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CAR STARTER AND BRAKE.

No. 520,134. Patented May 22, 1894.

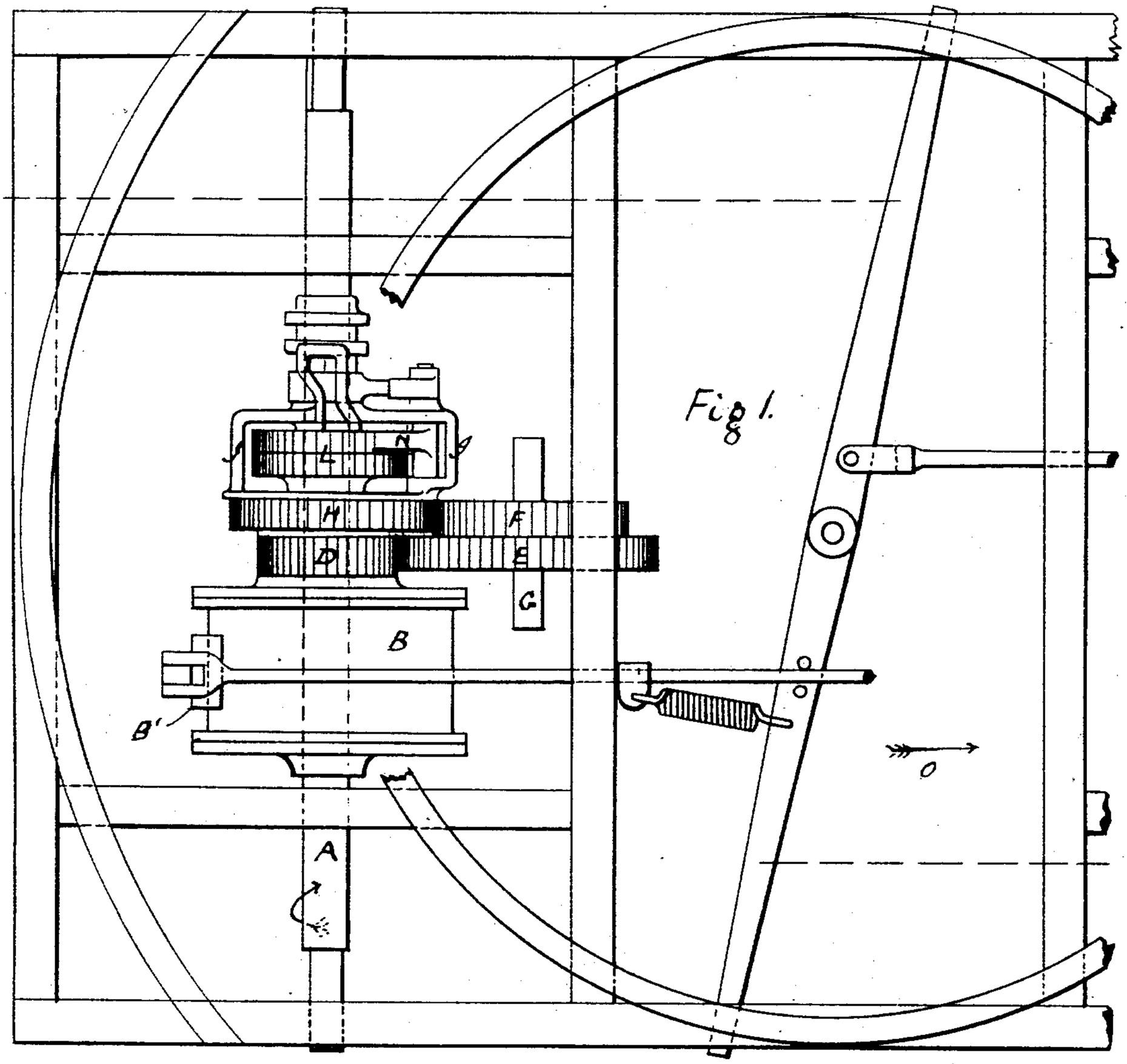

Fig 1.

