

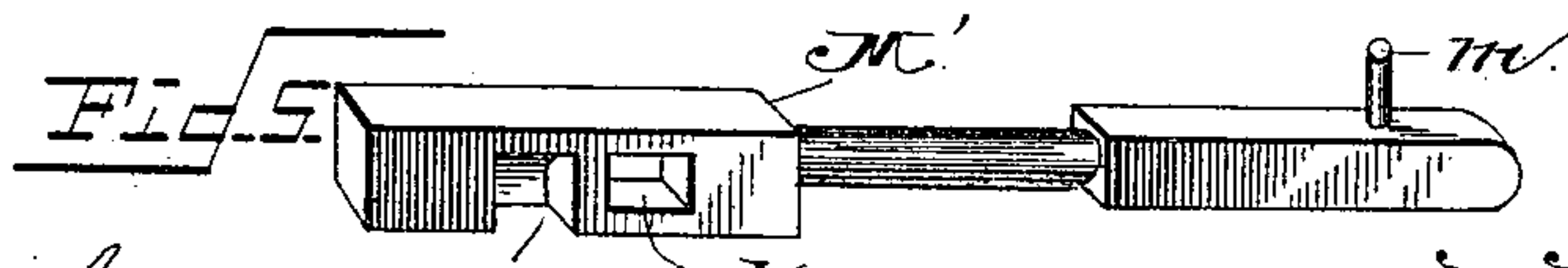
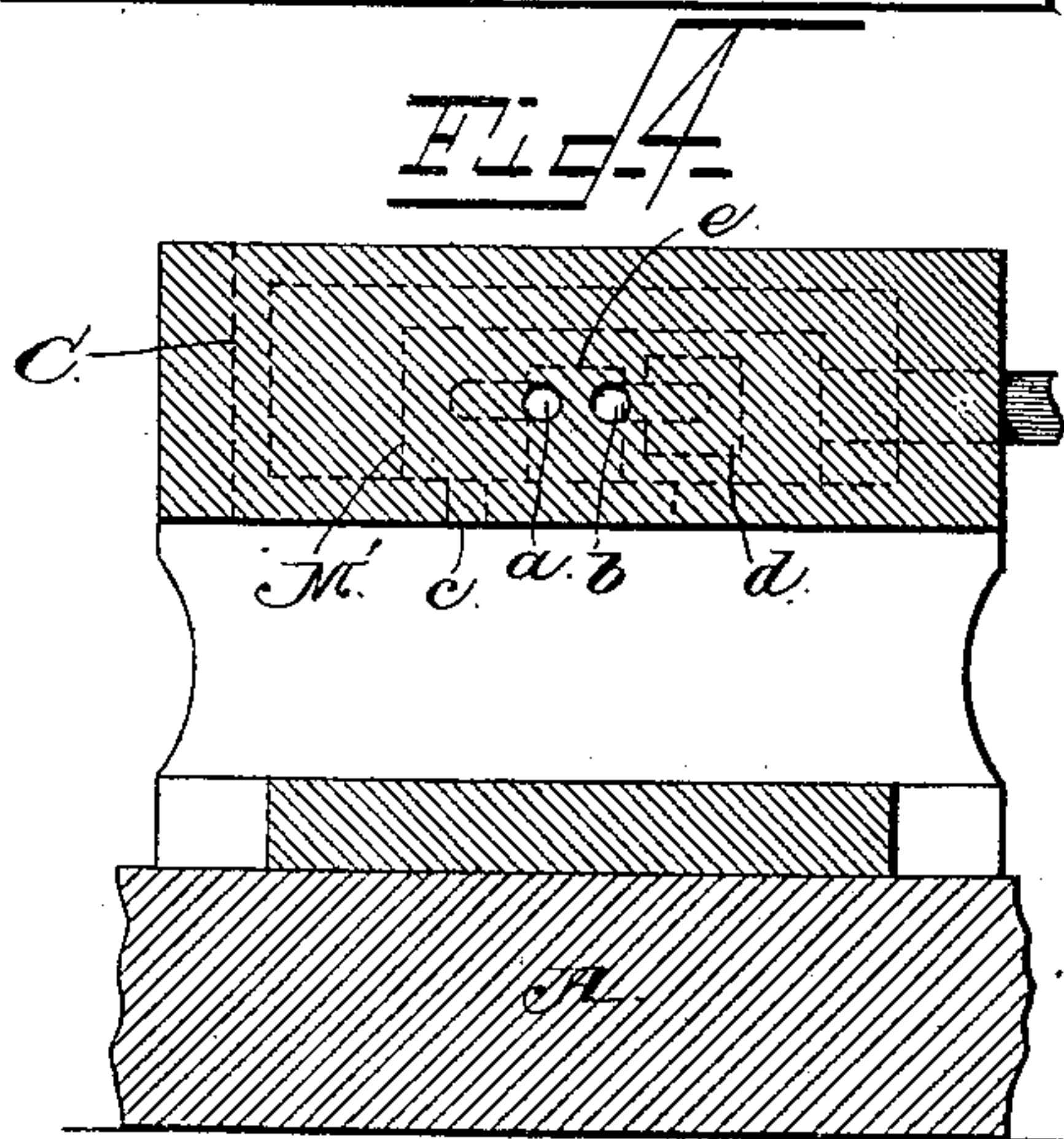
