W. G. WILSON.

SILENCER.

APPLICATION FILED NOV. 1, 1917.

1,313,971.

Patented Aug. 26, 1919.

2 SHEETS—SHEET 1.

Fig. 1

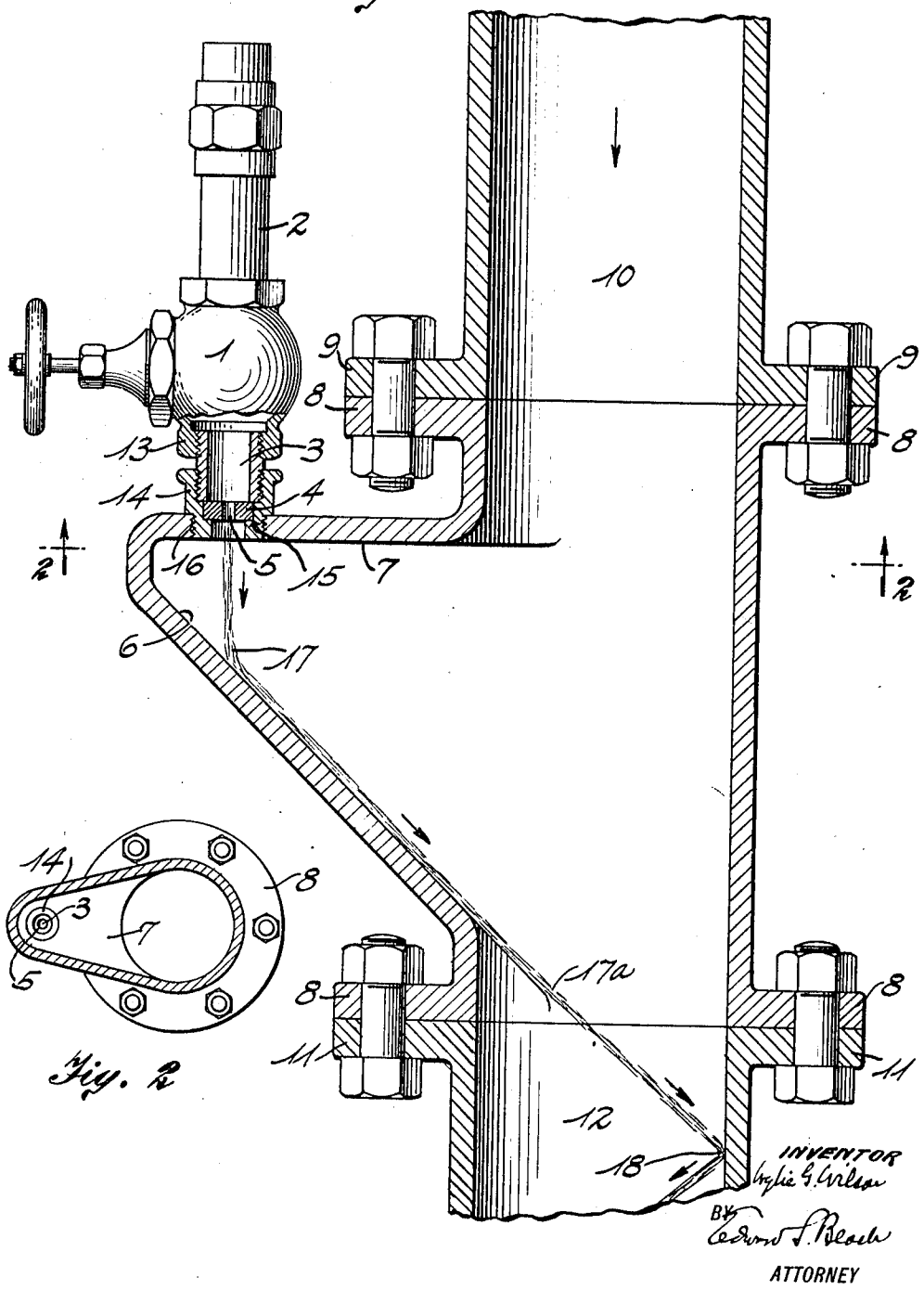


Fig. 2

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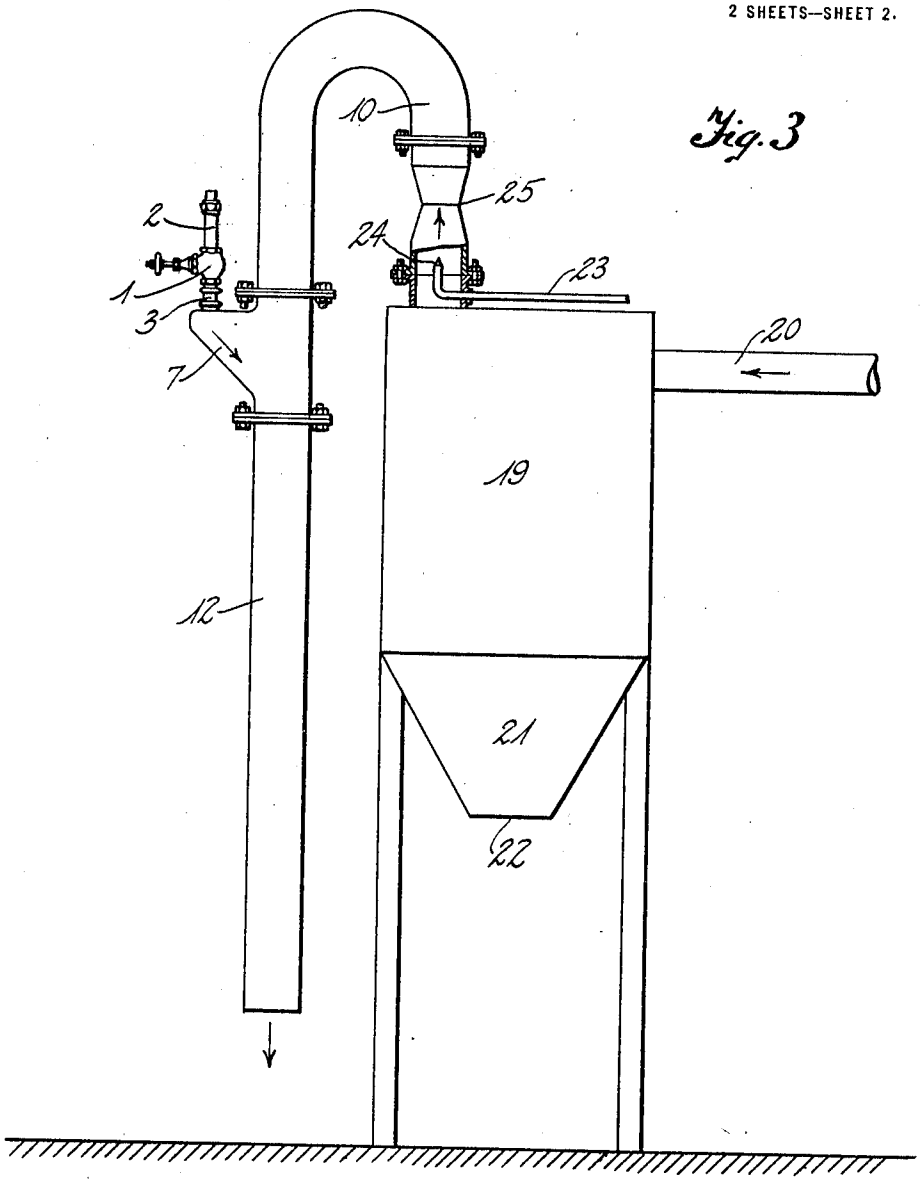
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Fig. 3



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UNITED STATES PATENT OFFICE.

WYLIE G. WILSON, OF ELIZABETH, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO EVERLASTING VALVE CO., A CORPORATION OF NEW JERSEY.

SILENCER.

1,313,971. Specification of Letters Patent. Patented Aug. 26, 1919.

Application filed November 1, 1917. Serial No. 199,636.

To all whom it may concern:

Be it known that I, WYLIE G. WILSON, a subject of the King of Great Britain, residing at Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Silencers, of which the following is a specification.

This invention is an improvement in silencers for silencing the great and objectionable noise and roar often heard for considerable distances from steam conduits, such for example as from ordinary ash-conveyer or other steam-jet vacuum-producing and air-moving installations.

In the accompanying drawings forming a part of this invention and illustrating the principle of my invention in one of many forms, but on the whole in the best form now known to me,

Figure 1 is a vertical sectional view of my new silencer interposed between sections of a steam conduit that may be a steam conduit in an ash conveyer. The view shows a water pipe and valve coupled to the silencer and shows a stream of water introduced into the steam path within the steam conduit.

