

(No Model.)

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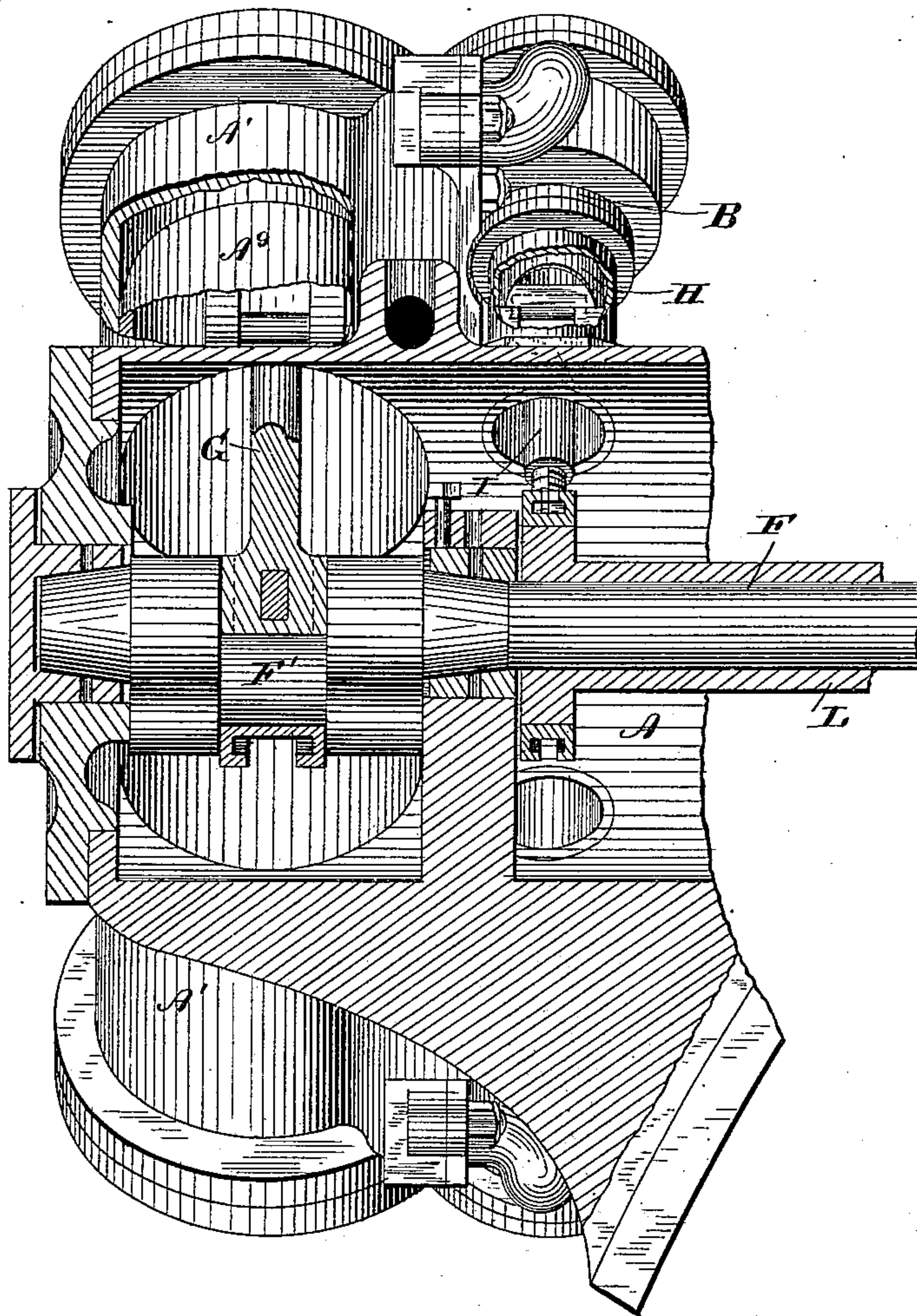
M. N. LYNN.