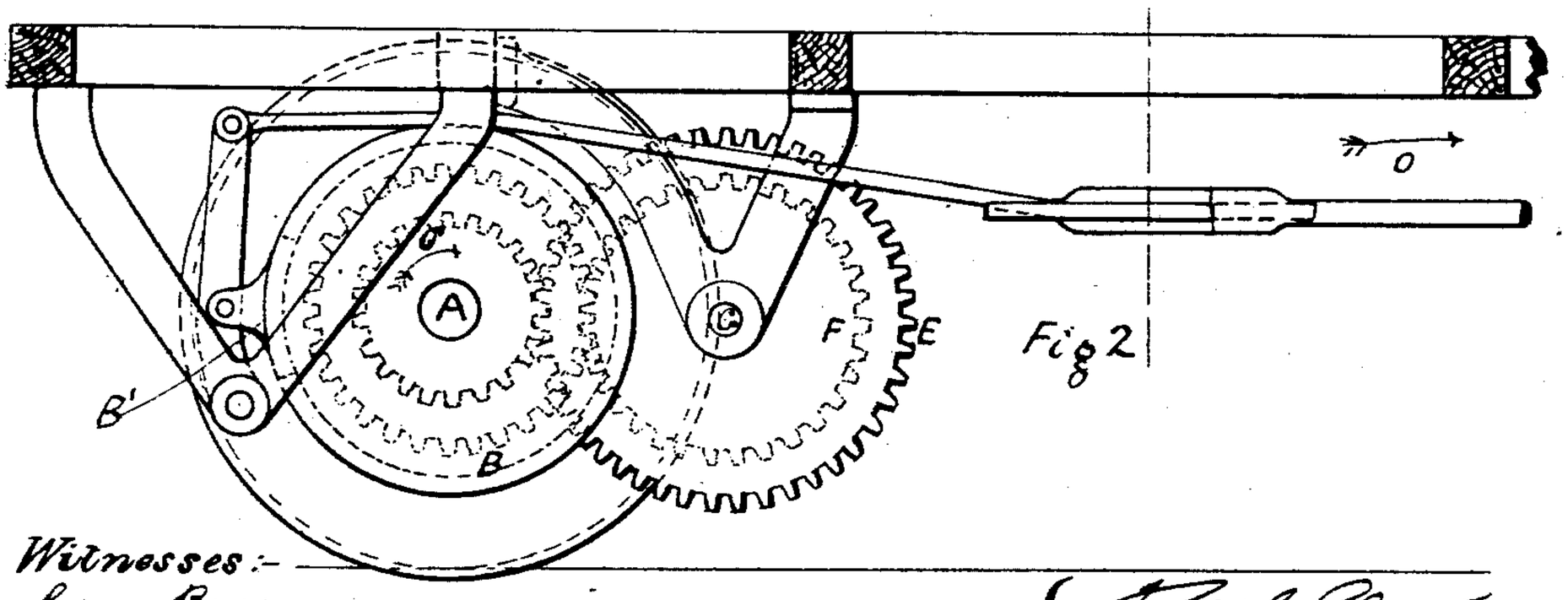

Fig 2

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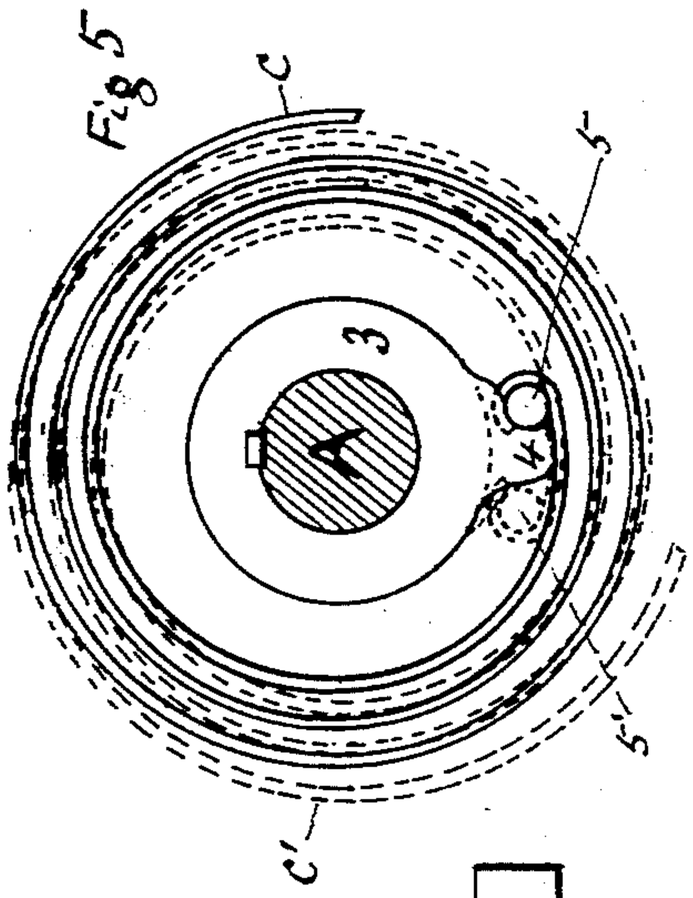

