No. 871,995. PATENTED NOV. 26, 1907.

C. O. HEDSTROM.

MOTOR CYCLE.

APPLICATION FILED MAR. 28, 1907.

Fig. 1.

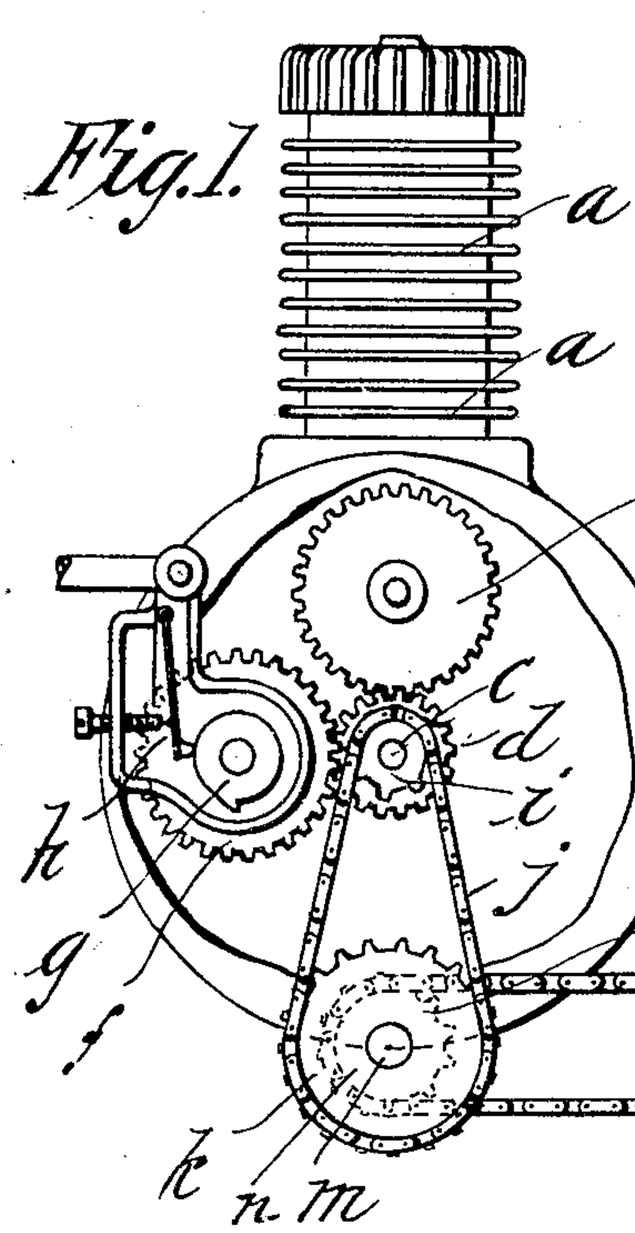


Fig. 3.

