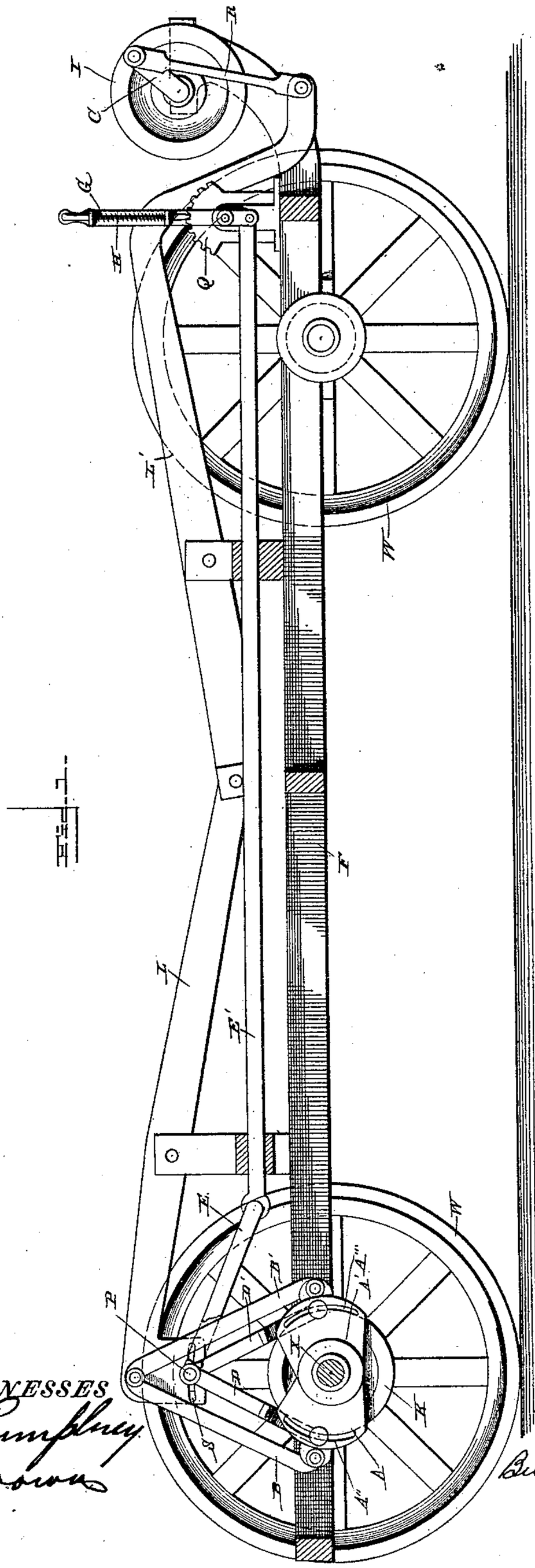
(No Model.) 3 Sheets—Sheet 1.

P. HOCKETT.

REVERSIBLE GRIP GEARING.

No. 430,021. Patented June 10, 1890.



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(No Model.) 3 Sheets—Sheet 2.

