

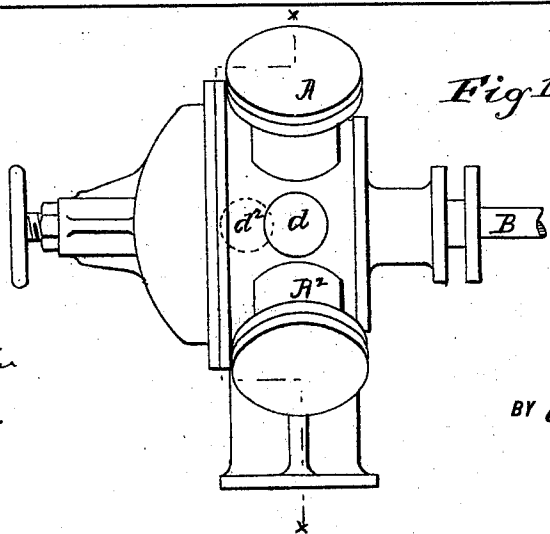
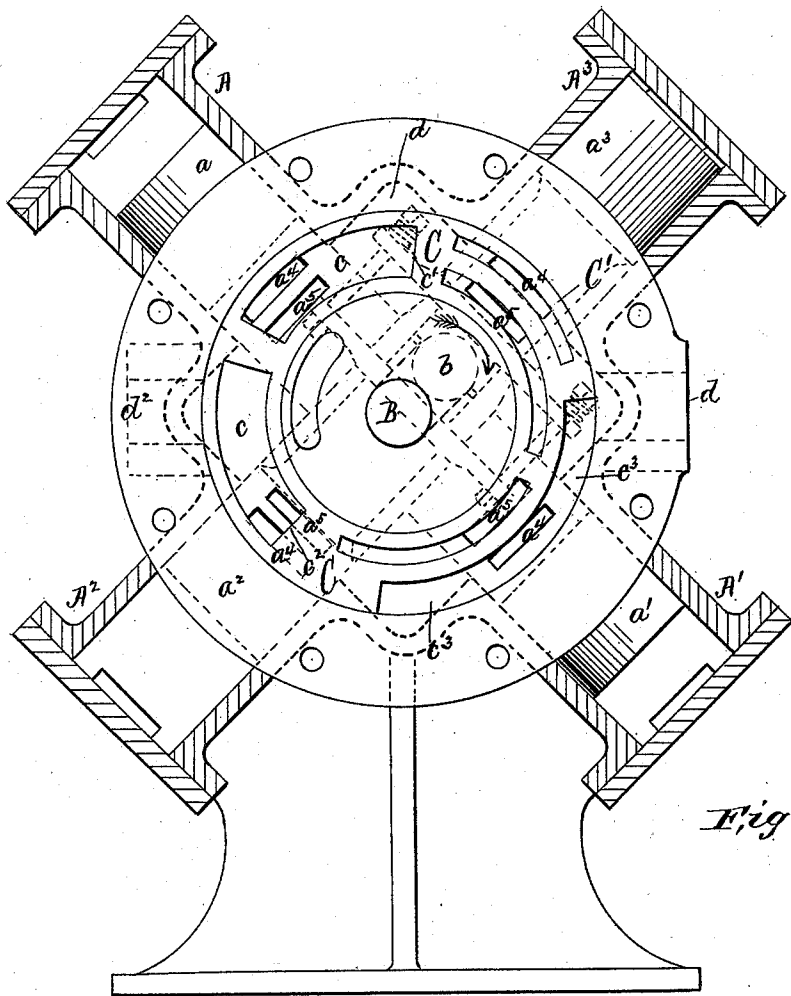
(No Model.)

3 Sheets—Sheet 1.

O. VEZIN.
MULTIPLE CYLINDER ENGINE.

No. 545,990.

Patented Sept. 10, 1895.



WITNESSES:

C. M. Benjamin
A. P. Sales.

INVENTOR

Oscar Vezin
BY *Andrew J. Fitch.*

ATTORNEY

(No Model.)

3 Sheets—Sheet 2.

O. VEZIN.
MULTIPLE CYLINDER ENGINE.

No. 545,990.

Patented Sept. 10, 1895.