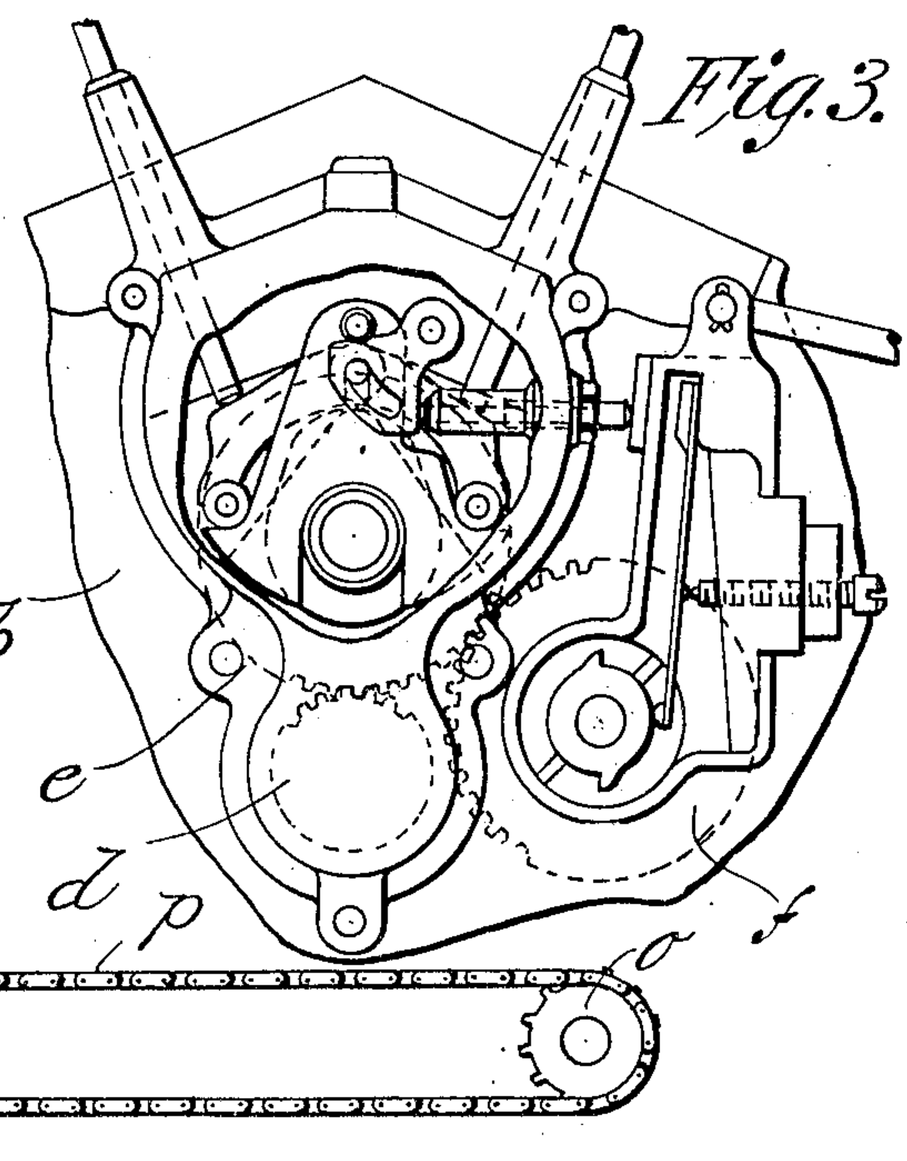
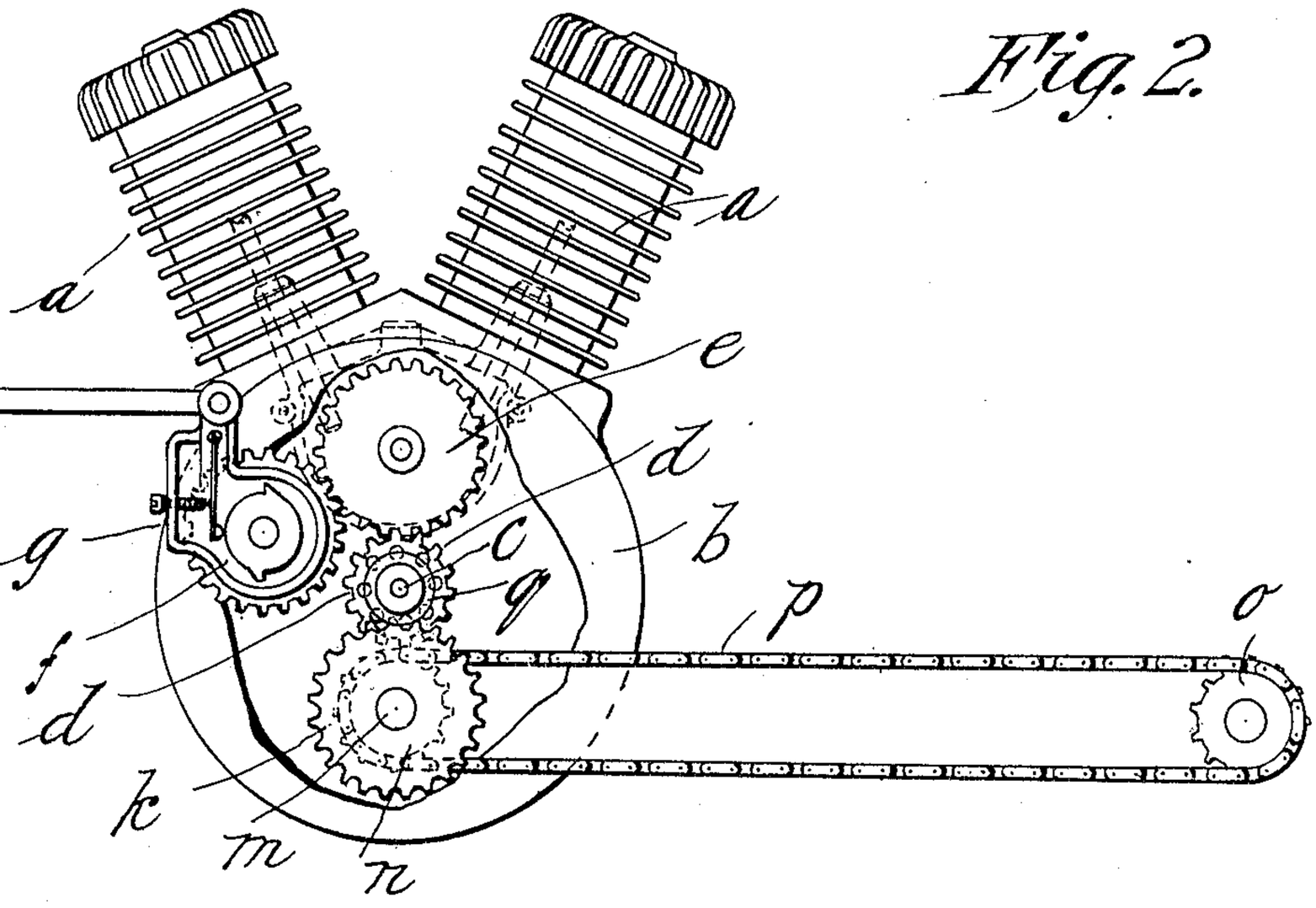