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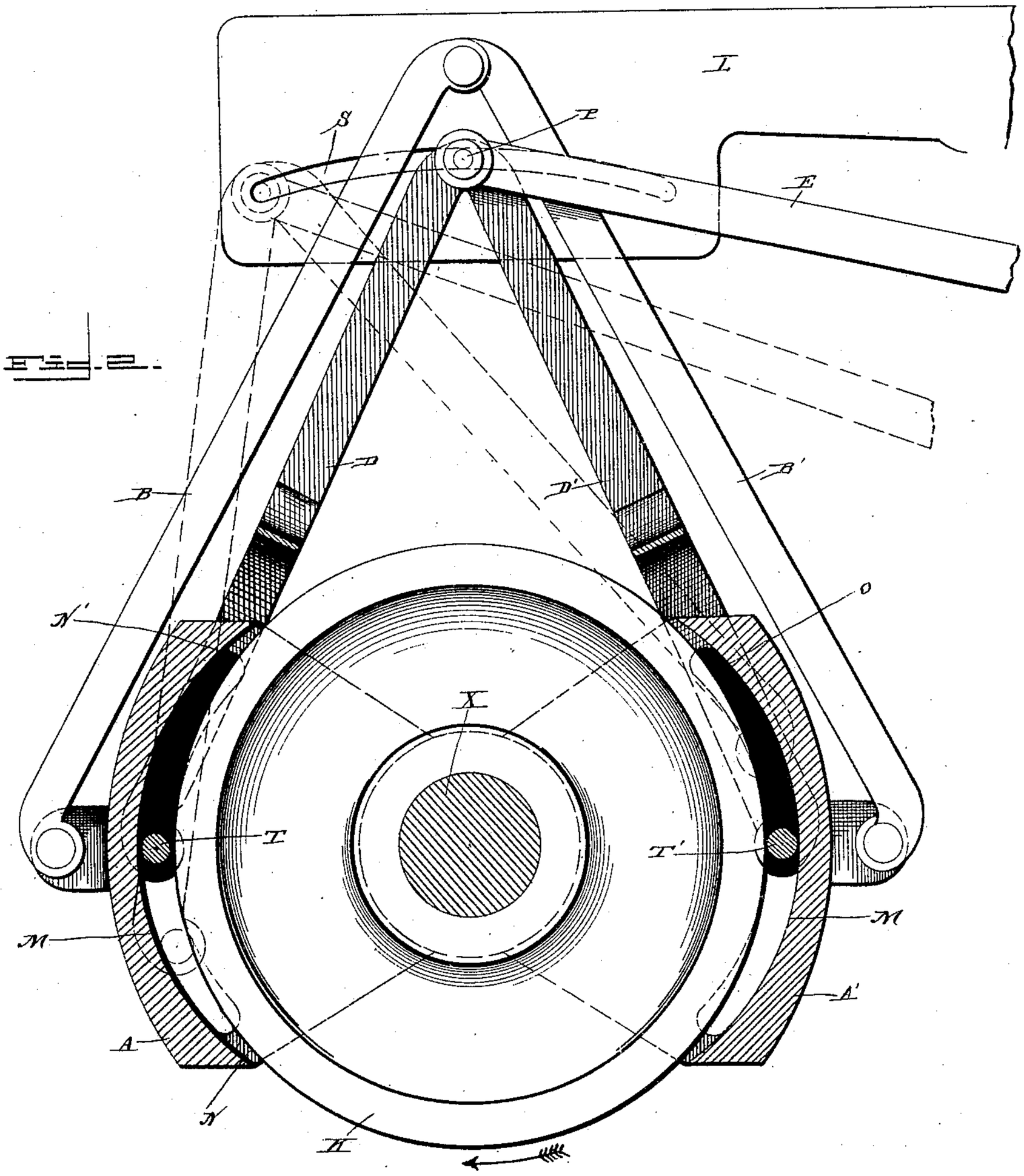
Fig. 2.



