

(No Model.)

4 Sheets—Sheet 1.

H. F. COLVIN.
LOCOMOTIVE ENGINE.

No. 463,856.

Patented Nov. 24, 1891.

Fig. 1.

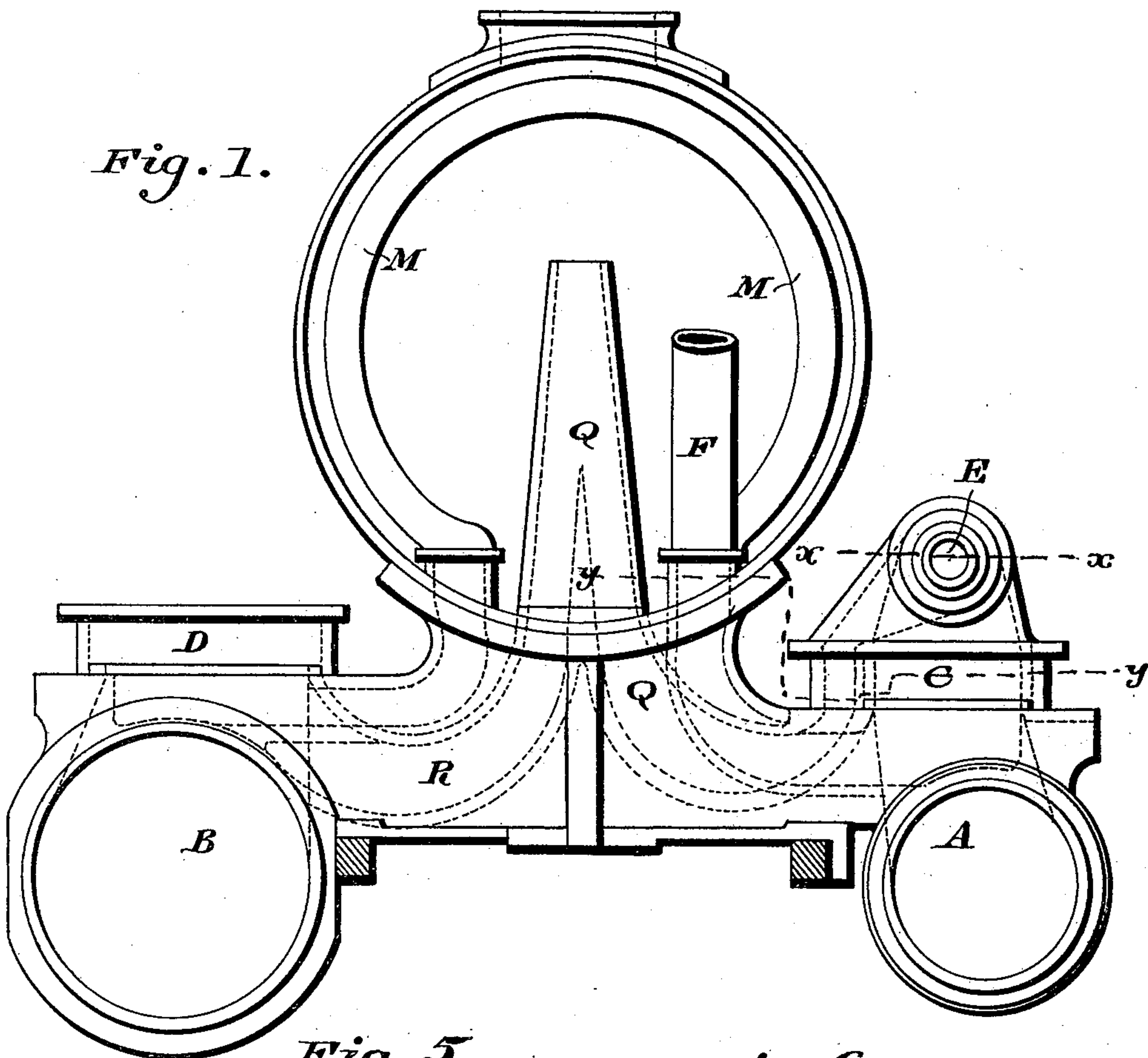


Fig. 5.

