

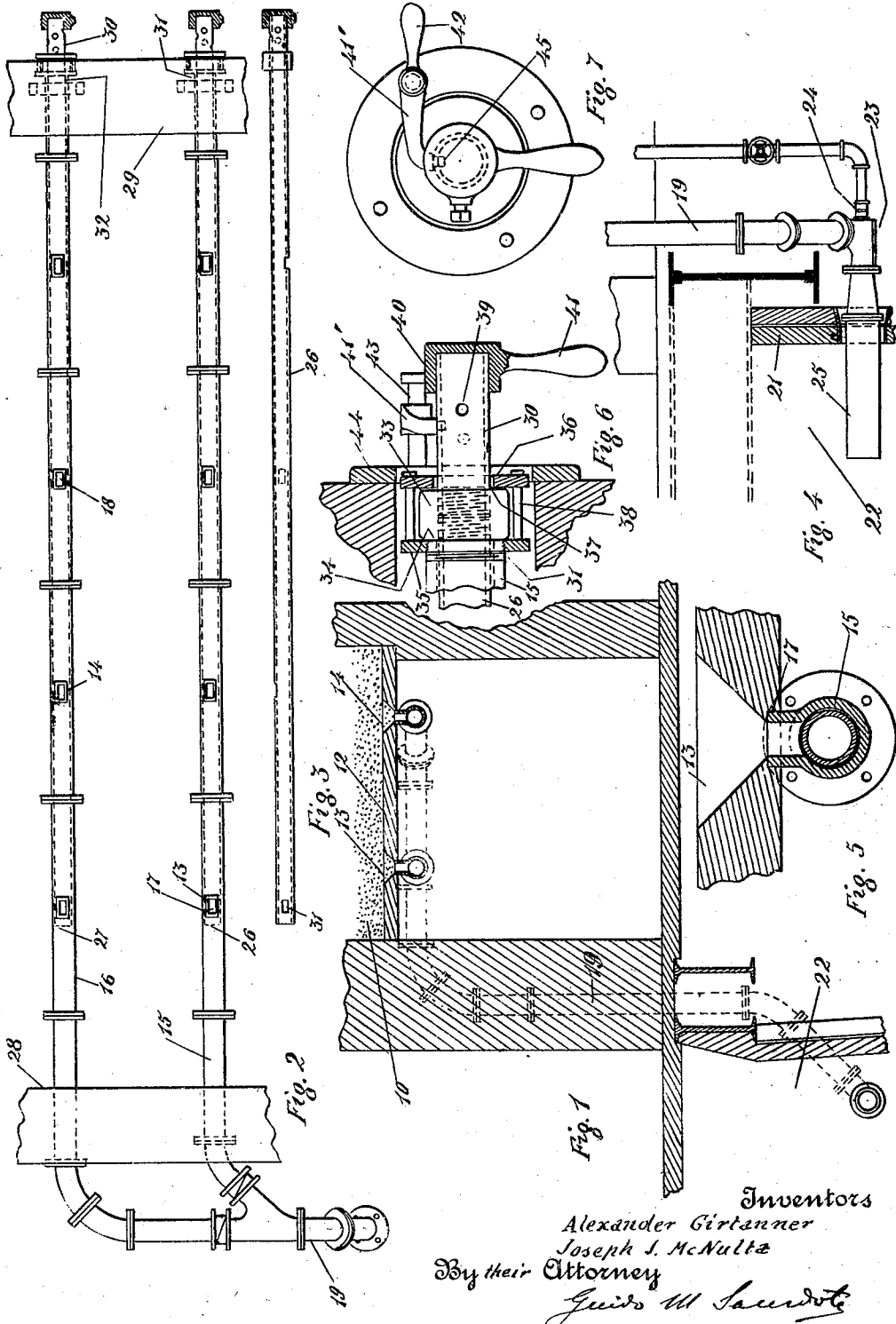
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A. GIRTANNER ET AL

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SOOT REMOVING SYSTEM

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Inventors
Alexander Girtanner
Joseph J. McNulta
By their Attorney
Guider W. Saundt

UNITED STATES PATENT OFFICE

ALEXANDER GIRTANNER, OF NEW YORK, N. Y., AND JOSEPH J. McNULTA, OF SUMMIT, NEW JERSEY, ASSIGNORS TO GIRTANNER ENGINEERING CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

SOOT-REMOVING SYSTEM

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This invention relates to improvements in dust collecting systems and more particularly to an improved selective suction arrangement, whereby soot, ashes and other materials in pulverized form may be removed by suction at different points as may be required, maintaining the full efficiency of the apparatus at all times.

