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FEEDING HOPPER FOR PNEUMATIC CONVEYERS

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FIG. 1.

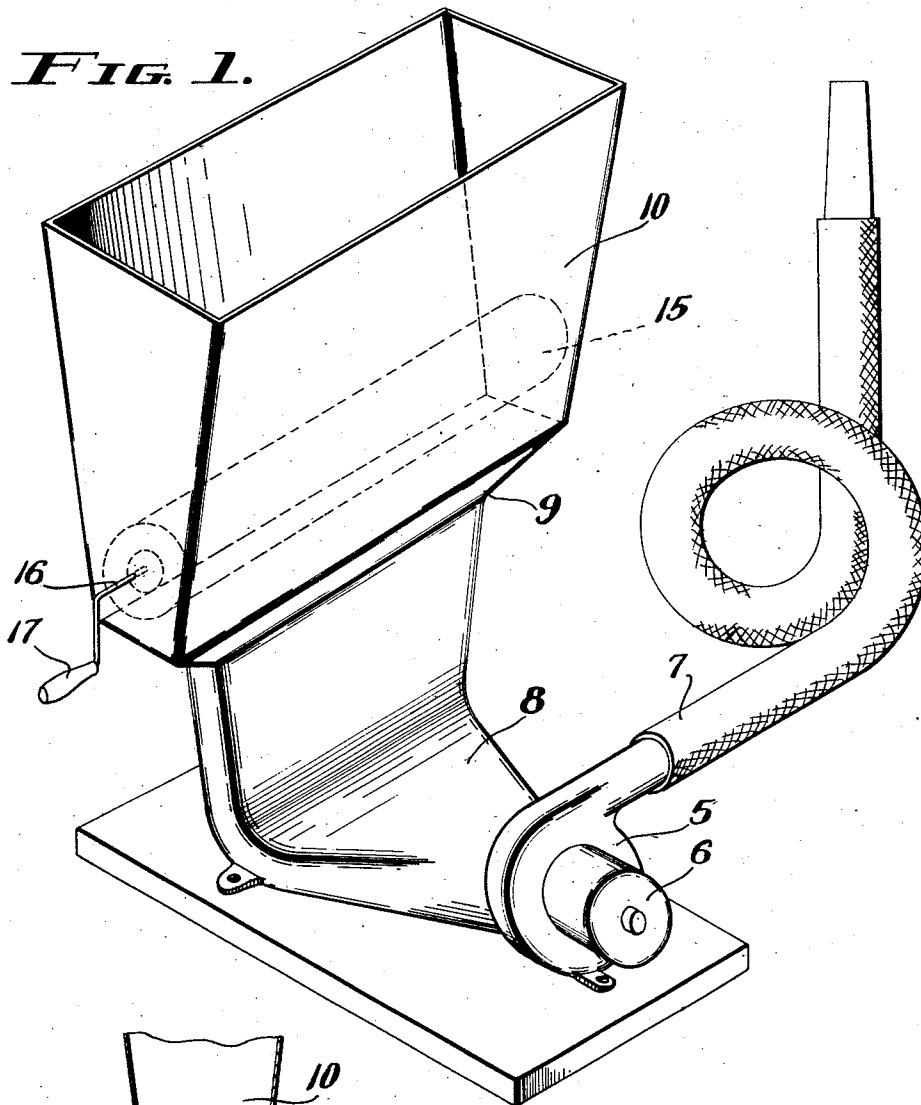
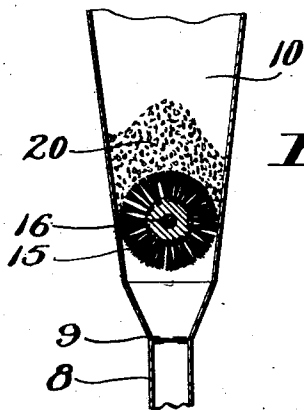


FIG. 2.

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FEEDING HOPPER FOR PNEUMATIC CONVEYERS

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This invention relates to improvements in feeding hoppers for pneumatic conveyers.

It is the object of the invention to provide a novel and simplified hopper including a device capable of feeding with substantial uniformity substances which would tend to cling to the walls of the conveyer, particular reference being made to particles of paper or other fibrous sheet material. The device will also operate however, to feed many other forms of granular and other materials.

