

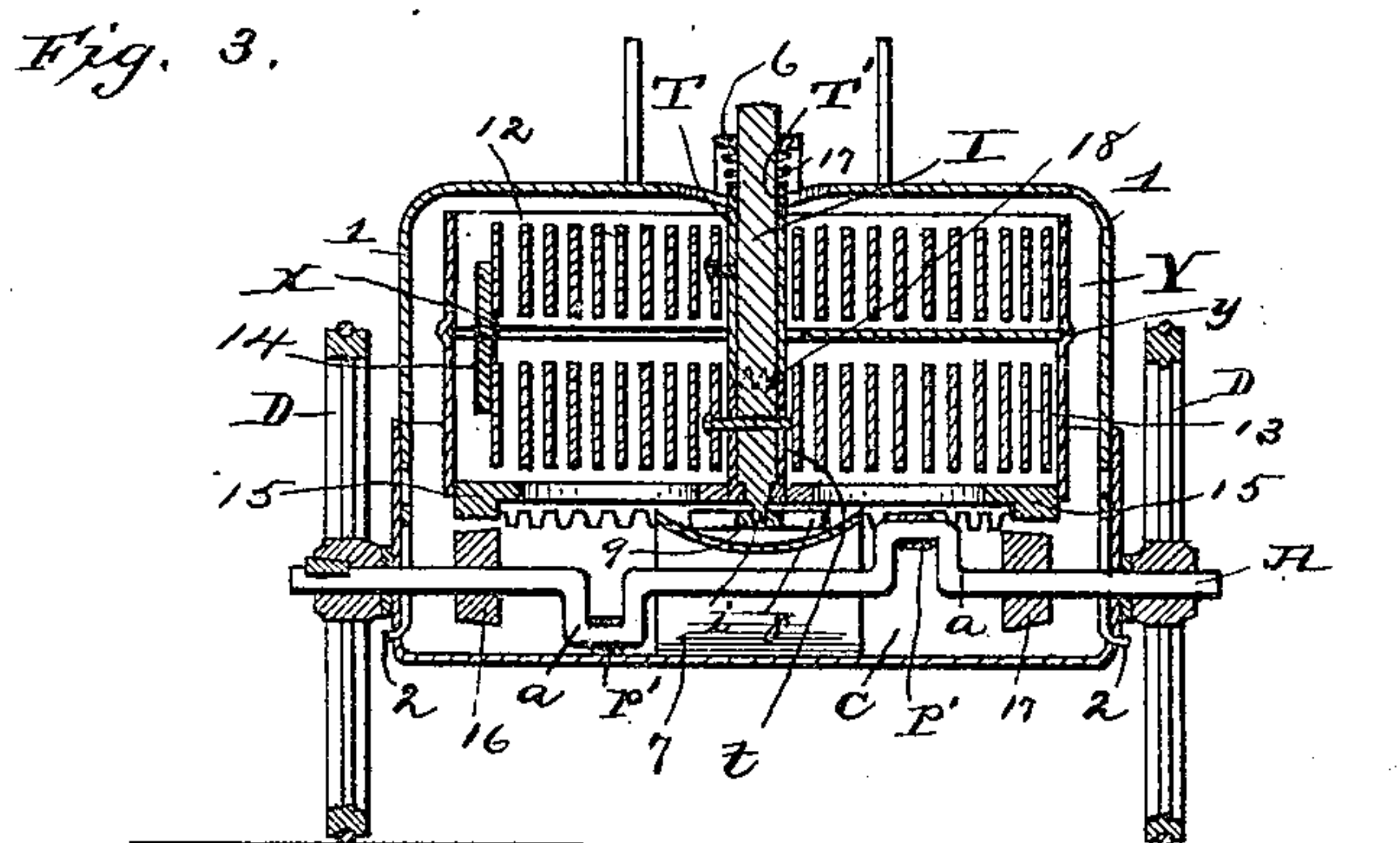