Fig. 2 is a cross-sectional view (looking up and on a reduced scale) of the silencer, the view being taken at line 2—2 of Fig. 1.

Fig. 3 is a vertical sectional view of a common form of ash-conveyer installation provided with my invention.

In the drawings, the water valve 1 is connected on its intake side with a conduit 2 for water. A tubular coupling 3 forms the eduction tube of the valve. The tube is partially choked by a centrally perforated disk 4, the water discharge hole 5 through which is opposed to the downwardly slanting wall 6 of the silencer casing 7 which has laterally of the wall 6 alined open ends surrounded by flanged ends 8. The upper end is bolted to the flange 9 of a steam conduit section 10, and the under flange 8 is bolted to the flange 11 of another section 12 of the steam conduit, the chamber of the silencer casing forming an interposed connecting conduit for the two steam conduit sections. The water pipe, silencer and steam conduit sections are shown in an upstanding position with the water hole 5 above the slanting wall 6 of the silencer. In the particular form shown the wall 13 of the eduction opening of the water valve is interiorly threaded for connection with the upper end of the tubular coupling 3, the lower end of which is exteriorly threaded for connection with the tubular coupling 14 having an interior annular shoulder 15 between which and the under end of the coupling 3, the disk 4 is held. The under end of coupling 14 is threaded at 16 into a hole in the top wall of casing 7.

