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J. C. TAUBER.

MACHINERY FOR CONVERTING MOTION.

No. 275,436. Patented Apr. 10, 1883.

Fig. 1

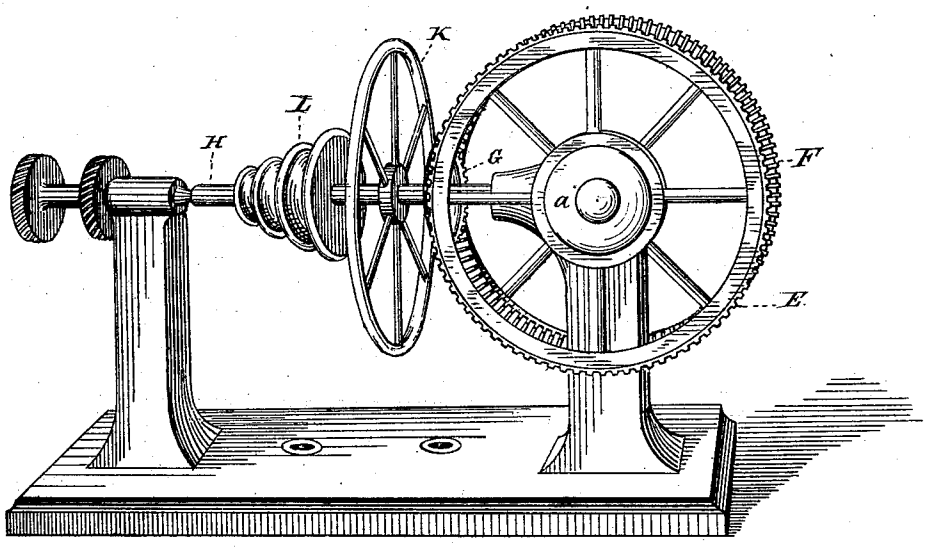
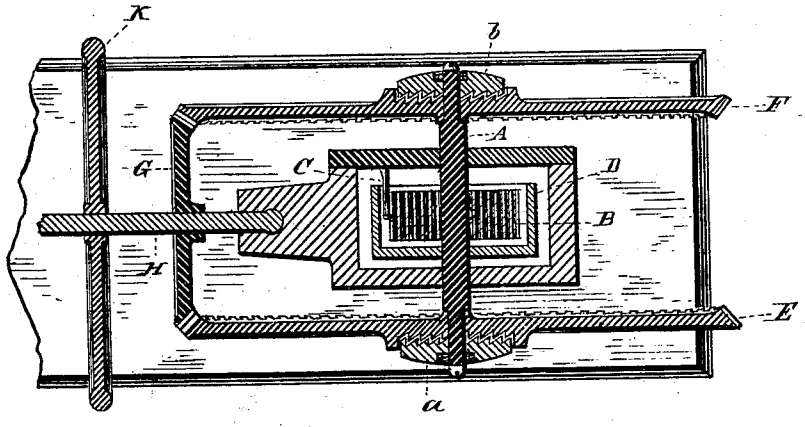


Fig. 2.



WITNESSES

J. W. Morris

H. C. Johnson

INVENTOR

J. C. Tauber

By Thos. B. Hall

ATTORNEY

N. PETERS. Photo-Lithographer. Washington, D. C.

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Fig. 3.

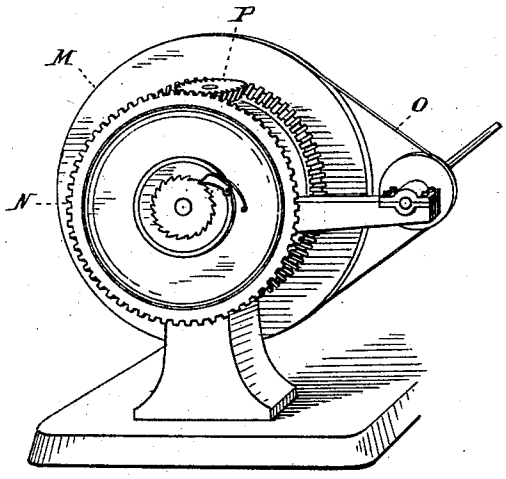


Fig. 4.