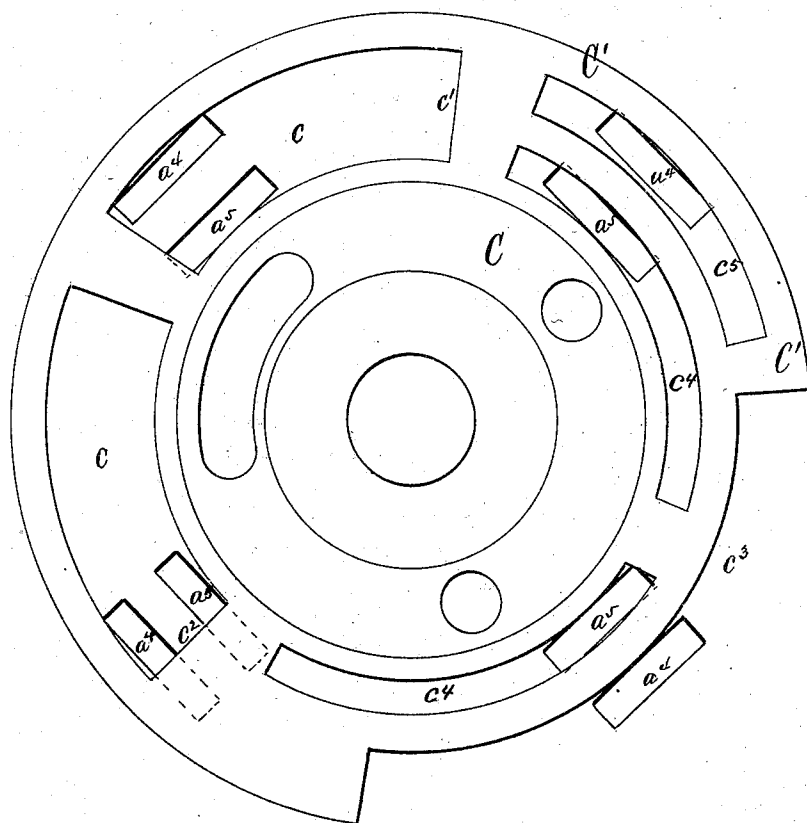


Fig. 3.

WITNESSES:

C. W. Benjamin
A. T. Fales.

INVENTOR

Oscar Vezin

BY

Arden S. Fitch

ATTORNEY

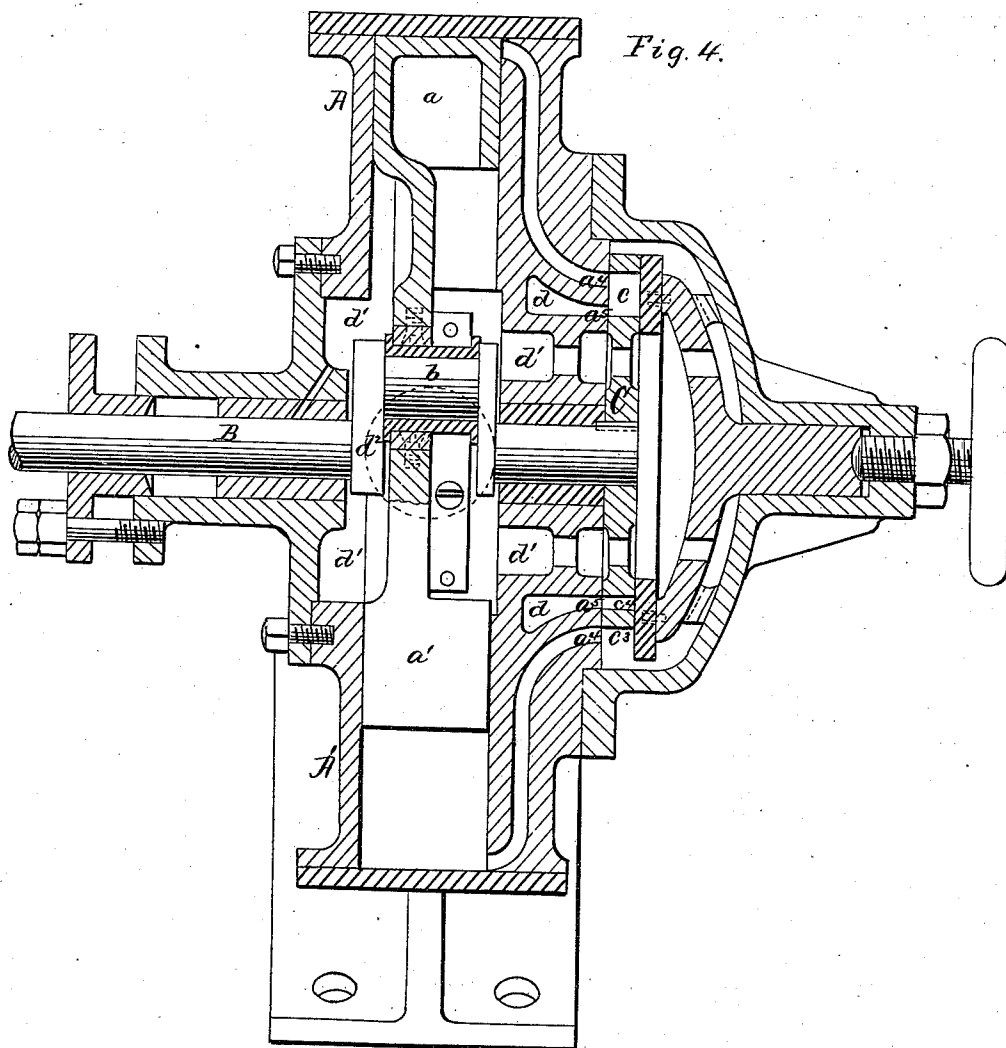
(No Model.)

