(No Model.) 2 Sheets—Sheet 1.

A. P. HESLOP.

PNEUMATIC CONVEYER.

No. 588,908. Patented Aug. 24, 1897.

Fig. 1

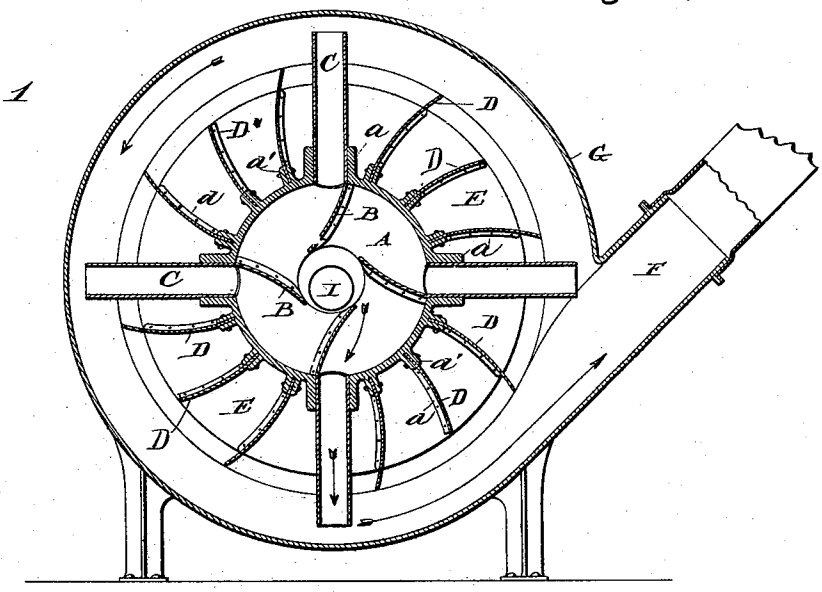


Fig. 2

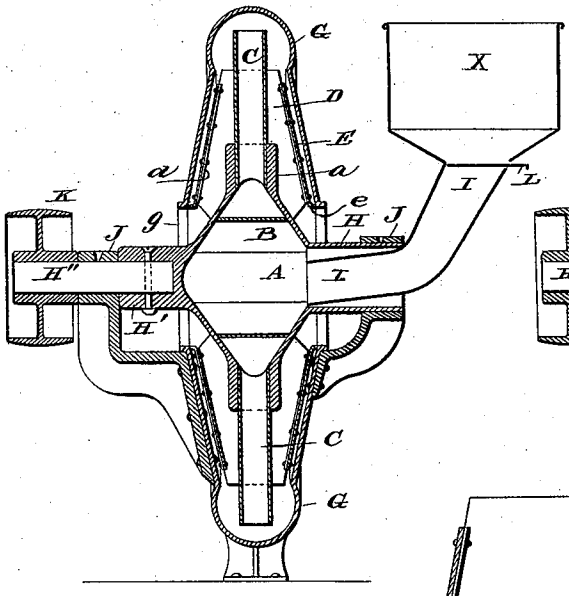


Fig. 3

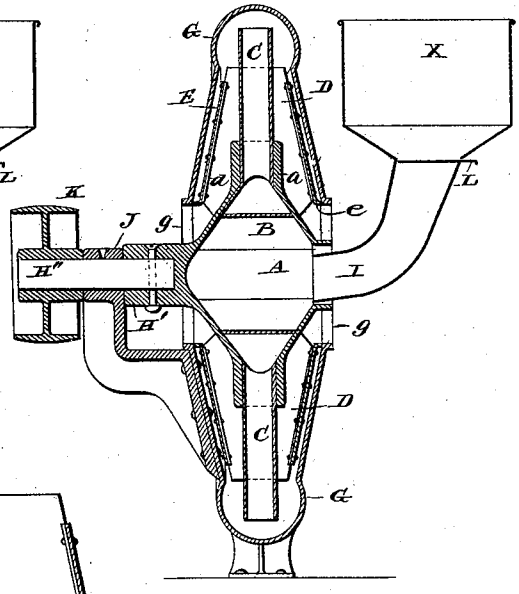
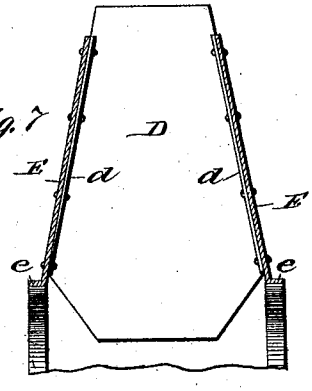