PITMAN ATTACHMENT FOR MULTIPLE CYLINDER STEAM ENGINES.

No. 334,025.

Patented Jan. 12, 1886.

Fig. 1.



Witnesses.

Charles R. Burr
Thomas Durant.

Inventor.

Mirabeau N. Lynn
by Church & Church
His Attorneys.

(No Model.)

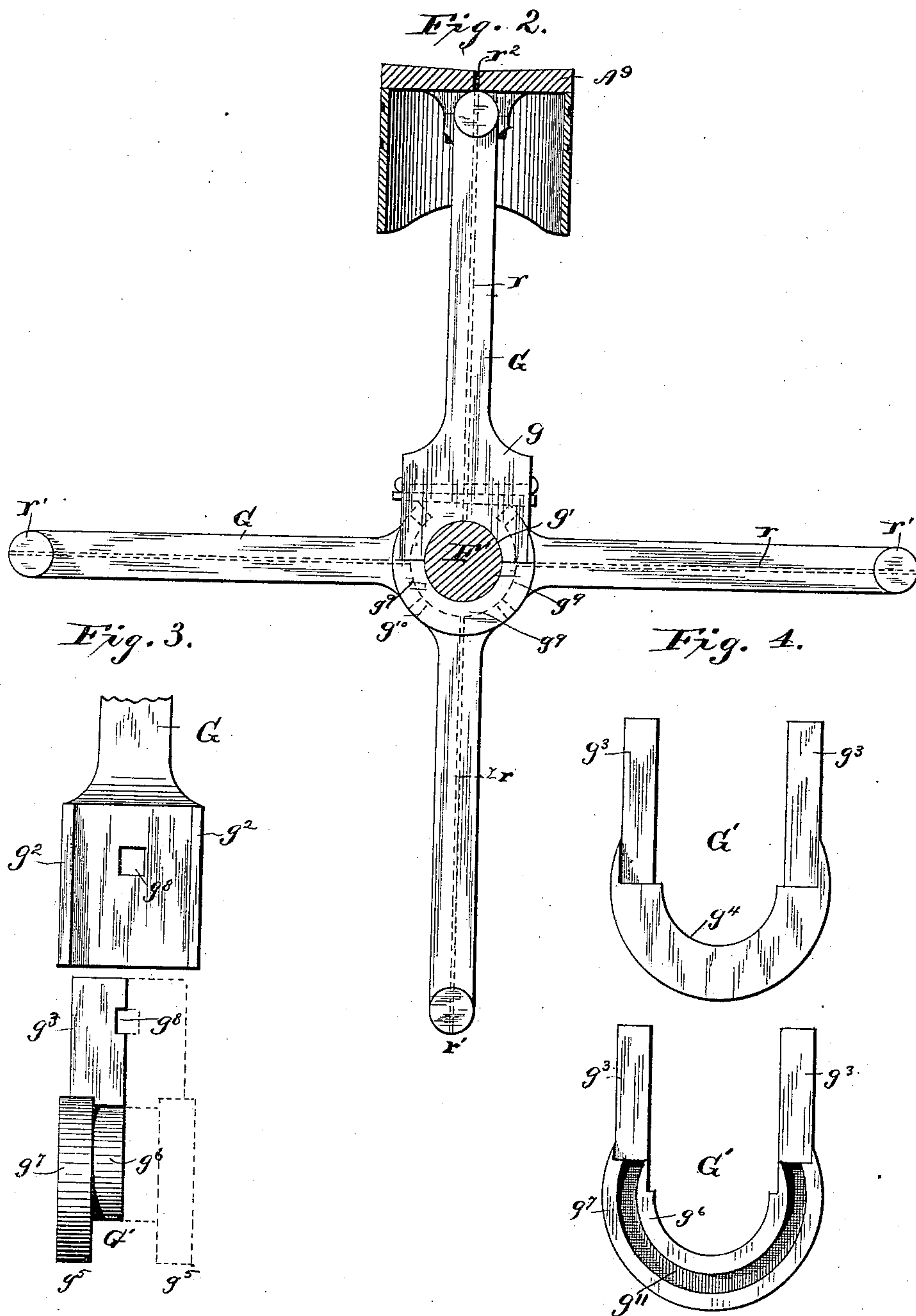
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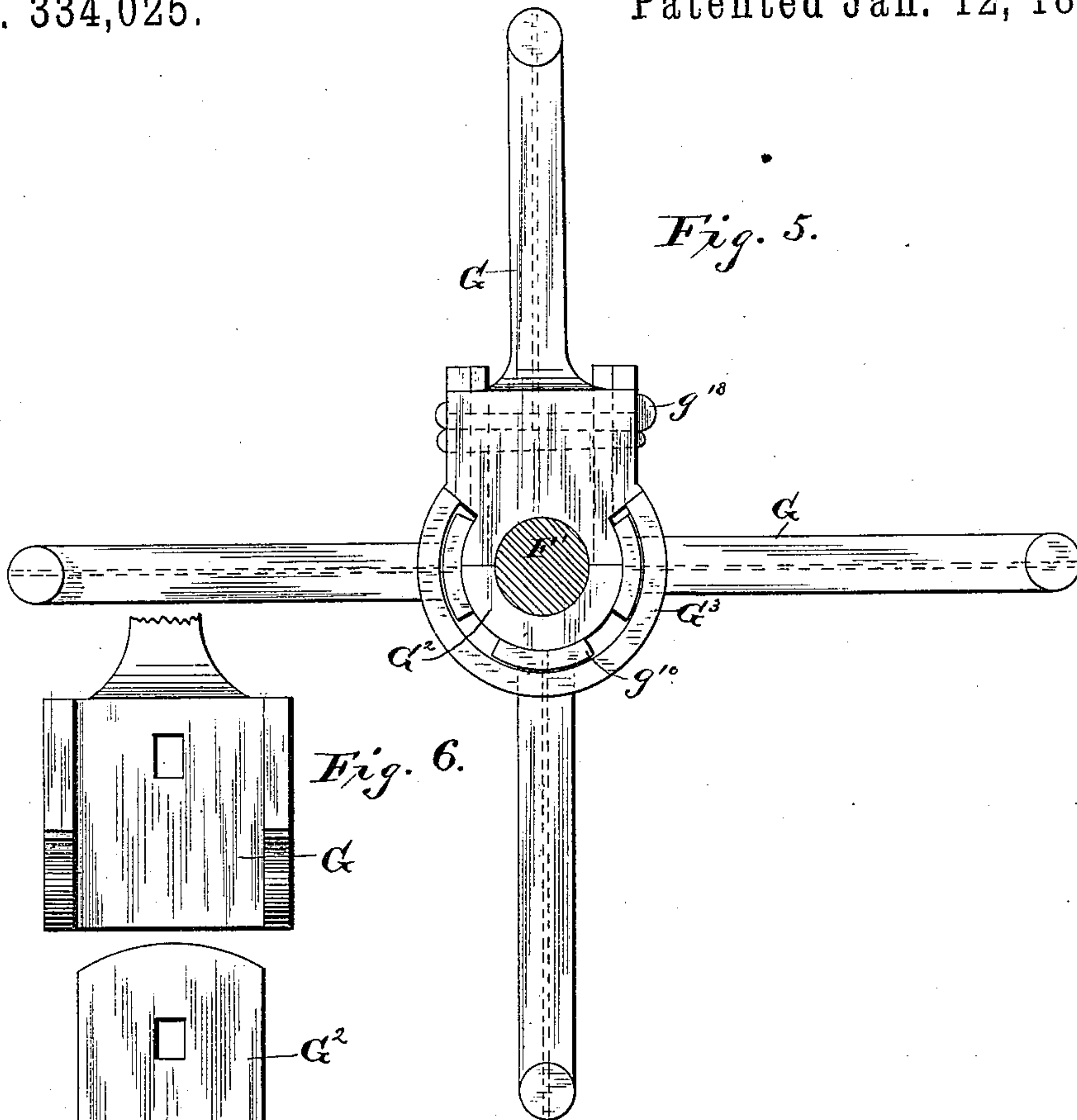
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M. N. LYNN.