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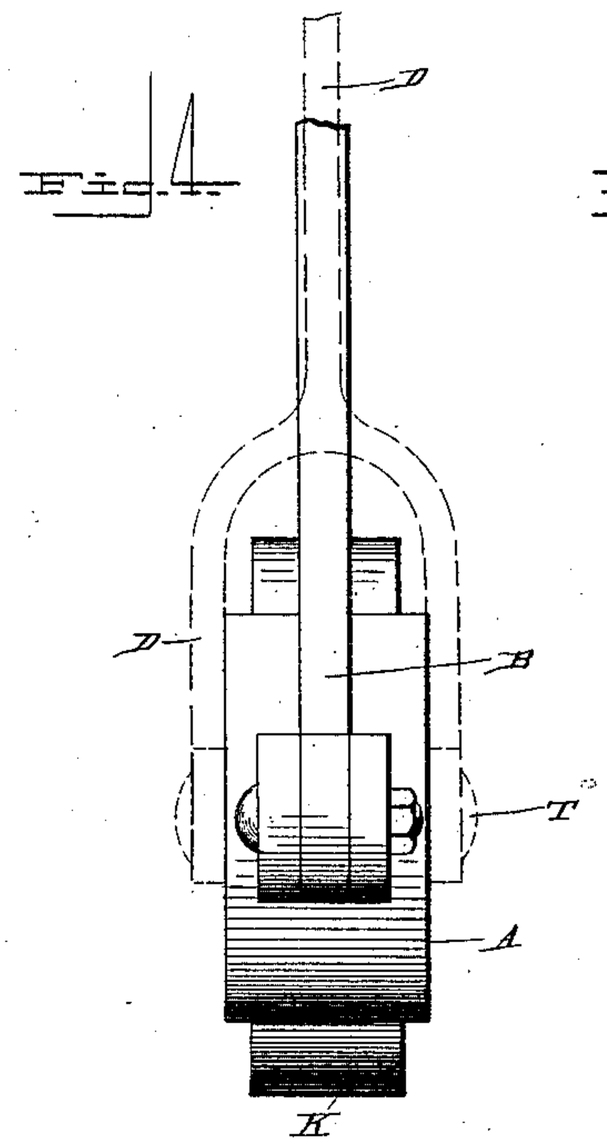

