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BLOWER FOR HANDLING DESICCATED MATERIAL

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Fig. 1.

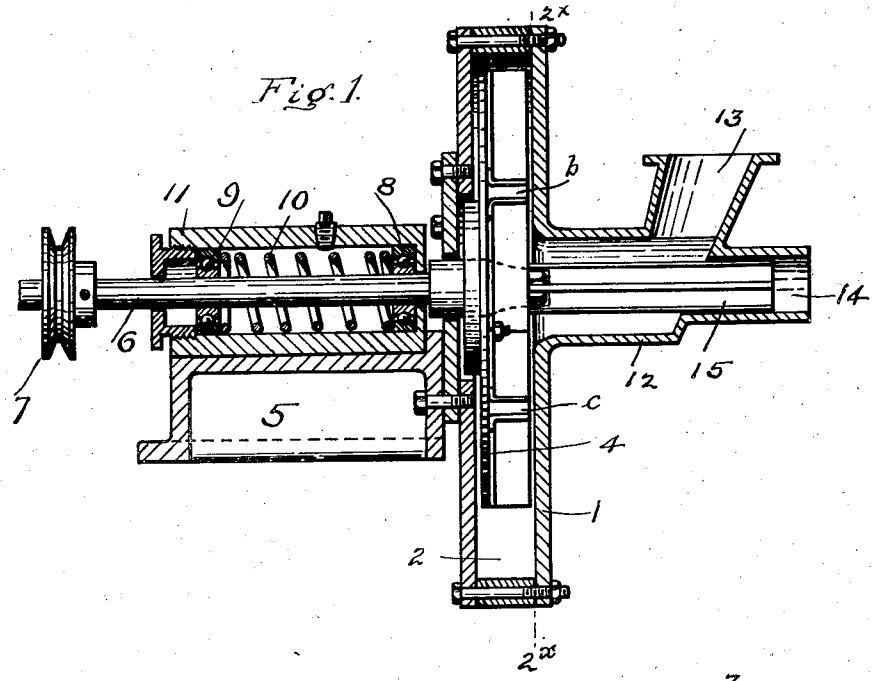
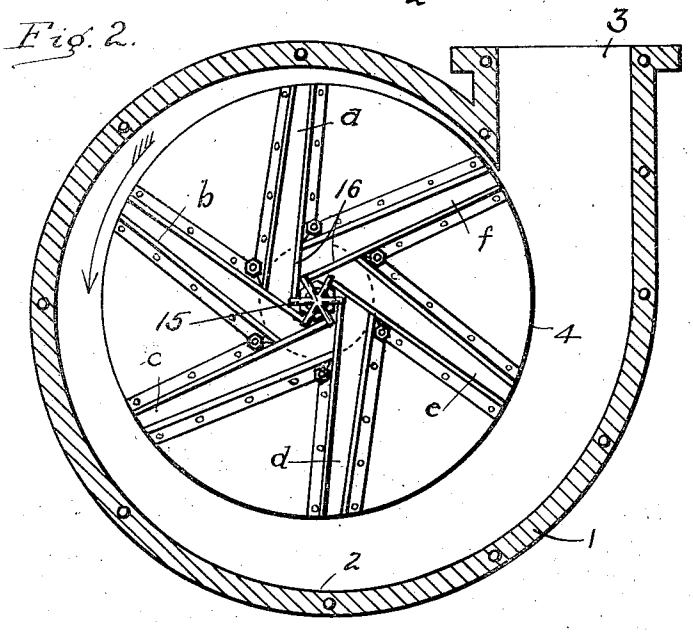


Fig. 2.



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BLOWER FOR HANDLING DESICCATED MATERIAL

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5 Claims. (Cl. 302—37)

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My present invention relates to blowers and has for its object to provide a combined form of air pump and blower particularly adapted for handling the distribution of finely divided granular material in a dry state. The invention comprehends the method of mixing a continuous stream of such material with a corresponding stream of air at their point of introduction to a revolving impeller and so acting upon the combined streams in a centrifugal manner that a compressional effect is produced which will cause said material to travel for a considerable distance through a conduit with the expenditure of minimum power.

Another object of my invention is to provide a centrifugal form of blowing apparatus into which grain or similar substances in a dry state may be fed continuously which discharges it into a conduit with a proportionally selected quantity of air with an initial force sufficient to cause it to travel vertical and lateral distances in excess of those heretofore reached with an expenditure of power greatly in excess of that which my apparatus requires.

To these and other ends my invention comprises further improvements and arrangement of parts all as will be fully explained in the following specification, the novel features thereof being set forth in the appended claims.

In the drawing:

Fig. 1 is a longitudinal sectional view of a centrifugal blower illustrating one adaptation of my present invention.

Fig. 2 is a cross sectional view showing a face view of the impeller, taken on the line 2*x*—2*x* of Fig. 1.

Similar reference characters in the several figures indicate similar parts.

My conception which has resulted in a very satisfactory type of blower for handling desiccated material resides in the creation of suitable apparatus for mixing air and granular substances initially and handling this mixture in such a way that I simultaneously increase the pressure and consequent fluidity thereof up to the moment of its discharge, from a high velocity rotary member, into a conduit leading to the bin or other receptacle located at a remote point.

