No. 645,866. Patented Mar. 20, 1900.

J. W. MARTIN.

MECHANICAL MOVEMENT.

(Application filed Oct. 30, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

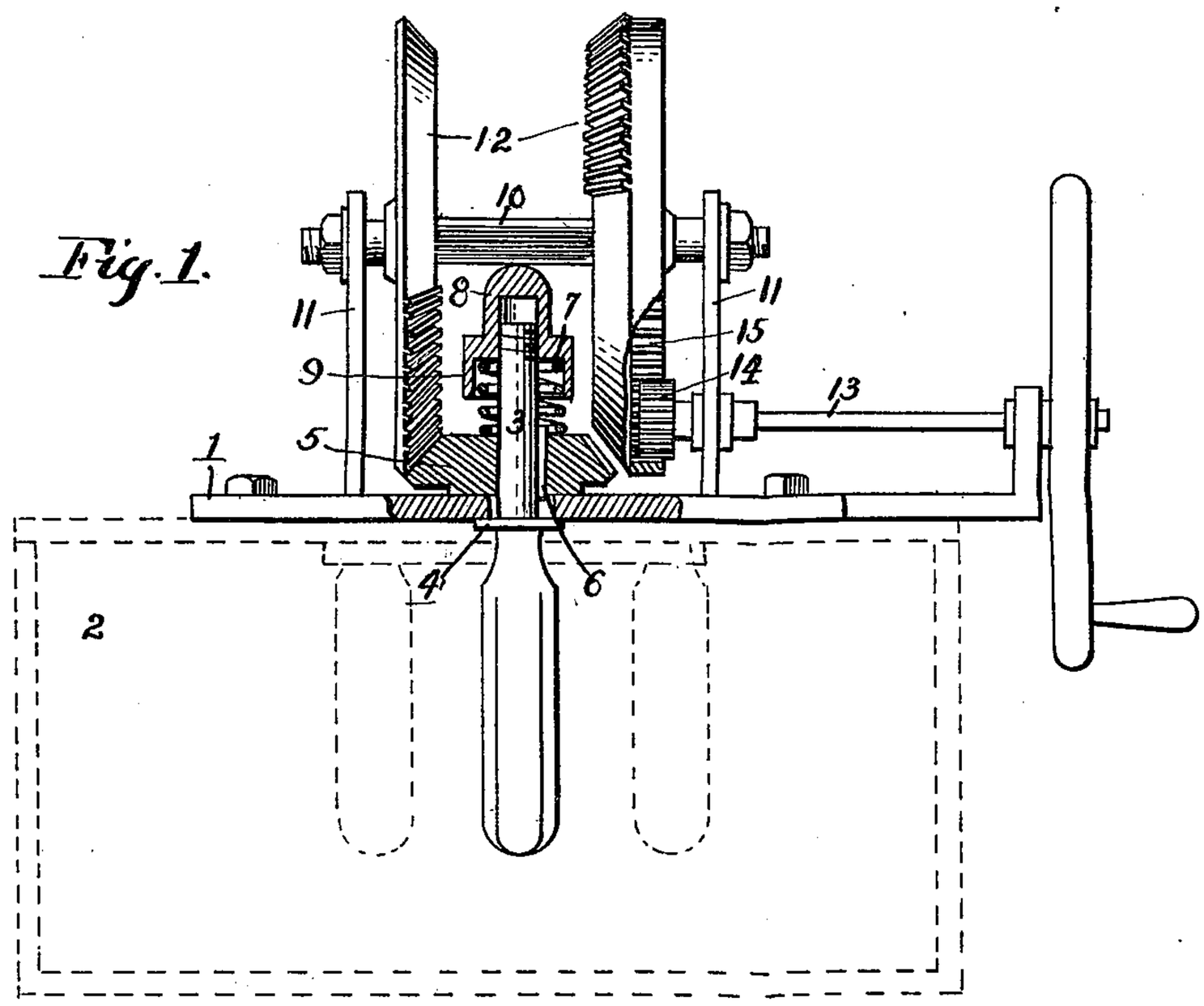

Fig. 2.

