

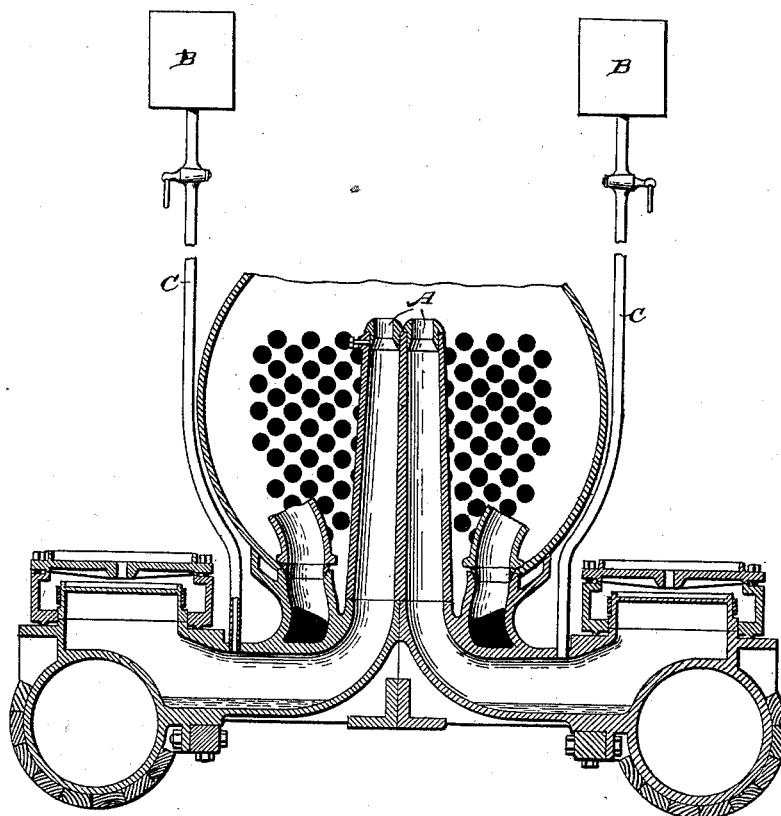
(No Model.)

J. Y. SMITH.
METHOD OF PROTECTING BLAST OR EXHAUST PIPES FOR LOCOMOTIVE
BOILERS.

No. 423,283.

Patented Mar. 11, 1890.

Fig. 1.



Witnesses
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UNITED STATES PATENT OFFICE.

JOHN Y. SMITH, OF DOYLESTOWN, PENNSYLVANIA, ASSIGNOR TO THE
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METHOD OF PROTECTING BLAST OR EXHAUST PIPES FOR LOCOMOTIVE-BOILERS.

SPECIFICATION forming part of Letters Patent No. 423,283, dated March 11, 1890.

Application filed November 13, 1889. Serial No. 330,191. (No model.)

To all whom it may concern:

Be it known that I, JOHN Y. SMITH, of Doylestown, in the county of Bucks and State of Pennsylvania, have invented a certain new and useful Improved Method of Protecting Blast and Exhaust Pipes for Locomotive-Boilers and Effecting the Removal of Deposits Therefrom; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming a part of this specification, and to the letters of reference marked thereon.

My present invention relates more particularly to improvements in the working of that class of steam-operated blast or exhaust apparatus wherein steam charged more or less with oil, grease, or other like lubricating materials is employed as the motive power for producing or inducing the draft. An example of such an apparatus is found in the ordinary exhaust apparatus used on locomotive and other boilers for inducing a draft through the furnace, wherein the exhaust-steam from the cylinders is discharged through a nozzle or blast-pipe. In the accompanying drawing this form of apparatus is shown merely as exemplifying one mode of applying my invention in practice.

The figure is a transverse vertical section through a portion of an ordinary blast or exhaust apparatus.

It is a well-known fact that in operating the ordinary blast apparatus the discharge orifice or nozzle soon becomes obstructed and sometimes almost entirely closed by a coating or deposit which forms upon the metal at or in the immediate vicinity of the discharge orifice or orifices. This deposit or coating is composed largely of oil or fatty matters mingled with soot, ashes, &c., the whole baked or burned into a solid compact material firmly attached by the metal and partially or wholly filling the steam space or passage. The primary cause for the formation of this obstructing coating I have traced to the presence of oil, grease, or like material employed for lubricating purposes in the cylinder, and carried by the exhaust-steam into the discharge pipe or nozzle, upon the wall of which it is deposited and adheres.

The discharge pipe or nozzle A is usually located within the smoke-box at the forward end of the boiler, and being exposed to the direct action of the products of combustion it is highly heated, more especially at the upper or discharge end and when the discharge of steam through the blast apparatus is interrupted. The oil, grease, or other lubricating material, being carried up and deposited upon the surface of the pipe or nozzle, together with dust, soot, and other materials which become incorporated therewith or adhere thereto, is baked or burned by the intense heat to which it is subjected, and is formed into a hard coating, strongly adhering to the surface of the passage. The coating thus produced continues to increase in thickness as the action is continued, until finally the passage is reduced to such an extent as to prevent the free escape of the exhaust-steam, thereby not only diminishing the blast, but also producing back-pressure in the cylinders. At such time it becomes necessary to remove the apparatus and either replace it with a new one or remove the deposits, which latter operation is usually performed by the aid of a hammer and cold-chisel, or by placing the pipe in a forge fire and exposing it to the action of a high degree of heat until the coating is burned to cinders, when it is scraped off.

