(No Model.)

C. W. COPELAND.

PUMPING SYSTEM FOR SURFACE CONDENSERS.

No. 273,965. Patented Mar. 13, 1883.

Fig 1

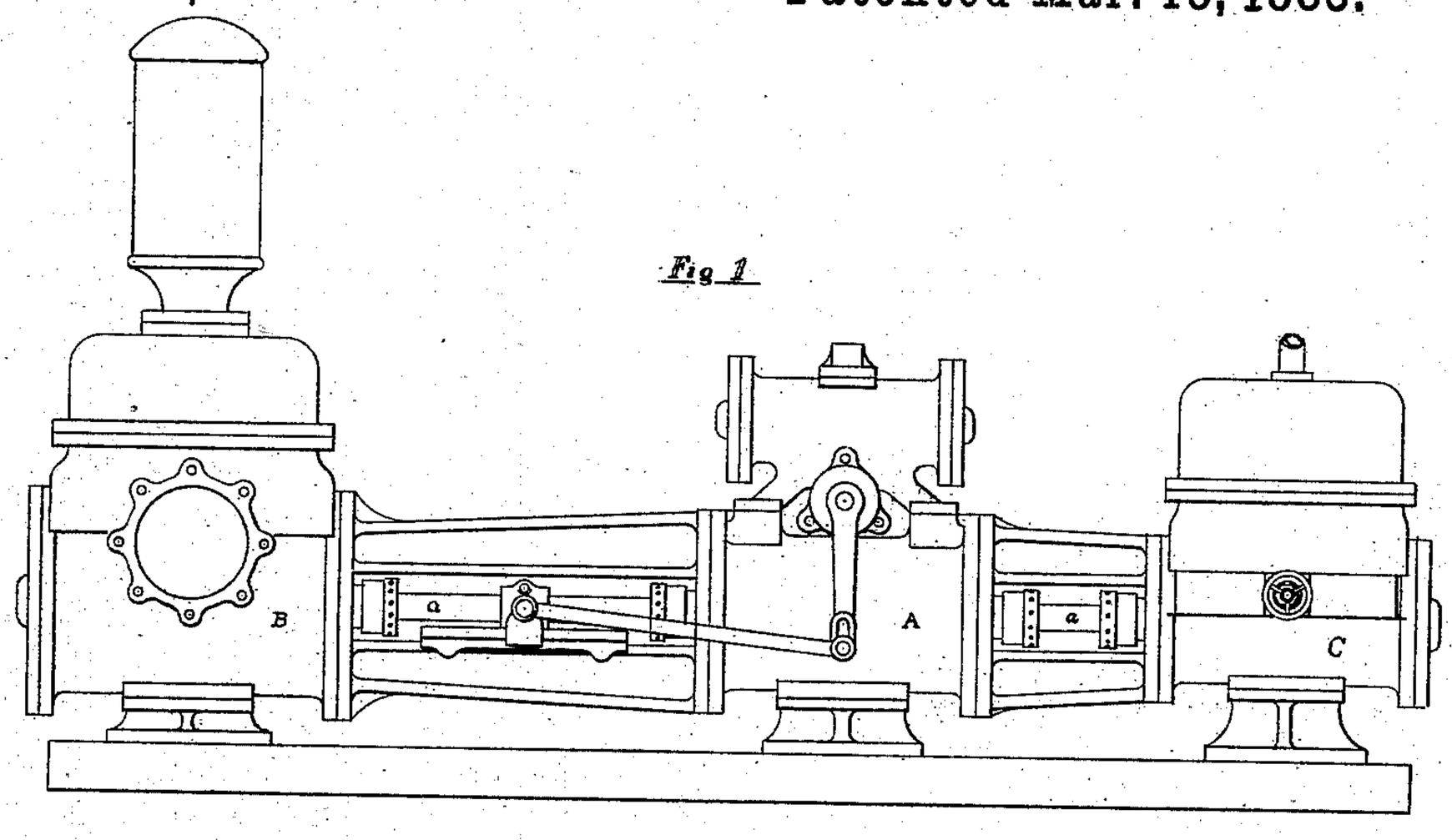


Fig 2

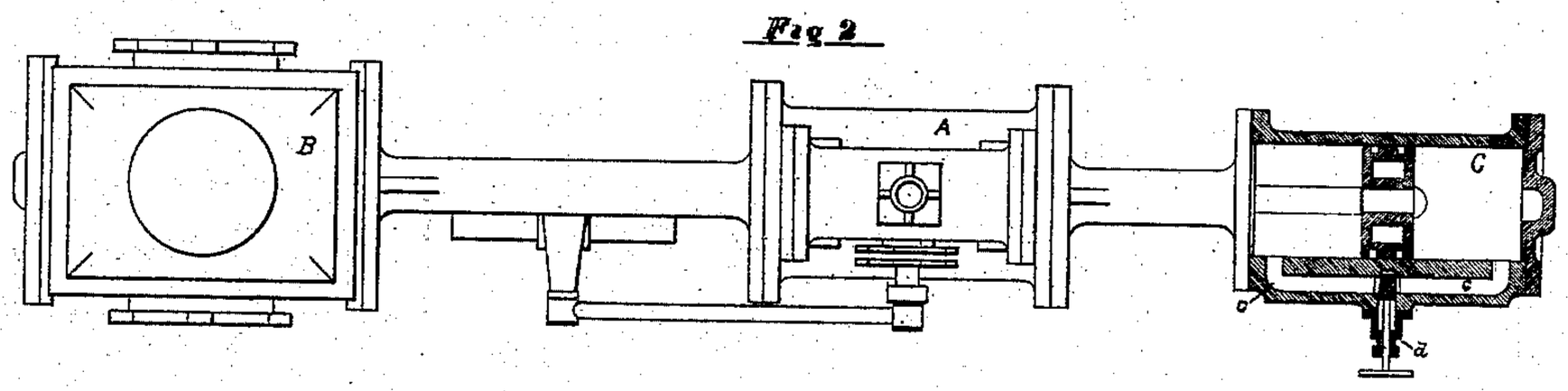
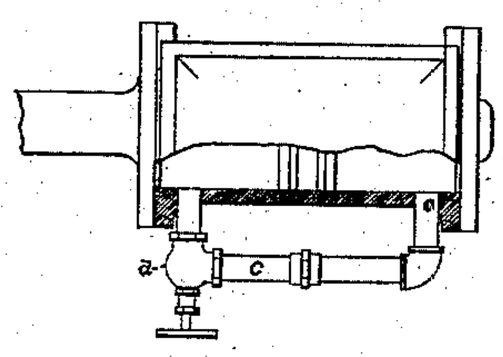


Fig 3



WITNESSES:

Harry Cracke

Chas. C. Lansing

INVENTOR

Charles W. Copeland

BY McKemble Hall.

ATTORNEY

UNITED STATES PATENT OFFICE.

CHARLES W. COPELAND, OF BROOKLYN, NEW YORK.

PUMPING SYSTEM FOR SURFACE-CONDENSERS.

SPECIFICATION forming part of Letters Patent No. 273,965, dated March 13, 1883.

Application filed March 25, 1882. (No model.)

To all whom it may concern:

Be it known that I, CHARLES W. COPELAND, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented a certain Improvement in Pumping Systems for Surface-Condensers, of which the following is a specification.

The air-pump and the water-circulating pump of a steam-engine using surface-condensation are ordinarily driven from the same source of power, and a separate and independent steam-cylinder is frequently employed for that purpose. Both pumps in either of these arrangements, and in any similar arrangement, are necessarily driven at the same relative speed, and it sometimes occurs in the changes involved, more particularly in ocean navigation, that the conditions under which the two pumps are operated are so altered that they will require different adjustments to keep them working together at the best rate for each of them and for the best aggregate result. If the air-pump should be driven at the most advantageous velocity, so far as it alone may be concerned, the circulating-pump may be at the same time sending too great quantity of water through the condenser, and not only wasting the power, but causing the feed to be returned to the boiler much colder than is desirable. On the other hand, if the speed be reduced to meet the conditions of the feed, the air-pump will not be worked to the best advantage. The usual practice in such cases is to regulate the circulation by a valve in the suction of the circulating-pump; but this expedient involves disadvantages of its own, as the contraction of the suction, although it lessens the delivery, may increase the labor of the pump.

My invention relates to this class of combined pumps; and it has for its object the regulation of the circulating-pump in such a manner that its work may be perfectly adjusted, and that the power applied will be in proportion only to the amount of work done, with but the slight variation due to friction.