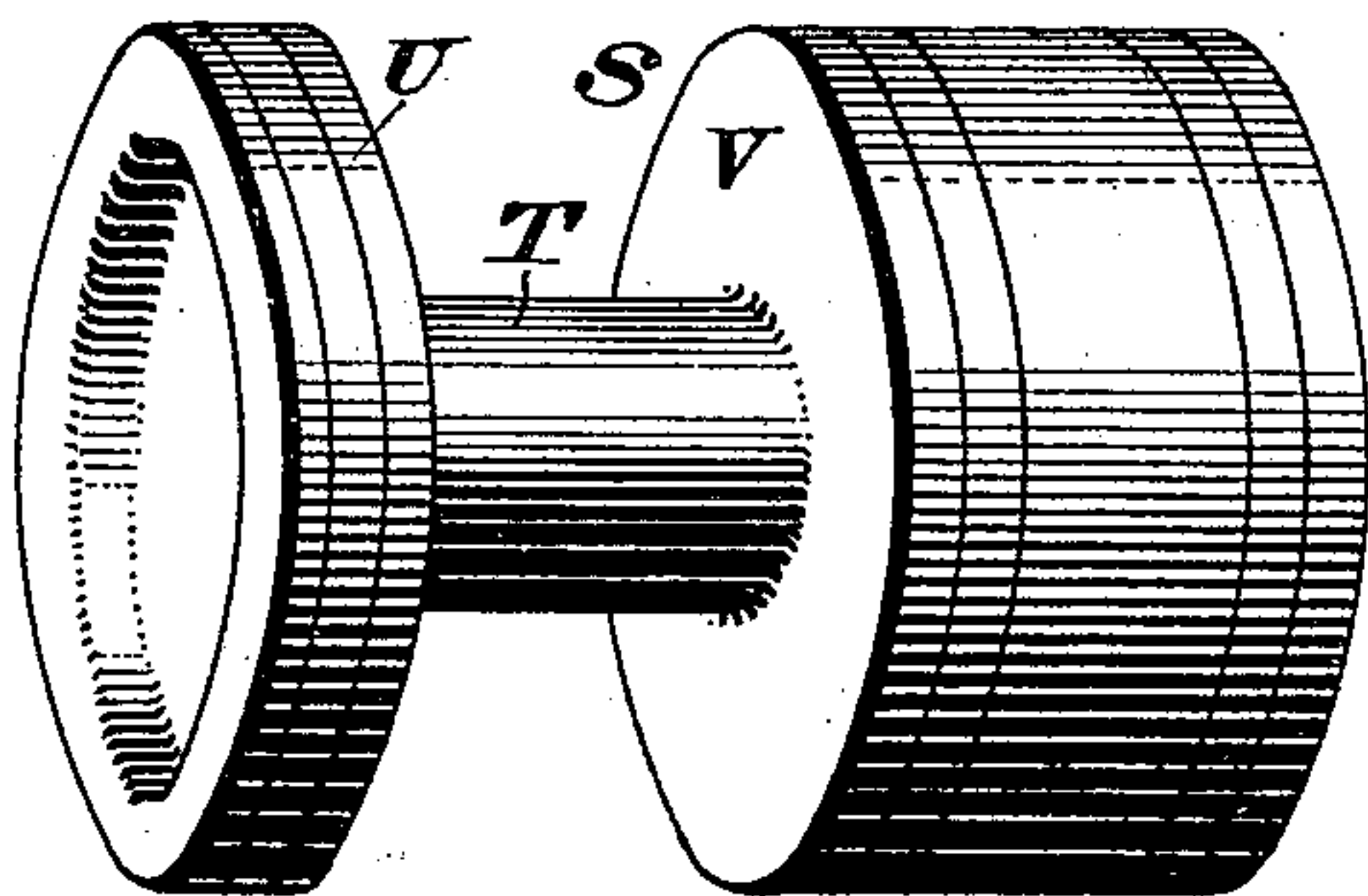
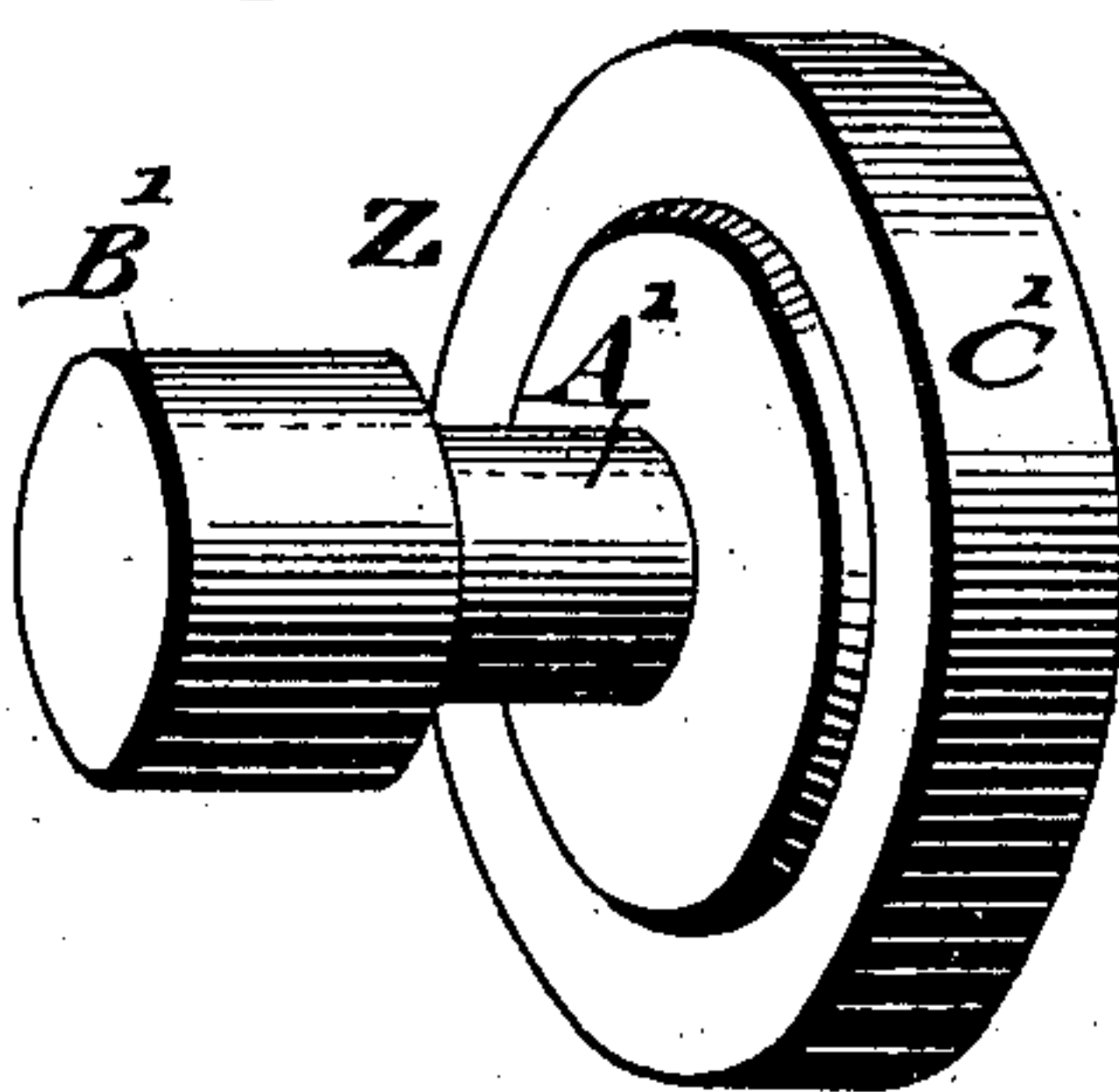


