

(No Model.)

2 Sheets—Sheet 1.

R. M. BECK.
MARINE ENGINE.

No. 440,531.

Patented Nov. 11, 1890.

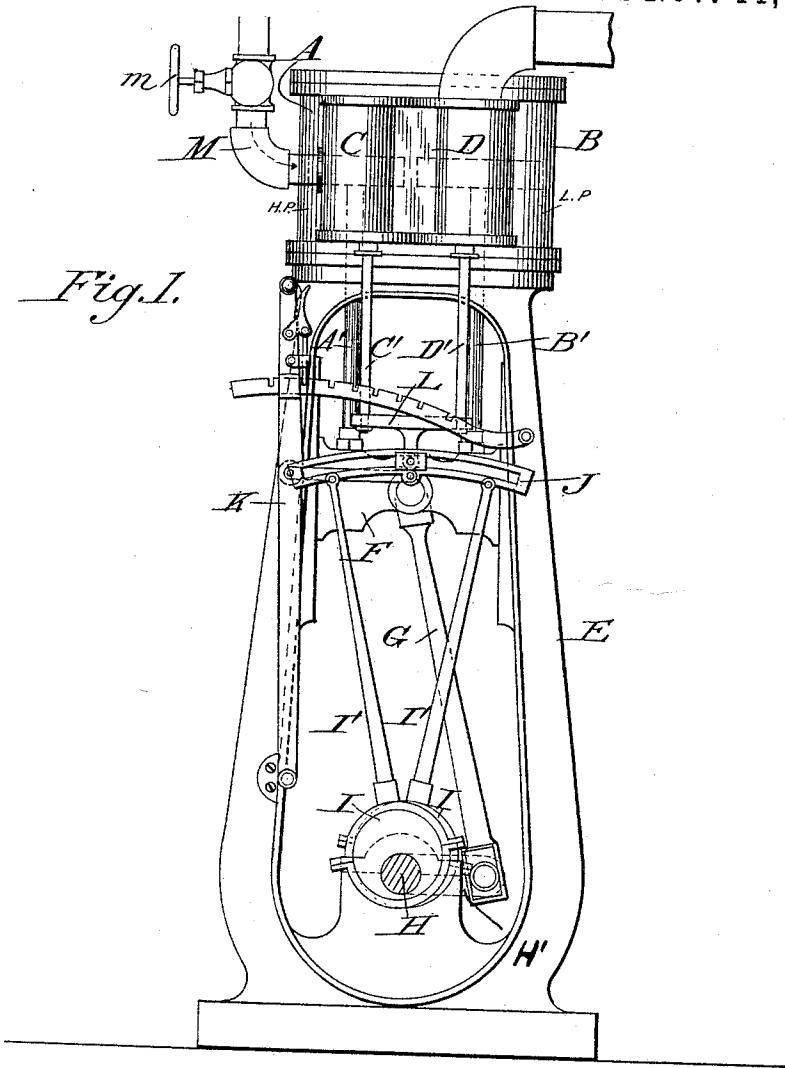


Fig. 1.

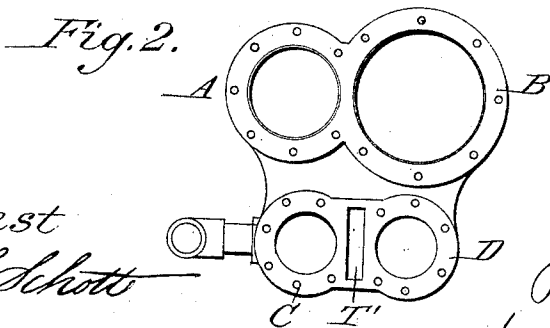


Fig. 2.

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per Fred E. Parker.

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Fig. 3.