Fig. 7



Witnesses.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 4

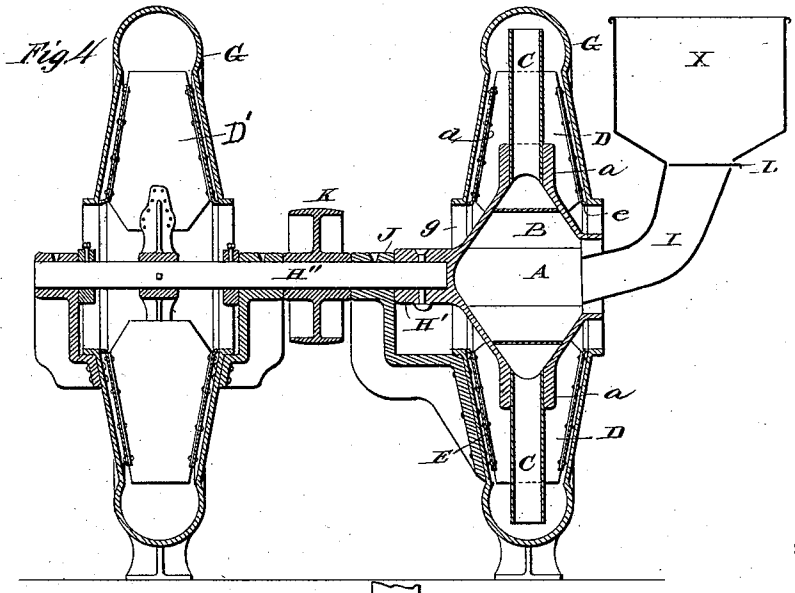


Fig. 6

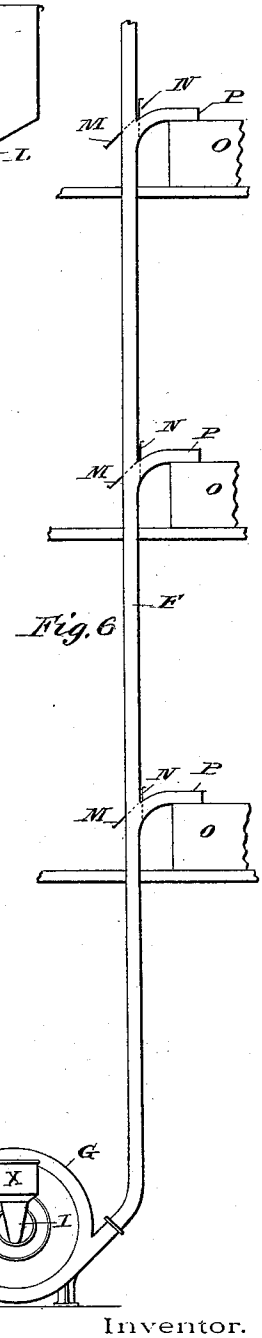


Fig. 5

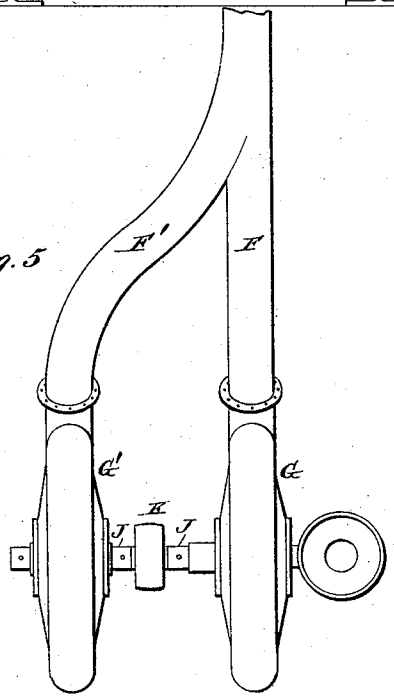
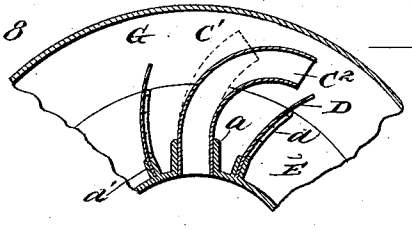


Fig. 8



Witnesses.

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UNITED STATES PATENT OFFICE.

ARTHUR P. HESLOP, OF ANACONDA, MONTANA.

PNEUMATIC CONVEYER.

SPECIFICATION forming part of Letters Patent No. 588,908, dated August 24, 1897.

Application filed June 4, 1897. Serial No. 639,371. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR P. HESLOP, a citizen of the United States, residing at Anaconda, Deer Lodge county, State of Montana, have invented certain new and useful Improvements in Pneumatic Conveyers, of which the following is a specification.

My invention relates to pneumatic conveyers for conveying and elevating dry material—such as grain, sawdust, tailings from stamp-mills and smelters, ashes, &c.—from a point of supply to a desired point of deposit; and it relates more particularly to such apparatus for moving all kinds of grain to different parts of tall buildings without destroying or injuring the grain and without injury to the machine, such transfer being effected either between points in the same or different planes, as required.

The object of my invention is to provide an apparatus of the character described which may be operated at a high rate of speed, so as to effectually perform its intended function and which may be readily applied to the various materials of the character indicated above, and my further object is to so construct such an apparatus that in rapid operation of the device choking and clogging of the machine will be effectually prevented, the distribution of the material from the feed-chamber being rendered uniform to effect its purpose.

With these general objects in view my invention consists in the novel construction and details thereof, as hereinafter described, and more particularly pointed out in the claims, with reference to the accompanying drawings, in which—

