(No Model.)

E. BEARD.

CONDENSER.

No. 466,213. Patented Dec. 29, 1891.

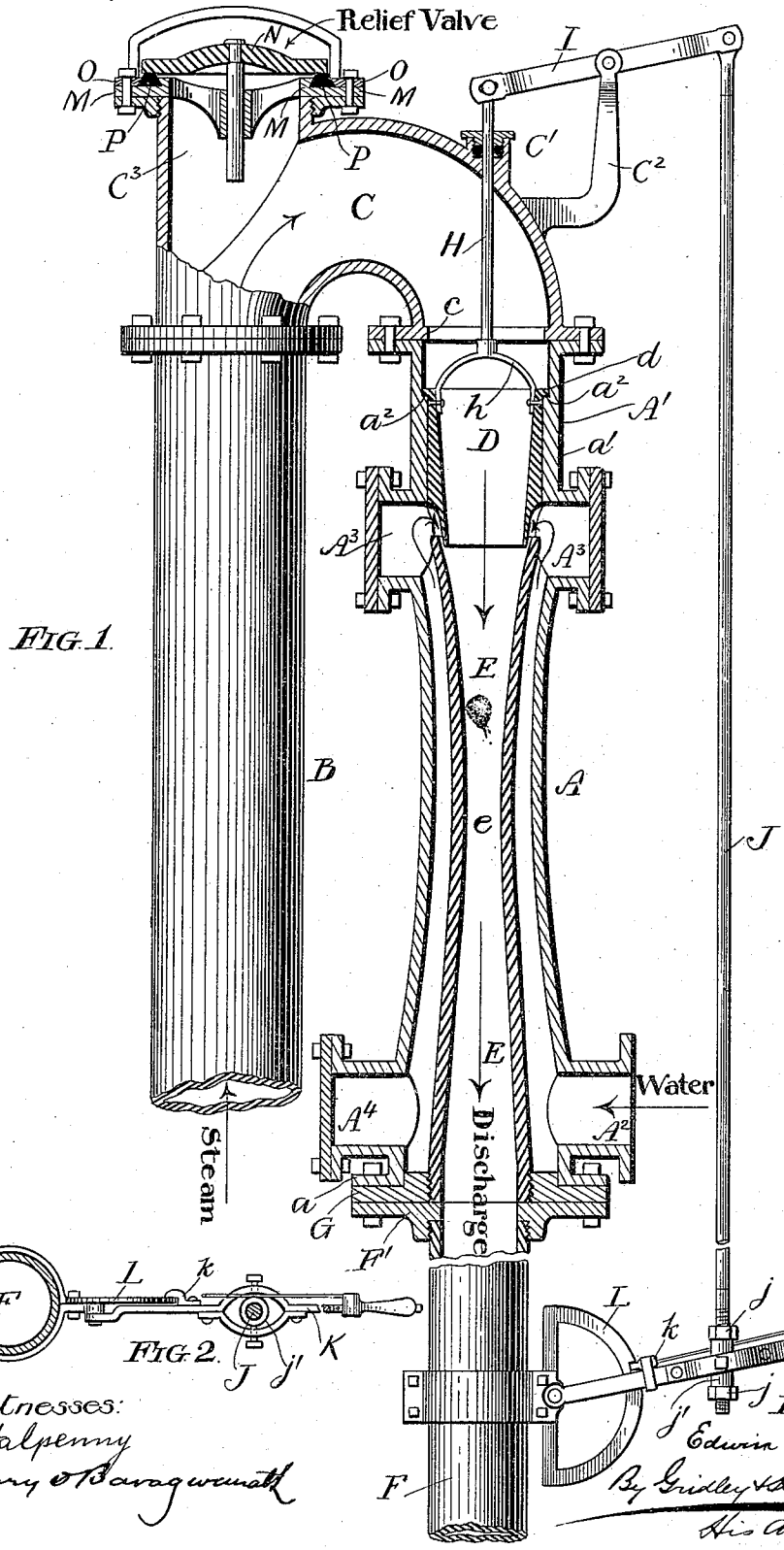

FIG. 1.

FIG. 2.

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CONDENSER.

SPECIFICATION forming part of Letters Patent No. 466,213, dated December 29, 1891.

Application filed September 4, 1891. Serial No. 404,797. (No model.)

To all whom it may concern:

Be it known that I, EDWIN BEARD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Condensers, of which the following is a specification, reference being had to the accompanying drawings, which are made a part thereof, and in which—

Figure 1 is a sectional elevation of the improved condenser and its accessories. Fig. 2 is a horizontal section of the discharge-pipe on the line 2 2, the parts below the plane of the section being shown in plan.

The present invention consists in certain features of novelty, that are particularly pointed out in the claims hereinafter.

Referring to the drawings, A represents the outer shell or jacket of the condenser; B, the exhaust-steam pipe; C, a U-coupling uniting their ends; D, the steam-nozzle; E, the condensing-pipe, and F the discharge-pipe. The condensing-pipe is situated within the jacket A and has its lower end screwed into or otherwise suitably secured to a ring G, which is bolted to a flange *a* on the lower end of the jacket. The same bolts secure to said flange a second ring F′, to which is secured the upper end of the discharge-pipe, the lower end of which dips into the hot-well, the latter being situated at a level thirty-four feet below the top of the condenser for a reason that is fully understood by those skilled in the art. The condensing-pipe is preferably formed with a contracted throat *e* and with flaring ends. The steam-nozzle, when in operative position, projects slightly into the upper end of the condensing-pipe, sufficient space being left between them to admit the volume of water necessary for thoroughly condensing the steam.