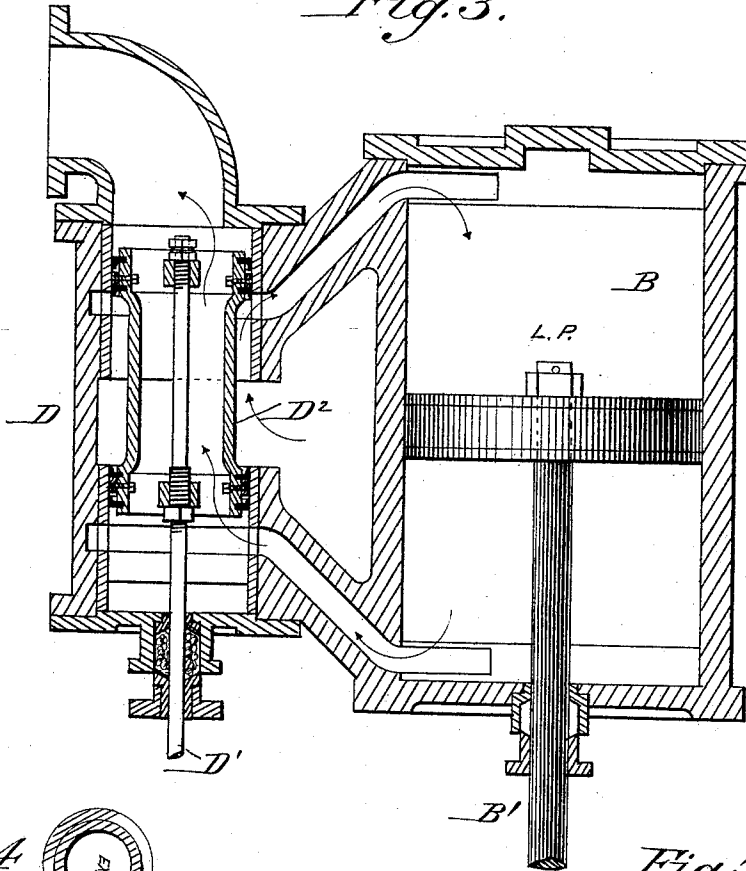


Fig. 4.

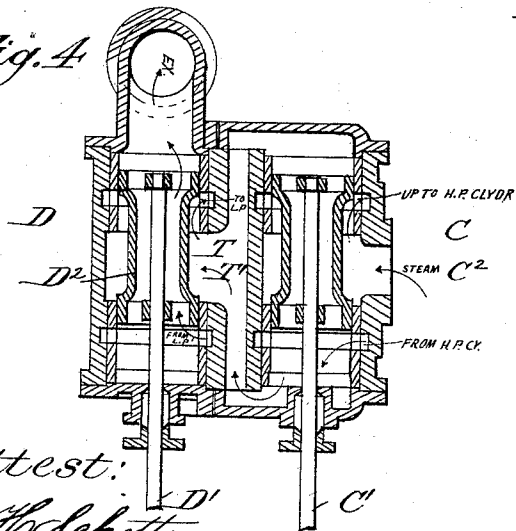
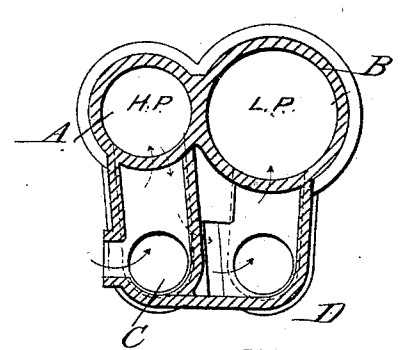


Fig. 5.



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UNITED STATES PATENT OFFICE.

ROBERT M. BECK, OF CHAMBERSBURG, PENNSYLVANIA.

MARINE ENGINE.

SPECIFICATION forming part of Letters Patent No. 440,531, dated November 11, 1890.

Application filed May 12, 1890. Serial No. 351,508. (No model.)

To all whom it may concern:

Be it known that I, ROBERT M. BECK, a citizen of the United States, residing at Chambersburg, in the county of Franklin and State of Pennsylvania, have invented certain new and useful Improvements in Marine 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 an improvement in vertical marine engines, particularly to that type of engines adapted for use with small steam-yachts, and also with tugs, steamboats, and other kinds of water-craft, the object of the invention being to construct a simple, efficient, and inexpensive marine engine; and the invention consists in the combination, with such an engine, of the arrangement of compound cylinders, substantially as described, and, further, in certain details in the construction, arrangement, and combination of the parts, substantially as will be hereinafter described and claimed.