The feeding of paper particles with any degree of uniformity has heretofore offered considerable difficulty because of the tendency of such particles to mass momentarily and to release irregularly indefinite volumes of material. I have found that through the means diagrammatically illustrated in the accompanying illustration I am able to control very successfully the delivery of paper or other sheet material to a pneumatic conveyer.

In the drawing:

Figure 1 is a diagrammatic illustration in perspective of a device embodying the invention.

Figure 2 is a transverse section through the hopper showing a detail of the rotary feeder therein.

Like parts are identified by the same reference characters throughout the several views.

The pneumatic conveyer is represented, for the purpose of this disclosure, as comprising a blower fan 5 operated by a motor 6 and provided with a tangential delivery to a flexible hose 7. This hose may lead to the nozzle employed in the application of an insulating mat to a wall surface in accordance with Patent No. 1,718,507 dated June 25, 1929. Hose 7 may also lead to an opening in a wall which is to be filled with dry paper or other insulating material. Obviously, it is immaterial from any broad standpoint to what service the pneumatic conveyer system is put.

The inlet 8 leading to fan 5 is laterally elongated in the manner which clearly appears from Fig. 1 and connects at 9 to the bottom of the hopper 10. The lateral elongation of the inlet and the corresponding form of the hopper permit the use of a rela-

tively high capacity rotary feeder 15 which is now to be described.

The rotary feeder 15 fits rather closely between the opposite side walls of the hopper. The feeder is highly porous to permit the passage of air to the blower 5. It is also highly resilient in order that it may fit closely to the wall of hopper 10 under normal circumstances and will nevertheless yield to deliver fragments of paper or other material along such wall into the air stream leading to the fan 5. The rotary feeder is also provided with a peripheral surface which is adapted to interact more or less positively with particles of paper for the delivery thereof. All of these requirements are met by the use as a feeder of a rotary brush such as that illustrated at 15. For illustrative purposes I have shown the brush mounted on a shaft 16 which, instead of being motor driven, is operated by a crank 17.

The material to be conveyed pneumatically is fed into the hopper 10 as shown at 20 where it rests upon the rotary feeding brush 15. The fan 5 is now set in operation and the blast of air moving downwardly through the hopper toward the fan will traverse the particles of material at 20 and the rotary feeding brush 15 to enter the nozzle or throat 8 leading to the fan. As long, however, as the shaft 16 remains at rest there will be no delivery of material 20 to the fan and conveyer system.

As soon as the rotary feeding device 15 is set in motion by means of the crank 17 or any other suitable means, particles of material directly caught at the ends of the bristles will be caused to pass downwardly along one wall of the hopper 10 into the fan inlet 8. The close proximity of the wall to the brush will wipe from the brush all material except such as is actually in contact with the bristles. The fact that the brush is porous and permits the passage of the air current from above, assists in freeing from the bristles the particles of paper which have been caught thereon for feeding purposes.

In practice the periphery of the brush will be substantially covered with a thin and fairly uniform layer of paper particles, virtually all of which will be delivered into the air

stream immediately upon passing the wall with which the brush interacts. Since the amount of material so delivered is proportionate to the amount of brush surface which passes the hopper wall 10 tangential thereto, it will be obvious that the rate of feed will be directly in proportion to the rate of rotation of the brush. By regulating the rate of operation of shaft 16 therefore, it is possible within wide limits to control with considerable accuracy the proportion of solid material to air in the fluid conveyer.

The feeder or brush fitted in the hopper throat permits the fluid stream to pass to the conveyer but intercepts the solids through which such stream is flowing. The feeder passes only such particles as adhere superficially to it. Thus the rate of delivery of solid matter is controlled, while fluid delivery is substantially constant.

I claim:

1. In a fluid conveyer, the combination with a fluid propelling device having an inlet pipe, of a hopper serving as the sole inlet port for said pipe, and a rotatable cylindrical brush disposed in said hopper in superficial engagement with the walls thereof, said brush being adapted to support material in the hopper and coacting with the walls thereof to meter said material for delivery into fluid passing through the hopper and brush.

2. In a fluid conveyer, the combination with a rotary fluid propelling device having an inlet pipe, of a hopper serving as the sole inlet port for said pipe, and a rotatable cylindrical brush disposed in said hopper in superficial engagement with the walls thereof and rotatable at speeds independent of the speed of the fluid propelling device, said brush being adapted to support material in the hopper and coacting with the walls thereof to meter said material for delivery into fluid passing through the hopper and brush, whereby material in the hopper may be metered at any desired rate irrespective of the fluid velocity.

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