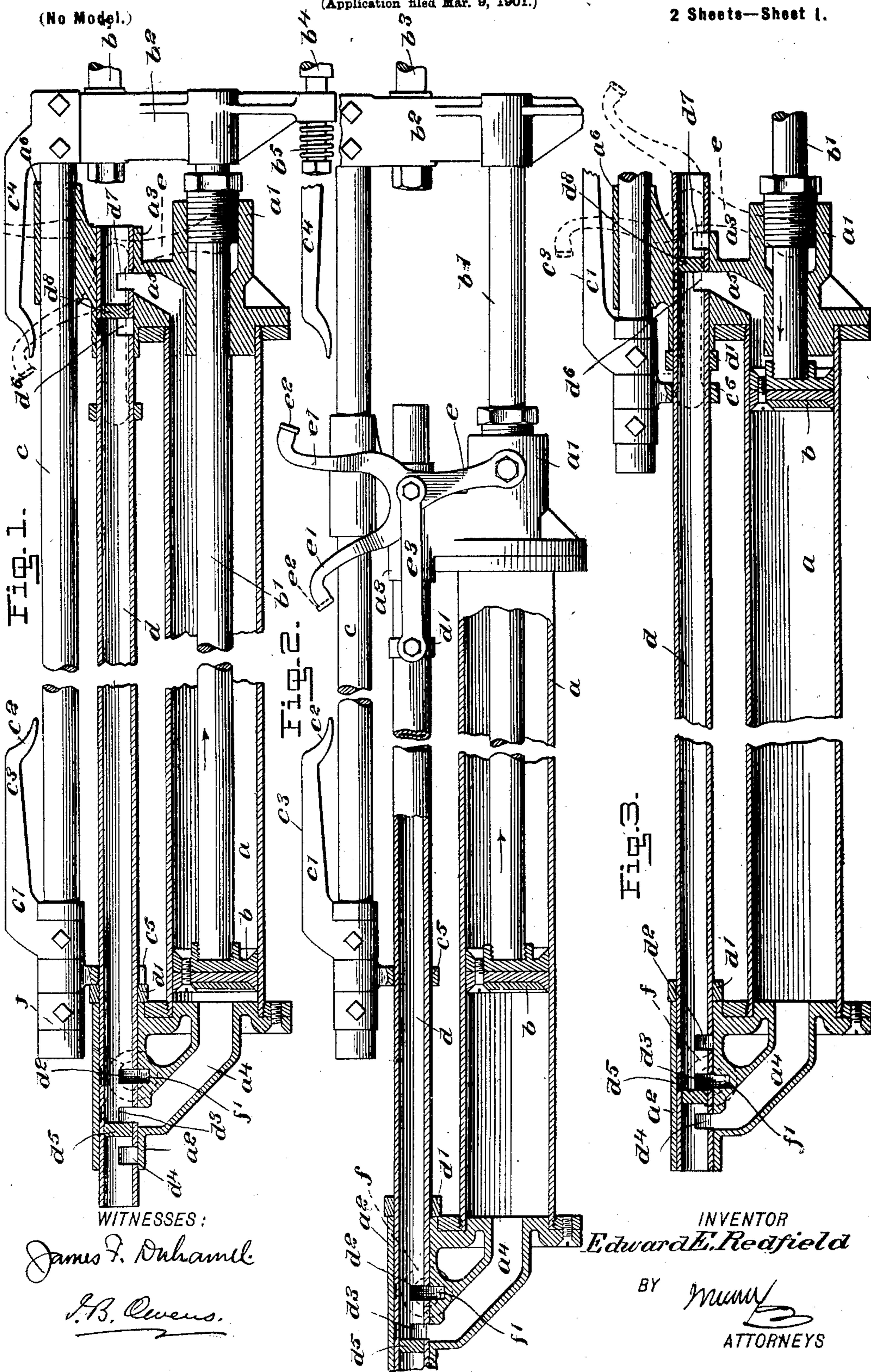


E. E. REDFIELD.
ENGINE.

(Application filed Mar. 9, 1901.)