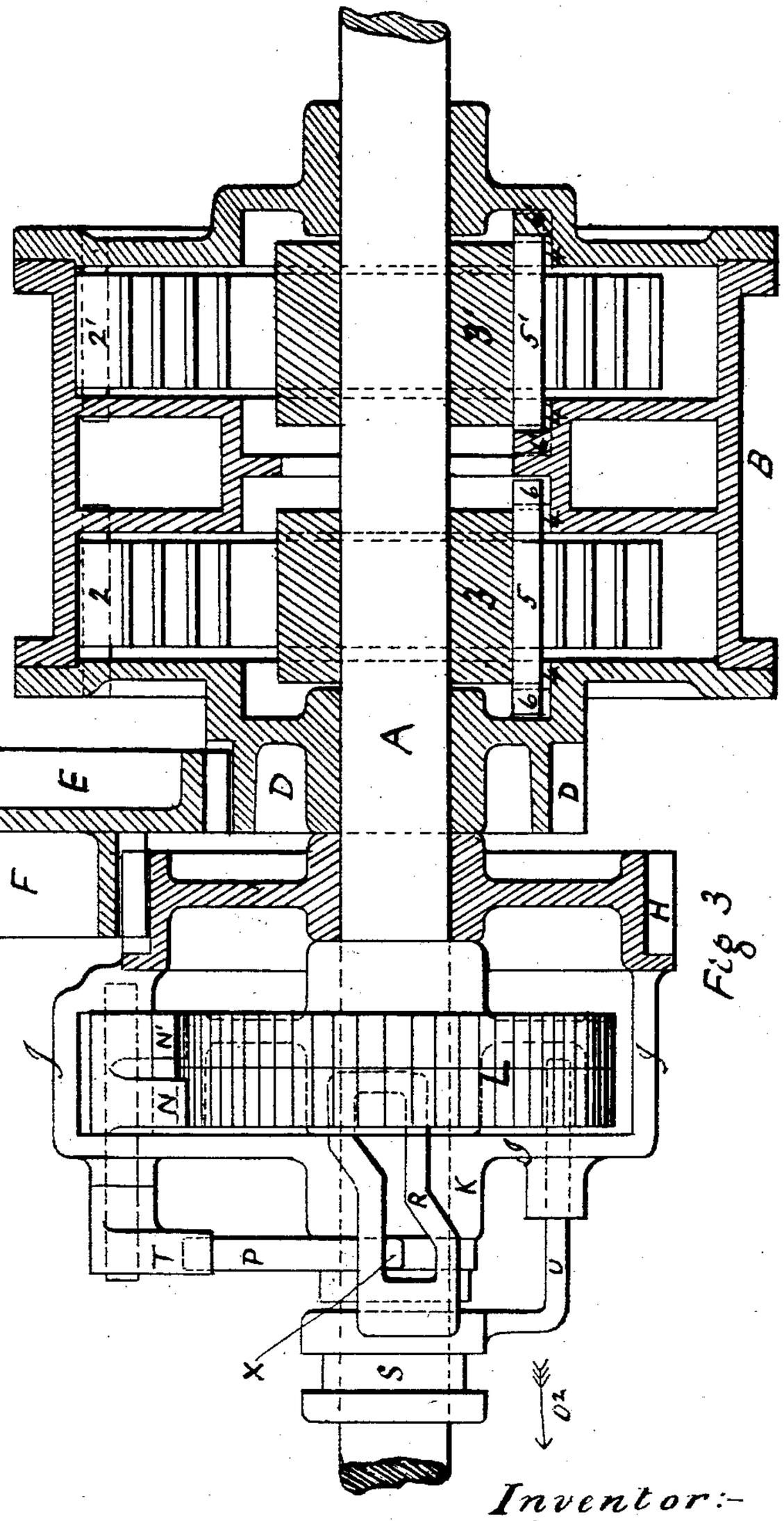

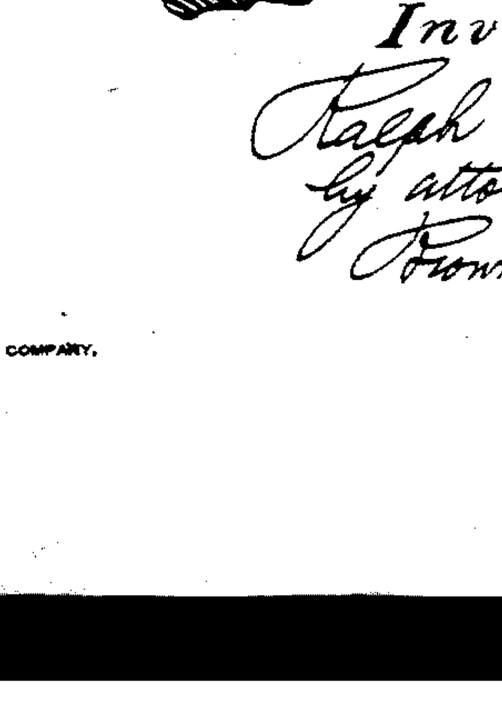

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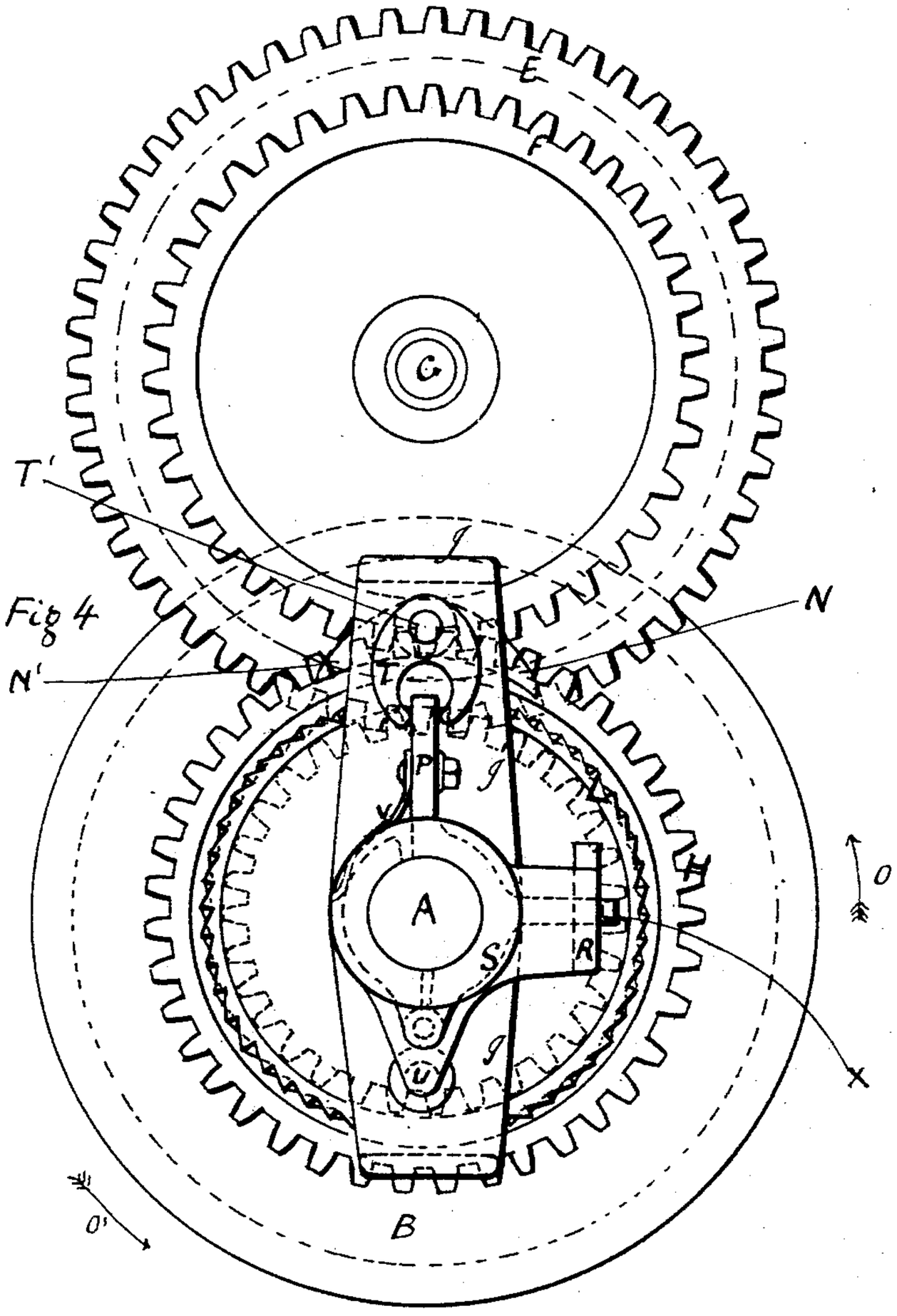

Fig 4

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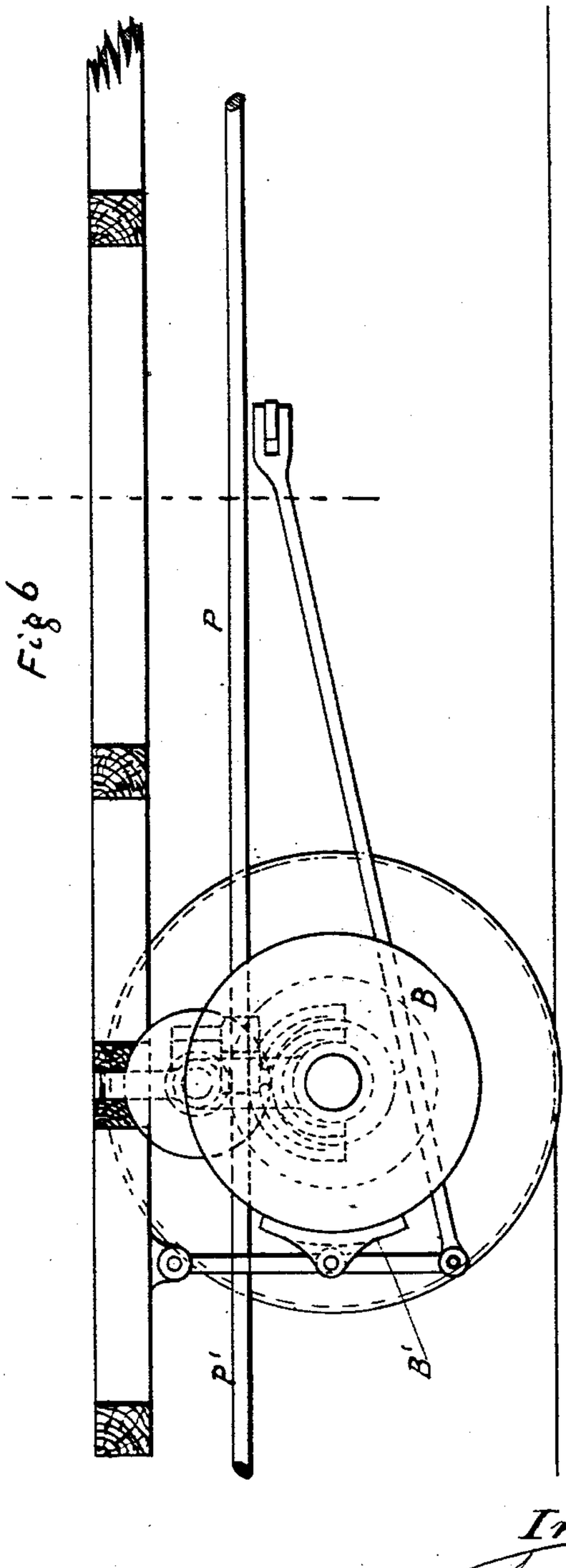