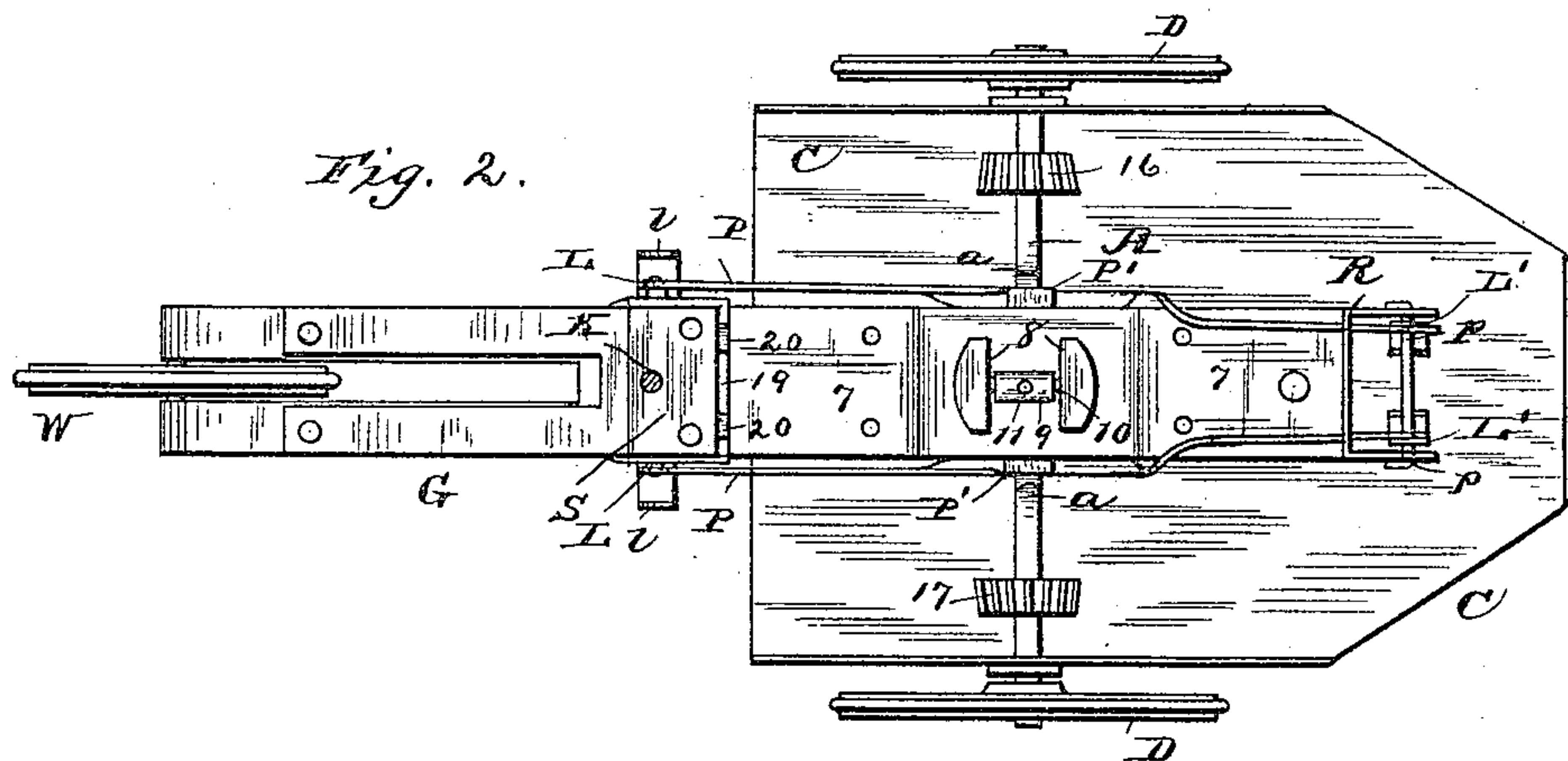
