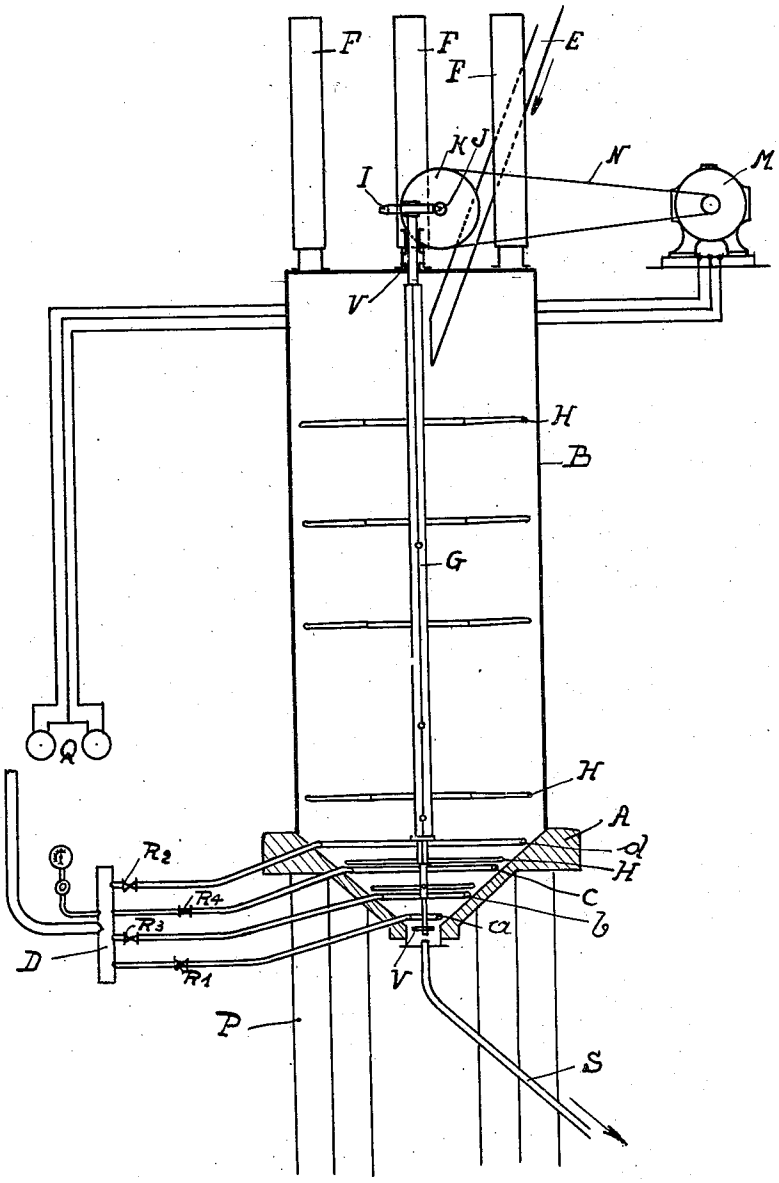
May 19, 1931. M. LEPERSONNE ET AL 1,806,068

PROCESS FOR RENDERING HOMOGENEOUS FINELY PULVERIZED MATERIALS IN LARGE MASSES

Filed Oct. 11, 1926



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Patented May 19, 1931 1,806,068

UNITED STATES PATENT OFFICE

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PROCESS FOR RENDERING HOMOGENEOUS FINELY PULVERIZED MATERIALS IN LARGE MASSES

Application filed October 11, 1926, Serial No. 140,986, and in France July 9, 1926.

The present invention relates to a process for rendering homogeneous finely pulverized materials in large masses, in particular for the preparation of the crude flour in the manufacture of Portland cement by the dry method.

This invention relates to known processes for rendering homogeneous pulverized materials in large masses in which the pulverized materials are made to acquire the fluidity of a liquid by the incorporation with the mass of a gaseous fluid, which forms a pellicle about the solid particles of the mass and thereby removes the mutual friction of such particles, the pulverized mass being mixed and rendered homogeneous by the action of a mechanical stirrer.