3 Sheets—Sheet 3.

O. VEZIN.
MULTIPLE CYLINDER ENGINE.

No. 545,990.

Patented Sept. 10, 1895.



WITNESSES:

C. W. Benjamin
A. T. Fales

INVENTOR

Oscar Vezin

BY

Arden S. Fitch

ATTORNEY

UNITED STATES PATENT OFFICE

OSCAR VEZIN, OF NEW YORK, N. Y., ASSIGNOR TO THE CROSS ENGINE COMPANY, OF WEST VIRGINIA.

MULTIPLE-CYLINDER ENGINE.

SPECIFICATION forming part of Letters Patent No. 545,990, dated September 10, 1895.

Application filed February 5, 1895. Serial No. 537,346. (No model.)

To all whom it may concern:

Be it known that I, OSCAR VEZIN, a citizen of the United States, residing at New York, county and State of New York, have invented certain new and useful Improvements in Multiple-Cylinder Engines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to a multiple-cylinder engine in which the several cylinders are radially arranged about a common crank-shaft, with the pistons of the respective cylinders connected to the crank on said shaft and in which the cylinder-ports are governed in lead, cut-off, and exhaust by a disk-valve mounted on and rotated by said shaft.

My invention consists in the combination, with the cylinders and their pistons and ports in an engine of the class stated, of a rotary disk-valve having steam-inlet, exhaust, and balance ports, as hereinafter described, and provided with a web between the inlet end of the steam-port and the exhaust-port thereof of such length or duration as will cause an interruption of the exhaust from the several cylinders successively during the return stroke of each of the respective pistons therein, and having a balance-port adapted to communicate with each cylinder-port, whereby a portion of the steam in front of each said piston during its said return stroke will be confined within the cylinder between the piston and the cylinder-head until the steam-port of the valve establishes inlet to each said cylinder for the working stroke of the piston thereof, so that the liability of the pistons to strike the heads of their respective cylinders at the end of their return strokes will be prevented by the cushion of steam thus constituted in each cylinder successively.

Figure 1 is a side elevation of a multiple-cylinder engine containing my invention. Fig. 2 is a vertical sectional view of the same on line *xx*, Fig. 1; and Fig. 3 is a plan, enlarged, of the disk-valve detached. Fig. 4 is a sectional view of the engine centrally through cylinders A and A', Fig. 2, but with the respective pistons of said cylinders respectively shown at the beginning of working and return strokes.

