

912,040.

2 SHEETS—SHEET 1.



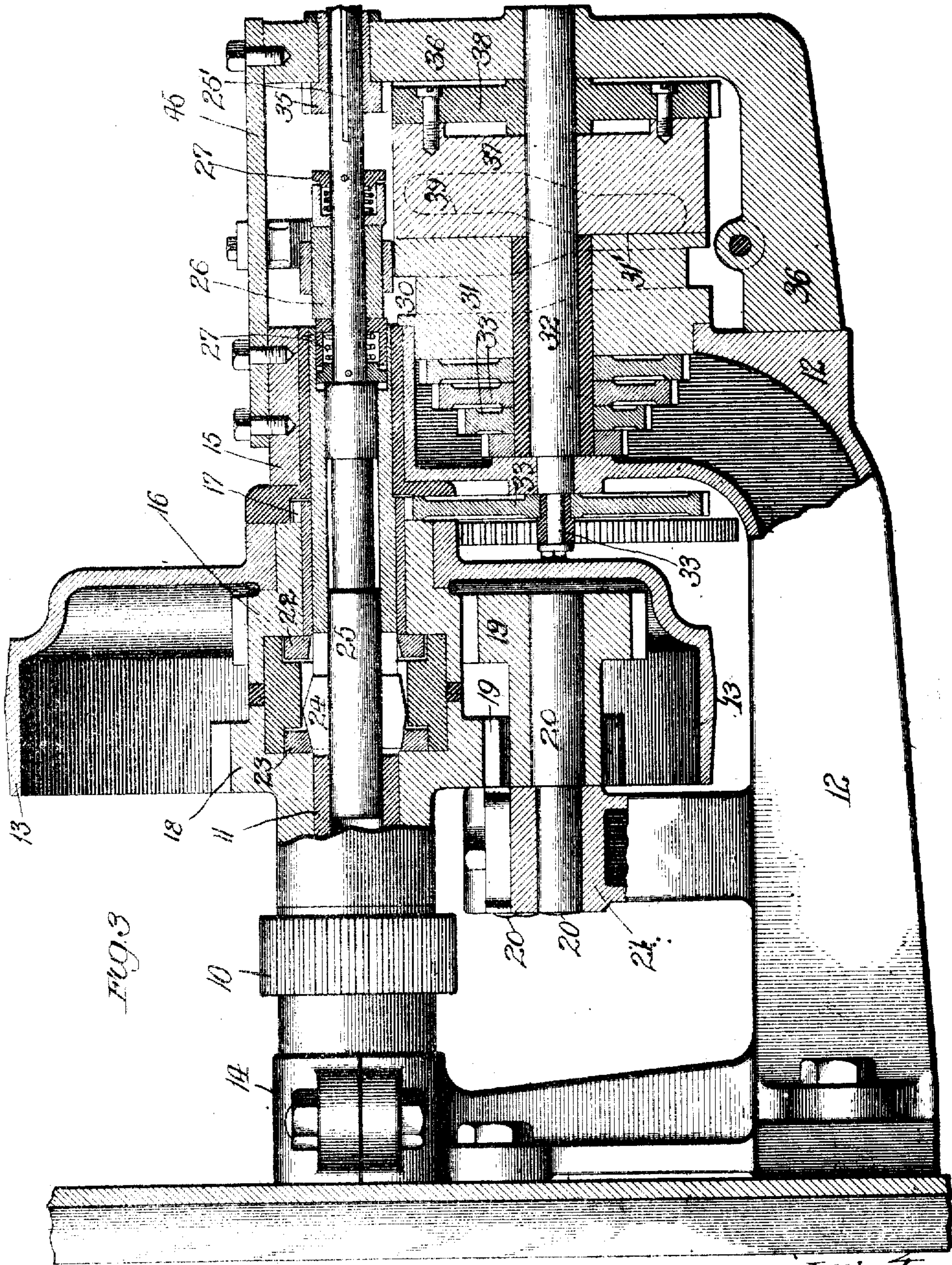
Inventor:
Frederick Snow

By *C. Hawley* *Att'y*

F. SNOW.
 ROTARY STOP MOTION.
 APPLICATION FILED SEPT. 8, 1902.

912,040.

Patented Feb. 9, 1909.
 2 SHEETS—SHEET 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

FREDERICK SNOW, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO
CONKLING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

ROTARY STOP-MOTION.

No. 912,040.

Specification of Letters Patent.

Patented Feb. 9, 1909.

Application filed September 8, 1902. Serial No. 122,533.

