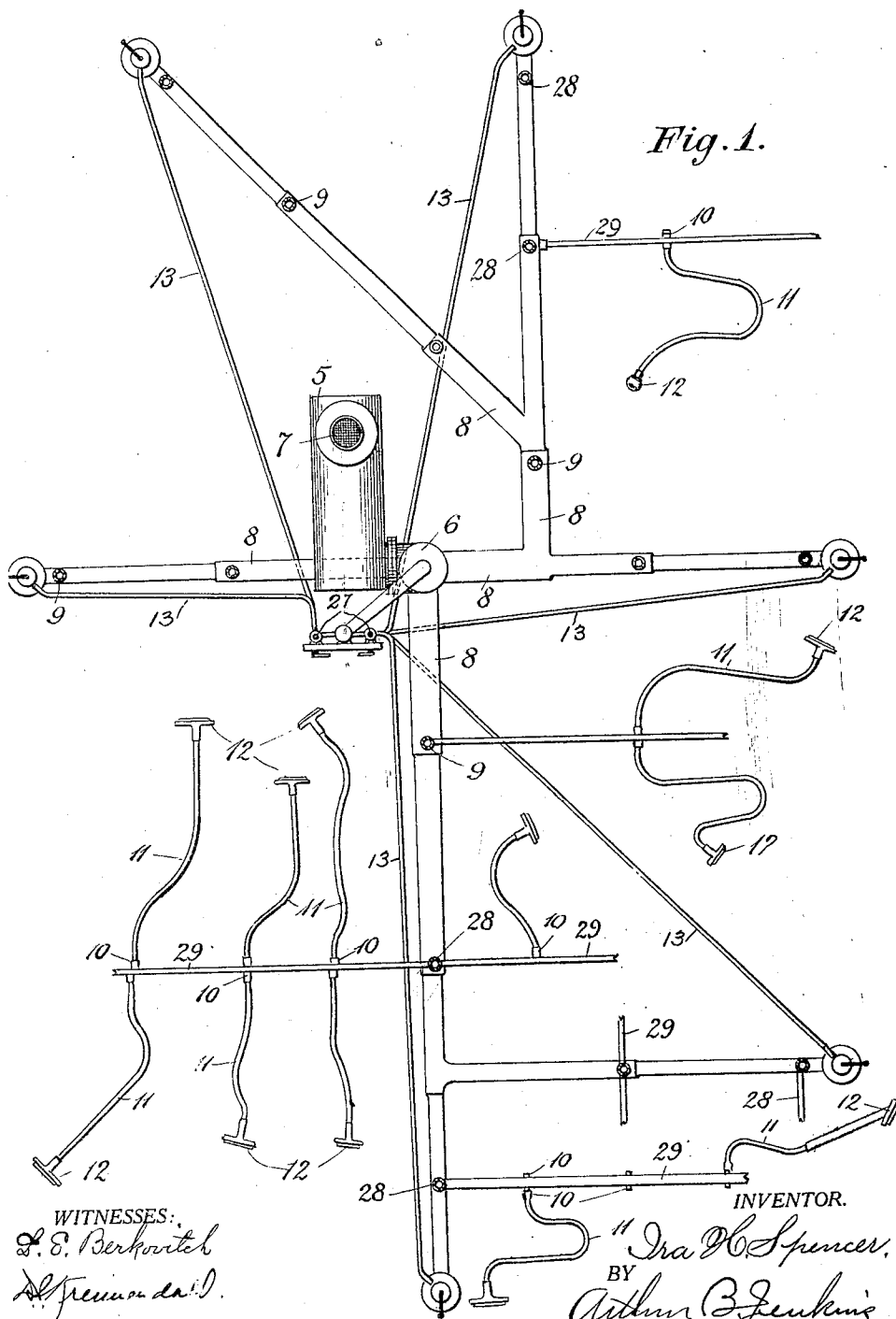


I. H. SPENCER.
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 APPLICATION FILED JAN. 30, 1908.

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Patented Dec. 10, 1912.