PITMAN ATTACHMENT FOR MULTIPLE CYLINDER STEAM ENGINES.

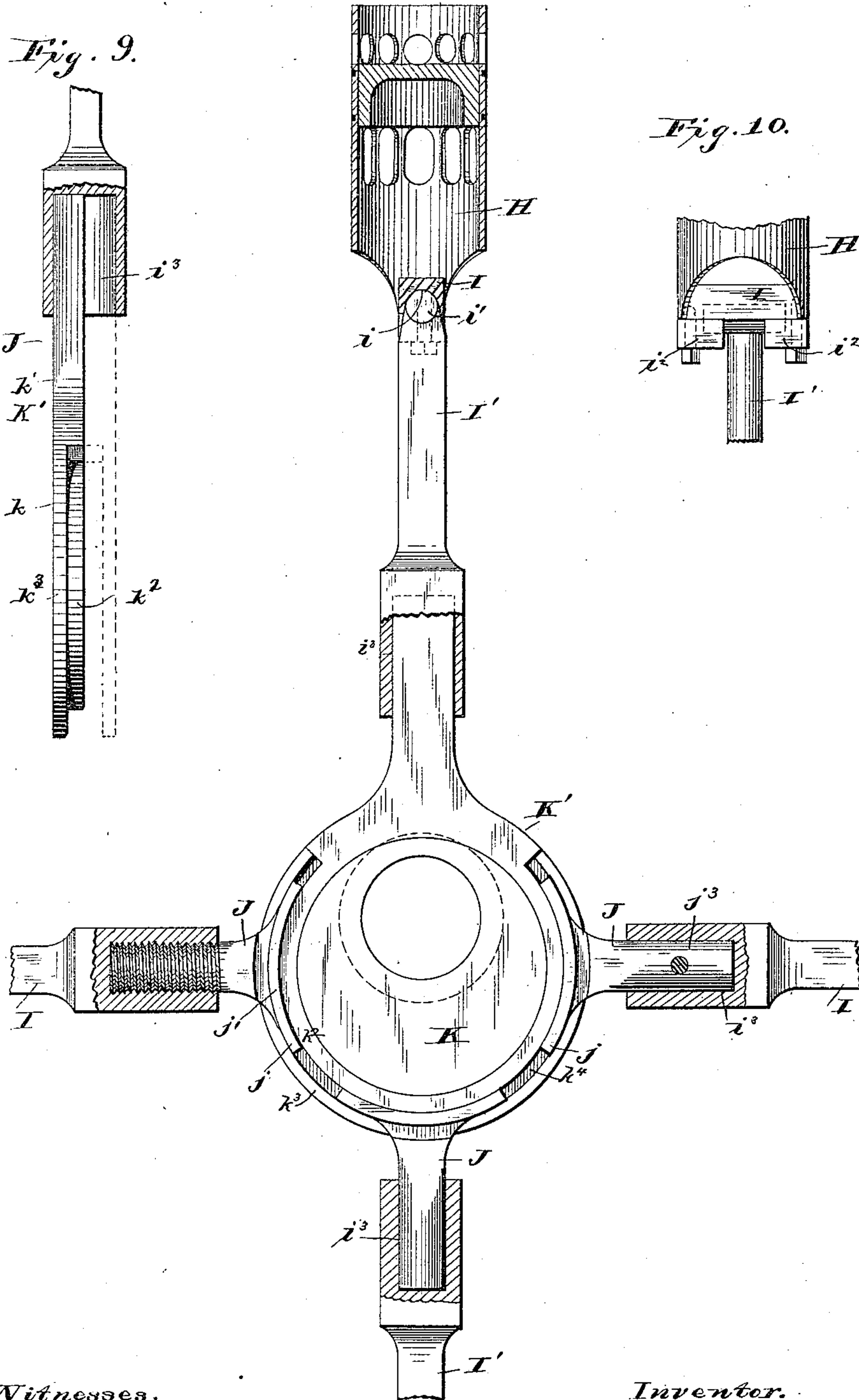
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Patented Jan. 12, 1886.

