METHOD OF CHARGING PLASTIC MATERIAL INTO MOLDS

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Witness:

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The primary object of the present invention is to deliver plastic material, such, for instance as clay and other ceramic substances, into containers such as molds, and to insure its proper distribution and solidification therein, although the invention may be used in the delivery, for other purposes, of material of the kind described, or other materials having the characteristics of solids in ductile or plastic condition. The invention proceeds upon the principle of utilizing a fluid medium under pressure for repeatedly segregating the material into individual wads or charges, and separately ejecting the same from the apparatus and with sufficient force, when the procedure involves the filling of a mold or other receptacle, to cause the wads to not only conform to spaces into which they are delivered, but to weld themselves to previously delivered wads so that upon completing the filling of the mold or receptacle, the material will exist therein as a single integral mass.

In carrying out the invention, the plastic material is fed from a supply passage, past a pressure developing space, and into a discharging barrel, in such form that the material fills the bore of the barrel and closes the same against the escape of pressure medium therethrough, with the result that the pressure medium builds up and imposes itself upon the material in such a way as to constrict the latter in a transverse dimension immediately behind the portion which fills the barrel, and thereby develop a superficial area against which the pressure medium can exert itself in the direction of discharge, and immediately thereafter tear the wad asunder in advance of the constriction and forcibly project it from the barrel. Preferably, the means for feeding the material past the pressure space and into the barrel will involve, at a suitable point in its construction, a bore bearing such relation to the bore of the barrel as will form the material into a column that snugly fits the barrel, thus insuring closure of the barrel against the escape of the pressure medium; and preferably also, the pressure medium, while coming from a source that is ample to build up the force required to constrict the column and sever and eject the wad, will nevertheless be delivered to the pressure space at such a rate of flow as to lower waste during the interval of time required for a new portion of the column to reach the discharge barrel, and to delay accumulation of pressure up to the severing and ejecting degree, until the desired length of wad has, by the feeding of the material, accumulated in the barrel; and, finally, the pressure space has such a capacity in rear of the constraining and severing point that when pressure reaches the severing and ejecting degree, the volume of pressure medium that has accumulated will be such as to lend ample efficiency to the operation by its expansive force. Steam or air may be employed as the pressure medium, with or without added material of lubricating quality, and any suitable means may be employed for keeping up a feed of material to the supply nozzle, for instance, a known type of spiral auger feed working in a hopper.

In the above description referring to the formation of the ejected material as wads, which has a particular significance as a result of the operation of the device herein disclosed, the term “wads” as found in the specification and in the appended claims means a substantial portion of the ejected material as it is severed by the built-up pressure of the pressure medium from the continuously moving column of material. This operation is possible by virtue of the rate of feed of the material through the column forming means 1 as compared with the rate of supply of the pressure medium in the pipe 5, in that the column of material when it first projects below the column forming means 1 will be uninfluenced at first by the low pressure and will continue to be uninfluenced until the projecting column has substantially filled the projecting nozzle 2. It will be readily understood that during the time that the projecting column has closed the inner end of the projecting nozzle 2 until the column has advanced to the end of the nozzle 2, the pressure medium has been held against escape within the chamber 4, and during this interval, the rate of feed of the column is so proportioned to the feed of fluid supply that the pressure is sufficient at this time to constrict and sever...
the column at the inner end of the nozzle 2 and to eject the wad remaining in the outer portion of the nozzle 2 into the mold. It can be seen from this explanation that the term "wad" defines a portion of the column of material at a length substantially equal to the length of the nozzle 2 shown in the drawing, and as used in the claims, refers to such a shape as differing from finely divided material which is formed as a result of the atomizing action. The accompanying drawing is a vertical axial section of the preferred form of apparatus through means of which to realize the invention.