Now the principal object of my present invention is to prevent the formation of this obstructing coating, or, if formed, to effect its removal without detaching the blast-pipe, and this I accomplish by introducing into the steam-passage an agent or material which will attack or combine with the lubricant, and so change or alter their composition as to prevent them from forming the smooth adherent water-repellent coating, or be capable of being burned or baked, as before, when subjected to heat at the end of the blast-pipe. The agents preferably employed are the strong alkalies—such, for example, as caustic potash or soda, or others similar or equivalent chemicals which will attack the lubricant and render it non-adhesive or soluble in water.

The best mode of practicing the invention is to introduce the agent for acting upon the lubricant into the steam-passage between the

exhaust-port of the cylinder and the blast-pipe, so that it will be caught or acted upon by the exhaust-steam and be brought into contact with the particles of oil or other lubricating material carried by the steam or deposited along the passage, thereby producing an intimate contact and incorporation of the lubricant and alkali or other equivalent agent employed for reducing the lubricant.

When caustic soda or equivalent chemicals are employed, they may be introduced into the steam-passage in a variety of forms and conditions. Thus the crystals may be placed in the passage and dissolved there, or the alkali reduced to powder and injected into the steam, or, in the preferred plan, a solution of the material may be prepared and fed at intervals into the exhaust-passage, either by flowing or forcing the liquid in regulated quantities automatically or at will, or by introducing it in the form of jets or spray.

In the illustration given I have shown a receptacle B for containing the solution, with a pipe C controlled by a valve and opening into the exhaust-pipe *d* at or near the valve-chest, so that as the solution is fed in it will be acted on by the exhaust-steam, and not only be diffused through the latter, but dashed against the walls of the passage, and thus be brought into contact with the particles of the lubricant drawn from the cylinders and valve-chests by the escaping steam.

Under some conditions it is advantageous to maintain a supply of the solution in the exhaust-passage, where it will be acted upon and dashed about both by the motion of the engine and the blasts of steam discharged through the exhaust-ports, thus cleansing the lining or inner surface of the exhaust-passage, as well as the blast-pipe, of adherent particles of oil.

When caustic alkali is employed for rendering the lubricant inoperative to produce the obstructing coating at the mouth of the blast-pipe, it is applied under conditions favorable to saponification—that is to say, the alkali and grease are thoroughly combined and mingled in the presence of heat and moisture, and the lubricant is thereby wholly or partially changed from a water-repellent substance into one more or less soluble in water, and hence capable of being acted upon and removed by the steam and hot water discharged through the apparatus.

The quantity and quality of the alkali solution may of course be varied to suit special conditions, and the mode or manner of introducing the material into the exhaust-passage and of effecting the thorough min-

gling of the materials may also be varied, as hereinbefore explained; hence I do not wish to be understood as limiting myself in these particulars, as the gist of my invention consists in the introduction into the exhaust-steam passage of any of the known agents for acting upon the lubricant carried by the steam in a manner to prevent or retard its adhesion to the blast-pipe and the formation of the obstructing coating thereon, and to facilitate its removal from the exhaust-passage and pipe or pipes by the action of the steam or steam and water.

Having thus described my invention, what I claim as new is—

1. The hereinbefore-described improved mode of protecting blast pipes or nozzles and preventing the formation of deposits thereon, which consists in introducing into the exhaust-passage a chemical agent, such as described, capable of acting upon the lubricant carried by the steam to prevent the permanent adhesion or lodgment of said lubricant within or upon the blast pipe or nozzle, substantially as and for the purpose specified.

2. The hereinbefore-described improved mode or process of protecting blast pipes or nozzles through which exhaust-steam is discharged by preventing the adhesion or facilitating the removal of the lubricants carried by the steam in contact with the walls of the passage, which consists in subjecting the lubricant to the action of an alkali in the exhaust-passage, as and for the purpose set forth.

3. The hereinbefore-described improved mode or process of clearing or protecting the blast pipes or nozzles of exhaust or blast apparatus from deposits, which consists in feeding or introducing caustic alkali into the exhaust-passage and causing the same to be mingled or brought intimately in contact with the lubricants carried by the exhaust-steam during the passage of the latter through the exhaust-passage and before reaching the nozzle, substantially as and for the purpose specified.

4. The hereinbefore-described improved mode or process of protecting blast pipes or nozzles from deposits such as described, the same consisting in converting or changing the character of the lubricants carried by the exhaust-steam during their passage through the exhaust-passages by the introduction of chemical agents having an affinity for the lubricants, substantially as and for the purpose set forth.

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Witnesses:

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