April 8, 1930. D. S. SAMMIS 1,754,121

FEED APPARATUS

Filed March 16, 1928

Fig. 1.

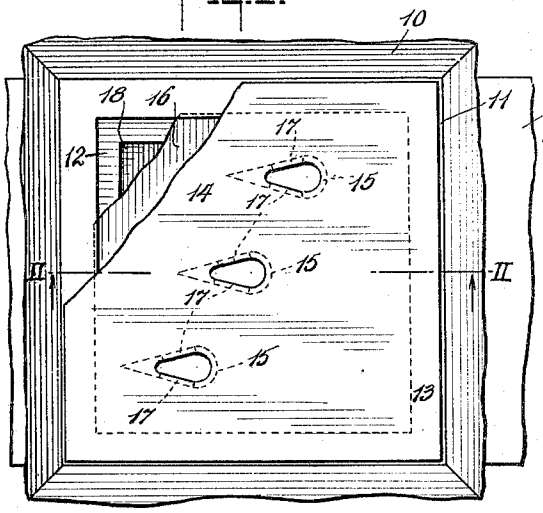
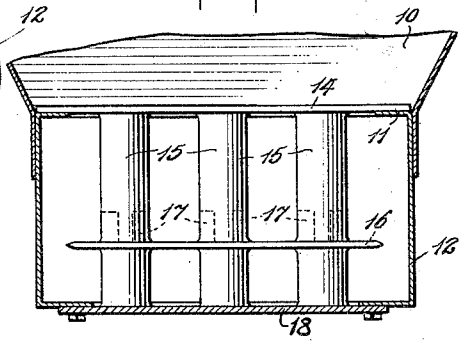


Fig. 4.



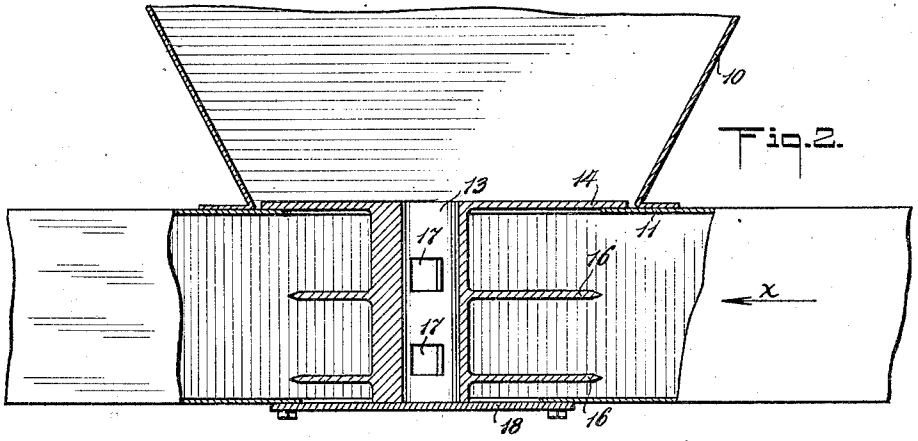
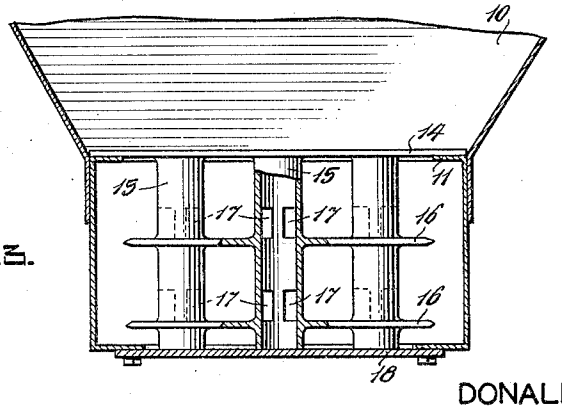


Fig. 2.

Fig. 3.