2 Sheets—Sheet 1.



No. 679,637.

Patented July 30, 1901.

E. E. REDFIELD.
ENGINE.

(Application filed Mar. 9, 1901.)

(No Model.)

2 Sheets—Sheet 2.

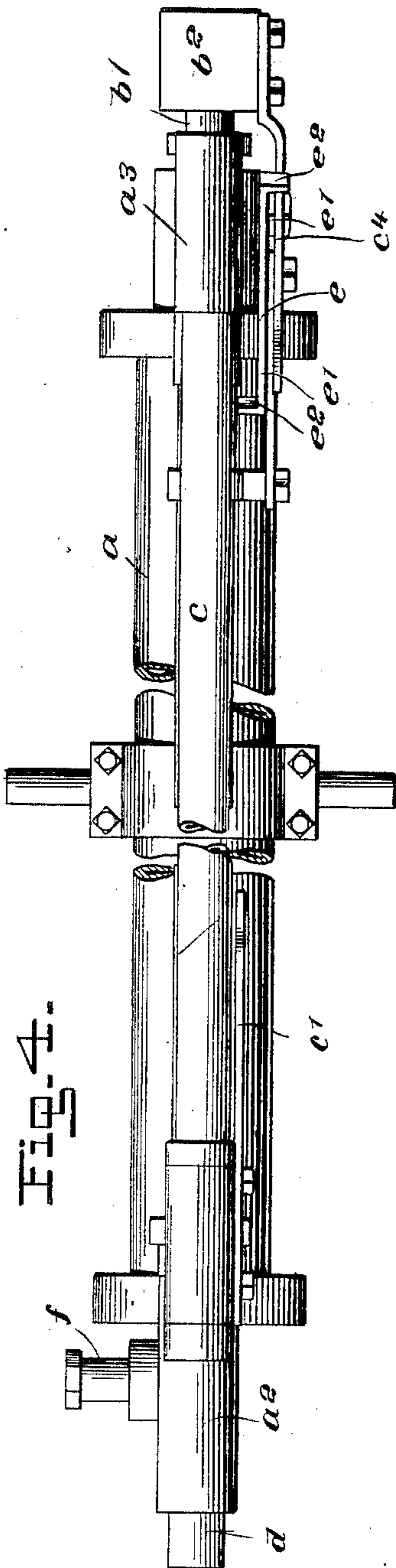


Fig. 4.

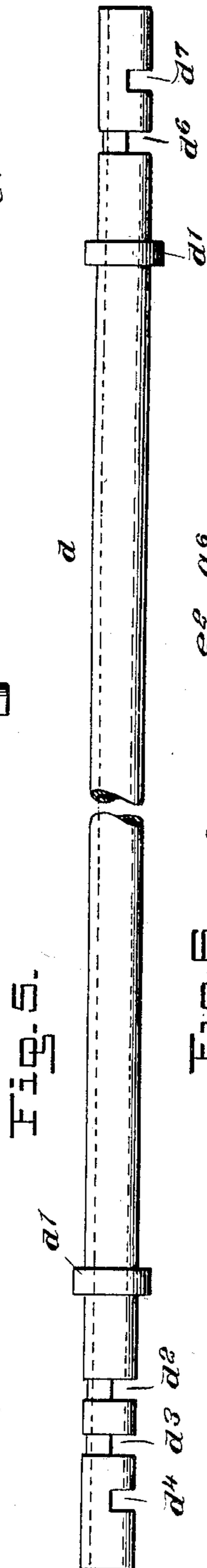


Fig. 5.

