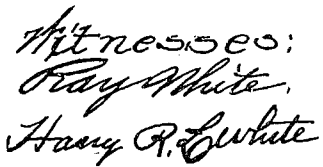


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3 SHEETS—SHEET 1.



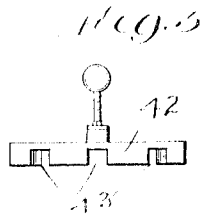
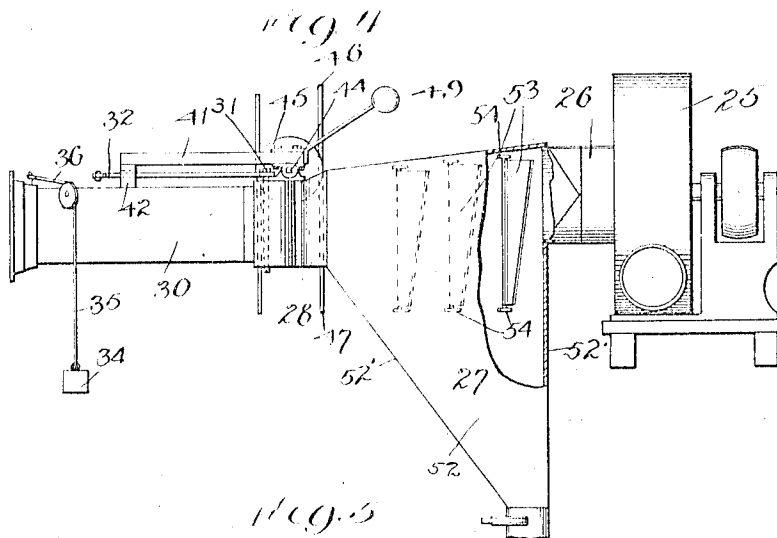
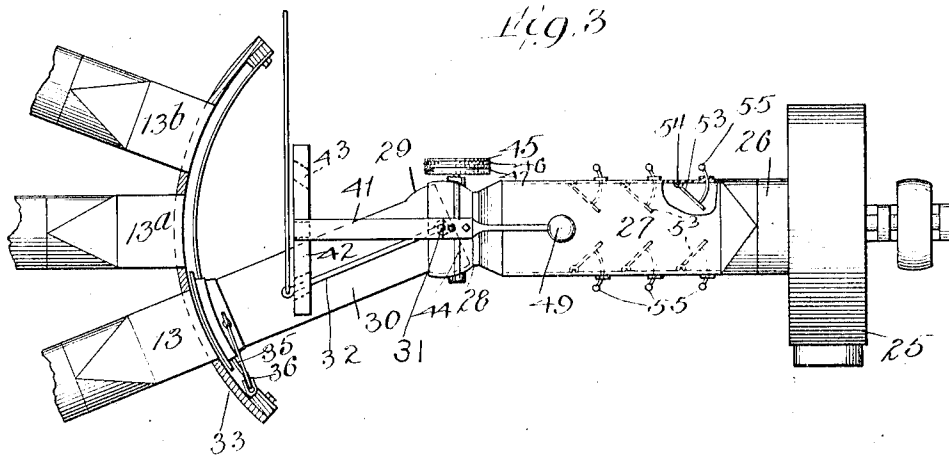
Inventor:
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By George Bain and May Allis

W. E. ALLINGTON.
DUST COLLECTING SYSTEM.
APPLICATION FILED JUNE 22, 1906.

1,048,477.

Patented Dec. 31, 1912.

3 SHEETS-SHEET 2.



Witnesses:
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3 SHEETS-SHEET 3.