Fig. 2.



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MOTOR-CYCLE.

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Application filed March 28, 1907. Serial No. 365,134.

To all whom it may concern:

Be it known that I, CARL OSCAR HEDSTROM, a citizen of the United States of America, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Motor-Cycles, of which the following is a specification.

My present invention relates to improvements in the driving mechanism for motor-cycles and is primarily adapted for motor cycles that are to be driven by an engine of the internal combustion type.

The machines heretofore in use have been driven by a single cylinder internal combustion engine which includes a sprocket-chain extending between the pinion on the end of the engine shaft and the main sprocket-wheel on the crank-shaft which is connected to the rear axle by the usual sprocket-chain. This form of construction in which the engine runs in the same direction as the wheels of the motor cycle, has been found to be very objectionable since the excessive wear of the sprocket-chain which extends between the sprocket pinion on the engine shaft and the main or large driving sprocket wheel on the crank-shaft is caused by the excessive speed of the engine, no matter how finely adjusted and fitted the parts may be. On account of this serious defect in the construction and operation of these parts of the motor cycle, it has been found necessary to devise some means that would increase the life of the machine in these particular points as the sprocket-chain referred to will only run about five hundred miles, as has been found in practice, before a new one must be provided in order to make the machine work properly.

In re-organizing the motive-power of the machine, in which an internal combustion engine is employed, I place a pinion, provided with anti-friction rollers on its periphery, on the end of the engine shaft in place of the usual sprocket pinion. This anti-friction roller pinion meshes with the teeth of the main or large driving sprocket-wheel and takes the place of the usual sprocket-chain heretofore used. This construction, in which a gear is substituted for the usual sprocket-chain, would necessarily cause the motor-cycle to run backwards, and, in order to avoid this objection, it is necessary to have the direction of rotation of the main shaft of the engine reversed; that is, to cause the engine or engines themselves to run in the opposite direction from that heretofore run. This reversal of the direction of rotation of the engine would therefore cause the motor-cycle, on account of this intermediate gear, to move forward in the usual way, as readily understood. On account of the backward rotation of the engine or engines, it is necessary, as I have found from actual practice, to provide some means for keeping the direction of rotation of the timing gear the same as before the re-organization of the machine, as will be mentioned in detail and referred to in the specification. The exhaust valve operating gear in my improved arrangement now drives the timer gear, which gear receives its motion from the pinion on the engine-shaft, while in the arrangement heretofore in use the timer gear was driven directly by the pinion on the engine-shaft, or in other words in one case the timer gear is directly driven, while in the other or latter case it is indirectly driven from the engine-shaft pinion.

The invention therefore broadly consists in re-arranging the timer gear so that it is driven by the exhaust valve gear instead of directly by the pinion on the engine shaft.

The particular advantages of this improvement will be fully set forth in the specification.

In the drawings forming part of this application,—Figure 1 is a side elevation of the motive parts of a motor cycle in which the motor casing is broken away for showing the usual construction and arrangement of the timing gear, make and break contacts, exhaust valve-gear, pinion on the engine-shaft, and the present employed sprocket-chain for transmitting the motive power and rotative motion of the engine to the main sprocket-gear on the crank-shaft, the pinion meshing with the timing gear and exhaust valve-gear and the exhaust valve-gear out of mesh with the timing gear. Fig. 2 shows the arrangement wherein I employ an internal combustion engine and the re-arrangement of the timing-gear, make and break contacts, exhaust valve-gear, the anti-friction roller pinion carried by the engine shaft and meshing with the main drive-gear and exhaust valve-gear of the machine, the pinion meshing only with the exhaust valve-gear and the exhaust valve-gear meshing with the timing gear.