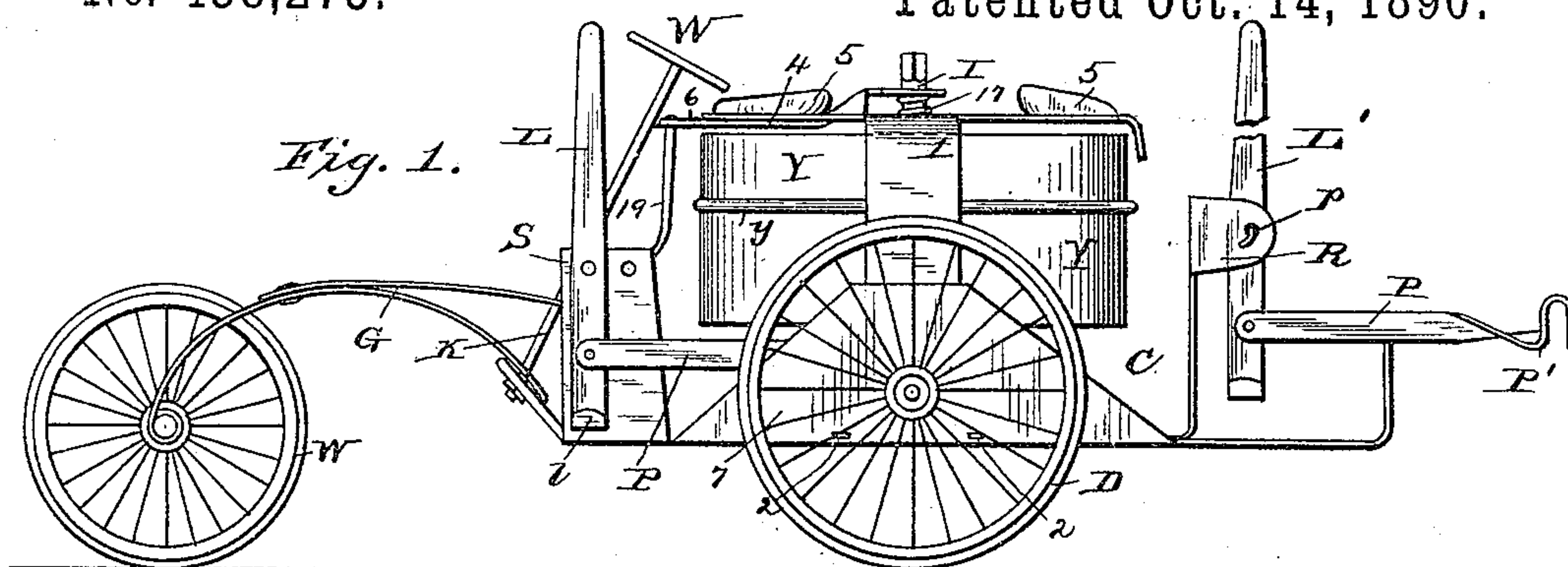
(No Model.)