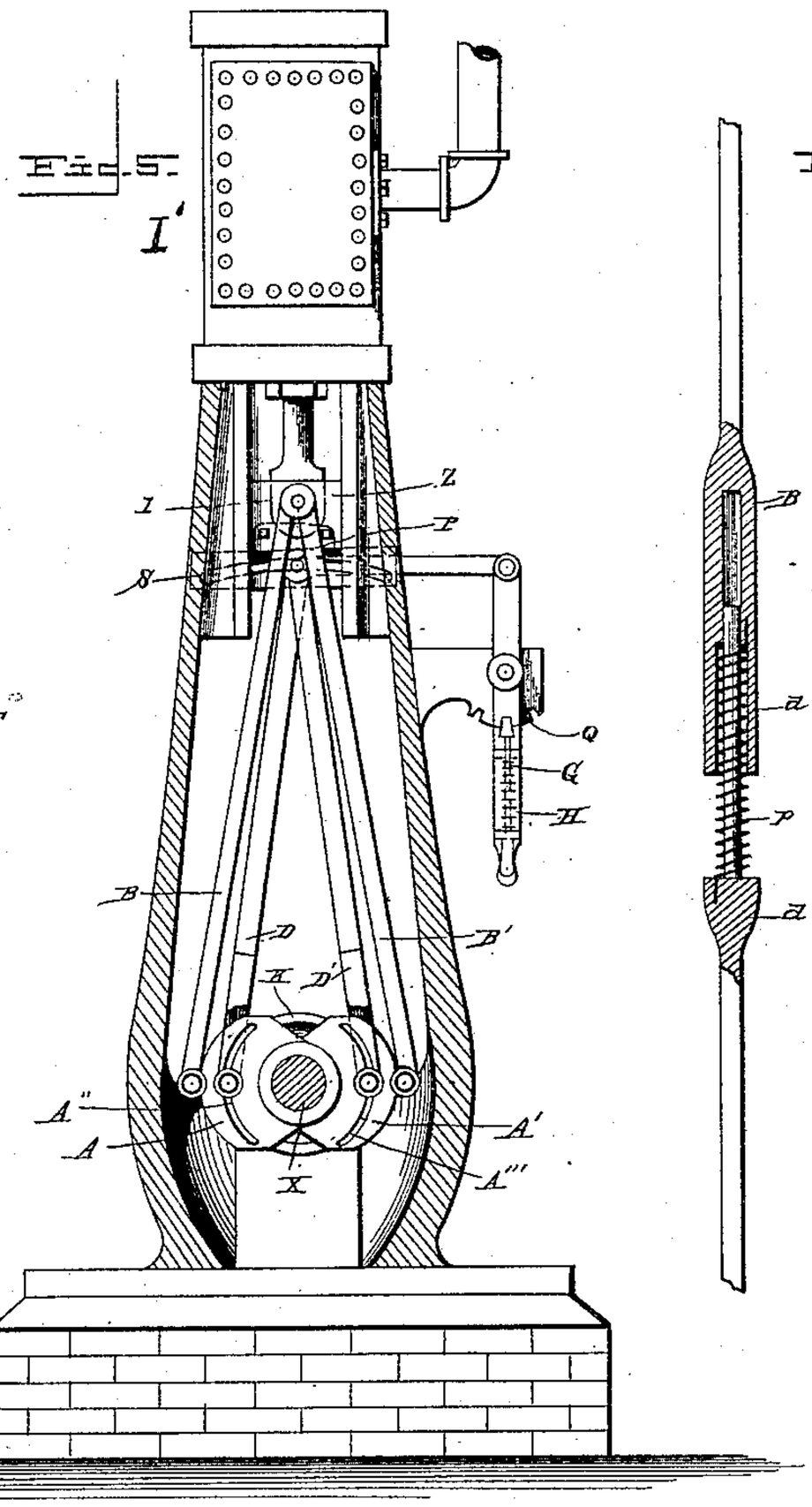

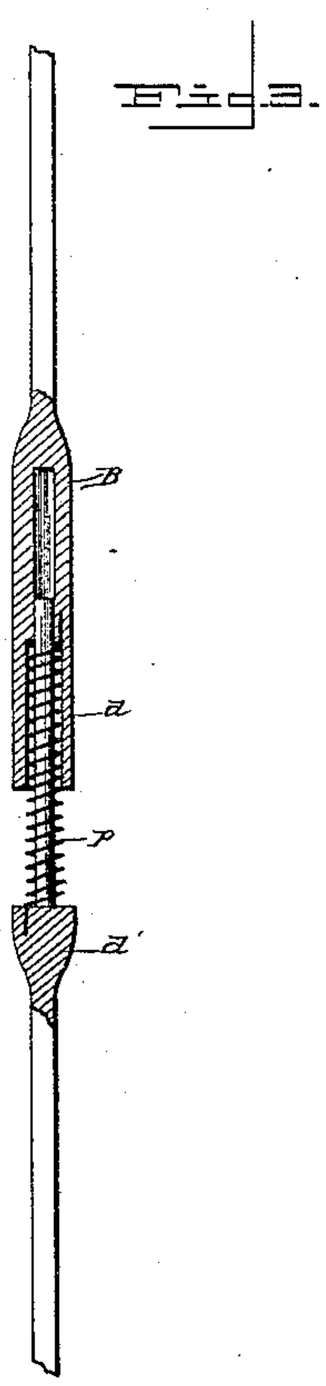

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UNITED STATES PATENT OFFICE.

PLEASANT HOCKETT, OF HUTCHINSON, KANSAS.

REVERSIBLE GRIP-GEARING.

SPECIFICATION forming part of Letters Patent No. 430,021, dated June 10, 1890.

Application filed February 12, 1890. Serial No. 340,386. (No model.)

To all whom it may concern:

Be it known that I, PLEASANT HOCKETT, a citizen of the United States, residing at Hutchinson, in the county of Reno and State of Kansas, have invented certain new and useful Improvements in Reversible Grip-Gearing; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention consists in the improved reversible grip-gearing hereinafter to be described and claimed.