Fig. 8.

Fig. 9.

Fig. 10.



Witnesses.

Charles R. Dunn
Thomas Duval.

Inventor.

Mirabeau N. Lynn
by Church & Church
his Attorneys.

UNITED STATES PATENT OFFICE.

MIRABEAU N. LYNN, OF RISING SUN, ASSIGNOR TO THE AMERICAN ELECTRIC HEADLIGHT COMPANY, OF INDIANAPOLIS, INDIANA.

PITMAN ATTACHMENT FOR MULTIPLE-CYLINDER STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 334,025, dated January 12, 1886.

Application filed June 1, 1885. Serial No. 167,292. (No model.)

To all whom it may concern:

Be it known that I, MIRABEAU N. LYNN, of Rising Sun, in the county of Ohio and State of Indiana, have invented certain new and useful Improvements in Pitman Attachments for Multiple-Cylinder Steam-Engines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the figures and letters of reference marked thereon.

In an application filed by me December 31, 1884, Serial No. 151,636, I have described an improved form and construction of steam-engine of the direct-acting multiple-cylinder type, and the present application, filed as a division of said prior application, is designed to cover certain improvements in the construction and application of the pitman as employed in said engine.

The present invention will first be described, and the particular features of novelty pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation, partly in section, of the main driving-shaft, showing the manner of applying the several pitmen thereto. Fig. 2 is an end view showing the manner of applying the pitmen to the crank. Figs. 3 and 4 illustrate details of the attachment Fig. 2. Figs. 5 and 6 illustrate a modification of the attachment Fig. 2. Fig. 7 is a side elevation, partly in section, of the valve-eccentric, its adjusting mechanism, and pitmen. Fig. 8 is a detail view showing the manner of attaching the valve-pitmen to the eccentric. Figs. 9 and 10 are details of the attachment Fig. 8.

Similar letters of reference in the several figures indicate the same parts.

The letter A designates the main frame or casing of the engine, to which are secured the piston-cylinders A' and valve-cylinders B, three or more in number, arranged radially and at equal distances apart about the main shaft F. Within each cylinder A' is arranged a piston, A'', and within each cylinder B a valve controlling the admission and escape of steam in the cylinders A', the exhaust-steam

being delivered through the valve-cylinders B into the central casing, A, where, together with the oil carried by the steam, it serves as a lubricant for the working parts. Within each cylinder A' is contained a piston, to which is pivotally attached a pitman of connecting-rod G, and the several pitmen are combined and applied to the crank F' in the following manner: One pitman is provided with a head, *g*, having a semicircular groove or bearing, *g'*, fitting the crank-pin and flanges *g''* on opposite sides, forming a way to receive the arms *g'''* of a sectional strap or yoke, G', which embraces the crank-pin and contains the other half-bearing *g''''*. This yoke G' is divided longitudinally into two half-sections, *g⁵*, each formed with an inner flange or shoulder, *g⁶*, and an outer flange or shoulder, *g⁷*, the latter narrower, but projecting in the same direction and concentric with the inner flange, *g⁶*, as shown in Figs. 3 and 4. The sections *g⁵*, when brought together as shown in Fig. 3, are applied to the head *g*, as indicated in Fig. 2, and secured in place by the gib and keys passing through said head and the keyway *g⁸*, formed in the proximate faces of the sections *g⁵*. The remaining pitmen G are each provided with a curved bearing, *g⁹*, fitting the outer surface of flange *g⁶*, and with a flange or shoulder, *g¹⁰*, on either side concentric with the bearing *g⁹*, and adapted to fit the space or groove *g¹¹* between the flanges *g⁶* and *g⁷*.

