

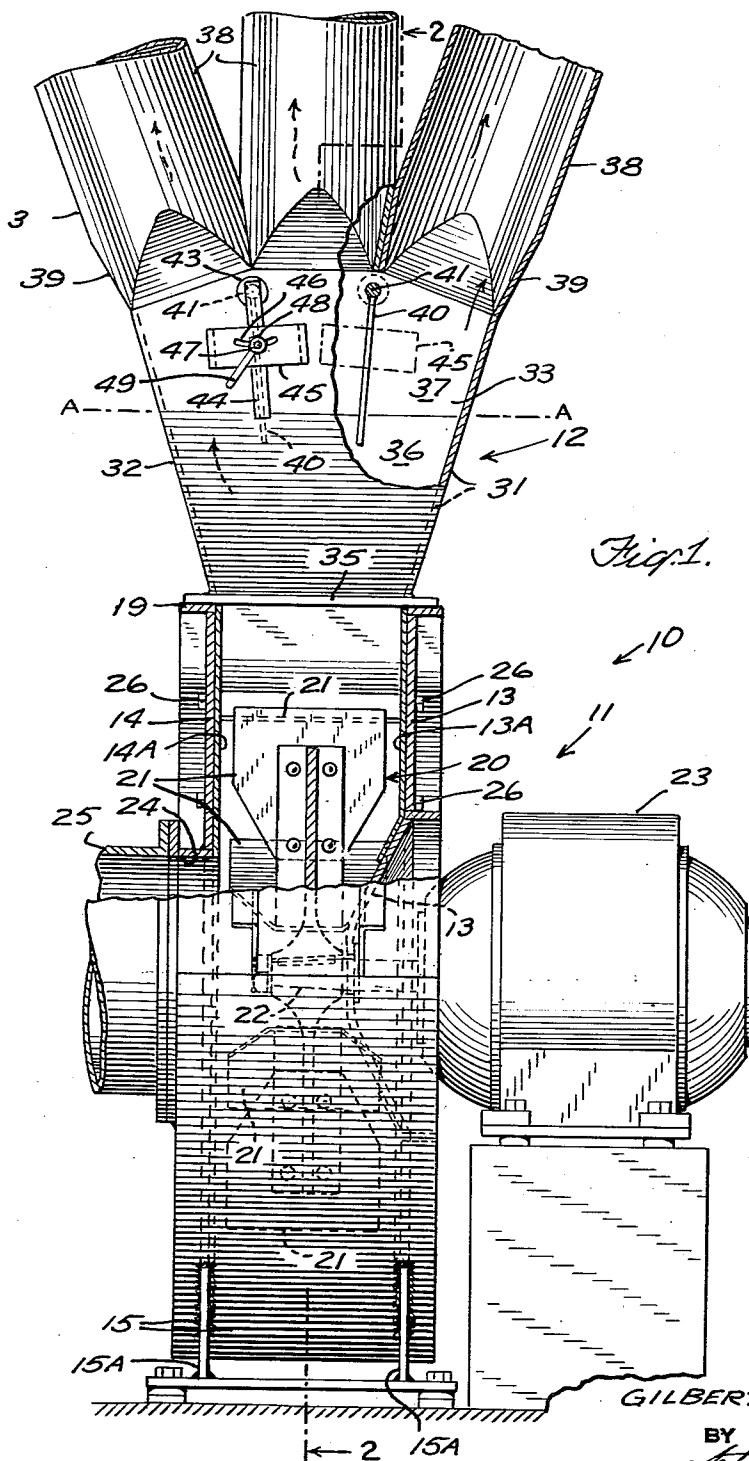
Aug. 21, 1962

G. C. WHITNEY, JR
CONVEYING AND DISTRIBUTING APPARATUS FOR
COMMUNUTED MATERIAL AND AIR

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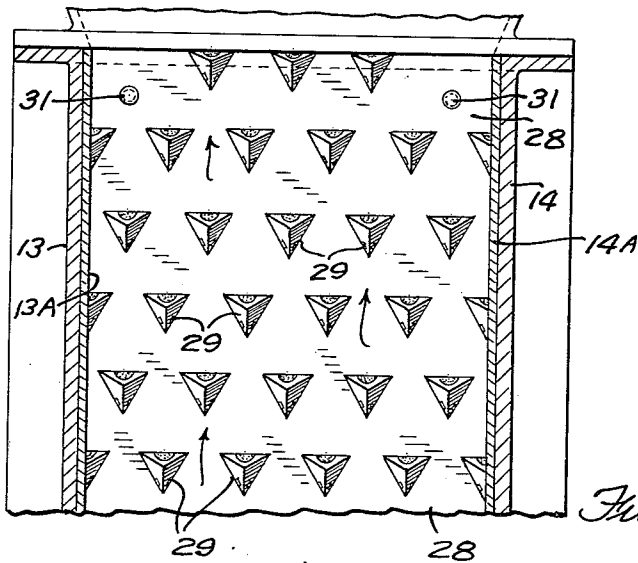
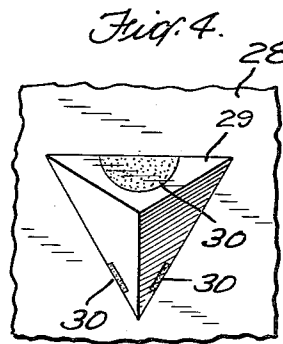