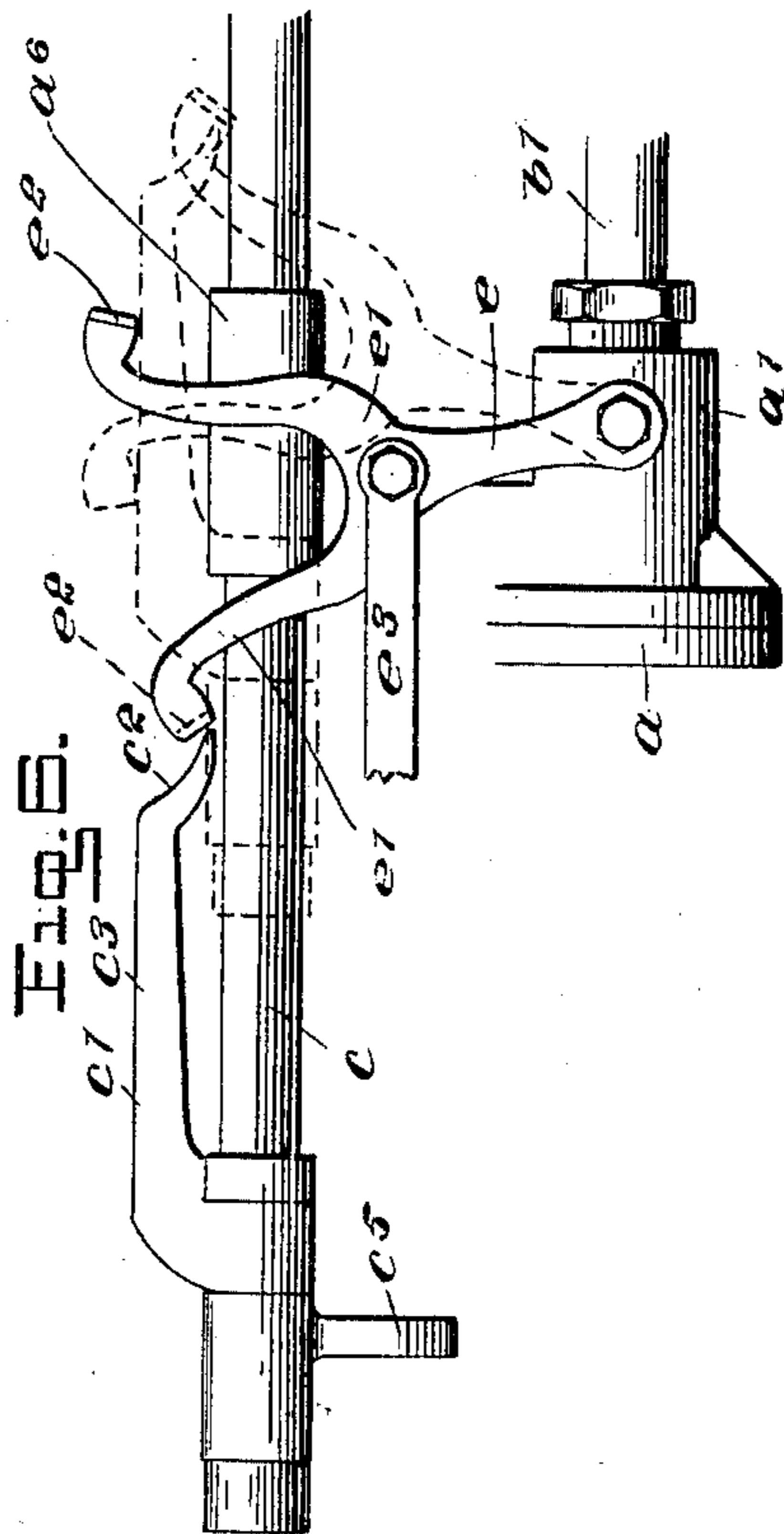


Fig. 6.

WITNESSES:

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INVENTOR

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BY

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ATTORNEYS

UNITED STATES PATENT OFFICE.

EDWARD E. REDFIELD, OF GRANTS PASS, OREGON.

ENGINE.

SPECIFICATION forming part of Letters Patent No. 679,637, dated July 30, 1901.

Application filed March 9, 1901. Serial No. 50,462. (No model.)

To all whom it may concern:

Be it known that I, EDWARD E. REDFIELD, a citizen of the United States, and a resident of Grants Pass, in the county of Josephine and State of Oregon, have invented new and useful Improvements in Engines, of which the following is a full, clear, and exact description.