To all whom it may concern:

Be it known that I, FREDERICK SNOW, of Chicago, Cook county, Illinois, have invented a certain new, useful, and Improved Rotary Stop-Motion, of which the following is a specification.

My invention relates to automatic stop mechanisms intended for employment in connection with the driving and reversing mechanism of a rotary washing machine or the like.

The object of my invention is to provide a mechanism which shall operate to stop a washer cylinder before or in front of the door in its containing shell, and although my invention is capable of other uses, I shall herein describe same as used upon a washer.

Rotary washing machines which comprise a stationary water shell and a rotary washing cylinder are always provided with means for rotating the cylinder, first in one direction and then in the other direction; the frequent reversal of rotation and the dashing effect of the cylinder being chiefly relied upon to agitate the garments that are being washed and force the water through the same for the purpose of cleaning them.

The usual driving and reversing mechanisms are automatic in operation and can be stopped at any time, but not at a particular point or in a particular position. The shell and the cylinder are each provided with a door which must be opened in filling and emptying the cylinder. When the door in the shell is closed the cylinder cannot be seen and this coupled with the indeterminate rotation of the cylinder by the driving mechanism occasions much annoyance to the users of washing machines inasmuch as when the cylinder is stopped, its door may be opposite to or remote from the door in the shell and can only be brought into position to be opened by laboriously turning the cylinder by hand. As a washer must be opened frequently, it is evident that the annoyance is great and that much time is lost in the many hand operations of turning the cylinder so that its door may be opened.

The object of this invention is to provide means for stopping the cylinder of a washing machine or the like with its door opposite the door or opening in the washer shell or equivalent machine part.

Another object of the invention is to not only stop the cylinder at the right point,

but also practically lock the same so that it cannot be turned or the operating mechanism set into operation accidentally through the turning of the cylinder while it is being loaded.

The particular object of this invention is to provide a mechanism that will operate automatically in connection with the means that are normally employed for driving a cylinder or like part and which mechanism will automatically stop and place the cylinder door at the right place.

To this end my invention consists, broadly, in a washer cylinder and shell, or other moving or stationary parts, in combination with a cylinder driving shaft, suitable driving and reversing means for the normal automatic operation of said shaft and a cylinder and a positive stop device for placing the cylinder door opposite the door in the shell when the normal operation of the cylinder is stopped. And further, my invention consists in an automatic auxiliary reversing mechanism which, when the normal operation of the cylinder is interrupted will cause the immediate reversal of the cylinder and stop the same at once, or cause several quick reversals, to overcome the momentum of the cylinder and bring its door to rest in the proper position.

Further, and specifically, my invention consists in a machine element such as a washer cylinder and alternative driving means therefor, in combination with a stop mechanism having an actuating member movable with said element and adapted to cause frequent and diminishing alternations of said driving means, and thus bring said element to a stop at a certain point when the normal action of said means is interrupted.

My invention further consists in particular constructions and in combinations of parts, all as hereinafter described and particularly pointed out in the claims.

The invention will be more readily understood by reference to the accompanying drawings forming a part of this specification, and in which:

Figure 1 is an end view of a washing machine embodying my invention; Fig. 2 is a plan view of the washer; Fig. 3 is an enlarged vertical section of the cylinder driving and stopping mechanism; Fig. 4 is an enlarged detail of the device for operating

the cam pins; Fig. 5 is a top view thereof; and Fig. 6, is a sectional detail of the same on the line $x-x$ of Fig. 4.

As shown in the drawings, 2 represents the washer shell.

3 is one of the heads of the shell and 4 is the washer cylinder that rotates within the shell, having its trunnions, 5, suitably journaled in the heads, 3, of the shell. The shell is provided with a large door opening, 6, and the door, 7, while the cylinder is provided with a smaller door, 8. When the door, 8, is opposite the door, 7, it may be opened for the purpose of emptying or loading the cylinder with garments to be washed.

9 is the large cylinder driving gear which is driven by the pinion, 10, on the shaft, 11, of the driving and reversing mechanism. This driving and reversing mechanism is preferably arranged on the bracket, 12, that is bolted on the head, 3. The driving mechanism may be operated by an electric motor bolted on the head, 3, of the washer and operating continuously in one direction, but in most cases the driving mechanism is operated by a single belt running over the driving pulley, 13, of said mechanism.

