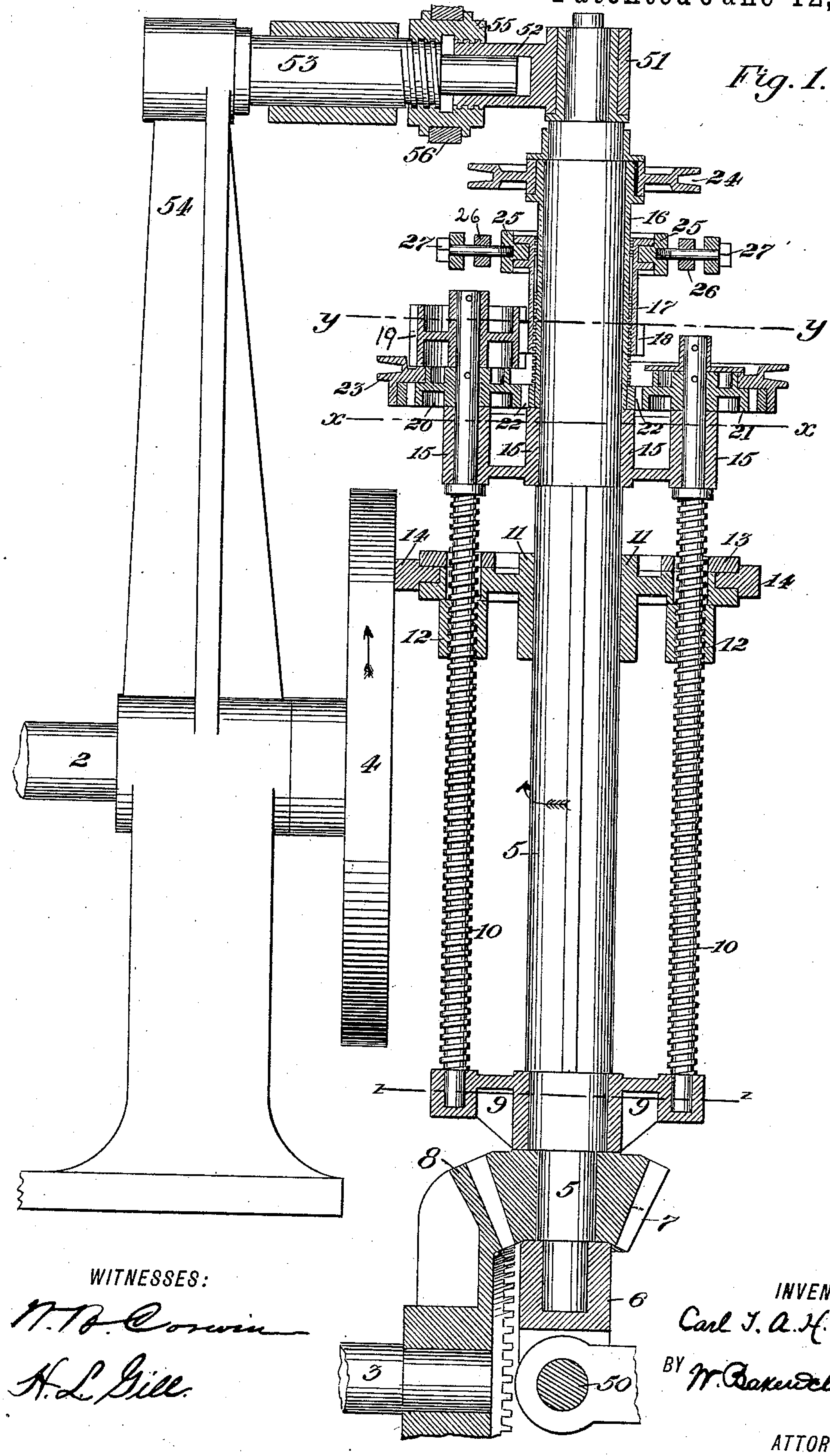
(No Model.)

4 Sheets—Sheet 1

C. T. A. H. WIEDLING.

DEVICE FOR TRANSMITTING POWER.

No. 384,598. Patented June 12, 1888.



WITNESSES:

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BY W. Bakewell & Sons.

ATTORNEYS.

(No Model.) 4 Sheets—Sheet 2.

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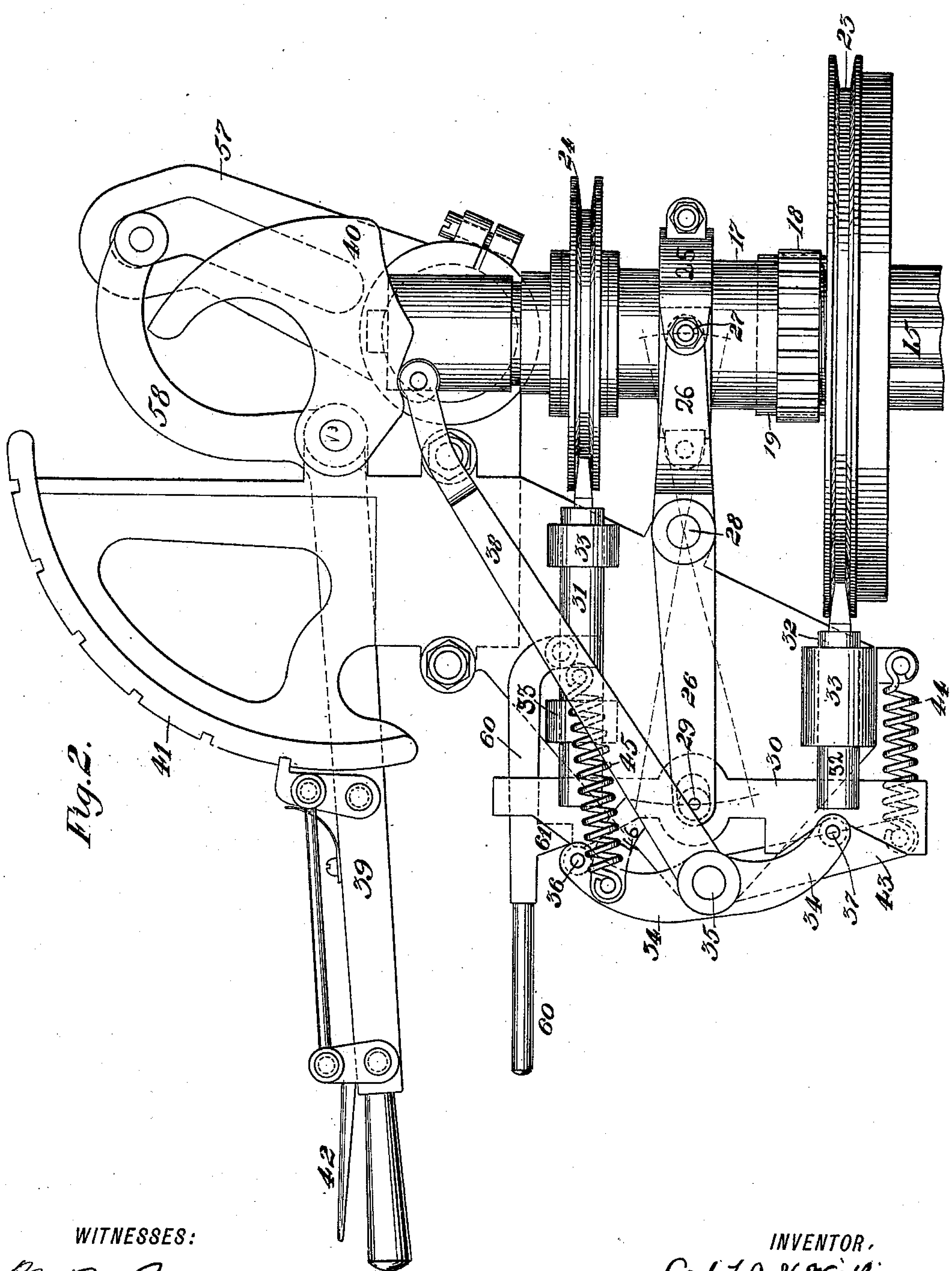

