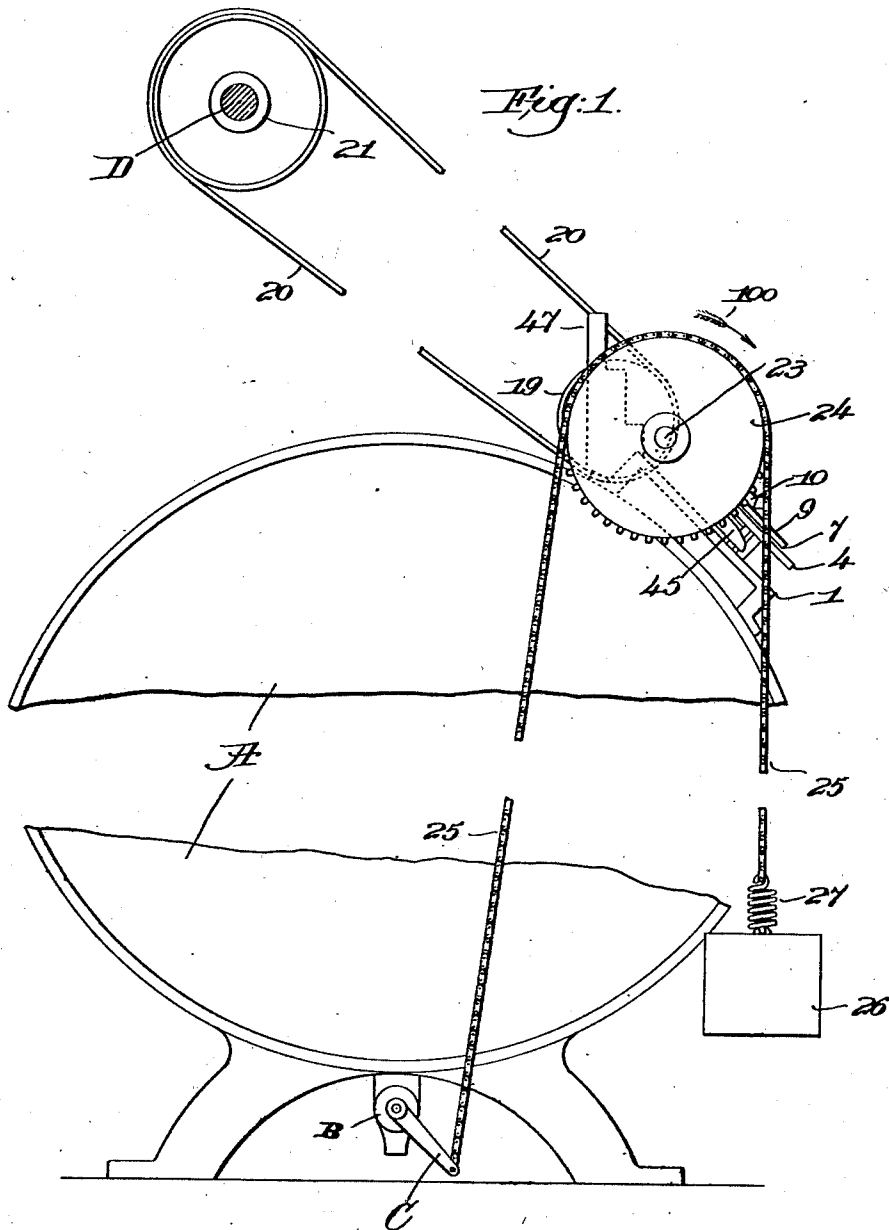


R. N. WEST.
 AUTOMATIC MECHANISM FOR OPENING OUTLET VALVES.
 APPLICATION FILED OCT. 8, 1910.

1,031,405.

Patented July 2, 1912.

2 SHEETS-SHEET 1.



Witnesses,
 Edward F. Allen.
 Joseph M. Ward.