In applying the pitmen to the crank those having the flanges *g⁹* are first placed in position with their flanges between the flanges *g⁶* and *g⁷* of the sections *g⁵*, and the latter are brought together until their inner flanges, *g⁶*, make contact. The yoke G' and the head *g* of the remaining pitman are next applied to the crank-pin, and the whole is clamped and firmly secured in position by the gib and key passed through the head *g* and the keyway *g⁸* in the section *g⁵*. Thus by the simple removal of the key all the pitmen may be readily detached from the crank-pin.

The pistons are single-acting, the steam under pressure being admitted to the outer ends of the cylinders only, the exhaust-steam being delivered into the hollow casing, where,

together with the oil, it serves to lubricate the several bearings.

As the bearing-surfaces of the pitmen upon the crank are not convenient of access, and as the motions of the pistons and shaft are rapid, it may be expedient to employ some additional means for the more effectual lubrication of the wearing-surfaces. With this end in view I have formed through each of the pitmen G a longitudinal passage or duct, r , extending from the bearing or head r' to the crank-pin or surface of the yoke, and in the piston A^3 , in line with the end of the passage or duct r , is formed a small port or opening, r^2 , whereby, as the pitman is reciprocated and the pitman-head oscillates in its bearings, the end of the passage or duct r will be caused to register with the opening r^2 in the piston for a longer or shorter interval, and permit the steam or water and oil fed to the cylinder with the steam to be forced or carried through the said passage or duct r and delivered upon the wearing-surface, thereby effectually lubricating the latter, and in proportion to the speed of the engine.

The valves H, for controlling the passage of steam to and from the cylinders A' , are tubular in form and operate within the cylinders D, connecting the valve-cylinders with the casing A.

The mechanism which I prefer to employ for actuating the valve is constructed and applied as follows: Upon the lower or inner end of the valve is secured or formed a cross-piece, I, provided with a concave bearing, i , adapted to receive the cross-head i' on the pitman I' , Fig. 10, the said cross-head being held in place by the bearing-blocks i^2 , bolted to ends of the cross-piece I. The several pitmen I' are formed with sockets i^3 on the end, Fig. 8, adapted to receive and retain by screw-threads or otherwise the detachable heads J, which latter are applied to the eccentric, as hereinafter described.

Upon the eccentric K, borne by the main shaft, is fitted a divided collar or ring, K' , Figs. 8 and 9, the two sections k k whereof are each formed or provided with a semi-cylindrical arm, k' , and two concentric flanges, k^2 k^3 , forming an annular groove, k^4 . The outer flange, k^3 , is narrower than the inner flange, k^2 , and when the two sections are brought together the arms k' can be inserted within one of the sockets i^3 , thereby retaining the sections in place with their inner flanges, k^2 , in contact forming a central bearing, concentric with the eccentric, and with a flange, k^3 , on either side thereof. Upon the bearing thus formed by the inner flanges, k^2 , is fitted the arc-shaped bearing or saddle j of the detachable heads J, the flanges j' thereof being received under the flanges k^3 on either side of the collar or ring k' . It will thus be seen that the several heads J (each provided with a shank, j^3 , fitting the socket i^3 in one of the pitmen I') are independently mounted or supported upon the collar or ring K' in such manner as to be free to move thereon between the collars k^2 k^3 , and that they are

all clamped and held in position by the bringing together of the two sections k and the insertion of the arms k' into one of the sockets i^3 of the pitman, whereby the several pitmen may readily be disconnected from the eccentric by the withdrawal of the pitman from the arms k' of the collar K' and the separation of the two sections k . The detachable heads J are duplicates of each other, and can readily be replaced when worn or broken, and the same is true of the valves and their several connected parts.