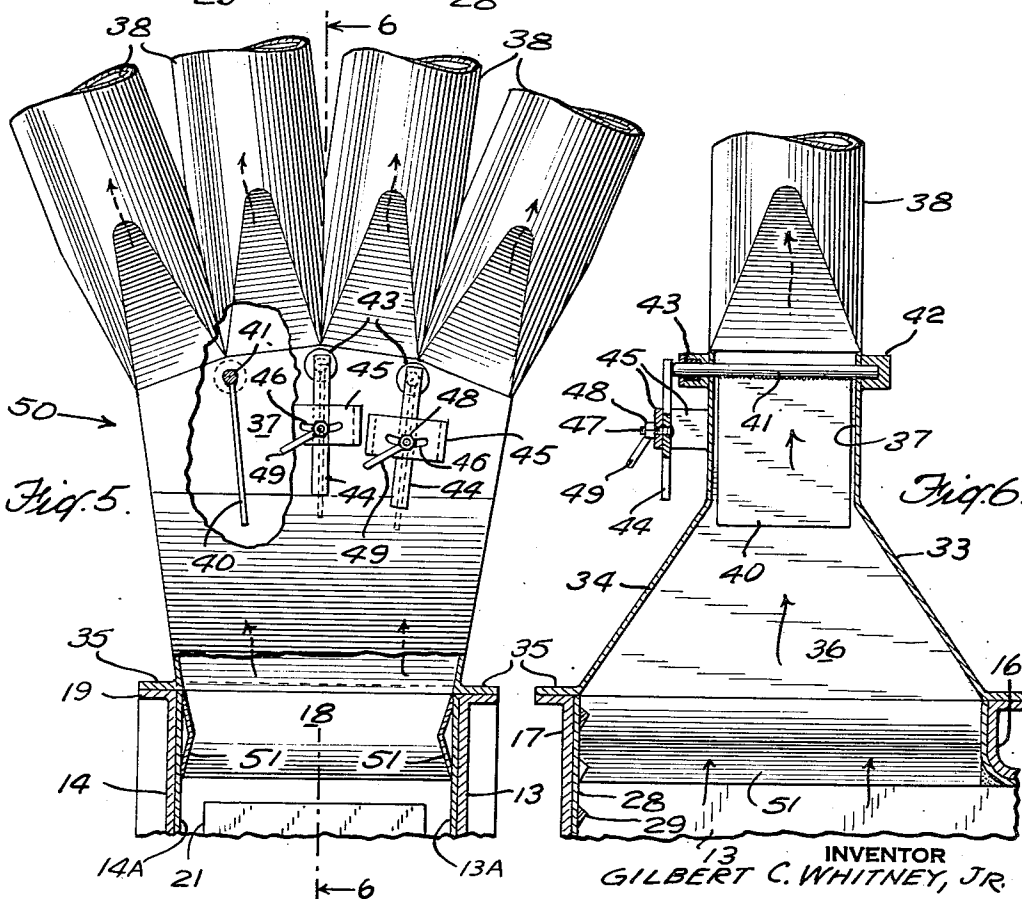


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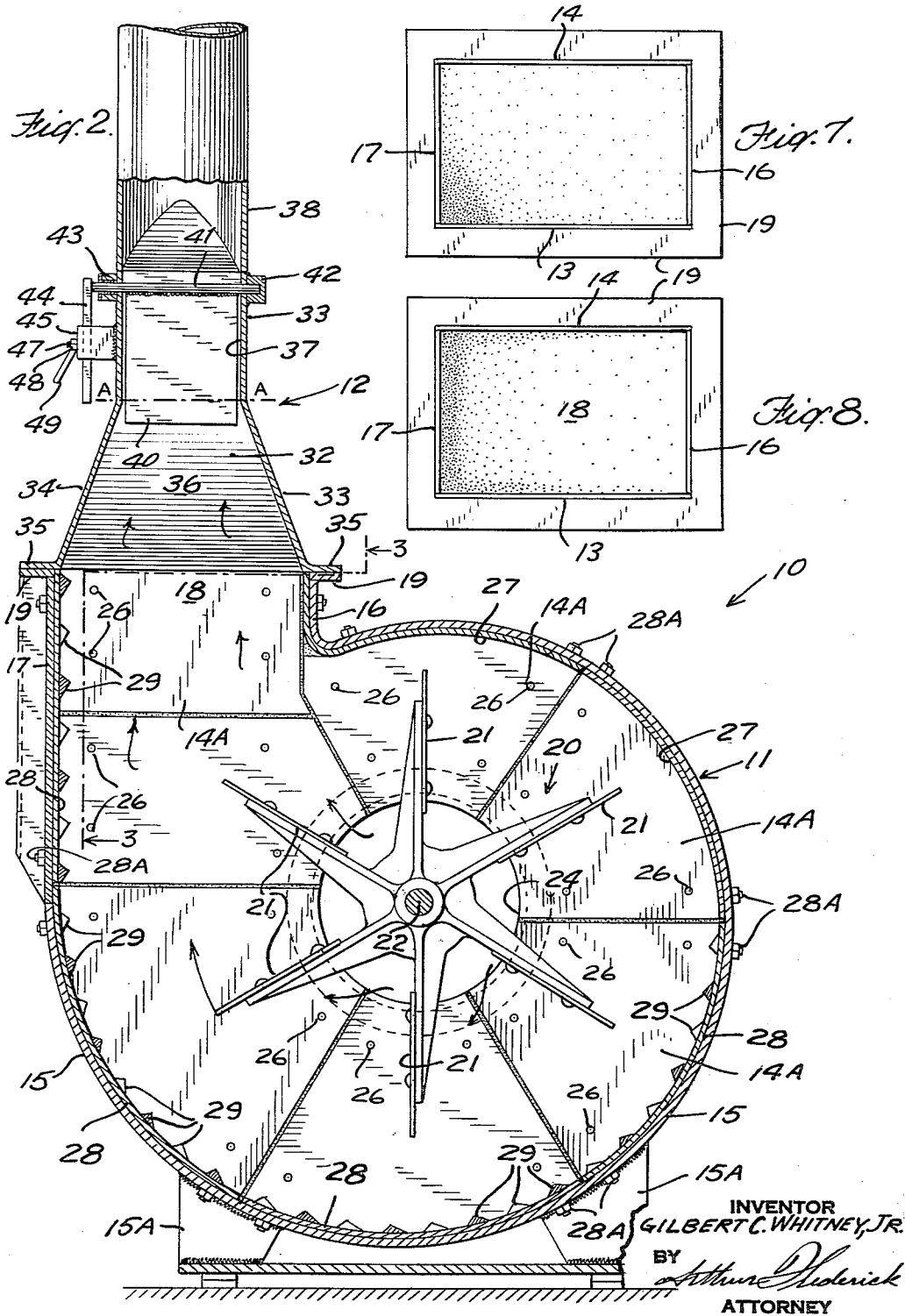
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**CONVEYING AND DISTRIBUTING APPARATUS
FOR COMMUNUTED MATERIAL AND AIR**

