Aug. 28, 1934. S. M. VIALE 1,971,885

CAMSHAFT DRIVING MECHANISM FOR INTERNAL COMBUSTION ENGINES

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Fig. 1.

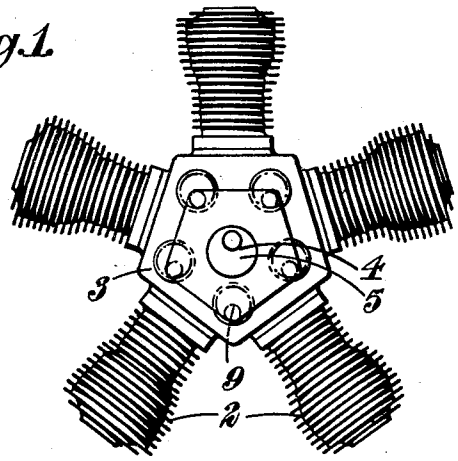
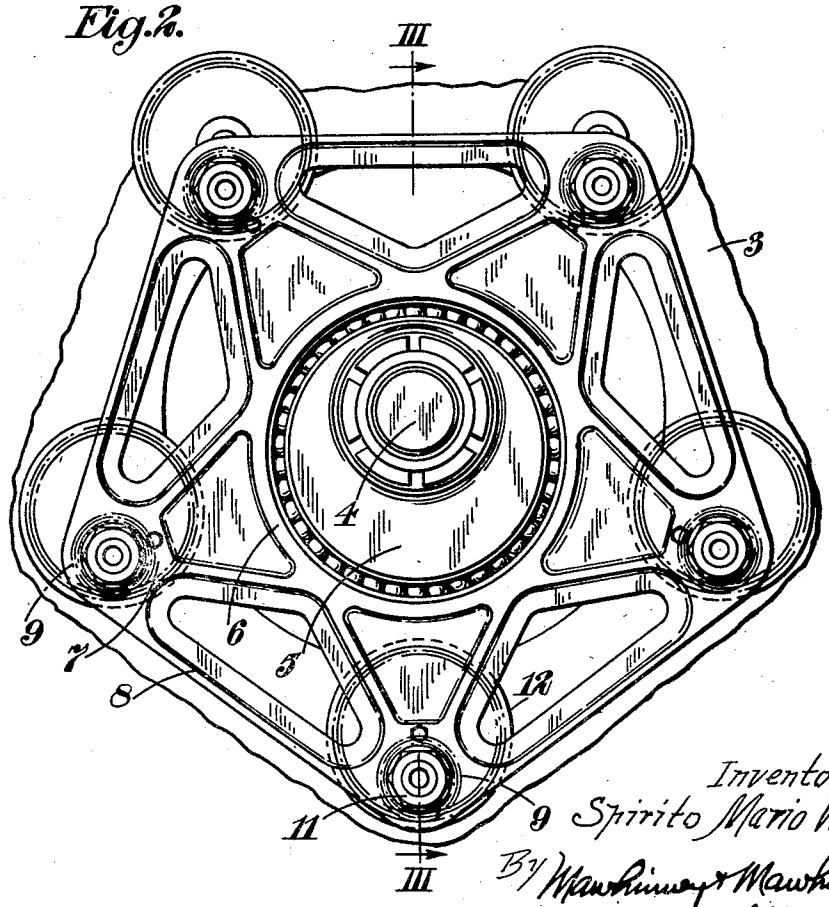


Fig. 2.