Fig. 6.



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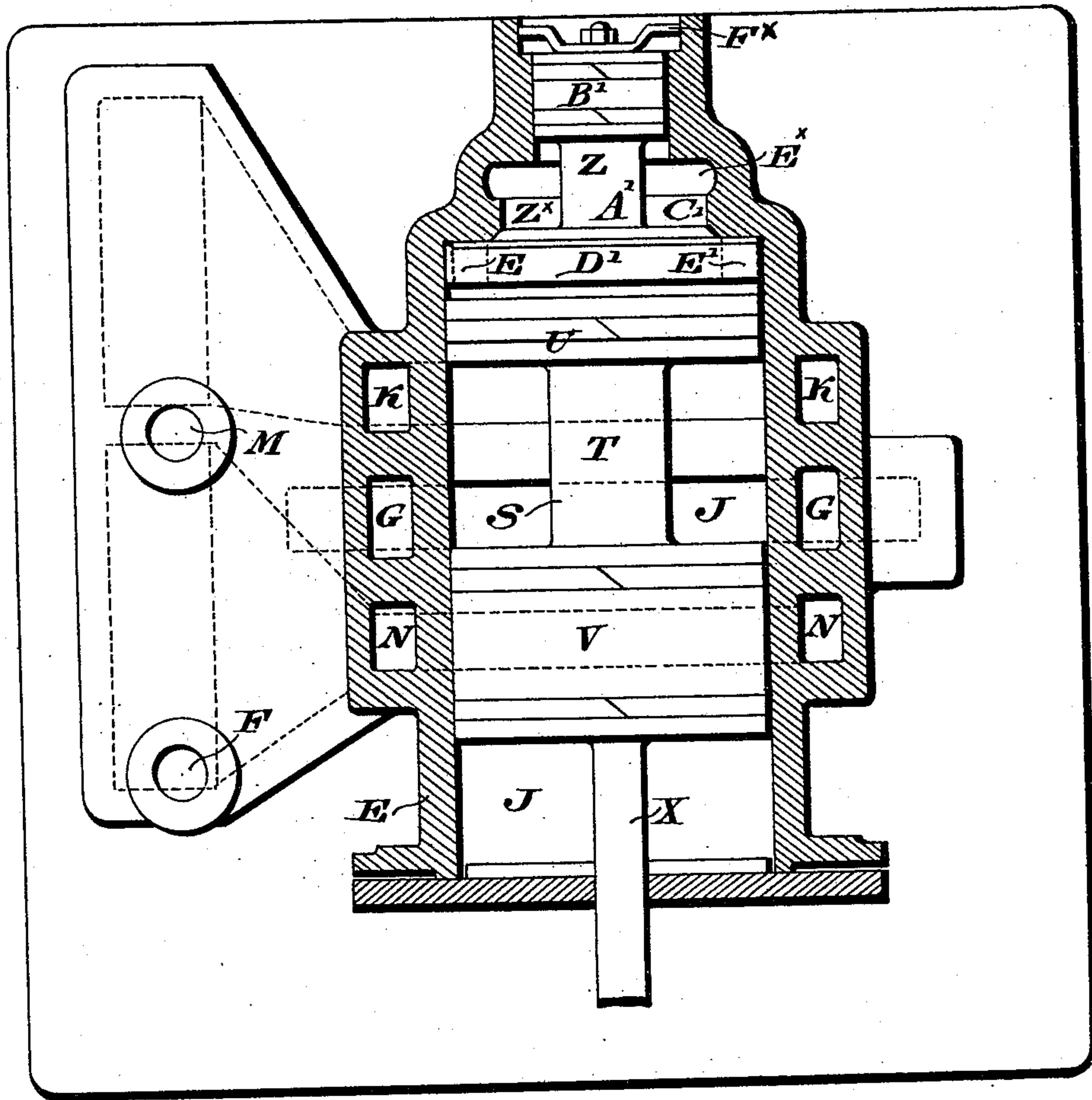
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Fig. 2.