Figure 1 is a longitudinal sectional elevation of my invention. Fig. 2 is a transverse section thereof. Fig. 3 is a similar view of a slightly-modified form. Fig. 4 is a central transverse section showing a supplementary blower combined with my apparatus. Fig. 5 is a top plan view of the same. Fig. 6 is an elevation showing the application of my invention to a building having two or more stories. Fig. 7 is a detail of the construction of the fan-blower. Fig. 8 shows a modification of the discharge-pipes.

Referring now to the drawings, in which the same reference-characters relate to the same or corresponding parts in all the views, A indicates a hollow hub which is provided with two trunnions H H', to the latter of which is secured a short shaft H'', rotatably mounted in a suitable bearing J, the former of which trunnions being hollow and rotatably mounted in a similar bearing J, thus providing an inlet centrally into the hollow hub A. It is obvious that the shaft H'' may be dispensed with and the solid trunnion H' elongated and mounted directly in the bearing J, if desired.

The hollow hub A is rotatably mounted within an outer casing G, which is provided with air inlet or inlets at suitable points, said inlets being preferably formed around the trunnions of the hub A by means of the circular flanged openings *g*, formed in the casing G, said openings *g* being sufficiently larger in diameter than the trunnions which they surround to provide the annular inlet-openings for air, as shown.

Leading from the lower portion of the casing G is the discharge-pipe F, through which the blast of air and the material carried thereby are delivered, the said discharge-pipe F preferably leading tangentially from said casing, as shown. I have shown this pipe F leading upwardly for elevating material; but it is obvious that it may lead horizontally or otherwise, as desired.

