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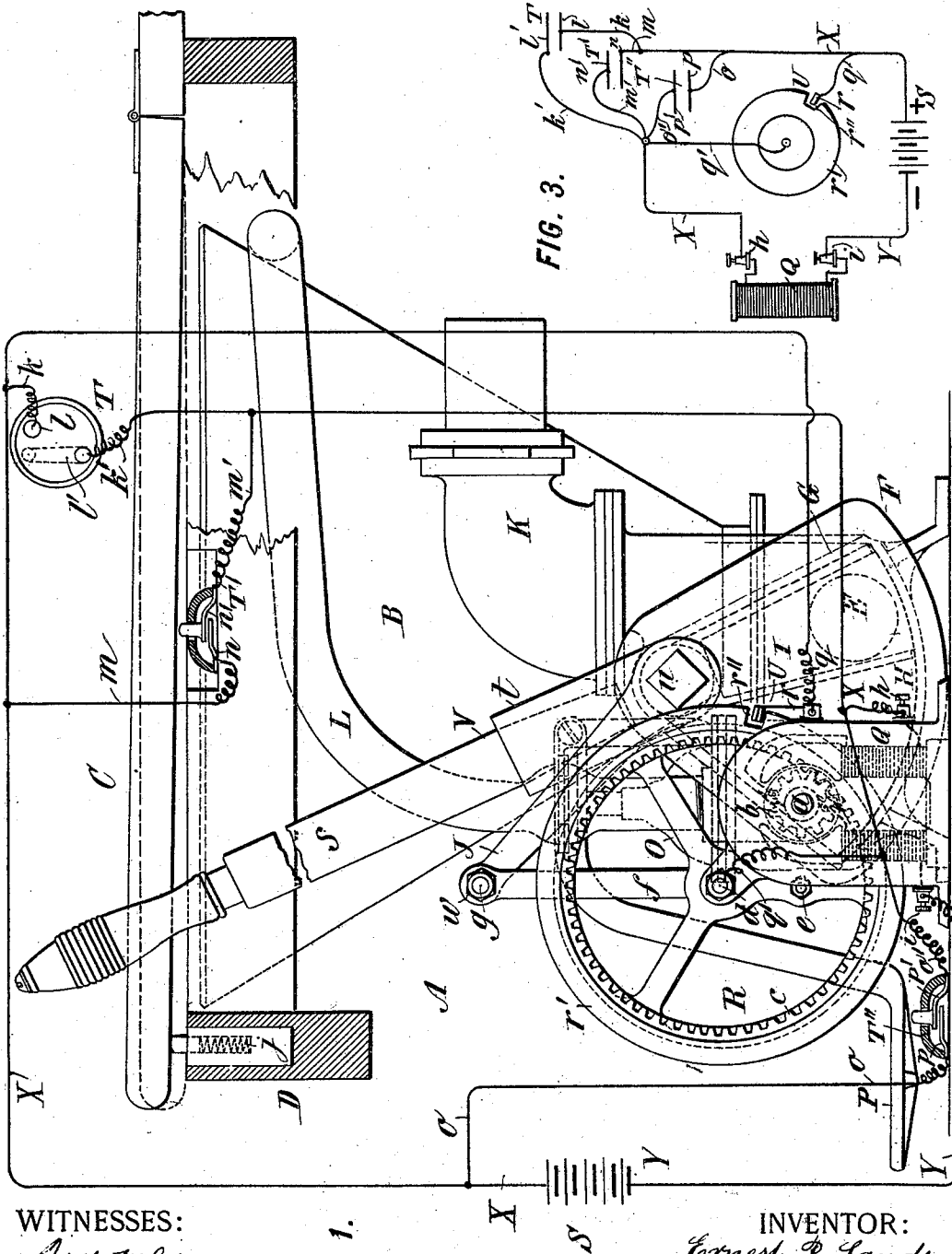
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MEANS FOR OPERATING WATER CLOSETS OR THE LIKE.

(Application filed Jan. 3, 1898. Renewed July 10, 1901.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES:

*Fred White*  
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FIG. 1.

