No. 751,924. PATENTED FEB. 9, 1904.

W. W. KELLY.

TRIPLE CYLINDER ENGINE.

APPLICATION FILED OCT. 24, 1903.

NO MODEL.

Fig. 1

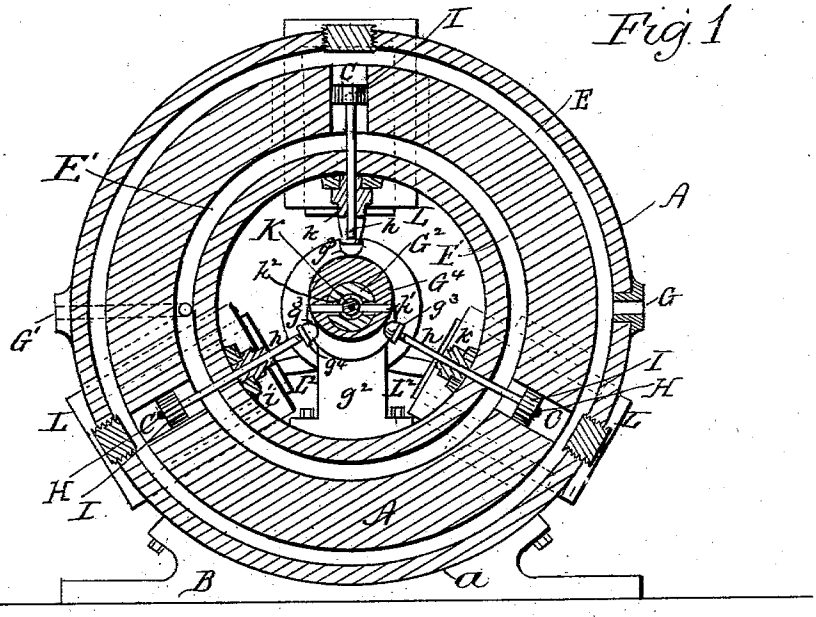


Fig. 2

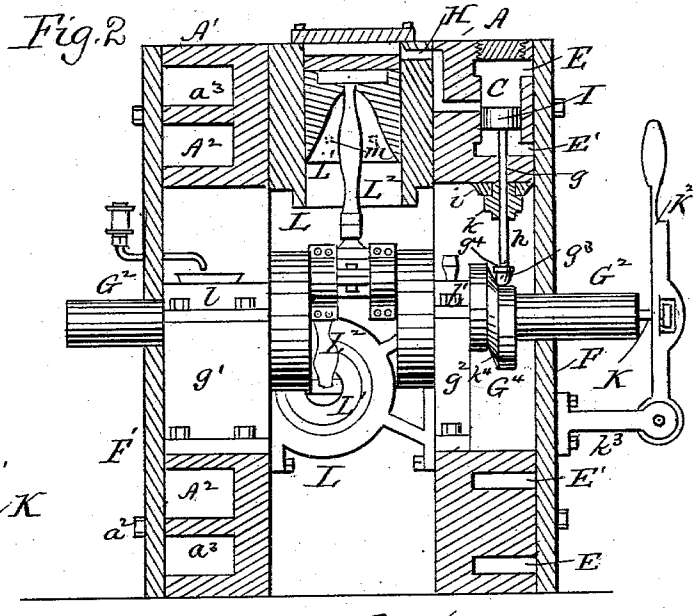
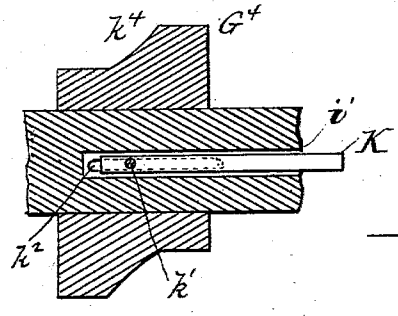


Fig. 3



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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UNITED STATES PATENT OFFICE.

WILLIAM WILSON KELLY, OF LORAIN, OHIO.

TRIPLE-CYLINDER ENGINE.

SPECIFICATION forming part of Letters Patent No. 751,924, dated February 9, 1904.

Application filed October 24, 1903. Serial No. 178,348. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM WILSON KELLY, a citizen of the United States, residing at Lorain, in the county of Lorain and State of Ohio, have invented certain new and useful Improvements in Triple-Cylinder Engines; 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.

This invention has relation to triple-cylinder engines in which the cylinders are arranged radially within or upon a ring-shaped frame and the piston-rods coupled to a central shaft passing through the frame.

The object of my invention is to provide an engine of this type in which the frame and sustaining parts will possess more than the usual strength, compactness, and rigidity, so that the engine may be run at very high speed without danger or excessive vibration and in which the valves and other moving parts will operate with the least possible amount of friction and without leakage or waste.

My invention consists in the novel construction, combination, and arrangement of parts hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a front view, partly in section, of an engine embodying my invention. Fig. 2 is a vertical transverse sectional view of the engine. Fig. 3 is a detail view in section of the valve-operating eccentric on an enlarged scale.