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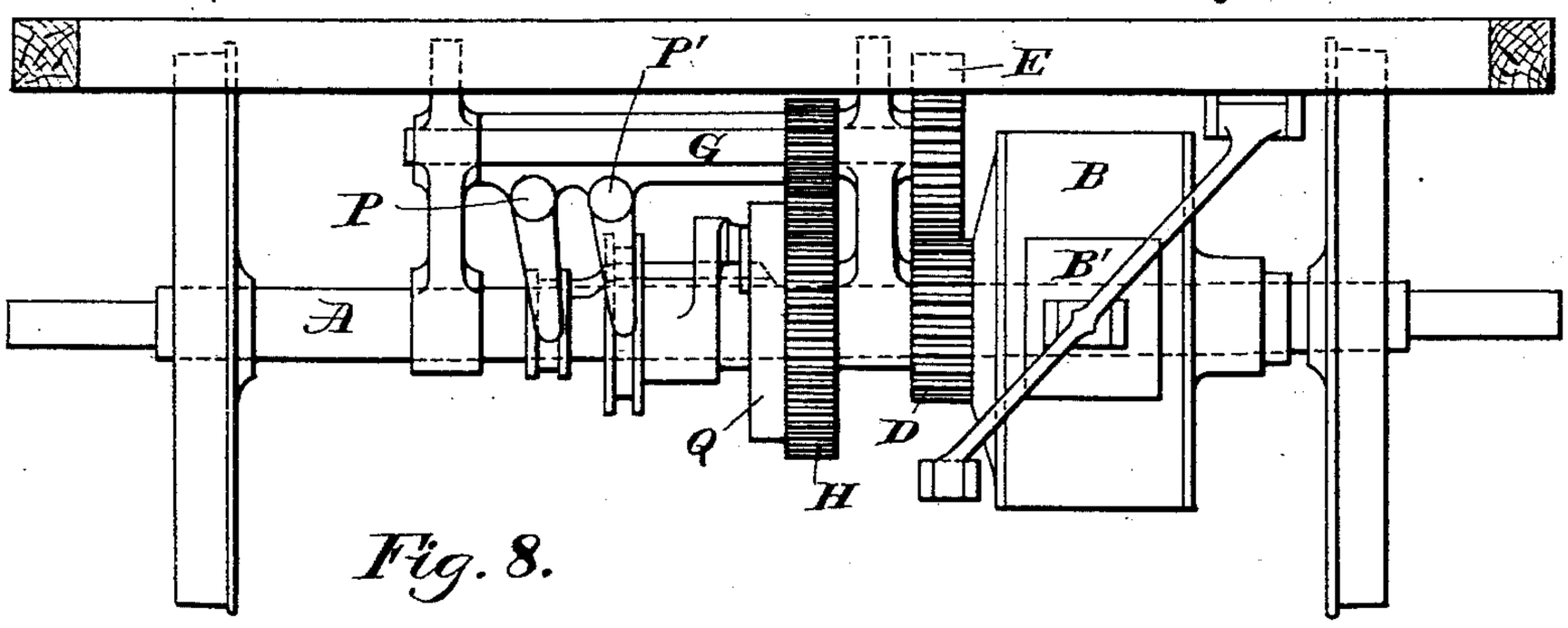

Fig. 8.

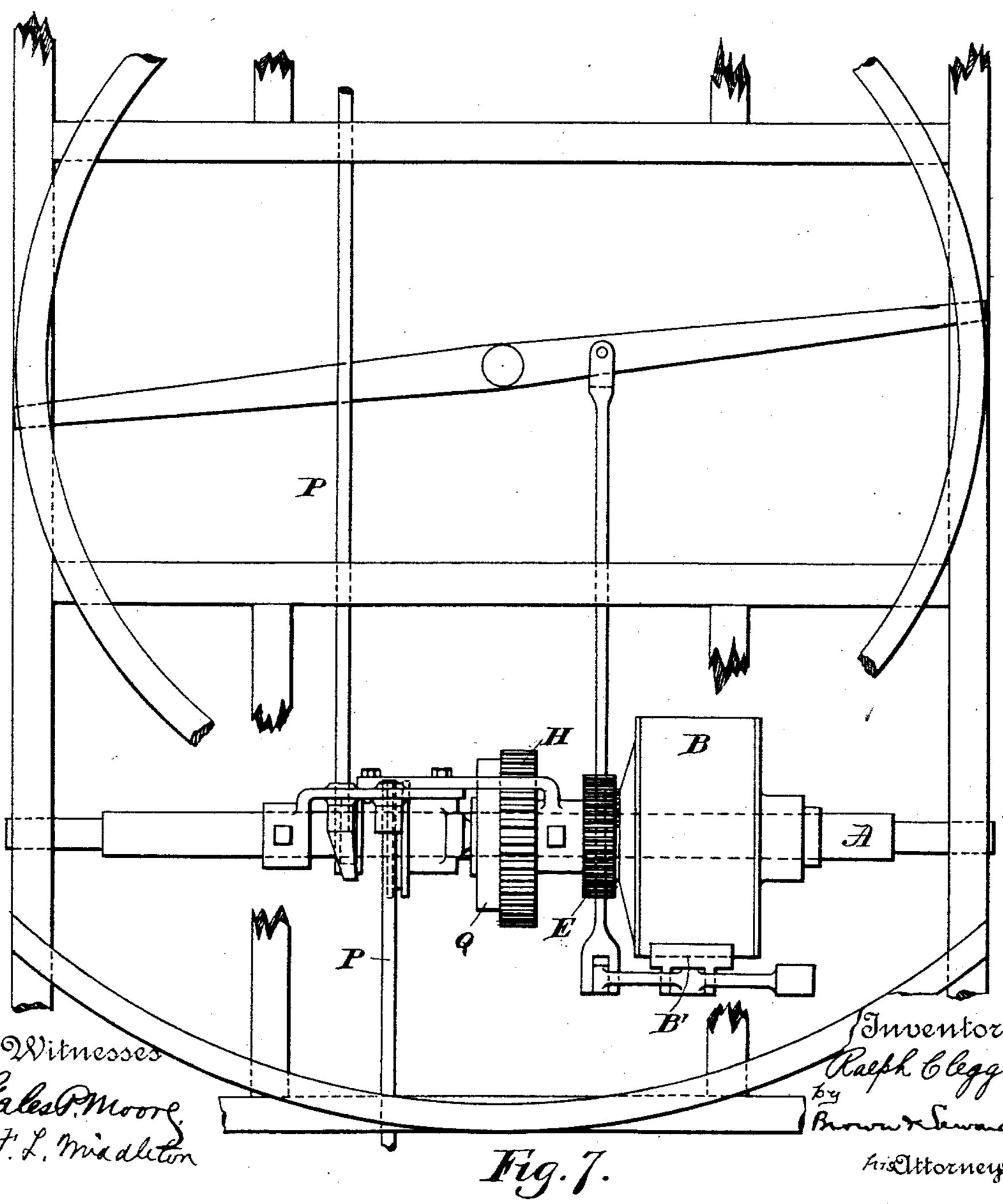

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Fig. 7.