1. Represents a forming and supplying nozzle to which material is constantly fed at a predetermined rate, and from which the material issues in the form of a column and passes to a discharging barrel 2 which it fits tightly enough to close the barrel against the passage of pressure medium. In reaching the barrel 2, the column of material passes a pressure space 3 to which the pressure medium is supplied, preferably by way of an accumulat

2. As the column of material passes the pressure space 3 and enters the barrel 2, pressure medium begins to build up in the chamber 4, and, being fed through pipe 5 at the proper rate, will attain a pressure by the time the column has progressed a predetermined distance in the barrel 2, to cause the pressure to deform the column and confine it transversely at and beyond the space 3, and this constriction will continue until the development of a rearwardly presented superficial area sufficient to enable the pressure medium to tear the newly formed wad asunder at the constriction or neck, and drive the portion of wad thus segregated from the barrel. This discharge of the segregated wad reopens the barrel 2, with consequent evacuation of pressure at the space 3 and in the chamber 4, which condition continues until a new portion of the column arrives at and fills the bore 2, whereupon the operation repeats itself.

As one desirable means for maintaining feed of material to and causing its issuance from the forming and supplying nozzle 1, the spiral auger or worm feed 6, working through the hopper 7 and into the throat 8, has been found quite satisfactory. By properly coordinating the speed of revolution of the feed member 6, the flow of pressure medium through the pipe 5 and the capacity of pressure chamber 4, the operation can proceed as a series of rapidly recurring discharges under such force, developed by muzzle velocity and mass of the individual wads, as will insure a compact loading of a receptacle, such, for instance, as a brick mold A placed to receive the discharge. By regulating the rate of flow through pipe 5 and properly selecting the capacity of the chamber 4 at a given rate of advancement of the material by the screw 6, the column may obviously be caused to progress a greater or less distance through the barrel 2 before the pressure becomes sufficient to constrict and sever the wad.

I claim:

1. The method of delivering plastic material, which consists in subdividing the material into successive wads, and blowing the wads intact into a receptacle.

2. The method of delivering plastic material, which consists in subdividing the material into successive wads, and blowing the wads intact into a receptacle with sufficient force to flow the mass of the wad and cause it to conform to the space which receives it and cohere with other wads against which it impinges.

3. The process of feeding plastic material, which consists in subjecting a body of the material to the segregating action of a pressure medium, and causing the pressure medium to impel a segregated portion in the form of an intact wad, to the place in which it is to be received.

4. The method of delivering plastic material, which consists in feeding the material in a column past a pressure space, subjecting the column laterally to the constricting and severing action of a pressure medium at said space, and impelling segregated wads of the material intact to a place of reception.

5. The method of producing and ejecting segregated wads of plastic material, which consists in passing the material from a supply passage, past a pressure developing space, to a discharging barrel and applying a fluid medium under pressure to the material at said space, and by the pressure of said medium severing a wad of such material and forcing it through the barrel.

6. The method of producing and delivering segregated wads of plastic material, which consists in feeding the plastic material in column form, past a segregating and pressure developing space, and into a delivery barrel, and applying a fluid medium under pressure against the column at said space until the column is constricted transversely and provided with a superficial area against which the pressure medium can act in the direction of delivery, and the portion of the column in advance of the constriction is severed and driven through the barrel.

7. The method of producing and delivering segregated wads of plastic material, which consists in forming the material into a column, feeding said column past a defined pressure space and into a barrel which the column closes against the escape of pressure medium, maintaining a fluid medium under pressure around the column at said space, and increasing the pressure of said medium...
as the column advances until the column is constricted and severed, and the resultant wad is driven from the barrel.

8. The method of delivering plastic material, which consists in feeding the material in the form of a column, from a forming nozzle, past a pressure space, and into a discharge barrel, causing the column to close the nozzle and the barrel against the escape of pressure medium from the pressure space through said nozzle and barrel, and accumulating the fluid medium under progressively increasing pressure around the column of material and thereby constricting the column transversely, and ultimately severing it as it passes said space, the duration of feed prior to severance of the column being regulated by the rate of accumulation of pressure medium at the space.

9. The method of delivering plastic material, which consists in feeding the material through a column forming space, past a pressure space, and into a projecting barrel, filling the column forming space and projecting barrel by means of the column against the escape of fluid from the pressure space and progressively building the pressure of a fluid medium in said space and in an accumulator communicating therewith until the pressure around the column constricts and severs a wad from the column, and the expansive force of the accumulated pressure medium drives the wad from the barrel.

Signed at Oak Hill, Ohio, this 14th day of April, 1926.

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