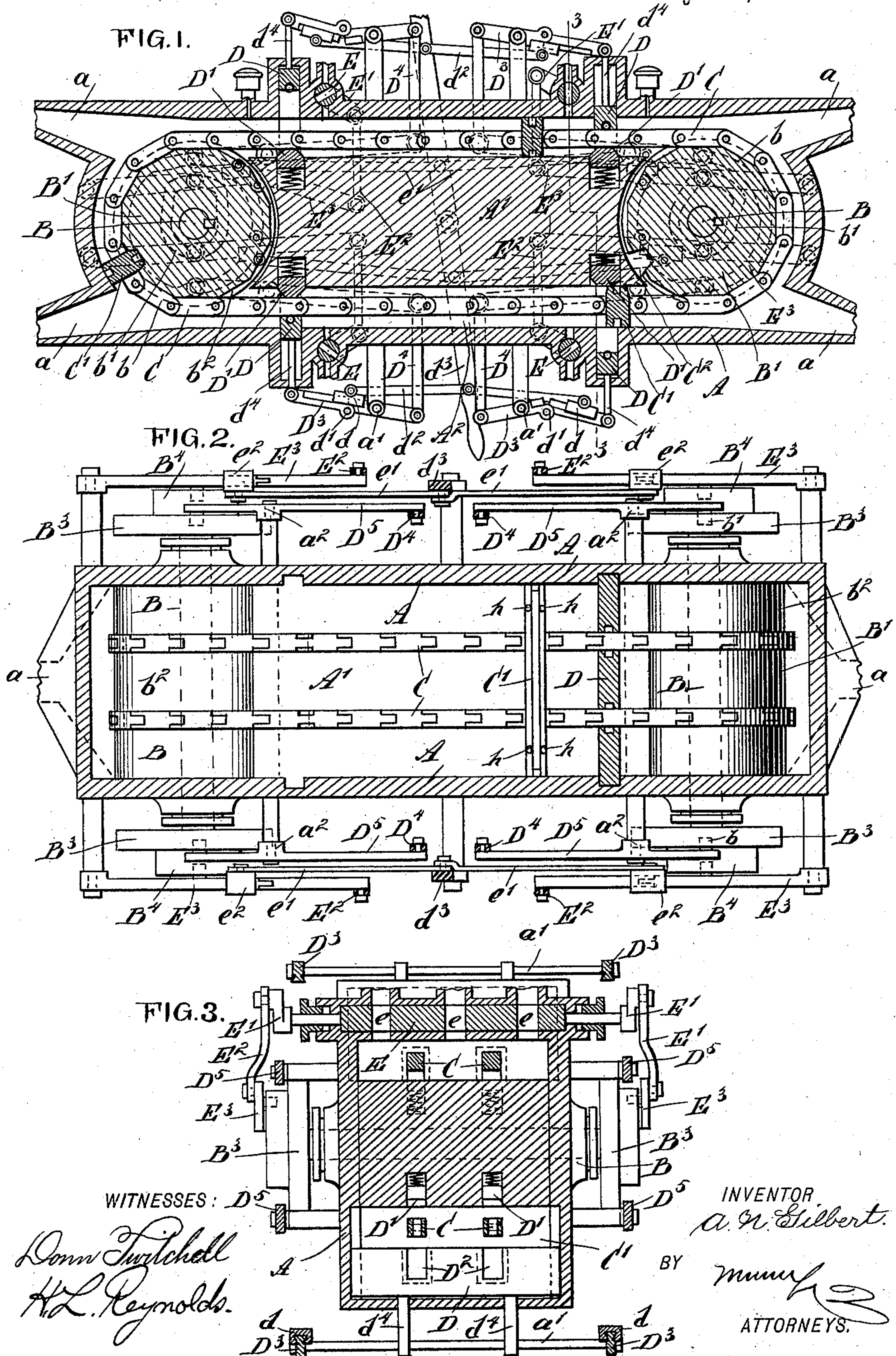


(No Model.)

A. N. GILBERT.
ROTARY ENGINE.

No. 604,038.

Patented May 17, 1898.



UNITED STATES PATENT OFFICE.

AUGUSTINE N. GILBERT, OF BERLIN, NEW HAMPSHIRE.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 604,038, dated May 17, 1898.

Application filed June 12, 1897. Serial No. 640,470. (No model.)

To all whom it may concern:

Be it known that I, AUGUSTINE N. GILBERT, of Berlin, in the county of Coos and State of New Hampshire, have invented certain new and useful Improvements in Rotary Engines, of which the following is a full, clear, and exact description.

My improvement in rotary engines consists, essentially, in two parallel shafts having cylinders or drums placed thereon and connected by a chain passing over the same, to which chain are attached bars extending parallel with the direction of the drums and forming piston-heads. This chain and the drums are surrounded by a casing which forms the cylinder, and the device is provided with suitable steam inlet and exhaust ports and valves and with devices for moving the abutment-plates.

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 figures.

Figure 1 is a longitudinal sectional elevation of my device. Fig. 2 is a sectional plan view taken through the upper chamber, through which the chain passes; and Fig. 3 is a sectional elevation taken parallel with one of the drums and upon the line 3 3 of Fig. 1.

