

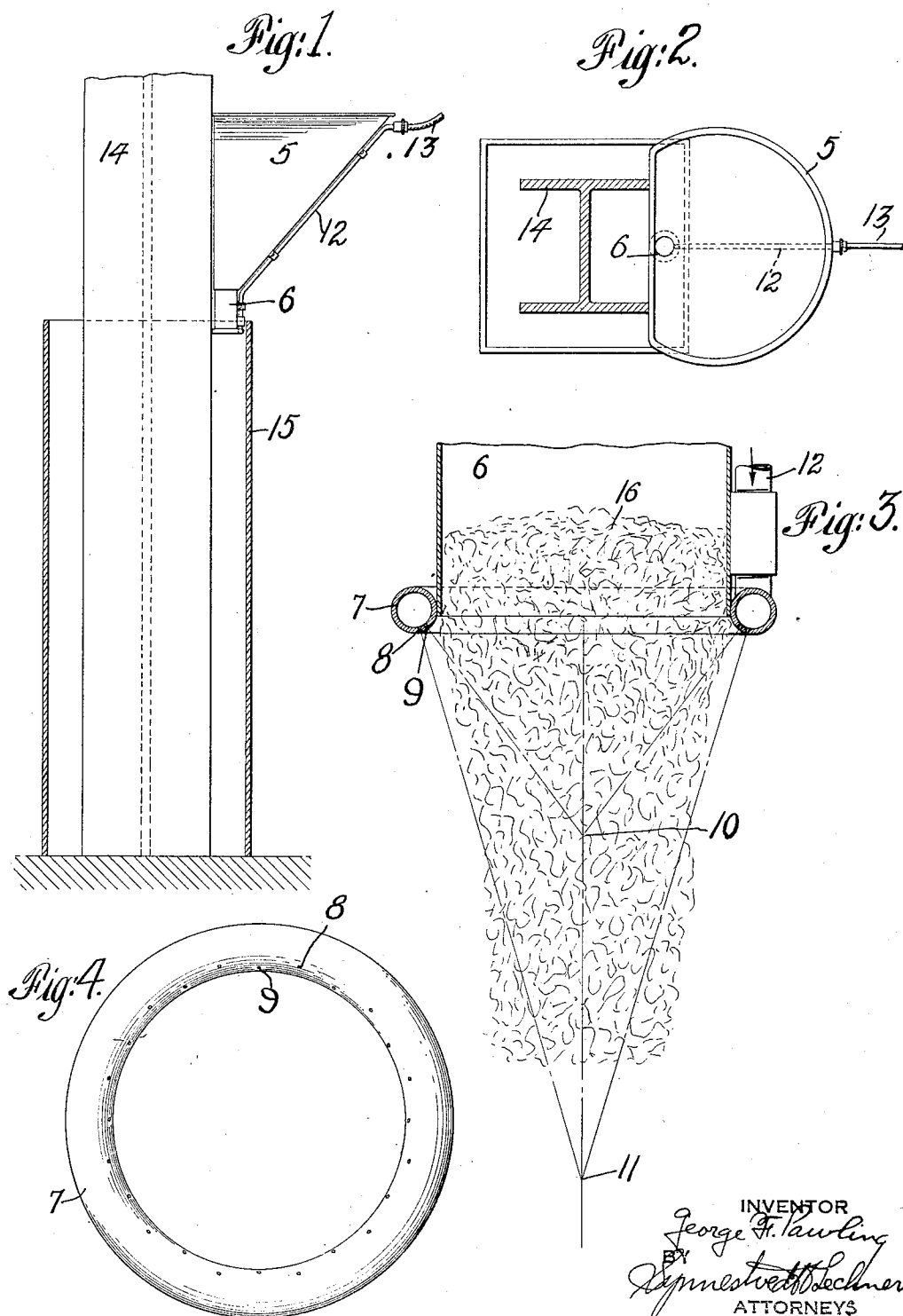
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METHOD OF AND APPARATUS FOR POURING GYPSUM OR LIKE MATERIAL

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METHOD OF AND APPARATUS FOR POURING GYPSUM OR LIKE MATERIAL

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This invention relates to an improved method of pouring gypsum or like material which is adapted to harden and set when mixed with water, as well as to an apparatus by means of which the method can be carried out.