Fig. 2.

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(No Model.)

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C. T. A. H. WIEDLING.

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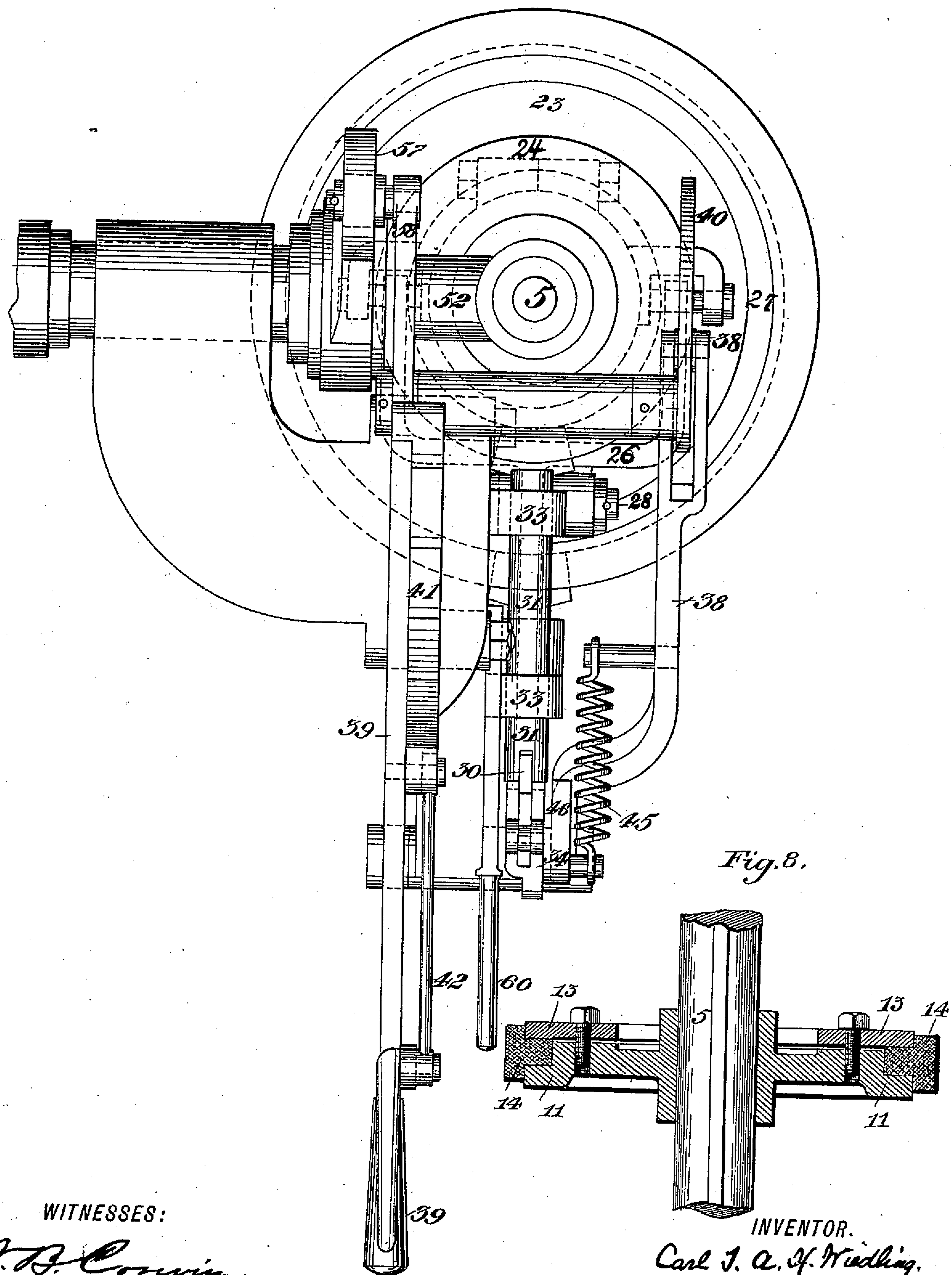
Fig. 3.



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(No Model.)

4 Sheets—Sheet 4.

C. T. A. H. WIEDLING.

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Fig. 5.