My invention comprises two parallel shafts B, upon which are mounted drums B', and the latter have their surfaces formed as polygons with a number of sides, each side being adapted to receive one of the links of the chain C, which is made in duplicate and passes about both of the drums B'. At intervals in its length, preferably equal to the circumference of the drum, are attached bars C', which extend both inward and outward from the chain. The drums are provided with grooves C², adapted to receive that portion of the bars C' which projects inward from the chain. These bars are provided with suitable packing-strips upon each edge designed to make a tight joint between the bars and the passage through which they pass.

A casing A surrounds both of the drums and the chain, and it is provided with a central portion A', lying within the two sides of the chain and between the cylinders, being con-

nected at each end and closely approximating the outer surface of the cylinder. This leaves a passage between the outer portion of the casing and the inner portion A', which is of such a size that the bars C', forming the pistons, will closely fit therein. The central portion A' at each end and close to the drums is provided with cross-grooves receiving the auxiliary abutments D'. These may be extended entirely across the cylinder, but preferably extend simply beneath the chain, and they are held outward against the chain by means of a spirally-coiled spring beneath them. Immediately opposite these abutments D' and sliding within cavities formed in the outer casing A are the main abutments D, which consist of plates connected by stems d⁴ with a cross-rod a', by which they are operated. These plates or abutments D are provided with slots D², which closely embrace the sides of the chain.

Close to the abutments D are steam-inlet ports and valves E. These valves, as shown, consist of round bars or cylinders having a plurality of ports or passages e extending therethrough. The valve-stems extend outward through suitable packing-boxes and are provided with crank-arms E', connected by links E² with levers E³, pivoted at their rear ends to the casing of the machine and provided intermediate their length with friction-rollers which engage grooves b' in the cams B⁴, mounted upon the same shaft B as the drums B'. The cam-grooves b' are so arranged as to give an intermittent motion to the levers E³, and as a consequence the valves E will be opened immediately after the pistons C' have passed the abutments D.

The cross-bar a', to which the abutment is connected, is carried upon one end of a lever D³, which consists of two parts pivoted to each other at d' and so arranged that they may be connected so as to act as one lever or disconnected so that the motion of one end of the lever will not affect the other end. This is accomplished by placing a block d upon the lever D³, which block is grooved and slides upon both parts of the lever. In Fig. 1 the lower right-hand lever D³ is shown with this block moved away from the joint, so

that the lever is broken or permitted to hinge at its center. The lower left-hand lever, however, has the block d placed at the joint, so as to unite the two parts of the lever to make it a single lever.

To the lever D^3 is connected a link D^4 , which at its other end is connected to a lever D^5 , which at a point intermediate its length is pivoted to the casing of the machine and at its outer end is provided with a friction-roller engaging the grooves b in the cam-disk B^3 . As shown in the drawings, four of these cam-disks, with the levers described as operated thereby, are provided with each engine, one disk being placed upon each end of each drum.

The cam-groove b is so constructed as to give an intermittent vibrating motion to the lever D^5 and a similar motion to the abutment D . The object of multiplying the levers is to insure a quick motion of the abutments and one which will promptly remove the same from the path of the piston and close it close behind the piston. The auxiliary abutment D' has its upper edges beveled, so as to be engaged by the inner edge of the piston and be forced outward thereby.

The levers E^3 , which operate the valves, are constructed on the same principle as the lever D^3 , having a similar block e^2 sliding upon the two parts of the levers and arranged so as to break the lever in the middle or to connect the two parts, so as to form a rigid lever.

The blocks d are connected by links d^2 with the controlling-lever d^3 , and the blocks e^2 are connected by links e' with the same lever d^3 . The arrangement is such that when the lever d^3 is thrown to one side diagonally opposite blocks d and e^2 are moved so as to break their respective levers, while the other two diagonally opposite sets of blocks are moved so as to unite the two halves of their levers into a single rigid lever. In consequence of this diagonally opposite abutments are operated together, while the other two abutments are thrown outward, so as to be inoperative. Similarly diagonally opposite valves are operated, while the other two valves are inoperative—that is, remain closed.

The casing A is provided with exhaust-pas-

sages a , which are four in number, two of which are in use at a time.

To reverse the engine, the lever d^3 is thrown to the opposite side of the center, which closes the two valves formerly in use and opens the two valves which were closed, at the same time changing the abutments which are operative.

The result is that the direction of the motion of the chain is reversed.

The pistons C' are preferably provided with inset-balls h , which bear against the sides of the cylinder and reduce friction.

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

1. A rotary engine, comprising parallel rotative drums, a chain passing about said drums, and having plates attached thereto and acting as pistons, a casing surrounding the paths of said pistons and also extending within the chain between the drums, said casing having steam inlet and exhaust ports and valves controlling the steam-ports, abutments having slots to accommodate the chain, cams mounted upon the drum-shafts, and mechanism connecting said cams with the abutments and valves, substantially as described.

2. A rotary engine having two sets of abutments and steam-valves adapted to be alternately used in reversing the operation of the engine, vibrating levers actuating said valves, each of said levers being composed of two parts pivoted to each other, and a coupling block or sleeve adapted to connect and disconnect the two parts to make of them a rigid or a jointed lever, substantially as described.

3. A rotary engine having two sets of abutments and steam-valves adapted to be alternately used in reversing the operation of the engine, vibrating levers actuating the same, each composed of two parts pivoted to each other, a coupling block or sleeve adapted to connect and disconnect the two parts to make of them a rigid or a jointed lever, a common reversing-lever, and links connecting the same with said coupling-blocks, substantially as described.

AUGUSTINE N. GILBERT.

Witnesses:

BERT L. PIKE,

JOSEPH H. BATES.