No. 676,220. Patented June 11, 1901.

A. A. CUMING.

ROTARY ENGINE.

(Application filed Oct. 14, 1899.)

(No Model.) 2 Sheets—Sheet 1.

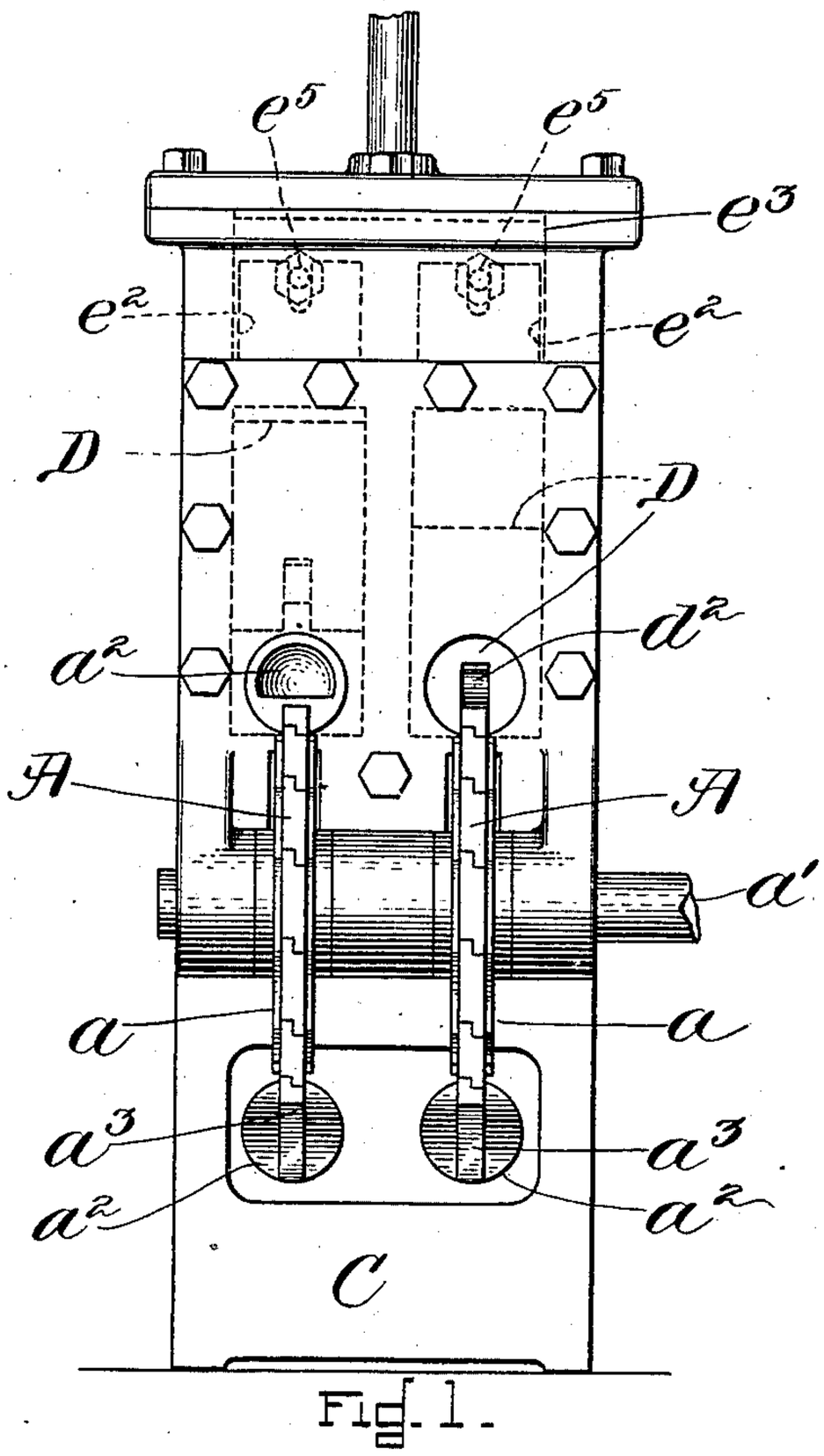

Fig. 1.