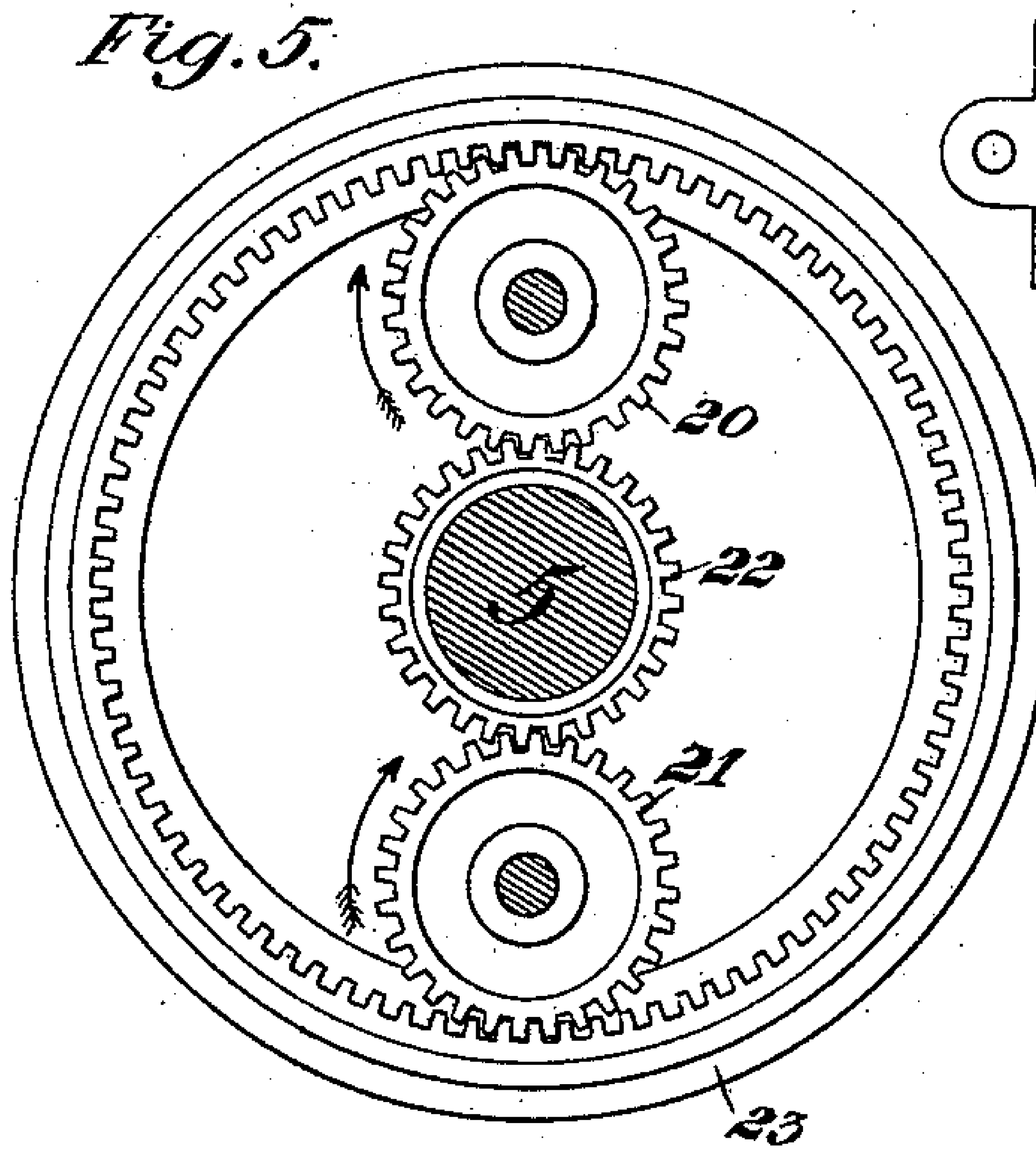


Fig. 7.

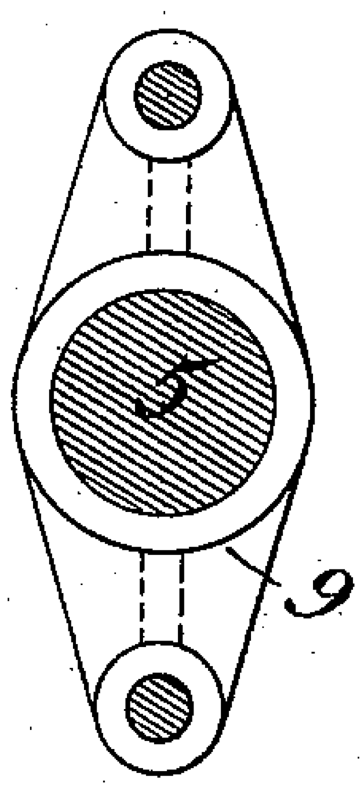


Fig. 6.