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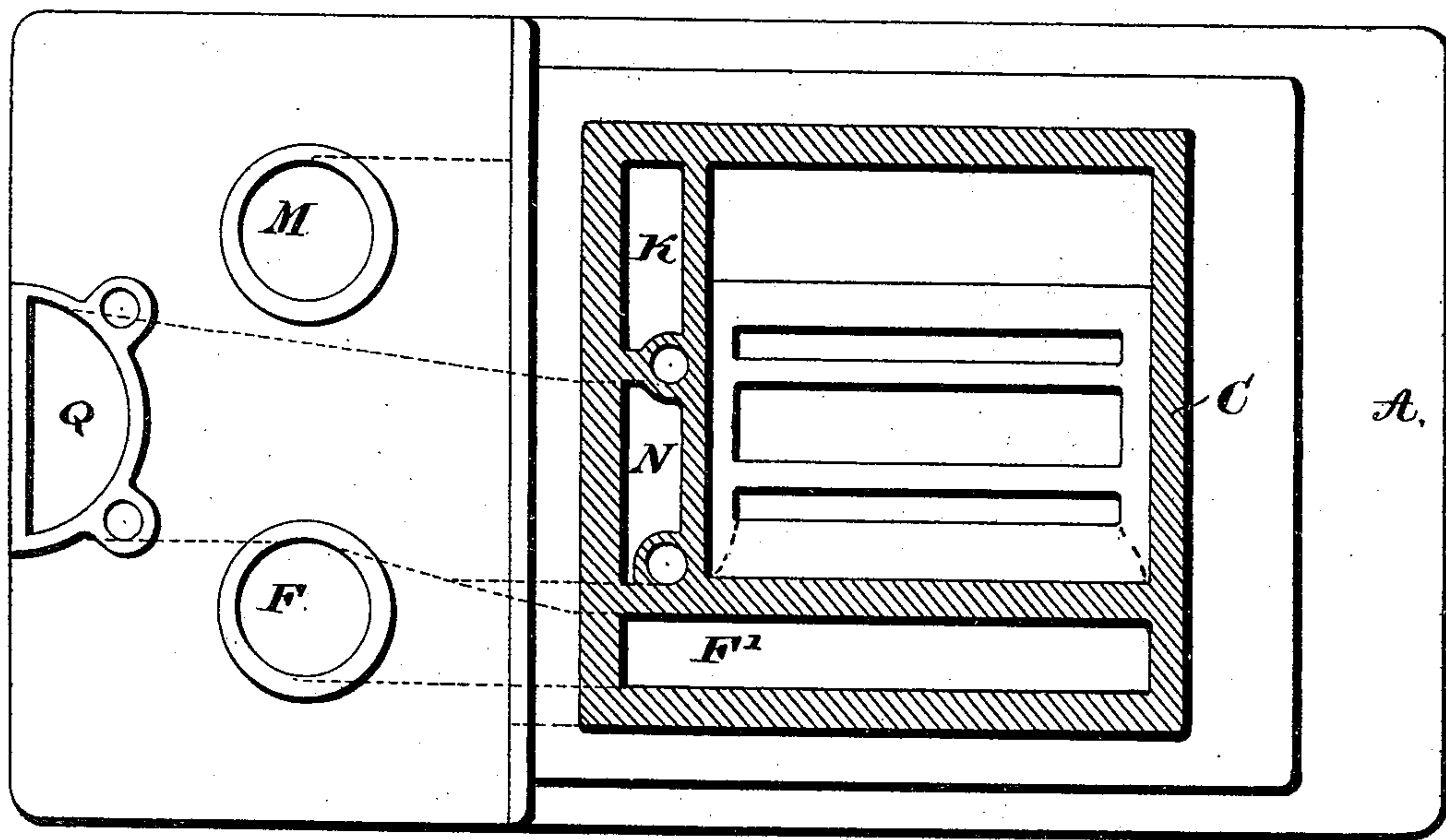
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Fig. 3.



