

No. 799,047.

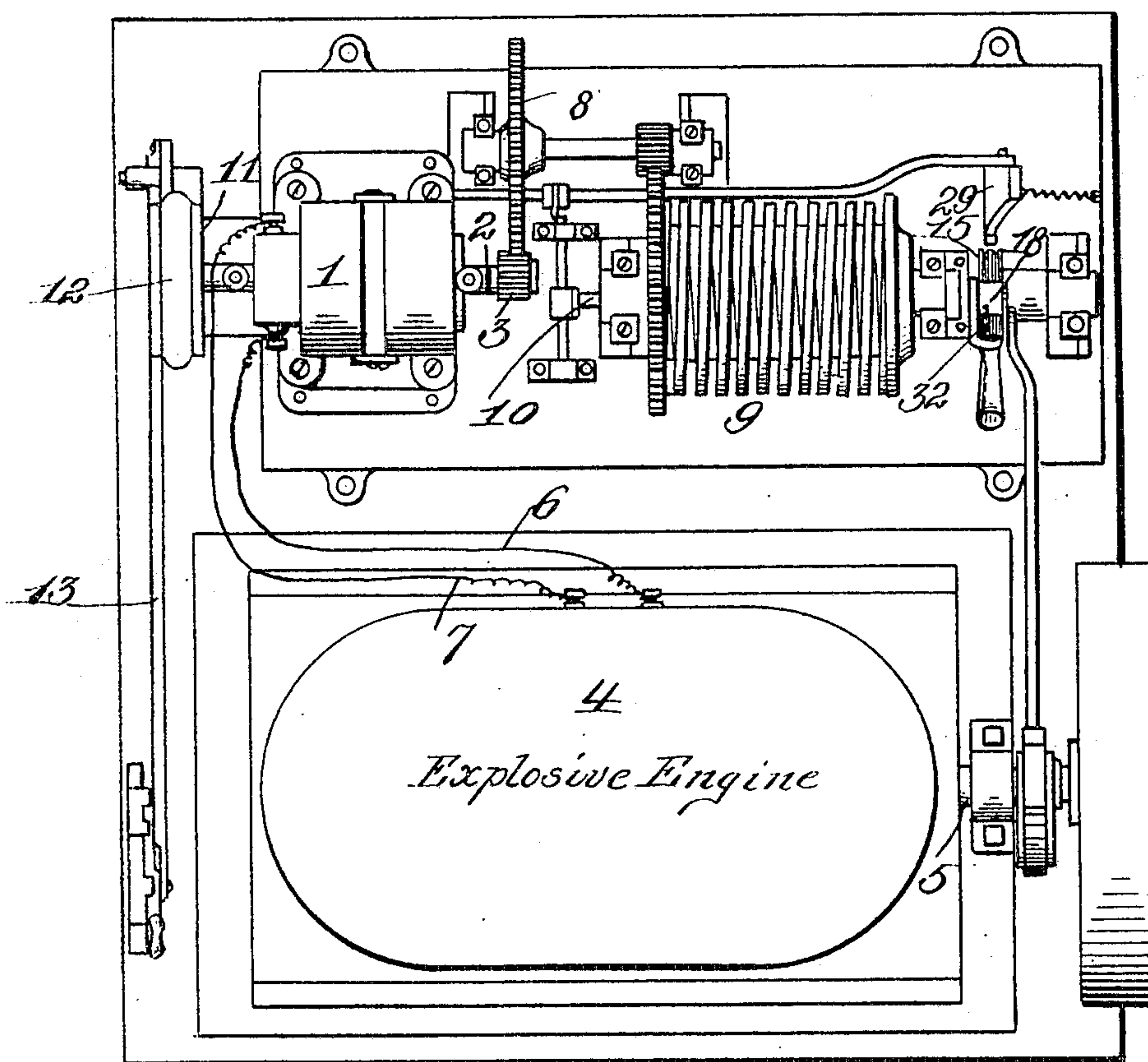
PATENTED SEPT. 12, 1905.