In the practice of such processes, as in the handling of finely pulverized cement raw material in the manufacture of Portland cement, which raw material must be thoroughly homogenized, it is known that when the raw material is delivered into the conical bottomed receptacle in which the homogenization is carried on, the material has a tendency to bridge across the smaller end of the conical bottom in successive layers and that when air or other gaseous fluid is supplied at the lower end for the purpose of imparting to the mass a fluid condition, the air sometimes fails of penetrating through the mass and sometimes breaks through the mass in the immediate vicinity of the shaft of the mechanical stirrer and so fails to bring about the desired fluid condition of the mass necessary to enable the mechanical stirrer to be set in operation. According to this invention this difficulty is overcome by introducing the gaseous fluid into the mass by successive injections, the upper bridging layers being thereby broken up and the passage of the gaseous fluid through the compacted mass being rendered possible without the breaking through of the air about the shaft of the mechanical stirrer without disturbance of the surrounding mass.

After this the stirrer is put into movement in the fluidified mass, and renders it homogeneous in the same manner as a liquid; then if the duration of the mixing operation exceeds the duration of the state of fluidity of the mass, the state of fluidity is maintained by the admission of additional air. This additional admission is regulated by simply reading the amperemeter which indicates the consumption of energy of the motor which drives the stirrer and which must be maintained constant.

A practical embodiment of the invention which has given good results consists in injecting air downwards into the lower part of the mass, in localizing these injections alternately near the periphery and near the centre and in moving further and further away therefrom until the whole of the mass is loosened in all its parts.

At this moment, as described above, the operation of rendering the mixture homogeneous may be commenced by the stirring action of the mechanical stirrer.

Apparatus for carrying out the process consists essentially of a vertical cylindrical vat resting upon a reversed frusto conical shaped base provided with an upper orifice for the admission of the mixture, a lower outlet orifice for the mixture in the conical base and upper orifices with filtering reeds for retaining the dust, a shaft with stirring arms being journalled in the axis of this vat in the base of which are disposed in the form of coaxial crowns air pipes pierced with holes directed downwards, the said pipes being connected by means of extensions provided with control cocks to a compressed air admission duct.

An example of apparatus for carrying out the process is shown in the accompanying drawing.

The mixing vat is composed of a conical concrete body A seated upon pillars P and surmounted by a cylindrical sheet metal reservoir B. In the interior of the vat moves a mechanical stirrer formed by a vertical shaft G pivotally mounted at V in the axis of the vat and provided with horizontal arms H. This shaft has keyed upon it a worm wheel I engaging with a worm J integral or virtually integral with the shaft of the pulley K driven by the belt N of the motor M.

When the motor M is started the mechanical stirrer is put into movement and the am-

peremeter Q of this motor indicates at each moment the consumption of power. The vat is provided in its base with a series of pipes *a*, *b*, *c*, *d* arranged in the form of coaxial crowns pierced with holes directed downwards and provided with control cocks R_1, R_3, R_4, R_2, regulating in the mass the admission of the air led in through the pipe D upon which these pipes are mounted. The flour enters the apparatus through the pipe E and issues from the apparatus through the duct S in a homogeneous condition. The filtering reeds F retain the dust which might have a tendency to escape.

The incorporation of air in the mass contained in the vat is obtained by opening and closing the cocks of the pipes in succession in the order R_1, R_2, R_3, R_4, repeating these operations in order to reduce the compactness of the mass little by little by a sort of loosening action by means of a dissolving action of the air until its fluidity is complete.

Once the mechanical stirrer has been put into action the fluid state may be maintained as long as is necessary either, for example, by opening intermittently the cocks of all the crowns each time the power consumed by the stirrer becomes too great, or by maintaining all or part of these cocks slightly open in a permanent manner during the whole mixing period.

What we claim is:—

The improvement in the process of rendering homogeneous a mass of pulverized material by incorporating with the mass a gaseous fluid to eliminate the mutual friction of the particles of the mass and mechanically stirring the mass, which improvement consists in introducing the gaseous fluid into the mass by injection at different heights from the bottom of the mass and simultaneously increasing the cross sectional area of the mass whereby the bridging layers are broken up and the mass has throughout the fluidity of a liquid, the mass being stirred at the same time and its fluidity maintained.

In testimony whereof we have signed our names to this specification.

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