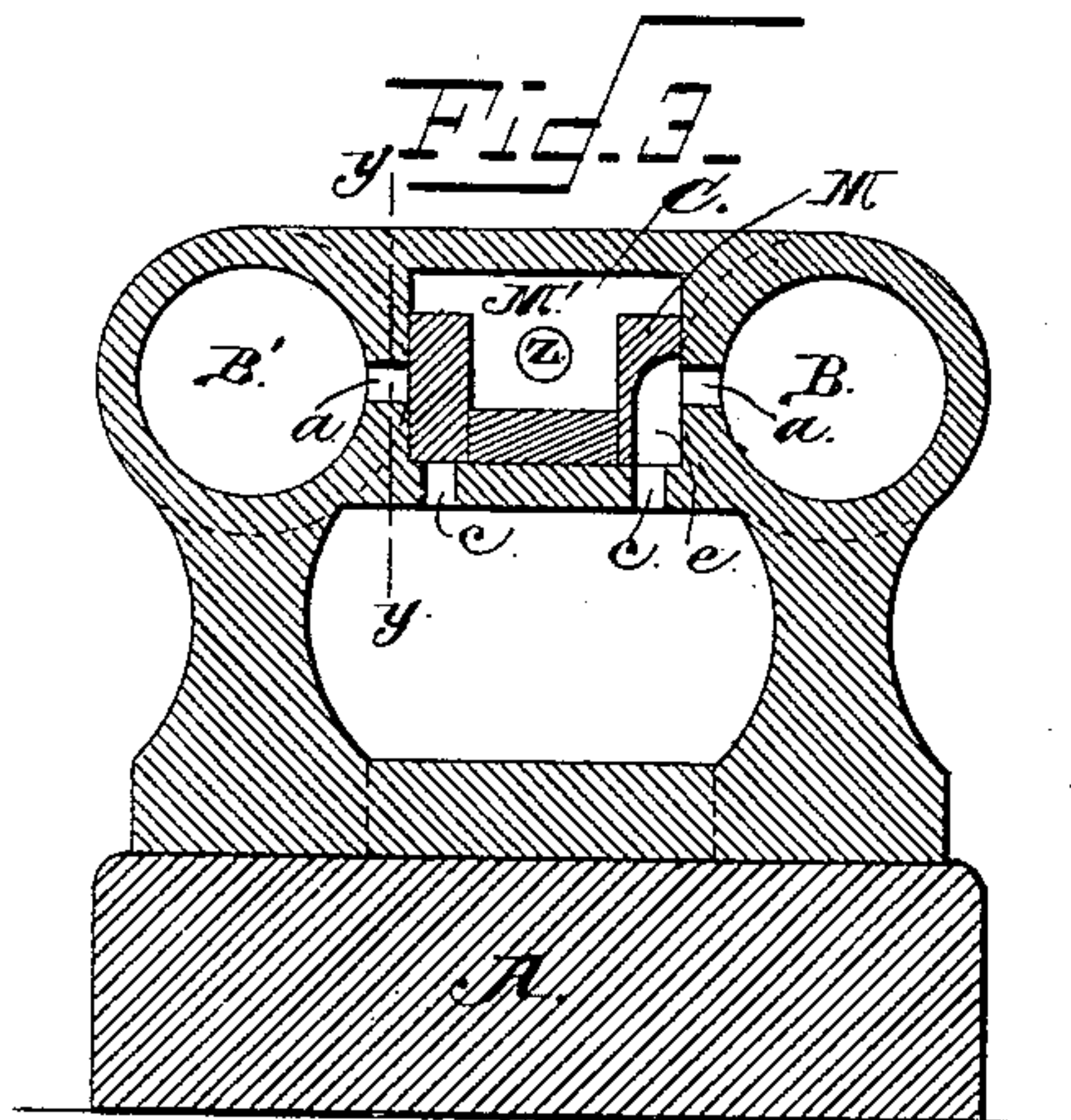
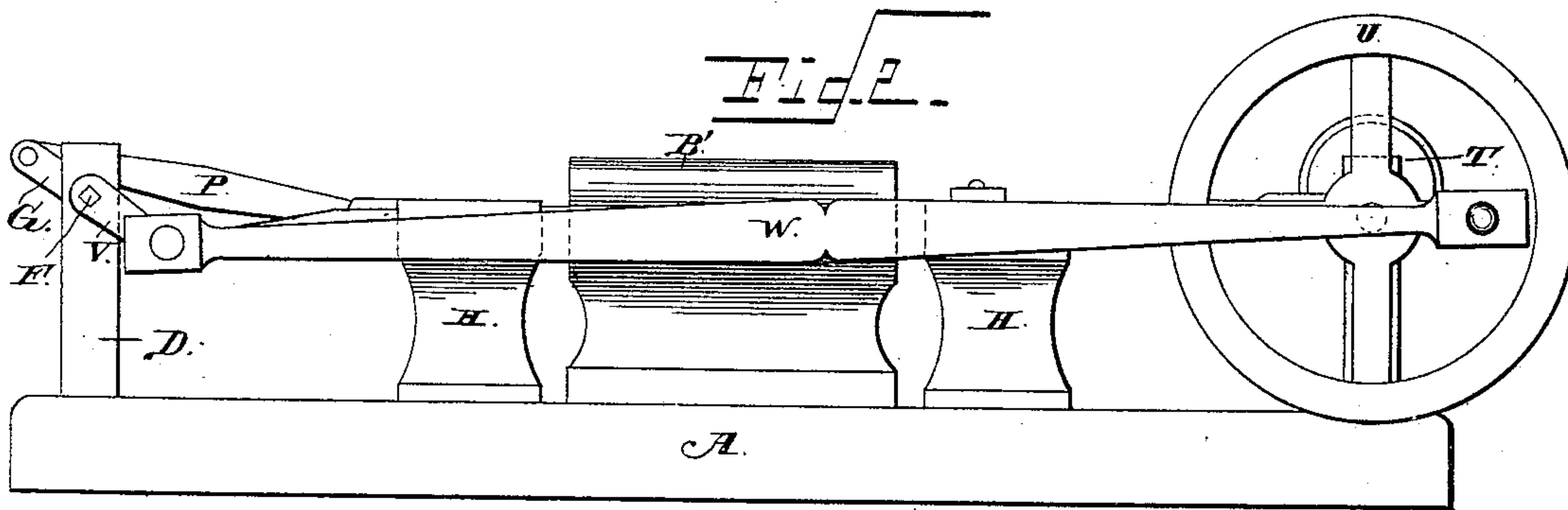