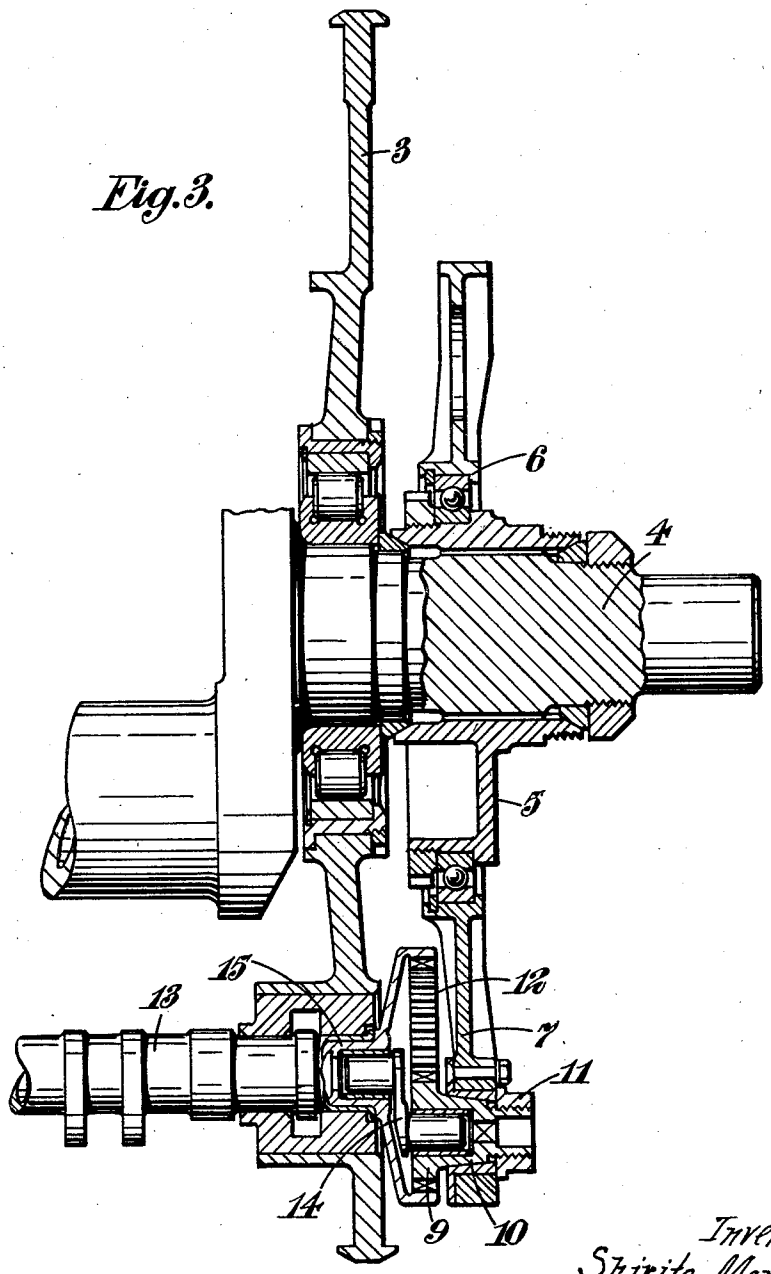
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Fig. 3.



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CAMSHAFT DRIVING MECHANISM FOR INTERNAL-COMBUSTION ENGINES

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In Great Britain November 27, 1931

5 Claims. (Cl. 74—68)

This invention relates to multi-camshaft internal-combustion engines of the star type (i. e., with the cylinders, or rows of cylinders, arranged on different radii around a common crankshaft), and particularly to the kind where each cylinder, or row of cylinders, has an individual camshaft for operating the valves, etc.

The main object of the invention is to provide simple means for driving all the camshafts from the single crankshaft, whilst obtaining other advantages specified later.

According to the invention, the crankshaft drives an eccentric strap on which are non-rotatably supported as many toothed wheels as there are camshafts, and each toothed wheel meshes in a planetary manner with a toothed wheel fast on a camshaft.

Preferably each camshaft toothed wheel is an internal gear. Preferably, also, each meshing pair of wheels has spigotal connections with a Z-shaped member journalled therein.

In the accompanying drawings:—

Figure 1 is a diagrammatic outline end view of a star-type engine according to the invention;

Figure 2 is a similar but fragmentary view, to a much larger scale, with the cover plate removed; and

Figure 3 is a cross-section taken on the line III—III of Figure 2.