W. B. HAYDEN.
ATTACHMENT FOR EXPLOSIVE ENGINES.

APPLICATION FILED MAY 31, 1905.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

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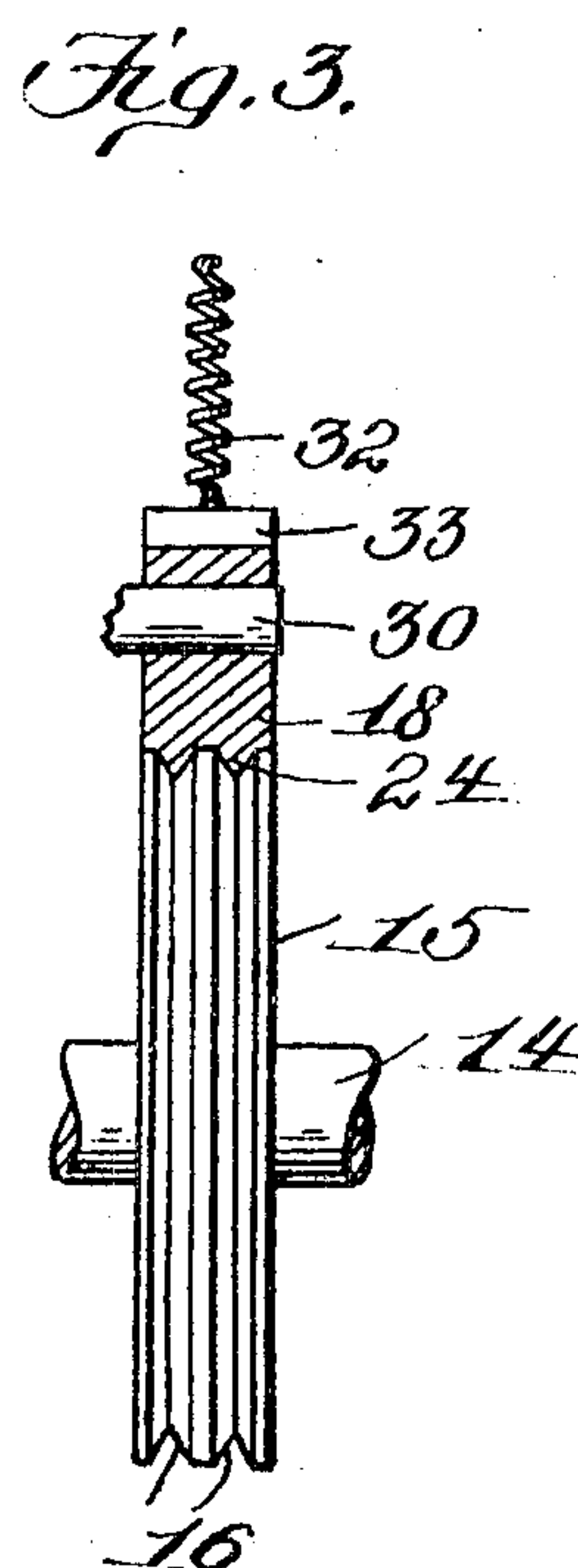
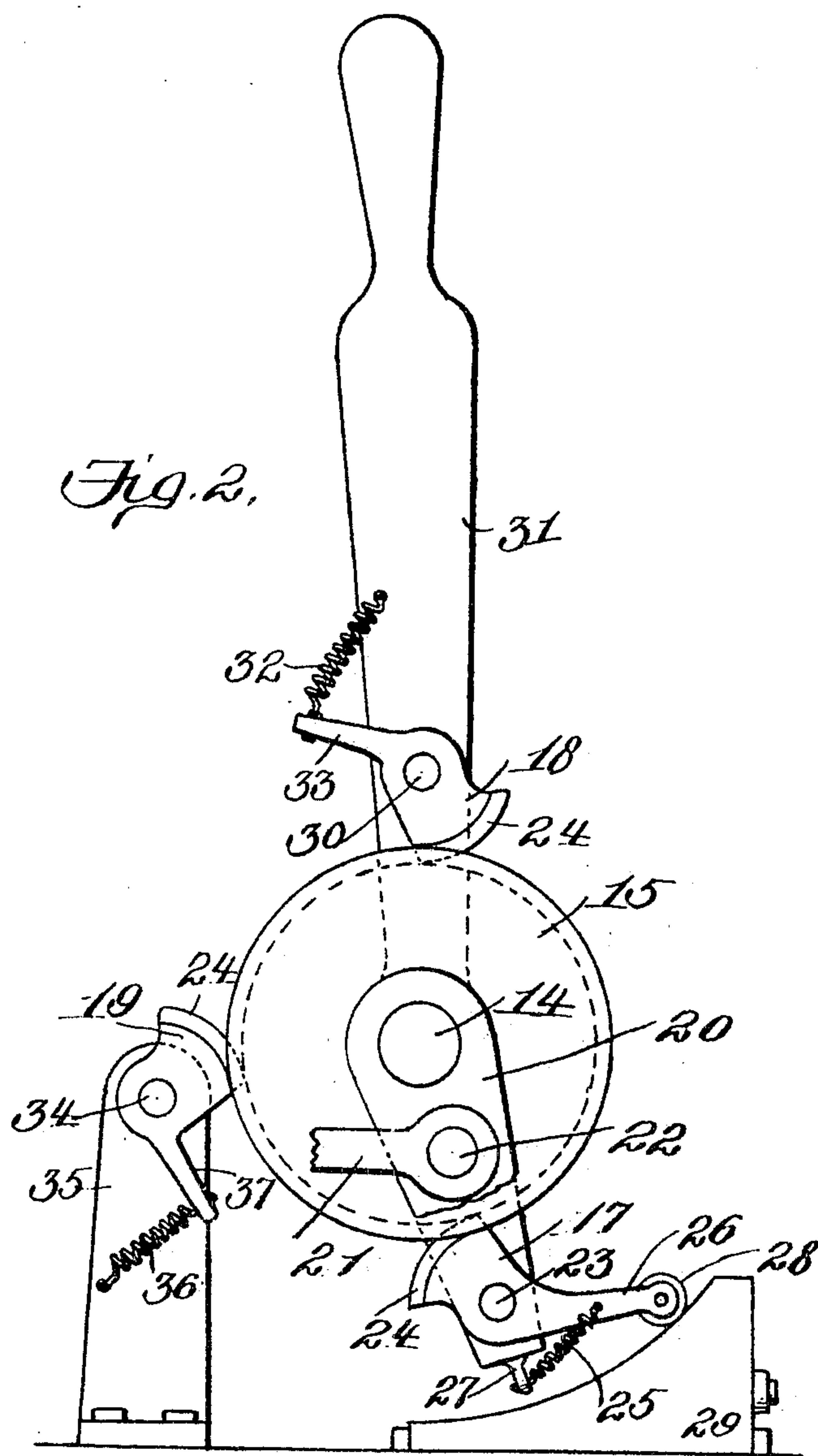
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ATTACHMENT FOR EXPLOSIVE ENGINES.
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