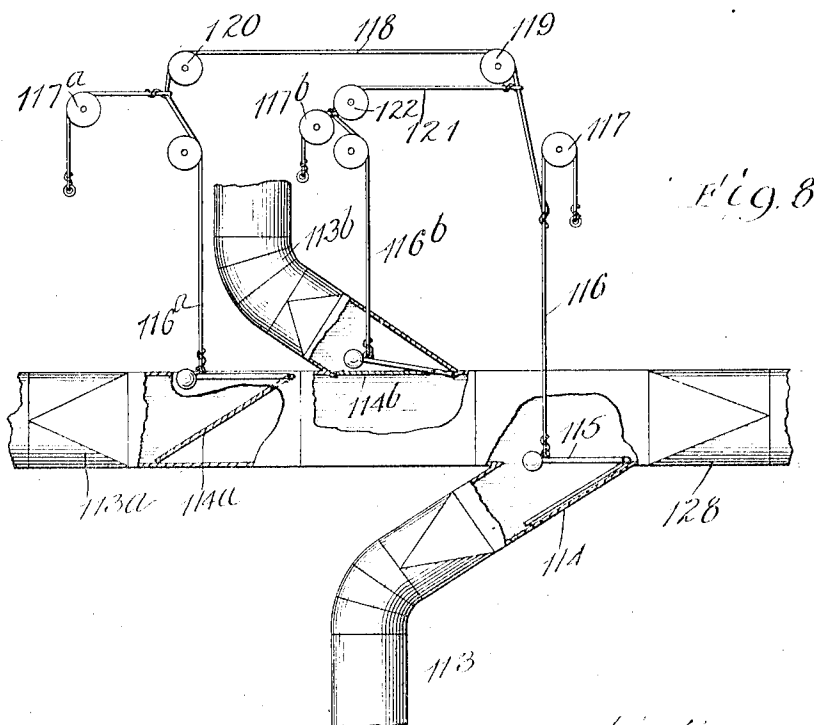


Fig. 8

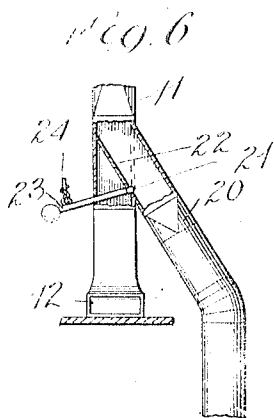


Fig. 6

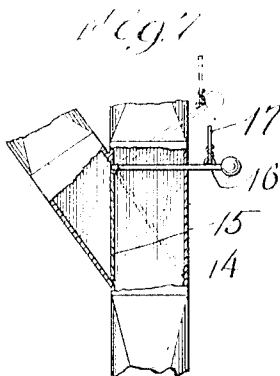


Fig. 7

Witnesses
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UNITED STATES PATENT OFFICE.

WILLIAM E. ALLINGTON, OF SAGINAW, MICHIGAN.

DUST-COLLECTING SYSTEM.

1,048,477.

Specification of Letters Patent. Patented Dec. 31, 1912.

Application filed June 22, 1908. Serial No. 322,820.

To all whom it may concern:

Be it known that I, WILLIAM E. ALLINGTON, a citizen of the United States, residing at Saginaw, in the county of Saginaw and State of Michigan, have invented certain new and useful Improvements in Dust-Collecting Systems, of which the following is a specification.

My invention relates to improvements in dust collecting systems, and has particular reference to systems of dust collection, such as are used for example in keeping clean grain elevators and the like.

Heretofore it has been the practice in grain elevators to install a system for the collection of dust arising from the handling of grain, comprising a number of leads of piping extending to different areas of the building to be cleaned, (for instance to the different floors and galleries of the building,) to effect communication between such leads and a large trunk, of sufficient capacity as to handle the air and material from substantially all of the different leads, and to install a fan and dust-collector of suitable capacity to handle the maximum quantity of air and material which may be supplied through the trunk. Such systems have been found in practice to be open to numerous objections, the most obvious of which is the great size of the fan necessarily used and the large expenditure of power or force necessary to drive the fan. It is true in such a dust collecting installation, that while all of the leads are necessary to secure proper cleaning of the premises, the maximum load imposed upon the system under any normal condition is greatly less than the fan-capacity necessarily provided for such system, so that such a system is operated with great waste of power and lack of economy. Further I have found that such systems readily become clogged and useless, in greater or less degree, for there being open communication between all of the leads and the main trunk at all times, if any one lead starts to clog, the freer air supply from other leads causes the fan to draw harder from such free leads, and thereby reduce the exhausting effect in the choked lead where it is most needed, so that the clogging becomes aggravated until it results in a practical disabling of that branch of the system, and in course of time the whole system is deleteriously affected so that the piping must be manually cleaned.

One of the salient objects of my invention is to provide a system wherein the effective work of cleaning an elevator or like plant may be accomplished by an installation involving a fan of much less capacity for any given size of plant than in the old system, and to provide means for insuring the operative association of the fan with only such lead as may be in practical operation at any given time, so that the full efficiency of the fan may be employed in the transportation of air and material through the operating lead, thereby minimizing the chance of choking any one of the leads.

Another object of my invention is to provide simple means which may be readily operated from any part of the structure, for controlling the communication of the several leads with the fan, and to so arrange said devices that while, under normal conditions, communication is constantly afforded between the fan and that lead wherein activity is most nearly constant, such communication may be interrupted and communication effected between the fan and some other lead.

A yet further object of my invention is to provide a simple and effective device for controlling the communication of the fan with the various leads, and to further provide simple and efficient controlling and locking means therefor.

