No. 10,897. PATENTED MAY 9, 1854.

A. M. SPRAGUE.

ADJUSTABLE FLUE BOTTOM OF STEAM BOILERS.

Fig. 1.

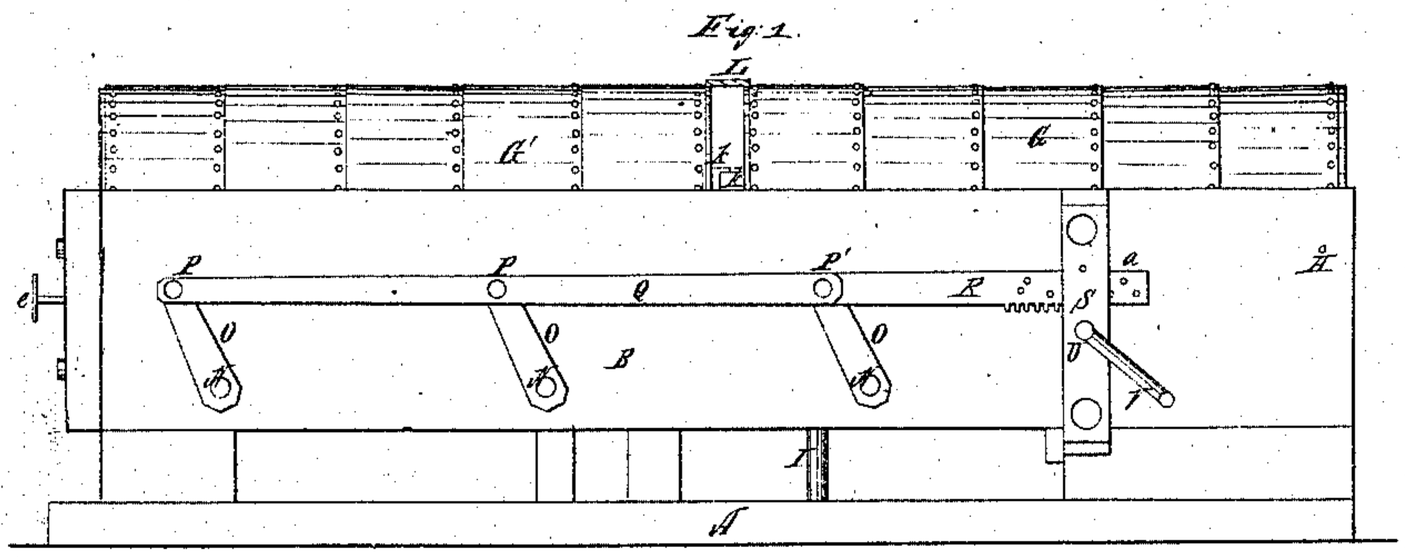


Fig. 2.