Referring again to the bracket, 12, it will be noted that said bracket is provided with inner and outer bearings, 14 and 15, for the shaft, 11, between which the main driving pulley, 13, is arranged, said pulley being journaled on the shaft, 11. Two pinions are attached to the pulley 13, to-wit, the driver pinion, 16, and the reversing mechanism pinion, 17. These rotate with the belt pulley, 13. 18, is the second driver pinion which is connected with the pinion, 16, by means of the idler gears, 19, 19, that are arranged on two stud shafts, 20, 20, held in the arms, 21, of the bracket, 12. The pinions 16 and 18 operate continuously in opposite directions and both are driven by the single belt pulley, 13. Two clutches, 22 and 23, are provided between the shaft, 11, and the pinions 16 and 18, respectively, and 24 represents the clutch operating member, by means of which either driver or pinion 16—18 may be temporarily secured to the shaft, 11, to drive it in a corresponding direction. The washer cylinder may thus be driven first in one direction and then in the other, as required for the agitation of the garments contained in the cylinder. By this simple mechanism I am able to properly operate the washer cylinder from a single driving element,—in this case the pulley, 13, which operates continuously in one direction. The clutches are operated alternately by the shifting of the member, 24, which is done automatically. The part, 24, is arranged on the sliding rod, 25, which is longitudinally movable in the hollow shaft, 11, and rotates with said shaft, 24 also serving as a key connecting 11 and 25. The rod, 25,

extends out through the end of the shaft, 11, and is provided with the shifter block, 26 that is arranged between the cushions, 27, on the rod, 25, to take up the shock of the clutches.

28 is the shifting lever that is pivoted on a part of the bracket, 12, and has a yoke, 28' that engages pins, 26' on the block, 26, which latter is located on shaft 25. The shifting lever is provided with a cam pin, 29, that normally occupies the cam groove, 30, in the cam wheel 31, that is situated below the shaft, 25. The cam wheel is provided with two cam surfaces and in each revolution it throws the shifting lever, 28, in both directions to clutch, first the pinion 16, and then the pinion, 18, to the shaft, 11, and washer cylinder. The cam wheel, 31, is journaled on a stud shaft, 32, in the bracket, 12, and is positively and continuously driven in one direction by a train of gears comprising gears 33 and other gears (not shown) intermeshing therewith, which train connects the cam wheel 31 with pinion 17, on the belt pulley, 13 as shown. The speed of the cam wheel, 31, with relation to the belt pulley, 13, may be changed by altering the arrangement of the gears in the train, 33, by any suitable means (not shown) and in such manner the shifter, 28, may be timed to reverse the washer cylinder after each revolution, or after each second, third or fourth revolution in one direction.

The mechanism thus far described is such a one as may be employed for causing normal operations or alternations of the cylinder and is described and claimed in my application of even date herewith, entitled "Driving and reversing mechanism". The normal cylinder driving and reversing mechanism lends itself admirably to the use thereof of the preferred embodiment of the invention of this particular application, to-wit: my automatic stop mechanism or stop motion by which the operation of the normal operating mechanism is controlled and so manipulated as to stop the cylinder with its door, 8, opposite the door, 7, of the shell. The rod, 25, which, as before explained, rotates with the shaft, 11, is extended through a pinion, 35. The hub of the pinion, 35, is journaled in the extension, 36, of the bracket, 12, and the connection between the pinion, 35, and rod, 25, is made by means of a key in the pinion and a groove or key seat 25' in the rod or shaft, 25; that is, the pinion is held against longitudinal movement and the rod moves back and forth through it while turning the pinion. I prefer also to extend the stud shaft, 32, through the extension, 36, and on this I arrange the stop cam wheel, 37, that is provided with a gear wheel, 38, which meshes with the pinion, 35, and is driven back and forth according to the direction of rotation of the rod, 25, and shaft, 11. The

rotation between the gears, 35 and 38, is the same rate as exists between the pinion, 10, and the cylinder gear, 9, so that the movement of the cam wheel, 37, at all times corresponds to the movement of the cylinder, 4, as distinguished from the operation of the normal reversing cam wheel, 31, which, as here shown, always rotates in one direction. The cam wheel, 37, is provided with a groove, 39, that has a single cam surface or off-set. If desired the cam groove in the wheel, 37, need extend only part way round the wheel and in forming the cam wheel, 37, I prefer that one side of the cam groove, 39, shall be constituted by the side 31' of the wheel, 31. The shifting lever, 28, is provided with the second pin 40 to fit the groove, 39. It is not advisable or possible to use both pins at the same moment and to prevent their simultaneous use and as a means for their operation, I preferably join the pins by a lever, 41, having a handle, 42, and pivoted on the shifting lever, 28. For holding the lever, 41, in either of its positions I provide the pull spring, 43, between the lever 28 and the lever 41. The cam surface of the groove, 39, is so placed that when the pin, 40, is thrown in, the cam surface of groove, 39, will engage with the pin at the moment when the door, 8, of the cylinder is opposite the door of the washer shell. As the normal operation of the machine has been interrupted by the withdrawal of the normal cam pin, 29, this engagement of the stop pin and stop cam will result in throwing the rod, 25, and reversing the cylinder, providing the cylinder has sufficient momentum to operate through the shaft, 11, and the pinion, 35 and, during the time that the part 24 is free from both clutches, drive the cam 39 past the pin 40. Should this occur it is obvious that the rod will be fully thrown and the shaft, 11, will be instantly reversed by the operation of the clutch, and the cam wheel, 37, will be started back to immediately cause a return reversal of the cylinder. If in the first instance or in the second instance the momentum of the cylinder is not sufficient to drive the shaft, 11, and cam wheel, 37, while disengaged from the pulley, 13, it is obvious that the motion of the parts will be stopped as soon as the pin, 40, is taken into the middle of the cam, 39. At such time the rod, 25, will be in its middle position. In either case the shaft, 11, will be freed from the driving pulley and the cylinder door will be stopped opposite the door in the shell.