WILLIAM B. HAYDEN, OF NEW YORK, N. Y.

ATTACHMENT FOR EXPLOSIVE-ENGINES.

No. 799,047.

Specification of Letters Patent.

Patented Sept. 12, 1905.

Application filed May 31, 1905. Serial No. 263,066.

To all whom it may concern:

Be it known that I, WILLIAM B. HAYDEN, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented new and useful Improvements in Attachments for Explosive-Engines, of which the following is a specification.

This invention relates to attachments for explosive-engines of the class in which is employed an electrical sparking device for the explosive charge, and the object thereof relates to certain improvements upon the construction of attachments as set forth in Patent No. 772,235, granted to me October 11, 1904, and my application, Serial No. 229,608, filed October 22, 1904. In the attachments for explosive-engines as set forth in the said patent and said application a rotatable yielding coupling device is employed and which is interposed between the generator and the engine, said coupling so constructed as to transmit movement to the generator from the engine and obtain regularity of speed for the generator-shaft, said coupling also so constructed and arranged as to be operated manually or independently of the engine, so that the generator can be operated in advance of the engine to obtain sufficient electrical energy to form a spark, so as to ignite the explosive or combustible charge at the proper moment. In the patent noted and the said application referred to the rotatable yielding coupling device is operated through the medium of a toothed wheel driven by a pawl oscillated from the engine and also driven by a pawl oscillated by a hand-operated lever. The toothed wheel is in the form of an ordinary sprocket-wheel, and the pawls engage between the teeth of the wheel, so as to rotate the same. This construction may be termed an "ordinary pawl-and-ratchet arrangement." For slow speed such construction operates very well; but at high speed it is not only noisy, but somewhat uncertain in the engagement between the pawl and the wheel, which causes pounding and injury to the various parts and requires an exact length of stroke to fit the teeth. The improvements which form a part of this application aim to overcome the foregoing objection and which provides means that does not require any particular length of stroke, is self-adjusting to any stroke, and when running at the highest speed is comparatively noiseless.