Witnesses.
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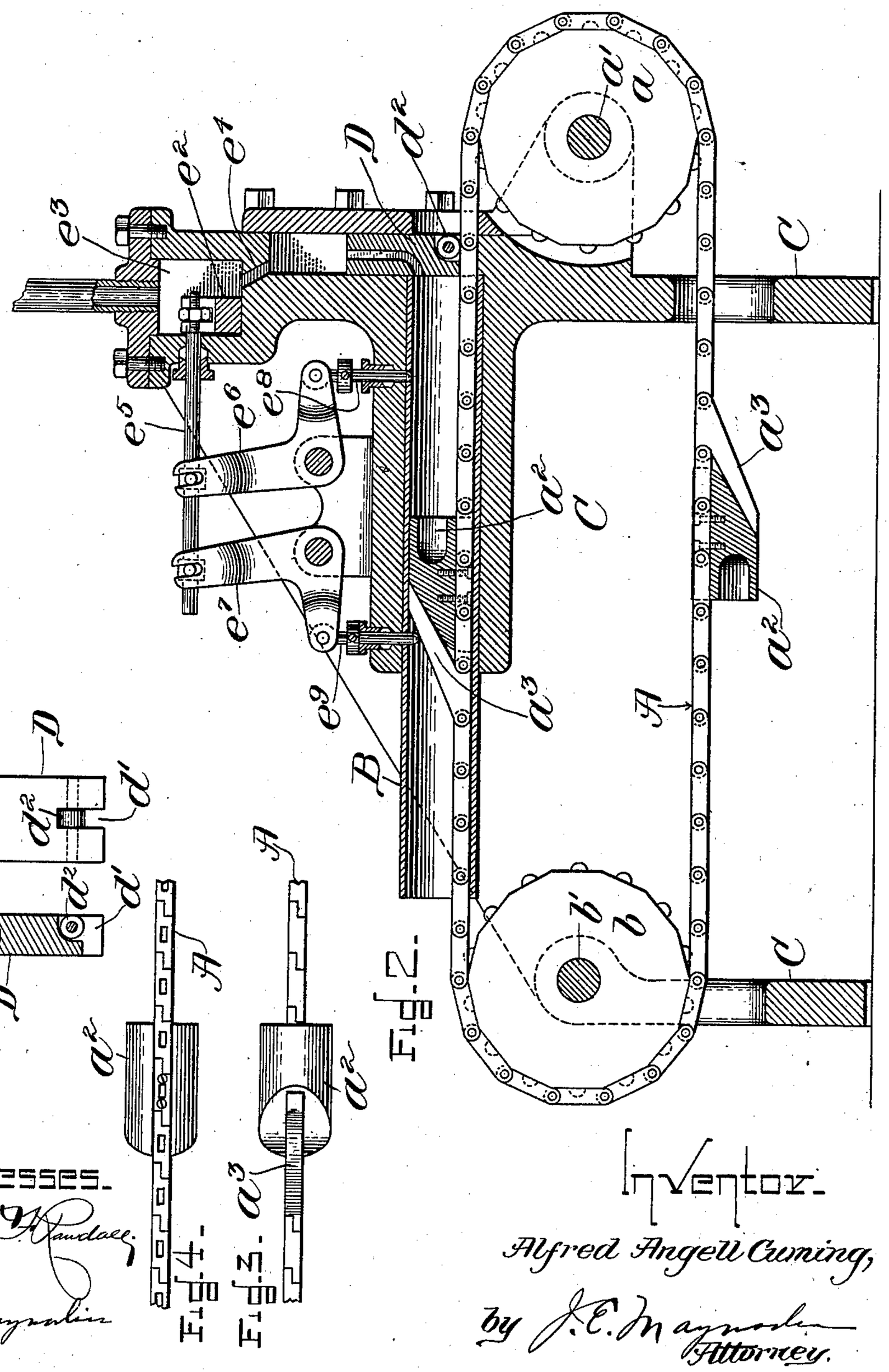

Fig. 2.

Fig. 5.

Fig. 6.

Fig. 4.

Fig. 3.

Witnesses.

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UNITED STATES PATENT OFFICE.

ALFRED A. CUMING, OF HINGHAM, MASSACHUSETTS.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 676,220, dated June 11, 1901.

Application filed October 14, 1899. Serial No. 733,558. (No model.)

