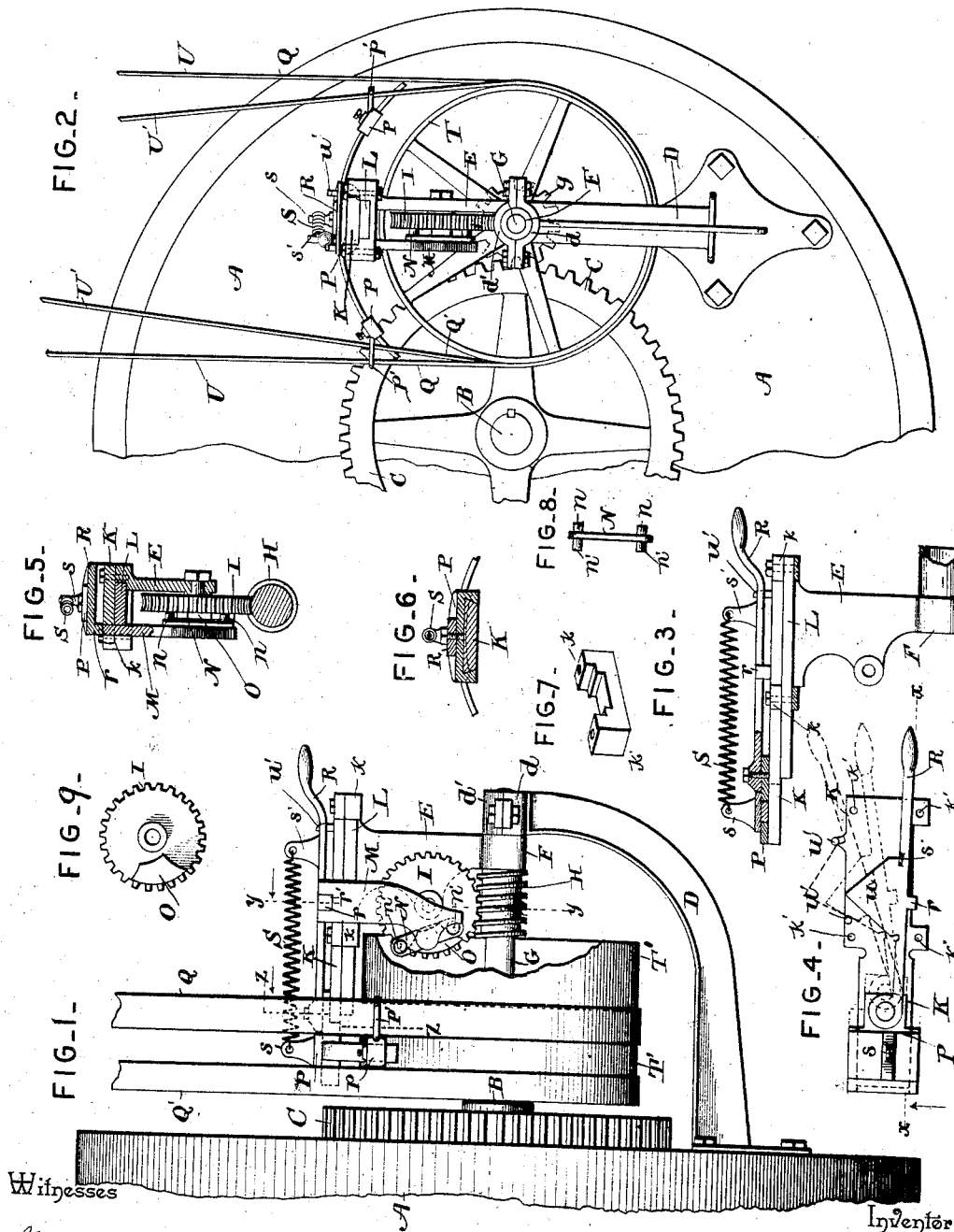


(No Model.)