Extending inwardly from the periphery of the hollow hub A are two or more partitions B, four in the present instance, consisting of thin plates of metal having their ends terminating at or near the trunnions of the hub and slightly curved and inclined, as shown, thus dividing the said hollow hub into a plurality of chambers, from each of which chambers extends a discharge tube or pipe C, secured in socket *a* and adapted to receive the material as it is discharged from the respective chambers of the hollow hub and deliver it outwardly into the path of the current of air moving toward the discharge-pipe F. The feed-pipe I extends from a suitable hopper X into the hollow trunnion H and is inclined downward, so as to deliver the material into the lower chambers of the hollow hub, the suction of the air-blast in the casing G assisting in the delivery of said material into the hub. The hopper X is provided with a suitable gate-valve L for cutting off the supply of material, when desired.

In order to create a current or blast of air within the casing G as the hollow hub rotates, I provide the said hub with a series of fan-blades D, extending outwardly from said hub, to which they are secured by suitable fastening-bolts passing through lips or flanges d' in the hub, and in order to strengthen said blades and direct the incoming air outwardly into the casing G, I preferably provide annular strengthening-plates E, between which the several fan-blades D are confined and rigidly secured by suitable flanges d, bolted thereto, and to increase the efficiency of the blast or current of air I preferably extend some of the blades slightly beyond other blades; but it will be observed in all cases that the blades D terminate inside of the ends of the discharge-pipes C, the latter being extended beyond the ends of the blades D for the purpose of preventing any possible injury to the fan-blades or to the material by contact of said blades with the material in its passage to the discharge-pipe F.

It will be observed that by dividing the central hub into a plurality of chambers the material is caused to be delivered uniformly into the chambers as the hub rotates, and as the corresponding discharge-pipe C rotates toward the bottom of the casing and into the path of the blast of air toward the discharge-pipe F the material is uniformly distributed from the said chambers, thereby avoiding any possible choking of the machine and permitting the machine to be run at a very high rate of speed. In this connection it should be noted that as the hub rotates at a high rate of speed considerable centrifugal force is developed, and consequently the material fed into the hub would have a tendency to move outward in various directions, but the partitions act as directing-surfaces to direct the material from each chamber to its respective discharge, thus obviating any tendency to clogging or choking of the pipe, which would otherwise exist if the material was not directed to separate chambers.

For heavier material it is desirable to use a modified form of discharging-pipe C, which is shown in Fig. 8, where it will be seen that the outer end of the pipe is curved, two curvatures being shown, the lesser, C', for medium-weight material and the greater, C^2, for heavier material, the curvature in each case being in the opposite direction to the motion of rotation. By this arrangement when heavier material is to be conveyed as the curved discharge tube or pipe comes toward the lower portion of the casing the centrifugal force and weight of the material which throw the material outwardly from the lower chambers will be modified somewhat by the contact of the material against the curved end portion of the tube, and the flow of material will be slightly checked, so that a deposit of a large mass of the heavy material at one point in the casing will be prevented, thus securing a uniform distribution of the material into the path of the blast or current of air as it moves toward the discharge-pipe.

In Fig. 7 I have shown an enlarged detail of the strengthening disk or plate E, which is provided with an annular flange e, that is adapted to run flush with the inside of the casing G, so as to prevent the escape of air at that point and to cause the air passing through the opening g to move outwardly between two plates E, so as to concentrate the blast or current of air near the outer periphery of the casing G.

In Fig. 3 I have shown a slightly-modified form in which the only difference lies in the omission of one of the bearings J, this form being adapted for use when conveyers of smaller size are needed, and I have in practice found that such a form operates successfully, running at the rate of speed of two thousand revolutions per minute.

In Fig. 4 I have shown, in combination with my improved conveyer, a supplemental blower, which may be of any approved design, arranged with its discharge-pipe F' leading into the discharge F of the main apparatus, the object of which is to assist the main apparatus in case it is necessary to convey the material of considerable weight, or material to a greater distance than usual. In this case I have shown a blower of the ordinary type, consisting of outwardly-projecting blades D', rotatably mounted upon the shaft H'' in the casing G'.

If desired, it is obvious that a suitable clutch mechanism may be interposed between the two blowers for the purpose of throwing either into and out of action, as desired.