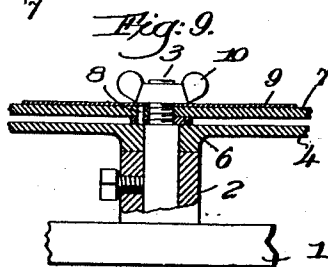
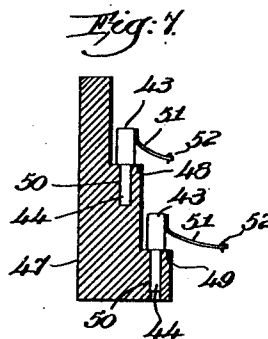
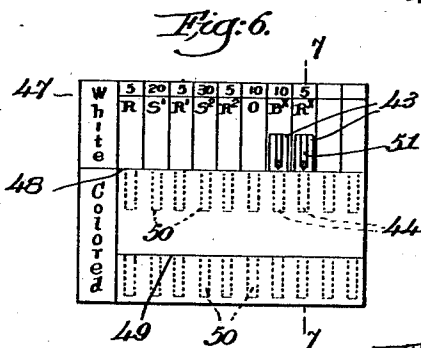
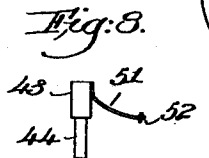
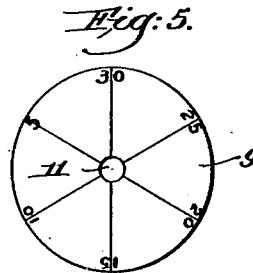
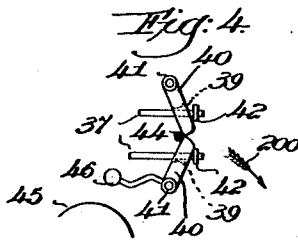
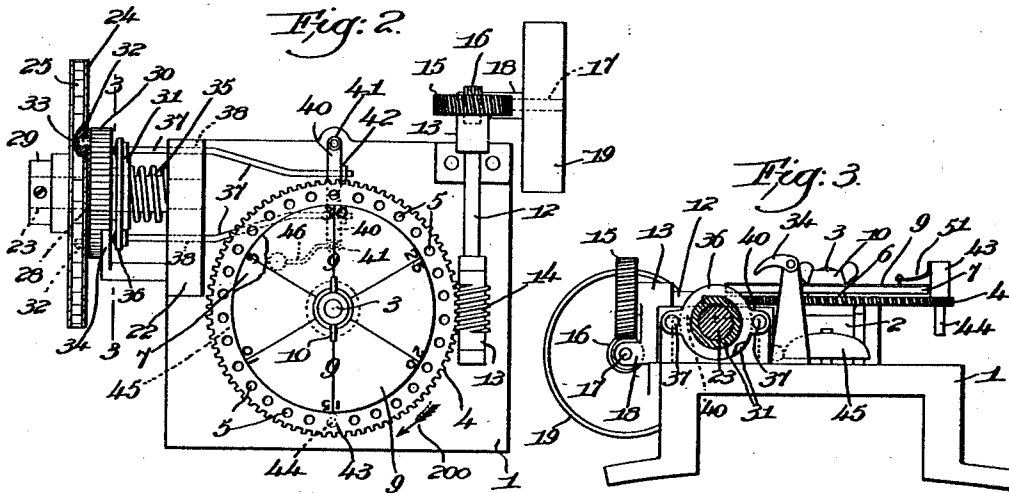
Inventor,
 Robert N. West,
 by Lewis R. R. R.
 attys.

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2 SHEETS-SHEET 2.



Witnesses,
 Edward F. Allen.
 Joseph M. Ward.

Inventor:
 Robert N. West,
 by Lewis R. Gregory

UNITED STATES PATENT OFFICE.

ROBERT N. WEST, OF WINTHROP, MASSACHUSETTS, ASSIGNOR TO YATES MACHINE COMPANY, OF SALEM, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

AUTOMATIC MECHANISM FOR OPENING OUTLET-VALVES.

1,031,405.

Specification of Letters Patent.

Patented July 2, 1912.

Application filed October 8, 1910. Serial No. 585,927.