E. G. SMITH.  
REVERSING GEAR.

No. 489,104.

Patented Jan. 3, 1893.



Witnesses

Inventor

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By his Attorneys,

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# UNITED STATES PATENT OFFICE.

ERNST G. SMITH, OF COLUMBIA, PENNSYLVANIA.

## REVERSING-GEAR.

SPECIFICATION forming part of Letters Patent No. 489,104, dated January 3, 1893.

Application filed April 29, 1892. Serial No. 431,169. (No model.)

*To all whom it may concern:*

Be it known that I, ERNST G. SMITH, a citizen of the United States, residing at Columbia, in the county of Lancaster and State of Pennsylvania, have invented certain new and useful Improvements in Reversing-Gears; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

The object of my invention is to provide a simple and direct gear which is automatically reversed at regular intervals to cause a reciprocation, oscillation, or vibration of a plunger, paddle-shaft or other device such as are used in churns, washing machines, &c.

Further objects and advantages of my invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings: Figure 1 is a front view of gear-reversing mechanism embodying my invention; Fig. 2 is a side view of the same; Fig. 3 is a transverse section on line  $x-x$  of Fig. 1; Fig. 4, showing the swiveled standard, the stop-lever and connected parts; Fig. 4 is a plan view of the slide, showing the stop-lever and indicating in dotted lines the position thereof when the belts are both held upon the loose pulleys; Fig. 5 is a section on line  $y-y$  of Fig. 1; Fig. 6 is a detail section, line  $z-z$  of Fig. 1. Fig. 7 is a detail view of one of the guides  $k$ ; Fig. 8 is an end view of the swivel. Fig. 9 is a detail view of the worm gear and cam O.

A in Figs. 1 and 2 represents a portion of the casing of a washing or other machine, to the main-shaft, B, of which is attached the gear, C.

D represents a supporting-arm, provided at its extremity with a bearing,  $d$ , having a removable cap,  $d'$ , and E represents a swiveled standard, provided at one end with a bearing-sleeve, F, which fits in the bearing at the end of the supporting-arm and is locked therein to hold said standard at any desired inclination by the cap,  $d'$ . This sleeve F forms the bearing for the outer end of the shaft, G, the inner end thereof being mounted in a suitable bearing, (not shown) in the side of the machine to which the reversing mechanism is attached. This shaft carries a pinion,

$g$  which meshes with the gear, C, and is also provided with a worm, H, which engages a worm-gear, I, mounted upon the standard E.

The outer end of the standard E is provided with a bearing plate, K, under which is a slide, L, being secured slidably thereto by the guides,  $k$ , which are in the form of clips, as shown in Fig. 7, and are bolted through perforations  $k'$  in the plate K, and extend under the slide L. This slide L is provided with a depending arm, M, which carries a swivel, N, provided with pins or studs,  $n$  in the path of a cam, O, upon the adjacent side of the worm-gear. This swivel is also provided with stops,  $n'$ , opposite to said pins or studs  $n$ , to engage the edge of the arm M to prevent complete rotation.

P represents a sliding-holder, provided with lateral arms,  $p$ , carrying belt-hooks,  $p'$ , to engage the belts Q Q', and to this holder is pivotally connected the locking-lever R which is provided with a lateral stud  $r$  to engage a notch  $r'$  in the upper end of the arm M of the slide L, said arm being extended vertically above the plane of the slide to lie in contact with said lever. The lever R is held in this engaged and normal position by the spring, S, which is connected at one end to a post  $s$  upon the holder P and at the other end to a similar post,  $s'$ , upon the lever R, a straight line connecting said points of connection of the spring lying upon that side of the pivotal point of the lever toward the notched arm, above described, whereby the arm is held in place. It will be understood that the holder P, which carries the belt hooks, slides upon the plate K, receiving its reciprocating motion from the slide L through the lever R which latter is pivotally connected to said holder, and therefore when said lever is locked with the slide L the holder P moves with the slide and lever, and when the lever is disengaged from the slide and held stationary by means hereinafter described, the holder and hence the belts remain stationary. T is the fixed pulley upon the main shaft, and T' T' are the loose pulleys, upon opposite sides of the fixed pulley.