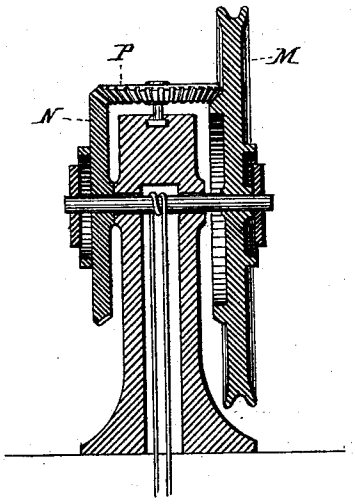


Fig. 5.

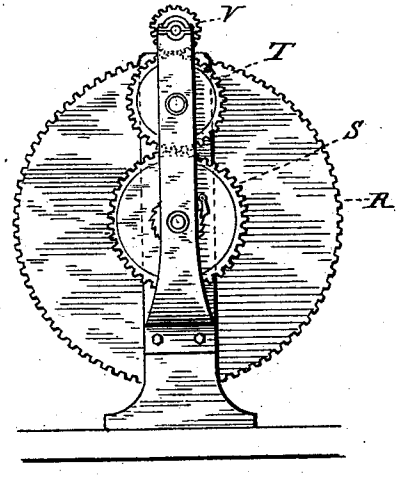
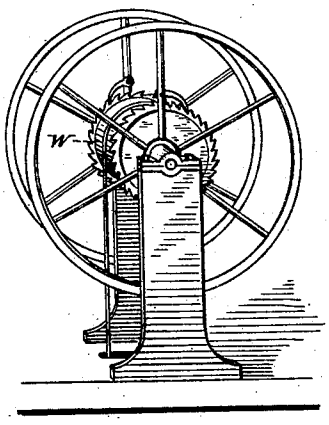


Fig. 6.



WITNESSES

J. W. Morris

H. C. Johnson

INVENTOR

J. C. Tauber

By Thos. B. Hall

ATTORNEY

N. PETERS, Photo-Lithographer, Washington, D. C.

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Fig. 7.

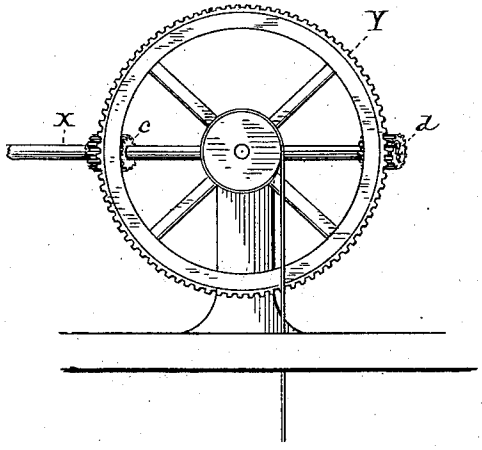


Fig. 9.

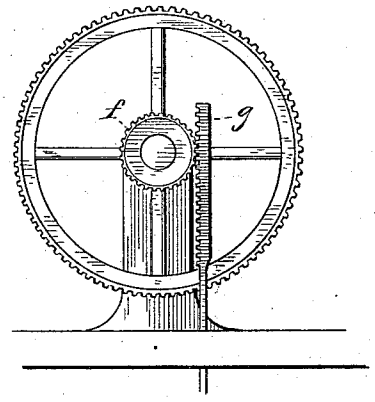


Fig. 8.

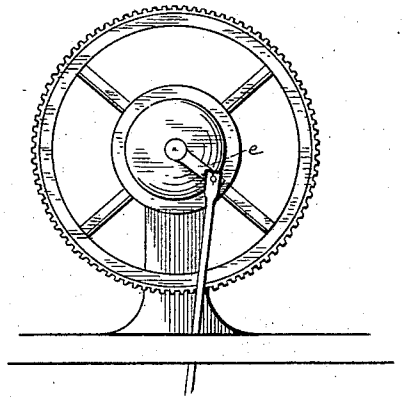
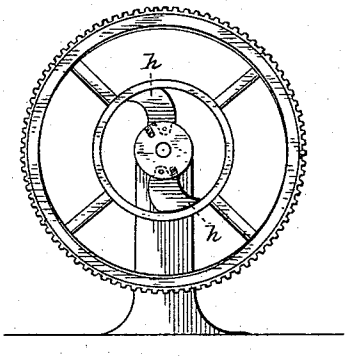


Fig. 10.