The primary object of this invention is to provide a novel and improved system of selective control, whereby one or another inlet to the conveying system may be instantly rendered operative or inoperative at will.

Another object of our invention is to provide a simple and efficient arrangement for the selective control of a plurality of inlets leading to a dust collecting system, whereby one or another of said inlets may be connected to or disconnected from the system in a simple manner, calculated to maintain the full efficiency of the system at all times by limiting the inlet area to a predetermined maximum.

Another object of this invention is to provide a device of a simple and improved design, particularly adapted for the removal of soot, dust and other materials in finely divided form from pockets and other parts of boilers along the path of the products of combustion where these materials in pulverized form are likely to collect.

With these and other objects in view as will more fully appear as the description proceeds, this invention also comprises certain novel and improved constructions and arrangements of parts as will be fully described and claimed in the appended claims.

The drawings specifically illustrate an embodiment of our invention as applied for the removal of soot from boilers; but as stated, it is understood that the inventive idea may be extended to other applications of kindred nature, such as the removal of ashes, grain conveying, sand blast apparatus, etc.

It is well known that the efficiency of dust collecting systems, where suction is employed to collect dust and other materials in minute form is intimately related to the total amount of active suction area of the various

inlets operative at any one time. The means employed for creating the suction in the system, will of course, have a given capacity measured in cubic inches or feet of air displaced during a given period of time, and it is obvious that the speed at which the air thus induced into the system passes through the various inlets, is substantially inversely proportional to the total area of said inlets.

For the suction action to be effective, it is necessary that a certain low pressure be maintained at all times, especially at the points of inlet, and therefore there are definite limitations which are imposed upon the designer when a given installation is to be figured on.

When the system extends to a number of points, each provided with its inlet or inlets and the total area of these inlets is considerably superior to that permissible by the capacity of the suction apparatus used, it is customary to provide each inlet with means such as a gate valve for closing or opening said inlet; so that only a few inlets at a time may be rendered operative in order to maintain the efficiency of the system.

In other words, installations of this kind are generally not sufficient for continuous operation at all points reached by the system but on the other hand, are sufficient for continuous operation with alternate use of the various points of suction.

The individual control of each inlet by means of valves or other appliances may often require considerable expense. Furthermore, an arrangement of this kind may only be adopted with difficulty when the points at which the inlets are located are not easily accessible or are altogether out of reach. In such cases, therefore, it would be necessary to provide for some method of remote control of each inlet and the cost involved might easily become prohibitive if some simple arrangement is not found.

It is the main object of our present invention to provide just such an arrangement of selective control of a plurality of inlets which is particularly adapted for use in such places which are difficult of access or which are not

within reach of the operator; said arrangement being extremely simple and effective and comprising a single controlling member which may be extended to a point where its operation may conveniently be effected. However, on account of its simplicity and relatively low cost, the arrangement may also be used to advantage at any point in a dust collecting system where a plurality of inlets leading to the same tubular element or branch of a system, are used.

Referring to the drawings,

Fig. 1 is a fragmentary cross sectional view in elevation of a boiler furnace showing an embodiment of our invention applied to the lower part of the combustion chamber;

Fig. 2 is a partly diagrammatic plan view of the suction members and controlling means therefor, extending through the walls and through the entire length of the boiler;

Fig. 3 is a detail plan view of one of the controlling members used;

Fig. 4 is a fragmentary detail side sectional view in elevation of the exhaust end of the soot collecting system;

Fig. 5 is a detail side sectional view in elevation of one of the suction members, as applied in Fig. 1, in an enlarged scale;

Fig. 6 is a detail side sectional view in elevation of the operating end of one of the said suction members, as shown in Fig. 2 in an enlarged scale; and

Fig. 7 is a detail end view thereof.