INVENTOR:

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# UNITED STATES PATENT OFFICE.

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## MEANS FOR OPERATING WATER-CLOSETS OR THE LIKE.

SPECIFICATION forming part of Letters Patent No. 689,915, dated December 31, 1901.

Application filed January 3, 1896. Renewed July 10, 1901. Serial No. 67,812. (No model.)

*To all whom it may concern:*

Be it known that I, ERNEST P. SANDS, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Means for Operating Water-Closets or the Like, of which the following is a specification.

This invention relates to water-closets and analogous sanitary devices which require to be operated either for discharging the soil therefrom or for supplying flushing-water thereto, or both, and aims to provide improved means for operating such devices.

The invention is especially applicable to discharging and flushing water-closets, particularly ships' closets, with reference to which the invention will be described.

Heretofore a lever or handle to be operated by the user has been relied on for the flushing and discharge of ships' closets. In such closets particularly several operations of such handle are desirable to thoroughly empty and flush the closet, and in practice it is sometimes found that these operations are imperfectly performed by the user of the closet, which renders it necessary that the occasional attention of an attendant be given to keep the closet in proper condition.

My invention aims to provide improved means whereby the closets can be operated with facility without the exercise of strength or force on the part of the user, and preferably automatically and to a precise extent when used. To this end in carrying out the invention I provide a suitable motor having the requisite power for effecting a number of operations of the closet, preferably using an electromotor, a suitable source of power—as, for example, a storage battery or electric generator—for this motor, a suitable connection between such motor and the operating parts of the closet for applying the power of the motor to these parts to cause them to operate, connecting by preference both the discharging and the flushing apparatus to the motor in such manner as to operate each therefrom, suitable means for throwing the motor into operation, such means preferably adapted to operate at will and also operating automatically incident to the use of the closet, and suitable means for terminating the operation of the closet at predetermined or desired periods

or points in its operation, and preferably, also, separable means whereby the closet can be operated manually if circumstances render this necessary.

While my invention can be applied to various constructions of apparatus, I will describe it as applied to a ship's water-closet and in the form in which an electric motor with a generator and switches is employed.

In the accompanying drawings, which show the preferred form of the invention, Figure 1 is a fragmentary side elevation of a ship's water-closet provided with my improvements. Fig. 2 is a fragmentary front elevation thereof, and Fig. 3 is a diagrammatic view showing the electric circuits.

Referring to the drawings, let A indicate a water-closet; B, the bowl thereof; C, the seat thereof; E, the discharge-pipe therefrom; F, the pump; G, the soil-pump or side thereof into which the discharge-pipe E opens; H, the water or flushing side thereof from which water is fed to flush the closet; I, the plunger of the pump; J, the operating-lever thereof; K, the soil-discharge pipe; L, the flushing-pipe; M, the water-pipe; N, an air-relief pipe; O, an air and water valve, and P the operating-treadle therefor. These parts may be of any usual or suitable construction and operation, those shown being taken as one example of a sanitary apparatus to which my present improvements are especially applicable. In the construction shown the seat is a hinged seat, carried by a seat-frame D. The pump F is a combined soil-discharge and flushing-water pump, having an oscillating plunger I swinging on the axis of a spindle *u*, the plunger dividing the interior of the pump into two chambers, the soil-chamber or pump G and the flushing chamber or pump H. The plunger I in its normal position rests opposite and closes the soil-outlet E from the bowl. The soil-discharge pipe K leads from the pump G to the ocean or to any other suitable place of discharge in a ship's closet, usually to a point below the water-level. The water-pipe M leads from a source of flushing-water—as, for example, from below the water-level of the ocean in a ship's closet—and supplies water to the flushing-pump H, from which the water as discharged passes through the flushing-pipe L into the bowl B to flush

the latter. The valve O may be any suitable valve for preventing a flow of water through the pipe M to the pump, except when desired, and for relieving the suction when the flushing-pump is operated without a supply of flushing-water, in which case the valve may permit an inflow of air to the pump through the air-pipe N, according to any well-known method of operation for this purpose. The treadle P is disposed near the floor, where it can be conveniently depressed by the foot of the user of the closet, and its purpose is to operate the valve O to close off the air-pipe N and permit a flow of water from the pipe M to the flushing-pump. In ordinary use heretofore such closets have been operated by the user, who has placed his foot on the treadle P and then manipulated the pump manually by a handle fixed thereto, thus simultaneously emptying and flushing the closet. Should the user neglect to depress the treadle or be ignorant of the desirability thereof, the relief-valve would permit the manual operation of the pump and the closet would be emptied, but not flushed.

