

(No Model.)

W. KENT.
BLOWING ENGINE.

No. 323,427.

Patented Aug. 4, 1885.

Fig 1

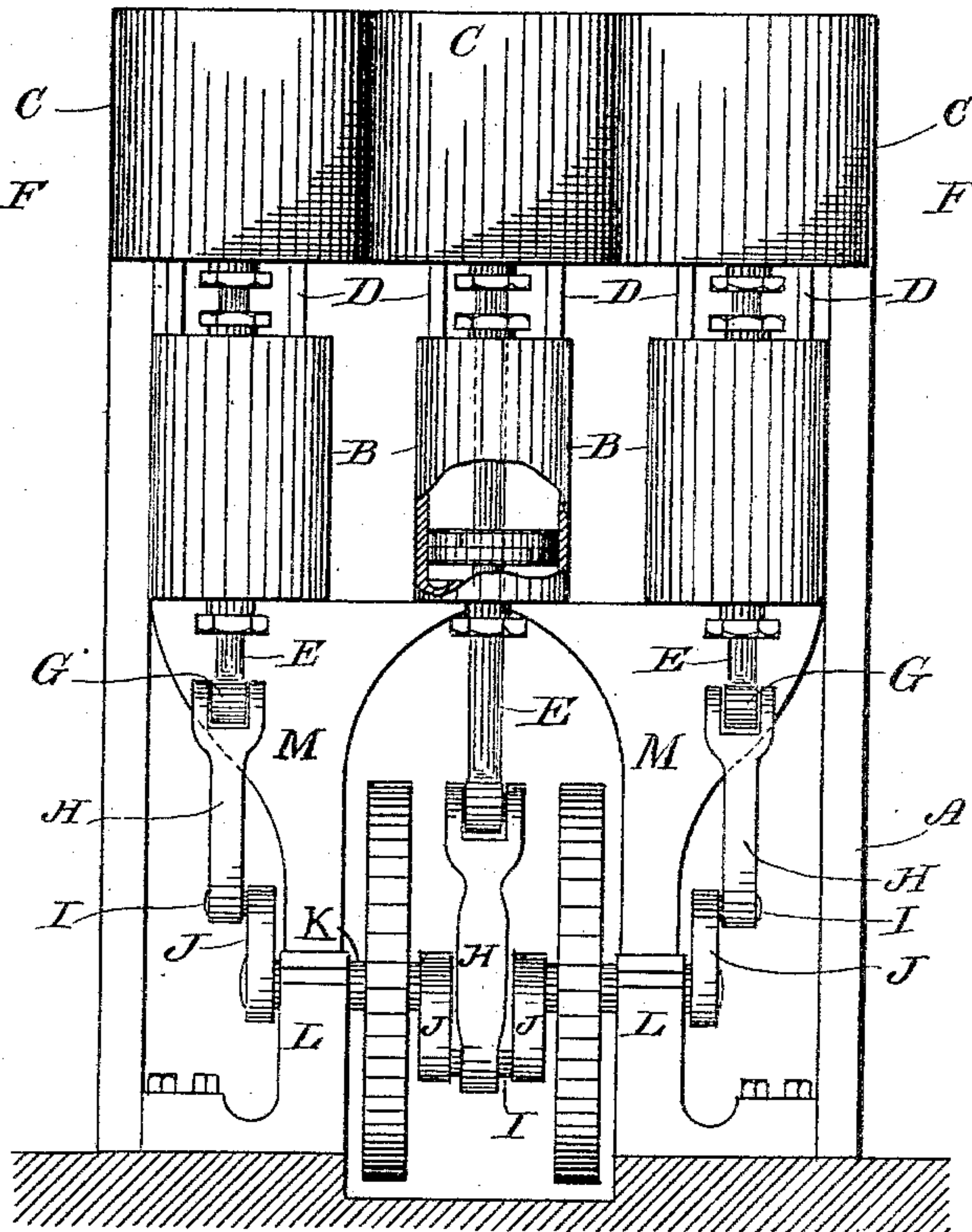
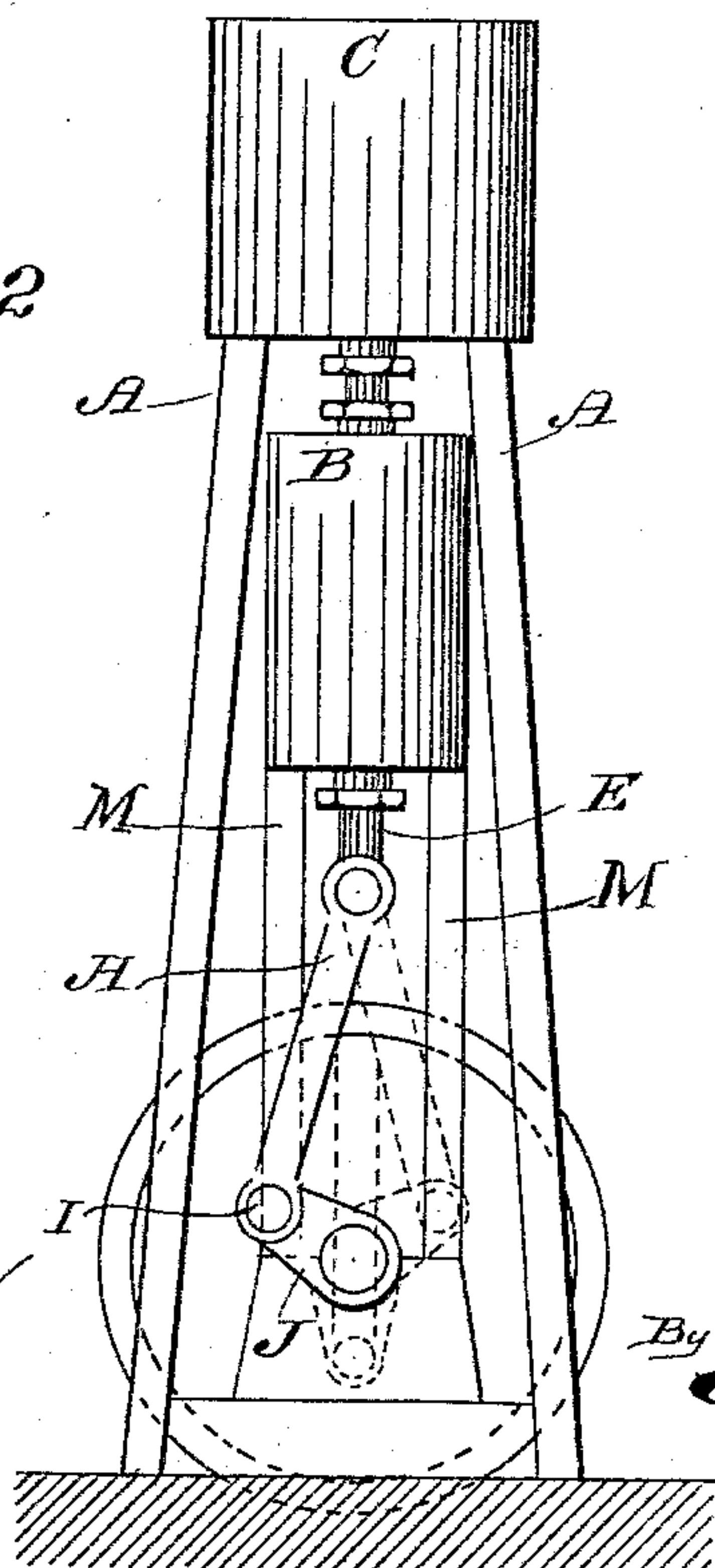