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6 Claims. (Cl. 302—28)

This invention relates to apparatus for conveying and distributing comminuted material and air and, more particularly, pertains to a centrifugal fan and distributor assembly for conveying a stream of comminuted material and air and dividing the stream into a plurality of smaller streams.

In conventional pulverized fuel fired furnaces, centrifugal fans, hereinafter referred to as exhausters, are employed to deliver through feed lines, pulverized fuel and air from a source thereof, such as a coal pulverizer, to burners of the furnaces. In furnace installations where a plurality of burners are arranged for firing into a furnace, it is economically desirable to provide an exhauster for two or more burners. Accordingly, various apparatus have been devised to convey and distribute pulverized fuel to several burners in such a manner that each burner receives a desired proportion of the total fuel and air discharged by an exhauster; for example, in most installations equal distribution of fuel and air to the burners is desired. None of the presently known means for conveying and distributing pulverized fuel to a plurality of burners from an single exhauster provides the desired proportioning of the total fuel to the burners under a wide load range on the exhauster, which exhauster load must be varied to provide the proper amount of fuel for different firing rates of the burners. It has been found in the operation of conventional exhausters, that the pulverized fuel is not discharged uniformly across the flow area of the outlet of the exhauster in the form of a homogeneous mixture of fuel and air, but that pulverized fuel is concentrated in a relatively small portion of the exhauster outlet adjacent the end wall surface of the exhauster casing. Furthermore, it has been found that the location of this concentration of pulverized fuel adjacent the end wall surface at the exhauster outlet, shifts between the side walls of the exhauster casing as the load on the exhauster varies. As a consequence of this shifting of position of the concentration of pulverized fuel discharged by the exhauster, a desired proportioning, of the pulverized fuel, as for example uniform distribution, to a plurality of burners cannot be maintained under all firing rates of the burners.

The load on the exhauster may be controlled by varying the angular velocity of the rotor or impeller of the exhauster, but the usual arrangement is to provide a constant speed motor to rotate the exhauster rotor at a constant r.p.m. and dispose a valve in or adjacent the inlet of the exhauster whereby the velocity of the air and, therefore, the amount of pulverized fuel flowing into the exhauster is controlled. The failure of conventional exhauster and distributor apparatuses to provide a desired distribution of pulverized fuel to a plurality of burners or burner feed lines under low load conditions, at which the air in which the fuel is entrained is at low velocity, is also attributable to the settling out and the recirculation or eddying of the pulverized fuel within the apparatus which causes erratic and unpredictable distributor function.

It is therefore an object of the present invention to provide an exhauster and distributor assembly which is capable of conveying and dividing a stream of comminuted material and air into a plurality of streams, each of which has a desired proportion of the total mixture of com-

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minuted material and air discharged by the exhauster over a wide load range of the exhauster.

Another object of the present invention is to provide an exhauster and distributor assembly of relatively simple construction, easily fabricated and repaired, and wherein the exhauster has a considerably longer operative life than heretofore known exhauster.

It is a further object of this invention to provide an exhauster and distributor assembly wherein eddying or recirculation of comminuted material within the assembly is minimized.

A still further object of the present invention is to provide an exhauster and distributor assembly wherein relatively high air velocities may be maintained through the assembly with a minimum pressure drop.