In said drawings 10 designates the lower part of the combustion chamber of a boiler where dust and soot 11, ordinarily collect in considerable quantities. This space is usually enclosed and difficult of access and furthermore, the temperature is usually such that no work can be performed while the boiler is in operation, except from the outside. The bed 12 of the combustion chamber is accordingly provided with a plurality of funnel shaped outlets which in the present instance are arranged in two longitudinal rows 13, 14. Underneath the bed plate and in register with said two longitudinal rows of outlets, are mounted two tubular suction members 15, 16, provided with inlets 17, 18 arranged in longitudinal series on said tubular members to correspond and register with said outlets as clearly shown in Figs. 2 and 5.

In so far as described, the system merely corresponds to one of ordinary design comprising two tubular suction members each provided with a plurality of inlets which must, of course, be controlled in order to limit the suction area to that which the capacity of the system calls for.

The two suction members 15, 16 lead to a common collector 19, which is directed downwardly and then through the wall 21 of and into the ash pit 22. Suction may, of course, be created in any suitable manner, the obvious way in this case being to use the available

steam under pressure; accordingly, elbow member 23 at the lower end of collector 19 is shown provided with a steam inlet 24 capable of delivering a steam jet right across the lower end of collector 19, co-axial with its side extension 25, leading to the ash pit as described. Steam thus directed under high pressure creates a suction within tube 19 as will be readily understood, causing therefore, loose material 11 to be drawn through those inlets 17, 18 which happen to be operated at any one time.

It is obvious that other means of creating suction can be used, for instance, a fan, in any case where it should be preferable to do so, since the application of our invention is not limited to steam boilers but may also be extended to dust collecting systems of various kinds, as stated.

The salient feature of our invention resides in the method of control of the various inlets leading to the same suction member. As stated, said inlets are arranged in longitudinal series spaced along the entire length of each suction member. Each suction member is provided with a controlling member such as 26 in Fig. 3, which is merely a tube open at its inner end, the outside diameter of which substantially corresponds to the inside diameter of suction members 15, 16. Said suction members extend from one side of the boiler through its wall 28 for the entire length of the combustion chamber and through the opposite wall 29 being open at this end. Controlling members 26, 27 can therefore, be longitudinally inserted into suction members 15, 16 and allowed to project outwardly as at 30 to allow for their being operated by hand. Said controlling members 26, 27 are provided with openings such as 31 which are spaced along said controlling members, to correspond with the longitudinal spacing of inlets 17, 18 of suction members 15, 16, when controlling members 26, 27 are fully inserted in their normal operative position. Said openings 31, however, are not arranged in longitudinal alignment but are angularly spaced in relation to each other, so that the angular adjustment of controlling members 26, 27 determines which inlet or group of inlets is operative at any one time.

In the case illustrated, no two openings 31 of the controlling members are arranged in the same longitudinal alignment and therefore, there is no possibility of rendering more than one of inlets 17, 18 operative at any one time. In other words, controlling members 26, 27 collectively and selectively control all the inlets leading to their respective suction members 15, 16 with but a single control for each controlling member.

Tubular controlling members 26 and 27 are inserted endwise into suction members 15, 16, their ends 31, 32, projecting through

side wall 29 and the transversal alignment of openings 31 to correspond with that of inlets 17, 18 is insured in any suitable manner. A simple arrangement is illustrated in Fig. 6 where it is seen that tubular member 26 has its projecting end 30 formed by a separate piece of tubing, joined to member 26 by means of a bushing connection 33.

