G. BECK.

Nozzles for the Escape of Steam or Gases under Pressure.

No. 207,384. Patented Aug. 27, 1878.

Fig. 3.

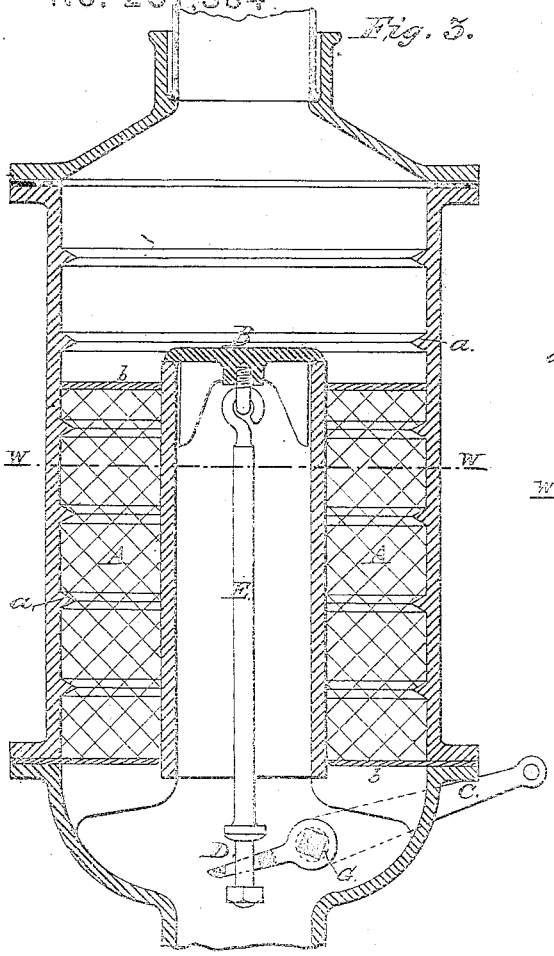


Fig. 1.

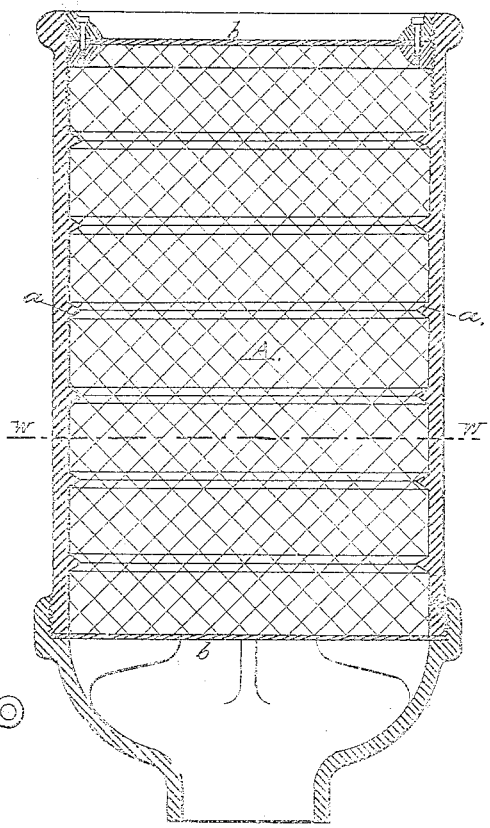


Fig. 2.

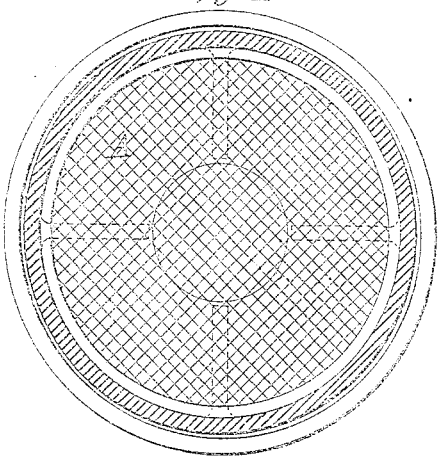
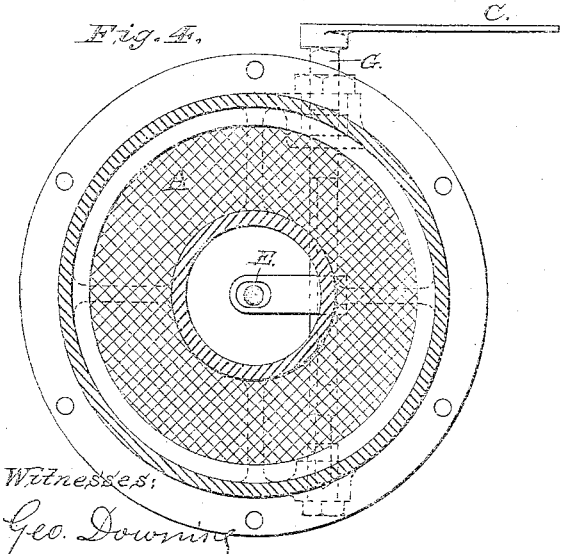


Fig. 4.



Witnesses;

Geo. Downing

Geo, Forbes.