Other and further objects of my invention will readily become apparent to those skilled in the art from the following description, taken in conjunction with the accompanying drawings, wherein:

Figure 1 is a diagrammatic elevation of a system embodying my invention, shown as applied to a grain elevator. Fig. 2 is a detail view of the controlling cable connection with a movable trunk. Fig. 3 is a plan view, and, Fig. 4 a side elevation, each with parts broken away, of a preferred means for controlling communication between the fan and the piping leads. Fig. 5 is a detail in front elevation of the lock shown in Figs. 3 and 4, Figs. 6 and 7 are enlarged details of valves shown in Fig. 1, and, Fig. 8 is an elevation with parts in section, of a modified embodiment of a part of my invention.

Throughout the drawings like numerals of reference refer always to like parts.

In Fig. 1, I have illustrated the application of my invention to a grain elevator.

building, which comprises, as is usual in grain elevators, a machinery floor, a garner floor, a storage floor, and a distribution floor in the cupola of the building, a belt gallery, leading to the storage house, and the first floor, to and below which extend the elevator flights, or conveyers, terminating in the usual elevator boats. These several floors and an elevator boot I have indicated on the drawings at points designated by their appropriate titles.

It will be understood that it is usual practice to provide in the dust collection system for such buildings an independent suction main or pipe 10 for each floor, or other distinct area to be cleaned, such mains being of substantially the same capacity, and each having communication, through suitable branches 11, with a number of "sweeps" 12, which in my system are open-ended receptacles directly connected with the branch pipes 11, and lying at the floor level, so that dust may be swept from the floor, in cleaning, into the normally open mouths of the sweeps, to be drawn in by the air current flowing through the pipe and conveyed through the dust collection system. Of course the suction main 10 is of proper capacity to handle the supply from all of the branches 11 thereon.

One or more leads 13, 13^a, 13^b, are provided, it being my preference to provide one riser 13^b for all of the suction mains 10 of the cupola, said riser being preferably of substantially the area or capacity of each of the suction mains 10; another lead, 13^a connecting with the belt gallery, and a third lead 13 arranged to connect with the suction main 10 for the first floor, each of the last named leads being of substantially the same capacity as its suction main 10.

Other arrangements in detail may obviously be made to suit conditions of use, it being the general plan of my installation, however, to have each lead, or riser, only of sufficient capacity to take off the air supply from the one suction main 10, a lead being provided from each area so located, or arbitrarily divided, that in cleaning it will be treated as a unit.

Where, as in the cupola, more than one suction main 10 communicates with the riser, I arrange the uppermost main for open communication with the riser and provide at the juncture of each of the lower mains with the riser a suitable valve 14. As best illustrated in detail in Fig. 7, such a valve preferably comprises a valve proper 15, a weighted stem 16, normally holding the valve in position to close the distribution pipe from communication with the riser, and movable to throw the valve to position, as shown in dotted lines in Fig. 7, to open the particular distribution pipe to the riser and cut off communication of the

riser with the distribution pipe normally opening thereto.

For convenience a cable 17, at one end attached to the operating lever 16, of the valve, may be run over a pulley 18 and arranged to be suitably secured, as by attachment to a hook 19, in position to hold the valve to dotted line position shown in Fig. 7.

From the first floor branch pipes, piping connection is usually made as at 20 from each branch pipe 11, to an elevator boot, a valve 21, as best shown in Fig. 6, being preferably provided to normally maintain open communication between the pipe 10 and the pipe 20, communicating with the elevator boot. The valve structure, shown in detail in Fig. 6, comprising preferably a valve proper 22, the weighted handle 23, an operating cord 24, whereby the valve may readily be thrown to open position to cut off communication of the pipe 20 with the pipe 11, and open communication through said branch pipe 11 with the floor sweeps 12, on the first floor.

For the piping installation described I provide a fan suitably proportioned in capacity for any one of the leads or risers, and provide a valve arrangement by which said fan is maintained normally in communication with the lead 13, so that ventilation is normally afforded for the elevator boots, and I further so provide the valve arrangement that it may be varied to effect communication between the fan and either of the leads 13^a, 13^b, but at the same time will interrupt the communication between the lead 13 and the fan. The preferred arrangement for accomplishing this result is shown in Figs. 1 to 5, wherein 25 indicates the fan, having its inlet connected, as by a trunk section 26, preferably of substantially the same capacity or sectional area as any one of the leads 13, 13^a and 13^b,—with a grain trap 27, of construction to be hereafter more fully described. The intake of the trap is provided as at 28, with a socket member of a flexible piping connection, into which takes the joint portion 29, of a trunk-section valve-member 30, secured to a pivot 31, for lateral motion therewith, and adapted to be laterally moved by a lever 32, secured to said pivot pin. At its outer extremity the valve member 30 is operatively associated with an arc 33, into which debouch the mouths of the leads 13, 13^a, 13^b, so that by movement to three lateral positions the valve 32 may be made to effect communication between any one of said leads, and the grain-trap and fan. A weight 34, secured to a cable 35, passing over a pulley 36, and connected with the free end of the valve, normally maintains the valve in such position as to communicate with the lead 13, but for moving said valve to either of its alternative positions, I provide a cable 130