To all whom it may concern:

Be it known that I, ROBERT N. WEST, a citizen of the United States, and resident of Winthrop, county of Suffolk, State of Massachusetts, have invented an Improvement in Automatic Mechanism for Opening Outlet-Valves, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention has for its object the production of simple and effective mechanism for so controlling outlet valves automatically that such valves may be opened at a predetermined time without requiring constant attention from the attendant of the apparatus equipped with such mechanism.

My invention is particularly designed for operation in connection with laundry washing machines, which machines are run by power and require attention from time to time to properly treat the batch of garments or other articles therein.

In custom and other large laundries there are usually a number of washers, depending upon the size of the plant, and in practice the batch of work is treated in accordance with a certain formula or course of procedure, the formulæ varying according to the character of the work, whether white or colored, coarse or fine, etc., and usually every laundry will have its own formula. For instance, it may be desired to subject the fresh batch to a preliminary rinsing for a certain number of minutes, in order to soften the starch, thoroughly wet the articles and loosen the dirt, and the rinsing liquid must be discharged before the next step. Then may come a treatment with suds for a given time, followed by a rinse, then a second treatment with suds, a second rinse, etc., and after the batch has been subjected to each treatment for a predetermined period the liquid appropriate to such treatment must be discharged from the washer by means of the outlet valve thereof.

Ordinarily the timing of the several treatments is done by the attendant noting the time a treatment begins, and marking on a slate or other convenient surface the time it is to terminate, and then the attendant tries with more or less success to follow out his own notations. With a single washer this is not a difficult matter, but when several washers must be looked after the attendant

cannot do justice to all of them, and some one or more must run over or under the proper time for a treatment while he is opening the outlet valves of other washers, attending to the introduction of wash liquor thereto, etc.

In my present invention I have devised a simple mechanism for opening automatically the outlet valve at the end of a predetermined period of time, so that no matter how many washers may be in charge of one person the outlet valve of each one will be opened at the termination of the proper period for any given treatment forming a part of the desired formula. The attendant is thus relieved of the duty of opening the outlet valves, and can give his time and attention to closing such valves, opening the proper inlet valves, and setting the controlling device for each outlet valve. I have also provided a device which gives a complete record of the series of treatments to which a batch of work has been subjected, so that the proper person can see whether or not the washer attendant has followed faithfully the prescribed formula or has been careless in his work, and in what particulars he has departed from the formula.

The various novel features of my invention will be fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is an end view, broken out, of a laundry washer with one embodiment of my present invention applied thereto, showing the outlet valve of the washer closed and in readiness to be opened automatically by the controlling mechanism; Fig. 2 is a top plan view of the controlling mechanism, enlarged, and with the pin rack omitted; Fig. 3 is a cross sectional detail of such mechanism, taken on the line 3—3, Fig. 2, looking toward the right; Fig. 4 is a detail in plan of a portion of the clutch-controlling means shown in Fig. 2; Fig. 5 is a plan view of one of the record disks, to be referred to hereinafter; Fig. 6 is a front elevation of a convenient form of pin rack used in connection with my controlling mechanism; Fig. 7 is a vertical section of the rack on the line 7—7, Fig. 6; Fig. 8 is a side view of one of the pins, with the recording member attached thereto; Fig. 9 is a vertical sectional detail, enlarged, on the line 9—9, Fig. 2, showing more clearly the construction of

certain parts of the controlling mechanism, to be referred to.