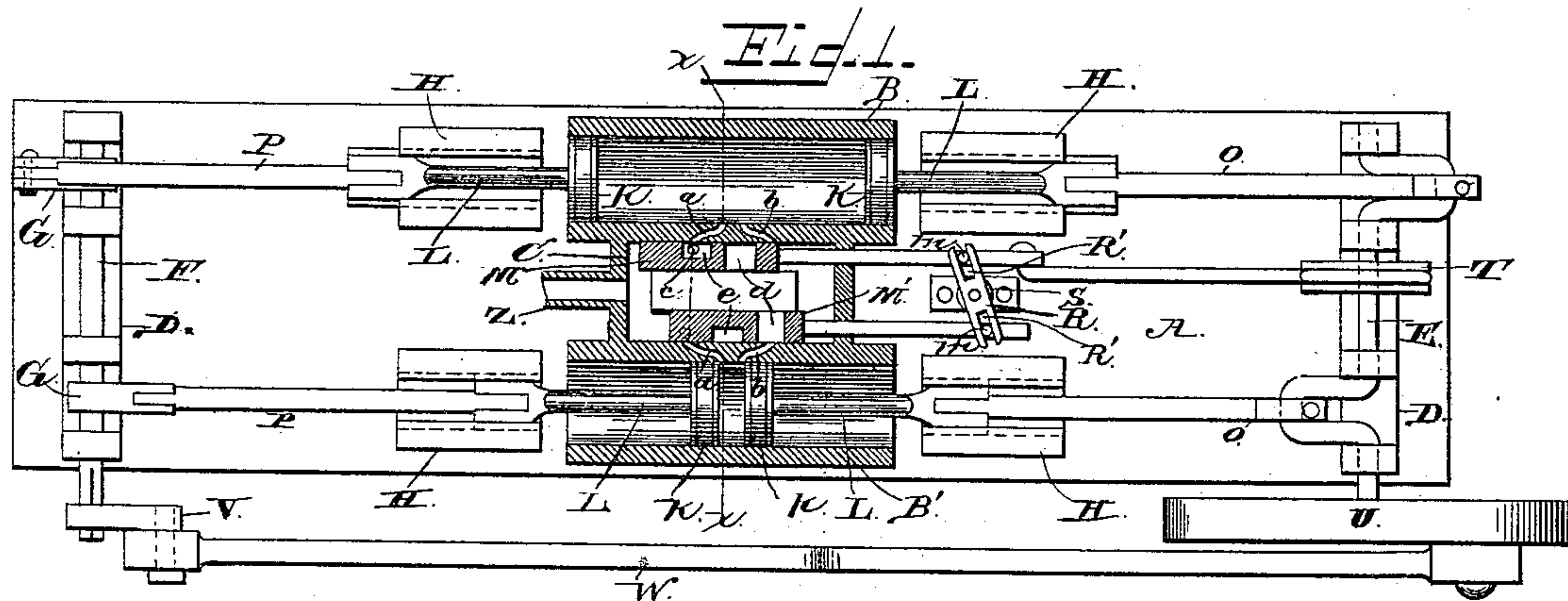
(No Model.)