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Fig 9

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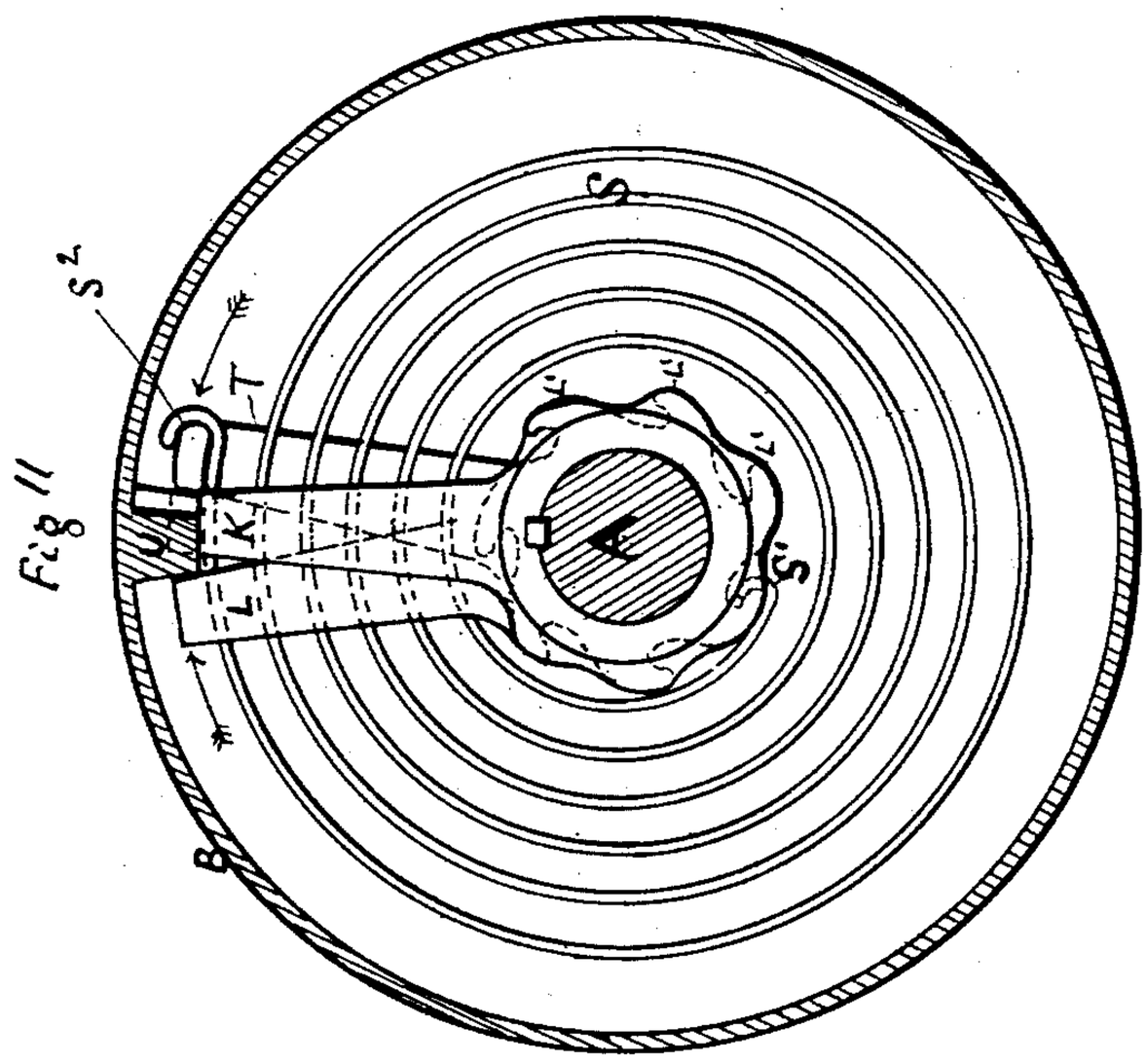