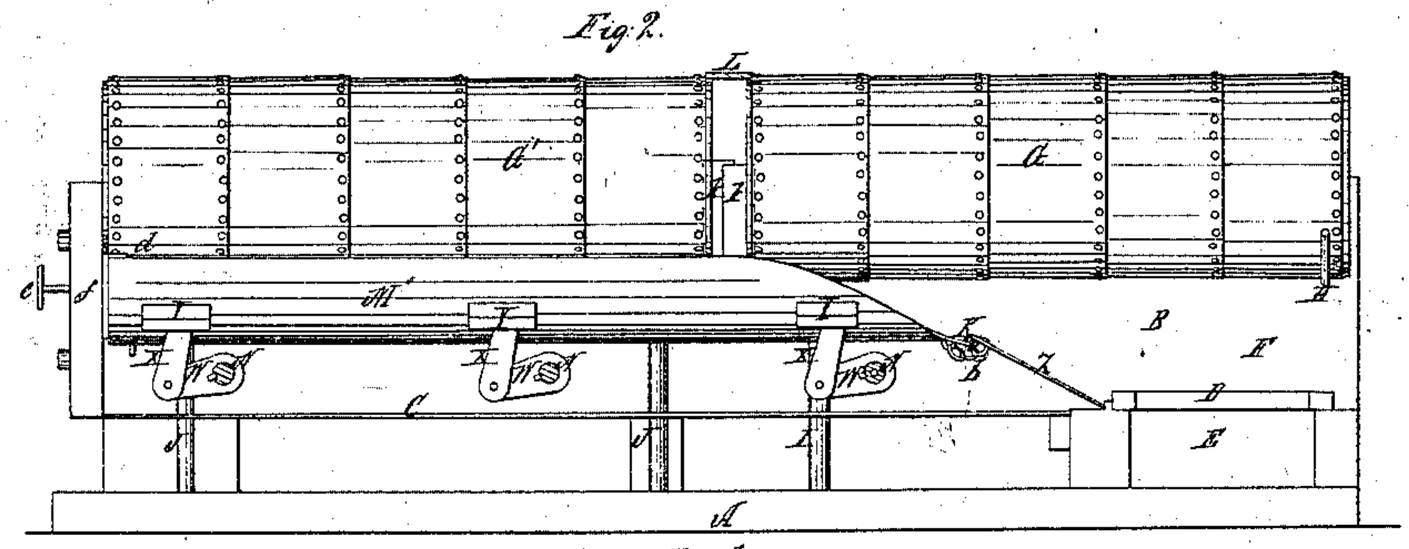
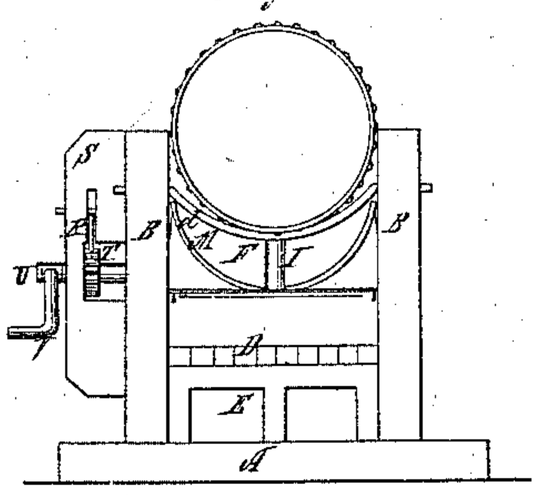


Fig. 3.



Witnesses:
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UNITED STATES PATENT OFFICE.

ALEXANDER M. SPRAGUE, OF MOBILE, ALABAMA.

ADJUSTABLE FLUE-BOTTOM OF STEAM-BOILERS.

Specification of Letters Patent No. 10,897, dated May 9, 1854.

To all whom it may concern:

Be it known that I, ALEXANDER M. SPRAGUE, of the city and county of Mobile, in the State of Alabama, have invented certain new and useful Improvements in the Flues of Furnaces for Steam-Boilers; and I do hereby declare that the same are described and represented in the following specifications and drawings.

To enable others skilled in the art to make and use my improvements I will proceed to describe their construction and use, referring to the drawings, in which the same letters indicate like parts in each of the figures.

Figure 1, is an elevation of a furnace and boilers. Fig. 2, is an elevation with the side of the furnace omitted to show the interior. Fig. 3, is an elevation of one end.

The adjustable bottom M may be made in the form represented or in such other form as may be desirable, and fitted to the space in the furnace under the boiler or boilers and beyond the grate, and perforated for the standards I and J J, and arranged so as to be raised and lowered with facility by such apparatus as may be provided for that purpose. There are two or more shafts N N fitted to turn in appropriate bearings in the sides of the furnace, and of sufficient length to extend through one side and allow the ends of the arms O, O, to be fastened upon them, as represented, each of which arms is provided with a pivot P, P′, to which the bar Q is fitted, so as to operate all the rock shafts N N at the same time. To operate these rock shafts a rack R is provided and fitted to traverse in the bracket S, fastened to the side of the furnace, when it is acted upon by the pinion T, upon the shaft U, fitted to turn in the bracket S and the side of the furnace, and is operated by the hand winch or lever V. Each of the shafts N N is provided with two arms, such as are represented at W W, which arms carry the supports X X, connected to them as represented, which supports extend up into scores in the brackets Y Y fastened to the adjustable bottom M, so as to raise and lower it as the shafts N N are turned by traversing the rack R, as above described, which rack may be retained in the desired position by inserting a pin in one of the holes, as shown at *a*.