H. F. BAYNE.

STEAM ENGINE.

No. 344,432.

Patented June 29, 1886.



Witnesses  
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# UNITED STATES PATENT OFFICE.

HENRY FRANKLIN BAYNE, OF RUSTON, LOUISIANA.

## STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 344,432, dated June 29, 1886.

Application filed March 18, 1886. Serial No. 195,705. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY FRANKLIN BAYNE, a citizen of the United States, residing at Ruston, in the county of Lincoln and State of Louisiana, have invented a new and useful Improvement in Steam-Engines, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to an improvement in steam-engines; and it consists in the peculiar construction and combination of devices, that will be more fully set forth hereinafter, and particularly pointed out in the claims.

In the drawings, Figure 1 is a top plan view, partly in section, of a steam-engine embodying my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a transverse sectional view taken on the line  $x x$  of Fig. 1. Fig. 4 is a longitudinal section taken on the line  $y y$  of Fig. 3, and Fig. 5 is a detail perspective view of one of the valves.

A represents the bed-plate, to the center of which is secured a pair of steam-cylinders,  $B B'$ . Between these cylinders is located a steam-chest, C. At each end of the bed-plate are secured blocks or standards D. In these blocks or standards, at one end of the bed-plate, is journaled a double-crank shaft, E, the cranks of which extend in opposite directions from each other, and in the standards or blocks, at the opposite end of the bed-plate, is journaled a rock-shaft, F, having arms G, which extend in opposite directions from each other. Guideways H are located at both ends of each cylinder. These cylinders are open-ended, and in the said cylinders are placed pistons K, the rods L of which have their cross-heads working in the guideways H. The opposing sides of the cylinders which form the sides of the steam-chest are provided with steam-ports  $a$  and  $b$ , which ports communicate with the interior of each cylinder and centrally therein, the ports diverging in the walls of the cylinders between the interiors and the exteriors thereof, whereby the ports in the sides of the steam-chest are at a suitable distance from each other. In the bottom of the steam-chest and immediately below the ports  $a$  are made exhaust-openings  $c$ .

M M' represent cut-off valves, which bear against the sides of the steam-chest. Each of these valves is provided with an opening,  $d$ ,

which extends entirely through the valve at a suitable distance from the front end thereof, and with a channel or groove,  $e$ , which is made in the valve on the side that bears against the side of the steam-chest, this channel being closed at its upper end and open at its lower end, and being located immediately in rear of the opening  $d$ . The piston rods on the front end of the engine are connected with the cranked shaft by means of pitmen O, and the piston-rod on the rear end of the engine are connected to the arms of the rock-shaft by means of similar pitmen, P.