With the foregoing and other objects in

view the invention consists of the novel construction, combination, and arrangement of parts hereinafter more specifically described, illustrated in the accompanying drawings, and particularly pointed out in the claims hereunto appended.

In describing the invention in detail reference is had to the accompanying drawings, forming a part of this specification, wherein like reference characters denote corresponding parts throughout the several views, and in which—

Figure 1 is a top plan view of an explosive-engine with the improved attachments in accordance with this invention arranged in operative position. Fig. 2 is a side elevation, partly broken away, of the operating means in accordance with this invention for the rotatable yielding coupling device; and Fig. 3 is a sectional detail showing the arrangement of the grooved operating-wheel and the teeth formed on the engaging face of the toggles.

It is thought unnecessary to describe specifically the various parts illustrated otherwise than that which forms the subject-matter of this invention, as the various specific details, which form no part of this invention, are referred to specifically and illustrated in Patent No. 772,235 and application Serial No. 229,608, and, referring to the drawings, the reference character 1 denotes an electrical generator; 2, its shaft; 3, a pinion on one end of the generator-shaft, said pinion 3 preferably being constructed of insulating material; 4, an explosive-engine; 5, the engine-shaft; 6, 7, sparking circuit-wire connections between the generator 1 and the combustion-chamber of the engine 4; 8, a multiplying-gearing; 9, a rotatable yielding coupling device engaging with the gearing and adapted to operate it; 10, a power and speed regulating mechanism for the said coupling device; 11, a speed-governor for the generator-shaft; 12, a band-brake, and 13 a hand-lever for operating the band-brake. The construction, functions, and operation of the foregoing parts are particularly set forth in Patent No. 772,235 and application Serial No. 229,608.

The reference character 14 denotes a shaft and which is suitably connected to the spring coupling device 9 for operating it when said shaft is rotated. Upon the shaft 14 is fixed a driven wheel 15 therefor, said wheel having its periphery provided with a plurality of annular grooves 16, into which is adapted to engage toggles 17, 18, and 19 for a purpose

to be hereinafter referred to. Suspended from the shaft 14 is an oscillatory hanger 20, which is driven from the engine through the medium of a reciprocatory connection 21, 5 said connection, as shown, being in the form of a rod and which is pivoted, as at 22, to the hanger 20. The reciprocations of the rod 21 cause the oscillations of the hanger 20. Pivoted to the lower end of the hanger 20, as at 10 23, is the toggle 17, which is adapted during the oscillations of the hanger 20 to engage the wheel 15 and rotate it, thereby imparting motion to the shaft 14. The engaging face of the toggle 17 is provided with a plurality 15 of teeth 24, corresponding to the shape of the grooves 16 in the wheel 15. As the teeth of the toggles 17, 18, and 19 are of the same construction, the same reference character is applied thereto. The toggle 17 is normally in 20 engagement with the wheel 15, and said action is had through the medium of the spring 25, which is connected at one end to a protuberance 26, formed on the toggle 17, and is connected at its other end to a lug 27, extending 25 from the lower end of the hanger 20. The toggle 17 is termed a "driving-toggle," and its function is to cause the rotation of the wheel 15, and said toggle 17 has the free end of its protuberance 26 provided with a 30 roller 28, which is adapted to engage a deflecting member 29, and when in engagement with said deflecting member 29 it causes the shifting of the toggle 17 upon its pivot 23, so that said toggle will be moved out of en- 35 gagement with the wheel 15 and discontinue the operation thereof. Why such action is had will be hereinafter referred to. The toggle 18 is termed a "hand-operated driving-toggle," and it is pivoted, as at 30, upon a 40 hand-operated lever 31, and said toggle 18 is normally in engagement with the wheel 15. Such action is had through the medium of a spring 32, pivoted at one end to the hand-lever 31 and at its other end to the outer end of a 45 protuberance 33 on the toggle 18. The toggle 19 is termed a "backlash-toggle," its function being to prevent back rotation of the wheel 15, and said toggle 19 is pivoted, as at 34, upon a support 35 and is normally in en- 50 gagement with the wheel 15. Such engaging action is had through the medium of a spring 36, connected at one end to the support 35 and at its other end to the outer end of a protuberance 37 on the toggle 19. Each of the tog- 55 gles 17, 18, and 19 is eccentrically mounted, as illustrated. The deflecting member 29 forms a part of the speed and power regulating mechanism for the coupling device. The providing of the spring 25 for the toggle 17 60 causes said toggle 17 to be self-adjusting, so no particular length of stroke of the rod 21 is necessary.