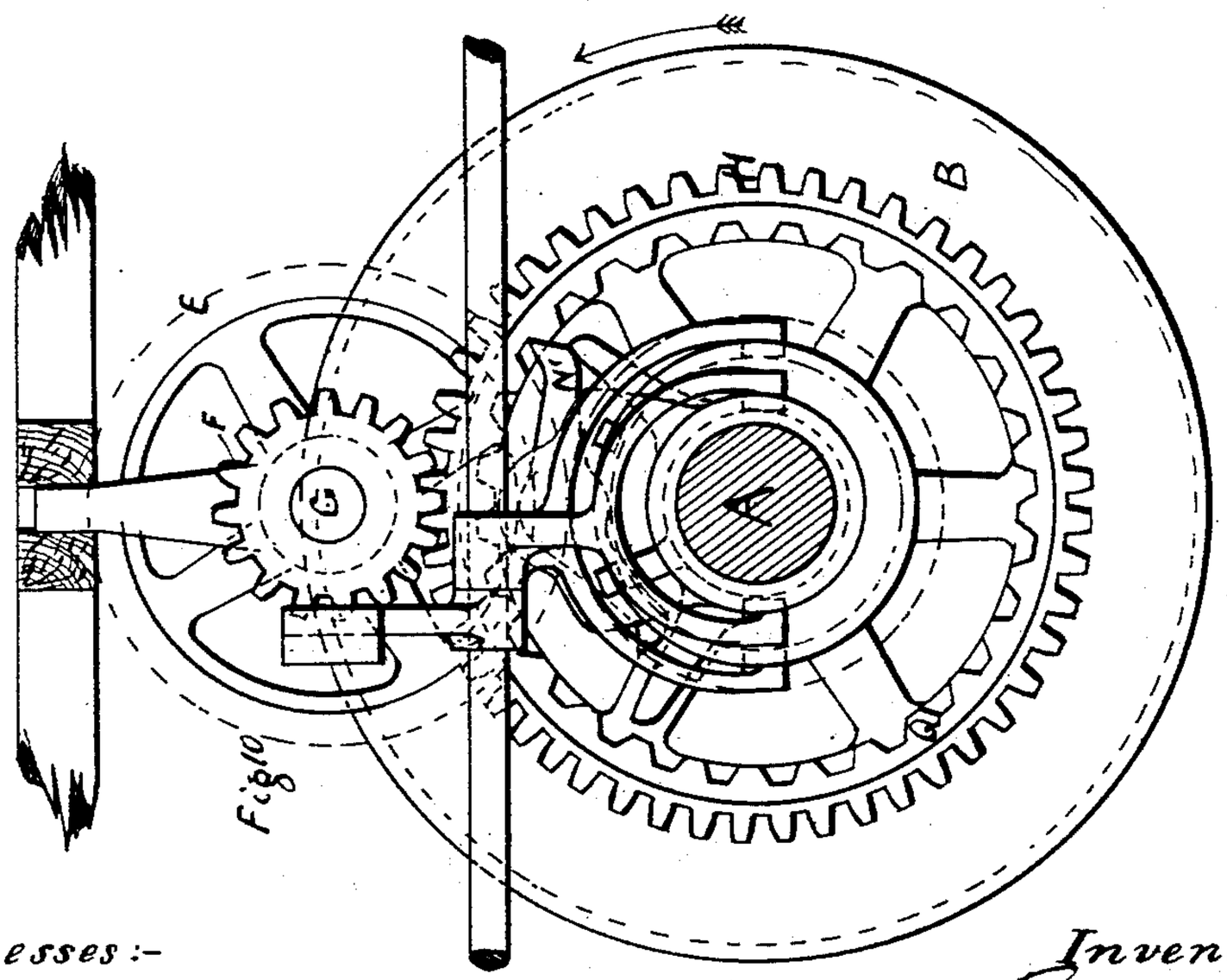

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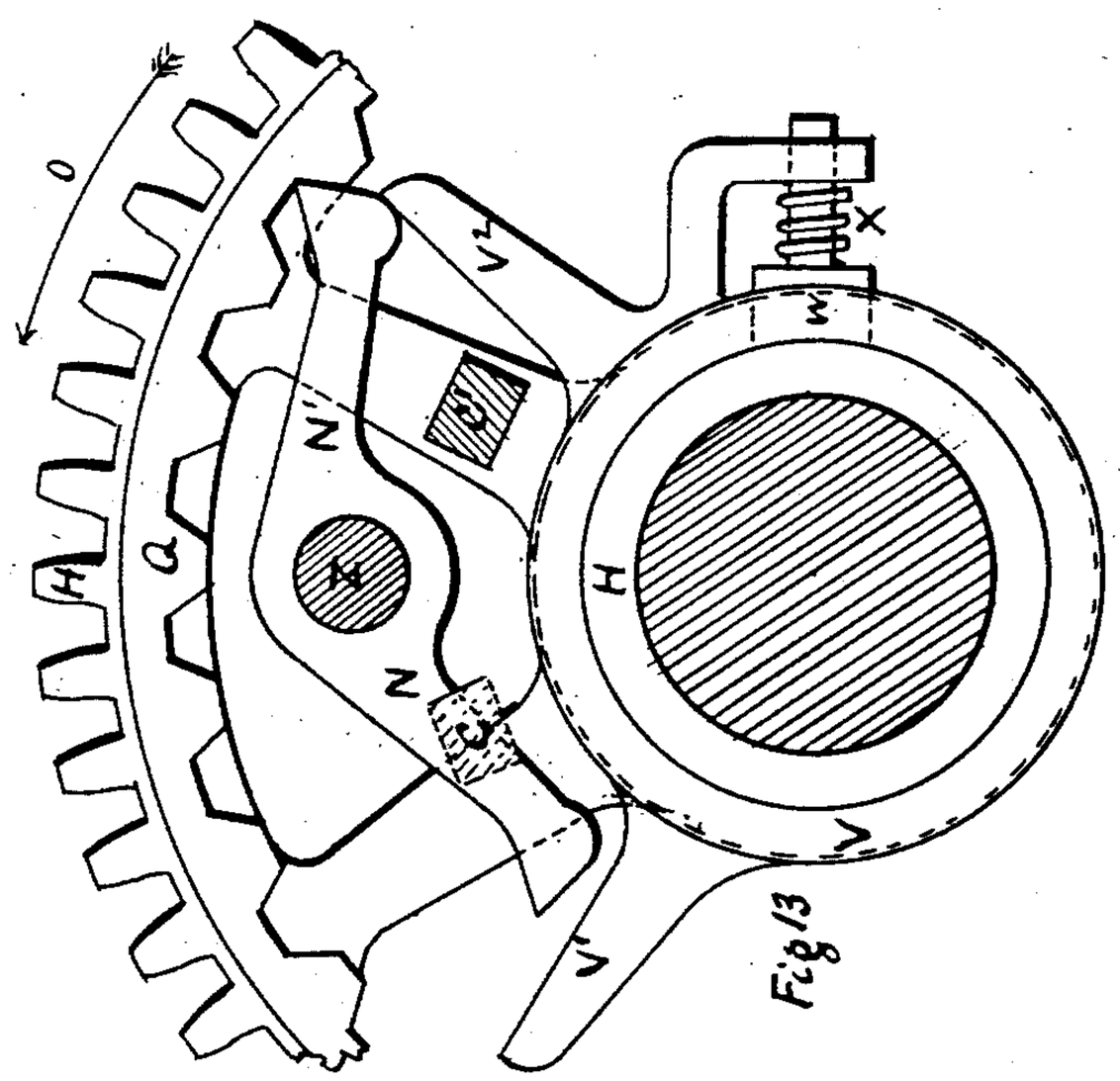