27 having branches 38 and 39 extending over suitable pulleys 40, for control respectively from the belt gallery and the various floors of the cupola.

5 It will be seen that either cable 39 or 38 may be pulled to swing the valve member laterally around to position to communicate with either of the leads 13^a or 13^b. I also provide means for locking the valve in
10 either of its adjusted positions, such means, for illustration, comprising a locking lever 41, provided with a transverse arm 42, notched as at 43 for engagement with the
15 operating lever 32 of the valve, and pivoted as at 44, upon a rod whereon is mounted a double grooved pulley wheel 45, over which take cables 46 and 47, extending to the different areas of the building where control is desirable, as over pulleys 48, the
20 locking lever being preferably counterbalanced as at 49, and the parts being so relatively arranged that from any area of the building, where it may be desired, one of the cables 46 or 47 may be operated, first to
25 act through pulley 45 to lift the member 42 of the locking mechanism, thereby freeing the valve-operating lever 32, for movement to position the valve in any one of its alternative positions, and then to restore said lock to
30 position shown in Fig. 4, to cause engagement of its appropriate notch 43 with the valve operating lever, to hold it in its adjusted position against the pull of the weight 34.

35 It will be understood that other locking devices and operating devices might readily be substituted for those herein shown, but it will be understood that the essential features of my invention may be embodied
40 even in the simple apparatus illustrated. The outlet of the fan 25 opens into a discharge pipe 50, preferably of only slightly greater capacity than any one of the leads 13, 13^a or 13^b and with the discharge pipe
45 is connected a dust collector 51, of any desired type. The grain trap, generally illustrated at 27, comprises vertical sides 52, and end walls 52', one of which is preferably inclined to narrow the lower or pocket
50 portion of the trap, below the inlet trunk 28, and the outlet trunk 26. In the upper portion of the trap, in the area of most direct communication between the inlet 28 and the outlet 26, I provide on each side a series of
55 deflectors 53, each tapering from its top to its bottom, and hinged as at 54, to the side wall of the casing. For each deflector an adjusting rod 55 is provided, passing through a suitable aperture in the side of
60 the casing.

The operation of my improved system is as follows: Under normal conditions the valve 30, standing in the position shown in Fig. 3, effects communication between the
65 fan and the lead communicating with the

first floor suction main and elevator boots, and the valve 21 stands in position to open communication of the elevator boots with the main.

Thus the fan normally draws air from
70 the elevator boots through the pipes 20, 13 and valve 30 in the grain trap, and discharges the dust-laden air free from grain, through the delivery pipe 50 to the dust collector 51. It will be understood
75 that the fan and delivery pipe are properly proportioned for this service, but are not of size large enough to handle the material and air from all of the main leads at once. If now it is desired to clean up the first floor,
80 the floor is swept and the material gathered in piles in front of the sweeps 12, the valves 21 of the various branch pipes moved to position to close communication of pipes 20 with the pipe 11 and open communication
85 between the sweeps 12 and the upper parts of the pipes 11, so that the air, after entering at the sweeps, passes the grain trap 27 and the fan 25, and is delivered through the delivery pipe 50 to dust collector 51 for
90 the separation of the dust and free delivery of the air in the usual manner.

In cleaning up the building it is customary to have a cleaning crew who go through the building systematically, proceeding from
95 floor to floor, so that it is unnecessary to have suction applied to the pipe 10 of more than one floor at a time. Now assuming that the cupola is to be cleaned, the crew, starting with the floor desired to be first
100 cleaned, say the top floor, operate the cable 46 to raise the locking-member 41, releasing the lever 32 for operation, then operate the cable 39 to cause the lever 32 to throw the valve member 30 into communication
105 with the lead 13^b, and release the lock-controlling rope 46 to permit the lock to return to position, so that its appropriate notch 43, engages the lever 32, and holds the valve in its adjusted position. Now
110 suction is created through the leads 13^b and the upper, normally-open suction main 10, to the sweeps 12 on the machinery floor of the cupola, and after said machinery floor is cleaned the crew may proceed down-
115 ward through the several floors below, at each floor to be cleaned throwing the valve 14 to open communication between the suction pipe for that floor and the risers 13^b, and at the same time to close off the nor-
120 mally-open lead to the upper floor. All the floors of the cupola having been cleaned the locking device is released and the valve allowed to automatically return to normal position. When the belt gallery is to be
125 cleaned the same operation follows, save that the operating cable 38 is moved only to draw the valve 30 to mid position to communicate with the lead 13^a. It will be understood that during the large portion of
130

the time when the building is not being cleaned the system stands always in normal condition, so that the fan acts to ventilate the elevator boots.