Accordingly, the present invention contemplates a novel exhauster and distributor assembly wherein the exhauster comprises a scroll shaped casing or housing having two spaced side walls connected together by a scroll end wall to form an enclosure. A rotor or impeller is disposed within the enclosure for rotation therein. The casing is provided with an inlet in one of the casing side walls to admit a mixture of comminuted material and air axially of the rotor and an outlet disposed in the scroll end wall substantially at right angles to the axis of the rotor to discharge the mixture of comminuted material and air. The inner surface of the scroll end wall is provided with means for distributing the comminuted material uniformly over the surface of the scroll end wall so that substantially all of comminuted material is discharged from the outlet in a stream of substantially uniform density across the scroll end wall between the casing side walls within a wide load range on the exhauster. The outlet of the exhauster is in communication with a distributor having an inlet portion which communicates with two or more feed pipes. The distributor inlet portion is of decreasing flow area in a direction toward the feed pipes to maintain the velocity of the comminuted material discharged by the exhauster at substantially constant velocity to minimize settling out of the particles and the recirculation thereof. Adjacent the inlets of the feed pipes are disposed a plurality of deflecting plate or dampers which divide the stream of comminuted material and air into a plurality of streams corresponding in number to the number of feed pipes. To achieve a predetermined proportionate distribution of the total comminuted material discharged by the exhauster to each of the feed pipes, as for example equal distribution to the feed pipes, if desired, the deflecting plates must be arranged to extend in planes normal with respect to the surface of the exhauster scroll end wall at the outlet of the exhauster.

It has been found that the means disposed on the inner surface of the exhauster scroll end wall, while providing for the discharge of substantially all of the comminuted material along the scroll end wall at the exhauster outlet, causes a small secondary flow of comminuted material adjacent each of the casing side walls at the outlet. This flow of comminuted material along the side walls, while resulting in a greater amount of comminuted material flow into the endmost feed pipes, does not appreciably affect the distribution of comminuted material to three feed pipes and has no detrimental effect where only two feed pipes are provided. However, this imbalance in comminuted material distribution is most undesirable when the comminuted material and air is to be divided for flow to four or more feed pipes and where equal flows to the feed pipes is desired or where the endmost feed pipes are to receive less comminuted material than the others. To overcome this problem where more than three feed pipes are employed, a second embodiment of this invention is provided wherein baffle means is provided at or near the exhauster outlet to deflect the stream of

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comminuted material flowing along the side walls of the exhaustor casing in a direction away from the side walls and therefore the endmost feed pipes.

The invention will be more fully understood from the following detailed description thereof when considered in connection with the accompanying drawings wherein two embodiments of the invention are illustrated by way of example, and in which:

FIG. 1 is a view in elevation of an exhaustor and distributor assembly according to a first embodiment of this invention, with parts broken away for illustration purposes only;

FIG. 2 is a sectional view taken substantially along line 2—2 of FIG. 1;

FIG. 3 is a fragmentary view in section taken substantially along line 3—3 of FIG. 2, somewhat enlarged and showing the novel exhaustor liner plates according to this invention;

FIG. 4 is an enlarged fragmentary view of one of the baffle elements shown in FIGS. 2 and 3;

FIG. 5 is a fragmentary view in elevation of an exhaustor and distributor assembly according to a second embodiment of this invention with parts broken away for illustration purposes;

FIG. 6 is a cross sectional view taken along line 6—6 of FIG. 5;

FIG. 7 is a somewhat diagrammatic view of the outlet of a conventional exhaustor showing the distribution of comminuted material; and

FIG. 8 is a diagrammatic view, similar to FIG. 7 of the outlet of the exhaustor according to this invention, showing the distribution of comminuted material.

Now referring to the drawings, and more specifically to FIGS. 1 to 4, the reference numeral 10 designates the apparatus for conveying and distributing comminuted material and air according to this invention which comprises an exhaustor 11 and a distributor 12.

The exhaustor 11 comprises a scroll shaped housing or casing having two spaced parallel side walls 13 and 14 which are connected together by a peripheral end wall 15. End wall 15 has a curved portion and integral straight vertically extending opposite end portions 16 and 17 which extend in spaced, parallel relationship with each other to define with side walls 13 and 14 a rectangular shaped outlet opening 18. The ends of side walls 13 and 14 and end portions 16 and 17 of end wall 15 are provided at outlet opening 18 with flanges 19. Exhaustor 11 is supported in a suitable manner as by means of four support legs 15A which are connected at one end to the lower surface of end wall 15.

An impeller or rotor assembly, having a rotor 20 comprising a plurality of spaced radially extending blades 21 which are mounted on a drive shaft 22 for conjoined rotation with the latter, is disposed within the exhaustor housing. Drive shaft 22 extends through and normal to side wall 13 of the exhaustor housing and is axially rotated by a motor 23 which is suitably supported adjacent exhaustor side wall 13.

Side wall 14 of the exhaustor housing is provided with an inlet opening 24 which is disposed in coaxial relationship to rotor drive shaft 22. Inlet opening 24 is connected, through a conduit 25, to a suitable source of comminuted material and air, as for example, coal pulverizing apparatus, to receive and admit comminuted material and air into the exhaustor housing axially of rotor 20. Motor 23 is preferably a constant speed motor, and, therefore, a valve (not shown) is disposed in or adjacent inlet 24 to regulate the flow of comminuted material and air through opening 24, into exhaustor 11.