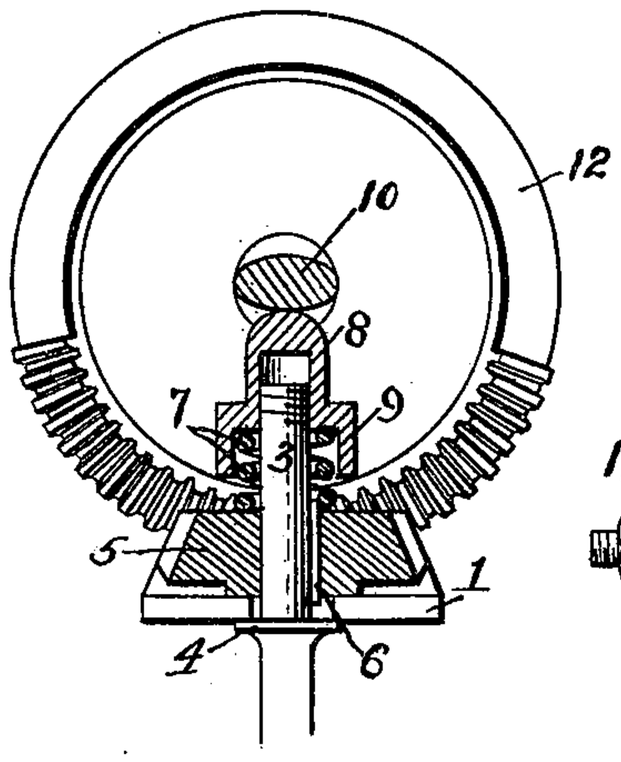

Fig. 3a.

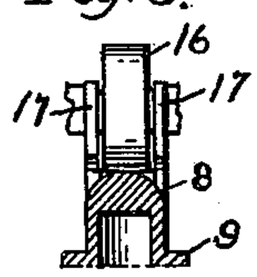

Fig. 3.

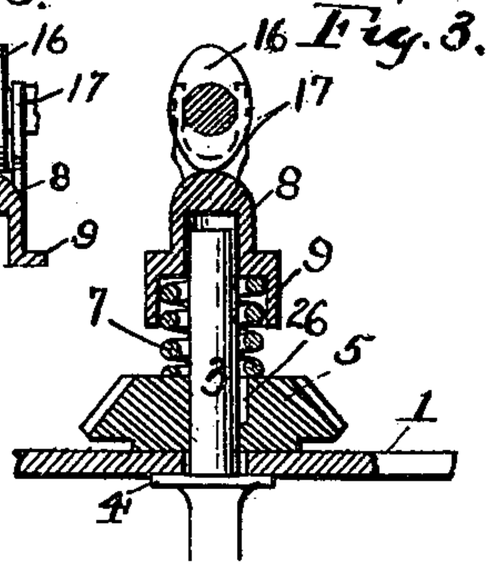

Fig. 4.

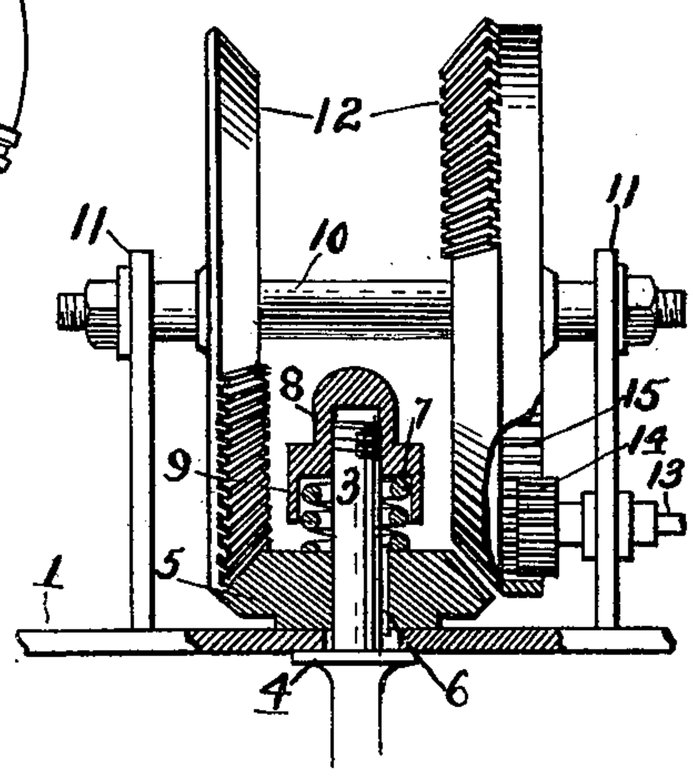

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Fig. 5.