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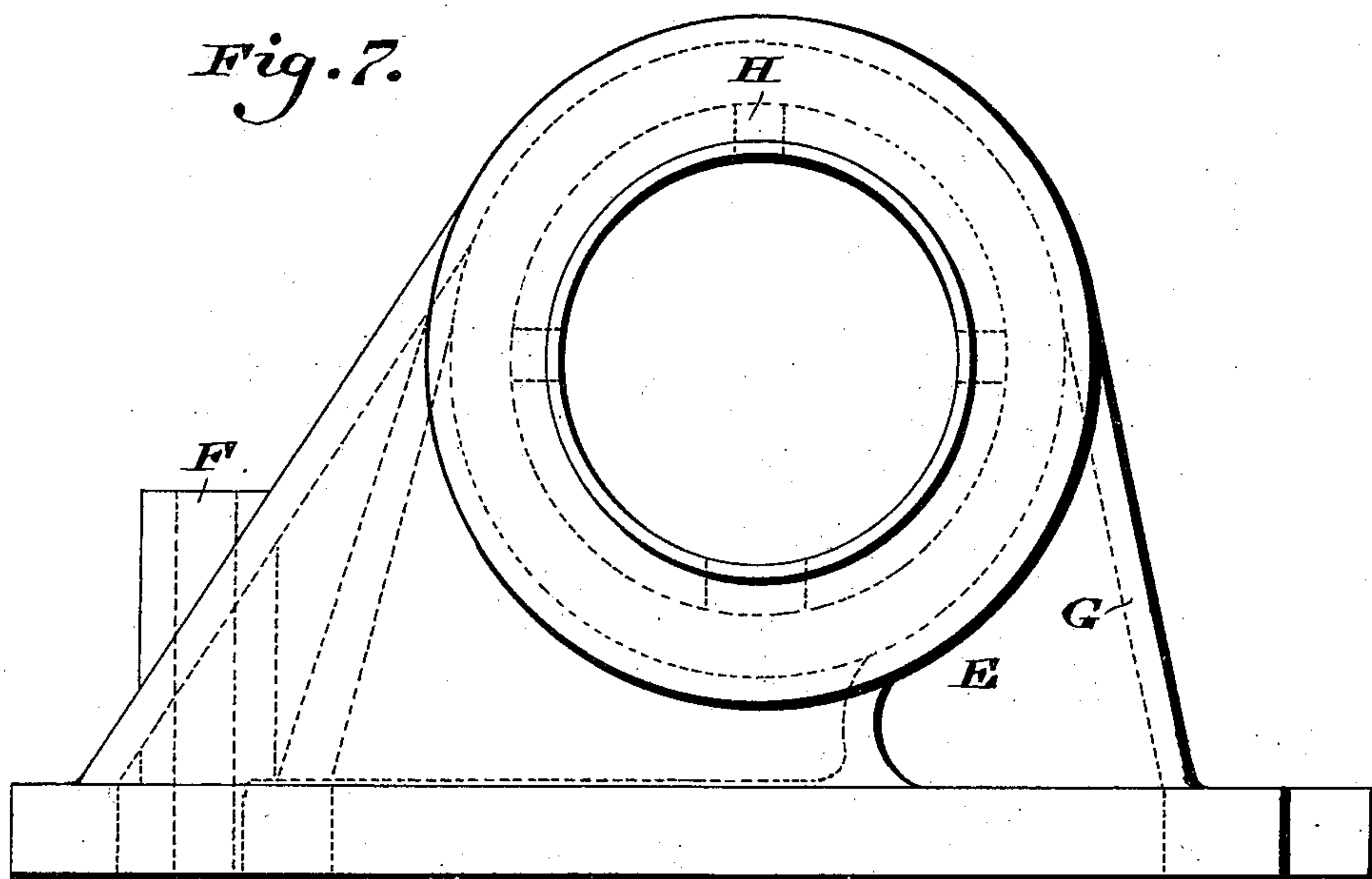