Referring to Fig. 1 the casing of a laundry washer of usual construction is represented at A, apparatus of this character in practice having within the casing a receptacle rotated by power and in which the articles to be washed are placed. The outlet valve is indicated at B, the valve stem having an attached arm C by means of which said valve is opened and closed, and in Fig. 1 the arm is positioned to close the valve. It will be understood that the washer is provided with suitable inlet valves for the introduction of the various liquids necessary to the proper treatment of the work, but as the washer *per se* forms no part of my present invention such valves are not herein shown, and may be of any usual construction. The washer may be driven by suitable belting from a power-actuated shaft D, Fig. 1, and this shaft is utilized to actuate the valve-opening mechanism forming my present invention. The shaft D in practice is driven at a substantially uniform speed by any suitable motor, such as a steam, gas, electric or other engine, in conformity with the common practice of transmitting power to various machines from a continuously rotated shaft. Upon the cylindrical wall of the casing A at a convenient height for the attendant, and near one end of the casing, I fixedly attach a suitable base plate 1 on which are mounted the various parts of the controlling mechanism, now to be described. An upright base 2, Fig. 9, on said base plate supports a fixed stud 3 on which is rotatably mounted a disk-like worm gear 4 having near its periphery a series of circularly arranged holes 5, thirty of the holes being shown in Fig. 2, each one corresponding to a one-minute period, as the gear is arranged to be driven continuously to make one complete revolution every thirty minutes. Said gear is held in place by a washer 6, Fig. 9, screwed onto the threaded end of the stud 3, and above the washer a circular metal dial 7 is mounted on the stud, the diameter of the dial being such that the holes 5 are at all times exposed adjacent its periphery. To prevent rotation of the dial it can be pinned to the washer, at 8, Fig. 9, the face of the dial being graduated in 5-minute intervals, similar to the graduations of the circular record disk or card 9, see Fig. 5. When using a record disk it is placed on the dial 7 with the two sets of graduations in register, and a suitable nut 10 on the stud 3 clamps the disk fixedly upon the dial, the disk having a central aperture 11, Fig. 9, for the reception of the stud.

In Fig. 2 the record disk is broken out to show a portion of the dial 7 beneath it. A shaft 12 is rotatably mounted in bearings

13 on the base plate, and carries a worm 14 which meshes with and drives the apertured disk 4, said shaft 12 also having fast thereon a worm-gear 15 meshing with a worm 16 fast on a short shaft 17 at right angles to shaft 12. The shaft 17 is mounted in a bearing 18 forming a part of one of the bearings 13, and a pulley 19 on the shaft 17 receives a belt 20, Fig. 1, driven from a pulley 21 on the shaft D. The power-transmitting train of gearing between the shaft D and the perforated disk 4 is so arranged that said disk will be driven at the desired slow speed, hereinbefore referred to as at the rate of one revolution per half hour. As shown in Fig. 2 the gearing carried by the base plate 1 is located near the inner side thereof, the outer side of said plate being located adjacent the end or head of the washer casing A. A bracket 22 on the base plate adjacent its outer side sustains a fixed shaft 23 which projects beyond the end of the casing A when the controlling mechanism is in place, and upon said shaft I mount rotatably a sprocket wheel 24, over which passes a sprocket chain 25 attached at one end to the arm C of the outlet valve, and to the other end of said chain is attached a weight 26, Fig. 1. Preferably I interpose a spring 27 between the weight and the chain, to serve as a shock absorber when the apparatus operates. The weight 26, chain 25, and sprocket wheel 24 constitute valve-opening means, the descent of the weight turning the wheel 24 and swinging the valve-arm C upward when the valve-opening means is free to act. Said sprocket wheel is held from axial movement by a shoulder 28 on the shaft 23, and a collar 29 pinned on the outer end of the shaft, as shown in Fig. 2. A ratchet 30 is rotatably mounted on said shaft and is also axially movable thereon, said ratchet having an annularly flanged hub 31, and projecting from the outer face of the ratchet are a series of projections 32 which are adapted to enter sockets 33, Fig. 2, in the adjacent face of the sprocket wheel, the latter and the ratchet thus constituting a detent clutch. When such clutch is closed, or operative, the weight 26 cannot rotate the wheel 24 in the direction of arrow 100, Fig. 1, because a pawl 34 in continuous engagement with the ratchet member 30 of the clutch prevents rotation thereof in the direction of the arrow. If the outlet-valve B is open the attendant can close it by pushing down arm C to the position shown in Fig. 1, and in so doing the pull on chain 25 raises the actuating weight 26 to operative position as the wheel 24 is revolved oppositely to arrow 100, and the ratchet member 30 will be revolved with it, the pawl 34 acting to hold the two members 24, 30 of the clutch in final position when the valve is

completely shut. It will now be manifest that so long as the detent clutch is operative the valve-opening means will be held from operating, but if the clutch is opened by moving the member 30 to the right, Fig. 2, the other member 24, (which is also a part of the valve-opening means) will be free to rotate and the weight 26 will then descend and open the outlet valve.