Since the inner surfaces of the exhaustor housing are subject to considerable wear by reason of the abrasive action of the comminuted material thereon, particularly where the comminuted material is pulverized coal, the inner surfaces of side walls 13 and 14 are each provided with liners. Each of the liners for side walls 13 and 14

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may comprise a plurality of sections 13A and 14A which are secured to their respective side walls by means of bolts 26 so that the liners may be readily removed and replaced. Likewise, the inner surface of end wall 15 is provided with a liner which may be constructed of a plurality of segments or sections for ease of installation, removal and replacement.

As shown in FIG. 7, in a conventional exhaustor, comminuted material and air is discharged through exhaustor housing outlet 18 with substantially all the comminuted material concentrated adjacent one part of end portion 17 of end wall 15. It has been found that this concentration of comminuted material at outlet 18 shifts along end portion 17 between side walls 13 and 14 as the load on the exhaustor changes. In other words, at high loadings where the velocity of the comminuted material entering inlet 24 of the exhaustor housing is high, the comminuted material axially penetrates relatively far into the rotor 20 before being centrifugally thrown outwardly along the inner surface of end wall 15, and therefore, discharges in a concentrated stream adjacent end wall 13. As the load on the exhaustor decreases, as by closing a valve (not shown) in the inlet 24, the entering velocity of the comminuted material decreases and the comminuted material does not penetrate as far between the rotor blades 21 before being thrown radially outwardly against the inner surface of end wall 15, and results in the shifting toward end wall 14 of the concentration of comminuted material discharging through outlet 18. This shifting of the position of the bulk of the comminuted material discharging from the exhaustor under different loads on the exhaustor, presents the problem of distributing the comminuted material and air into a plurality of smaller streams having a predetermined proportion of the total comminuted material discharging from the exhaustor within a wide load range on the exhaustor. To overcome this problem and provide a stream of comminuted material of substantially uniform density and containing substantially all the comminuted material adjacent end portion 17 and between side wall 13 and 14 at outlet 18, end wall 15 is provided with a novel liner according to this invention.

As shown in FIG. 2, the liner for end wall 15 comprises a plurality of arcuate shaped plates 27 and 28 which are arranged in endwise abutment with each other along the inner surface of end wall 15. Plates 27 extend over the surface of end wall 15 from end portion 16 to a point slightly below the horizontal plane of the drive shaft 22 of rotor 20, while plates 28 cover the remaining surface of end wall 15, including straight end portion 17.

As best shown in FIG. 3, plates 28 are provided with a plurality of spaced triangular pyramidal shaped baffles 29. Baffles 29 are arranged in spaced rows across the width of plates 28 with the baffles 29 in one row offset from baffles 29 of the next adjacent rows so that the baffles 29 of one row lie between the baffles of the next adjacent rows. Each of the baffles 29 is disposed with an edge forming the intersection of two adjacent triangular faces of baffle 29, lying parallel to the length of plates 28 and facing in a direction opposite the direction of the flow of comminuted material through the exhaustor so that each baffle 29 presents two triangular faces in the path of flow of comminuted material to thereby deflect impinging particles laterally with respect to the direction of flow of comminuted material.

As best illustrated in FIG. 4, each baffle 29 is provided with a cut-out portion 30 in each triangular face thereof adjacent the base of the baffle. Cut-out portions 30 permit the baffles 29 to be secured by welding to plates 28 and, at the same time, permits the weld beads to be cut down to provide smooth triangular faces without appreciably weakening the weld.

Although the baffles 29 have been illustrated and described as being welded to the plates 28, it is contemplated that the baffles may be secured to the plates in

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some other suitable manner, or be formed as an integral part of the plates without departing from the spirit and scope of this invention.

Plates 27 and 28 are secured to end wall 15 by means of bolts 28A which may be readily removed to effect removal and replacement of plates 27 and 28, when necessary.

In operation of exhauster 11, herein described, rotation of rotor 20 causes comminuted material and air to be drawn into the exhauster housing through inlet opening 24 coaxially of rotor 20. The comminuted material is thrown radially outwardly, toward and against liner plates 27 and 28 of end wall 15 by rotor blades 21 and thence are carried adjacent liner plates 27 and 28 toward outlet 18. As the comminuted material flows adjacent liner plates 28 toward outlet 18, baffles 29 continuously deflect the comminuted material laterally toward and away from end walls 13 and 14 to thereby redistribute the comminuted material across the width of plates 28. This redistribution of comminuted material is continuously maintained by baffles 29 until the comminuted material reaches outlet opening 18 so that substantially all of the comminuted material discharges, as shown in FIG. 8, through outlet 18 in a stream of substantially uniform density adjacent the entire surface of end portion 17 of end wall 15 regardless of changes in the operative load on the exhauster. The stream of comminuted material and air flows from outlet 18 into distributor 12, hereinafter described in detail, and is divided into a plurality of smaller streams, as will be hereinafter fully described.

