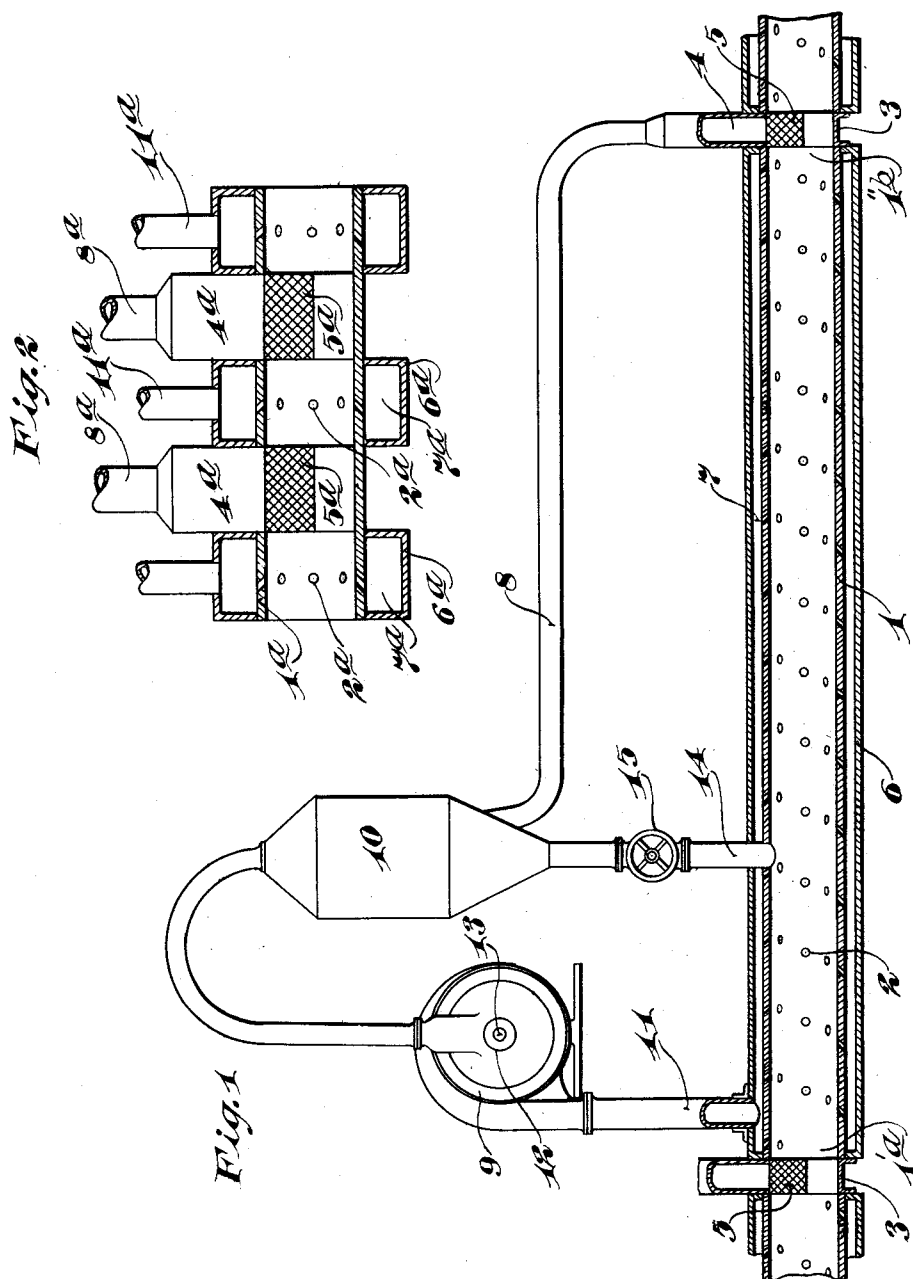


A. C. McCORD.
CONVEYING SYSTEM.
APPLICATION FILED MAR. 9, 1910.

1,051,905.

Patented Feb. 4, 1913.



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UNITED STATES PATENT OFFICE.

ALVIN C. McCORD, OF CHICAGO, ILLINOIS.