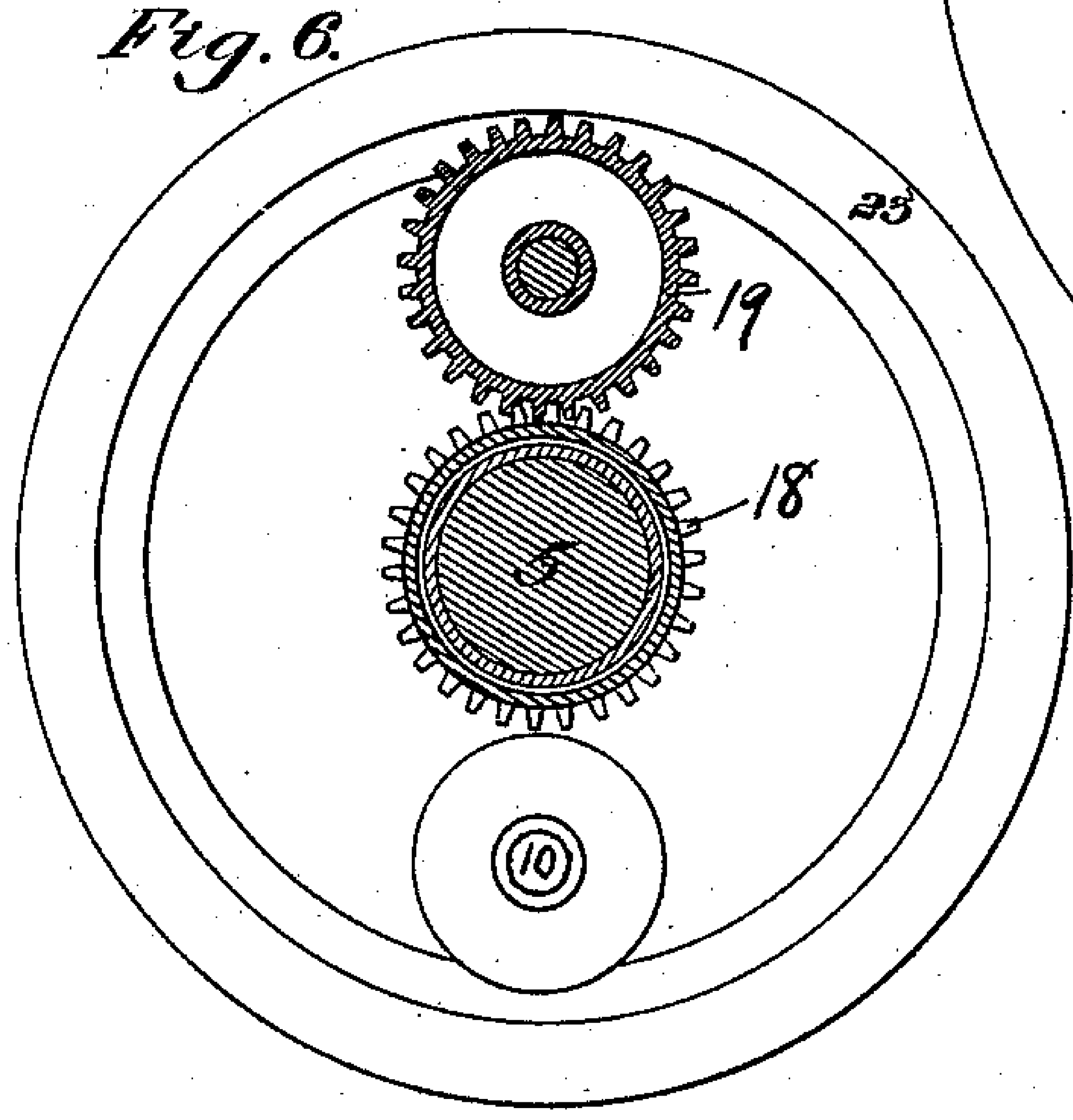
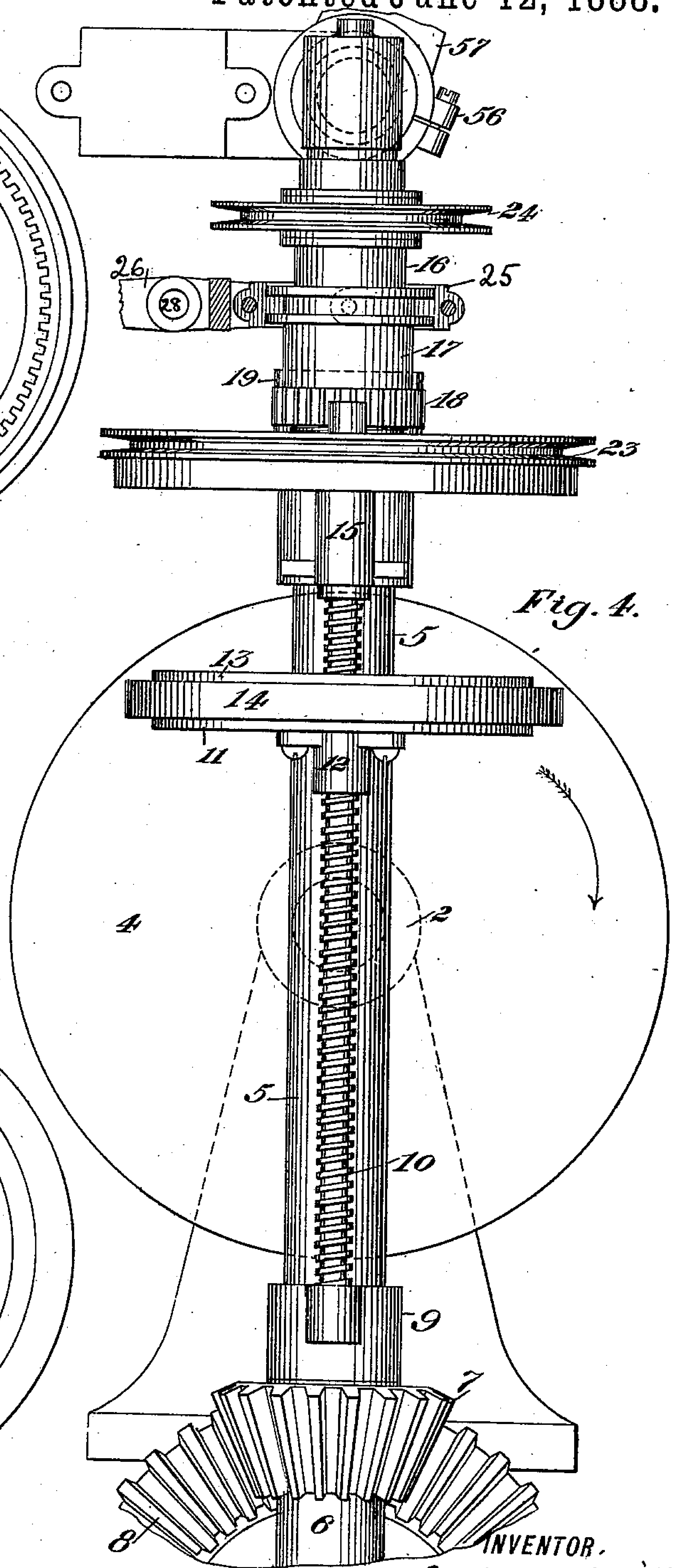


Fig. 4.



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UNITED STATES PATENT OFFICE.

CARL THEODOR AUGUST HERMANN WIEDLING, OF NEW YORK, N. Y., ASSIGNOR TO JOHN S. CONNELLY, OF PLAINFIELD, NEW JERSEY, AND THOMAS E. CONNELLY, OF BROOKLYN, NEW YORK.