Fig 13

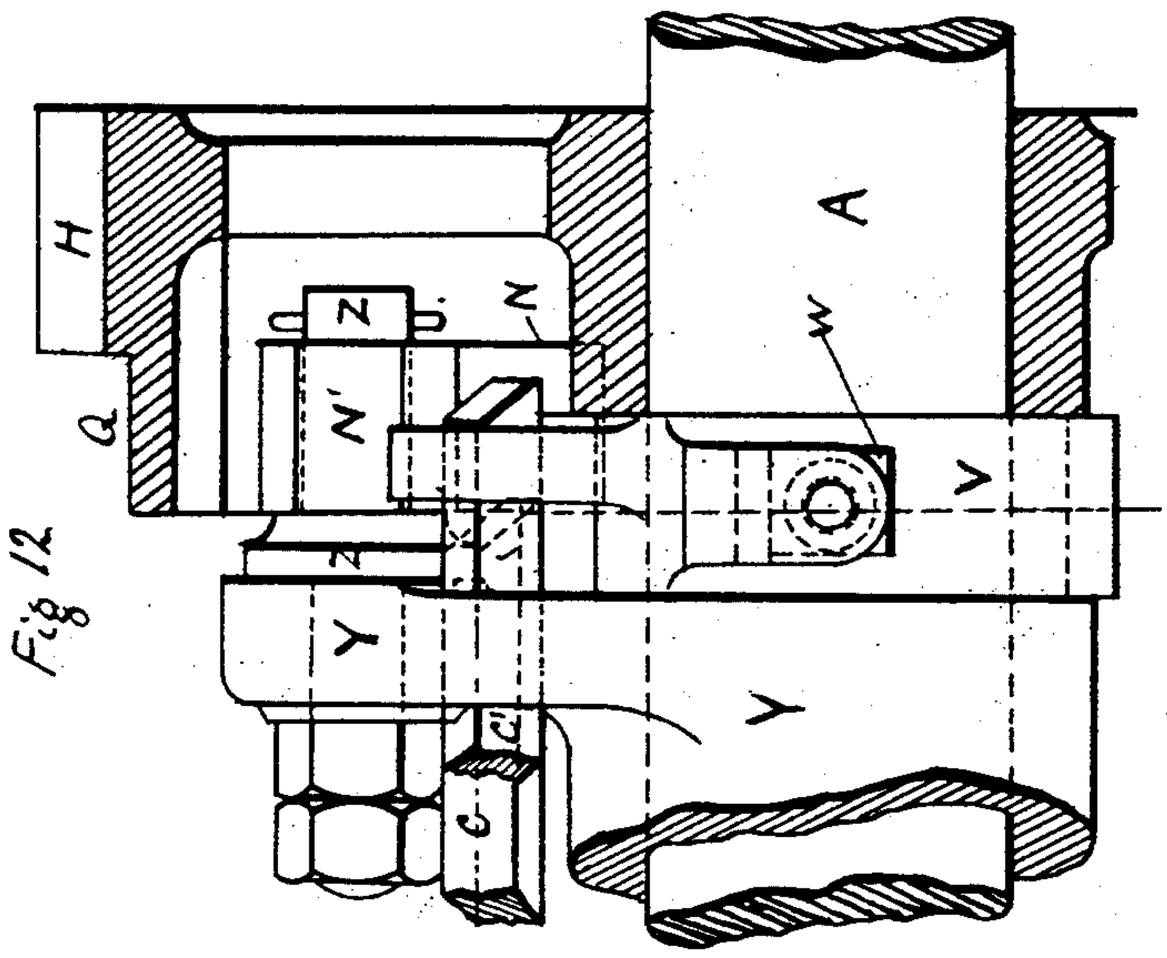

Fig 12

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UNITED STATES PATENT OFFICE.

RALPH CLEGG, OF LONGSIGHT, ENGLAND.

CAR STARTER AND BRAKE.

SPECIFICATION forming part of Letters Patent No. 520,134, dated May 22, 1894.

Application filed July 30, 1891. Serial No. 401,153. (No model.)

To all whom it may concern:

Be it known that I, RALPH CLEGG, mechanical engineer, of Wellington Place, Longsight, Manchester, in the county of Lancaster, England, have invented certain new and useful Improvements in a Brake and Starting Apparatus for Tramway-Cars and other Similar Vehicles, of which the following is a specification.

My invention relates to an arrangement or device for braking, starting, assisting to start, or influencing forward for a certain distance, tramway cars and other vehicles.

In order that the invention may be clearly understood and carried into effect, reference may be had to the accompanying drawings.

Figure 1 is a plan of a portion of a tramcar with the body removed; Fig. 2 a side elevation of the same. Figs. 3, 4 and 5 are detached and enlarged parts of the brake disk and pinion wheels. Fig. 6 is a side elevation; Fig. 7 a plan; Fig. 8 an end elevation; Figs. 9, 10, 11, 12 and 13 views of portions detached showing an arrangement in which one of the springs necessary in the arrangement illustrated in Figs. 1 to 5 is dispensed with.

The drawings represent the apparatus as intended for acting when the tramcar is moving in either direction.

A is one of the axles of the tramcar. B the brake disk containing the helical springs C, C′ arranged to act in opposite directions as will presently be explained.

D is a pinion wheel and is fast to one side of the brake disk B. The brake disk B and pinion D are free to revolve on the axle A.

E, F are a pair of wheels different in size from each other and may be cast together or connected with each other, in any convenient way and may be either fast or loose on the pin, stud, or shaft G. The pin, stud, or shaft G is suitably supported in a bracket or brackets fast to the framework of the car. The pinion D gears into the wheel E and the wheel F gears into the wheel H, which can revolve loosely on the axle A. As it is required to connect a double winged click or pawl N, N′ to the wheel H it is more convenient to have this wheel made with projecting arms I carrying an additional boss K for the purpose of steadying it on the axle A. Between the two bosses K and H is a ratchet wheel L fast on the axle A. This ratchet wheel may have two rows of teeth arranged to point in opposite directions. One or other of the wings of the click or pawl N, N′ is put into action with one or other row of the teeth of the ratchet wheel L, the particular wing of the click or pawl put into action depending on the direction in which the car is traveling. When the car is intended to be started in the direction indicated by the arrow O Fig. 2 the wing N′ is put into action and when in the opposite direction, the wing N is used. The changing arrangement of the click or pawl is effected by parts S, R, P, T, and X now to be described. The short shaft T′ rocks in the arm I and has fast to it the click or pawl N, N′. Also fast to the short shaft T′ is a lever T. Encircling the axle A and free to revolve thereon, but with a slight friction caused by the pressure of a spring V is another lever P, having a projection or finger X. The incline R is moved longitudinally on the axle by means of the grooved collar S. The object of the projection U on the grooved collar S is to enable the wheel H and arms I to carry the incline R and collar S round and the lever P and the finger X which acts on the incline R must be free to revolve on the axle A, but with the friction before named. As the wheel H runs loosely on the axle A, it will if it turns in the direction indicated by the arrow O′, Fig. 4 allow the lever P by means of the friction mentioned, to throw the wing N′ of the click in contact with one of the rows of teeth on the ratchet wheel L and allow the wheel H to turn the axle A also in the same direction as will presently be explained.

The manner in which the spring or springs are charged is hereinafter described.

When the brake disk B is released after having had the spring or springs charged, the wheel D is forced round with the disk on the axle A and communicates motion to the wheel E and through F works the wheel H.

The annexed drawings Figs. 3 and 4 represent the wheel D as half the size of the wheel E and the wheels F and H of equal size to each other. The disk B will therefore have to revolve twice to give one revolution to the axle A, but in the mechanism herein employed, the peculiarity is that if the axle re-

volves once while the brake disk B is arrested by the brake B′ and thus charging the spring or springs C, C′ once round, it will when the brake B′ is released also communicate to the axle A one revolution in the same direction while the brake disk B, however, performs two revolutions. If the wheel D be less than before mentioned and E enlarged or which is the same thing F reduced and H enlarged more force or power will be exerted on the axle A, but the distance through which they can propel or assist forward tho car will be reduced. On the other hand, if the wheel D be enlarged and E reduced less propelling power will be exerted but for a greater distance. If, however, E and F be equal in size to each other no effect at all would be gained and the whole apparatus would be neutralized so far as the starting of the car is concerned. When the car is running free the gearing constantly revolves and the brake disk B will run at the same rate as the axle, but according to the proportions shown on the dawings the wheel H only revolves at half the speed: hence when running in the direction indicated by the arrow O Figs. 1 and 2, the lever P having by means of the friction on the axle before named, a more forward tendency than the wheel H upon which the pawl N, N′ is mounted, holds the wing N′ of the click or pawl out of contact with the teeth of the ratchet wheel L. At the same time the finger X coming in contact with the other side of the incline R, the farther advance of the lever P is arrested and the other wing N of the click is kept out of gear with the ratchet wheel teeth. But if after one of the springs has been charged by the axle running in the direction indicated by the arrow O Figs. 1 and 2 while the brake disk is arrested by the brake B′ the brake B′ be released, the effect would be to rotate the wheel H in advance of the axle A and therefore the lever P will have a tendency opposite to that which it previously had and throw the wing N′ of the click in gear with the ratchet wheel L. When the direction of the car is reversed the part S is thrown longitudinally as indicated by the arrow O^2 Fig. 3 and therefore the incline R is set in position for operating the finger X so that it will actuate the wing N of the click in the same manner as it previously actuated N′. The longitudinal movement of the collar or part S is effected by a lever working a fork in the groove of the collar S, (not shown in the drawings) and may be worked by the driver or by the simple turning round of the body of the car when changing the direction.