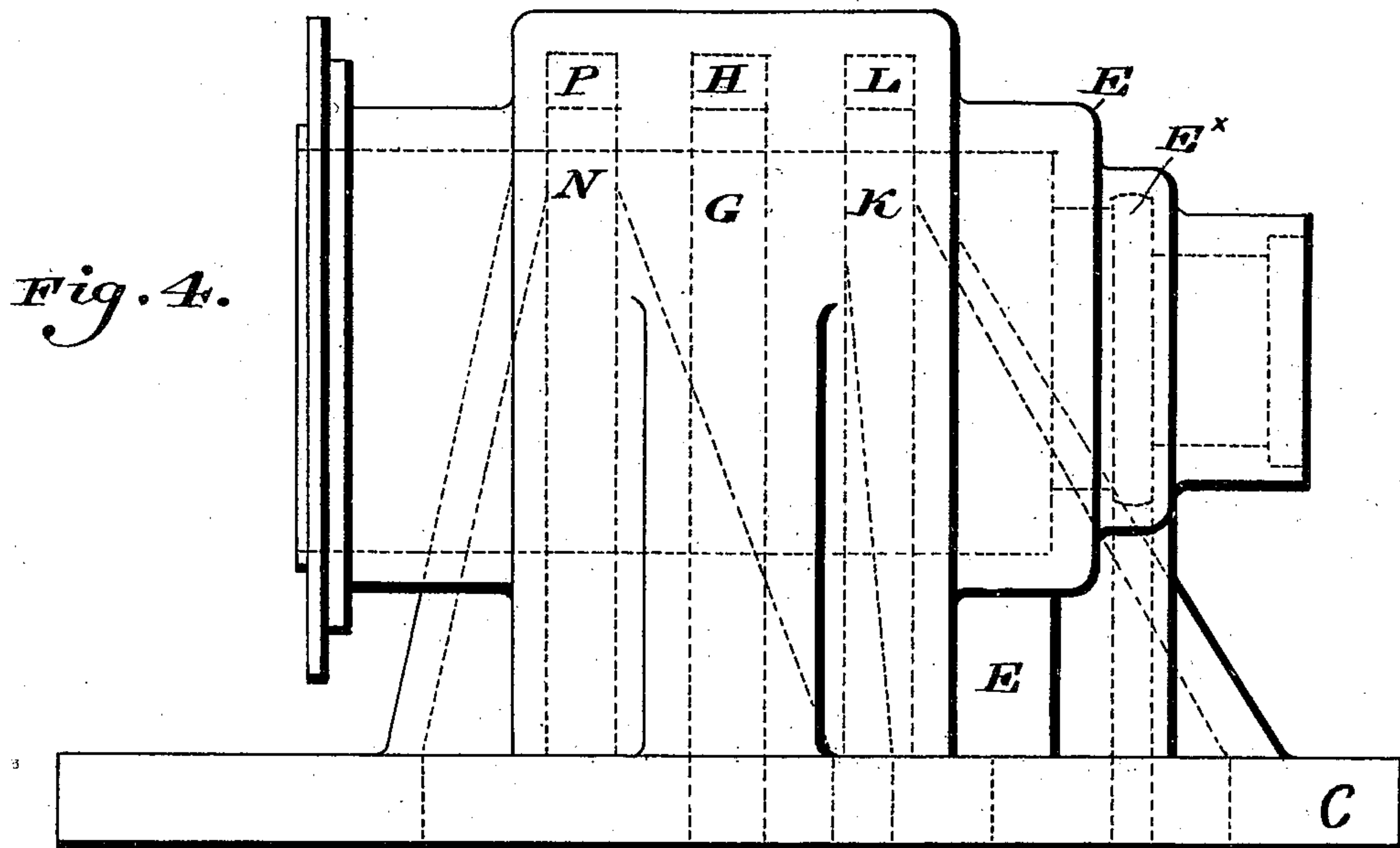
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LOCOMOTIVE-ENGINE.