A spring 35 serves to maintain the clutch operative to perform its detent function, and I will now describe the automatic means for rendering such detent clutch inoperative at a predetermined time. The flanged hub 31 is loosely surrounded by a collar 36 to which are attached two links 37 slidable in parallel holes 38, Fig. 2, in the bracket 22, the links being bent inward beyond said bracket and extended under the apertured disk 4, the free ends of the links passing loosely through slots 39, see dotted lines Fig. 4, in a pair of triggers 40. Said triggers are mounted to swing laterally on upright supports 41 on the base plate, nuts 42 on the links bearing against the inner edges of the triggers to maintain them normally in the position shown in Fig. 2 due to the expansive action of spring 35, and at such time the free ends of the triggers practically touch each other at a point in a circle corresponding to the circular series of holes 5 in the disk 4. If a pin be inserted in one of the holes 5, with its shank depending below the disk 4 far enough to engage the triggers, then manifestly the rotation of the disk in the direction of arrow 200 after such engagement will cause such pin to first swing the triggers and, through the links 37, disconnect the clutch members 24, 30, and then the pin will pass between and beyond the triggers, the spring 35 then acting to re-engage the clutch members and to set the triggers in the position shown in Fig. 2. Also, it will be apparent that the farther away from the triggers is the hole 5 in which the pin is placed the longer will be the period during which the triggers remain set in normal position, because the slowly revolving disk 4 must carry the pin through the longer arc before it can engage said triggers.

A convenient form of pin for tripping the triggers is shown in Figs. 6, 7 and 8, comprising an enlarged head 43 and an elongated shank 44, the head supporting the pin when its shank is inserted in a hole 5 of the disk 4, the shank then depending below the disk as shown at the right, Fig. 3. It is supposed that the pin has been inserted in the hole 5 opposite the index 15, Fig. 2, and from the foregoing it will be understood that it will be fifteen minutes before the shank of the pin will be brought into engagement with the triggers to trip the same and thereby cause the detent clutch to re-

lease the valve-opening means. In like manner, had the pin been inserted in the hole opposite the index number 5, 20, or 25 it would be five, twenty- or twenty-five minutes, respectively, before the pin could trip the triggers. If, now, the outlet valve B is shut at a given time, manually, and it is desired to open said valve automatically after a given period, say 25 minutes, the attendant places the pin in the hole of the disk 4 which is opposite the index number 25 and then attends to other matters until warned by a suitable alarm that the valve has been opened at the desired time. The alarm herein shown consists of a gong bell 45, mounted on the base plate and having a striking hammer 46 attached to one of the angularly movable trigger-supports 41, see Fig. 4, the sudden return of the triggers to normal or set position after disengaged by the pin causing the hammer to strike the bell and thus sound an alarm every time the outlet valve is opened. The detent clutch is opened to release the valve-opening means before the pin can pass between and beyond the triggers, as will be apparent, and hence the bell will not be struck until a short time after the opening of the valve, say about one-half minute, thus giving an opportunity for the wash liquor to be discharged before the attendant reaches the washer to prepare for the next step. The pin rack which I use is conveniently made as a stepped body 47 presenting horizontal shelves 48, 49 one above the other and offset, as shown in Fig. 7, so that a plurality of sets of pins can be accommodated and manipulated, the pin rack being preferably supported on the base plate 1, in upright position, near its top edge, Fig. 1. Each shelf has a series of holes 50 drilled into it to receive the shanks of the pins not in use, and I propose to have a pin for each step or process comprehended in a given formula for treatment.

Referring to Fig. 6 the small spaces above the several pin holes may be marked with figures denoting minutes, as 5, 20, 5, etc., and the larger spaces beneath will be marked to indicate particular steps or processes in the treatment formula, as R, S', R', S², R², O, B^x, and R^x, indicating respectively the initial rinse or "slush" as it is sometimes called; first suds, first rinse, second suds, second rinse, oxalic, blueing, and last rinse.