The adjustable bottom M should be made to correspond or nearly so with the bottom of the boiler or boilers as represented in Fig. 3, and the end toward the grate may be made straight across and bent up, as represented at K, Fig. 2, so that the upper end of the inclined vibrating piece or bridge Z, may hook onto it, as represented, and it may be further secured by the links *b*, as represented or otherwise. The lower end of the piece Z rests and traverses upon the bottom of the furnace just beyond the grate as the bottom M is raised or lowered, as above described, to adjust the space between the bottom M and the boilers to suit the kind of fuel being burned in the furnace. As the adjustable bottom M may expand and contract, so as to leave a space at the back end of the furnace, a piece of sheet-iron *d* may be bent and laid on the bottom M and a slot cut in the bottom for the end of the rod *e*, which extends through the back end of the furnace *f* and is bent at right angles and passes through a hole in the plate *d* and the slot in the bottom M, so that the plate *d* may be pulled against the wall, so as to close the space by drawing the rod *e* when necessary. The bottom M and the plate Z may be covered with a layer of fire or other brick.

It is apparent from the foregoing description that my improvements enable the engineer to vary the space or flue under the boiler through which the flame passes and adapt it to the state of his fire or the kind of fuel he is burning, whenever he pleases, by turning the shaft U, as heretofore described, for if the fuel which he is consuming produces a large volume of flame a large space under the boilers will be required for its escape; but if the fuel is inferior and produces but a small volume of flame he can reduce the space under the boiler by raising the movable bottom and adapt it to the volume of flame produced, so as to generate the most steam possible by the fuel consumed, and thereby make a saving in the quantity of fuel consumed.

I contemplate that the improvements made by myself may be modified in various ways by skilful engineers and adapted to the various circumstances under which they are used without departing from the principles or merits of the improvements I have invented; also, that the adjustable bottom may be used to advantage under permanent or land boilers; also that instead of the adjustable bottom above described a series of flame gates may be arranged about six feet apart on the

permanent bottom C, so that they can be raised by the engineer, so as to compel the flame to pass close to and in contact with the boiler as it passes over each of these gates in succession. The tops of these gates may be made to correspond, or nearly so, with the bottom of the boiler, and they may be made of soap-stone or fire-brick or of iron faced with soap-stone or fire-brick or of such other material as will answer the purpose.

My improvements are peculiarly and particularly adapted to and for the boats navigating the long rivers on the American continent, where the kind of fuel is changed several times a day or once in a few hours, for a boat at New Orleans may have a supply of fat pine wood and as she ascends the Mississippi river she may get the following kinds of wood and coal: Cotton-wood, hackberry, ash, oak, beech, and bituminous coal. Besides the wood may be either dry or seasoned or fresh cut and green, so that there may be a great loss in burning it without my improvements above described.

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

1. The movable adjustable bottom of the flue space under the boiler or boilers, so constructed and arranged that it may be raised and lowered or adjusted to graduate the size of the flue under the boiler or boilers and adapt such flue to the kind of fuel used substantially as described for the purposes set forth.

2. I also claim in connection with the above-mentioned movable adjustable bottom, the inclined vibrating piece or bridge Z or its equivalent so constructed and arranged that it will operate with the bottom M and conduct the flame from the furnace into the flue under the boilers substantially as described.

ALEXANDER M. SPRAGUE.

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