CONVEYING SYSTEM.

1,051,905.

Specification of Letters Patent.

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Application filed March 9, 1910. Serial No. 548,198.

To all whom it may concern:

Be it known that I, ALVIN C. McCORD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Conveying Systems; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In some particulars, my present invention is in the nature of an improvement upon that type of a pneumatic conveyer system disclosed and claimed in my prior Patent, #857,096, of date June 18th, 1907, but my present invention involves various novel features which make the conveyer system a thoroughly practicable commercial proposition for long distance transportation.

The invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

In the apparatus disclosed in the drawings of my said prior patent, the conducting pipe is provided with spiral perforations and an air chamber surrounding the said perforated pipe in connection with means for producing a blast of air in the said surrounding chamber. The particular object of the spirally disposed perforations was to force the material being conducted through the pipe away from the walls of the pipe, while, at the same time, propelling the same forward. This spiral arrangement is advantageously employed in the present improved conveyer system but is not an essential feature thereof. In the use of my said prior system, it was found difficult to get rid of air that was forced into the conducting pipe through the perforations or twyers thereof. This difficulty was met by decreasing the frequency of the air inlet perforations or twyers toward the delivery end of each of the several sections of the casing surrounding the perforated conducting pipe, and by connecting the delivery end portion of each section of the conveying pipe to a fan or blower and, from thence, directing the same air back into the delivery end portion of the surrounding casing and, thence, again back into the said pipe section, through the air perforations thereof. This system was, in practice, found to work perfectly. The blower or blowers will draw the air away from the exhaust ends of the conveyer pipe

sections and put the same back again into the intake ends of the surrounding casing thereof, so that one might liken the system to one in which a series of imaginary air rollers act in succession on the material which is being rolled or conveyed to its destination. It was also found that the blower will draw the air away from the conveying pipe without bringing away with it any appreciable quantity of any material, unless it should be the finest kind of dust; but, in order to provide against this, I preferably employ a dust collector or trap through which the air is passed on its way from the delivery end back to the receiving end of any particular section of the conveyer system. The decrease in the frequency, or, in other words, the increase in the spacing between the perforations of the conveyer pipe in a direction from the receiving toward the delivery ends of the sections thereof, gives the proper distribution of pressure. It would probably be the equivalent of the above stated distribution of the perforations to maintain an even spacing thereof and to decrease the size of the perforations progressively from the receiving toward the delivery ends of the pipe sections. The important thing would seem to be a progressive decrease in the conducting capacity of the perforations, in a direction from the receiving toward the delivery ends of the said pipe sections.

In a conveyer system of this type, where the conveying pipe is of great or considerable length, a large number of blowers, connected as above described, will be employed and, preferably, each fan will be independently driven by an electric motor. This improved system, therefore, contemplates the transportation of all bulk commodities, primarily by electricity, the electric force at the various points of application of the power being transformed into a pneumatic force for direct action upon the commodities which are being transported.

A portion of the conveying system, designed in accordance with my invention, is illustrated in Figure 1 of the drawings, which view is partly in section and partly in diagram. Fig. 2 is a sectional view illustrating a modified form of the apparatus.

The conveying pipe 1 is provided with spirally arranged air perforations 2, which decrease in frequency, as above stated, in a direction from the receiving end 1' to

ward the delivery end 1''^b of the assumed section of the said pipe. The said pipe is, in fact, made up of a multiplicity of axially alined pipe sections, which connect directly to annular portions 3 of air exhaust chambers 4. The passages, through the said pipe sections and through the said annular portions 3, are of such diameter that they afford an extended and unbroken conveying conduit. The upper half sections of the annular portions 3 are formed by segmental screen plates or wire gauze sections 5, that separate the interior of the air conveying conduit from the exhaust chamber 4. Each pipe section is independently jacketed by a surrounding tubular casing 6, which leaves an annular air chamber between the same and the surrounded section. Each air exhaust chamber 4 is connected by a pipe 8 to a fan or blower 9, preferably through a dust collector or dust trap 10, and in the preferred arrangement, each fan 9 is connected by an air delivery tube 11 to the receiving end of the air jacketed chamber 7. The electric motor 12, for driving the fan 9, preferably has its armature directly connected to the fan shaft 13, but so far as the broad idea of this invention is concerned, the motor may be connected to the fan in any suitable way. The dust collector 10 is shown as connected by a depending pipe 14 to the intermediate portion of the conveying tube section, from which the air is drawn and delivered into the said dust collector. In the dust delivery pipe 14 is a valve 15, preferably of an automatic type.