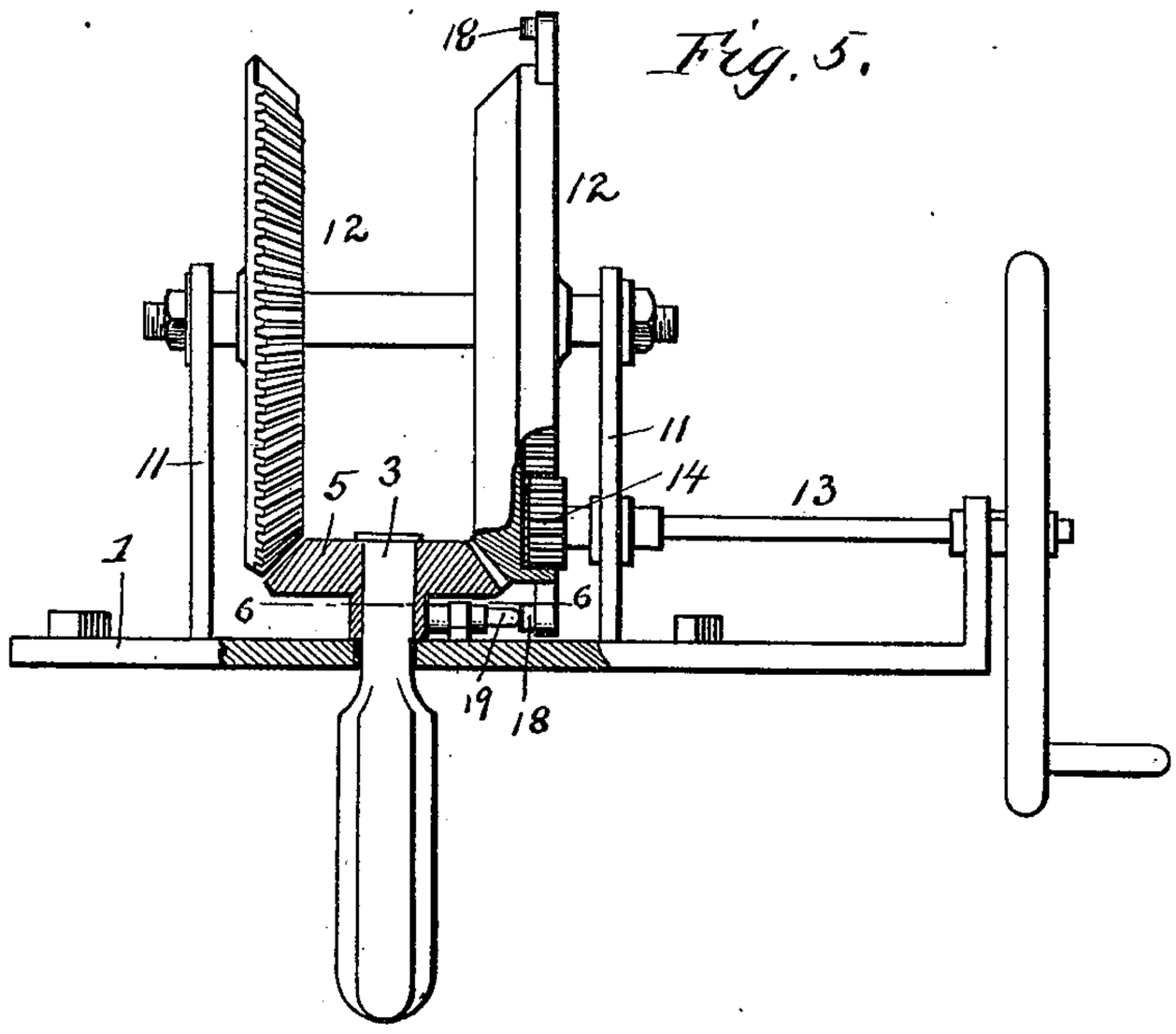
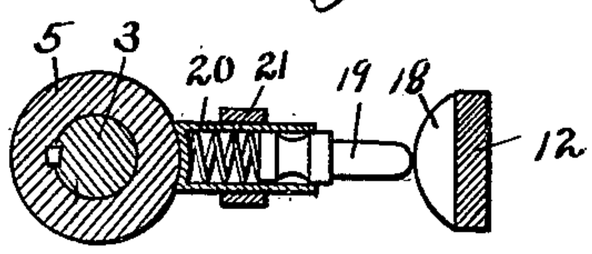