According to my present invention I provide improved means for operating the closet, which I will now describe in detail in their preferred form as applied to the closet shown. These improvements preferably comprise a motor Q, capable of operating the closet, a connection R between this motor and the operating parts of the closet, means S for energizing the motor, controlling provisions T for throwing the latter into operation, means U for terminating the operation of the motor, and separable provision V, permitting manual operation of the closet when desired. These parts may be of any suitable character, construction, or method of operation; but I prefer to employ for these several features the parts, construction, and arrangement which I will now describe in detail.

The motor Q may be any suitable engine or motor for driving the operating mechanism of the closet, and the connection R may be any suitable connection by which the driving effect of the motor is communicated or applied to the closet. Preferably the motor is an electric motor having a rotative armature-shaft *a*, carrying a toothed pinion *b*, which rotates with considerable speed while the motor is driven, and the connection R consists of a spur-gear *c*, preferably having internal teeth meshing with the pinion *b* and driven thereby, mounted to rotate on a fixed stud *d* and having a crank-pin or equivalent provision *e*, by which it is connected through a link *f* with a pin *g* near the end of the operating-lever J. As the gear is driven by the pinion its crank-pin passes through a circular path, in traveling which its motion is communicated to the lever J by the link *f* in such manner as to oscillate the lever and throw the plunger from one extreme position to the reverse extreme position and back. The crank-pin and lever are preferably connected, so

that at one point, which will be termed the "inactive" position of the apparatus, the plunger I of the pump will be opposite and close the outlet E of the bowl, so that while inactive communication between the pump and bowl will be closed. The inactive point of the crank-pin in the construction shown is its point of extreme depression, in which the axes of the crank-pin stud *d* and lever-pin *g* are in alinement. Movement of the gear *c* in either direction from this point will swing the lever rearwardly, causing the pump-plunger to move toward the flushing side of the pump, thus creating a suction in the soil-pump and filling the latter with soil from the closet and simultaneously discharging the water from the flushing-pump into the bowl, this operation continuing until the end of the oscillation of the pump in that direction, when the continued motion of the crank-pin will reverse the oscillation, and the contents of the soil-chamber will be discharged and the flushing-chamber again filled with flushing-water by the reverse movement of the pump-plunger.

When an electromotor Q is employed, any suitable generator for energizing the motor may be utilized, and the motor itself will be of a character adapted to the current supplied by such generator. In vessels particularly it is usual to employ either a storage battery or a small dynamo for operating the incandescent or other lights required through the vessel, and in such cases the motor can be fed from such generator without other special provisions. For the sake of simplicity I have shown diagrammatically a battery S as the means for energizing the motor, the circuit connections between the battery and motor comprising a positive wire X and a negative wire Y. The wire X leads to and is connected with the binding-post *h* of the motor, and the wire Y leads to and is connected with the binding-post *i* thereof. While the circuit between the battery and motor is closed the motor is continuously driven and the closet continuously operated, and upon breaking the circuit the motor becomes inactive and operation of the closet ceases.