The principal objects of the invention are to greatly simplify and expedite the handling of this type of material, as well as to markedly reduce the cost. A further object of the invention is to improve the character of the resulting structure which is particularly important in the case of gypsum. By the improvements hereinafter to be set forth I am enabled to greatly increase the crushing strength of gypsum, as well as to improve its structural characteristics.

Still another object of my invention is to provide a method of and an apparatus for pouring materials of the character described by mixing with them the least possible quantity of water which will accomplish a proper setting, which, for example, in the case of gypsum would be just sufficient water to effect proper crystallization.

In this connection it might be noted that it has heretofore been customary in placing gypsum to mix it with an equal quantity of water which produces a grout containing in the neighborhood of five times the amount of water necessary for crystallization. It has been necessary in previous practice to use this large quantity of water in order to properly handle the gypsum, for the reason that it sets very quickly and the mixture must be quite thin in order to be properly placed before setting has begun.

All of this excess water, of course, has to be dried out, and in fireproofing large columns or girders for example this often takes a very long time and interferes to a great extent with subsequent plastering and painting operations.

By my improvements I am enabled to overcome the foregoing difficulties and to improve the character of the finished work.

It is also an object of my invention to provide an extremely simple apparatus by means of which my improved method can be carried out with the assistance of labor which is

only ordinarily skilled. It is also an object of the invention to greatly reduce the amount of labor necessary for a given amount of work.

Still another object of the invention is to provide a method of and apparatus for placing gypsum or like material without creating the large clouds of dust incident to present practices and to mix the material with the water in such a way as to improve the manner in which it flows into position in the form and without material wastage, even where metal forms are used with openings there-through such as found in the ordinary metal laths commonly used in building construction.

How the foregoing objects, together with such other objects as may appear hereinafter, or are incident to my invention, are obtained will be described below in connection with the accompanying drawings which illustrate a preferred form of apparatus for carrying out my improved method.

In the drawings:—

Fig. 1 shows a type of my improved apparatus in position to pour a fireproofing coating of gypsum around a column.

Fig. 2 is a plan view of Fig. 1.

Fig. 3 is a vertical section on an enlarged scale through the bottom portion of my mixing or pouring funnel, and

Fig. 4 is a bottom plan view of a portion of my improved apparatus.

My improved apparatus consists essentially of a funnel-like member 5 having a straight sided outlet or neck portion 6.

Around the periphery at the bottom of the neck portion 6 is a hollow ring 7 provided with two series of nozzles or jets 8 and 9. By inspection of Fig. 4 it will be seen that the nozzles 8 and 9 alternate and that the individual nozzles in each series are staggered with respect to each other.

The nozzles are inclined toward the axis of the outlet opening 6, the series 9 meeting at some point 10 substantially in the center of the descending column of material and a short distance below the bottom of the outlet 6 as shown in Fig. 3 and the series 8 meeting at some point 11 in the center of the column

of descending material but substantially below the point 10.

The ring 7 is connected by means of the pipe 12 and hose 13 to any suitable source of water.

The apparatus is shown in Fig. 1 as in position for pouring a fill of fire-proofing material around a column 14, a form of any desired character 15 being shown as surrounding the column.

In operation the funnel 5 is filled with gypsum or other material of similar nature, depending upon the work in hand and the outlet 6 is designed to permit a certain flow of this material which may be suitable for the existing conditions. The material falls in a sort of a column from the mouth of the opening 6.

