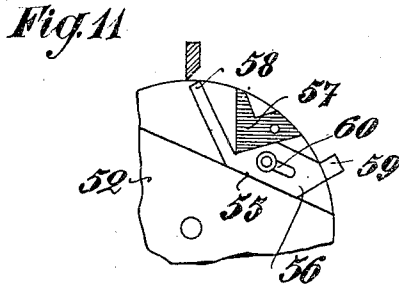
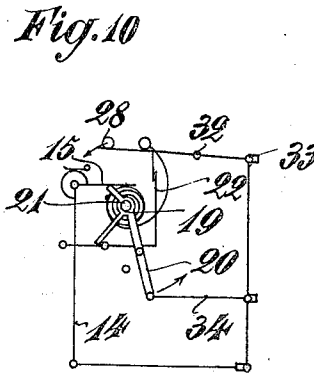
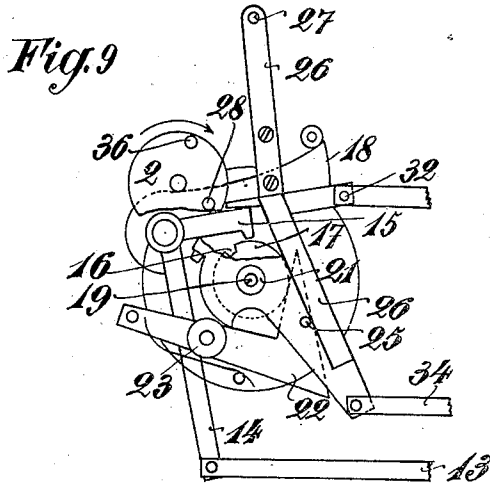
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4 SHEETS—SHEET 3.



Witnesses
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H. JACOBI.
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4 SHEETS—SHEET 4.

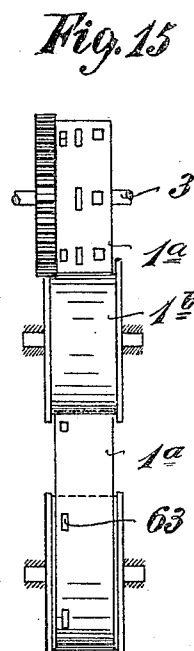
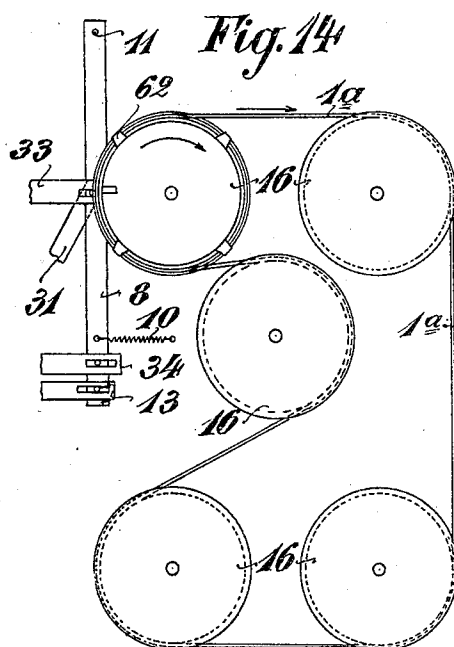


Fig. 16

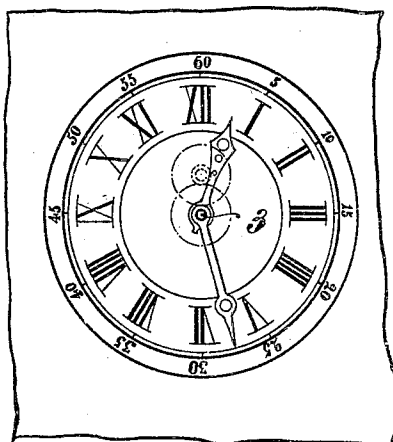
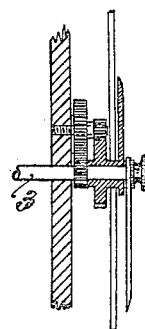


Fig. 17



Witnesses
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Hermann Liss

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UNITED STATES PATENT OFFICE.

HUGO JACOBI, OF LEIPZIG, GERMANY.

APPARATUS FOR THE AUTOMATIC OPENING AND CLOSING OF PIPES, VALVES, &c., AT
FIXED INTERVALS.

957,341.

Specification of Letters Patent.

Patented May 10, 1910.

Application filed June 16, 1906. Serial No. 321,972.

To all whom it may concern:

Be it known that I, HUGO JACOBI, a subject of the Emperor of Germany, residing at Leipzig-Plagwitz, Germany, have invented a new original Improvement for an Apparatus for the Automatic Opening and Closing of Pipes, Valves, &c., at Fixed Intervals, of which the following is a specification, reference being had to the accompanying drawing, forming part thereof.

The object of my present invention relates to an apparatus to automatically open the mouth of pipes, valves, lids, and the like conducting water, steam, gas or the like and to keep said mouth open for a certain lapse of time and then close the same.