It will be assumed that the engine is in operation, which will reciprocate the connection 65 21. The latter imparts oscillations to the

hanger 20, which, carrying the toggle 17 therewith, will cause the wheel 15 to be driven, owing to the engagement of the toggle 17 with said wheel. The operation of the wheel 15 will rotate the shaft 14 and wind up the 70 compound spring coupling. The latter in turn, through the intervention of the multiplying gearing and pinion 3, operates the generator-shaft. In case the operation of the generator-shaft is such that it would start to 75 exceed the normal speed limit set therefor the speed and power regulating mechanism comes into play—that is to say, the deflecting member 29 will be moved in the path of the roller 28, so that the toggle 17 will be deflected 80 and not engage and operate the wheel 15, and said toggle 17 will be held out of engagement with the wheel 15 until the deflecting member 29 is moved out of the path of the roller 28. If it be desired to operate the generator in 85 advance of the engine, the lever 31, which is loosely mounted upon the shaft 14, is oscillated and which action causes the toggle 18 to engage and rotate the wheel 15, thereby winding up the compound spring coupling 90 device. It will be stated, however, that before the lever 31 is oscillated the band-brake is thrown into operation, so as to prevent rotation of the generator-shaft. The lever 31 95 is then oscillated. Such oscillation will store energy in the compound spring coupling, said energy when the generator-shaft is released causing the operation of said shaft, thereby generating sufficient electrical energy to form 100 a spark and ignite the explosive mixture in the combustion-chamber of the engine, the engine being set for such purpose. The exploding of the mixture in the combustion-chamber of the engine causes the operation 105 of the engine, which in turn drives the connection 21, and the operation of the parts will be had in a manner as hereinbefore set forth.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is— 110

1. A driving device comprising a driven wheel having its periphery provided with annular grooves, an oscillatory hanger, and an eccentrically-mounted toggle having teeth corresponding to the grooves in the wheel and 115 adapted to engage said wheel and rotate it during the oscillations of the hanger.

2. A driving device comprising a driven wheel having its periphery provided with annular grooves, an oscillatory hanger, an eccentrically-mounted toggle having teeth corresponding to the grooves in the wheel and adapted to engage said wheel and rotate it 120 during the oscillations of the hanger, and a spring connected with the toggle and with the hanger for retaining the toggle in engagement with the wheel. 125

3. A driving device comprising a driven wheel having its periphery provided with annular grooves, an oscillatory hanger, an eccen- 130

trically-mounted toggle having teeth corresponding to the grooves in the wheel and adapted to engage said wheel and rotate it during the oscillations of the hanger, said toggle provided with a protuberance, and a roller carried thereby, combined with means engaging said roller for moving the toggle out of engagement with the wheel, thereby discontinuing the operation of the wheel.

4. A driving device comprising a driven wheel having its periphery provided with annular grooves, an oscillatory hanger, an eccentrically-mounted toggle having teeth corresponding to the grooves in the wheel and adapted to engage said wheel and rotate it during the oscillations of the hanger, and an eccentrically-mounted toggle having teeth conforming to the grooves in the wheel and adapted to engage the wheel to prevent back rotation thereof.

5. A driving device comprising a driven wheel having its periphery provided with annular grooves, an oscillatory hanger, an eccentrically-mounted toggle having teeth corresponding to the grooves in the wheel and adapted to engage said wheel and rotate it during the oscillations of the hanger, a spring connected with the toggle and with the hanger for retaining the toggle in engagement with the wheel, an eccentrically-mounted toggle having teeth conforming to the grooves in said wheel and adapted to engage the wheel to prevent back rotation thereof, and a spring for retaining the last-mentioned toggle against the wheel.