A A' A² A³ are the cylinders, arranged radially about a common crank-shaft B, with their respective pistons *a a' a² a³* connected to the crank *b* of said shaft. At *a⁴* are shown the cylinder-ports and at *a⁵* the ports of the steam-chest. The cylinder-ports and chest-ports are governed in inlet cut-off and exhaust by a disk-valve C, which is mounted on and rotates with the shaft B. At *c* is shown the steam-port of the valve, of which *c'* is the inlet end and *c²* the cut-off, while the exhaust-port is at *c³*. The engine is single-acting. Steam enters the chest at *d*, being led thence by the rotary valve to the cylinders, successively, the inward stroke of the several pistons being their working stroke and the cylinders exhausting on their return stroke, through the central apertures in the valve, as shown, into the central chamber *d'* of the engine, and escaping thence at *d²*, as is usual in engines of this class. The valve is balanced, as indicated in the drawings, by means of the ports *c⁴*, which are formed in the valve-body, in that portion thereof which is diametrically opposite to the portion in which is the steam-port *c*, as shown, and which balance-ports *c⁴* are located so as to communicate with the chest-ports *a⁵* successively during the rotation of the valve.

In carrying out my invention I constitute the peripheral web of the valve-body, between the inlet end of the steam-port *c* therein and the exhaust-port *c³* thereof, of such a length or duration that as the valve rotates said web, as illustrated at C', will interrupt the exhaust from the cylinders successively at a point during the return stroke of the respective pistons therein, and this point may be, desirably, near the end of said return stroke. In this web C' of the valve I constitute a balance-port *c⁵*, reaching circumferentially substantially throughout the extent of the web, as shown, and located to communicate successively with each cylinder-port *a⁴* during the rotation of the valve.

In Fig. 2 the direction of rotation of the crank-shaft is indicated by an arrow, the cylinder A having full inlet of steam on its piston *a* at half working stroke, with the opposite cylinder A' exhausting, its piston *a'* being at half return stroke while steam is about

to cut off to cylinder A^2 , with its piston a^2 near the end of a working stroke and the cylinder A^3 , with its exhaust interrupted by the described web C' of the valve, its piston a^3 being near the end of its return stroke. It is evident that the steam confined in each cylinder, between the head thereof and the piston, during the latter portion of the return stroke of the piston, will be compressed by the advancing piston and will give a cushion between the piston and the cylinder-head having a resistance in excess of the normal steam-pressure, and that this cushion will effectively prevent collision between the piston and its cylinder-head at the end of the said return stroke; and it is also obvious that as soon as the valve in its rotation establishes inlet through its steam-port to the cylinder A^3 the excess of pressure established, as described, between the piston a^3 and the cylinder-head will be equalized with the steam-pressure, and it is apparent that the described valve in its continuous rotation will, by means of the web C' , as set forth, successively interrupt the exhaust from the several cylinders at a point in the return stroke of the respective pistons thereof near the end of said return stroke, with the resulting effects hereinbefore recited; and it is also evident that the balance-port c^5 , communicating, as described, with each cylinder-port a^4 successively during the rotation of the valve, will preserve the balance of the valve during the existence of the aforesaid excess pressure or

cushion in front of each piston during the return stroke thereof and obviate the tendency of such pressure to tilt the valve laterally, and so cause friction between the perimeter of the valve and its seat, which would prevail if the web C' were not balanced.

What I claim as my invention, and desire to secure by Letters Patent, is—

In a multiple cylinder engine in which the several cylinders are radially arranged about a common crank-shaft with their respective pistons connected to the crank of said shaft, and in which the said several cylinders are successively governed in steam inlet, cut-off and exhaust by a disk-valve mounted on and rotated by said shaft, the combination with said cylinders and their pistons and ports of the said rotary disk-valve having steam-inlet, exhaust and balanced ports, and provided with a web between the inlet-end of the steam-port and the exhaust-port thereof, having a balance port therein adapted to successively communicate with each cylinder-port, said web being of a length or duration adapting said web to successively interrupt the exhaust from said cylinders during a portion of the return-stroke of each of the respective pistons therein, substantially as and for the purpose set forth.

OSCAR VEZIN.

Witnesses:

ARDEN S. FITCH,
A. T. FALES.