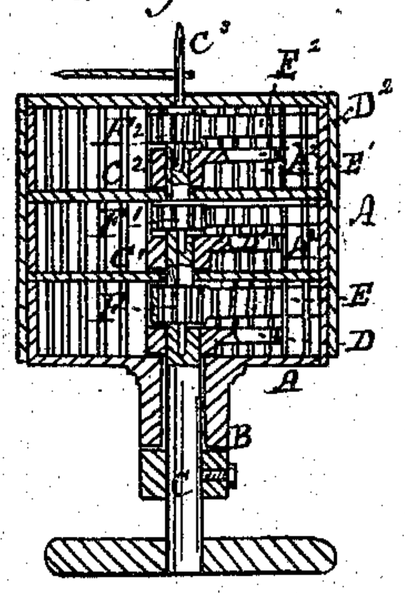
W. F. Goodwin.

Mechanical Movement.

No. 75676 Patented Mar. 17, 1868.

Fig. 2.



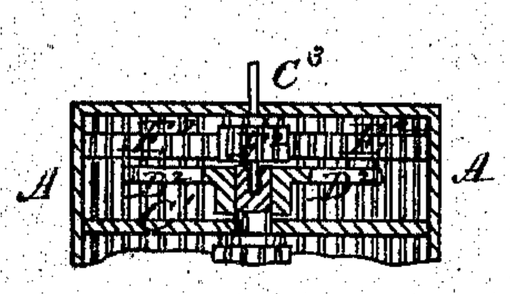


Fig. 4.

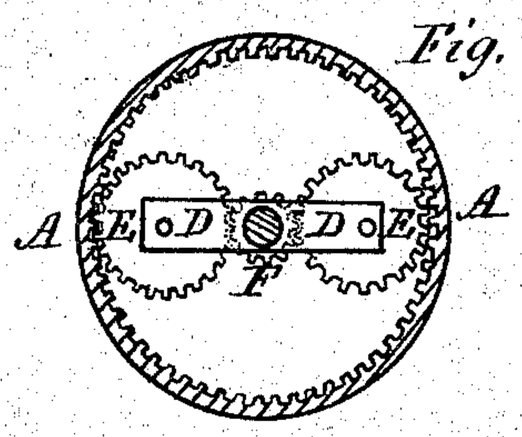
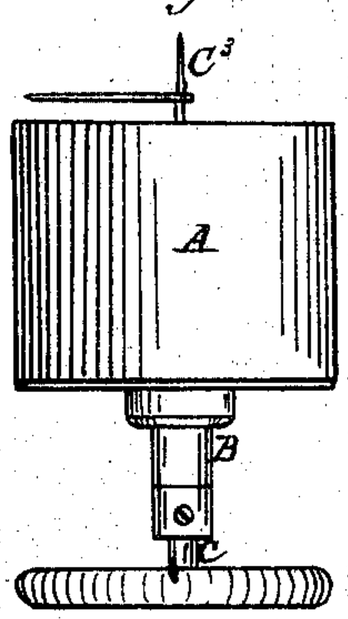


Fig. 1.



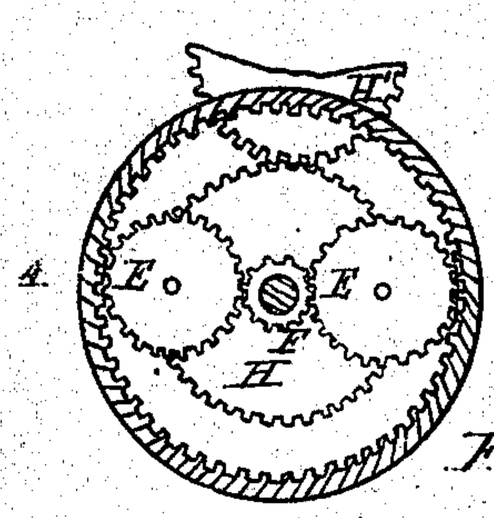


Fig. 5.