6. The combination with a driven wheel having its periphery provided with an annular groove, of an oscillatory and eccentrically-mounted toggle having a tooth corresponding to the groove in the wheel and adapted during the oscillations thereof to engage in the wheel for rotating it, and a manually-operated and eccentrically-mounted toggle having a tooth corresponding to the groove in said wheel and adapted when operated to impart movement to the wheel independently of the first-mentioned toggle.

7. The combination with a driven wheel having its periphery provided with a plurality of annular grooves, of an oscillatory and eccentrically-mounted toggle having a plurality of teeth corresponding to the grooves in said wheel and adapted during the operation thereof to engage the wheel for rotating it, and a manually-operated and eccentrically-mounted toggle having a plurality of teeth corresponding to the grooves of the wheel and adapted to engage and operate said wheel independently of the first-mentioned toggle.

8. The combination with a driven wheel having its periphery provided with an annular groove, of an oscillatory and eccentrically-mounted toggle having a tooth corresponding to the groove in the wheel and adapted during the oscillations thereof to engage in the

wheel for rotating it, and an eccentrically-mounted toggle having a tooth corresponding to the groove in the wheel and adapted to engage the wheel to prevent back rotation thereof.

9. The combination with a driven wheel having its periphery provided with an annular groove, of an oscillatory and eccentrically-mounted toggle having a tooth corresponding to the groove in the wheel and adapted during the oscillations thereof to engage in the wheel for rotating it, a manually-operated and eccentrically-mounted toggle having a tooth corresponding to the groove in said wheel and adapted when operated to impart movement to the wheel independently of the first-mentioned toggle, and an eccentrically-mounted toggle having a tooth corresponding to the groove in the wheel and adapted to engage the wheel to prevent back rotation thereof.

10. The combination with a driven wheel having its periphery provided with a plurality of annular grooves, of an oscillatory and eccentrically-mounted toggle having a plurality of teeth corresponding to the grooves in said wheel and adapted during the operation thereof, to engage the wheel for rotating it, and an eccentrically-mounted toggle having a plurality of teeth corresponding to the grooves in the wheel and adapted to engage the wheel to prevent back rotation thereof.

11. The combination with a driven wheel having its periphery provided with a plurality of annular grooves, of an oscillatory and eccentrically-mounted toggle having a plurality of teeth corresponding to the groove in said wheel and adapted during the operation thereof to engage the wheel for rotating it, a manually-operated and eccentrically-mounted toggle having a plurality of teeth corresponding to the grooves of the wheel and adapted to engage and operate said wheel independently of the first-mentioned toggle, and an eccentrically-mounted toggle having a plurality of teeth corresponding to the grooves in the wheel and adapted to engage the wheel to prevent back rotation thereof.

12. The combination with a driven wheel having its periphery provided with a plurality of annular grooves, of an oscillatory and eccentrically-mounted toggle having a plurality of teeth corresponding to the grooves in said wheel and adapted during the operation thereof, to engage the wheel for rotating it, and a spring for retaining the toggle against the wheel.

13. The combination with a driven wheel having its periphery provided with an annular groove, of an oscillatory and eccentrically-mounted toggle having a tooth corresponding to the groove in the wheel and adapted during the oscillations thereof to engage in the wheel for rotating it, a manually-operated and eccentrically-mounted toggle having a tooth corresponding to the groove in said wheel and

adapted when operated to impart movement to the wheel independent of the first-mentioned toggle, and springs for retaining the toggles against the wheel.

5 14. The combination with a driven wheel having its periphery provided with a plurality of annular grooves, of an oscillatory and eccentrically-mounted toggle having a plurality of teeth corresponding to the grooves
10 in said wheel and adapted during the operation thereof to engage the wheel for rotating it, a manually-operated and eccentrically-mounted toggle having a plurality of teeth corresponding to the grooves of the wheel and
15 adapted to engage and operate said wheel independently of the first-mentioned toggle, and springs for retaining the toggles against the wheel.