With the above described arrangement, it is evident that, when the fan is driven in the proper direction, it will draw the air from the corresponding air exhaust chamber 4 and will deliver the same back into the receiving end of the corresponding air jacket 7 at a point in close proximity to the air exhaust chamber 4 of the next pipe section in the direction from which the commodity is being conveyed; and, hence, the air is used over and over through the successive independent air circuits and each air circuit serves to convey the commodity or material for a certain distance and to deliver the same to the next adjacent rotating air current. In this way, an even conveying action may be maintained in a conveying conduit of any desired length.

Fig. 2 illustrates a modified construction in which the difficulties above noted are overcome. In this construction, the pipe sections 1^a and the surrounding casing sections 6^a are made very short and each is connected by a single row of air passages or twyers 2^a, and the exhaust chambers 4^a are connected to pipes 8^a, while the air chambers 7^a are connected to pipes 11^a. Segmental screen sections 5^a, which correspond to the above described screen sections

5, are also employed. In this construction, a single fan or blower may be connected to a multiplicity of pipes 8^a and 11^a.

What I claim is:

1. In a conveying system, an air jacketed conveying pipe having perforations opening thereinto from its air jacket, the conducting capacity of which perforations progressively decreases from one point toward another.

2. In a conveying system, a perforated conveying pipe having a multiplicity of surrounding air jackets, and means for drawing air from the delivery end of one assumed section of the said pipe and for delivering the same into a corresponding surrounding air jacket and, from thence, back into the same section of said conveying pipe.

3. In a conveying system, a perforated conveying pipe having a multiplicity of surrounding air jackets spaced longitudinally thereof and having perforations opening thereinto from said air jackets, and means for drawing air from the delivery ends of the assumed sections of the said conveying pipe and for delivering the same into a corresponding surrounding jacket and from thence back to the said section of said conveying pipe.

4. In a conveying system, the combination with a perforated conveying pipe having a multiplicity of surrounding air jackets spaced longitudinally thereof and having perforations opening from the respective air jackets into the said conveying pipe, said perforations from each of said jackets being arranged to progressively decrease in conducting capacity in the direction of the travel of the material through the said conveying pipe, and a multiplicity of air conduits and cooperating means for forcing air therethrough, arranged to maintain a multiplicity of endless air circuits through the several air jackets and adjacent assumed sections of the said conveying pipe and all cooperating to convey material in a common direction through the said conveying pipe.

5. In a conveying system, a perforated conveying pipe having a multiplicity of surrounding air jackets spaced longitudinally thereof and having perforations opening thereinto from said air jackets, and means for drawing air from the delivery ends of the assumed sections of the said conveying pipe and for delivering the same into a corresponding surrounding jacket and from thence back to the said section of said conveying pipe, the said perforations being spirally arranged in the walls of the said conveying tube.

6. In a conveying system, the combination with a perforated conveying pipe having a multiplicity of surrounding air jackets spaced longitudinally thereof and hav-

ing perforations opening from the respective air jackets into the said conveying pipe, said perforations from each of said jackets being arranged to progressively decrease in
5 conducting capacity in the direction of the travel of the material through the said conveying pipe, and a multiplicity of air conduits, and cooperating means for forcing air therethrough, arranged to maintain a
10 multiplicity of endless air circuits through the several air jackets and adjacent assumed

sections of the said conveying pipe and all cooperating to convey material in a common direction through the said conveying pipe, the said perforations being spirally arranged 15 in the walls of the said conveying tube.

In testimony whereof I affix my signature in presence of two witnesses.

ALVIN C. McCORD.

Witnesses:

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C. J. COPELAND.