2 Sheets—Sheet 1.

A. E. MILLER.
TRICYCLE.

No. 438,273.

Patented Oct. 14, 1890.



Witnesses

Harry L. Amer.

Inventor

Austin E. Miller.

By his Attorneys,

M. J. Gollamer. C. A. Snow & Co.

(No Model.)

2 Sheets—Sheet 2.

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Fig. 4.

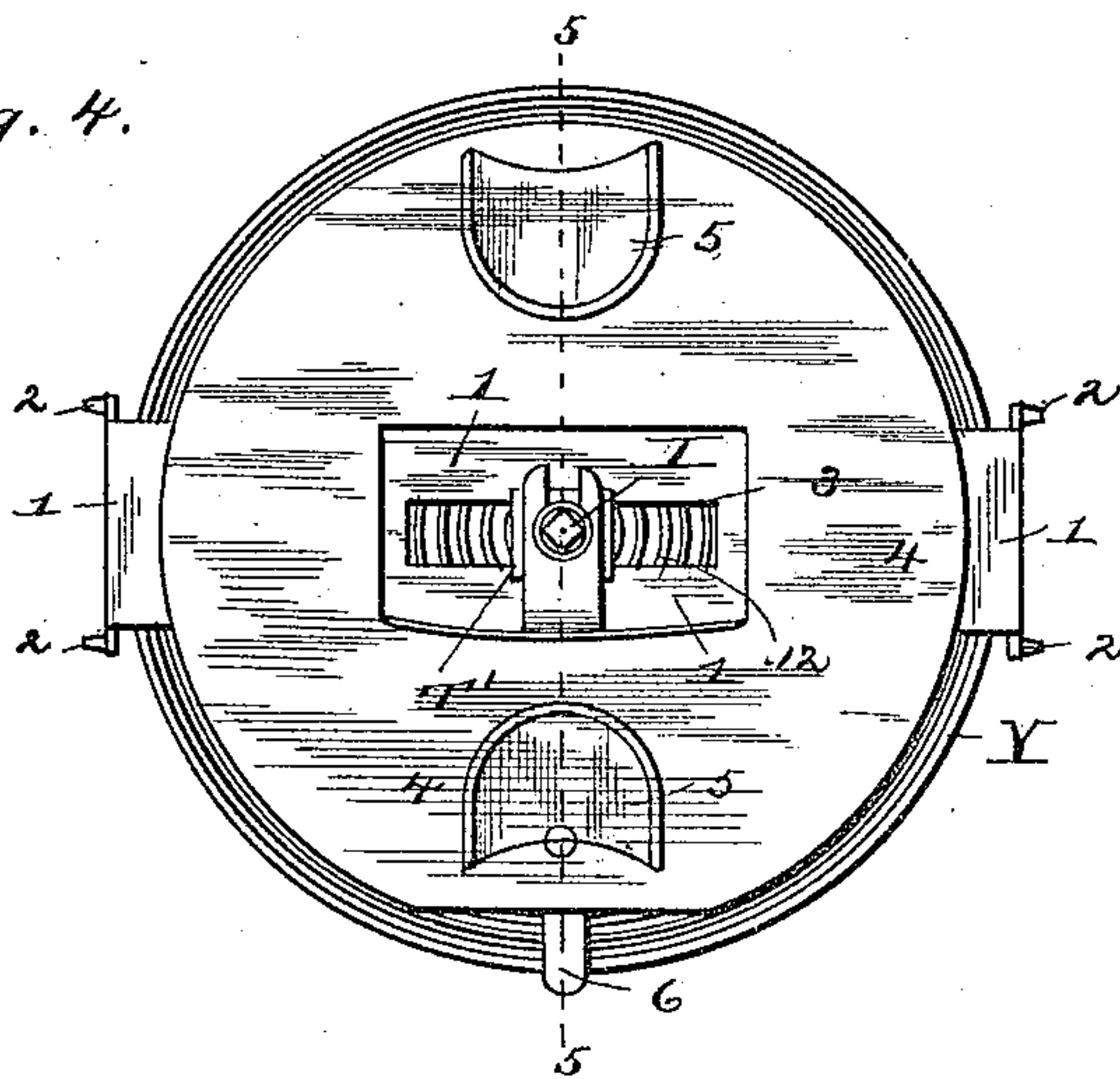
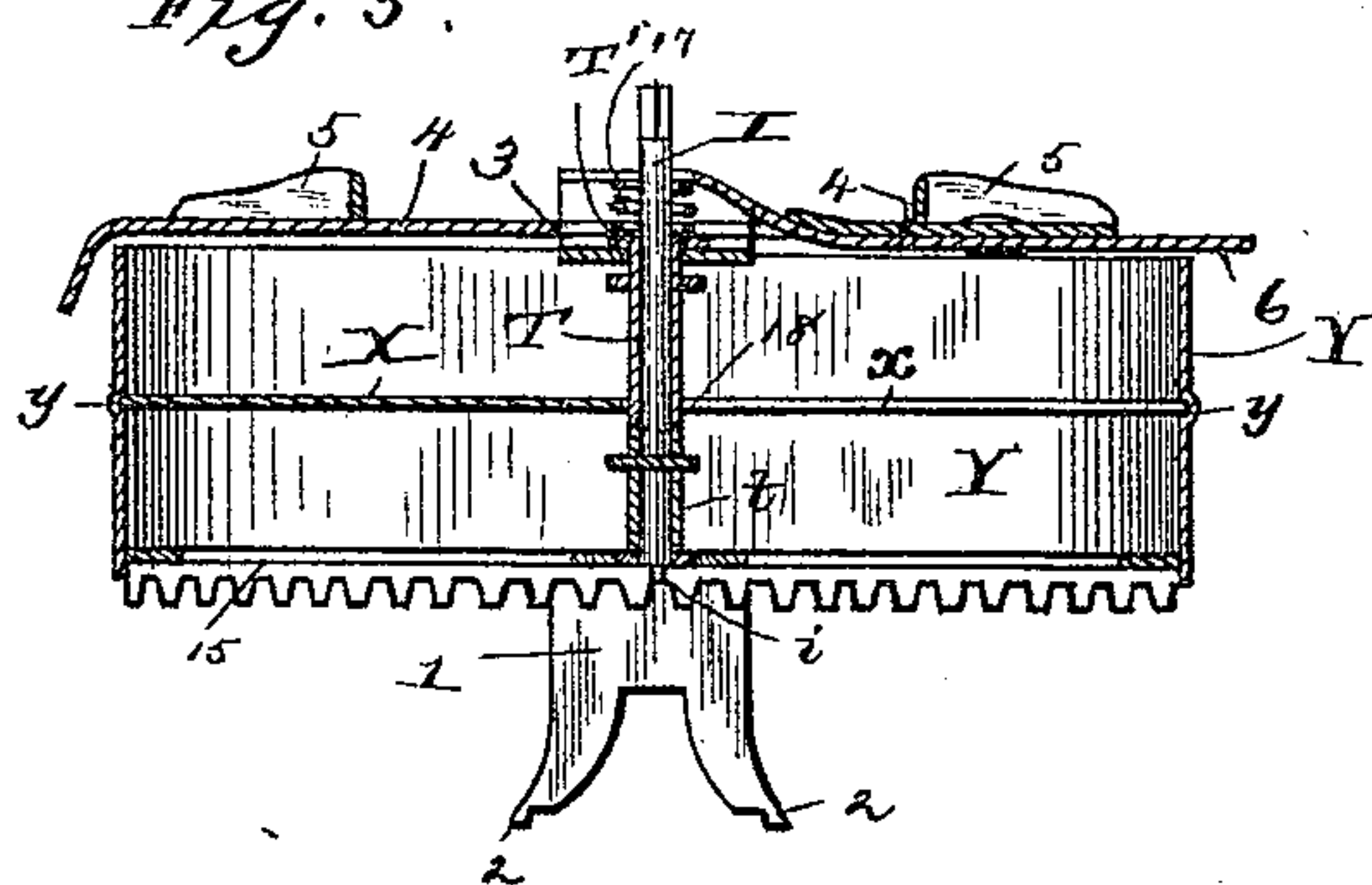