In the accompanying drawings, illustrating my invention, Figure 1 is a side elevation of my improved vertical marine engine. Fig. 2 is a top plan view of the same with the cover-plates removed and indicating more particularly the arrangement of the vertical cylinders and their adjacent valve-boxes. Fig. 3 is an enlarged vertical section of the low-pressure cylinder with its valve-chamber and valves. Fig. 4 is a vertical section of the two valve-chambers belonging respectively to the low-pressure and the high-pressure cylinders. Fig. 5 is a horizontal cross-section of the cylinders and their valve-chambers.

Like letters of reference designate corresponding parts throughout all the different figures of the drawings.

Referring to Fig. 1, we find there shown a general elevational view of a vertical marine engine having the usual mechanical parts which belong to a steam-engine of this type, and having my improved arrangement of steam-cylinders combined and arranged with the other parts of the marine engine to effect the object hereinabove referred to and provide the simple, cheap, and efficient combi-

nation of parts as constituting the subject-matter of the present invention.

E denotes the main frame of the vertical marine engine, as shown in Fig. 1, which frame may be of any convenient and desirable structure, varying of course within wide limits to permit it to be adapted for use in various locations.

A denotes the high-pressure cylinder, and B the low-pressure cylinder, which are both located in the example of the invention shown in the drawings in a vertical position alongside of each other and closely contiguous. Adjacent to these steam-cylinders A and B are their valve-boxes C and D, C being the high-pressure valve-box and being located adjacent to the high-pressure cylinder, while D is the low-pressure valve-box, and is located adjacent to the low-pressure cylinder, both of said valve-boxes not only being adjacent and contiguous to their respective cylinders, but also close to each other, as shown. The steam-cylinders and their valve-chests are supported upon the main frame E, as indicated in Fig. 1.

Within the high-pressure cylinder is the piston having the piston-rod A', and within the low-pressure cylinder is also its piston having the piston-rod B', said piston-rods A' and B' being connected to a common cross-head F, which is connected by the connecting-rod G with the single crank H' on the crank-shaft H. On this crank-shaft also are suitable eccentrics I I, connected to the rods I' I', which are connected to the slotted arm J. Said arm is obviously adjustable by means of the lever K.

C' denotes the valve-rod belonging to the valve C' within the valve-chamber C, and D' denotes the valve-rod belonging to the valve D' within the valve-chamber D. Said valve-rods C' and D' are connected to the common head L, which has an adjustable connection with the slotted arm J. There is thus provided a link-motion attachment for the valve.

One very desirable feature of the arrangement of compound cylinders consists in the central or intermediate chamber T, which is of suitable size and shape and is situated between the valve-chambers C and D. This central or intermediate chamber is described

particularly and is also claimed in my former patent, No. 422,111, granted February 25, 1890. Hence I only claim it herein in the combination. The live steam enters the high-
 5 pressure cylinder through the steam-inlet M, which is fitted with a cock *m*, as shown in Fig. 1, and from the high-pressure cylinder the exhaust-steam will be discharged into the intermediate chamber T, from which the
 10 steam is then furnished to the low-pressure valve-chamber and thence to the low-pressure cylinder. As will be seen by noting the direction of the arrows in Figs. 3, 4, and 5, the valves which I preferably employ in the valve-
 15 chambers C and D are hollow piston-valves, as shown at C² and D². The location of the chamber T is of great advantage, as it has its side or wall T' next to the high-pressure cylinder, and consequently in contact at all
 20 times with the live steam in the boiler, as is fully stated in my former patent, just referred to.

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

In a marine engine, the combination of the main frame E, the high-pressure cylinder A,

the low-pressure cylinder B, said cylinders being located in a vertical position alongside of each other, the high-pressure valve-box C, 30 adjacent to the high-pressure cylinder, the low-pressure valve-box D, adjacent to the low-pressure cylinder, the intermediate chamber T between valve-chambers C D, said intermediate chamber having its wall exposed to 35 the live steam, the cross-head F, to which the piston-rods A' and B' are connected in common, the crank-shaft H, having the single crank-arm H', the connecting-rod G, connecting the cross-head F with the single crank-
 40 arm H', the eccentrics I I, likewise on the crank-shaft, having rods I' I', connected to the slotted arm J, and the slide L, adjustably connected to the arm J and having the valve-
 45 rods C' and D' connected thereto, which valve-rods are connected to the valves within the chambers C D, all the parts being arranged substantially as described.

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

ROBERT M. BECK.

Witnesses:

J. M. MCDOWELL,
 F. M. DUNCAN.