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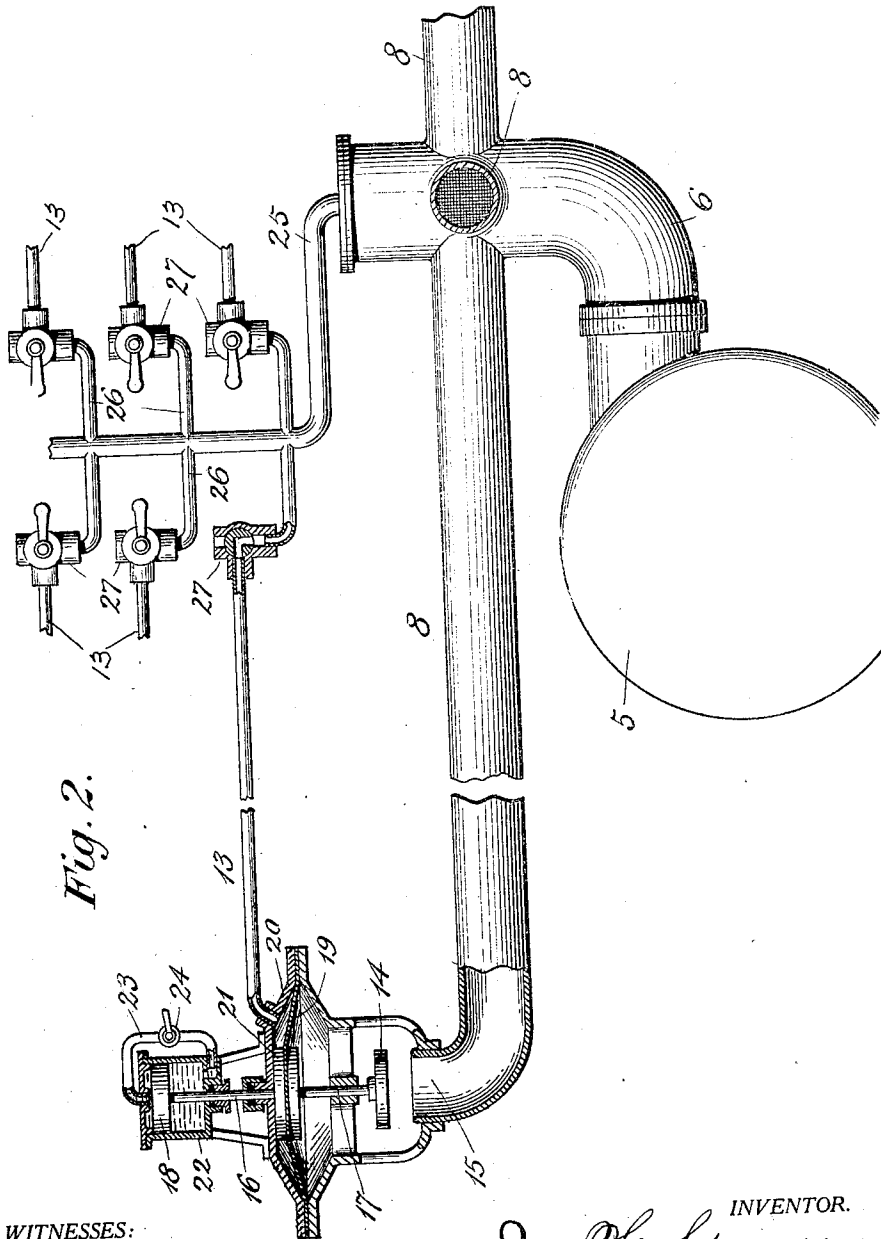


Fig. 2.

WITNESSES:

L. S. Berkovich
 J. H. Spencer

INVENTOR.

Ira H. Spencer,
 BY
 Arthur B. Jenkins,
 ATTORNEY.

UNITED STATES PATENT OFFICE.

IRA H. SPENCER, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE SPENCER TURBINE CLEANER COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT.

MEANS FOR CLEARING THE PIPES OF PNEUMATIC SYSTEMS.

1,046,884.

Specification of Letters Patent.

Patented Dec. 10, 1912.

Application filed January 30, 1908. Serial No. 413,396.