Fig. 5.



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UNITED STATES PATENT OFFICE.

AUSTIN E. MILLER, OF SPRAGUE, WASHINGTON.

TRICYCLE.

SPECIFICATION forming part of Letters Patent No. 438,273, dated October 14, 1890.

Application filed March 27, 1890. Serial No. 345,526. (No model.)

To all whom it may concern:

Be it known that I, AUSTIN E. MILLER, a citizen of the United States, residing at Sprague, in the county of Lincoln and State of Washington, have invented a new and useful Tricycle, of which the following is a specification.

This invention relates to velocipedes, and more particularly to that class thereof known as "tricycles."

The object of the invention is to provide a machine which is to be driven by two persons or by the force of a spring which has been wound up either by hand or by the machine itself in descending some hill. This object I accomplish by my improved tricycle, which consists, essentially, in improvements in the combined hand and foot levers for driving the main axle, in the oscillating casing carrying the driving-spring and means for oscillating it, and in the double spring within said casing, adapted to be wound by hand or by the machine itself, as well as of adjunctive and specific details of construction which assist in the attainment and accomplishment of the end in view and certain auxiliaries which tend to enhance the value of the completed machine, all as hereinafter more fully described, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my tricycle complete. Fig. 2 is a plan view thereof with the spring and its connections and supports removed. Fig. 3 is a central transverse section with the spring and its connections and supports in place. Fig. 4 is a plan view of the spring casing and support. Fig. 5 is a vertical section on the line 5 5 of Fig. 4 with the springs removed.

Referring to the accompanying drawings, the letter C designates the carriage; A, the main axle journaled in the sides thereof and cranked at *a*, and D the main driving-wheels, one of which is keyed to one end of this axle and the other of which is loose on the other end.

S is a standard at the front of the main carriage, in which is a king-bolt K, and mounted upon this king-bolt is a guide-frame G, having a guide-wheel W at its rear end. The rear end of the frame G extends beyond the king-bolt and carries this wheel, by means of

which the said frame may be turned on the king-bolt to guide the machine.

R is a rear standard also rising from the carriage C near its rear end, as shown in Fig. 1.

My improved tricycle may be operated by two riders, who apply power by hand to the upper ends of levers L and by foot to their lower ends *l*, which power is communicated by pitman-rods P to the cranks *a* of the axle A. The two rear levers L' are mounted upon a removable pivot *p* through the rear standard R, and may be carried out of operative position by being turned to the rear, as shown in Fig. 1, or may be turned into operative position, as shown in Fig. 2, the hooked ends P' of the pitmen P engaging over the eyes *p'* at the rear ends of the front pitmen P, which eyes loosely embrace the cranks *a*.

My improved tricycle may also be operated by spring mechanism constructed as follows:

1 designates a U-shaped frame, the ends of whose body are bifurcated and the tips 2 of which are bent outwardly, so as to engage holes through the sides of the casing C, the opening between the bifurcations straddling the main axle A. The center of the U-shaped body is provided with a depression having a longitudinal slot 3, and the body also carries a plate 4, having seats 5 at its front and rear edges, upon which the operators sit while driving the tricycle. Pivoted below the front seat 5 is an arm 6, having a bifurcated rear end, for a purpose hereinafter set forth.

The numeral 7 designates a shield curving upwardly from the base of the carriage C and covering the central portion of the axle A, and rising from the upper face of this shield are two lugs 8. A stop 9 has reduced ends or bearings 10, which are journaled in the opposite inner faces of the lugs 8, and is provided with a socket or bearing 11 at its center, it being understood that this stop oscillates transversely of the carriage.

The letter Y designates a cylindrical casing having a rim *y* in its side at about the center of its height, and in this rim slides a disk X, having a slot *x* in one edge.

12 and 13 are spiral springs located, respectively, above and below the disk X, their outer ends being connected through the slot *x* by

a vertical bar 14. The inner end of the lower spring 13 is connected to a tube *t*, which rigidly connects with the lower end of the vertical shaft I, and the lower extremity of this shaft is reduced, as at *i*, and adapted to rotate within the socket 11 at the center of the step 9.

Keyed to the shaft I and rigidly connected to the lower end of the tube *t* is a large gear-wheel 15, whose teeth are on its under face at its periphery and are adapted to be thrown into engagement alternately with gears 16 and 17, keyed to the main axle A, as shown in Fig. 2, according as the vertical shaft I is tipped to one side or the other of the machine.