Fig. 3 shows a detail view and relative arrangement of the assembled parts of the motive power of the motor cycle.

Referring to these drawings in detail, *a* designates the usual cylinder of an internal combustion engine only one of which is used, and *b* the crank-casing thereof, a portion of which is broken away to show the interior arrangement and location of the usual gears and make and break devices.

c designates the engine or main driving-shaft on which is mounted, in the usual way, the pinion *d* that meshes with the exhaust valve gear *e* for operating the exhaust valves of the engine, and also meshes with the timing gear *f* which operates the make and break mechanism and includes the single lift-cam *g* against which presses the trailer arm *h* whereby the electric ignition circuit is opened and closed at a predetermined point in the revolution of the timer shaft.

Mounted on the end of the driving-shaft *c* is a sprocket-pinion *i* over which passes the sprocket-chain *j* which also passes around the main sprocket-wheel *k* that is mounted on the crank-shaft *m*. The crank-shaft also carries a smaller sprocket-wheel *n* (shown in dotted lines) that is geared back to the rear axle sprocket-wheel *o* by means of the usual sprocket drive-chain *p*.

The mechanism just referred to is the usual construction and arrangement in some types of motor cycles but it has been found in practice that the chain *j* on account of the high speed of rotation of the engine, rapidly becomes worn necessitating a new chain and sometimes new pinions, thus materially decreasing the efficiency of the machine and also causing an excessive amount of noise. These defects have led to the construction and arrangement shown in Figs. 2 and 3. In order to overcome these various defects, I provide the motor cycle with an internal combustion engine, (preferably two although it is not necessary that two engines should be used,) and I do this mainly for increasing the motive power of the motor cycle,—the number or type of engines does not, however, have any bearing on my present improvement.

Instead of the chain *j* for transmitting the power of the engine from the shaft *c* to the crank-shaft *m*, I employ a roller pinion on the end of the shaft *c*, as designated at *q*, the details of construction of which form no part of this application. This roller pinion meshes directly with the teeth of the main drive-wheel *k* on the crank-shaft *m* which carries the usual sprocket-wheel *n* (shown in dotted lines) and drive-chain *p* for transmitting the power to the rear sprocket-wheel *o*. Since the interposition of the roller pinion *q* between the shaft *c* and the crank-shaft *m* would cause the sprocket-wheel *k* to rotate in the reverse direction from that shown in Fig. 1, and necessarily drive the motor-cycle backward, it is therefore necessary to cause the engines to rotate rearwardly, that is in the opposite direction from that employed in Fig. 1. By reason of this rearward rotation of the engine, the gear *d* on the shaft *c* would necessarily drive the timing cam *g* and its gear *f* in the opposite direction thus causing the timing mechanism to be inoperative, that is to say the usual timing mechanism could not be used to advance or lead the make and break contact points so as to cause the engine to run properly. In order to overcome this serious objection of the timing mechanism, I re-arrange the gears *d*, *e*, and *f* so that the gear *d* meshes as usual with the exhaust valve-gear *e* but does not mesh with the timing gear *f* which, however, is now operated from the exhaust valve-gear *e*, as shown in Figs. 2 and 3. This re-arrangement therefore maintains the direction of the timing gear *f* in the same direction as it did before the employment of the roller-pinion *q* and permits the operator of the machine to adjust the timing, that is to advance or retard the spark in the usual way and also maintain the same velocity of rotation of the timing gear *f*, as before.

What I claim, is:—

1. In combination with the motive parts of a motor-cycle, an engine-shaft, a pinion and gear thereon, an exhaust valve-gear, a main sprocket-shaft, a gear thereon, a timing gear, the gear on the engine-shaft meshing with the exhaust valve-gear, said exhaust valve gear meshing with the timing gear, the pinion meshing with the gear on the main sprocket-shaft whereby, upon the reverse motion of the motive power the timing mechanism and the motor-cycle will be driven in a forward direction as described.

2. In combination with the exhaust valve gear, timer gear, main and sprocket-gear and engine shaft of a motor cycle, a gear on the engine-shaft meshing with the exhaust valve gear, the exhaust valve gear meshing with the timer gear, a pinion on the engine shaft meshing with the main sprocket-gear whereby when the engine is rotated in a reverse direction the motor cycle and timer gear will be rotated in a forward direction, as described.

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