Assuming a steam current for effecting movement of a load of ash, for example, to be flowing downwardly in the steam conduit as indicated by the arrow in Fig. 1, and that the objectionable noise and roar may not occur, the water valve is opened or kept open during operation, so that a stream 17 of water may flow on the slanting wall 6 and thence downwardly toward the under section 12. The water stream or jet spreads over the inclined surface of the slanting wall 6 and flows as a curtain across the steam path as at 17^a to the wall 18 opposite the wall 17 and causes such condensation of the steam as to silence the noise heretofore occasioned by the steam when issuing into the open atmosphere or into any place in which the steam suddenly expands into low pressure.

That the introduction of water into the path of a steam current of noise-creating velocity in steam-jet vacuum-producing and air-moving installations, will silence the noise resulting from issuing steam that suddenly expands is my discovery; and the apparatus shown is one of many readily conceivable forms of devices for effecting the noise-silencing result following the introduction of a steam-condensing volume of water into the path of escaping steam.

In Fig. 3 I show a typical ash-conveyer installation wherein the ash-receiving tank 19 is located vertically on upright posts anchored in the ground. Such tanks commonly are from fifteen to twenty feet in length, and from ten to fourteen feet in diameter, and usually have their under ash-discharge ends located from eight to ten feet above the ground. The tank is supplied through the ash-conveyer pipe 20 which is commonly eight inches in diameter and always communicates with the ash tank near the top of the latter. As is well known in the art of pneumatic conveyance of solids by a vacuum system, the conveyer pipe indicated by 20 in this case is open to

the atmosphere at its intake end, air from the free atmosphere flowing into the conveyer pipe together with the entrant material. The tank bottom is usually conoidal as indicated at 21, the smaller central opening of such bottom being provided with a gate 22 by opening which the tank is discharged. The in-feed of the ashes is effected by means of a steam-jet pipe 23 coming from a source of steam under pressure and having a constricted upturned discharge-nozzle 24 within the escape or exhaust steam pipe 10 which leads from the top of the tank. This pipe is constricted at 25 slightly above the nozzle 24 to form in connection with the nozzle a vacuum-producing air-ejector structure. The discharge end of the exhaust pipe 10 is commonly, but not necessarily, open to the atmosphere. The flow of steam through the nozzle 24 into the constricted portion 25 of the pipe 10 effects partial vacuumizing of the tank, and the ashes are thereby caused to flow through the pipe 20 into the tank. Such or analogous installations comprising steam plants and steam-jet vacuum-forming and air-moving installations are numerous for moving ashes and other waste materials in various manufacturing plants; and the roar and noise resulting from the steam escape from the discharge or exhaust pipe of the plants, such as the pipe 10 or the pipe 12, very often constitute a public nuisance, may be made the subject of municipal regulations and of litigation, and can be very often heard for many miles.

The construction and mode of operation of my described apparatus are such that the steam, air, water, vapor or dust not only escape silently, but escape without any practical back-pressure in the apparatus. Any excessive back pressure therein would stop the working of the apparatus and elimination of undue back pressure is an essential feature of the construction and mode of operation of apparatus embodying the present invention.

Prior to my invention I am not aware that anyone has produced a device for stopping such noise successfully, although some inventors have attempted to solve the problem.

What I claim is:

In apparatus for silencing the noise of escaping steam from apparatus for pneumatic conveyance of ashes and other comminuted solid material, the combination of a vacuum tank for reception of ashes or other comminuted solids; for such solids a conveyer pipe the discharge end of which communicates with an upper portion of the tank whereby the conveyed solids gravitate on their discharge into the tank chamber, such tank chamber being open to the atmosphere through said conveyer pipe; a steam and air escape pipe communicating with the upper portion of the tank and having its discharge end positioned to effect discharge of contained water, vapor, air or dust without substantial back pressure in such pipe; a steam supply pipe communicating with a steam-jet-creating device located in the path of air escaping from the tank into the steam escape pipe, the steam jet operating to create a partial vacuum in the tank for effecting a movement of air through the conveyer pipe into the tank and from the tank into and through the steam-escape pipe; and for the steam-escape pipe a device constructed and operating to introduce a steam-condensing volume of water into the path of the steam flowing through said steam-escape pipe whereby the escaping steam is partially condensed and escapes without practically objectionable noise.

In testimony whereof I have hereunto set my hand this 18th day of October, 1917.

WYLIE G. WILSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."