DEVICE FOR TRANSMITTING POWER.

SPECIFICATION forming part of Letters Patent No. 384,598, dated June 12, 1888.

Application filed January 3, 1888. Serial No. 259,683. (No model.)

To all whom it may concern:

Be it known that I, CARL THEODOR AUGUST HERMANN WIEDLING, a citizen of Schwarzburg, Sondershausen, and of the German Empire, residing in the city of New York, and the county and State of New York, have invented a certain new and useful Improvement in Apparatus for Transmitting Power; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side view of the mechanism which I employ for transmitting power and for varying the speed of transmission, some of the parts being shown in vertical central section for the purpose of clear illustration. Fig. 2 is a front view of the upper part thereof, showing the levers which are under the control of the operator. Fig. 3 is a plan view. Fig. 4 is a front elevation of the parts shown in Fig. 1 without the operating-levers, &c., which are shown in Fig. 2. Fig. 5 is a horizontal cross section on the line *x x* of Fig. 1, viewed from beneath. Fig. 6 is a similar section on the line *y y* of Fig. 1, viewed from above. Fig. 7 is a horizontal cross-section on the line *z z* of Fig. 1. Fig. 8 is a vertical sectional view of the friction-disk 11, showing the manner in which its encircling friction-ring is held to its seat.

Like symbols of reference indicate like parts in each.

In the drawings, 2 is the primary driving-shaft of the machine, and 3 is the shaft to which it is desired to transmit power of variable speed. For this purpose I provide the driving-shaft 2 with a plain friction-disk, 4, and arranged parallel with the face thereof is a shaft, 5, which is stepped at its base in a bearing, 6, and is provided with a pinion, 7, meshing with a corresponding gear-wheel, 8, on the shaft 3.

Fixed to the shaft 5, at the base thereof, is a bracket, 9, having two projecting arms, whose ends serve as bearings in which are stepped the ends of two parallel screw-threaded spindles, 10, which are also parallel with the shaft 5. On the shaft 5 is an encircling wheel or disk, 11, secured to the shaft by a longitudinal feather and keyway, so as to be movable lengthwise thereon and yet rotary therewith. The threaded spindles 10 pass through this disk, and their threads engage with the female threads of boxes or bushings 12, which project downward and surround the spindles. The circumference of the disk 11 is recessed, so as to receive therein a friction-ring, 14, whose periphery is adapted to bear against the face of the friction-disk 4. This friction-ring is held to its seat by a suitable cover-ring, 13, which is adjustably secured to the disk 11 by means of bolts or otherwise. This is illustrated in Fig. 8. The disk 11 and its friction-ring, in conjunction with the friction-disk 4, form the means for transmission of the power, for as the disk 4 rotates it will, through friction, turn the disk 11 and the shaft 5. The function of the ring 14 is to prevent wear of the disk 4 by reason of any unequal speed of the contact-surfaces, owing to increase of resistance to the working of the machinery. In such cases, the surface-friction being greater than that of the ring 14 in its seat, the ring will slip on the disk 11, thus causing all the wear to be taken up by the seat, not by the faces of the friction-disks. The use of this slipping contact-surface is of great importance, and the principle of its arrangement may be applied generally to devices for transmitting power by frictional contact. I do not therefore intend to limit my claim for this feature to the specific application of it which I show and describe, but intend to cover it broadly in any device for transmitting power by friction.

The variation in speed of the driven shaft 5 is produced by moving the friction-disk 11 on the shaft 5 nearer to or farther away from the center of the disk 4, and a reversal of the motion is produced by moving the disk 11 from one side of the center of the disk 4 to the other side, as will be readily understood.

My invention consists in an improved apparatus for effecting the motion of this disk with accuracy and rapidity, as I will hereinafter more fully explain, and to provide means for varying the pressure of contact of the disk in harmony with its distance from the center of the other disk, the apparatus being designed especially for use in connection with the driven parts of locomotive-engines, or any other machine in which it is desirable to reverse the motion of the axle without reversing the engine and to effect the reversal automatically and with certainty.

Referring again to the drawings, Fig. 1, the spindles 10 have bearings at their upper ends in a projecting frame, 15, which encircles and is fixed to the driven shaft 5. Above the frame 15 is a cylindrical sleeve, 16, which loosely encircles the shaft 5, and which is externally screw-threaded, and fitting around this sleeve is a second internally-threaded sleeve, 17, on whose outer surface are cogs or teeth 18. These cogs mesh with a pinion, 19, fixed to the end of one of the spindles 10, so as to rotate therewith, and below the pinion 19, keyed to the same spindle, is a cog-wheel, 20, while keyed to the other spindle in the same horizontal plane is another cog-wheel, 21, and keyed to the sleeve 16, between the cogs 20 and 21 and meshing with both of them, is a third cog-wheel, 22. The cogs 20 and 21 are, however, of somewhat larger diameter than is the cog-wheel 19, so that when they are simultaneously rotated at the same speed the cog-wheels 18 and 22, which are in gear therewith, rotate at different speeds. The gear-wheels 20 and 21 have short cylindrical extensions, forming seats, whereby there is supported a ring, 23, arranged concentrically with the shaft 5 and provided with a downwardly-projecting flange having gear-teeth meshing with the teeth of the cogs 20 and 21, Figs. 1, 2, and 5. The periphery of the ring 23 is grooved, as shown in Fig. 1, to afford means, hereinafter to be explained, for retarding or stopping the rotation of the ring. Keyed to the sleeve 16 is a disk, 24, having a similar groove designed for the same purpose. The gear-wheels 20, 21, 22, and 23 and the screws 15 together constitute an epicyclic train, which when the outer wheel, 23, is unretarded can together rotate on the axis of the shaft 5 without producing individual rotation of the wheels 20 and 21 on their own axes, and when the outer wheel is retarded in its rotation the wheels 20 and 21 and the screws are caused thereby to rotate on their axes, as will be readily understood by reference to Fig. 5.

I shall now indicate generally how these parts act to effect the motion of the threaded spindles 10 and the consequent motion of the friction-disk 11.