The friction of the cam and cam pin, 40, is sufficient to prevent the accidental partial rotation of the cylinder, 8, during the time that the cylinder is being emptied or filled, and it is obvious that so long as the pin is midway in the offset of the cam there can be no communication of the power of the belt pulley, 13, to the shaft, 11, as both

clutches, 22 and 23, are then free to operate loosely around the shaft. If by chance or intention the cylinder should be turned by hand while the parts are in this position, the result would be to throw on the power and drive the cylinder back to its "stopped" position. All danger of accident or injury to the operator is thus obviated. There is a moment during the shifting of the pins 29 and 40 of the lever, 41, when neither pin serves to hold the rod, 25, in the shaft, 11, and to take care of the rod at this time and maintain the clutch connection with the shaft, 11, until the moment of its opposite operation by one cam or the other, I preferably provide the spring bolt, 44, on the cross bar, 45, and provide the cam rise, 46, on the block, 26. The bolt is forced back when the block is in its middle position and drops down behind the rise, 46, when the block is thrown past it, after which the bolt serves to practically lock the clutch until it is again positively operated by one of the cams. This device also serves to relieve the sides of the cams from the back pressure or pull on the clutches, while the pins are working in the straight portion of the cam grooves.

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

1. A mechanism of the class described, comprising a machine element adapted to rotate more than a complete revolution in each direction, and alternately acting driving means, in combination with a stop mechanism, having an actuating member, that is movable with said element and which is adapted to cause in said element frequent and diminishing alternations of less than one revolution each by said driving means and to stop said element at a certain point, when the normal action of said driving means is interrupted, substantially as described.

2. In a mechanism of the class described, a machine element to be stopped at a predetermined point, and an operative normally alternating means adapted to cause one or more revolutions of said element in the two directions successively; in combination with auxiliary reversing means operatively interposed between said element and said normally operative means, and adapted to cause diminishing alternations of said element until said element is stopped at the desired point, substantially as described.

3. In a mechanism of the class described, a working element, and alternately acting driving means therefor, comprising main or normal and auxiliary reversing mechanisms governing said driving means and actuated by said driving means and said working element respectively, substantially as described.

4. In a mechanism of the class described,

a working element, and alternately acting driving means therefor comprising main or normal and auxiliary reversing mechanism governing the action of said driving means and actuated by said driving means and said working element respectively at different times, and means adapted to disconnect said main reversing mechanism from the driving means and connect the auxiliary reversing mechanism therewith to return and stop said element at a certain position or point of rest, substantially as described.

5. In a mechanism of the class described, a working element, in combination with a driver therefor, a main reversing mechanism adapted to impart alternations of various degrees to said working element, an auxiliary reversing mechanism adapted to impart frequent and diminishing alternations to said element and finally hold the same at rest, and means for setting either of said reversing mechanisms into operation, substantially as described.

6. In a mechanism of the class described, a rotary part, to be alternated and stopped at a predetermined point, in combination with an alternately acting driver therefor and means moving in time with said rotary part and actuated thereby to cause diminishing alternations thereof by said driver when the normal operation of said driver is interrupted, substantially as and for the purpose specified.

7. In a mechanism of the class described, a rotary element, in combination with a driving and reversing mechanism therefor, means operable to discontinue the normal action of said driving and reversing mechanism and means operable to cause diminishing reversals thereof, to stop said rotary element in a given position, substantially as described.

8. In a mechanism of the class described, a rotary element, in combination with means for driving the same, a reversing mechanism, and a stop mechanism adapted to be operated by said rotary element and cause frequent diminishing reversals of said driver, to stop said rotary element in a given position, substantially as described.