In the construction illustrated, where five radial cylinders, 2, 2, 2, or rows of cylinders, are used, the crankcase 3 resembles a pentagon (in end view) symmetrically arranged around the central crankshaft 4. On this shaft is fast an eccentric 5 journalled on the rim of which is a non-rotatable strap (6, 7, 8) in the form of a strap portion 6 and parts 7, 7 which extend radially outwards to reach the five camshafts. These parts resemble spokes and may be connected together by tangential connections 8, 8 as shown.

In the arrangement illustrated the strap is of skeleton pentagonal form and at each corner is arranged some means for securing a toothed wheel or pinion 9. This may be mounted upon or formed with a short stem 10 which is frictionally held in place, but capable of angular adjustment when released, by means of a nut 11. It will be clear that each pinion 9 is stationary about its axis, and that this revolves in a small orbit similar to that of the eccentric strap.

Each pinion 9 meshes with an internally-toothed wheel 12 fast on a camshaft 13, so that, as its axis rotates in its orbit, it takes with it the internally-toothed wheel, which rotates on the pinion, and the camshaft revolves at half the engine speed, if the internally-toothed wheel is double the diameter of the pinion.

For providing greater support the drawings show a Z-shaped member 14 the ends of which spigot into the wheels of a meshing pair, being journalled therein. The hub portions 15 of the internally-toothed wheel in which the end of the member 14 is journalled is itself supported in the wall of the crankcase 3.

By means of the invention any number of camshafts can be directly driven from a single member on the crankshaft, and it is possible to time or set angularly any one camshaft without disturbing the others. For this purpose it is merely necessary to slacken any particular nut 11 for the associated pinion, and to twist the camshaft slightly in the required direction.

Furthermore, the mass of the eccentric member may be employed to serve as part of the crank shaft balance weight.

What I claim as my invention and desire to secure by Letters Patent of the United States is:—

1. Shaft driving means, comprising a main shaft, a plurality of secondary shafts, a toothed wheel fixed to each secondary shaft, an eccentric strap driven by the main shaft, and a plurality of toothed wheels non-rotatably supported by said eccentric strap, the number of toothed wheels on the eccentric strap corresponding in number to the toothed wheels on the secondary shafts and being respectively in mesh therewith.

2. In shaft driving means, a main shaft, a plurality of secondary shafts, a toothed wheel fixed to each secondary shaft, an eccentric strap driven by the main shaft, and a plurality of toothed wheels non-rotatably supported by said eccentric strap, the number of toothed wheels on the eccentric strap corresponding in number to the toothed wheels on the secondary shafts and being respectively in mesh therewith, said toothed wheels being arranged to mesh in a planetary manner.

3. In a shaft coupling, a main shaft, a plurality of radially arranged secondary shafts, a non-rotatable eccentric strap driven by the main shaft, a plurality of toothed wheels corresponding in number to the number of secondary shafts and fast on said eccentric strap, and an internally toothed wheel fast on each secondary shaft and in mesh with the corresponding toothed wheel on the eccentric strap.

4. In a shaft coupling, a main shaft, a plurality of secondary shafts, a toothed wheel fixed to each secondary shaft, an eccentric strap driven by the main shaft, and a plurality of toothed wheels non-

rotatably supported by said eccentric strap, the number of toothed wheels on the eccentric strap corresponding in number to the toothed wheels on the secondary shafts and being respectively in mesh therewith, and a Z-shaped member journaled in each meshing pair of wheels to provide a spigotal connection therebetween.

5. In a shaft coupling, a main shaft, a plurality of secondary shafts, a toothed wheel fixed to each secondary shaft, an eccentric strap driven by the main shaft, and a plurality of toothed wheels non-rotatably supported by said eccentric strap, the number of toothed wheels on the eccentric strap corresponding in number to the toothed wheels on the secondary shafts and being respectively in mesh therewith, and adjustable means for fixing and freeing the toothed wheels to the eccentric strap to permit of the angular adjustment of the secondary shafts.

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