E. J. STODDARD.

DRIVING MECHANISM FOR AUTOMOBILES.

APPLICATION FILED NOV. 30, 1914.

1,306,864.

Patented June 17, 1919.

3 SHEETS—SHEET 1.

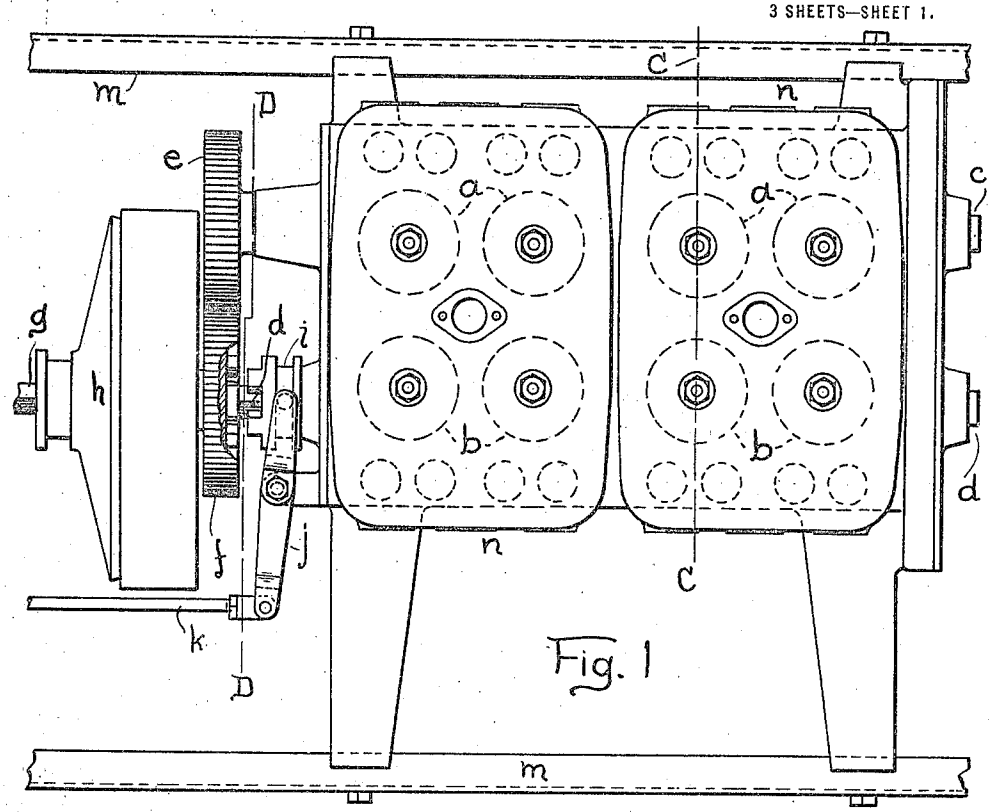


Fig. 1

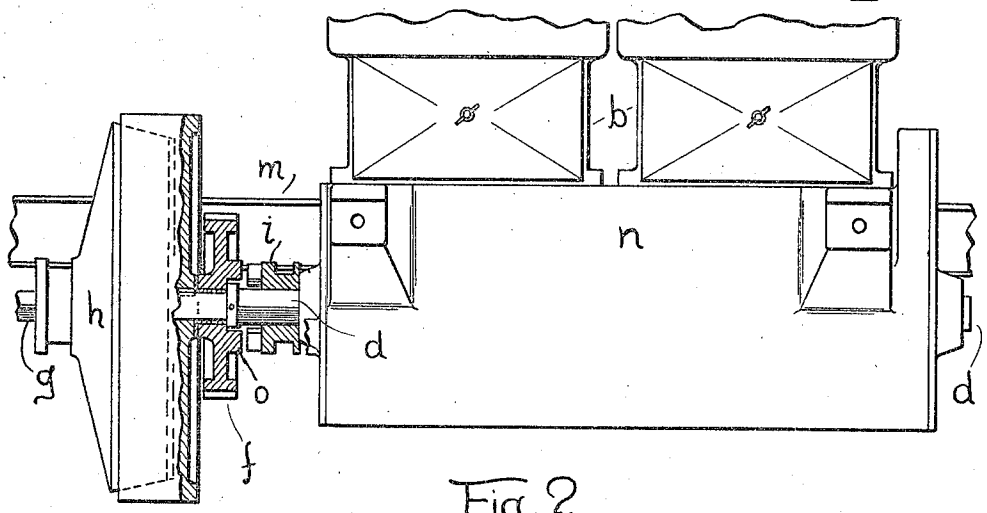


Fig. 2

WITNESSES

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3 SHEETS—SHEET 2.