WITNESSES

J. W. Morris

H. G. Johnson

INVENTOR

J. C. Tauber

By Thos. B. Hall

ATTORNEY

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

JOHANN C. TAUBER, OF PLAIN CITY, OHIO.

MACHINERY FOR CONVERTING MOTION.

SPECIFICATION forming part of Letters Patent No. 275,436, dated April 10, 1883.

Application filed February 21, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHANN C. TAUBER, a citizen of the United States, residing at Plain City, county of Madison, and State of Ohio, have invented certain new and useful Improvements in Machinery for Converting Oscillating Motion into Rotary Motion; and I do hereby declare the following to be a description of the same, and of the manner of constructing and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it appertains to construct and use the same, reference being had to the accompanying drawings, forming a part of the specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

In making this invention attention has been directed solely to machinery formed without a dead-center, and which is actuated by the return-stroke as well as by the forward stroke of the oscillating device. The advantage inherent in machinery adapted to operate without the possibility of stopping on a dead-point is obvious. The advantage possessed by machinery which is adapted to be actuated by both the forward and the return strokes of the oscillating device is that a very much lighter fly-wheel may be used than otherwise would be possible. For in such instance the fly-wheel need be only of weight sufficient to generate momentum during one stroke of the oscillating device to continue the movement of the driving parts during the instant of time when the stroke or vibration of the oscillating device is being changed from one direction to the opposite direction. This fact renders such machinery especially useful to jewelers, watchmakers, and other artisans, as it may be small in size and yet ample in speed and power. It can be placed on the work-bench and used in counter-shafting, or it can be applied directly to the work. Such machinery is of merit in connection with dental lathes and analogous portable mechanism, which require lightness of weight and compactness of form as their requisites.

One controlling object in view in making this invention was to adapt a machine of the above description so that it might be actuated by direct power as the oscillating device rocked in one direction, and might be actuated by secondary power as the oscillating device rocked in its opposite direction of movement. A second controlling object was to cause this intermittent direct power to wind up a motor simultaneously with imparting positive action to the driving parts, said motor being adapted to actuate the driving parts by its secondary power, and at the same time therewith to return the oscillating device into normal position for the next recurring application of the direct power.

With these ends in view and to the attainment thereof my invention consists, first, in providing means whereby an oscillating device may be actuated by positive power in one stroke, and may be actuated by secondary power in its opposite stroke; secondly, in providing means whereby an oscillating device may be actuated in one direction by direct power which simultaneously winds up a motor, the latter actuating the driving parts during the intervals of suspension of the direct power, and at the same time returning the oscillating device to its normal position for the next impulse of positive power.

In addition to these two main principles of construction the invention consists of certain other matter hereinafter described and claimed.

Referring to the drawings, Figure 1 is a perspective view of one form of machinery embodying the invention. Fig. 2 is a sectional plan of the same. Fig. 3 is a perspective of a different form. Fig. 4 is a vertical cross-section of said different form. Fig. 5 is a side elevation of another form of the same principle. Fig. 6 is a perspective of still another form of the invention. Fig. 7 is a perspective of an additional modification. Fig. 8 is a detail view, representing a modification of the oscillating device. Fig. 9 represents another modification of the oscillating device. Fig. 10 represents a companion wheel provided with friction-clutches.

The form of machinery shown in the first two figures is constructed with an oscillating shaft, A, having a spring-drum, B, made fast thereto, one end of the spring being secured to said drum or shaft, and the other end be-