To all whom it may concern:

Be it known that I, IRA H. SPENCER, a citizen of the United States, and a resident of Hartford, in the county of Hartford and State of Connecticut, have invented new and Improved Means for Clearing the Pipes of Pneumatic Systems, of which the following is a specification.

My invention relates to the class of devices specified, and the object of my invention among others is to provide a device of this class in which the system may be kept clear from obstruction or from which obstruction may be readily removed.

One form of apparatus in the use of which the objects sought may be attained is illustrated in the accompanying drawings, in which—

Figure 1 is a diagrammatic view illustrating the arrangement of my improved apparatus. Fig. 2 is a view, scale enlarged, of a structure illustrating the operation of the apparatus.

In the accompanying drawings the numeral 5 illustrates a device for creating a flow of air, and my invention finding ready application in connection with pneumatic cleaning apparatus in which a suction is produced at the intake of cleaning tools, for the purpose of facilitating the description this device may be considered as a pneumatic exhauster of any approved form and will be hereinafter referred to as a pump the representation being that of a turbine exhauster. This pump has an inlet to which an inlet pipe or tube 6 is connected, and an outlet 7 which may discharge into any suitable receiver, chimney or like structure.

My invention is especially applicable in a cleaning system in which the tubes extend for a considerable distance in different directions, as where installed in very large buildings, in railroad yards for the purpose of cleaning the interior of cars and their contents, and in other like places.

The numeral 8 denotes the mains connected with the inlet pipe 6. These mains are arranged in any desired manner as to relative location and are of proper size throughout their length or different portions of their length to properly perform the function required.

In approved forms of construction an

area in cross-section will be given to the pipes in proportion to the number of branches connected with the mains.

The numeral 9 denotes branches extending from the main 8, and these branches are provided with hose connections 10 for attachment of a hose 11, each containing at its outer end a cleaning tool 12. These branches are provided with such suitable number of hose connections as will adapt the system for the special purpose to which it is to be put.

The mains and branches are proportioned as to size in cross-section to permit the flow of a current of air to enable the proper operation of all of the cleaning tools connected therewith. It will, therefore, be seen that when all of the cleaning tools connected with a certain main are in operation the volume of air passing through the main will be much larger and the flow faster than in cases where a less number of the cleaning tools are in operation, as in the latter instance much less air can gain access through the smaller number of cleaning tools in operation. It has been found that when a few of the cleaning tools only are in operation, owing to this comparatively sluggish movement of the air current, the heavier particles of dirt with which the air is impregnated as a result of the cleaning operation, will settle to the lower levels within the pipe, which will thus gradually become obstructed, should the cleaning operation with the comparatively small number of tools continue for a sufficient length of time, which result is liable to occur in any system. This obstruction to the pipes would eventually become so great as to seriously impair, if not entirely obstruct, the efficiency of the mains, by checking the movement of the air currents therethrough. It has, therefore, been found desirable to provide some means for preventing this obstruction to the mains, and as they extend in various directions and at considerable distances from the pump, the means for preventing obstruction should be centrally located.

To this end I have provided a device having the requisites above set out, such a device, in the form illustrated herein, including auxiliary pipes 13 suitably connected with the pump 5. At the end of each main or at such other location as will an-

5 swer the purpose, a flushing valve 14, closing a vent opening 15 to the main is located. Each valve is so arranged that it may be operated by a movement of air through the
 10 auxiliary pipes 13, the latter being supplied preferably one to each main or a branch when such may be required. Each valve has a stem 16 extending through a guide 17 and bearing a piston 18. Each stem is connected
 15 to a diaphragm 19 located in a shell 20. A weight 21 may be employed, if desired, to assist in the closing movement of each valve, and as shown in Fig. 2, this weight may be in two pieces clamping the diaphragm 19
 20 between them. Each piston 18 is located in a cylinder 22, the whole forming a dashpot arrangement for regulating the rate of movement of the flushing valve 14, especially in its closing movement. A by-pass
 25 23 establishes communication between the chambers in each cylinder on opposite sides of the piston, and a by-pass valve 24 may be employed to control the movement of fluid through the by-pass. By this construction the rate of movement of the piston
 30 may be changed to suit various conditions which may arise. Any suitable means, however, may be employed in lieu of the dash-pot for regulating and controlling the closing movement of the flushing valves 14. Such a regulator is desirable for the reason
 35 that when the force which has opened a valve is released the suction created by the pump would cause such valve to close suddenly and the consequent shock would be liable to rupture the pipes or injure other parts of the apparatus.