The frame of the engine consists principally of the two ring-shaped or circular castings A A,′ which are secured by bolts to a base B, having a concavity at *a* in which the castings A A′ rest and in which they are firmly bolted. These ring-shaped frame-castings are of the same size and exterior outline or contour, but differ in other respects, as will be hereinafter described. The casting A is so constructed as to form the valve-chests, which appear as and are cylindrical chambers C C C, arranged radially and communicating with the circular concentric channels E E′, formed in the face of the casting A. When the engine is put up, the channeled face of the casting A has bolted to it the plate F, which covers the channels E E′, and the latter are then the supply and exhaust passages for the steam, respectively, the steam entering and leaving or exhausting by the ports G G′, respectively. Ports H lead from the inner sides of the valve-chambers to the cylinders. The valves I are simple pistons, and their stroke or play is just sufficient to close and open the port leading to the cylinders. The valve-stems *h* pass through openings *g*, formed in the casting A, and these openings are surrounded by bosses *i*, which sustain plugs *k*, through which the valve-stems pass.

G^2 designates the horizontal power-shaft of the engine, which passes through the center of the engine-frame and is mounted on bearing blocks or pedestals g' g^2, bolted to the inner cylindrical walls of the frame-sections A A′ and provided with the usual caps or boxes *l l′*. The shaft G^2 passes through openings in the center of the plates F F′, and on the working side of the engine is mounted a double eccentric G^4, against the peripheral surfaces of which the ends of the valve-stems abut, each valve-stem having screwed on its end a rounded head g^3, of suitable metal, and back of such head a jam-nut g^4 to prevent the head from becoming loose. The end of the power-shaft at the working side of the engine is formed with an axially-bored socket i' for the reception and play of the bar K, which at its inner end is provided with a lateral pin k', which passes through slots k^2 in the shaft G^2 and through the walls of the eccentric G^4. At its outer end the bar K is swiveled to a lever K^2, which is fulcrumed at one end to an arm k^3, bolted to the frame of the engine. The eccentric G^4 is adjusted lengthwise of the shaft G^2 by the operation of the lever K^2, so as to cause the ends of the valve-rods to ride on the peripheries of one or the other of the eccentric-disks, according as it is desired to run the engine forward or backward. Between the two eccentric surfaces the eccentric-block is beveled, as shown at k^4, so that the ends of the valve-stems can easily pass from one eccentric to the other.

L L L designate the steam-cylinders, which consist of bored castings having longitudinal side webs and flanges, through which flanges they are bolted to and between the two sections A A′ of the engine-frame.

L′ designates the pistons, having cupped bodies, and L^2 are the piston-rods, pivotally connected to the pistons. The piston-rods are connected by crank connections of the usual construction to the crank of the engine-shaft, and the pistons are staggered, so that the crank connections lie side by side, as shown in Fig. 2, and work independently on the crank.

The section A′ of the engine-frame is cast as a ring, chambered on one side, as shown at A^2, to lighten and decrease the amount of metal, and has bolted to its face a flat ring or disk F′, similar to the disk F on the working side, the bolts a^2, by which the plate is held in position, entering the webs a^3, cast with the section A′. The pedestal g' at the driving side of the engine is the full width of the frame-section A′, while the pedestal g^2 on the other side of the frame is only one-third the width of the section A, so as to leave room for the play of the eccentric G^4.

The cylinders L are provided with relief-holes m one-sixteenth the diameter of the cylinders and serve to free the cylinders at the finish of the piston-stroke of any and all fluid, as well as to lubricate the working parts of the engine.

The base B, upon which the engine rests, may either be a separate casting or cast integral with the engine-frame.

An engine constructed as described has great strength and is capable of the highest speed without vibration or jar, with no sound from the exhaust and no return pull either in pistons or valves. The valve-chest is a single casting, and the provisions for the admission and exhaust of steam and the working of the pistons and valves are such as to do away with stuffing-boxes, glands, packing, links, and all motions connected with the ordinary reversing-engine.

Having described my invention, I claim—

1. The herein-described triple-cylinder engine, comprising the cast ring-shaped sections A A′, the radially-arranged cylinders L L L, bolted to and between said sections, the pistons L′ and piston-rods L^2, the power-shaft G^2 formed with a crank to which said piston-rods are connected, the radially-arranged piston-shaped valves I having radial stems h and the valve-operating eccentric G^4 mounted on said power-shaft; the frame-section A being formed with the annular concentric channels E E′ communicating with the steam supply and exhaust ports and with the valve-chambers C C C, substantially as described.

2. In a triple-cylinder engine of the type described, the combination with the steam-cylinders, pistons, valves situated all in the same plane, valve-stems having free outer ends, and power-shaft, of the adjustable double eccentric G^4 having cylindrical peripheries and mounted on the power-shaft and means for adjusting said eccentric substantially as described.

3. In a triple-cylinder engine of the type described, the combination with the ring-shaped frame comprising the annular cast sections A, A′ and cranked power-shaft, of the cylinders and their pistons and piston-rods, the latter being independently connected to the power-shaft and the engine-cylinders staggered in the frame, and bolted to and between the sections A, A′ and the supporting-base B, by which the engine is supported in an upright position, substantially as described.

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

WILLIAM WILSON KELLY.

Witnesses:
H. S. Craig,
Annie Thomas.