The inner end of the upper spring 12 is rigidly connected to a tube T at its center, which tube has an enlarged head T', squared so as to fit and move in the slot 3 in the frame 1 in order that this tube may be prevented from rotating. The upper end of the shaft I passes loosely through this tube and loosely through the bifurcated rear end of the arm 6, above described, a small coiled spring 17 being interposed between said squared head and said bifurcated end. The function of this coiled spring is (when the head T' is at the center of the depression) to press the upper tube T through the slot *x* in the disk X and against the upper end of the lower tube *t*, which is rigidly connected to the shaft I, and the meeting ends of these tubes are provided with ratchet-teeth 18, as shown in the drawings. When, however, the head T' is moved to either end of the slot 3, it is raised, and the tube T is thereby lifted so that its teeth 18 disengage those on the tube *t*.

A plate 19 is secured to the upper end of the standard S at the front ends of the carriage C, and is provided with notches 20, in which the free end of the arm 6 may be seated to hold it at either extremity or at the center of its adjustment.

With this construction the operation of my device is as follows: A single operator may sit upon the front seat 5 with his hands upon the upper ends of the levers L and his feet engaging the lower bent ends *l* thereof, and may reciprocate these levers alternately to impart a rotary motion to the rear axle A and drive the machine. As one lever is drawn back the other is pressed forward and the two foot-rests or stirrups are oppositely moved, and this operation affords an opportunity of imparting much power to the driving of the machine. The steering is done by this operator, who moves the handle of the frame G from side to side in a manner which will be readily understood. A second operator may sit upon the rear seat 5, facing rearwardly, and may operate the rear levers L' in the same manner. In this case the hooked ends P' of the rear pitmen P are engaged with the cranks *a*, whereas when but one operator is driving the machine these hooks are preferably disengaged therefrom. When the machine comes to a downgrade, the arm 6 is moved, the shaft I is tilted, the large gear-wheel 15 is turned

into engagement with the gear 16, and the running of the machine downgrade winds up and imparts a tension to the spiral springs within the casing Y, the teeth 18 upon the tubes T and *t* being out of engagement because the shaft I is tilted, as will be understood. When the bottom of the grade has been reached, the arm 6 is moved to the central notch 20, whereby the large gear is caused to stand in a horizontal plane out of engagement with both small gears, and the head T' and tube T are lowered so that the teeth 18 engage and prevent the unwinding of the springs. When an upgrade is reached, the arm 6 is thrown to the other side, disengaging the teeth 18, and the large gear is thereby caused to engage the other small gear 17 upon the axle A. The uncoiling of the springs within the casing imparts rotation to the large gear and thus assists the operators in driving the machine up the hill or grade.

The upper end of the shaft I may be squared, as at 21, whereby the springs can be wound up by a cranked key when desired, in which case the shaft I will be vertical and the teeth 18 will slip over each other. It will thus be seen that the spring mechanism may be used to drive the machine on a level or to assist in driving the machine up a hill, and that the springs may be wound up either by hand or by the running of the machine.

What I claim is—

1. The combination, with the carriage carrying front and rear standards and the double-cranked axle journaled in said carriage, of levers pivoted to the front standard and pitmen connecting them to the crank, other levers removably pivoted to the rear standard, and pitmen connected to said levers, the free ends of said pitmen having hooks adapted to removably engage said cranks, substantially as described.

2. In a tricycle, the combination, with the main axle carrying the driving-wheels and the steering mechanism, of pivoted levers connected to said axle for driving the same, and spring mechanism, substantially as described, adapted to be thrown into engagement with said axle, in the manner and for the purpose set forth.