40 The auxiliary pipes 13 extending from the valve mechanisms appurtenant to each of the mains lead preferably to valve operating mechanism which is interposed between the valve and the pump 5. Each of the pipes 13, as shown, extends to this valve operator, which includes a valve operator tube 25 extending into the inlet pipe 6. This valve operator tube 25 has branches 26 connected therewith in which operating valves
 45 27 are located. These operating valves 27 are collectively arranged in a position preferably near the pump 5, and as shown in Fig. 2. This arrangement may resemble something the form of a switch-board used in electrical apparatus. The valve shown in section is in its open position, the remainder
 50 of the valves being closed.

55 The numeral 28 indicates a stand-pipe which may rise from the end of a main, or from any portion thereof, as within a building, and branches 29 may extend from this stand-pipe to different parts of different floors or stories in the building.

60 It will be noted that in an apparatus as herein shown and described the different mains and branches of a system may be readily cleared of an accumulated mass of

65 dirt or like material in a ready and efficient manner. The operating valves being all located in proximity to the pump the operator may observe the action of the clearing operation upon the pump and thus be ready
 70 to regulate such clearing action so that injury to the pump will not result. The pipes may be cleaned out at regularly stated intervals and within a short space of time, thus insuring at all times the effective operation
 75 of all parts of the system.

80 Should a separate device for operating the flushing valves and located at a distance from the pump be employed, there would be danger that a flushing valve might inadvertently be left open. This would cause ineffective operation of all of the branches connected with that main at least and would impair the efficiency of the whole system, and the only way in which the open valve could
 85 be located would be by actually finding such valve, which might in a large and widely extending system consume a great deal of time.

90 By my improved device the flushing valves may be readily operated as hereinbefore described from a single location, the closing of such valves is insured, and this closing movement is regulated to such extent as to prevent injury to the apparatus.

95 I claim:—

1. In a pneumatic apparatus, a main flow pipe, a device for creating flow of a current of air for carrying purposes through said main, which has an opening at a distance from said current creating device, a valve to
 100 control said opening, pneumatically operated means for opening and closing said valve, said means being constructed to act under the force normally in the flow creating device, an auxiliary pipe connecting said
 105 pneumatically operated means with said current creating device, and a valve located in said auxiliary pipe in proximity to said current creating device to control the movement of said valve.

110 2. In a pneumatic apparatus, a plural number of mains having openings at one end, a device for producing flow of air currents through said mains and connected therewith at the end opposite said openings,
 115 a valve for controlling each of said openings, pneumatically operated mechanism for operating said valves, said mechanism being constructed to act under the force normally in the flow producing device, a plural number of auxiliary pipes each connected with the pneumatically operated device, a common return pipe connected with said device for producing air currents, said return pipe
 120 extending between the ends of said auxiliary pipes that branch therefrom.

125 3. In a pneumatic apparatus, a plural number of mains each having an opening at one end, a device for producing air currents connected with the opposite ends of said

5 mains, a valve for controlling each of said openings, a pneumatically operated device for operating the valves, said device being constructed to act under the force normally
10 in the current producing device, a common return pipe connected with said device for creating the flow of air currents, auxiliary pipes extending from said pneumatically actuated apparatus and entering said
15 common return pipe on diametrically opposite sides thereof, and valves located in said auxiliary pipes on opposite sides of said
20 common return pipe.

4. In a pneumatic system including a pipe with means for creating flow of a current of
15 air therethrough, said pipe having an opening therein, a valve for closing the opening into said pipe, means for preventing forcible
closing of the valve, an auxiliary pipe connected with the current producing apparatus, 20
and means for creating flow of air through said auxiliary pipe.

IRA H. SPENCER.

Witnesses:

ARTHUR P. DAY,
MAY C. CARROLL.