This invention relates to an engine to be driven by motive fluid of any sort and characterized by a reciprocating piston and certain peculiar valve mechanism controlling the motive fluid. The engine is especially adapted to operate drag-saws; but it should be understood, however, that the engine is useful in other connections, as will explain themselves to persons skilled in the art.

This specification is a specific description of one form of the invention, while the claims are definitions of the actual scope thereof.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a sectional view of the invention with parts broken away. Fig. 2 is a similar view showing the parts in different positions. Fig. 3 is a sectional view showing the parts in still another position. Fig. 4 is a plan view of the engine. Fig. 5 is a side view of the tubular valve, showing it detached from the rest of the apparatus; and Fig. 6 is an enlarged detail side view of the valve-operating gear, showing the movements thereof.

a indicates the cylinder of the engine, which may be of any suitable length.

b indicates the piston, and b' the rod. The rod is fitted to move through a gland a' on the cylinder, and it carries a cross-head b^2 , having two studs b^3 and b^4 . The stud b^3 is fast on the cross-head, and the stud b^4 is mounted to slide therein and is engaged by a spring b^5 .

In using the invention in connection with a drag-saw the saw is pivoted to the studs b^3 and b^4 , and the spring b^5 in yielding permits the saw to be rocked slightly, as is essential to the proper operation of the drag-saw. Attached to the rear portion of the cross-head b^2 and projecting rearwardly in parallelism with the piston-rod b' is a valve-rod c . This rod carries a tappet c' at its rear end, such tappet

comprising an inclined front surface c^2 and a plane top surface c^3 . A tappet c^4 , similar in form to the tappet c' , is carried by the upper end of the cross-head b^2 . The tappets c' and c^4 project in opposite directions—that is to say, their inclined front surfaces point toward each other—and these tappets, moving in time with the piston b of the engine, serve to operate the valve, as will be fully described hereinafter.

Boxes a^2 and a^3 are formed, respectively, at the ends of the cylinder a and carry the tubular slide-valve d , this valve extending throughout the length of the cylinder and parallel therewith. Pivoted on the stuffing-box a' of the cylinder a is a rocker e , which extends upward and has two arms e' in the form of a fork at its upper end. The arms have their extremities e^2 bent transversely in opposite directions, such extremities being respectively in line with the tappets c' and c^4 . The rocker e is connected by a link e^3 with the slide-valve d . As the parts b , b^2 , and c reciprocate the tappets c' and c^4 alternately engage the extremities e^2 of the arms e' of the rocker e and throw the rocker from the position shown by full lines in Fig. 6 to that shown by dotted lines in said figure, and vice versa. When the inclined extremities e^2 strike the extremity of the arm e' , it throws the rocker slowly toward its opposite position, and when the end of the arm e' rides up over the curved end c^2 of the tappet and reaches the top surface c^3 thereof the rocker will have been thrown to its opposite position. The tappet then passes under the arm of the rocker, sliding the top surface c^3 along the same, and thus holding the rocker in the position to which it was thrown and preventing any idle movement of the rocker immediately subsequent to the assumption of its new position. The rear end of the valve-rod c has a downwardly-projected lug c^5 , which slides loosely on the tubular valve d without influencing the movement thereof. The front end of the rod c is held slidably in a box a^6 , forming an extension of the box a^3 . The valve d is provided with attached collars d' , adapted, respectively, to engage the boxes a^2 and a^3 , so as to limit the movement of the valve.