In the drawings, Figure 1 is a longitudinal sectional view of a motor-frame with my invention attached. Fig. 2 is an enlarged detail of the intermittent grip and operating-piece. Fig. 3 is a modification. Fig. 4 is a detailed view of the grip. Fig. 5 is a modification.

In the use of certain classes of motors, of which, perhaps, the electric motor is the best known type, it becomes necessary to reduce the high speed of the motor to a lesser speed in the propulsion of cars, and for the purpose of economy it is very desirable that the gearing to bring about this reduction of speed should be simple and cheap. It is also desirable that, without complicating said gearing, some means for reversing the motion shall be introduced, so that the motor may run continuously in one direction, thereby realizing its highest efficiency, while the car can be moved back and forth at will. To accomplish these objects, I have designed the apparatus illustrated, which is an improvement upon that described in my application for patent, Serial No. 325,349, filed September 28, 1889, in which F is the frame of a motor or car mounted on wheels W W. Upon the axle X of one of these pairs of wheels is mounted wheel K, shrunk or keyed on said axle and revolving therewith. This wheel has a hardened-steel face, and on the same axle, or on an axle substantially concentric therewith, are mounted the shoes or pawl-levers A A′, which oscillate up and down under the control of the links B B′, which are hinged to any suitable driving-piece—such as the lever L—or to a cross-head of an engine *l*, as shown in Fig. 5. The pawl-levers A A′ have certain circular openings formed on their inner sides M M′. These are struck from a center with a radius less than the radius of the wheel K, and as a result there are formed between said faces of the pawl-levers and the face of the wheel certain crescent-shaped cavities N N′, as best shown in Fig. 2. In these crescent-shaped cavities are hardened steel or iron rollers T T′, which are of such diameter that when in the central position shown in Fig. 5 they do not touch the sides of the cavity in which they are confined, but which, when they approach either extremity of the crescent-shaped cavity, become wedged between the surfaces of the wheel and the shoe, and thereby cause the wheel to revolve with the shoe in one direction in the well-known manner. Instead of having these rollers T T′ controlled by a permanent spring, as provided for in my application above mentioned, I prefer to extend them through slots A″ A‴ and support them upon certain links D D′, which are hung from an adjustable pin P. It is evident, therefore, that as this adjustable pin P is thrown to the right or the left the rollers T T′ will be raised or lowered alternately in the manner indicated by the dotted line in Fig. 2. This adjustable pin P may of course be supported and controlled in any one of a large number of ways, one of which I have illustrated, which consists in mounting said pin in a slot S, cut in a portion of the lever L, and controlling the position of the pin in said slot by means of the pivoted link E, the sliding bar E′, and the hand-lever H, which is controlled by means of the latch and spring G and the toothed quadrant Q in the usual way.

In Fig. 1 the electric motor is illustrated as mounted at one end of the car, and is indicated by the letter I. By means of the usual crank and connecting-rod C and R the motion is transmitted from this motor to the vibrating lever L′, and thence through the second lever L to the links B B′, and thus to the grip-gearing, as is shown in Fig. 1.

Of course the electric motor or any other motor used might be connected to the first lever L or it might be connected directly to the links B B′, as illustrated in Fig. 5, in which the motor I is replaced by a steam-engine I′, connected to the cross-head Z, to which are pivoted direct the links B B′, the valve-motion for said engine not being shown.

In the method of mounting the reversing-

gear illustrated in Figs. 1 and 2 it is evident that with a too-great amplitude of vibration of the lever L there would be a certain disturbance of the rollers T T′ toward the limit of the vibration of the lever if the links D D′ were rigid. To obviate this, any suitable elastic link may be used, such as is illustrated in Fig. 3, where the link is formed of two portions *d d′*, which telescope one with the other, and are held together by the spiral spring *p*, being thereby capable of shortening and elongation within certain limits under compression and tension.