A pump constructed with my improvement may be driven at a high speed or the speed required for the air-pump, and the delivery reduced to a minimum by an open communication between the opposite sides of the piston, the only power wasted in such circumstances being that due to the passage of the water from end to end of the pump-cylinder. The air-pump may be driven at the most advantageous speed, and the water-pump may be regulated to secure the best result with the speed, without imposing useless work upon the pumping machinery, whether it be an independent engine or otherwise.

To enable others skilled in the art to which it appertains to make and use my invention, I will proceed to describe its construction and operation, with reference to the drawings, which represent a horizontal arrangement of pumps worked by an independent steam-cylinder.

The invention may be applied in a similar manner to vertical pumps, or to those worked by connections from the main engine.

Figures 1 and 2 are respectively an elevation and a plan of an independent combination of a steam-cylinder, A, an air-pump, B, and a circulating-pump, C, all placed in the same line on practically the same piston-rod *a a*.

In Fig. 2 the circulating-pump is represented in section, to show the passage *c*, that is cast on the side of the pump to connect the two ends, the opening of the passage being regulated by the adjustable valve *d*. When the valve is closed the pump will be permitted to do its full amount of work, and when the valve is open the water is simply passed from end to end of the pump, so that the adjustment of the valve fully regulates the circulation without throwing materially more work upon the pump than is required to accomplish its purpose of circulating the water through the condenser.

Fig. 3 represents a circulating-pump, partly in section, and a method of adapting the improvement to a pump already constructed. The pipe *c* connects the ends of the pump, and the opening is regulated by the valve *d*. The same end may be accomplished by valves in the delivery valve-chest, communicating with the pump-chamber, with the openings regulated in any of the ordinary ways, so that the

passage of the water through the condenser may be regulated within the capacity of the pump.

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

In a pumping system for surface-condensers, the combination of an air and a water pump driven by the same motor, the latter provided with a circulating-passage having a controlling valve, substantially as shown, whereby the two pumps may be operated at the speed required by the air-pump to effect its work and the water delivered to the condenser in quantity to meet the requirements of the boiler-feed.

CHAS. W. COPELAND.

Witnesses:
HARRY CRASKE,
WM. KEMBLE HALL.