The inner face 34 of said connection abuts against the face of a flange 35 mounted upon the extreme end of a suction member 15 when openings 31 correspond in a transverse sense to inlets 17, 18. The inner tube or controlling member 26 is maintained in this position where it may be rotated but is constrained against axial displacement by means of another flange 36, abutting against the outer face 37 of the bushing connection mounted upon flange 35 by means of studs 38, of a suitable length. This arrangement is extremely simple and inexpensive and possesses the advantage of being adapted to be put together by using readily available standard fittings and parts.

Controlling members 26, 27 are operative externally of the boiler through their projecting ends 30 and may be rotated from time to time by angular quantities corresponding to the angular distances between the openings 31. The positioning of the controlling members to insure successive registering of their openings 31 with inlets 17, 18 may be obtained in any suitable manner, the provision of an arrangement to this end being within the province of any ordinary mechanic. However, since simplicity and low cost are essential in this class of devices, we illustrate an arrangement answering both these conditions in a satisfactory manner.

This arrangement is shown in detail in Figs. 6, 7, and merely comprises perforations such as 39, made along the circumference of projecting parts 30 of the controlling members, so that their angular distances will correspond to the angular distances between openings 31. Said openings are preferably arranged along a spiral rather than along a circumference in order not to unduly weaken the section of tubular parts 30.

At the outer end of each of the parts 30, is secured a cap 40 provided with a handle 41 which may be used to rotate the controlling member attached thereto, to its various positions. A suitable stop is provided adapted to interlock with the various openings 39 in order to maintain the controlling member in the angular position in which it has been set. A convenient arrangement is illustrated where 41' designates a lever provided with a handle 42, pivotally mounted upon a stud 43 outwardly projecting from the wall of the boiler or from flange 44 mounted upon said wall. Lever 41' terminates in a plug 45, which is radially directed in relation to extension 30 of the controlling member and

which can enter any opening 39 which may be registering therewith, acting thus as a stop preventing angular motion of the controlling member.

Member 41' may be moved outwardly around its pivot by means of handle 42 to free extension 30 of the controlling member when the same is to be set in a different angular position. If the openings 39 are set in spiral arrangement as shown it is necessary for stud 43 to be sufficiently long to permit axial shifting of lever 41' to the various longitudinal positions occupied by openings 30, as shown.

It is thus seen that by means of this simple arrangement the controlling members are positioned both in a longitudinal and an angular sense to insure correct registering of any one of their openings 31 with their corresponding inlet 17 or 18, so that the suction action may be shifted to any desired point within the range of suction members 15, 16, at a moment's notice. The efficiency of the suction action is maintained at all times because the suction area is always limited to a predetermined maximum, and the difficulty of control of the various inlets at points which cannot otherwise be conveniently reached by the operator, is at the same time removed.

Our invention may be carried into practice in a number of different ways without departing from the inventive idea, and the drawings are therefore merely intended for illustrative purposes and not in a limiting sense; accordingly, we reserve ourselves the right to design and build devices embodying our invention in any way or manner which may enter fairly into the scope of the appended claims.

We claim:

1. The combination with a boiler furnace having an ash pit and a dust collecting chamber of a dust collecting system, comprising a tubular suction member mounted underneath said chamber and provided with a longitudinal series of spaced openings communicating with said chamber, an extension from said suction member leading to said ash pit, means for creating suction within said suction member and for discharging the dust drawn there-through within said hopper, a rotatable tubular controlling member inserted into said suction member, provided with openings adapted to selectively register with the openings of said suction member by rotation of said controlling member, means for longitudinally positioning said controlling member, means for operating the same and means for retaining it in its various angular positions.

2. In a dust collecting system, an open end tubular suction member provided with a longitudinal series of spaced openings, a rotatable controlling tubular member inserted thereinto and projecting from its open end, provided with angularly displaced openings adapted to selectively register with the openings of said suction member by rotation of

said controlling member, a collar on said controlling member abutting against the end of said suction member and a flange associated with said suction member abutting against the outer surface of said collar, preventing axial displacement of said controlling member, an operating member mounted upon the projecting end of said controlling member, and means cooperating with said controlling member for retaining said controlling member in any one of its operative angular positions.

ALEX GIRTANNER.
J. J. McNULTA.