Fig. 3

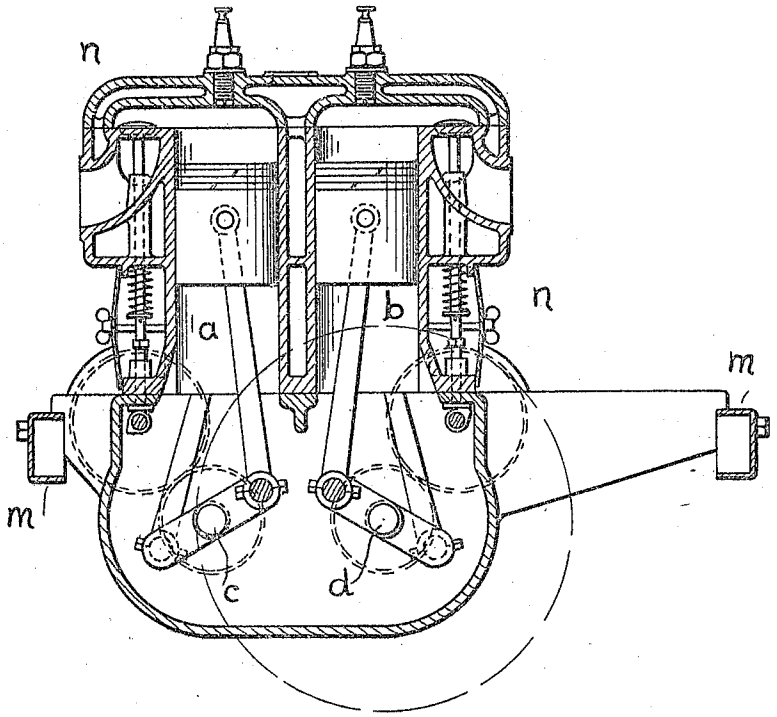
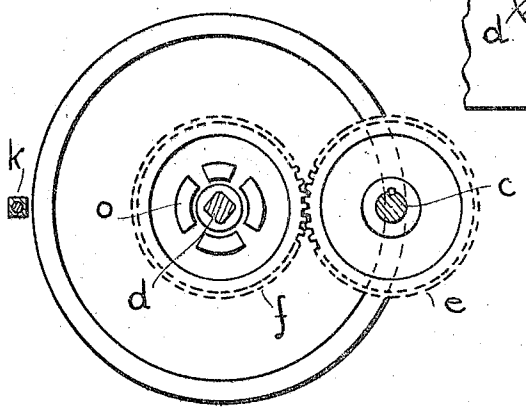