The method of operation of my invention is the following: The driving-piece L or the cross-head Z, as the case may be, being given motion, the driven wheel K will revolve in one direction or the other or remain stationary, according to the adjustment of the hardened rollers T T′. When the adjustable pin P is in its central position, as shown in full lines in Fig. 2, it is evident that neither of the pins T T′ will engage with the pawl-levers, and therefore the wheel K may stand still or move under its own laws. When the reverse-lever is thrown over, however, in such a way as to force the pin P into the position indicated in dotted lines in Fig. 2, the roller T will be forced downward into the portion N of the cavity M, while the roller T′ will be drawn up into the extremity O of the cavity M′. It is evident, therefore, that on the downward stroke of the driving-piece the rollers of the lever D′ will engage (being forced into the narrow upper end of the crescent-shaped cavity M′) and the driven wheel K will be drawn in the direction of the arrow, while on the upstroke of the driving-piece the roller T will engage, being forced into the end N of the cavity M, and on this stroke also the wheel will be drawn in the direction of the arrow. Therefore continued reciprocation of the driving-piece will result in continued rotation of the driven wheel K. If the pin P were now drawn over to the other end of the slot S, the reverse state of affairs would be brought about, and the reverse motion of the wheel K would be produced in the well-understood manner. As it is of course evident that these changes can be made while the gearing is in operation, it will be seen that my invention produces a simple direct-acting grip-gear, which can be instantly reversed during the continued operation of the driving-power.

The mechanical advantages of this gear in converting rapid rotation to slower rotation result from the fact that the rapidly-moving motor may be given a very slight crank-throw, so that the oscillations of the grip-gearing, whether derived direct from the crank or through intermediate levers, may be very rapid, but of greatly-restricted extent. Although the gearing has this restricted motion, it yet operates directly upon the wheel K, of a diameter much larger than the diameter of the crank circle of the motor, and consequently the desired reduction of speed is obtained, and at the same time the bulky construction of the driving-gear and the costly toothed gearing commonly used is done away with. Thus if the motor made two thousand revolutions a minute with a crank-radius of one inch the pawl-levers would vibrate through a space of two inches at the rate of two thousand strokes a minute. This would give the driven wheel K a peripheral velocity of four thousand inches a minute, and if it were ten inches in radius it would make two hundred revolutions a minute. If the truck-wheels W were thirty inches in diameter, the car would be driven about twenty miles an hour.

Having therefore described my invention, what I claim as new, and desire to protect by Letters Patent, is—

1. In a reversible grip-gear, the combination of the main frame, the driven wheel, the pawl-levers which oscillate about a center substantially concentric with the driven wheel, which said pawl-levers have certain crescent-shaped cavities, rollers located in said cavities, the operating-levers, links connecting the pawl-levers with the operating-lever, links supporting the rollers, and the adjustable pin from which said last-mentioned links are hung, substantially as described.

2. In a reversible grip-gear, the combination of the main frame, the driven wheel, the pawl-levers which oscillate about a center coincident with that of the driven wheel, which said pawl-levers have certain crescent-shaped cavities, hardened rollers located in said cavities, the driving-piece which has a slot therein, the links which connect the oscillating pawl-levers with the driving-piece, the second set of links which support the rollers, the pin from which said second set of links are hung, which is adjustable in the above-described slot, the hand-lever, and connections by which said adjustment may be controlled, substantially as described.

3. In a reversible grip-gear, the combination of the main frame, the driven wheel, the pawl-levers which oscillate about a center coincident with that of the driven wheel, which said pawl-levers have certain crescent-shaped cavities, hardened rollers located in said cavities, the driving-piece which has a slot therein, the links which connect the oscillating pawl-levers with the driving-piece, the second set of links which support the rollers, the pin from which said second set of links are hung, which is adjustable in the above-described slot, the hand-lever, sliding rod, and oscillating link-connection to said pin, whereby the adjustment may be controlled, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

PLEASANT HOCKETT.

Witnesses:
T. H. BROWN,
W. H. PUMPHREY.