The eccentric K may be mounted upon and connected to the main shaft in any well-known manner; but I prefer the following arrangement, as providing an efficient mechanism and means for reversing the eccentric, and hence the direction of rotation. The eccentric K is formed upon or attached to a sleeve, L, embracing the main shaft, and provided with a spiral groove or slot, l , into which a stud or pin, l' , attached to a second sleeve, L' , projects. This sleeve L' fits over and slides upon the sleeve L, being connected to rotate with the main shaft by a feather and groove. It is further provided with a series of parallel teeth, cut or formed on its external surface, constituting a circular rack, with which the teeth of a pinion, l^2 , mesh, said pinion being mounted upon a transverse shaft provided with a hand-wheel (not shown) and operating within the casing E^3 .

When the engine is in operation, the sleeve L' , revolving with the main shaft, communicates motion to the eccentric through the medium of the pin and the groove in the sleeve L, thereby actuating the valves. To reverse the position of the valves, it is only necessary to reciprocate the sleeve L by means of the pinion l^2 , as by so doing the pin or stud l' , acting against the walls of the spiral groove in the sleeve L, will produce a partial rotation of the latter, and with it the eccentric and valves.

In Figs. 5 and 6 I have illustrated what I deem a modification of the means for applying the several pitmen or piston-rods to the crank. Instead of dividing the strap or yoke G' longitudinally and grooving it, as described, to receive the T or flanged head of the pitman, as described, two straps, G^2 G^3 , are employed, the inner strap, G^2 , applied directly to the crank or wrist-pin, and furnishing the bearing for the heads of pitmen G, while the outer strap, G^3 , slotted, as at g^7 , for the reception of the pitmen, is placed over the strap G^2 , and the two united to the head g by the gib and key g^{18} . As thus constructed, the pitmen have their bearing upon the inner strap, and are held in place and guided by the outer strap, G^3 , between which and the strap G^2 the flanges g^{10} on the pitman are confined.

I claim as my invention—

1. In a multiple-cylinder steam-engine, as a means for connecting the pitmen to the crank-pin, and in combination with the latter, the headed pitman and sectional yoke applied di-

rectly to the crank-pin, the pitmen provided with flanged curved bearings fitting the grooved ways in the said yoke, substantially as described.

5 2. In combination with the pitman having the bearing g' and flanges g^2 , the yoke G' , provided with the concentric grooves g^{11} , and the pitmen having curved bearings g^9 and flanges g^{10} applied to said yoke and engaging the
10 grooves therein, substantially as and for the purpose set forth.

3. In combination with the head g of the pitman, its curved bearings and ways, the sectional yoke, flanged as described, and provided
15 with arms fitting the ways in the head g , and the several independent pitmen, each having a curved and flanged bearing engaging and cooperating with the flanges of the yoke, substantially as described.

20 4. In combination with the pitman and yoke applied to the crank-pin, the independent pitmen mounted in ways upon the yoke, substantially as described.

25 5. In combination with a divided yoke and the series of independent pitmen applied thereto, the pitman applied directly to the crank-

pin and the key for securing the yoke to said pitman and confining the independent pitmen upon said yoke, substantially as described.

6. In combination with the valves, the socketed pitman and the detachable heads applied
30 to the eccentric and to the pitmen, substantially as described.

7. In combination with the eccentric, as a means for actuating the valve, the sectional
35 collar provided with grooved ways to receive the independent pitmen heads and arms for insertion in the socket of one of the pitmen, substantially as and for the purpose described.

8. In a steam-engine such as indicated, the
40 combination, with the piston having the opening for the passage of the lubricant, of the pitman pivoted to the piston at one end and applied to the crank at the other, and provided with the longitudinal duct or passage, substan-
45 tially as described.

MIRABEAU N. LYNN.

Witnesses:

D. S. WILBER,

E. P. LYNN.