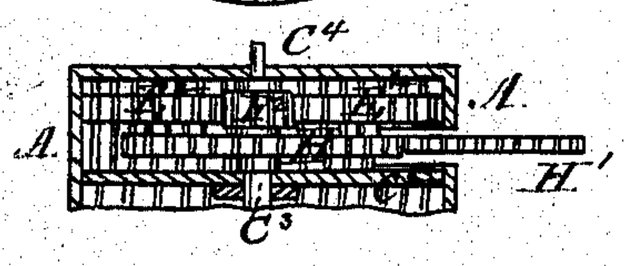
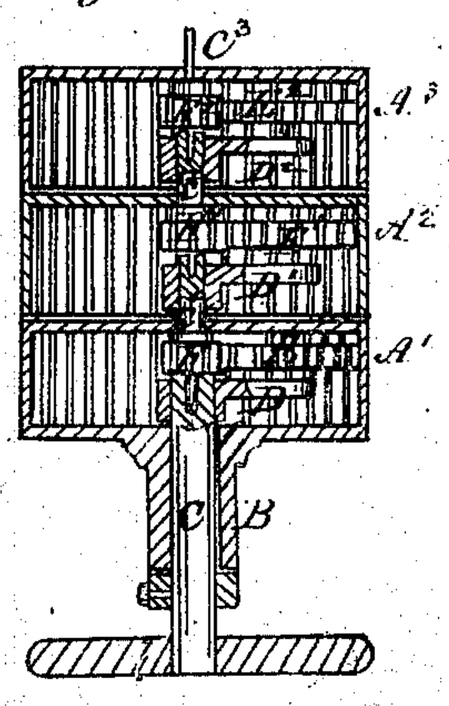


Fig. 3.



Witnesses
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WILLIAM F. GOODWIN, OF EAST NEW YORK, N. Y.

Letters Patent No. 75,676, *dated March* 17, 1868.

IMPROVEMENT IN MECHANICAL MOVEMENT.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, WILLIAM F. GOODWIN, of East New York, county of Kings, and State of New York, have invented a new and useful Improvement in Mechanical Movements for Multiplying and Transmitting Motion and Power, to be used for waters, clocks, and for all other purposes where motion is required to be multiplied for converting power into speed or speed into power; and I hereby declare the following to be a full description of the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 represents an outside view of one form of a case or drum in which my improved mechanical movement may be arranged and operated.

Figure 2 is a vertical section through the same, showing the arrangement of mechanism within the drum.

Figure 3 is a similar section through the same apparatus, showing the drum composed of separate apartments or sections, arranged to operate together.

Figure 4 shows a vertical and also a transverse section of the same parts of the apparatus, showing two intermediate transmitting-wheels, mounted one at each end on one arm, and meshing with the same pinion.

Figure 5 shows a vertical and a transverse section of the same devices, showing the intermediate or transmitting-wheels mounted on a toothed driving-wheel, which gears or meshes with a toothed wheel that enters the toothed drum from the outside, through a cut or opening in the side of said drum.

Similar letters of reference denote corresponding parts in the several figures.

This invention consists in the novel construction and arrangement of gear-wheels within an internally-toothed drum or case, mounted on short shafts, which are in a line and rotate on the same centre, and have their bearings in and are supported by partitions or diaphragms within said drum or case. The gearing may be described as follows:

Letter C is the main driving-shaft. Letters C^1 C^2 C^3 are short shafts or hubs, on each of which a pinion is mounted, and also an arm or toothed wheel, which carries an intermediate wheel or wheels on the end of the driving-shaft C, which terminates within the drum A, and is mounted in a tubular arm or bearing-sleeve, B. Attached thereto is an arm, D, rigidly connected to and turning with shaft C, and provided at its outer swinging end with a short fixed stud or pivot, *d*, on which is mounted a transmitting-wheel, E, which gears with and receives its motion on stud *d*, from the toothed drum A. Said wheel E also gears with and communicates motion to a pinion, F, keyed to a second shaft, C^1, which at one end has a pivot bearing in the end of shaft C, and near its other end is supported in a diaphragm or partition, G. The end of shaft C^1, extending through said partition G, is armed with a fixed arm or crank, on the outer swinging end of which is a second transmitting-wheel gearing with the drum A, and with a second pinion, E, on a third shaft or hub, C^2. The shaft C^2 has a pivotal bearing at one end, in shaft C^1, and at its other end a bearing in a second partition or support, G^1. The projecting end of shaft C^2 has its arm and transmitting-wheel, for imparting motion from the drum A, to a third pinion, F^2, on a fourth shaft, C^3, the bearings of which are arranged in a manner similar to those before described, and the same arrangement of shafts and pinions may be continued to any desired extent, the last shaft or spindle, or the series projecting through the end or head of case A, as represented in the drawing.