20 15. The combination with a driven wheel having its periphery provided with an annular groove, of an oscillatory and eccentrically-mounted toggle having a tooth corresponding to the groove in the wheel and adapted during the oscillations thereof to engage in the
25 wheel for rotating it, an eccentrically-mounted toggle having a tooth corresponding to the groove in the wheel and adapted to engage the wheel to prevent back rotation thereof, and springs for retaining the toggles against
30 the wheel.

35 16. The combination with a driven wheel having its periphery provided with an annular groove, of an oscillatory and eccentrically-mounted toggle having a tooth corresponding to the groove in the wheel and adapted during the oscillations thereof to engage in the
40 wheel for rotating it, a manually-operated and eccentrically-mounted toggle having a tooth corresponding to the groove in said wheel and adapted when operated to impart movement to the wheel independently of the first-mentioned toggle, an eccentrically-mounted toggle having a tooth corresponding to the groove
45 in the wheel and adapted to engage the wheel to prevent back rotation thereof, and springs for retaining the toggles against the wheel.

50 17. The combination with a driven wheel having its periphery provided with a plurality of annular grooves, of an oscillatory and eccentrically-mounted toggle having a plurality of teeth corresponding to the grooves in said wheel and adapted during the operation thereof, to engage the wheel for rotating
55 it, an eccentrically-mounted toggle having a plurality of teeth corresponding to the grooves in the wheel and adapted to engage the wheel to prevent back rotation thereof, and springs for retaining the toggles against the wheel.

60 18. The combination with a driven wheel having its periphery provided with a plurality of annular grooves, of an oscillatory and eccentrically-mounted toggle having a plurality of teeth corresponding to the groove in said wheel and adapted during the operation

thereof to engage the wheel for rotating it, 65 a manually-operated and eccentrically-mounted toggle having a plurality of teeth corresponding to the grooves of the wheel and adapted to engage and operate said wheel independently of the first-mentioned toggle, an 70 eccentrically-mounted toggle having a plurality of teeth corresponding to the grooves in the wheel and adapted to engage the wheel to prevent back rotation thereof, and springs for retaining the toggles against the wheel. 75

19. The combination with a driven wheel having its periphery provided with a plurality of annular grooves, of an oscillatory hanger, an eccentrically-mounted member carried by the hanger and having a toothed face corresponding to the grooves in said wheel and further provided with a protuberance and a roller, a spring connected with the hanger and with said protuberance, said member adapted to engage said wheel and operate it, a hand- 85 operated lever, an eccentrically-mounted member carried by said lever and having a toothed face corresponding to the grooves in said wheel and further provided with a protuberance and a roller, a spring connected at one 90 end to said lever and its other end to the protuberance of the last-mentioned member, said last-mentioned member adapted when said lever is operated to engage and rotate said wheel, a support, an eccentrically-mounted 95 member on said support and having a toothed face corresponding to the grooves in said wheel and further provided with a protuberance, and a spring connected with said support and the protuberance of the last-mentioned member, said last-mentioned protuberance adapted to engage said wheel to prevent back rotation thereof. 100

20. The combination with a driven wheel having its periphery provided with a plurality 105 of annular grooves, of an oscillatory hanger, an eccentrically-mounted member carried by the hanger and having a toothed face corresponding to the grooves in said wheel and further provided with a protuberance and a 110 roller, a spring connected with the hanger and with said protuberance, said member adapted to engage said wheel and operate it, a hand-operated lever, an eccentrically-mounted member carried by said lever and having a toothed 115 face corresponding to the grooves in said wheel and further provided with a protuberance and a roller, a spring connected at one end to said lever and at its other end to the protuberance of the last-mentioned member, 120 said last-mentioned member adapted when said lever is operated to engage and rotate said wheel, a support, an eccentrically-mounted member on said support and having a toothed face corresponding to the grooves in 125 said wheel and further provided with a protuberance, and a spring connected with said support and the protuberance of the last-men-

tioned member, said last-mentioned protuber-
ance adapted to engage said wheel to prevent
back rotation thereof, combined with means
adapted to engage said roller for moving the
5 said member carried by the hanger out of en-
gagement with the wheel.

In testimony whereof I have hereunto set

my hand in presence of two subscribing wit-
nesses.

WILLIAM B. HAYDEN.

Witnesses:

MATILDA L. HAYDEN,
OLIVER H. PERRY.