Suppose the parts to be in the position shown in Fig. 1, with the shaft 5 driven by the friction-disk 4 and rotating in the direction of the arrow. Then, so long as neither the ring 23 nor the disk 24 is retarded, the spindles, the sleeves, and the gear-wheels above described rotate with the shaft 5 on the axis of the shaft, but not otherwise. If, however, friction be applied to the ring 23, so as to stop it, then the engagement of the cog-wheels 20 and 21 with the cogs of the ring 23 will cause them to revolve and to turn the spindles 10, to which they are fixed, and, of course, as the spindles 10 revolve their action on the threaded bushings 12 is to move the friction-disk 11 up or down, as the case may be. The rotation of the cogs 20 and 21 acts on the intermediate cog, 22, which revolves with its affixed sleeve 16, and the rotation of the spindles also acts on the outer sleeve, 17, through the cogs 18 and 19 and rotates it in the same direction with the sleeve 16. Owing, however, to the differential gearing above described, the sleeve 17 turns somewhat less rapidly than the sleeve 16, and therefore, by reason of the screw-threads on these sleeves, the outer sleeve, 17, moves on the sleeve 16, upward or downward, as the case may be, for the purpose of automatically relieving the friction on the ring 23, as I will hereinafter explain. Suppose, however, that instead of applying friction to the ring 23 it will be applied to the disk 24. In that case the sleeve 16 and the affixed gear-wheel 22 will be held stationary, and the effect of this gear-wheel thus acting on the traveling gear-wheels 20 and 21 will be to rotate the latter, together with the spindles 10, in a direction opposite to that above described, also moving the outer sleeve, 17, in an opposite direction. It is therefore apparent that if the ring 23 be held, the friction-disk 11 will be caused by the threaded spindles to move in one direction, and that if the disk 24 be held the friction-disk 11 will be caused to move in the opposite direction, and that if the parts be as they are shown in Fig. 1 and the friction-disk 11 be caused to move downward, the speed of rotation transmitted to the shaft 5 will decrease until the disk 11 reaches the center of the large disk 4, and then as the disk 11 continues to recede from the center on the other side thereof the speed transmitted will continue to increase, the machinery meanwhile rotating in an opposite direction.

I shall now describe the means which I use for applying friction to the disk 24 and the ring 23, referring especially to Figs. 2 and 3 of the drawings, in which the parts are shown in the positions which they occupy when the disk 11 is at or near the center of the disk 4.

On the vertically-moving sleeve 17 is arranged a loosely-fitting collar, 25, and loosely connected with the collar is a lever, 26, having a forked end which is pivoted to the sides of the collar at opposite points by bolts 27. The lever 26 has its fulcrum on a pin, 28, and at its extremity it is slotted lengthwise, and fits around a pin or stud, 29, on a vertical plate or bar, 30. The bar 30 fits within slots made in the rear ends of two bars, 31 and 32, which are arranged to slide lengthwise within bearings 33, and at their forward ends are tapered, so as to fit conveniently within the grooves of the ring 23 and disk 24, respectively. The outer edge of the bar 30 is shaped as shown in Fig. 2, there being a double incline at the upper end and a double converging incline at the bottom. 34 is a lever loosely journaled at its middle point to a shaft, 35, and having at its ends friction-rollers 36 and 37, which bear against the inclined ways of the bar 30, the roller 36 bearing against the projecting inclines at the upper end of the bar, and the roller 37 bearing against the double inward incline at the lower end of the bar. Fixed to the shaft 35 and projecting radially therefrom is a lever, 38, having at its end a friction-roller which bears against the periphery of a cam, 40, which cam is rotated by means of the reversing-lever 39, provided with the usual quadrant, 41, and latch 42. In order to keep the end of the lever 38 in contact with the eccentric periphery of the cam 40, I provide it with a projecting arm, 43, to which is attached a spring, 44, the tension of which acts on the lever 38 to force it upward. There is also another spring, 45, which at one end is attached to the lever 38, and at the other end is attached to the upper arm of the double lever 34. This arm of the lever 34 has also a projecting arm, 46, which is directed toward and normally engages with the side of the lever 38. Suppose, now, that the parts are in the position shown in Fig. 2, with the end of the lever 38 bearing against the periphery of the cam 40 and the arm 46 resting on the side of the lever. In order, now, to cause the end of the bar 31 to engage the disk 24, and by the means above explained to cause the rotation of the threaded spindles 10, I raise the lever 39, say, to the second notch of the quadrant. This turns the cam 40 on its axis and depresses the free end of the lever 38 correspondingly, and this motion of the lever, by removing the support from the arm 46, suffers the spring 45 to draw forward the upper end of the lever 34, pressing it against the bar 30, and thus forcing the bar 31 forward into the groove of the disk 24, and holding that disk from rotation. As before explained, this at once causes the motion of the friction-disk 11 away from the center of the disk 4, and also causes the collar 25 on the sleeve 17 to move downward. The outer end of the lever 26 is thereby raised, and with it is raised the bar 30, thus allowing the upper end of the lever 34 to be drawn forward, following the inclination of the bar 30 until the arm 46 comes in contact with the lever 38, when the strain of the spring 45 on the bar 31 is released, and the disk 24 begins once more to rotate, with the effect of stopping the revolutions of the spindles 10.

If it is desired to remove the friction-disk 11 still farther from the center of the disk 4, it is done by raising the lever 39 still more, with the same result, the motion of the sleeve 17 allowing the disk to move through a predetermined distance, and then automatically stopping it. This is done with great rapidity and with a certainty which, without such means as this, would be impossible in connection with machinery, such as locomotive street-cars, where very quick action is desirable. In order to move the friction-disk 11 in the opposite direction, it is necessary, as before explained, to check the motion of the ring 23, and for this purpose I move the lever 39 in the opposite direction from that last described. This withdraws the contact of the cam 40 from the friction-roller at the end of the lever and suffers the spring 44 to act on the lever 38 through the arm 43, and also on the lever 34 through the arm 46, and to throw the lower end of the lever 34 forward, thereby pressing on the bar 30 and forcing the bar 32 into contact with the ring 23. As before explained, this causes the spindles 10 to rotate in the reverse direction, and raises the sleeve 17 until the resulting motion of the lever 26 and inclined bar 30 suffers the upper end of the double lever 34 to move back far enough to cause the roller at the end of the lever 38 to engage the periphery of the cam 40, at which time, the strain on the bar 32 being relieved, the ring 23 begins to turn and the variation of speed of the driven parts is checked.