Fig. 4



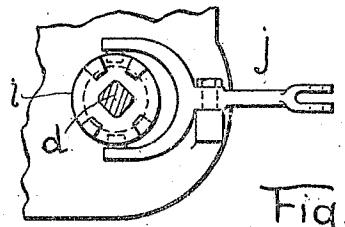


Fig. 5

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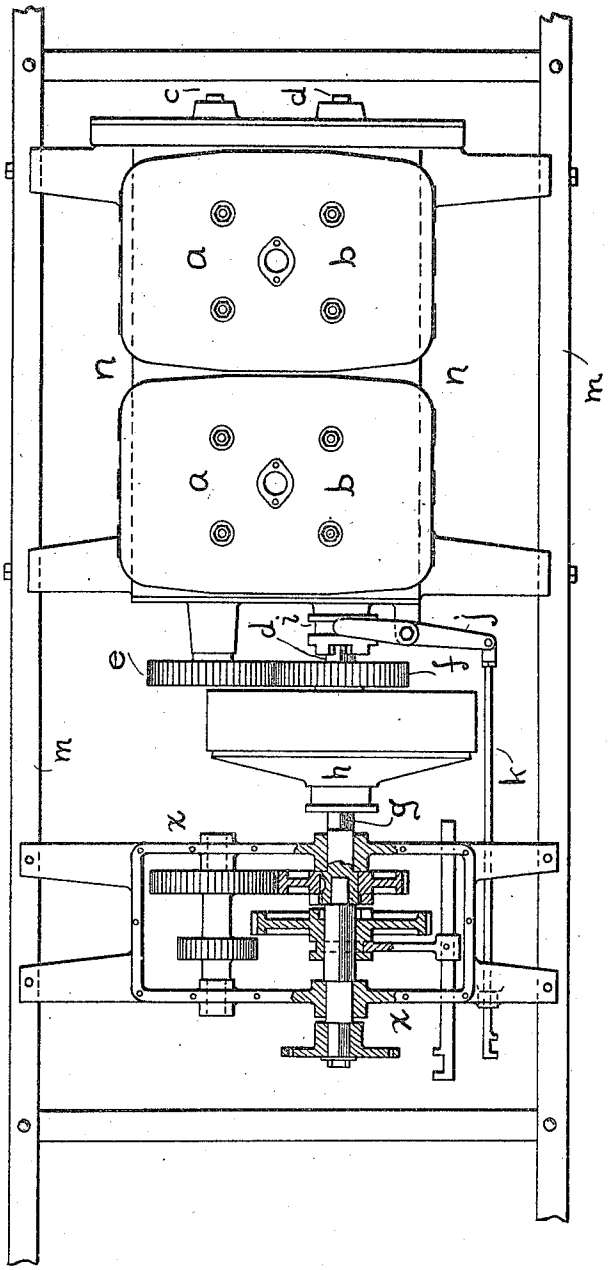
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3 SHEETS—SHEET 3.

Fig. 6



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UNITED STATES PATENT OFFICE.

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DRIVING MECHANISM FOR AUTOMOBILES.

1,306,864. Specification of Letters Patent. Patented June 17, 1919.

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To all whom it may concern:

Be it known that I, ELLIOTT J. STODDARD, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Driving Mechanism for Automobiles, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to automobiles and special objects of my improvement are to combine with an automobile a motor consisting of a plurality of units in which one of said units may be used with the usual conventional and well understood connection with the driving wheels and another unit may be simply connected or disconnected with the first unit so as to maintain proper working conditions such as uniformity of driving torque, balance of moving parts and to secure these objects without increasing the complication or number of machine parts.

I secure this object in the device illustrated in the accompanying drawings in which;

Figure 1, is a plan view of an apparatus embodying my invention, only so much of the automobile being shown as is necessary to illustrate the combination and the engine therewith.

Fig. 2, is a partial side elevation of the apparatus shown in Fig. 1, the side bar of the chassis toward the observer being removed and some parts shown in section.

Fig. 3, is a section on the line C—C Fig. 1.

Fig. 4, is a section on the line D—D Fig. 1.

Fig. 5, is a detail elevation showing the jaw clutch.

Fig. 6, is a view similar to Fig. 1 but showing said apparatus combined with a change-speed gearing.

n n indicates an internal combustion engine as a whole. In this instance such engine has eight cylinders arranged in sets of four lying parallel with each other, each set operates in the usual way upon its cranks and crank shaft except that each set of cylinders is somewhat offset toward the center. One of the sets of cylinders is designated by the letter *a* and the other by the letter *b*. *c* is the crank shaft of the cylinders *a*, and *d* that of the cylinders *b*. *e* is a gear wheel fixed upon the shaft *c*. *f* is a gear wheel rotatably mounted upon the shaft *d* and provided on its inner face with teeth or cavities *o* of a jaw clutch. *g* is the transmission shaft and *h* the usual clutch element. The latter being interposed between the shaft *d* and the transmission shaft *g* in the usual way. *i* is a clutch block fitting upon a squared portion of the shaft *d* and adapted to reciprocate thereon and provided on its outer surface with teeth or cavities adapted to engage the teeth or cavities *o* of the jaw clutch on the wheel *f* so as to bind said wheel to the shaft *d*.

The jaw clutch by which the gear wheel *f* is secured to the shaft *d* is of such construction that it can only engage when the wheel *f* has a certain angular position. To this end the teeth upon the block *i* and the cavities of the clutch shaft on the wheel *f* are unevenly spaced.