To all whom it may concern:

Be it known that I, ALFRED ANGELL CUMING, of Hingham, in the county of Plymouth and State of Massachusetts, have invented a Rotary Engine, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is an end elevation of a rotary engine embodying my invention. Fig. 2 is a section on line 2 2 of Fig. 1. Fig. 3 is a top plan of the piston and a portion of the endless flexible carrier to which the piston is fast, and Fig. 4 an inverted plan of the same. Figs. 5 and 6 are details of the gate hereinafter referred to.

My invention is a rotary engine comprising an endless flexible carrier having a piston fast thereon, a cylinder provided with a gate for closing the entrance of the cylinder, a cam located in advance of the piston and moving with it, a supply-valve for the cylinder, and means whereby the cam first causes the gate to be opened and closed as the piston enters the cylinder and then opens and closes the supply-valve.

In the drawings the endless flexible carrier A is supported by wheels a and b, fast on shafts a' b', respectively, which shafts are journaled in bearings in frame C, and to the flexible carrier A are secured pistons a^2 and also cams a^3.

B is the cylinder, through which extends the carrier A, to which are secured pistons a^2 and cams a^3, which are carried in an endless path by carrier A and successively traverse cylinder B in one direction.

At that end of cylinder B at which pistons enter is located a gate D, which serves to close the cylinder at that end and which is slotted at its lower end, as at d'. (See Figs. 5 and 6.) The carrier A moves through this slot d' when gate D is in its closed position.

Gate D has mounted on it in slot d' an anti-friction-roll d^2, which is engaged by cams a^3, which raise gate D by passing under roll d^2 to permit piston a^2 to enter cylinder B, and after the piston has entered the cylinder gate D is returned to its normal position and closes the entrance end of cylinder B, as explained below.

The steam or other agent is admitted to cylinder B into the space between piston a^2 and gate D and expanding causes piston a^2 to traverse the cylinder and the steam is discharged from the cylinder at the open end thereof. The force exerted on the pistons is transmitted by endless carrier A to shaft a', which may be connected in any suitable manner with the mechanism to be driven, and any number of engines may be connected with shaft a', two being shown in Fig. 1. A slide-valve e^2, located in the steam-chest e^3, is for controlling the port e^4, leading from steam-chest e^3, and the stem e^5 of valve e^2 is connected with bell-crank levers e^6 and e^7, which levers e^6 and e^7 are connected to plungers e^8 and e^9, which are located within cylinder B and occupy positions in the path of cams a^3, so that the cams move valve e^2 first in one direction and then in the other to open and close valve e^2, as will be clear. As one of the pistons a^2, with its cam a^3, passes into cylinder B plunger e^8 is raised and lever e^6 operated to move valve e^2 and open port e^4, and when port e^4 is thus opened gate D is assisted in its descent by the pressure of the steam, and when in its lowermost position the steam passes through port e^{10} in said gate into cylinder B, port e^{10} being closed when gate D is not in its lowest position. After cam a^3 and the piston have passed plunger e^8 and reached plunger e^9 the latter is raised and lever e^7 operated to move valve e^2 and close port e^4, after which the expansion of steam in cylinder B acts on the piston until the latter is discharged from the end of the cylinder.

I do not confine myself to the specific means shown for operating the valve and opening the gate and cutting off the steam while the gate is open, for many other ways of accomplishing these results will be obvious to those skilled in the art without departing from my invention.

What I claim as my invention is—

1. In a rotary engine the combination of an endless flexible carrier; a piston fast on that carrier; a cylinder; a gate closing the entrance of that cylinder; a cam located in advance of the piston and moving with it; a supply-valve for the cylinder and means whereby the cam first opens the gate then opens the supply-valve and then closes the supply-valve.

2. In a rotary engine the combination of an

endless flexible carrier; a piston fast on that carrier; a cylinder; a supply-valve for that cylinder; a gate closing the entrance to the cylinder; means to open the gate; means to open and close the supply-valve and means to prevent the steam from entering the cylinder until the gate is closed.

3. In a rotary engine the combination of an endless flexible carrier; a piston fast on that carrier; a cylinder; a supply-valve for that cylinder; a gate closing the entrance to the cylinder; means to open the gate; means to open and close the supply-valve and means carried by the gate to prevent the steam from entering the cylinder until the gate is closed.

ALFRED A. CUMING.

Witnesses:
WM. MAYNADIER,
H. POWERS.