In Fig. 6 I have shown a side elevation of blower in which my pneumatic conveyer G has its discharge-pipe F leading upwardly to several floors of a building, and at each floor is provided a branch discharge-pipe P for delivering material into receptacles O, at the junction of which branch pipes and main pipe I provide two gate-valves M and N, which may be opened and closed, as desired, in order to bring the material to any one or more of said floors.

I claim as my invention—

1. In a pneumatic conveyer, the combination with the casing having inlet for air, and a discharge-pipe leading therefrom, of a hollow hub rotatably mounted in said casing and fan-blades projecting therefrom, said hub being divided into a plurality of chambers, a discharge-pipe extending outwardly from each of said chambers and a feed-pipe for delivering material into the hollow hub, substantially as described.

2. In a pneumatic conveyer, the combination with a casing, an air-inlet therefor, a discharge-pipe leading from said casing, of a hollow hub rotatably mounted in said casing and divided into a plurality of chambers, means for creating a blast of air in said casing, and means for feeding material to said chambers, discharge-pipes leading from said chambers

adapted to deliver material from said chambers into the path of a blast of air as it moves toward the discharge-pipe of the casing, substantially as described.

3. In a pneumatic conveyer for granular material, the combination with the casing provided with inlets for air and a discharge-pipe leading from the casing, of a hollow hub rotatably mounted in said casing, fan-blades projecting from said hub and a discharge pipe or pipes extending outwardly from said hub and terminating outside of the ends of the fan-blades, adapted to discharge the material from the hub into the path of the blast of air passing to the discharge-pipe, substantially as described.

4. In a pneumatic conveyer, the combination with the casing provided with air-inlet and a discharge pipe or passage leading from the said casing, of a hollow hub rotatably mounted in said casing, means for feeding material to said hub, fan-blades projecting from said hub, annular plates confining said blades between them, a discharge pipe or pipes extending from said hub, and terminating beyond the ends of the fan-blades and adapted to discharge the material from the hub into the blast of air passing to the discharge-pipe of the casing, substantially as described.

5. In a pneumatic conveyer, the combination with the casing provided with air-inlet, and a discharge-pipe leading from the casing, of a hollow hub rotatably mounted in said casing, and means for feeding material to said hub, a discharge pipe or pipes extending outwardly from said hub, fan-blades extending outwardly from said casing, some of the blades extending beyond other blades, said discharge-pipes terminating beyond the ends of the fan-blades, and adapted to discharge material from the hub into the path of the blast of air passing through the discharge-pipe of the casing, substantially as described.

6. In a pneumatic conveyer, the combination with the casing provided with air-inlet and a discharge pipe or passage leading from said casing, a hollow hub rotatably mounted in said casing, fan-blades projecting from said hub, discharge pipe or pipes extending from the hub and adapted to discharge the material into the path of the blast of air passing to the discharge-pipe of the casing, substantially as described.

7. In a pneumatic conveyer, the combination with the casing provided with a central inlet for air and a discharge-pipe leading from said casing, of a hollow hub rotatably mounted in said casing, means for delivering the material to said hub, and a plurality of partitions dividing the hub into a plurality of chambers, fan-blades projecting from the hub for creating a blast of air, and discharge-pipes extending outward from the hub, having their outer ends curved in the opposite direction to the motion of rotation, substantially as described.

8. In a pneumatic conveyer, the combination with the casing provided with air-inlet and a discharge leading from said casing, of a hollow hub rotatably mounted in said casing, means for feeding material to said hub, means for creating a blast of air in said casing and a discharge pipe or pipes extending outwardly from the hub, said pipe or pipes having their outer ends curved, substantially as described.

9. In a pneumatic conveyer, the combination with the casing provided with air-inlet, and a discharge-pipe leading from the casing, of a hollow hub having discharge pipe or pipes extending outwardly therefrom, fan-blades mounted on said hub and annular plates to which said blades are secured, provided with annular flanges running in contact with the inner face of the casing, substantially as described.

In testimony whereof I have signed my names to this specification in the presence of two subscribing witnesses.

ARTHUR P. HESLOP.

Witnesses:
J. T. O'BRIEN,
E. B. HAMILTON.