The gear wheels *e* and *f* engage each other so that when the wheel *f* is bound to the shaft *d* the shafts *c* and *d* are united so as to turn at the same angular velocity. When the wheel *f* is disengaged from the shaft *d* the cylinders *a* are disconnected and the automobile will be driven by the cylinders *b* only. When the wheel *f* is secured to the shaft *d* by the clutch, as above described, the shafts *c* and *d* are united at such a relative angle that the impulse of all eight cylinders shall occur at equal angular distances of the revolution of the transmission shaft and so that the reciprocating parts are balanced and so that the reverse torque of the cylinders oppose each other and therefore avoid vibration from this cause. It will be observed that the parts may be lighter and that half of the cylinders may be thrown out of gear when not required so that the other half can be more economically and efficiently operated under ordinary conditions. It will be observed also that the cylinders are arranged compactly and in approved vertical positions.

x x represents a change speed gearing having a less number of gear combinations than is usual. The particular type or construction of this gearing is not material to this invention and the device is well understood in the art. It is intended to represent such a gearing generically and as interposed in the transmission shaft.

The plurality of adjustments of the change speed gearing is available with the cylinders *a* in or out of engagement, thus the range of adjustment provided for by the gearing is

doubled, therefore the number of speed changes by combinations of the change speed gearing elements may be less. The cylinders being offset toward each other provide for a smoother torque diagram.

The set of cylinders *b* is connected to drive the automobile in the usual way, the transmission shaft *g* being of the usual and conventional construction and the clutch *h* being also of the usual and conventional construction directly uniting the crank shaft of the cylinders *b* with the transmission shaft *g*.

The individual cylinders of the 8-cylinder engine shown will be smaller than those of a 4-cylinder engine of the same power. Consequently, when the set *b* alone is used it will not be necessary to throttle them as much as in the ordinary 4-cylinder engine and they will therefore be used under more favorable conditions. The gear wheel *f* being freed from the crank shaft of the cylinders *b*, such cylinders will drive the automobile without more complication and under the same conditions as the ordinary 4-cylinder engine.

Inasmuch as a change speed gearing of a less number of parts may be used, the introduction of the gears *e* and *f* will not increase the complication of the aggregate mechanism, while the range of power application will be as great as with the more complicated change speed gearing and the single unit power plant.

There being four cylinders in each set, therefore there will always be working strokes in both sets at the same time, and the sets being so geared together that the reverse torques of the cylinders in one set is in an opposite direction to the reverse torques in the other set. Therefore, the reverse torques will counteract each other and largely avoid the vibration due to this cause.

What I claim is:

1. The combination with an automobile, of an engine having two sets of cylinders and co-acting parts including a crank shaft for each of said sets of cylinders, means for connecting and disconnecting said crank shafts independent of the main transmission shaft, a main transmission shaft for said automobile and a clutch mechanism for directly connecting one of said crank shafts to said main transmission shaft, for the purpose described.

2. The combination with an automobile, of an engine having two sets of cylinders and co-acting parts including a crank shaft for each of said sets of cylinders, a main transmission shaft for the automobile, and a clutch adapted to directly connect one of said crank shafts with said main transmission shaft, a gear wheel upon each of said crank shafts, the teeth of said gear wheels engaging each other, the gear wheel upon the directly-connected crank shaft being loose thereon, and means for releasably connecting said loose gear wheel with said crank shaft.

3. The combination with an automobile, of an engine having two sets of cylinders and co-acting parts including a crank shaft for each of said sets of cylinders, a main transmission shaft for said automobile, means for directly connecting one of said crank shafts to said main transmission shaft, a gear wheel upon each of said crank shafts, the teeth of said gear wheels engaging with each other, and means for engaging and disengaging the gear wheel upon said directly connected crank shaft with said crank shaft.

4. The combination with an automobile, of an engine having two sets of cylinders and coacting parts including a crank shaft for each set of cylinders, means for connecting and disconnecting said crank shafts independent of the main transmission shaft of the automobile, a single main transmission shaft, and a change speed gearing in said single main transmission shaft whereby the power of one or both of said sets of cylinders may be transmitted through said main transmission shaft and the power and speed transmitted may be varied by the change speed gearing either when transmitting the power of a single set of cylinders or both sets of cylinders.

In testimony whereof I sign this specification in the presence of two witnesses.

ELLIOTT J. STODDARD.

Witnesses:
VIRGINIA C. SPRATT,
AGNES M. HIPKINS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."