The opening and closing of the mouth of valves or the like is caused by means of a clock-work or by any other well known actuating mechanism the main shaft of which carries a drum having a certain dead motion while rotating, the circumference of which provides next to a set of holes engaging a well known arresting mechanism a second set of holes the distances between which vary according to the desired opening and closing intervals. This second set of holes is successively engaged by a releasing peg of a spring actuated mechanism. The releasing peg is at once redrawn by said spring actuated mechanism while the drum independently of the main shaft of the clock work is so far advanced by means of an advancing device of said spring actuated mechanism that the releasing peg strikes during its rearward motion against the surface of the drum and permits a further rotation of the same. During this operation the valve or the like actuated by said spring actuated mechanism is automatically closed or opened. The apparatus according to my present application shows in contradistinction to similar well known devices the essential advantage that the single intervals can be regulated according to need as the holes on the circumference of the drum are arranged at distances according to a predetermined manner. In place of the holes of said drum I can just as well arrange an endless ribbon provided with holes and guided over rollers said ribbon being moved by a pin fixed to said drum which engages said holes during the rotation of the drum.

The new feature of my invention consists

furthermore in the advantageous arrangement that I can use only the drum or the endless ribbon provided with holes according to the circumstance if the desired adjustment shall be successively effected in a shorter or longer interval whereby a control of the successive adjustments can be attained by combining the clock work with a dial plate as the mechanism itself is regulated by the arrangement of propellers and by a spring releasing said mechanism which spring influences the locking of the valve or the like.

A further important advantage consists in the automatical and regular winding of a special clock work so that a stopping of said clock during its operation is fully prevented.

In the accompanying drawing in which I have illustrated my invention like letters of reference refer to like parts throughout the different views.

In said drawings:—Figure 1 shows a front view of the whole mechanism the driving means being at rest. The direction of rotation is indicated by arrows, Fig. 2 shows a top view of Fig. 1, Fig. 3 shows a diagrammatical front view of the parts shown in Fig. 1, Fig. 4 shows a diagrammatical top view of the parts shown in Fig. 2, Fig. 5 shows a cross-section of the drum, Figs. 6–10 show various views of the lock released by the spring referred to by the numeral 10, Figs. 11–13 show special parts of the automatically actuated clock work, Fig. 14 shows a front view of the position of the endless belt by means of which the opening and closing of the valves or the like in certain intervals is successively attained, Fig. 15 shows a side view of Fig. 14, Fig. 16 shows in a front view the arrangement of a dial plate by means of which a control of the apparatus and simultaneously of the clock work is attained, and Fig. 17 shows a side view of Fig. 16 partly shown in cross-section.

The drum 1 having during its rotation a certain dead motion is rotated by a shaft 3 of a well known clock work (which for sake of clearness is not shown in the drawings) by means of a pushing contrivance 4 having a flat slot and being fixed to the shaft 3 and by the pin 5 fixed to the drum. On the circumference of the drum 1 along side a set of holes 6 operating together with a well

known stopping device, a second set of holes 7 is arranged. The drum 1 is uniformly rotated in the direction of the arrow (Figs. 1 and 3) so that a hole 6 places itself below the releasing peg 9. This peg 9 is now moved into said hole 6 by means of a spring 10 and by means of a lever 8 pivotally mounted on a pivot 11 so that as shown in Fig. 3 the actuating device serving to actuate the valves is released. It is for this purpose that the lever 13 is movably fastened at the lower end of the lever 8 by means of a pivot 12 while at the other end of said lever 13 a lever 14 is attached which connects on its part to a lever 15 provided on its free end with a nose, so that after the redrawing of the lever 8 by the spring 10 the nose of the lever 15 is redrawn from a slot 16 on an arresting disk 17. On the shaft 19 of the arresting disk 17 I mount a spring 18 in such a way that after the release of the disk 17 the lever 20 with its sleeve 21 is freely rotated around the shaft 19 whereby the sleeve 21 in consequence of its connection with the shaft 19 rotated by the spring 18 moves in the direction of the arrow (Figs. 9 and 10).

In consequence of the motion of the lever 20 the rotatory mounted lever 22 is pressed down by the sliding of the roller 23 which is moved out of the cavity of the lever 20 whereby the nose 24 is released for the later on following rearward motion. At the same time the peg 25 of the lever 20 strikes against a prolongation of a lever 26 rotatory mounted on a pivot 27 and redraws the nose 24 from the peg 28 of the disk 2, so that said disk can freely rotate in the direction of the arrow. (Fig. 9). After a certain distance of rotation the peg 28 presses against a single armed lever 30 rotatory mounted on a pivot 29 which lever redraws by means of a lever 31 the peg 9 fixed to the lever 8 from the drum and replaces the lever 26 by means of a pin 32 and an arm 33 into its original position in order to arrest the peg 28 of the disk 2. Simultaneously the lever 8 removes the lever 20 by means of a rod 34 into its original position whereby the spring 18 is simultaneously wound up. The nose 15 self-actingly engages the notch 16 and the lever 22 is replaced into its original position in any desirable manner, for instance by a spring not shown in the drawing by which motion the lever 26 with its nose 24 is arrested in its original position. (Figs. 1, 3, 7, 11). While the peg 9 remains in its redrawn position the drum 1 is advanced by means of a ratchet 35 independently from the main shaft of the clock work so that the peg 9 after its return strikes the surface of the drum. This motion is caused as follows. Immediately after the effect of the pin 28 of the rotating disk 2 the pin 36 presses against a single armed lever 37 rotatable