I shall now describe another feature of my invention, whose object is to provide a variable frictional contact between the friction-disks 4 and 11.

When the work required to be done by the mechanism of which the friction-disks form part is very great, the friction-disk 11 is moved toward the center of the disk 4, and in such case it is necessary that the disks should be held firmly in contact. When, however, the work to be done is lighter and the disk 11 is moved toward the periphery of the disk 4, the pressure of contact of the disks need not be so great, and it is desirable that it should be lessened in order to avoid unnecessary wear and friction. To this end I have provided means whereby, as the friction-disk 11 is moved toward the center of the primary disk 4, the pressure of contact of the disks may be increased, and that as the disk 11 is moved toward the periphery of the other the contact-pressure shall be diminished. To this end, as shown in Fig. 1, I pivot the bearing 6 of the shaft 5 by means of a pin, 50, so that the whole shaft may be moved on this pivot toward or from the disk 4, and in order to produce this motion I use for the bearing of the upper end of the shaft a tubular bearing, 51, having a projecting socket, 52, which fits loosely over the contracted end of an arm, 53, projecting from the stationary frame 54. The socket 52 and the arm 53 are externally screw-threaded with threads of opposite direction, and over them fits a nut, 55, having female threads which engage therewith. On this nut is clamped a collar, 56, from which projects a lever, 57, having a slot wherein fits a friction-roller at the end of the projecting arm 58 of the reversing-lever 39.

The upper part of the slot of the lever 57 is substantially concentric with the pivotal point of the lever 39, and the remainder of the slot is eccentric, so that while the first part of the upward motion of the lever has no effect on the lever 57 the remainder of its motion moves the lever 57 and turns the nut 55, thereby separating the parts 52 and 53 and causing the shaft 5 to move away from the friction-disk 4, thus diminishing the pressure of the periphery of the disk 11 against the disk 4, and finally separating the disks altogether from each other if the motion of the nut 55 be continued long enough. The inclination of the slot of the arm 57 and the eccentricity of the cam 40 are made in such relations to each other that as the disk 11 is caused by the indirect action of the cam 40 to move from the periphery toward the center of the disk 4 the pressure of the disks against each other is gradually and correspondingly increased.

I am aware that in prior devices for the transmission of power by frictional contact disks have been used one of which is movable to and from the center of the other to vary the speed of the transmitted power, and is also movable by means of levers, so as to entirely disconnect the disks and to stop the motion of the driven machinery; but in none of these prior devices have the parts been adapted to vary the contact-pressure to make it conform properly to the relative positions of the disks. In my apparatus I employ a device for moving the disk 11 with its bearings, and by means of this device I am enabled either manually or automatically to vary the contact-pressure in such way that the disks shall be held in contact by a positive force of greater or less degree, corresponding to their position. To do this by hand it is essential that I should use a screw or its mechanical equivalent—such as the screw-nut 55 or a cam of very gradually-varying eccentricity—which will enable the parts to be moved accurately through small distances, so that the contact-pressure may be increased and diminished gradually without actual break of the contact. Such mechanism I designate generically a "screw" in the claims which refers to this feature of my invention.

In order to reverse the direction of the motion of the driven parts by causing the disk 11 to move across the center of the disk 4, I proceed as follows: When the driven disk is in motion and has acquired momentum, I move the lever 39 far enough to turn the nut 55 sufficiently to separate the disks entirely from contact with each other, and then I force down a lever, 60, which is pivoted to the frame of the machine and which has a projection or lug, 61, so situate as to be interposed between the roller 36 of the lever 34 and the bar 30. This separates these parts, and also forces the roller 37, at the other end of the lever 34, against the lower end of the bar 30, thus causing the bar 32 to engage the friction-ring 23 and to retard the same. Then, as the shaft 5 is caused to revolve by the momentum of the driven parts, the friction-disk 11 is screwed past the center of the driving-disk 4, and if the lever 60 be raised and the lever 39 be moved back to bring the disks once more into contact the parts will be driven in the opposite direction, as will be readily understood.

It is plain that I may also reverse the motion by stopping the shaft 5 and by screwing the friction-wheel 11 past the center of the disk 4, either by turning the wheel 24 or ring 23 by hand, or by hand stopping the ring 23 while the shaft 5 is revolving by momentum.

The advantages of the apparatus which I have described will be apparent to those skilled in the art, and it will also be apparent that it is susceptible of many modifications by the substitution of equivalent parts and changes of form. I do not therefore by the mention of specific parts in the claims by their well-known mechanical designations intend to limit myself solely thereto, since suitable racks or levers may be substituted for the screws, and other similar changes, which will suggest themselves to the skilled mechanic, may be made; and in the following claims I use the term "gearing" generically, to cover not only cog-wheels, but other mechanical parts effecting the same purpose.

The use for which I have especially designed my improvement, as I have already stated, is in connection with the driven parts of locomotive-engines in which the locomotive-power is supplied by a continuously-operating gas-engine, the principal advantage of the invention being to provide convenient means whereby the motion of the locomotive may be reversed and its speed varied without reversing or changing the speed of the engine, so that the care of the engine may be put in the hands of ordinary workmen, who need not have any special mechanical training or skill. That this apparatus accomplishes this desirable result will be apparent from the foregoing description. The entire control of the motion of the car is governed by the use of the reversing and speed-changing lever 39, and the motion of this lever does not at all affect the action of the engine, which may be driven continuously and without attention from one end of a trip to the other.

I claim—

1. In a device for transmitting power by means of frictional contact, the combination, with friction-disks, one of which is movable to vary the speed of the transmitted motion, of a screw-connection which engages the movable disk, and gearing which is movable to cause the action of the screw-connection on the friction-disk, whereby it is moved, substantially as and for the purposes described.

2. In a device for transmitting power by frictional contact of disks, the combination of the said disks, one being movable toward and from the center of the other to vary the speed of the transmitted motion, and one being movable to and from the surface of the other to vary the contact-pressure, said disks having actuating mechanisms by which said motions are effected, said actuating mechanisms being mechanically connected, whereby on the motion of the one disk toward or from the center of the other the contact-pressure of the disks shall be varied, substantially as and for the purposes set forth.