It will be understood that this formula is illustrative only, and that the number of minutes to be given to each step is also illustrative, but whatever be the formula there will be a pin for each step or process thereof. Then when a particular process is to be carried out in the washer the attendant takes out the pin in front of the correspondingly indicated space in the pin rack, and places it in the hole of the disk 4 which is

opposite the proper index number on the dial 7 or record card 9. Thus, for "second suds" the pin in space S^2 , Fig. 6 would be taken from the rack and placed in the hole of the disk just beyond the triggers, as this process or step must last for thirty minutes. When that process has been completed and the outlet valve opened automatically the attendant would shut said valve, turn into the washer the proper liquid for the next step, to wit: "second rinse," and after replacing the first mentioned pin in space S^2 of the rack removes the pin from the next space R^2 , places it in the disk 4 opposite the index number 5, and starts the washer. This procedure is followed through the entire formula or series of processes to which the articles are to be subjected, each step or process thus coming in its proper sequence and acting through a predetermined period of time. The attendant is free to attend to other duties as soon as he has put the proper pin in the hole in the revolving disk called for by the formula, and that particular washer is dismissed from consideration until the alarm sounds to signal the completion of a process.

In Fig. 6 the upper set of pins may be used for a white work formula, and the lower set for colored work, but to avoid confusion I have omitted the lower pins and also the process indices and times for the same. When it is deemed unnecessary to keep a record of the actual treatment of each batch of work the record cards 9 are not used, the care and faithfulness of the attendant being relied upon to follow the formula and plain, headed pins can be used to trip the detent-releasing triggers. If a record is desired, however, and in many cases it is very desirable as a check upon the work of the washer attendant, a fresh record card is clamped on the dial 7 before treatment is begun on a batch of work. Each pin of a set is provided with a lateral, resilient carrier 51 adapted to carry at its free end a pencil point 52, Fig. 8, the carrier serving to press the point on the face of the card 9 when the pin is inserted in a hole of the disk gear 4, and the pin shanks must fit so tightly in the holes as to be held from turning therein. As the disk revolves the point 52 of the pin traveling with it will trace a curved line on the card, and the length of such line will show whether the particular step or process has been carried out properly or improperly, while its position relatively to the center of the card will indicate the particular process. To accomplish this latter the carriers 51 must be of different lengths, the pin for each process having its carrier differing in length from the carriers on all the other pins of the set. This is indicated in Fig. 7, where the pin in the upper set has a much shorter carrier than the pin in the

lower set. If a certain process, such for instance as the second suds, or S^2 , Fig. 6, called for thirty minutes, and the corresponding pencil line on the record card showed less than a complete circle it would show that the attendant had shortened the period. Similarly, if a five-minute process should be recorded by a curve from the 5 index to the 25 index on the record card it would show plainly that the attendant had let the washer run for five minutes after the termination of the process, wasting time. Thus a check is kept on the work and on the attendant, the record showing not only whether the batch of work was treated in accordance with the formula, but if not wherein the treatment differed from that of the formula, and how much it differed.

Various changes or modifications in details of construction and arrangement may be made by those skilled in the art without departing from the spirit and scope of my invention as set forth in the annexed claims.

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

1. In apparatus of the class described, an outlet valve, opening means therefor, comprising a weight, a flexible connection between it and the valve, and a rotatable member coöperating with the connection, combined with a ratchet adapted to coöperate with said member, a pawl to engage the ratchet to restrain said member from weight-induced rotation when said member and the ratchet are in coöperation, a continuously rotating shaft and mechanism actuated by said rotating shaft to act upon and move the ratchet axially and cause it to release said rotatable member at a predetermined time, whereby such member is then free to rotate as the descent of the weight draws the flexible connection thereover.