The motive fluid is led to the engine through

a supply-pipe f , and this pipe communicates with the interior of the box a^2 through a port f' . The tubular valve d has its rear end formed with three ports, respectively designated d^2 , d^3 , and d^4 . A plug or stopper d^5 is fitted in the tubular valve d between the ports d^3 and d^4 . The rear end of the tubular valve d is open. The front end of the tubular valve d is formed with two ports d^6 and d^7 , between which is arranged a plug or stopper d^8 . The front end of the valve is also open. A fluid-passage a^4 is formed at the rear end of the cylinder, the passage leading from said end of the cylinder to and communicating with the interior of the box a^2 . A fluid-port a^5 is formed at the front end of the cylinder, this port leading from the cylinder to and communicating with the interior of the box a^3 . Assuming that the parts are in the position shown in Fig. 1, in which it will be seen that the piston b is at the limit of its rearward stroke and that the port d^2 is in registry with the port f' , the port d^3 in registry with the passage a^4 , and the port d^7 in registry with the passage a^5 , the motive fluid passing from the pipe f will enter the tubular valve d through the port b^2 and will pass out of the same into the cylinder and act against the rear side of the piston through the port d^3 and passage a^4 . The exhaust-steam will pass through the passage a^5 and port d^7 and out the open front end of the valve d . The rod c and attached parts move with the piston. Fig. 2 shows the piston at approximately the middle of its stroke, the valve devices being in the same position as in Fig. 1. Fig. 3 shows the position of the parts when the end of the stroke has been reached and immediately upon the return or rearward movement of the piston. In this view the rocker e is indicated in dotted lines as being thrown to the position opposite that in which it is thrown in Figs. 1 and 2, and when the parts are so disposed the position of the valve d will have been changed, so as to place the port d^6 in registry with the passage a^5 , the port d^3 in registry with the port f' , and the port d^4 in registry with the passage a^4 . The live steam now passes into the tubular valve by way of the port d^3 , and traversing the length of the valve it passes into the front end of the cylinder through the port d^6 and passage d^5 , driving the piston in the direction of the arrow in Fig. 3. The exhaust-steam passes out of the passage a^4 through the port d^4 and to the atmosphere through the open rear end of the tubular valve. In order to equalize the pressure against the valve, I have formed steam-passages in the outer surface of the valve and communicating with the ports d^6 , d^2 , and d^3 , as shown in the drawings. This permits the steam to pass around the outer side of the valve, and it permits the valve to move freely and with uniform resistance.

The advantages of the construction and ar-

angement of the engine will be apparent to persons skilled in the art.

Various changes in the form, proportions, and minor details of my invention may be resorted to without departing from the spirit and scope of my invention. Hence I consider myself entitled to all such variations as may lie within the scope of my claims.

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

1. An engine having a cylinder, boxes arranged at the end portions thereof and communicating with the cylinder, a tubular valve having its end portions mounted in the boxes, the valve being in communication with a source of fluid-supply and having at each end two ports separated from each other by a plug or stopper fitted in the valve and the ends of the tubular valve being open, and a gear for operating the valve.

2. An engine having a valve-gear comprising a rocker connected with the valve to actuate it, the rocker having a forked upper end, the arms of which are turned laterally in opposite directions, and two tappets moving in unison toward and from the rocker and arranged respectively to engage said laterally-bent ends of the rocker-arms, to throw the rocker.

3. An engine having a valve-gear, comprising a rocker connected with the valve, and two tappets arranged at opposite sides of the rocker and moving in unison toward and from the same to throw the rocker back and forth.

4. An engine having a cylinder with steam-passages at its ends, a tubular valve having communication with the steam-supply and having two ports in each end portion, a closure fitted between each pair of ports, and a gear for reciprocally driving the valve.

5. An engine, comprising a cylinder with steam-passages at its ends, a tubular valve extending parallel with the cylinder and commanding the steam-passages thereof, a rod connected with the piston and arranged to slide parallel with the cylinder, and a rocker connected with the valve and engaged by parts on the rod, whereby to operate the valve.

6. An engine, having a cylinder with steam-passages at its ends, a tubular valve having communication with the steam-supply and having feed-ports coacting with the steam-passages of the cylinder, the tubular valve having exhaust-ports also coacting with the steam-passages, and means carried in the valve for separating the feed and exhaust passages.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWARD E. REDFIELD.

Witnesses:

CHARLES E. MAYBEE,
WILLIAM C. HALE.