Any suitable provisions for controlling the operation of the motor either manually or automatically may be employed. I prefer to use one or more switches for this purpose, one (lettered T) being a manual or hand switch suitably disposed where most convenient for operation by the hand of the user of the closet, and the others being suitably disposed at such places or points as will necessitate their automatic operation prior to, during, or after the use of the closet, as desired. Two automatic switches are shown, one (lettered T') being disposed on the seat-frame under or adjacent to the seat C and closed by the depression of the latter against its spring-riser *j*, when a person sits on the seat, and the other (lettered T'') being disposed under or adjacent to the treadle P of the valve O or otherwise

suitably combined with this flushing-valve, so that it will be operated automatically with the operation of the valve. These three switches are so disposed in the line that closing of either of them will close the circuit and cause the operation of the motor so long as any of the switches are closed. The hand-switch T is a passive switch, which will ordinarily stand open, but when closed will remain closed until again opened by hand, while the automatic switches T' and T'' are spring-switches, which will automatically open and break the circuit as soon as released. These switches are preferably all placed in the wire X, which for this purpose has a branch *k*, leading to the contact *l* of the switch T, and a branch *k'*, leading from the spring *l'* thereof; also, a branch *m*, leading to the contact-point *n* of the switch T', and a branch *m'*, leading from the contact-spring *n'*, and also a branch *o*, leading to the contact *p* of the switch T'', and a branch *o'*, leading from the contact-spring *p'* thereof back to the line.

As either of the automatic switches may be opened at any period of the operation of the closet and as it is desirable that the operation thereof should in any event continue throughout a predetermined period and is preferable that it should always be arrested at the one point in the sequence of operations of the closet, my invention provides means for continuing the operation of the closet through one pumping and discharge action and for automatically terminating it at the position of rest of the parts should the user have failed to have employed the hand-switch T or should he open the latter switch at other than the time at which the parts are in this position. These means are preferably an additional switch U, automatically operated by the moving parts of the closet, closing the circuit when these parts leave and preserving the circuit closed until these parts reach certain predetermined positions. The switch U, I prefer to construct for the one part in a branch *q*, leading from the wire X to a contact-spring *r*, fixed to any suitable point—as, for example, the casing of the motor Q—and for the other part of a movable and preferably circular contact-piece *r'*, having an interrupter or notch *r''* at one point and a continuous conducting contact-surface throughout the remainder of its substantially annular face, which contact-ring makes electrical connection with the spring *r* and is connected by the branch *q'* with the wire X beyond the switch. The ring *r'* is preferably carried on the rim of the gear *c*, and its interrupting-notch *r''* is disposed to break the circuit through the switch by coming opposite the spring *r* at the instant that the parts reach the position of rest shown in Fig. 1 and to close the circuit through the switch immediately the parts leave this position and keep it closed until they again reach this position. Thus should any other switches be closed even for an instant the switch U will necessitate one com-

plete revolution of the gear *c* before permitting the motor to discontinue operation, and when permitting such discontinuation the parts will be stopped at the desired position.

To provide for manual operation of the closet, my invention comprises an alternative operating provision V, which preferably consists of an elongated hand-lever *s*, separably seated in a socket *t*, fixed to the spindle *u*. By oscillating this lever the pump can be worked by hand, if desired, and by lifting this lever out of the socket-piece the automatic operation can proceed independently of manual manipulation. If automatic operation is not required, the hand-lever can be used and the motor separated from the closet by unscrewing the nut *w* and removing the stud *g*, so that the link *f* is disconnected from the lever J. This or any other suitable separable connection whereby the automatic mechanism or the manual provision for operation of the closet can be used alternatively or in conjunction is desirable.

In operation should the user neglect to turn on the switch T the automatic switch T' will throw the closet into operation while the user is on the seat. If the user depresses the foot-treadle P, the closet will operate independently of the other provisions, and thus it will be emptied as rapidly as supplied with flushing-water. In cases where the flushing-water is taken from below the water-level this is important as a security against flooding of the closet, as by my invention no flushing-water can pass to the bowl except while the pump is operated to discharge the latter. Should the user neglect to operate the pump-valve, the flushing will be omitted, but the soil will be discharged by the pump and the closet be left clean. If any person closes and neglects to open the hand-switch, the closet will simply continue to operate until this is corrected by the attendant or a subsequent user. Such operation will be harmless and will not be in any sense undesirable. To avoid unusual resistance to such continued operation, I employ in conjunction with my automatically-operated pump a relief-passage Z around the discharge-valve *v* of the flushing-pump. This passage consists of a pipe extending from the upper part of the flushing-pipe L to the air-pipe N and avoids the vacuum incident to the action of the flushing-pump, which would occur if the water or feed valve S' cannot supply water to the pump by reason of failure to permit a flow of water through the pipe M, due to the closing of the valve *q''*, incident to the elevated position of the treadle P. The hand-lever V will generally be uncoupled or rendered inoperative relatively to the pump, so that it will not have to participate in all the movements of the latter; but it will be conveniently placed, so that at any time it can be employed should the motor or the source of power fail or be insufficient to overcome any unusual resistance to operation of the closet.