5 It will thus be seen that when the dust from cleaning is not being handled the fan acts to draw air through one lead only, and that during the cleaning operation each of the various leads, extending to the different
10 areas of the building is in turn connected for communication with the fan, so that the action of the fan is at all times localized to create suction to some one lead, thereby preventing the clogging heretofore referred to
15 as of common occurrence in the old style system, and enabling the installation of a relatively-small fan, small trunking and delivery piping and small dust collectors.

In Fig. 8 the modified valve arrangement,
20 as shown, provides a trunk 128, which opens to the grain trap in the usual manner, and the leads 113, 113^a and 113^b, corresponding with the leads 13, 13^a and 13^b in the other views. Each of these leads is provided with
25 a separate valve for opening or closing the communication with the trunk 128, and said trunk is properly proportioned for handling the air and material from only one lead at a time. I preferably provide in connection
30 with the separate valves 114, 114^a and 114^b, of the several leads, means for insuring the closure of the normally-open lead 113, whenever either of the leads 113^a, or 113^b is opened by manipulation of its valve, and conversely
35 for automatically opening communication between the lead 113 and the trunk, when both the leads 113^a and 113^b are closed by their valves. To this end the several valves are connected by a series of cables to secure
40 the desired results, in the embodiment shown each of the valves indicated by the numeral 114 with or without exponents, being provided with a correspondingly distinguished operating lever 115, to which is connected an
45 operating cord 116.

Pulleys 117, 117^a and 117^b are provided with the several cords respectively, and, as an example, the desired result may be accomplished by connecting with the cord 116^a a
50 cable 118, extending over pulleys 119 and 120, for connection with the cord 117^a and also a cable 121 extending over pulley 122, for connection with cord 116^b. Thus as
55 either of the cords 116^a or 116^b is operated to open its corresponding valve 114^a or 114^b, the lever 115 or valve 114 is raised to cut off communication between the normally-open lead 113 and the trunk 128, and conversely
60 when the operating cord last operated is released, to permit the restoration of valve 114^a or 114^b to normal closed position, the valve 114 is swung by its weight to normal

or open position. Such a construction lacks some of the advantages of the preferred form of construction, but it will obviously
65 operate in a measure to secure the benefit incident to the installation of my improved system. The grain trap shown also acts with great efficiency to prevent heavy dust from being deposited with the grain. The
70 grain in transit through the trap drops in a curve into the pocket and tends to carry with it heavy dust particles, but the deflectors 53, laterally restricting the direct air path from inlet to outlet, force the air to sweep down-
75 ward through the grain path, thereby freeing the grain from dust as it is falling into the trap.

While I have herein described an installation embodying my invention, in a particular type of building, and have illustrated the same conventionally, it will be understood that I do not limit my invention to the specific construction of devices herein shown and described further than as specified in the
85 claims, as it will be obvious that in the practice of the invention the details incident to the installation will vary widely to suit the requirements of the particular buildings through the exercise of mere mechanical
90 skill.

Having thus described my invention, what I claim and desire to secure by Letters Patent, of the United States, is:

1. In a system of the character described, 95 a fan, a plurality of leads, extending to different areas, means for effecting communication between the fan and any selected lead, operating means therefor extending to and operable from any area to effect communication
100 between the lead from said area and the fan, a locking device for said valve, and means operable from any area for releasing said locking device.

2. In a system of the character described, 105 a fan, leads extending to different areas, each adapted to supply the fan to its normal capacity, means for effecting communication between the fan and any selected lead, operating means therefor extending to and oper-
110 able from any area to effect communication between the lead for said area and the fan, a locking device operable from any area to maintain the valve in adjusted position, and means for automatically restoring the valve
115 to connection with a predetermined lead whenever said locking means is released.

In testimony whereof I hereunto set my hand in the presence of two witnesses.

WILLIAM E. ALLINGTON.

In the presence of—
GEO. T. MAY, JR.,
MARY F. ALLEN.