around a shaft 37^a and redraws by means of the lever 38 the lever 39 provided with the pawl 35 freely rotatable around its shaft 3 as the pawl 35 engages a ratchet wheel 35^b of the drum 1. While a hook like formed arresting lever 40 rotatory mounted in its center engages a somewhat longer hole 7 running in a parallel direction with the set of holes 6 in order to possibly prevent derangements of the operating clock the drum is advanced so far that the peg 9 strikes against the surface of the drum as already said above. If the pin 36 of the disk 2 leaves the lever 37 the spring 41 removes the whole arresting mechanism from the hole 7 and the ratchet 37 engages another tooth of the ratchet wheel 35^b in order to continue the rotation of the drum. The upper ratchet 35^a arrests the drum during the rearward motion of the ratchet 35.

Meanwhile the disk 2 fixed to the toothed wheel 42 has rotated the crank disk 44 (Fig. 6) fixed to a toothed wheel 43 whereby the crank disk by means of its pin 45 in combination with levers, arms or the like opens or closes a valve, pipe or the like according to the rotation of said toothed wheels.

In order to prevent a sudden and hard striking of the pin 28 of the disk 2 against the ratchet 24 a regulating device is arranged in such a manner that the shaft 46 of the disk 2 is provided with a spiral thread 47, 48 connected with propellers 49 (Figs. 1, 2, 6 and 7) so that a uniform elastic operation of the whole mechanism is attained. Furthermore a selfacting clock regulator (Figs. 11 and 12) is arranged which prevents that the clock stops while the closing and opening of the valves or the like takes place. Any disturbance in consequence of the stopping of the clock work or of the drum 1 in consequence of not winding up the spring is fully prevented by this arrangement.

As shown in Fig. 13 the lever 51 winds up the spring of the clock work actuating the disk 2. Figs. 11 and 12 illustrate this arrangement at an enlarged scale.

Construction and operation of this device is as follows. The disk 52 is firmly fixed upon the shaft of the spring of the clock work rotating by means of suitable gearing (left away in the drawing for sake of clearness) the disk 3 while the lever 53 with its pin 54 is freely rotatable around the shaft 54^a. The lever 53 is connected to the lever 51 by an intermediate arm 53^a. The disk 52 is cut off along the border 55 as shown in the drawing (Figs. 11, 12, 13). The sliding piece 56 is movably arranged upon said cut border and the pushing contrivance 57 is rotatably fastened on the disk 52.

In the position shown in Fig. 13 the pin 54 of the lever 53 strikes the pushing con-

trivance 57 and rotates the disk 52 in the direction of the indicated arrow until the nose 58 strikes the upper stop 59^a which effect is caused on the lever 51 in consequence of the pin 50 of the disk 46 seated on the shaft of the drum actuating the clock work. By this motion the sliding piece 56 is so far pushed rearward that the pin 54 drops into the hole 60 (Fig. 11), the pin 54 becomes free as the pin 50 of the disk 46 slides over the lever 51 it being located at its outmost border. The lever 51 returns into its position by means of a spring 61 so that at any time by means of the peg 54 the disk 52 can be rotated in the direction of the arrow toward the upper stop 59^a simultaneously winding up the meanwhile unwound spring of the clock work so that a completely unwinding of said spring is prevented. A return motion of the shaft of said spring is prevented by any suitable arresting device which is not illustrated in the drawing.

To control the work of the mechanism I use a dial plate with fingers mounted on the front end of the shaft 3 of the drum.

In order to enable an opening and closing of valves or the like in certain intervals I can use instead of a drum an endless ribbon 1^a running over said drum and over rollers

16 which ribbon is just as before the drum provided with holes 6 and 7. By this action a motion of the endless ribbon is attained as the teeth 62 of the drum 1 engage the holes 63 of the endless ribbon.

What I claim as new and desire to secure by United States Letters Patent, is:—

In an apparatus to automatically open and close the mouth of pipes, valves, and the like serving to conduct water, steam or the like the combination of a drum, a set of holes provided on said drum, an arresting mechanism coöperating with said holes, a second set of holes provided on said drum running parallel to the first set of holes, a peg engaging said second set of holes, a clock work means to operate said peg in accordance with said clock work, and means to forward said drum if said peg is out of engagement, substantially as described and for the purpose set forth.

In witness whereof I have hereunto signed my name this 28th day of May 1906 in the presence of two subscribing witnesses.

HUGO JACOBI.

Witnesses:

PAUL HEY,
CARL GÜTTICH.