2. In apparatus of the class described, in combination, an outlet valve, manually set means to open it automatically, including a weight and a flexible connection between it and the valve, a detent clutch normally restraining said means from operating, and including a member coöperating with said connection and rotated thereby when the clutch is rendered inoperative means including swinging triggers, to act upon the clutch and release said rotatable member, to permit it to be rotated by the action of the weight through the flexible connection and thereby render active the valve-opening means, a continuously revolving disk having a circular series of apertures, a tripping pin adapted to be placed in an aperture and brought by the revolution of said disk between and into engagement with and to trip the triggers, and a fixed index dial adjacent

and concentric with said disk to determine the aperture in which the pin is to be placed.

3. The combination, with a washer and its outlet valve, and a continuously rotating driving shaft for the washer, of valve-opening means adapted to be set manually, a detent device to restrain said means from operating to open the valve, said device including a member rotatable in one direction and movable axially into and out of operative position, and mechanism to act upon the detent device and cause it to release the valve-opening means after the lapse of a predetermined period, said mechanism including a circularly perforated disk revolving continuously at a slow speed, a speed reducing connection between said driving shaft and the disk, to revolve the latter at the desired rate of speed, a removable pin adapted to be inserted in the disk at different points adjacent its periphery and to effect axial movement of said member of the detent device into inoperative position when said pin reaches a fixed point in its path of movement, and a fixed index concentric with said disk and adjacent thereto.

4. The combination, with a washer and its outlet valve, and a continuously rotating driving shaft for the washer, of manually set means to open said valve automatically, a detent device to restrain said means from operating after the same has been set, including a two-part clutch one member of which is provided with ratchet teeth, and a pawl to prevent rotation thereof, mechanism to cause the separation of the clutch members and permit rotation of one of said members, to release said valve-opening means, said mechanism including a clutch-separating trigger, a fixed index dial, and a concentric and continuously rotated disk having a series of holes adjacent its periphery and beyond the dial, connections between the driving shaft and the disk to rotate the latter, a pin-rack, and a series of pins removably mounted therein and adapted to be placed one after another in sequence in holes in said disk at various points indicated by the dial, each pin when in the disk engaging and moving the trigger to separate the clutch members and thereby render

the detent device inoperative at the end of a predetermined period of time.

5. The combination, with a washer and its outlet valve, of manually set means to open said valve automatically, a detent device to restrain said means from operating after the same has been set, a disk continuously rotated at a fixed speed and provided with a circularly arranged series of holes, a set of tripping pins corresponding to different processes to which the work in the washer is to be subjected, said pins being adapted to be inserted one at a time in a hole in the disk, a fixed dial concentric with and adjacent the disk, to indicate the hole in which a pin is to be inserted, and means actuated by the pin to render the detent device inoperative, the pin in the disk acting upon such means to cause the detent device to release the valve-opening means when said pin has traversed a predetermined arc due to revolution of the disk.

6. The combination, with a washer and its outlet valve and a driving shaft for the washer, of manually set means to open said valve automatically, a detent device to restrain said means from operating after the same has been set, said device including a rotatably and axially movable member, a disk continuously rotated at a fixed speed and provided with a circularly arranged series of holes, and a driving shaft for the washer, a fixed dial concentric with and adjacent the disk but within the series of holes therein, and means to render the detent device inoperative, said means including a pin adapted to be inserted in one of the holes in the disk, and a trigger operatively connected with said member of the detent device and arranged in the path of and to be tripped by the pin when the latter reaches a certain point due to revolution of the disk, to effect axial movement of said detent member to inoperative position, the indices on the dial determining the starting point of the movement of the pin with the disk.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

ROBT. N. WEST.

Witnesses:

JOHN C. EDWARDS,
LOUIS C. SMITH.

It is hereby certified that in Letters Patent No. 1,031,405, granted July 2, 1912, upon the application of Robert N. West, of Winthrop, Massachusetts, for an improvement in "Automatic Mechanism for Opening Outlet-Valves," an error appears requiring correction as follows: Page 5, lines 85-86, strike out the words "and a driving shaft for the washer," and insert the words *a speed-reducing connection between said shaft and the disk, to rotate the latter;* and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 6th day of August, A. D., 1912.

[SEAL.]

C. C. BILLINGS,
Acting Commissioner of Patents.