Condensers have heretofore been constructed with a steam-nozzle and condensing-pipe adjustable relatively to each other for the purpose of regulating the capacity of the water-passage. An object of the present invention is to provide means for quickly enlarging the water-passage and again reducing it to normal size, so as to permit obstructions to be swept away without breaking the vacuum. I desire to have it understood, however, that in its broadest sense my invention is not limited to any particular means for accomplishing this result; but I recommend the arrangement shown in the drawings, and will now proceed to describe it.

In order to confine the nozzle D to a strictly rectilinear movement it is formed with parallel exterior sides, and the upper part A′ of the shell is formed, as at *a′*, with a corresponding bore, in which the nozzle fits. Above the bore *a′* the shell is counterbored to form a shoulder a^2, which engages a flange *d* on the nozzle and forms a stop for limiting the movement of the latter toward the condensing-pipe. The opening in the adjacent end of the coupling C is less in diameter than the counterbore, thereby producing a shoulder *c*, which forms a stop for limiting the movement of the nozzle away from the condensing-pipe.

H is a rod connected to the nozzle by means of a bail *h* and passing out through a stuffing-box C′ on the coupling C.

I is a lever fulcrumed to an arm C^2 and having one of its ends connected to the rod H by a slot and pin.

J is a second rod having its upper end connected to the upper end of lever I, and K is a hand-lever to which the lower end of rod J is connected. Should the annular water-passage become clogged a downward movement of the hand-lever K would draw the nozzle away from the condensing-pipe, thereby greatly enlarging the annular water-passage and permitting the obstructing matter to be swept on by the inrushing water, while a return movement of the lever would restore the nozzle to its former position. These movements can be made so quickly that the vacuum is not broken, as the stop a^2 already described will insure a return of the nozzle to the exact position from which it was moved. The stop a^2 is operative only when the nozzle is so adjusted as to leave a space of minimum size for the passage of the water, as shown in the drawings. When it is adjusted for a larger space, (by means presently described,) it is arrested and held at its proper place by means of a spring-dog *k*, carried by the lever

K and engaging a single stop-notch formed in a segment L, arranged concentric with the center of movement of the lever.

In order to adjust the nozzle D so as to increase the size of the water-passage it is only necessary to shorten the connection between the nozzle and the stop that arrests its movement toward the pipe E. To this end I prefer to thread the rod J for the reception of a pair of nuts *j j*, between which is confined a loose collar *j'*, to which the hand-lever K is swiveled. Assuming the parts to be in the positions shown in the drawings, if it be desired to increase the size of the water-passage by moving the nozzle farther away from the condenser-pipe E, it is simply necessary to turn the nuts *j j* farther onto the rod J. I do not, however, confine myself to either of the two devices shown and described for limiting the movement of the nozzle, nor to the means shown and described for adjusting its position, as there are many other ways of accomplishing these results that will readily suggest themselves to those skilled in the art. Another simple and effective way of accomplishing both would be to place an adjustable nut directly on the rod H at such a point that it will come in contact with the stuffing-box or other part when the nozzle is in the desired position.

One or more (preferably two) hand-holes A^3 are provided at the top and one A^4 at the bottom of the jacket for affording access to the interior thereof for inspecting, cleaning, repairing, &c. The bottom portion of the water-space X is of greater area than the annular water-passage, and hence the said space will act as a settling-chamber in which foreign substances will be precipitated and from which they may be removed through the hand-hole A^4. In the drawings I have shown the water-inlet A^2 communicating with the water-space very near the bottom thereof; but it is not necessary that this should be so.

On the top side of the coupling C, opposite the exhaust-steam pipe B, is a short branch or hub C^3, to which is secured a ring M, which constitutes the seat for the relief-valve N. Around the outside of the seat proper the ring M is rabbeted and an undercut groove is formed in the resulting shoulder. To this rabbeted portion is secured a second ring O, whose inner and under corner is beveled off, so that a dovetail groove is left between the ring O and the shoulder on ring M. In this groove is placed a rubber packing-ring P, of corresponding shape in cross-section and of sufficient thickness to project slightly above the face of the valve-seat. The packing is thus held very firmly in place.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. In a condenser, the combination, with a steam-nozzle and a condensing-pipe, of a water-jacket surrounding said pipe and leaving between them a water-space of sufficient capacity to act as a settling-chamber, a space for the passage of water from said water-jacket to the interior of the condensing-pipe, said space being of less capacity than the space between the water-jacket and condensing-pipe, and an opening in the water-jacket for removing sediment therefrom, substantially as set forth.

2. In a condenser, the combination, with the steam-nozzle and condensing-pipe, of the water-jacket A, surrounding said condensing-pipe and having the inlet A^2 at bottom and the hand-holes A^3 and A^4 at top and bottom, respectively, substantially as set forth.

3. In a condenser, the combination, with a condensing-pipe, of a steam-nozzle arranged opposite and movable toward and from the end of said pipe, a stop for limiting the movement of said nozzle toward said pipe, so as to maintain a space between them for the passage of water, and means for supplying water, substantially as set forth.

4. The combination, with the condensing-pipe E and means for supplying water, of the movable nozzle D, situated opposite said pipe, a stop for limiting the movement of said nozzle toward said pipe, the rod H, connected to said nozzle, and means for operating said rod, substantially as set forth.

5. The combination, with the pipe E and means for supplying water, of the movable nozzle D, the rod H, connected thereto, the hand-lever K, connections between said rod and lever, and a stop for limiting the movement of the lever, substantially as set forth.

6. The combination, with the pipe E and means for supplying water, of the movable nozzle D, a hand-lever, a stop for limiting the movement of said hand-lever, and adjustable connections between the nozzle and lever, substantially as set forth.

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