Distributor 12 comprises a conduit or housing having two spaced side walls 31 and 32 which are inclined as required with respect to the plane of side walls 13 and 14 of the exhauster housing (see FIG. 1). Side walls 31 and 32 are connected by opposite end walls 33 and 34 which extend upwardly from outlet 18 of the exhauster and thence vertically in spaced parallel relationship to each other. Side walls 31 and 32 and end walls 33 and 34 are each provided with flanged ends 35 which lie in coextensive relationship with flanges 19 of the side wall 15 and end walls 13 and 14 of the exhauster housing. Flanges 19 and 35 of the respective exhauster and distributor housings are suitably secured together, as by a plurality of bolts (not shown) to connect exhauster 11 and distributor 12 together. The lower portions of the side walls 31 and 32 and the inwardly inclined portions of end walls 33 and 34 define therebetween an inlet portion or chamber 36 while the spaced parallel vertically extending portions of end walls 33 and 34 and the upper portions of the side walls 31 and 32 define therebetween an outlet portion or chamber 37.

A plurality of cylindrical feed pipes or conduits 38, having rectangular shaped end portions 39, are arranged in side-by-side abutment with each other at their end portions 39 and in a plane parallel to the plane of straight portion 17 of end wall 15 of the exhauster housing. Feed pipes 38 are connected together and to side walls 31 and 32 and end walls 33 and 34, as by welding, so that the interior of feed pipes 38 communicate with outlet portion or chamber 37 of the distributor housing.

A plurality of deflecting baffles or dampers 40 are disposed in outlet chamber 37 of the distributor housing and are arranged to extend in planes between and normal to the end walls 33 and 34, the number of dampers 40 being one less than the number of feed pipes 38. For example, as best shown in FIG. 1, where there are three feed pipes, two dampers 40 are required. The dampers 40 are positioned adjacent the joint between each of the abutting feed pipes 38 to divide outlet chamber 37 into a plurality of compartments corresponding in number to the number of feed pipes 38. Dampers 40 may be fixed, but, as shown, are preferably pivotally mounted.

As illustrated in FIGS. 1 and 2, each damper 40 is secured to a shaft 41, which extends between and

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through end walls 33 and 34 and is journaled for axial movement in journal boxes 42 and 43 which are secured to end walls 33 and 34, respectively. The end of shaft 41 which extends through end wall 34, passes through journal box 43, and is connected to an adjustment arm 44. Arm 44 projects normal to the axis of shaft 41 and in the same plane as damper 40. By movement of arms 44, dampers 40 may be pivoted to any desired position to achieve the desired apportionment of comminuted material to each of the feed pipes 38.

To provide for securing dampers 40 in a desired position of adjustment, an inverted U-shaped bracket 45 is provided for each damper 40. Each U-shaped bracket 45 is connected at the ends of its legs to end wall 34 and is positioned and dimensioned so that arm 44 projects between the legs of bracket 45 and contacts the under surface of the horizontal portion of bracket 45. The horizontal portion of bracket 45 is provided with an arcuate slot 46 through which a threaded stud 47 extends, the stud being secured at one end to arm 44. A locknut 48, having a handle 49 secured thereto, is turned upon threaded stud 47 and against the upper surface of the horizontal portion of bracket 45 until arm 44 is drawn tight against the undersurface of the horizontal portion of bracket 45 to thereby lock arm 44 and damper 40 in the desired position of adjustment.

As shown in FIGS. 1 and 2, the inclination of end walls 33 and 34 is such as to provide inlet portion or chamber 36 with a gradually decreasing flow area in the direction of flow of comminuted material and air there-through and a flow area, in a plane designated A—A at outlet portion or chamber 37, substantially less than the flow area of outlet 18 of exhauster 11. The distributor housing is also constructed, as shown, so that the total flow area of feed pipes 38 is greater than the flow area at A—A. It has been found preferable to construct the distributor housing so that the flow area at A—A is approximately one-half that of the flow area of outlet 18 of the exhauster and approximately 85% less than the total flow area of feed pipes 38. By providing a decreasing flow area through the distributor housing to the point A—A and a greater total flow area at the feed pipes 38 than at A—A, the velocity of the comminuted material is maintained through the distributor housing with a minimum pressure drop whereby settling out of nominally entrained comminuted material and stratification and recirculation of comminuted material is minimized. Furthermore, it has been discovered that distributor 12 constructed, as above described, also minimizes the recirculation of comminuted material back into the housing of the exhauster through outlet 18 adjacent end portion 16 of end wall 15; the substantial reduction in this recirculation provides rotor 20 of exhauster 11 with a longer operative life by reducing wear thereon.

In operation of the exhauster and distributor assembly 10, herein described, comminuted material and air is drawn into the exhauster housing through inlet opening 24 by rotation of rotor 20 and is thrown radially outwardly toward and against liner plates 27 and 28. The comminuted material and air is then conveyed, adjacent liner plates 28, to outlet 18. The comminuted material upon impingement against baffles 29 of liner plates 28 is distributed across the width of the liner plates 28, as previously described, so that substantially all the comminuted material is discharged through outlet 18 into a stream of substantially uniform density (as shown in FIG. 8) adjacent end portion 17 of end wall 15 within a wide load range of the exhauster. The stream of comminuted material flows from outlet 18 into inlet chamber 36 of distributor 12 and along the inner surface of end wall 34 of the distributor housing to the end edges of dampers 40. The dampers 40 then divide the stream of comminuted material and air into smaller streams which flow through the compartments formed

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within outlet chamber 37 by dampers 40, and thence into feed pipes 38.