U is a straight belt and U' is a crossed belt.

In operation, one of the belts being arranged upon the fixed pulley, the shaft is rotated, thereby operating the worm-gear and carry-

ing its cam around until it strikes one of the pins or studs upon the swivel. This moves the slide, and as the holder is connected thereto by the locking lever the belts are moved or shifted, thereby bringing the other belt upon the fixed pulley. This causes a reversal in the direction of operation of the shaft and hence of the gear, which carrying the cam in the opposite direction engages the pin or stud at the opposite end of the swivel, moves the slide in the opposite direction to that previously accomplished, and again shifts the belts.

The pins or studs for the engagement of the cam may be attached directly to the depending arm, but the above construction is preferable for the reason that more certainty of engagement is attained, and the parts are less liable to be strained or forced out of position.

When it is desired to stop the mechanism, the locking lever is disengaged from the slide and swung to the right, until its V-shaped projection, *u*, lies between the guide-pins *u'* which are attached to the bearing plate *k*, as above described. When in the position shown in dotted lines in Fig. 4, the belts are both held upon the loose pulleys, thereby stopping the operation of the mechanism. If, when the locking-lever is disengaged from the slide, its V-shaped projection is not in alignment with the space between said guide-pins one of its beveled edges will engage one of the pins as also shown in dotted lines in Fig. 4, and draw the lever and holder to the position in which the belts are upon the loose pulleys.

Having thus described my invention, what I claim and desire to secure by Letters Patent of the United States, is:

1. In a reversing-gear, the combination with a bearing plate, a sliding holder, a slide, a cam engaging the slide, and means to operate the cam, of a locking-lever pivotally-connected to the holder and having a stud to engage a notch in the slide, and a spring *S* connecting the free end of said lever to the holder, and arranged to hold the lever in or out of engagement with the slide, substantially as specified.

2. In a reversing-gear, the combination with a slidable holder a bearing plate, a slide having a depending arm and a notch *r'*, pins or

studs carried by said arm, a cam to engage said pins or studs, and means to operate the cam, of a spring-pressed locking-lever carrying a stud to engage the notch in the slide, substantially as specified.

3. In a reversing-gear, the combination of a bearing-plate provided with studs *u'*, a sliding holder, a slide, a cam, means to operate the cam, and a spring-pressed locking-lever pivotally connected to the holder and provided with a stud to engage a notch in the slide and a projection to engage said studs, substantially as specified.

4. In a reversing-gear, the combination with fixed and loose pulleys, oppositely running belts and a movable holder connected to the belts, of a slide mounted upon a bearing plate connected to said holder, a swivel mounted upon an arm of said slide and carrying pins or studs, a gear carrying a cam to engage said pins or studs and means to operate the gear, substantially as specified.

5. In a reversing gear, the combination with fixed and loose pulleys, oppositely-running belts, and a movable holder connected to the belts, of a slide mounted upon a bearing plate, a locking lever pivotally connected to the holder and normally engaging the slide, said lever being provided with a V-shaped projection, stationary guide-pins to engage said projections, as described, pins or studs carried by the slide, a cam, and means to operate the latter, substantially as specified.

6. In a reversing-gear, the combination with a holder a bearing plate, a slide, connections between the holder and slide, a rotary cam, and means to operate the same, of a pivoted swivel carried by the slide and provided with pins in the path of the cam, substantially as specified.

7. In a reversing-gear, the combination with a holder a bearing plate, a slide connected to the holder and provided with an arm, a rotary cam, and means to operate the cam, of a swivel pivotally mounted upon the arm of the slide and provided at each end with oppositely-extending pins, all substantially as and for the purpose specified.

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Witnesses:

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