The drum or internal gear-case A, being supposed to have (for the purpose of illustration) sixty teeth, and the pinions F F^1 F^2, &c., twelve teeth each, the operation of the gearing would be as follows:

The shaft C revolving, carries with it the arm D, and the transmitting-wheel E meshing with the drum, receives a rotary motion on its own shaft therefrom, which is communicated to the pinion F and its shaft or hub C^1, in the same direction with the shaft C, the two shafts turning together and in the same direction. Shaft C^1 receives one revolution from shaft C, and the pinion F having, as stated, twelve teeth, and being driven through the transmitting-wheel E by the drum having sixty teeth, receives five revolutions therefrom, the shaft C and pinion F receiving, therefore, one revolution with and from the shaft C, and five revolutions from the drum A, have six revolutions to one of shaft C; consequently the arm D^1, connected to and turning with shaft C^1, causes its transmitting-wheel E^1 to traverse the cogged drum six times while the arm D traverses said drum once. The pinion F^1 is, consequently, acted upon six times by the teeth of the drum while the pinion F is operated upon once by said teeth, and the shaft C^2 receiving one additional revolution from and with each revolution

of the shaft C^1, the pinion F^1 and its shaft C^2 have imparted to them six revolutions to one of shaft C^2 and pinion F, and thirty-six to one revolution of main shaft. The third pinion, F^2, mounted on a fourth shaft, C^3, continuing in the same ratio of increase, has two hundred and sixteen revolutions to thirty-six revolutions of the third shaft, six of the second, and one of the main driving-shaft C; and so through any desired number of shafts, until the required velocity is attained, the ratio of increase of velocity of each succeeding shaft being as six to one of the shaft which drives it. A variation of the ratio of increase may be made by varying the relative number of teeth of drum A and the pinions F; as, for example, if the number of teeth of the drum, as compared with the number of teeth of the pinion, be as three to one, the ratio of increase will be four; if as four to one, the ratio of increase will be five.

Instead of the arms D D^1 described, spur-wheels, sprocket-wheels, or pulleys may be used, and the transmitting-wheels may be mounted upon fixed studs thereon. This may be done where it is desired to convey the motion of any one or more of the shafts to the outside of the stationary drum A. H represents the spur-wheel to which the transmitting-wheels are applied, gearing with a corresponding spur-wheel, H′, penetrating the casing through a slot formed therein, and mounted on a shaft outside of said drum or casing. The same result may be attained by sprocket-wheels or pulleys, and chains or belts—an arrangement which will be found particularly valuable and useful in hoisting-apparatus, where, with the varying weight to be lifted, any one of a series of hoisting-ropes passing over the several pulleys thus arranged, the power may be applied with a varying speed and effect. The partitions G may be simply diametrical arms or bars, affording a bearing for one end of the shaft to which it is applied, and may be secured between separate rings of teeth, as shown in fig. 2, in the end of one of the separate compartments A^1 A^2 A^3, &c., of which the drum is formed, or inserted directly in the one main drum, A, and secured by screws passing through said drum from the outside, or in any suitable manner. The arms D may extend upon both sides of its shaft, and provided with a transmitting-wheel at each end, gearing with the drum and the same pinion in such manner as to balance and give additional strength to the structure.

What I claim as new, is—

1. The arrangement of two or more shafts in line with each other, one having a pivotal bearing in and operated by the other, substantially as described.

2. The arrangement of the line-shafts within the concentric internally-cogged drum or case, substantially as described.

3. The internally-cogged drum subdivided into separate compartments, or provided with the bearing-partitions for the line-shafts, as described.

4. The line-shafts provided with spur-wheels, or their equivalent, in combination with the internally-cogged drum, substantially as described.

WM. F. GOODWIN.

Witnesses:

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ALEX. MAHON.