Dampers 40 may be adjusted to provide any desired apportionment of the total comminuted material and air discharged through outlet 18 of the exhauster. If it is desired to provide equal distribution of comminuted material and air to feed pipes 38, dampers 40 are positioned, as shown in FIG. 1, to divide outlet chamber 37 into three substantially equal compartments. If it is found that this initial adjustment of dampers 40 does not provide the precise degree of distribution of comminuted material and air to each of the feed pipes 38, one or both of the dampers 40 may be repositioned by loosening locknuts 48, moving arms 44 and studs 47 in slots 46 of brackets 45 in a direction to the right or left, as viewed in FIG. 1, depending upon which of the feed pipes 38 is receiving more or less than the desired proportion of the comminuted material. When the proper position of dampers 40 is found, dampers 40 are locked in the selected position by tightening locknuts 48 on studs 47 until arm 44 is drawn tightly against bracket 45. If it is desired to provide a smaller proportion of the total comminuted material and air to one of the feed pipes 38 with equal distribution of the remaining comminuted material in the other feed pipes 38, dampers 40 may be pivoted toward side walls 31 and 32 to reduce the flow area between dampers 40 and the adjacent side wall and effect that desired distribution.

As illustrated in FIG. 8, the exhauster according to this invention provides in addition to the main stream of comminuted material adjacent end portion 17 of exhauster end wall 15, a small secondary flow or stream of comminuted material adjacent side walls 13 and 14 at outlet 18 of the exhauster. While the secondary streams of comminuted material adjacent side walls 13 and 14 discharging from outlet 18 flow along side walls 31 and 32 of the housing of the distributor to cause a slightly greater flow of comminuted material into the endmost feed pipes 38 than in pipes 38 disposed between the endmost feed pipes, this excess amount of comminuted material flowing into the endmost feed pipes 38 is negligible where the distributor has no more than three feed pipes 38. In addition, the excess amount of comminuted material flowing into the endmost feed pipes 38 may be compensated for by moving dampers 40 in a direction toward side walls 31 and 32 so that a greater flow of comminuted material from the main stream is allowed to pass into the center feed pipe 38 and a lesser portion thereof into each of the endmost feed pipes 38. However, where comminuted material and air is to be divided into four or more streams the problem of providing equal distribution to all the feed pipes is most difficult because of the secondary streams of comminuted material discharging along side walls 13 and 14 of the exhauster and flowing along walls 31 and 32 of the distributor. It has been found that the problem cannot be solved by adjustment of dampers 40 to reduce the flow of comminuted material from the main stream of comminuted material into the endmost feed pipes without reducing the air flow into the endmost feed pipes to a point below a critical value. Accordingly, an exhauster and distributor assembly 50, constituting a second embodiment of the present invention and shown in FIGS. 5 and 6 is provided whereby the aforesaid problem is obviated.

The exhauster and distributor assembly 50 is substantially identical in construction to the exhauster distributor assembly 10, shown in FIGS. 1 to 4, and therefore like parts will be designated by the same reference numerals. Exhauster and distributor assembly 50 only differs from the exhauster and distributor assembly 10 in that the distributor is provided with four feed pipes 38 and three dampers 40 rather than three feed pipes 38 and two dampers 40 provided in distributor 12 of exhauster and distributor assembly 10; and in that a V-shaped baffle plate 51 is secured to each of the side walls 13 and 14 of the

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housing of exhauster 11 adjacent outlet 18. Baffle plates 51 are disposed to extend between end portions 16 and 17 of end wall 15 and function to deflect the comminuted material, in the secondary streams adjacent side walls 13 and 14, toward the center of inlet chamber 36 of the distributor and away from the endmost feed pipes 38 so that the amount of comminuted material distributed to the endmost feed pipes 38 is not effected by the secondary side wall streams of comminuted material. Since the secondary side wall streams of comminuted material are effectively eliminated by V-shaped baffles 51, equal distribution of comminuted material and air to four or more feed pipes 38 can be achieved. As previously described with respect to exhauster and distributor assembly 10, dampers 40 of exhauster and distributor assembly 50 may be adjusted to provide equal distribution of the comminuted material and air to each of the feed pipes, or any other desired distribution.

The present invention, herein described, provides an exhauster and distributor assembly wherein comminuted material and air may be distributed into a plurality of streams each of which streams has a predetermined proportion of the total comminuted material and air discharged from the exhauster under a wide operative load range of the exhauster. It is also apparent that an exhauster and distributor assembly has been provided by this invention which has an appreciable longer operative life than previously known exhauster and distributor assemblies.

Although, but two embodiments of the invention have been illustrated and described in detail, it is to be expressly understood that the invention is not limited thereto. Various changes can be made in the arrangement of parts without departing from the spirit and scope of the invention, as the same will now be understood by those skilled in the art.