ing fastened to the standard C. To the periphery of this spring-drum is secured a band, D, which depends downward and is adapted to be connected to a treadle, so that the machine can be driven by one foot of the operator. Such treadle might be located beneath the work-bench on which the machine is placed; or the power may be derived from any suitable place, as a single wire cord, or its equivalent, may be intermittently operated at a distance from the machine and transmit actuating-power to the latter very well. On the opposite extremities of the shaft are loosely mounted the two companion wheels E and F, the spring-drum being located between said wheels, and the latter being respectively provided with ratchets *a* and *b*. Ratchet *a* of wheel E operates to automatically connect the latter to the shaft, so as to turn therewith, as the shaft has movement in a forward direction. When the shaft has movement in reverse direction, said ratchet *a* automatically disconnects wheel E from the shaft, and said wheel is thereby permitted to move independently of the shaft. Ratchet *b* of wheel F operates to automatically connect the latter to the shaft while said shaft is moving on its return stroke, and to automatically disconnect wheel F from the shaft when the latter is moving on its forward stroke. A driver, G, secured to a driving-shaft, H, is adapted to be in constant engagement with both said wheels. Each wheel is thus maintained in constant rotation, inasmuch as when it is not operated by the oscillating device it rotates idly with the driver, and there is no inertia thereof to be overcome by the oscillating device when the latter is again connected to said wheel. The driver is adapted to be actuated by wheel E when the latter is fast to the oscillating device, and when wheel F is fast to the oscillating device the driver is actuated by said latter wheel, the two wheels E and F respectively engaging with the driver on opposite sides of its axis of rotation, thereby causing the opposite rotary movements of said wheels to operate the driver in a constant rotary movement in a single direction. The driving-shaft carries a light fly-wheel, K, which need be only of such weight and size as to gain momentum sufficient, on one stroke of the oscillating device, to continue the movement of the driving-shaft during the instant of time in which said oscillating device is changing from its stroke in one direction to its reverse stroke. The driving-shaft may be provided with a graded series of pulleys, L. By intermittently drawing or pulling out the band D two results follow: the oscillating shaft is rocked forward and the spring-motor is wound up. Wheel E, being ratcheted fast to the oscillating shaft during this forward movement, is thereby positively rotated, and actuates driver G in a corresponding positive rotation. Upon releasing the band from this direct power two results simultaneously take place: the recoil of the wound spring actuates the oscillating device in its return movement, so as to be in normal position for the next recurring application of direct power, and it also actuates wheel F, as the latter is then ratcheted fast to said oscillating device. Wheel F carries the driver G with it in rotation, and thus the latter is actuated by the secondary power of the motor during the interval of suspension of positive power. In this manner the band is rewound on the spring-drum, and the driving parts maintained in steady rotation.

Reference now being had to the several modifications shown in the drawings, it will be observed that in the form of machinery represented in Figs. 3 and 4 wheels M and N respectively correspond to wheels E and F of the machinery shown in the first two figures, wheel M being of greater diameter than wheel N and carrying a belt, O, which operates the driving-shaft, said wheels being connected together by bevel-gear wheel P.

In the form of machinery shown in Fig. 5 wheels R and S correspond, respectively, to wheels E and F of the first two figures, wheel R being of greater diameter than wheel S. A wheel, T, connects the small companion wheel S with the large companion wheel by means of a pinion, V.

It will be observed that in each of the two forms of machinery last described the driving-shaft is parallel with the axis of the oscillating device, instead of being at right angles therewith, as in the form of machinery first described. In the machinery illustrated in Fig. 6 of the drawings, the spring-drum W rocks freely on the fixed shaft, and the ratchets connect said drum directly to the two companion wheels.

I have shown in Fig. 7 a driving-shaft, X, on which are loosely mounted the two companion wheels *c* and *d*, said wheels being in constant mesh with wheel Y, made fast to the oscillating device. Companion wheel *c* is provided with a pawl which engages with a ratchet rigid with the driving-shaft when the oscillating device turns in one direction, and when said oscillating device turns in its opposite direction a pawl of companion wheel *d* engages with a corresponding ratchet of the driving-shaft, each companion wheel turning idly on the driving-shaft when its respective pawl is not engaged therewith, as described.

In Fig. 4 the oscillating shaft is represented as provided with two depending cords, instead of one depending cord or band and a spring-drum. This is to illustrate one modified form of oscillating device, as a weight may be secured to one of the two cords and operate substantially in the same manner that the spring does in the machinery first described.

Another modification of oscillating device is shown in Fig. 8, the rock-shaft being provided with a rigid arm, *e*, sufficiently weighted to operate in substitution for a coil-spring or a weighted cord, as previously described.

A further modified form of oscillating device is represented in Fig. 9, the rock-shaft having pinion *f* rigid therewith and meshing with a vertical rack-bar, *g*.

In each one of these three modifications gravity would actuate the oscillating device in its reverse stroke.

In Fig. 10 a companion wheel is represented as provided with friction-clutches *h* in substitution for a pawl and ratchet.

The various modifications herein set forth are given to illustrate the breadth of the principle of my invention, and they should not be understood as restricting said principle to the forms thus represented.