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UNITED STATES PATENT OFFICE

DONALD S. SAMMIS, OF STRATFORD, CONNECTICUT, ASSIGNOR TO THE NEW HAVEN SAND BLAST COMPANY, OF NEW HAVEN, CONNECTICUT, A CORPORATION OF CONNECTICUT

FEED APPARATUS

Application filed March 16, 1928. Serial No. 262,241.

This invention relates to apparatus whereby finely divided material may be fed into a conveying air current. More particularly it relates to apparatus to feed sand, for instance, from a hopper bottom to a conduit wherein a moving column of air carries the sand to a blast room or cabinet.

Among the objects of the invention are the formation of a feed apparatus as a single unit, the provisions of such an apparatus which may be readily removed from and replaced in the hopper from above, and the construction of such an apparatus which will be readily accessible for the removal of foreign matter or damp material when clogged therein. Other objects will appear from the following description.

I have discovered that these objects can best be realized by means of a specially-constructed apparatus, one form of which is illustrated in the accompanying drawings, wherein:

Figure 1, is a plan view of a hopper bottom to which a feed apparatus constructed in accordance with the invention has been applied,

Fig. 2, is a section on the line II—II through the hopper bottom of Figure 1, and the conveyor pipe beneath it,

Fig. 3, is an end view of Fig. 2 as seen from the right, and

Fig. 4, is a view similar to Fig. 3 showing an alternate form of the apparatus.

In the past it has been customary to convey sand, grain or other finely-divided material to a platform in a conveyor pipe or pneumatic conduit by means of nipples, the height of whose open ends above the platform governs the rate of material flow. Such a construction has been subject to serious objection, because unless the material is screened and dried before coming to the nipples the latter are likely to become clogged; and in a construction including nipples having their ends disposed above a platform inside a tube, there is scant access for cleaning out foreign particles or dislodging moist material. Further these old constructions did not provide for easy removal and replacement of the apparatus, nor has it been possible to remove and replace the apparatus through the hopper bottom which is the simplest way of doing so. Still further, former constructions have not been made unitary or as a single casting because it was considered more desirable to have the distance from the nipples to the platform adjustable. This has resulted in obvious disadvantages particularly where abrasive or moist material is to be handled.

Briefly, feed apparatus according to the present invention comprises the combination of a hopper, a conveyor pipe beneath the hopper, and a unitary feed plate of special construction insertable in and removable from the bottom of said hopper acting as a continuation thereof, and extending into the conveyor pipe. The feed plate comprises a hollow shaft, and platforms extending from the hollow shaft, openings being provided in the shaft above the platforms. The feed plate is constructed as a unitary whole.

In the drawings there is shown a hopper 10, having a bottom 11, immediately beneath which a conveyor pipe 12 is disposed. Projecting through the hopper bottom 11 and supported thereby is a sand feed plate 13, which projects into the conveyor pipe 12. The feed plate preferably extends to the bottom of the conveyor pipe.

The feed plate comprises an upper plate 14, one or more hollow shafts 15 projecting substantially perpendicularly therefrom, and platforms 16 extending in a plane substantially perpendicular to the hollow shafts. Openings 17 are provided in the hollow shafts immediately above the platforms 16 which permit the sand (or other material) flowing from the hopper into the hollow shafts, to run out upon the platforms.

It is preferred to give the hollow shafts a substantially stream line section. As is well known, a stream line section is one which divides easily and gently a body of fluid moving against it, and which permits the fluid to close together behind it without causing turbulent areas and suction pockets. Thus the forward surface of each shaft against which the fluid first flows may be given a conformation which will easily divide the fluid flowing against it (here it is shown as rounded) and the outer portions of each shaft behind these

surfaces may be formed in converging faces. See Figure 1.

The hollow shaft is open at both ends, and a door 18 in the bottom of the conveyor pipe 12 closes the lower end of the hollow shaft by bearing against its edges when shut.

The sand feed plate may be constructed with various sizes of opening 17 to control the rate of flow or to suit different types and sizes of material.

Obviously the arrangement illustrated may be varied considerably. For instance, only one platform may be employed, as shown in Fig. 4.