The proper amount of water necessary to effect complete crystallization of the material is introduced through the hose 13 and is discharged from the nozzles 8 and 9 so that as the material 16 falls through the opening 6, it will be completely surrounded by the sprays of water projected through the nozzles 8 and 9. In the progress of both the water and the material toward the form they will be thoroughly mixed a short distance below the outlet 6, as indicated roughly in Fig. 3, it being understood, of course, that Fig. 3 is somewhat diagrammatic in character, since it is difficult to illustrate just exactly what takes place in operation. However, Fig. 3 is an approximate representation of the manner in which the material falls from the outlet 6, is surrounded by the water and subsequently mixed with the water in its progress toward the form.

In carrying out the invention it should be noted that for each cubic foot of gypsum in dry form, approximately a gallon and a half of water should be sprayed through the nozzles 8 and 9. This proportion provides approximately just the amount of water which is necessary for crystallization of the gypsum, and by a few simple experiments the average operator can so regulate the flow of water coming in through the hose 13 as to exactly meet the requirements for any given size opening 6. In fact the device is designed so that with the average city water pressure coming in through the hose 13, the amount of water which will pass out of the nozzles 8 and 9 will be approximately that which is necessary for the quantity of material 16 which can pass out of the opening 6. But, as stated, if the water pressure should vary considerably, the operator can experiment by timing the quantity which flows into a given size container in order to get the right amount for the quantity of material adapted to pass through the opening 6 in the same space of time.

I have found in practice that this method of placing gypsum or like material com-

pletely eliminates the creation of clouds of dust and greatly reduces the labor involved in pouring, as well as the time of drying, so that there will be no interference with subsequent plastering and painting operations. Furthermore, gypsum, when poured with just the proper quantity of water for crystallization, has a much greater crushing strength than gypsum poured by former practices and its structural characteristics are greatly improved.

As an example of the amount of labor which can be saved, I have found in practice that the work heretofore carried on by five men can be accomplished by two men, and the result be much improved.

I have also found in practice that my invention results in a mixture of gypsum and water which forms into small drops or balls capable of readily flowing to all parts of the form, with the result that the fill of material is uniform throughout. In addition, this characteristic makes it possible to pour gypsum or like material where the forms are of light metal construction with openings of greater or less size therethrough, such as ordinarily found in metal lath. There is very little wastage or loss of material compared with what takes place in former practice where a very thin mixture has been poured.

What I claim is:—

1. A pouring device of the character described comprising in combination, a funnel for receiving the dry material, and means for spraying water into the material as it discharges from the funnel, said means including an annular series of nozzles arranged around the outlet so as to converge their streams in the center of the discharging column of material a short distance below said outlet, and a second series of nozzles around the outlet but arranged to converge their streams in the center of the discharging column at a point below said first point of convergence.

2. In apparatus for pouring gypsum or like material adapted to harden and set when mixed with water, the combination of a funnel having an outlet for discharging a column of dry material, a series of spraying nozzles surrounding the outlet arranged to converge their sprays at the center of the column, and a second series of spraying nozzles alternating with the first series also adapted to converge their sprays at the center of the column but at a different point.

3. In apparatus for pouring gypsum or like material adapted to harden and set when mixed with water, the combination of a funnel having an outlet for discharging a column of dry material, a series of spraying nozzles surrounding the outlet arranged to converge their sprays at the center of the column, and a second series of spraying noz-

zles also adapted to converge their sprays at the center of the column but at a different point.

5 4. A pouring device of the character described comprising in combination, a funnel for receiving the dry material, and means for spraying water into the material as it discharges from the funnel, said means including a series of nozzles arranged around
10 the outlet so as to direct their streams toward the interior of the discharging column of material, and a second series of nozzles arranged to direct their streams toward the center of the discharging column but in a direction different from that of the first
15 series.

5. A pouring device of the character described comprising in combination, a funnel for receiving the dry material, and means for
20 spraying water into the material as it discharges from the funnel, said means including a plurality of nozzles arranged to direct their streams toward the interior of the discharging column of material, certain streams
25 being directed toward the center of the column in a direction different from other streams.

In testimony whereof I have hereunto signed my name.

30 GEORGE F. PAWLING.

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