Inventor:

Geo. Beck.

UNITED STATES PATENT OFFICE.

GEORGE BECK, OF LONDON, ENGLAND, ASSIGNOR TO PHILIP SYNG JUSTICE, OF SAME PLACE.

IMPROVEMENT IN NOZZLES FOR THE ESCAPE OF STEAM OR GASES UNDER PRESSURE.

Specification forming part of Letters Patent No. **207,384**, dated August 27, 1878; application filed December 10, 1877.

To all whom it may concern:

Be it known that I, GEORGE BECK, of Devonshire street, Queen's Square, London, in the county of Middlesex, in that part of the United Kingdom called England, have invented new and useful Improvements in Nozzles for the Escape of Steam or Gases under Pressure, which improvements are fully set forth in the following specification, reference being had to the accompanying drawings.

This invention consists in employing an apparatus through which steam and gases under pressure shall be forced to pass, in their efforts to escape into the open air or any other place provided for them, without such escape being accompanied by the usual puffing and roaring noise; and where such escaping steam and gas are used as a means of creating a draft in the smoke-funnel to induce quick combustion this apparatus creates a more uniform and regular draft than can be obtained by the introduction of the exhaust-steam pipe with a cramped exit, as is usually employed, which, giving only intermittent puffs of great force, is apt to eject cinders and coals from the smoke-box of the engines employing it, while by the use of this apparatus it will be found that cinders and incandescent matter are not liable to be jerked or shot out from the smoke-chamber or fire-box, thus forming also a most perfect spark-arrester for high-pressure engines, such as locomotive, portable, and traction engines.

To produce the desirable results just described I provide a suitable chamber, of metal or other material, and preferably of cylindrical form, varying in size according to the pressure of steam or gas to be passed through it as well as the volume of the same. This chamber is provided with an inlet and an outlet opening for the steam or gas. Near to and between these openings I secure metallic gratings or screens, of wire *b* or pierced plates, and the space between these gratings, screens, or pierced plates I fill with small particles of glass, metal, stone, or any suitable material, and preferably of a spherical form. These materials may be either solid or pierced with small holes like beads, and the chamber may be filled or partly filled by them, according to the result sought, for the greater the quantity and the smaller the size of the particles in the chamber the less will be the noise of the escaping steam or gas; but the back pressure will be proportionately increased if extremes of quantity or minuteness of size be reached.

I am careful to provide sufficient area in all my chambers to allow a free escape of the steam through the metallic gratings or pierced plates, so that no back pressure may arise, except what is due to the passage of the steam or gas through the contained material in the chamber, and this I reduce to a minimum point by graduating the size of the material and the quantity used to the result which may be desired if it be an almost quiet discharge without regard to back pressure of a few pounds, or if it be a reasonable quieting of the noise with a minimum amount of back pressure.

I have found chambers varying in their internal diameter from three inches to eight inches, and from six to ten inches in length, to be good working sizes for discharging steam quietly from pipes varying from three-fourths to one and one-half inch, and having a pressure of ten to thirty pounds, respectively, and that spheres of glass or round beads varying from one-eighth inch to three-eighths give very good results, both as to quieting and back pressure, when properly proportioned to the boiler-pressure and volume to be discharged. I have also found that clusters of chambers, either connected or separate, may sometimes be more advantageously used in discharging large volumes of steam quickly than by one single and large chamber.

If it be deemed advisable to arrange one of my quieting-chambers at the base of a discharge steam-pipe, as in steam ships or vessels, by or through which the boiler-steam may be discharged quickly, I have found an annular chamber, as shown in Fig. 3, to be a convenient arrangement. This chamber may have horizontal ribs *a* projecting from its sides, as shown, to prevent the steam in its escape from creeping close to the wall of the chamber, and thus cause more noise in its escape than if forced to pass more entirely through the interstices of the contained particles. The cham-

ber may also be divided by vertical walls with similar ribs projecting horizontally from their sides.

Figure 1 shows the usual form of my quieting-nozzle.

Fig. 2 shows a plan of Fig. 1 on line W.

Fig. 3 shows an annular chamber, A, with central valve B arranged to be discharged by hand with lever C, pawl D, and rod E by rotating rocker-shaft G, the central valve B to be loaded, so as only to lift when the back pressure from the contained material in the annular chamber A is too great to permit the steam to pass freely through the chamber, when the roaring noise will disclose the fact. The cross-lines in Figs. 1 and 3 indicate the space for the contained material which is to be placed in the chambers.

Fig. 4 is a plan of annular chamber A.

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

1. The construction of metallic or other suitable chambers or nozzles, as hereinbefore described, of any suitable form, filled or partially filled with loose particles of glass, stone, metal, or other similar materials that are not readily perishable by the action of steam upon them, to be used in quieting or suppressing the noisy roar of steam or gases when the same are forced to pass through such chambers or nozzles of contained material, substantially as described.

2. In an exhaust-nozzle or quieting-chamber, the combination of the chamber A-A, having the central valve B, the annular ribs *a*, and the gratings or screens, and filled with glass, metal, or other equivalent material, substantially as shown and described.

GEORGE BECK.

Witnesses:
GEO. DOWNING,
GEO. FORBES.