In carrying out my invention I provide an apparatus comprising a narrow casing 1, substantially circular in exterior appearance the inner surface 2 of which is a volute curve leading to a discharge nozzle 3 which marks the point of attachment of a conduit (not shown) which it is to be understood may lead in any direction,

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usually vertically and then laterally to the desired point of discharge. Journaled in the casing is a rotary impeller 4. At the left hand side of casing 1 is a bracket 5 which may form the support for the apparatus and carries suitable journal bearings for the impeller shaft 6 which is rotated from a suitable source of power and may be driven by a pulley 7.

The bearings shown comprise ball races 8 and 9 which are held in spaced relation by a spring 10, said parts being mounted in a box 11.

At the right hand side of the casing 1 is a tubular inlet 12, disposed axially of the impeller 4 and opening into the casing. At a point somewhat removed from the casing the inlet has an opening in its upper side and extending therefrom and flaring outwardly is a receiving funnel 13, which forms a restricted discharge spout through which grain or similar material passes into the inlet 12. The latter, directly below said spout, has an axially disposed opening for the introduction of air. It is slightly less in diameter than that of the spout and as a structural feature I surround it with a collar 14.

Attached to the center of the impeller and extending through the inlet 12 and for a distance into the collar 14 is a rotary member 15, shaped hexagonally, or otherwise formed with a plurality of blades, against which material passing from the feed spout 13 impinges so that it is broken up or separated and distributed evenly in the air stream which is drawn into the inlet.

The impeller comprises the disc 4 which lies in close proximity to the side of the casing 1 away from the opening of inlet 12. On its face the disc has a number of ribs forming a series of channels *a, b, c, d, e, f* the arrangement and construction of which are important, and as they are similar a description of one will suffice for all.

In the drawing these channels are shown as being formed between the faces of opposing angle irons riveted to the disc and of such height that the two sides of the impeller have an operating clearance in the casing. The inner ends of the channels lie just within the circumference of the inlet 12, as indicated by the dotted circle in Fig. 2. They do not connect with each other, however, one wall of each, as indicated at 16, serving to separate it from the next channel of the series. I deem this arrangement desirable as it assures the independent action of the channels. It will be noticed that the channels instead of being radially disposed are substantially each one half of a chord of the circular disc 4, said half falling on its trailing side. Another important feature in

the channels' construction lies in the fact that they taper outwardly. This is for the purpose of concentrating the mixture of granular material and air at the point of discharge during the rotation of the impeller.

In summarizing, the practice of the method I employ for handling grain and like finely granulated substances in conjunction with the described apparatus, I wish to point out the following. The bladed rotary element in the center of the inlet imparts an initial rotary movement and a mixture of air and grain at their point of introduction to the impeller which eliminates what I call breakage of the grain, i. e. any hesitancy of the grain to take up the rotary movement of the impeller and consequently prevents any tendency to clog the inner ends of its channels. Having avoided this difficulty I prevent any tendency of the air at the center of the wheel from tending to separate from the apportioned quantity of grain, hence the pressure caused by the weight of the grain as it gathers tangential velocity increases as it moves outwardly in each passage or channel and is discharged therefrom with great velocity with the result that there is a constant uniform mixture of air and grain flowing continuously into the delivery pipe or conduit. I have determined in practice that the mixture discharged by the impeller enters the discharge conduit at a pressure several times that of the air alone and is in proportion to the specific gravity of the mixture and that it does not separate until entering a distant bin or is passed through a special separator for venting the air.

I claim:

1. In a blower, the combination with a casing having a laterally located discharge opening and a combined inlet for air and granular material opening into its center, of a rotary impeller provided with a plurality of channels extending inwardly from its periphery having their open inner ends located opposite said inlet and each closed off from the channels at its inner ends.

2. In a blower, the combination with a narrow volute casing having a central opening for the introduction of air and granular material, of a rotary impeller journaled in the casing provided with a plurality of separate independent channels opening at their inner ends into the central opening and extending tangentially of the central opening, said channels being tapered toward their outer extremities.

3. In a blower, the combination with a casing having a lateral discharge passage and provided with a central inlet for the reception of air and granular material, and a rotary device for mixing said elements before their entry into the casing, of a rotary impeller in the casing having independent non-communicating passages leading tangentially from said inlet to its periphery which are graduated in width from their inner ends outwardly to their point of discharge.

4. In a blower, the combination with a volute casing having a lateral discharge opening and a central intake opening, and a laterally extending air and granular material mixing chamber embracing the intake, of a rotary impeller in the casing, a mixing member rotating with the impeller lying in said chamber, said impeller having independent non communicating channels located tangentially of the central opening and arranged to receive separately at their inner ends a mixed stream of air and granular material from the mixing member.

5. In a blower, the combination with a narrow volute casing having an intake at one side for a mixture of air and granular material, of an air impeller journaled in the casing comprising a disc, pairs of spaced ribs on the face of the disc disposed to form channels tapering from points tangential to the casing intake to the periphery of the disc, each of said channels being closed off at its inner end from the other channels.

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