Fig 2



Witnesses:
S. Williamson
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Inventor
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Atty's.

UNITED STATES PATENT OFFICE.

WILLIAM KENT, OF JERSEY CITY, NEW JERSEY.

BLOWING-ENGINE.

SPECIFICATION forming part of Letters Patent No. 323,427, dated August 4, 1885.

Application filed January 5, 1885. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM KENT, a citizen of the United States, residing at Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Blowing-Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to certain novel and useful improvements in blowing and air-compressing engines for blast-furnaces, Bessemer converters, and the like, and has for its object to obviate the disadvantages now existing in this class of engines—i. e., high first cost, lack of economy of steam, and liability to “break-downs” through excessive strains; and with these ends in view my invention consists in certain details of construction and combination of elements hereinafter fully explained, and then specifically designated by the claims.

In order that those skilled in the art to which my invention appertains may fully understand its construction and operation, I will proceed to describe the same in detail, referring by letter to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a front elevation of my improvement, showing the relative position of the steam and air cylinders, one of the former being broken away and sectioned to show the piston and rod; and Fig. 2 is a side view showing the relative angles of the cranks.

Similar letters denote like parts in both the figures of the drawings.

A is the frame-work of my improved engine, which may be of any convenient or desired shape.

B are steam-cylinders, three in number, supported by the two housings M, which transmit the strains directly to the pillow-blocks L.

C are three air-cylinders arranged above the steam-cylinders, and separated by braces D, adapted to receive and sustain the strain on said cylinders.

E are piston-rods, which pass through the steam-cylinders up into the air-cylinders, and have on their upper ends the pistons F. The lower ends of these piston-rods form heads G, to which are connected the pitmen H, their

lower ends in turn being connected to the crank-pins I, secured in the cranks J.

K is a shaft journaled within the pillow-blocks L. On this shaft are arranged the three cranks J, at one hundred and twenty degrees to each other, as shown in Fig. 2.

The disadvantages above referred to result chiefly from the fact that in the present construction of blowing-engines the strains in the air and steam cylinders do not balance each other; but on the contrary, when the pressure on the steam-piston is greatest, the resistance to the air-piston is the least, and when the pressure on the steam-piston has decreased by the expansion of steam the resistance to the air-piston has increased by the compression of air. These differences of pressure and resistance thus produced are balanced by very heavy fly-wheels, to and from which the strains are transmitted through heavy cross-heads and connecting-rods. These cross-heads and connecting-rods are subjected to severe transverse strains, frequently repeated in reverse directions, which are often the cause of dangerous “breakdowns.”

In my improved construction the work done is divided into three portions within three air-cylinders, and the difference of pressure and resistance between the air and steam cylinders is not only divided by three, but is perfectly balanced by means of the crank-shaft with its three cranks at one hundred and twenty degrees to each other. Thus the heavy cross-heads for transmitting strains from the pistons to the fly-wheels are dispensed with, and I am also enabled to dispense with fly-wheels, and at the same time use the steam expansively and obtain steadiness of motion, although I may employ one or more small fly-wheels to increase this steadiness, as shown in the drawings.

The utmost economy of steam may be secured by arranging the three steam-cylinders as a compound engine. The arrangement that I prefer is, that the middle be the high-pressure cylinder, and that the two side cylinders receive an equal portion of the exhaust-steam from this high-pressure cylinder, and these cylinders exhaust their steam into the condenser. (Not shown.)

The arrangement of one high-pressure cyl-

inder and two equal-size low-pressure cylinders with three cranks at one hundred and twenty degrees has been found of great value in marine engines in diminishing and equalizing strains on cranks and crank-pins, and in securing economy of steam, and I do not claim any such arrangement, broadly; but

What I do claim as new and useful is—

1. In a blowing-engine, three air-cylinders, each having a steam-cylinder arranged opposite it, with the same piston-rod, and coupled together by means of a crank-shaft the cranks of which are set at an angle of one hundred and twenty degrees to each other, whereby all strains proceeding from the weight of parts or from the pressures of steam or air are balanced, substantially as set forth.

2. A blowing-engine having three air-cylinders of equal size, each with a steam-cylinder opposite it, and having the same piston-rod, and coupled together by means of a crank-

shaft the cranks of which are set at angles of one hundred and twenty degrees to each other, the steam-cylinders being proportioned so that each does an equal amount of work, substantially as shown and described.

3. A blowing-engine containing three air-cylinders, each with a steam-cylinder opposite it, and upon the same piston-rod, the cylinders of which are arranged as a compound engine, with one high-pressure and two low-pressure cylinders, and coupled together by means of a crank-shaft the cranks of which are set at angles of one hundred and twenty degrees to each other.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM KENT.

Witnesses:

JOHN L. GILL, Jr.,
C. P. HIGGINS.