In substitution for any ratchet or friction clutch the companion wheels may be provided with appliances of a different character, provided they are adapted to automatically connect and disconnect said companion wheels to the operating parts, as previously set forth.

It is apparent that the oscillating device may be adapted to be returned in its reverse stroke by other means than those herein suggested. So, too, other forms of embodying and using the principle of my invention may be employed in substitution for any of the forms I have herein shown. It will therefore be understood that omissions, substitutions, and changes may be made as regards the forms and parts herein set forth, provided the principles of construction and operation embraced in the following claims are retained and employed.

I therefore particularly point out and distinctly claim as my invention—

1. In machinery for converting oscillating into constant rotary motion, the combination, with an oscillating device, of mechanism whereby it may be actuated by positive power during its movement in one direction, and may be actuated by secondary power during its movement in the opposite direction, substantially as and for the purpose described.

2. In machinery for converting oscillating motion into constant rotary motion, the combination, with an oscillating device provided with a motor, of means whereby direct power may intermittently actuate said oscillating device in one direction, and simultaneously wind up said motor, the latter being adapted to actuate the oscillating device in its opposite direction of movement, substantially as and for the purpose described.

3. In machinery for converting oscillating motion into constant rotary motion, the combination, with an oscillating device, of two rotary devices respectively turning in opposite directions, and adapted to alternately connect themselves to said oscillating device as the latter has its respective forward and return movements, substantially as described.

4. In machinery for converting oscillating motion into constant rotary motion, the combination, with an oscillating device and two wheels, of appliances which connect one of said wheels directly to said oscillating device as the latter moves in one direction, and which connect the companion wheel directly to said oscillating device as the latter moves in the opposite direction, substantially as described.

5. In machinery for converting oscillating motion into constant rotary motion, the combination, with an oscillating device and means for actuating it by positive power in one direction and for actuating it by secondary power in the opposite direction, of two wheels adapted to be alternately driven by said oscillating device as the latter is respectively actuated by the positive and the secondary powers, substantially as set forth.

6. In machinery for converting oscillating motion into constant rotary motion, the combination, with an oscillating device, means for intermittently actuating it in a positive movement, and a motor adapted to be wound up by such positive movement and to actuate said oscillating device in its reverse movement, of two wheels, one connecting itself to said oscillating device as the latter is positively actuated, and the other connecting itself to said oscillating device as the latter is actuated by said motor, substantially as set forth.

7. In machinery for converting oscillating motion into constant rotary motion, the combination, with an oscillating device adapted to be actuated alternately by positive and secondary powers, respectively, of two wheels adapted to be alternately connected to said oscillating device and driving mechanism connected to both said wheels, substantially as set forth.

8. In machinery for converting oscillating motion into constant rotary motion, the combination, with an oscillating device and two wheels alternately actuated thereby, of means whereby each wheel when not actuated by said oscillating device may be maintained in idle rotation in a constant direction, substantially as set forth.

9. In machinery for converting oscillating motion into constant rotary motion, the combination, with an oscillating device, two wheels, and a driver which engages with said wheels, respectively, on opposite sides of its axis of rotation, of appliances which alternately connect said wheels to the oscillating device, and thus maintain said driver in a steady rotation, substantially as set forth.

10. In machinery for converting oscillating motion into constant rotary motion, the combination, with an oscillating device, of two wheels adapted to alternately actuate driving mechanism by respectively turning in opposite directions as they are operated by said oscillating device, substantially as set forth.

11. In machinery for converting oscillating motion into constant rotary motion, the combination, with an oscillating device, and means for actuating it by positive power in one direction and by secondary power in the opposite direction, of two wheels operated by said

oscillating device, and adapted to alternately actuate driving mechanism by said positive and secondary powers, substantially as set forth.

12. In machinery for converting oscillating motion into constant rotary motion, the combination, with an oscillating device, means for positively rocking it in one direction, and a motor adapted to be wound up by such positive rocking, and to actuate the oscillating device in its reverse movement, of two wheels each adapted to be rotated only in a single direction, means for alternately making said wheels fast to the oscillating device, and a driver engaging with both said wheels, substantially as set forth.

In testimony that I claim the foregoing to be my invention I have hereunto set my hand this 15th day of February, A. D. 1883.

JOHANN C. TAUBER.

Witnesses:
THOS B. HALL,
J. G. HALL, Jr.