SPECIFICATION forming part of Letters Patent No. 463,856, dated November 24, 1891.

Application filed August 6, 1891. Serial No. 401,826. (No model.)

To all whom it may concern:

Be it known that I, HENRY F. COLVIN, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Locomotive-Engines, which improvement is fully set forth in the following specification and accompanying drawings.

My invention relates to improvements in locomotive-engines, and is designed as an improved construction and arrangement of the parts shown and described in United States Letters Patent granted to me May 27, 1890, No. 428,892.

The invention, as herein described, consists in providing two cylinders, one a high-pressure and the other a low-pressure, with a controlling-valve adapted to either direct live or exhaust steam from the high-pressure cylinder to the low-pressure cylinder, and a reducing-valve to regulate the pressure of the live steam passed to the said low-pressure cylinder, so as to equalize the working of the said cylinders, the said valves being arranged and operated in the same casing or shell.

Figure 1 represents an end view of an engine embodying my invention. Fig. 2 represents a sectional view on line *x x*, Fig. 1, on an enlarged scale. Fig. 3 represents a sectional view on line *y y*, Fig. 1. Fig. 4 represents a side view of the casing or shell containing the reducing and controlling valves. Fig. 5 represents a perspective view of the controlling-valve. Fig. 6 represents a perspective view of the reducing-valve. Fig. 7 represents an end view of the part shown in Fig. 4.

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

Referring to the drawings, A designates a high-pressure, and B a low-pressure, cylinder, said cylinders having the steam-chests C and D, respectively. Seated on the chest C is a shell E, having its interior chamber at one end in communication with the said steam-chest by channel *E^x*, so as to be adapted to receive live steam from said chest, which latter receives its steam from a boiler by means of a pipe F, leading into an opening F' therein. In the wall of the shell E and about midway of the length thereof is a circumferential pas-

sage-way G, communicating with the exhaust-steam passage of the high-pressure cylinder and having ports H opening into the chamber J within the shell E. On one side of the passage-way or channel G and in the wall of the shell E is a passage-way K, having the port or ports L, adapted to communicate with the said chamber J, the passage-way K also communicating with a circular receiver or pipe M, which leads to the steam-chest D. On the other side of the passage G from the passage K is a channel N, which communicates with a pipe Q, leading to the atmosphere, and has the port or ports P, adapted to communicate with the chamber J. The cylinder B has an exhaust-steam passage R, leading to the said pipe Q. Within the chamber J is the controlling or intercepting valve S, consisting of a stem T, with the heads U and V at the ends thereof, said heads having packing, as usual, so as to closely fit in the walls of said chamber J. The said heads are of such width and at such distance apart that the valve is moved in such position that the exhaust-steam passage G is in communication with the passage K and shut off from the passage N, and when the valve is drawn back the exhaust-steam passage G is shut off from the passage K, which is now open to the live steam, which enters the shell on one side of the head U through the channel *E^x* and a reducing-valve Z, hereinafter explained. At the same time the said exhaust-steam passage G is in communication with the passage N. The valve S is operated by a rod or handle X, which is connected with the head T thereof, and passes through one end of the cylinder or shell E. The reducing-valve Z, which, when closed, forms a small chamber Z^x in the end of the shell E, is constructed of a stem A' and heads B' C', the said head B' closely fitting in the end of the shell E, so as to be guided therein and also to close said end, thereby preventing the escape of steam therefrom. The head C' has its contact-face for the steam of a size as much larger, relatively, than the exposed surface of the head B' as the diameter of the cylinder B is larger than the cylinder A, so that the work performed by the two cylinders, when live steam is employed in both, will be equal. The head C' has an inclined

portion, which is seated on inclined portions of the inner wall of the chamber J of the shell E, and is connected or secured to a disk D', which fits within the walls of the chamber J and has a number of openings E' surrounding the head C', which permit the escape of the live steam from the chamber Z^x to the chamber J when the said valve Z is raised from its seat. A stop F^x, properly secured to the shell E, assists in limiting the play of the valve Z.

The operation of the device is as follows: When it is desired to use the cylinders A and B as a simple engine, the valve S is drawn back by means of the rod X, so that its head U shuts off the exhaust-steam in the chamber J from the passage K, which latter is now free to receive the live steam entering the said chamber J from the chamber Z^x through the openings E' in the disk D', the head C' having been raised from the seat by the force of the live steam in said chamber Z^x. The live steam entering the passage-way K passes to the receiver or pipe M and thence to the chest D, which thus supplies the cylinder B with live steam. Owing to the reducing-valve Z, which automatically regulates the lift of its head C' from off its seat, and thereby the amount and pressure of the steam passing from the chamber Z^x through the openings E' to the cylinder B, the work of the cylinders B and A will be equalized. While the live steam is thus supplied from the steam-chest C to the steam-chest D, the exhaust-steam from the chamber J escapes through the passages N to the pipe Q, and thus to the atmosphere. The exhaust-steam from the cylinder B also escapes to the atmosphere by the pipes R and Q. When it is desired to use the cylinders A and B as a compound engine, the valve S is moved to a proper position. This position places the chamber J in communication with the passage K, so that exhaust-steam fed to the said chamber by the passage G enters the passage K and the receiver M, and thereby the steam-chest D, thus supplying the cylinder B with the exhaust-steam of the high-pressure cylinder A. The exhaust-steam of the cylinder B escapes by the pipes R and Q to the atmosphere.