The brake disk B as before explained is loose on the axle A (see Fig. 3). The pins 2, 2′ connect one end of each spring to the brake disk B. Fast on the axle A are two blocks 3, 3′ each having at a certain point two ears or projections 4, 4 and 4′, 4′ Figs. 3 and 5. Inside the brake disk B are two stops 6, 6′. The pins 5, 5′ are connected to the springs at the ends opposite to those of the pins 2, 2′. The stops 6, 6′ enable the springs to maintain at the start a sufficient tension so that they may exert the required force in starting the car at any point of their charge. When the brake disk B is held by the brake B′ and the axle A revolves in the direction indicated by the arrow O′ Fig. 2, the blocks 3, 3′ are also rotated and by means of the ears 4, 4 on the block 3 carry forward the end of the spring C to which the pin 5 is attached and against which the pair of ears 4, 4 is in contact while the other end of the spring at 2 remains stationary and by this means the spring C alone is charged. When the axle is reversed the pair of ears 4′, 4′ on the block 3′ repeat the process on the other spring C′ and charge it. At the same time while one spring is being wound up in one direction by the arresting of the brake disk, the other spring or springs used for the contrary direction is or are not affected at all. The springs being coiled and arranged in opposite directions one pair of the ears or projections 4, 4, or 4′, 4′ on the blocks 3 or 3′ only engage against one of the pins 5 or 5′ according to the direction in which the car is running and charge the particular spring or springs required for the appointed direction of the car.

A modification of the apparatus is shown in Figs. 6 to 13 in which I employ one spring for both directions of the car while at the same time retaining the general principle of the arrangement.

I will hereinafter take a spring to mean one or more springs all coiled in one direction and either helical or spiral.

Fig. 6 is a side elevation of the apparatus, Fig. 7, a plan, and Fig. 8 an end elevation. The carrier wheels E, F, Figs. 9 and 10, are fast to and carried on a short shaft G. This shaft G is supported by and free to revolve in one or two arms R^3, R^3 having journals at R, R. The arms embrace the axle A at R′, R′ and these with the projections at R^2, R^2 serve as a means of steadying the shaft G and wheels E and F. The pinion D like the pinion D in Fig. 3 is fast to one side of the brake disk B. Inside the brake disk is an arm K fast on the axle A. Loose and free to revolve on the axle A is another arm L having on its boss a series of hooked recesses L′ for the purpose of securing one end of the spring S at S′. Another arm T, also loose and free to revolve on the axle A carries the other end of the spring S at S^2. Inside the brake disk B is a stop U with which on one side the arm L comes in contact and on the other side the other arm T. The hooked recesses on the boss of the arm L are for the purpose of securing the spring S when its tension is being adjusted. Now, if the axle A Fig. 11 turn to the right while the brake disk is arrested, the arm K Figs. 9 and 11 actuates the arm T, which carries the end of the spring at S^2 while the arm L having the spring secured on its boss at S′ is held stationary by being in contact with the stop U and thus

charges the spring. Again, if the axle turn to the left, the arm K actuates the arm L while the arm T is held stationary by the aforesaid stop U and hence the spring is charged in that direction. It will be seen that in whichever direction the axle A revolves when the brake disk B is arrested by the brake B′ this arrangement would charge the spring S in one direction and at the same time the effect of two springs working in opposite directions is accomplished. Cast on the wheel H is an internal ratchet wheel Q, the teeth of which are so shaped that one or the other wing of the double winged click or pawl N, N′ (seen more clearly in Figs. 12 and 13) is capable of working in connection with the teeth of the ratchet wheel Q as desired. This wheel H is free to revolve on the axle A and on one part of its boss is a part V from which project fingers V′ V². In the boss of this part V is an aperture through which is passed a die W pressed down on the boss of the wheel H by the spring X so as to produce a slight friction sufficient to carry the part V together with the fingers V′ V² round with the boss of the wheel H. The stud or pin Z is carried by the arm or lever Y fast on the axle A. Now, if the wheel H revolves in advance of the axle A which it will do when the brake disk B is liberated after having had the spring charged, in the direction indicated by the arrow O, Fig. 13, it will throw the finger V² against the wing N′ of the click putting it in contact with the teeth of the ratchet wheel Q and allowing it to turn the axle in the same direction in a manner similar to that explained in the preceding arrangement. On the other hand, if the axle revolve faster than the wheel H which it will do when the car is running free, the wing N′ is held clear of the teeth of the ratchet wheel Q and the other wing N is prevented from engaging with the teeth by the sliding part C′ (seen more clearly in Figs. 12 and 13) being under the wing N′. When it is desired to reverse the working of the apparatus, the sliding part C′ is withdrawn and the other part C thrown under the wing N. If, however, both sliding parts C and C′ are thrown under the wings N and N′, the apparatus will be neutral so far as starting the car is concerned. The controlling of the position of the respective sliding parts C, C′ is effected by the forks M, M′ and is suitably placed at the will of the driver by the shafts P, P′, Figs. 6, 7 and 8, extending to places directly under his feet. Instead of the hereinbefore mentioned arrangements of the wheels D, E, F, H the object may be effected by an internal wheel in place of an ordinary one H and suitable pinions working therein substantially in the same manner as hereinbefore described; or bevel wheels may be substituted to attain the same purpose.

I may observe also that I do not confine myself to the precise details to which I have had occasion to refer as many variations may be made therefrom without deviating from the principles or main features of my invention.

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

1. In a car brake and starter, the combination of a brake drum and a brake applied thereto, a spring contained in said drum to be charged with power by the application of the brake to said drum, a toothed wheel secured to the said drum and gearing into suitable gearing by which when the drum aforesaid ceases to be retarded by the brake the rotation of such drum is transmitted to the axle upon which the said drum is mounted as hereinbefore described.

2. In a car brake and starter, the combination of an axle A, a brake drum B on said axle and a spring within said drum to be charged with power by the retardation or arrest of said drum, a toothed wheel D secured to the said brake drum, gear wheels E, F and H, a ratchet wheel and pawl, and means for transmitting motion from the said wheel H to the axle A, all substantially as hereinbefore described.

3. In a car brake and starter comprising an axle, a brake drum on said axle and a spring within said drum, the means of controlling the direction in which the apparatus is to work said means consisting in the grooved collar S operated by the driver of the car, incline R, frictional lever P, double winged click or pawl N, ratchet wheel L and arm I, all arranged combined and operating in conjunction with each other substantially as herein set forth.

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