Fig. 6.



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UNITED STATES PATENT OFFICE.

JAMES W. MARTIN, OF OMAHA, NEBRASKA.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 645,866, dated March 20, 1900.

Application filed October 30, 1899. Serial No. 735,280. (No model.)

To all whom it may concern:

Be it known that I, JAMES W. MARTIN, a citizen of the United States, residing at Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in Gearing for Washing and other Machines, of which the following is a specification, reference being had therein to the accompanying drawings, in which—

Figure 1 is a vertical section of my invention, partly in side elevation and applied to a washing-machine; Fig. 2, a vertical section taken at right angles to Fig. 1; Fig. 3, a similar view showing a slightly-modified arrangement; Fig. 3ª, a detail side elevation, partly in section, of the upper part of Fig. 3; Fig. 4, a similar view to Fig. 1, showing the cap adjusted out of contact with the eccentric; and Figs. 5 and 6, sectional views of another modification.

This invention relates to that class of gearing for washing and other machines in which a vertical agitator-shaft or other driven shaft is rotated first in one direction and then in the opposite direction by the continuous rotation in one direction of a pair of mutilated gears alternately meshing with a gear on said shaft; and the special object of the present invention is to provide devices for automatically retarding the rotation of the agitator or other shaft as each set of gear-teeth leaves the pinion on said shaft, so that said pinion will come to a complete rest before the gear-teeth on the opposite drive-wheel commence their engagement with the pinion on the agitator or other shaft, whereby the teeth on the mutilated gears will always properly engage the gear on the agitator or other shaft, and thereby prevent injury to the parts and insure smooth operation of the machine.

Referring to the drawings by numerals, 1 designates the base-plate of the gearing, which plate is suitably fastened on top of the washing-machine body 2 and is provided with an opening for the passage of the agitator-shaft 3, this shaft being provided with a flange 4, abutting against the under side of plate 1, and a beveled pinion 5, bearing up against the upper side of said plate, this beveled pinion rotating with the shaft, but slidable thereon by reason of a spline-and-feather connection 6 or any other suitable connection.

Bearing upon the upper side of the pinion is a coil-spring 7, which surrounds the upper end of shaft 3 and whose tension is regulated by a cap 8, screwed on the upper end of shaft 3, this cap being preferably provided with a depending flange 9, partly inclosing the upper end of the spring. By reason of this spring device the pinion 5 is made to bear resiliently upon the base-plate 1, and thereby offer a resistance to the rotation of the agitator.

Keyed in the usual manner on a shaft 10, supported upon standards 11, rising from plate 1 on either side of the bevel-wheel 5, are two mutilated beveled gears 12, the geared portion of each being opposite the mutilated or blank portion of the opposite gear. These gears are rotated by means of a hand-operated shaft 13, suitably journaled and provided with a pinion 14, meshing with an internal gear 15, formed on one of the gears 12 on the side adjacent to the pinion 14.

The shaft 10, between the gears 12, is formed elliptical in cross-section, the longer axis of the ellipse being coincident with the spaces between the terminals of the toothed portions of said gears, and the cap is adjusted so as to normally bear upward against the shaft, whereby when the shaft is rotated the cap will be depressed twice with each revolution of the said shaft, the depressions occurring coincidently with the change of rotation in the direction of the pinion 5. In this manner the pinion is brought to a stop immediately after one gear releases it and before the other gear engages it, whereby accurate and smooth engagement is insured and injury from undue shock that would necessarily occur if the pinion were allowed to continue its rotation during the interval of changing from one gear to the other is avoided.