By making the parts as described a single shell or casting contains both the controlling and the reducing valves, the parts are easily accessible, and each of the cylinders, when they work as a simple engine, exhaust directly to the atmosphere.

It will be seen that the shell or casing E can be readily secured in place on the chest C or detached therefrom, if desired, for any purpose. When desirable, this casing E can be made in the same piece with the steam-chest C.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A compound engine having a controlling or intercepting valve and a reducing-valve

operating in a single shell or chamber, said shell being adapted to be seated on the steam-chest of the high-pressure cylinder of the engine and in direct communication therewith, so as to receive live steam therefrom, substantially as described.

2. A compound engine having a controlling-valve and a reducing-valve, said valves having a single shell independent and separated from the cylinder-castings but adapted to be seated on the steam-chest of the high-pressure cylinder, receiving live steam from said chest and exhaust-steam from the cylinder, substantially as described.

3. In a compound engine, high and low pressure cylinders with steam-chests, a separate shell or casting having a chamber therein directly communicating with the steam-chest of the high-pressure cylinder and a passage-way directly communicating with the exhaust-steam passage of the same cylinder, a reducing-valve and a controlling-valve in said chamber and in opposite ends thereof, and pipes leading from said steam-chests to said shell, said parts being combined substantially as described.

4. In a compound engine, high and low pressure cylinders having steam-chests, a separate shell seated on the steam-chest of said high-pressure cylinder and having a controlling-valve therein and provided with a chamber adapted to communicate with the steam-chest of the high-pressure cylinder, and a receiver communicating with said chamber and the steam-chest of the low-pressure cylinder, said parts being combined substantially as described.

5. High and low pressure cylinders having steam-chests, a separate shell seated on the steam-chest of said high-pressure cylinder and having a chamber communicating with the said steam-chests, and a valve in said chamber adapted to either open or close said communication, said parts being combined substantially as described.

6. In a compound engine, high and low pressure cylinders having steam-chests, a separate shell or casting seated on the steam-chest of the high-pressure cylinder and having a chamber in communication with the said steam-chest, a reducing-valve in said chamber, a receiver leading from a passage-way in said shell communicating with the exhaust-steam passage of the said high-pressure cylinder to the steam-chest of the low-pressure cylinder, and a valve in said shell controlling the inlet into said passage-way, said parts being combined substantially as described.

7. In a compound engine, high and low pressure cylinders having steam-chests, a separate shell or casting seated on the steam-chest of the high-pressure cylinder and having a chamber with ports opening from an inlet in said shell for the exhaust-steam of the high-pressure cylinder, a passage communicating with the live-steam chest of the high-pressure cylinder, and an outlet-passage from the said

chamber for the exhaust-steam, an outlet-passage in connection with a pipe or receiver leading to the steam-chest of the low-pressure cylinder, and a controlling-valve in said shell for said passages, said parts being combined substantially as described.

8. In a compound engine, high and low pressure cylinders with steam-chests, a separate shell or casting seated on the steam-chest of the high-pressure cylinder and having a chamber receiving steam from said chest, a passage-way in said chamber in communication with the exhaust-steam passage of the high-pressure cylinder, ports connecting said passage-way and chamber, a passage-way in said shell leading therefrom to a receiver in communication with the steam-chest of the low-pressure cylinder, and a controlling-valve in said chamber for said passage-ways, said parts being combined substantially as described.

9. In a compound engine, the shell E, hav-

ing the controlling-valve S and reducing-valve Z, said valves being in a single chamber and in opposite ends of the shell, and said shell being adapted to be seated on the steam-chest of the high-pressure cylinder and receive live steam directly therefrom, substantially as described.

10. In a compound engine, a shell adapted to be secured to the steam-chest of the high-pressure cylinder of the engine and having within it a controlling-valve for regulating the passage of the live and exhaust steam to the low-pressure engine, and a reducing-valve for regulating the pressure of the live steam in its passage from the high-pressure to the said low-pressure cylinder, substantially as described.

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