The operation (which for convenience will be described in connection with sand) is as follows:

With the feed apparatus arranged as described and illustrated, the hopper 10 is filled with sand. Sand will also immediately fill the hollow shafts of the feed plate, being stopped at the bottom of the shaft by the door 18. Sand from the hollow shaft will likewise flow out through the openings 17 upon the platforms 16, until stopped by attaining its angle of repose upon the platforms.

A current of air flowing through the conveyor pipe 12 in the direction of the arrow x picks up particles of sand from the platform outside of the openings 17 and will carry the same to any desired point: for instance, a sand blast room or cabinet. As sand is carried away by the air current, more sand flows through the openings. Thus an even and continuous feed of sand to the conveyor pipe is assured so long as the current of air continues.

If the sand in the hopper 10 is moist and tends to stick in the hollow shafts, the door 18 may be opened and the hollow shafts cleaned out. If foreign material, as core wires for instance, chokes the hollow shafts, these too may be cleaned out through the door 18.

It will be realized that, by giving the shafts the somewhat stream-line shape illustrated, and by positioning the openings 17 in the converging faces of the shafts an increased air velocity is effected at the point where the inertia of the same must be overcome, thus giving a better pick-up for a given rate of flow through the conduit. Likewise the stream-line shape of the hollow shafts tends to prevent abrasion of their lee surfaces by the air-carried sand and depositing of sand behind the hollow shafts. Further, the feed plates, being formed in one piece, are easily replaced after the permissive amount of wear. There is nothing adjustable about them, the size of openings being designed for the particular material to be handled. Finally, the present construction makes possible the removal of moist sand and foreign matter clogging the hollow shaft without tearing down the entire apparatus. The ruggedness and simplicity of the apparatus are self-evident. These, and other advantages make the present invention a very valuable advance in the art.

Obviously the invention is not confined to the specific details of construction here described and illustrated by way of example, nor is its use confined to sand and grain. The apparatus is susceptible of embodiment in various modified forms without departing from the underlying thought of the invention.

I claim:

1. In a feed apparatus for finely divided material, a feed plate comprising a hollow shaft, and platforms extending from said hollow shaft, there being openings in said shaft above the platforms.

2. A feed apparatus for finely divided material comprising a hopper, and a conveyor pipe beneath said hopper having an opening therein, and a door in said conveyor pipe closing the opening, in combination with a feed plate disposed in the opening in said hopper and extending to the bottom of said conveyor pipe.

3. A feed plate for feeding a finely divided material from a hopper to a conveyor pipe, said feed plate being formed as a unitary whole and comprising a hollow shaft having an opening therein, and a platform projecting from said shaft below the opening.

4. A feed plate for feeding a finely divided material from a hopper to a conveyor pipe, said feed plate being formed as a unitary whole and comprising a hollow shaft of substantially stream line section having openings in the converging faces thereof, and a platform projecting from said shaft below the openings.

5. A feed plate for feeding finely divided material from a hopper to a conveyor pipe, said feed plate being formed as a unitary whole and comprising an upper plate, a hollow shaft projecting substantially perpendicularly therefrom having an opening therein, and a platform projecting substantially at right angles to said shaft below the opening.

6. A feed plate for feeding finely divided material from a hopper to a conveyor pipe, said feed plate being formed as a unitary whole and comprising an upper plate, a hollow shaft of substantially stream line section projecting substantially perpendicularly therefrom and having openings in the converging faces thereof, and a platform projecting substantially at right angles to said shaft below the opening, substantially as described.

7. A feed apparatus for finely divided material comprising a hopper, and a conveyor pipe beneath said hopper, in combination with a feed plate including a hollow shaft

having openings therein disposed in the bottom of said hopper the hollow shaft extending to the bottom of said conveyor pipe, and a door in the bottom of said conveyor pipe closing the end of the hollow shaft, and adapted to give access to the same when open, substantially as described.

In testimony whereof I have signed my name to this specification.

DONALD S. SAMMIS.