It will be seen that my invention provides improvements which can be conveniently and advantageously availed of for operating closets, either for discharging or emptying them, or for flushing them, or for inaugurating or terminating either of these operations, and it will be understood that the invention is not limited to the particular use or adaptation shown and described as constituting its preferred form, but that it can be employed for any analogous modification, as circumstances or the judgment of those skilled in the art may suggest, without departing from the spirit of the invention.

When automatic controllers or switches are employed for starting or terminating the operation of the closet, it will be understood that they can be so disposed as to be operated by any part necessarily moved precedent or subsequent to the use of the closet or analogous device, many such parts being commonly employed and all being equally available for this purpose.

I do not claim herein the construction of the pump shown, which is claimed in the companion application filed by myself and John Corcoran December 21, 1895, Serial No. 572,868, for certain improvements in pumps and valves for ship and other closets jointly invented by us.

What I claim is, in means for operating water-closets and analogous devices, the following-defined novel features and combinations, substantially as hereinbefore set forth, namely:

1. The combination with a pump water-closet the pump of which has a plunger which in one position closes the passage from the bowl, of a motor for driving the pump thereof, and controlling means for said motor adapted when the motor is started to stop it at the end of a predetermined succession of movements and in a determined position and at the point of its operation at which the pump-plunger is opposite said passage.

2. The combination with a pump water-closet the pump of which has a plunger which in one position closes the soil-passage from the bowl, of a motor for driving such pump, and controlling means for said motor adapted when it is started to insure its stoppage with the pump-plunger in the position closing said soil-passage.

3. The combination with a pump water-closet the pump of which has a plunger which in one position closes the passage from the bowl, of an electromotor for driving the pump thereof, a switch controlling the operation of said motor, and means driven by said motor for operating said switch to stop the motor at

the end of a prescribed cycle of movements and when the pump-plunger is opposite said passage.

4. The combination with a pump water-closet of an electromotor for driving its pump, the circuit feeding said motor, a switch in connection with said circuit by the closing of which to start the motor, and an automatic switch normally open, connected to the motor to be closed upon the starting thereof, and adapted to maintain the circuit closed until the end of a prescribed movement of the motor, and thereupon to break the circuit and stop the motor.

5. For operating a water-closet, the combination with the operative mechanism thereof, of an electromotor connected to and operating such mechanism, a switch controlling the energizing of such motor, and a second switch controlling the energizing thereof operating coincidentally with the operation of the closet, and terminating the operation of such motor at a predetermined period in the operation of the closet.

6. The combination with a water-closet, of a valve controlling the flushing operation, a motor for operating the closet, and means in connection with said valve for automatically starting said motor when the valve is operated.

7. The combination with a water-closet and its operating mechanism, of an electromotor for driving the latter, a switch for controlling the circuit feeding said motor, and means for controlling said switch comprising a wheel geared to said motor, said wheel having a provision adapted for engagement with said switch to break the circuit, whereby upon completion of a prescribed run of said motor the movement of said wheel brings said provision into coincidence with said switch and the motor is thereupon stopped.

8. The combination with a water-closet and its operating mechanism, of an electromotor for driving the latter, a wheel R geared to said motor, formed at one point with a notch  $r''$ , and a switch U adapted when in said notch to break the circuit, and when displaced therefrom to maintain the circuit closed, whereby after the starting of said wheel the circuit is kept closed and the motor running until said notch coincides with said switch and the motor is stopped.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ERNEST P. SANDS.

Witnesses:

J. HARRY CURTISS,  
LOUIS SANDS.