R represents a yoke, which is journaled on the upper end of a standard, S, that is located between the guideways on the front ends of the cylinders, and the said yoke has its extremities slotted, as at R'. The valves M M' are provided with the usual valve-rods, which extend through the front wall of the steam-chest, and are provided with pins  $m$ , which work in the slots in the ends of the pivoted yoke. An eccentric, T, is secured to the crank-shaft near the center thereof, and the said eccentric is connected to one of the valve-rods by means of the usual eccentric-rod and eccentric-strap. A fly-wheel, U, is secured on one end of the crank-shaft, and to one end of the rock-shaft is secured a crank-arm, V.

W represents a pitman which connects the arm V with the fly-wheel, and Z represents the steam-supply pipe which communicates with one end of the steam-chest between the slide-valves therein.

The operation of my invention is as follows: While the pistons in the cylinder B are moved outwardly therein to their fullest extent the pistons in the other cylinder, B', are moved inwardly nearly in contact with each other. The valve M' is moved so as to have its opening  $d$  communicating with the port  $b$  of the cylinder B', and the channel  $e$  of the said valve is moved past one of the exhaust-ports  $c$ , the flat lower side of the said valve closing the said port, and the flat inner side of the said valve at the rear end thereof closing the port  $a$ . The valve M, which admits steam to the cylinder B, is moved rearwardly so as to have its channel  $e$  communicating with the port  $a$ , and the other exhaust-port,  $c$ , and the opening  $d$  in the said valve is moved rearwardly past the port  $b$ , the flat inner side at the front end of the said port



closing the opening *b*. When steam is admitted into the steam-chest, it passes through the opening *d* of the valve *M'* into the opening *b* of the cylinder *B'* and is fed into the said cylinder between the pistons therein, which causes the said pistons to move outwardly in the cylinder in opposite directions, thereby imparting half a revolution to the driving-shaft. This movement of the driving-shaft reverses the positions of the valves, causing the valve *M'* to close the opening *b* of the cylinder *B'*, and the channel *e* in the said valve to communicate with the opening *a* and the exhaust-opening *c*. The valve *M* has been moved to open the port *b* so as to admit steam into the cylinder *B* between the pistons and close the port *a* and the other exhaust-port, *c*. Steam is thus cut off from the cylinder *B'* and admitted to the cylinder *B*, causing the pistons in the latter cylinder to move outwardly in opposite directions and the pistons in the cylinder *B'* to move inwardly therein. As the valve *M'* communicates with the port *a* and the exhaust-port *c*, the exhaust-steam in the cylinder *B'* is forced outwardly from the said cylinder while the steam is being admitted between the pistons in the cylinder *B*, as will be very readily understood. By this construction and arrangement the steam is caused to expand between the movable pistons in each cylinder, thereby utilizing all the expansive force of the steam and gaining a considerable increase of power over the ordinary steam-engines in which the steam is caused to expand between a movable piston and an immovable cylinder-head.

I do not desire to limit myself to the precise construction hereinbefore described, as it is evident that many modifications may be made therein without departing from the spirit of my invention.

Having thus described my invention, I claim—

1. In a steam-engine, the combination of the

cylinders *B* and *B'*, having the inlet and the exhaust ports, two pistons in each cylinder adapted to move simultaneously in opposite directions, and the valves for admitting steam to one cylinder and exhausting the steam from the other simultaneously, substantially as described.

2. In a steam-engine, the combination of the cylinders *B* and *B'*, having the inlet and the exhaust ports, and two pistons in each cylinder adapted to move simultaneously in opposite directions, and the valves for admitting steam to one cylinder and exhausting the steam from the other alternately, the crank-shaft at one end of the engine, pitmen connecting the said shaft with one pair of the pistons, the rock-shaft at the opposite end of the engine, pitmen connecting the said rock-shaft with the remaining pair of pistons, and the pitman *W* connecting the crank-shaft with the rock-shaft, substantially as described.

3. In a steam-engine, the combination of the cylinders *B* and *B'*, having the inlet and the exhaust ports, and two pistons in each cylinder adapted to move simultaneously in opposite directions, and the valves for admitting steam to one cylinder and exhausting the steam from the other alternately, the pivoted yoke connected to the valves, and means for operating said yoke, substantially as described.

4. The combination, with the cylinders having the ports *a* and *b*, and the steam-chest having the exhaust-openings *c*, of the slide-valves having the openings *d* and the channels *e*, for the purpose set forth, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

HENRY FRANKLIN BAYNE.

Witnesses:

EUGENE HOWARD,  
JOHN DWYER.