3. In a device for transmitting motion by means of frictional contact, the combination, with disks and their bearings, one of the disks being movable toward and from the center of the other to vary the speed of transmitted motion, and the bearings of one of the disks being movable to move said disk to and from the surface of the other, of a screw which is connected with and moves said bearings, whereby the pressure of contact of the disks is variable conformably with the position of one disk relatively to the other, substantially as and for the purposes described.

4. In a device for transmitting motion by frictional contact, the combination of the contact elements, one of which is a rotary disk or wheel having an encircling friction-ring, which is fitted loosely to its seat on the disk and bears against the other contact element, whereby on the application of excessive resistance it shall slip on its seat, substantially as and for the purposes described.

5. In a device for transmitting power by means of frictional contact of friction-disks, one of which is movable to vary the speed of the transmitted motion, the combination of a gear-wheel, 22, which rotates on the axis of the friction-disk, other gearing connected therewith, and also connected with the mechanism which moves the movable friction-disk, and a friction-ring, 23, which is in mechanical connection with said gearing, and which normally revolves on the axis of the disk, whereby on retardation of the said ring the mechanism of the movable disk will be driven independently and will effect the motion thereof, substantially as and for the purpose set forth.

6. In a device for transmitting power by means of frictional contact of friction-disks, one of which is movable to vary the speed of the transmitted motion, the combination of a gear-wheel, 22, which rotates on the axis of the friction-disk, other gearing connected therewith, and also connected with the mechanism which moves the movable friction-disk, a friction-ring, 23, which is in mechanical connection with said gearing, and which normally revolves on the axis of the disk, whereby on retardation of the said ring the mechanism of the movable disk will be driven independently and will effect the motion thereof, and means for retardation of the gear-wheel 22 to effect the reverse action of the parts, substantially as and for the purpose set forth.

7. In a device for transmitting power by frictional contact of disks, the combination of the said disks, one of which is movable toward and from the center of the other to vary the speed of the transmitted motion, and which is provided with mechanism for producing such movement, and a lever operated in harmony with the movement of said movable disk, which lever automatically causes the cessation of said movement when the disk is moved through a predetermined distance, substantially as and for the purpose set forth.

8. In a device for transmitting power by frictional contact of disks, the combination of the said disks, one of which is movable toward and from the center of the other to vary the speed of the transmitted motion, and which is provided with mechanism for producing such movement, and a cam which through suitable mechanism acts on the mechanism of said movable disk to cause it to operate, and a lever operated in harmony with the said movement of the movable disk, which lever stops the motion of the disk after it has moved to an extent corresponding to the degree of motion of the cam, substantially as and for the purpose set forth.

9. In a device for transmitting power by means of frictional contact, the combination, with friction-disks, one of which is provided with mechanism by which it is movable to vary the speed of the transmitted motion, of differential gearing driven by the power connections which cause the motion of the movable friction-disk, said differential gearing acting automatically to cause the cessation of the motion of the disk when it has moved through a predetermined distance, substantially as and for the purpose set forth.

10. In a device for transmitting power by means of frictional contact of friction-disks, one of which is movable to vary the speed of the transmitted motion, the combination of a gear-wheel, 22, which rotates on the axis of the friction-disk, other gearing connected therewith, and also connected with the mechanism which moves the movable friction-disk, a friction-ring, 23, which is in mechanical connection with said gearing, and which normally revolves on the axis of the disk, whereby on retardation of the said ring the mechanism of the movable disk will be driven independently and will effect the motion thereof, and means for retardation of the gear-wheel 22 to effect the reverse action of the parts, a threaded sleeve, 16, forming part of and rotating with the gear-wheel 22, a threaded sleeve, 17, working thereon, gearing connected with the sleeve 17 and which drives it at a different rate of speed from that of the sleeve 16, whereby the one sleeve is caused to move on the other, and a lever operated by motion of the sleeve, which automatically causes cessation of motion of the gearing when it has moved through a predetermined distance, substantially as and for the purpose set forth.

11. In a device for transmitting power by means of frictional contact, the combination, with frictional disks one of which is movable toward and from the center of the other to vary the speed of transmitted motion, of an epicyclic train of gearing which is connected with the said movable disk and acts thereon to cause its said motion toward and from the center of the other disk, substantially as and for the purposes described.

12. As a device for transmitting power by means of the frictional contact of disks and varying the same, mechanism for moving one of the disks, and retarding devices whereby

said mechanism is caused to operate, a lever, 38, by motion of which pressure is caused to be exerted on the retarding devices, and a bar, 30, connected with the moving mechanism of said disk and moved thereby to relieve the pressure exerted on the retarding devices, substantially as and for the purposes described.

13. As a device for transmitting power by means of frictional contact of disks and varying the same, mechanism for moving one of the disks, in combination with the friction-bars 31 and 32, by motion of which said mechanism is caused to operate, a lever, 34, a movable bar, 30, interposed between this lever and the said friction-bars and connected with the moving mechanism of said disk, a spring connecting the levers 38 and 34, and a stop, 46, substantially as and for the purposes described.

14. As a device for transmitting power by means of frictional contact of disks and varying the same, mechanism for moving one of the disks, in combination with the friction-bar 31, by motion of which said mechanism is caused to operate, a lever, 38, by motion of which pressure is caused to be exerted on the friction-bar, a bar, 30, connected with the moving mechanism of said disk and moved thereby to relieve the pressure exerted by said lever on the friction-bar, and a cam and lever whereby the lever 38 is operated, substantially as and for the purposes described.

15. In a device for transmitting power by frictional contact of disks, the combination, with said disks, one of which is movable to and from the other to effect variation in contact-pressure, of a lever, 39, which effects the motion of one of said disks to vary the speed of the transmitted motion, and a lever, 57, also operated by motion of the lever 39, and connected with the movable bearing of the axis of said disk, whereby a corresponding and simultaneous change of speed and variation of contact-pressure is effected, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand, at New York city, this 1st day of December, 1887.

CARL THEODOR AUGUST HERMANN WIEDLING.

In presence of—
THOMAS W. BAKEWELL,
M. M. FREEMAN.