9. In a mechanism of the class described, a rotary element, and normally alternately acting driving and stop means adapted to cause one or more quick reversals of said element and stop the same in a given position, when the normal operation of said element is discontinued, substantially as described.

10. In a mechanism of the class described, a rotary element in combination with a driver therefor, a reversing mechanism and a quick reverse stopping cam coupled to said element and arranged to operate said reversing mechanism to cause frequent diminish-

ing alternations of said element, and stop the same, substantially as described.

11. In a mechanism of the class described, a rotary element, in combination with a driving shaft coupled thereto, drivers for rotating said shaft in opposite directions, a reversing mechanism driven constantly in one direction and an automatic stopping device driven by said shaft, substantially as described.

12. In a mechanism of the class described, a rotary element, in combination with a driving shaft coupled thereto, drivers for rotating said shaft in opposite directions, a reversing mechanism positively operated by one of said drivers and controlling the operation of said shaft and an automatic stopping mechanism driven by said element through the medium of said shaft, when the shaft is disconnected from said reversing mechanism, substantially as described.

13. In a mechanism of the class described, a rotary element to be stopped in a given position, in combination with driving and reversing mechanism, including a periodically operated shifter, and a stop cam, driven by said element and adapted to positively operate said shifter to stop said element at a given point or position, substantially as described.

14. In a mechanism of the class described, a frame, in combination with a rotary element, element driving and reversing mechanism, including reversing clutches and a clutch shifter periodically operated, and means driven by and with said element and adapted to arbitrarily operate said clutches to stop said element at a given point or position in said frame, substantially as described.

15. In a mechanism of the class described, a rotary element, in combination with a driven shaft coupled thereto, reversing clutches on said shaft, means for driving said clutches in opposite directions, a clutch shifter, normal operating means therefor, auxiliary clutch operating means, actuated by said element and a selective device for causing the operation of either of said means, substantially as described.

16. In a mechanism of the class described, a frame, in combination with a rotary element, mechanism for alternately driving said element, and means for simultaneously checking the normal operation of said element and causing first, the reversal, and then the stoppage thereof in a given position within said frame, substantially as described.

17. In a mechanism of the class described, a rotary element suitably supported, a driving shaft coupled thereto, a single driving pulley constantly operating in one direction, clutches rotatable in opposite directions by said pulley, a clutch shifter, a cam driven by said pulley for actuating said shifter peri-

odically, a stop cam coupled to said element through the medium of said shaft and means for connecting said stop cam to said shifter, to cause quick reversals and the stoppage of said element, substantially as and for the purpose specified.

18. In a mechanism of the class described, a rotary element, in combination with positively actuated alternately acting driving means therefor, means for interrupting the regular operation thereof, and a mechanism actuated by the momentum of said element and adapted to cause diminishing alternations of said element, substantially as described.

19. In a mechanism of the class described, a rotary element adapted for alternately acting rotation, and having a part to be placed or left in a given position when the element is stopped, in combination with alternative driving means, including a shifter, a stop cam actuated by said element and having a cam surface positioned with relation to the stopping point of said element and means for connecting said cam and shifter to first cause quick reversals of said element and thereafter stop the same substantially as described.

20. In a mechanism of the class described, a machine element and normally operative alternating means adapted to cause one or more revolutions of said element in the two directions successively, and said element being formed to be stopped at a predetermined point, in combination with auxiliary reversing means operatively interposed between said element and said normally operative means and adapted to cause frequent and diminishing alternations of said element until said element is stopped at the desired point, substantially as described.

21. In a mechanism of the class described, a machine element and the mounting thereof, in combination with the mechanism for alternately rotating said element, said mechanism having a shifting member, an automatic stop-cam alternatively rotated with said element and means for interrupting the regular operation of the alternatively rotating mechanism, causing the operation of said shifter by said element through the medium of said cam, whereby the element may be brought to a stop gently following several reversals thereof of diminishing duration, substantially as described.

22. In a mechanism of the class described, an element for alternate rotation, in combination with driving and reversing mechanism therefor, and means for stopping said element at a certain point, said means operating to cause diminishing alternations of the alternately rotated element, substantially as described.

23. In an automatic stop mechanism, a working element in combination with automatic normal driving means for rotating said element first in one direction and then the other, a cam connected with said element, and means for discontinuing the automatic action of said driving means and simultaneously connecting said cam with said driving means to cause diminishing alternations or oscillations of said element thereby, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two witnesses, this 2nd day of September, 1902.

FREDERICK SNOW.

Witnesses:

C. G. HAWLEY,
J. W. BECKSTROM.