What is claimed is:

1. A comminuted material and air conveying and distributing apparatus, comprising a fan having a scroll shaped housing, said housing comprising two spaced side walls connected together by an end wall, a rotor disposed within said housing and mounted on at least one of said side walls for axial rotation within the housing, said housing having an inlet communicating with a source of comminuted material and air to pass said comminuted material and air into said housing axially of said rotor, an outlet in said end wall disposed substantially at right angles to the axis of rotation of said rotor, said outlet being in part defined by said end wall, a source of rotary power connected to said rotor to axially rotate said rotor whereby comminuted material and air is flowed from said inlet of the fan to the outlet of the fan, means comprising a plurality of pyramidal shaped deflecting baffles disposed along the inner surface of the end wall of the fan housing for distributing the comminuted material flowing within the housing so that substantially all the comminuted material is discharged through the fan housing outlet in a stream of substantially uniform density adjacent the end wall of said fan housing outlet under all loading conditions of the fan, second means for receiving said stream of comminuted material and air discharging from said housing outlet of said fan and dividing said stream into a plurality of smaller streams each having a predetermined proportion of the total comminuted material and air discharged from said housing outlet of said fan.

2. A comminuted material and air conveying and distributing apparatus, comprising a fan having a scroll shaped casing, said casing comprising two spaced side walls connected together by a peripheral end wall, a rotor disposed within said housing and mounted on at least one of said side walls for axial rotation within said casing, said peripheral end wall having a curved portion and an integral substantially straight portion extending substantially at right angles to the axis of rotation of said rotor and terminating in spaced relationship with the opposite

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end portion of said end wall, the distal end portion of the straight portion and the opposite end portion of said end wall defining with the side walls an outlet, said casing having an inlet disposed in one of said side walls and communicating with a source of comminuted material and air to receive and pass comminuted material and air into said casing axially of said rotor, a source of rotary power for axially rotating said rotor to thereby pass said comminuted material and air from said casing inlet to said outlet, a plurality of deflecting baffles arranged along at least part of the inner surface of said peripheral end wall for distributing the comminuted material substantially uniformly over the inner surface of the peripheral end wall so that substantially all comminuted material is discharged from said outlet in a stream of substantially uniform density adjacent the straight portion of said peripheral end wall and between said side walls under all loading conditions of the fan, distributing means for receiving said stream of comminuted material and air from the outlet of said fan and dividing said stream into a plurality of smaller streams each having a predetermined portion of the total comminuted material and air discharged from the outlet of said fan casing, said plurality of deflecting baffles each comprising pyramidal shaped members arranged in the path of flow of the comminuted material flowing adjacent the inner surface of said peripheral end wall so as to deflect comminuted material laterally with respect to the direction of flow thereof and thereby effect substantially uniform distribution of the comminuted material at the outlet of the fan casing adjacent the straight portion of the casing end wall.

3. A comminuted material and air conveying and distributing apparatus, comprising a fan having a scroll shaped casing, said casing comprising two spaced side walls connected together by a peripheral end wall, a rotor disposed within said housing and mounted on at least one of said side walls for axial rotation within said casing, said peripheral end wall having a curved portion and opposite integral end portions extending substantially normal to the axis of said rotor and in spaced parallel relationship to each other to define with the side walls of the casing an outlet, said casing having an inlet opening in one of said side walls to receive comminuted material and air from a source thereof and admit said comminuted material into said casing axially of said rotor, said rotor being connected to a source of rotary power for axially rotating said rotor within said casing to cause said comminuted material and air to be conveyed from said inlet to said outlet, a liner superimposed upon substantially the entire inner surface of said peripheral end

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wall, a plurality of baffles disposed on said liner for distributing the comminuted material flowing adjacent the liner so that substantially all the comminuted material is discharged from said outlet in a stream of substantially uniform density adjacent one of said integral end portions of said peripheral end wall and between said side walls under all loading conditions of the fan, distributing means for receiving said stream of comminuted material and air from the outlet of said fan and dividing said stream into a plurality of smaller streams each having a predetermined proportion of the total comminuted material and air discharged from the outlet of said fan casing.

4. An article of manufacture for a scroll end wall of the casing of a centrifugal fan employed for conveying comminuted material and air, comprising a plate member bent to conform with the inner surface of the scroll end wall, a plurality of pyramidal shaped baffles secured at their base portions to the surface of said plate member, said pyramidal shaped baffles being arranged in spaced parallel rows with the pyramidal shaped baffles in one row being offset from the pyramidal baffles in the next adjacent rows.

5. An article of manufacture for a scroll end wall of the casing of a centrifugal fan employed for conveying comminuted material and air, comprising a plate member having a shape to conform with the inner surface of the scroll end wall, a plurality of spaced baffles projecting from the surface of said plate member, each of said baffles comprising a pyramidal shaped member having a triangular base and arranged with a base line extending normal to the length of said plate member.

6. An article of manufacture for a liner for a scroll end wall of the casing of a centrifugal fan employed for conveying comminuted material and air, comprising a plate having a shape to conform with the inner surface of the scroll end wall to which it is to be attached, a plurality of spaced triangular base pyramidal baffles, said pyramidal baffles being secured at the triangular base to said plate and arranged in spaced parallel rows with the pyramidal baffles in one row being offset from the pyramidal baffles in the next adjacent rows, each of said pyramidal baffles being disposed with a base line extending normal to the length of said plate.

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