It is obvious that the pressure-cap may be adjusted to constantly bear up against the shaft, or it may be adjusted so as to contact only with the projecting portions thereof; but I prefer that it be adjusted so as to bear lightly against the shaft at all times, whereby noise and jar will be avoided.

It will be observed that the essential feature lies in bringing the pinion and driven shaft to a standstill during the interval of changing from one gear to the other and by

a resilient pressure. It is desirable that the pressure upon the pinion be removed as much as possible during its engagement with the driving-gears, since pressure at that time is objectionable because it increases the labor of operating the machine and the wear of the parts. By properly proportioning the parts it is obvious that the pressure upon the pinion while in engagement may consist simply of the weight of the driven shaft, the spring, and the cap, which will reduce the pressure practically to *nil*.

As shown in Figs. 3 and 3ª, I may secure on shaft 10 an eccentric 16 and upon the cap a pair of bifurcated guides 17, adapted to embrace the shaft and located one on either side of the eccentric, so that the cap will be depressed at each half-revolution of the shaft. The cap in this device is not attached to the shaft of the pinion, and the pinion is fastened rigidly to the shaft by key 26; but the shaft is preferably extended up into the spring to serve as a guide for the cap and spring. In this form of the device it will be observed that the action of the parts will be substantially the same as in Figs. 1 and 2, except that when the pinion is in engagement with the gears there will be no pressure whatever upon them. As shown in Fig. 4, the cap may be screwed down out of the way of the shaft 10, and said shaft 10 need not be provided with an eccentric or cam; but the objection to this arrangement is that unnecessary friction is produced by having the retarding pressure constantly in action, whereas it is only essential that it be in action during the interval between the change in engagement of the driving-gears.

It will be obvious that other modifications of my invention will be made without departing from the spirit thereof. It is also obvious that the invention is capable of use in connection with machines other than washing-machines—for instance, churns, ice-cream freezers, &c. Hence I do not wish to be confined in respect of the use or application of the invention.

In the modification shown in Figs. 5 and 6 one of the gears 12 is provided with a pair of inward-extending cam-lugs 18, one at each end of the series of gear-teeth thereon. These lugs are adapted to alternately strike a pin 19, inclosed in a slidable tube 20, mounted on the base-plate 1, and force said tube inward against the hub of pinion 5, a spring 21 being inclosed between the inner end of pin 19 and the inner closed end of said tube, whereby said tube is normally pressed inward lightly against the hub of the pinion. It will be observed that the lugs 18 will actuate the pin at the moment of the change of gears and by resilient pressure on pinion 5 bring said pinion and its shaft (which is rigidly attached to it) to a standstill and release the same before the opposite gear comes into mesh.

I claim—

1. The combination of a support, a driven shaft carrying a pinion, a pair of gears adapted to alternately engage said pinion and rotate it in opposite directions, a holding device, and means for operating said device automatically, whereby the pinion is brought to rest and held at rest just before the gears in turn come into engagement with it.

2. The combination of a support, a driven shaft carrying a pinion, a pair of gears adapted to engage said pinion alternately and rotate it in opposite directions, a frictional holding device, and means for automatically operating said frictional holding device as each gear in turn releases the pinion, whereby the pinion is brought to rest and held at rest previous to each engagement of the gears.

3. A reversing mechanism, comprising a support, a driven shaft carrying a pinion, a driving-shaft provided with gears adapted to alternately engage said pinion and rotate it in opposite directions, a spring-actuated, frictional holding device engaging said pinion, and a pressure device engaging said holding device and adapted to actuate it as each gear in turn releases the pinion, whereby the pinion will be arrested and held against rotation until each gear in turn engages it.

In testimony whereof I hereunto affix my signature, in the presence of two witnesses, this 14th day of October, 1899.

JAMES W. MARTIN.

Witnesses:

OTIS D. FISHER,

ARTHUR STURGES.