3. In a tricycle, the combination, with the main axle carrying the driving-wheels and small gears keyed thereon near its ends, of a spring mechanism, substantially as described, carrying a large gear adapted to be engaged with either or disengaged from both small gears, an upright shaft on which said mechanism is mounted, and means, as set forth, for tilting said shaft, as and for the purpose specified.

4. The combination, with the carriage having a front standard and a notched plate carried thereby, of spring mechanism, substantially as herein described, mounted upon an upright shaft, and a pivoted arm, its front end engaging said notches and its rear end being bifurcated and engaging said shaft, the

whole operating as and for the purpose set forth.

5. The combination, with the carriage, a shield carried thereby, lugs on said shield, and a step pivoted between the adjacent faces of said lugs and provided with a socket at its center, of spring mechanism, substantially as herein described, mounted upon an upright shaft, the lower extremity of which is seated in said socket, and means, as set forth, for tilting the upper end of said shaft, the whole operating as and for the purpose specified.

6. The combination, with the carriage having holes in its sides and a main shaft journaled in said sides above and between said holes, of a U-shaped frame having bifurcated ends straddling said axle and outwardly-bent tips engaging said holes, and a spring mechanism, substantially as described, mounted in said frame, as set forth.

7. The combination, with the U-shaped frame having a longitudinal slot at the center of its body, the carriage supporting said frame, and a step carried by said carriage below the center of said slot, of an upright shaft journaled in said step and its upper end passing through said slot, a tube having a squared upper end sliding laterally in said slot and through which tube the shaft passes, a compound spring connected at its lower end to said shaft and at its upper end to said tube, a large gear carried by the shaft, and small gears keyed to the main axle, the whole operating substantially as set forth.

8. In a tricycle, the combination, with the carriage, a main axle journaled therein and having small gears near its ends, a front standard having a notched plate, an oscillating step over the center of said axle, and a U-shaped frame having a transverse slot above said step, of an upright shaft journaled in said step and its upper end passing through said slot, a tube having a squared upper end sliding in said slot, through which tube the shaft passes, a compound spring connected at its lower end to said shaft and at its upper end to said tube, a large gear carried by the shaft and standing normally above said small gears, an arm pivotally connected to said frame and having a bifurcated rear end loosely engaging said shaft, the front end of said arm engaging said notched plate, and a ratchet-connection, substantially as described, between said tube and shaft, the whole operating as set forth.

9. The combination, with a cylindrical casing having a groove in its side at about the center of its length, a shaft located in the center of said casing, a tube surrounding said shaft, and a ratchet-connection between them, of a disk seated in said groove and having a radial slot embracing said shaft, a spring above said disk connected at its inner end to said tube, a spring below said disk connected at its inner end to said shaft, a plate passing through said slot in the disk and rigidly connecting the outer ends of said springs, and a gear carried by said shaft, the whole operating substantially as and for the purpose set forth.

10. The combination, with the shaft, the lower tube rigidly secured to the lower end thereof and provided with teeth in its upper end, and the compound spring connected at one end to said tube, of an upper tube loosely mounted on the upper end of said shaft and having teeth in its lower end engaging those in the lower tube, the upper end of the compound spring being connected with the upper tube, and means, substantially as described, for raising and lowering the upper tube, as and for the purpose set forth.

11. The combination, with the shaft seated at its lower end in a step, the lower tube rigidly secured to said shaft near its lower end and provided with teeth in its upper end, and the compound spring connected at one end to said tube, of an upper tube loosely mounted on the upper end of said shaft and having teeth in its lower end engaging those in the lower tube, the upper end of the compound spring being connected with the upper tube, a frame having depression in its center, provided with a slot through which said shaft passes, the upper end of said upper tube having a squared head sliding in said slot, an arm pivotally connected to said frame and having a bifurcated end straddling said shaft, and a coiled expansion-spring upon said shaft between said bifurcated end and said enlarged head, the whole operating substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

AUSTIN E. MILLER.

Witnesses:

GEO. F. HOLLAND,
A. W. HOLLAND.