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CEMENT GUN NOZZLE

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Fig. 1.

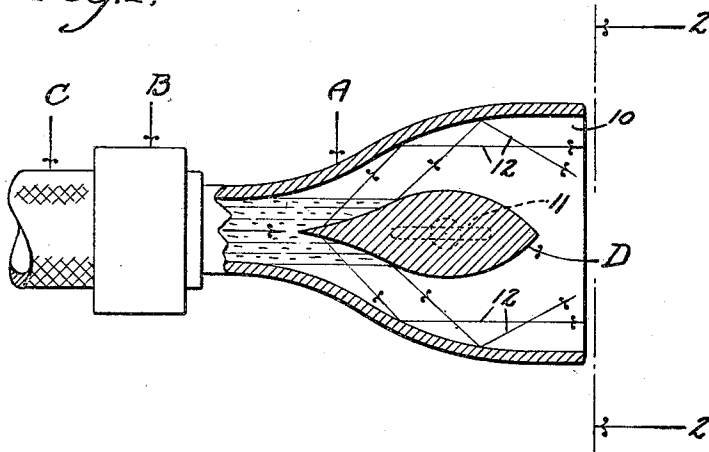
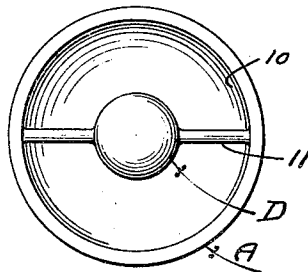


Fig. 2.



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CEMENT GUN NOZZLE

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This invention relates to cement gun nozzles and deals with the deposition of particles of a hydrated concrete mixture or its equivalent upon a surface by means of air pressure. In applying cement or "Gunite" by means of a cement gun equipment, it is well known that a certain amount of rebound of the particles takes place as the particles are deposited upon the surface and ranges from a small percentage of the total amount of material conveyed, to a high percentage of conveyed material depending largely upon the nature of the deposited product desired. In cases where a dense compact concrete is required, it becomes necessary to apply the particles with a high velocity in order to obtain a ramming action of the projected particles and, consequently, a great amount of rebound takes place. But in cases where such high density is not required but more nearly equals the density of average hand work, the rebound of particles introduces a waste of material and a loss of time. The control of rebound of particles in cement gun operation, therefore, becomes of paramount importance. Accordingly, it becomes an object of this invention to provide a cement gun nozzle having means therein which operates as a deterrent against the rebounding of particles.

Rebound, as it is used in this instance, may be defined as the reflecting of particles of material from a depositing surface; the reflected energy being due to the incident energy of each particle. This invention, therefore, deals with the ballistic properties or incident velocity of the projected particles and is not primarily concerned with the density of deposition only in so far as the characteristics of such deposits are effected by the speed of the impacting particles. It, therefore, becomes another object of this invention to provide a nozzle of the character described characterized by having elements capable of altering the ballistic properties of the projected particles.

In considering the ballistics of the particles as related to rebound, it is clear that any change in the incident velocity of the particles directly affects the percentage of rebound. Any decrease, therefore, in the in-

cident velocity of the particles issuing from the nozzle orifice operates to reduce the rebound of particles from a depositing surface. Accordingly, it becomes a further object of this invention to introduce into a cement gun nozzle an obstructing element designed to retard the flow of the particles therethrough in a manner to decrease the velocity of the particles.

This invention, broadly speaking, contemplates the reduction of particle velocity by deflecting the particles in transit and consequently setting up a disturbance amongst the particles which appreciably reduces their velocity. An additional portion of the velocity of the particles is absorbed by ineffective work performed against the sectional area of the obstructing element transverse to the normal particle movement. It is clear that by disturbing the normal flow of particles an agitation is set up amongst the particles that interrupts their flow and thereby converts a large amount of kinetic energy of the particles into heat that is rapidly dissipated by the volume of air flowing therethrough. Manifestly, therefore, the particles after passing through such a zone of disturbance must emerge with a greatly reduced velocity. A nozzle of the above character is especially adapted for work when depositing upon a flat horizontal surface where no high degree of densification is required. In the embodiment of my invention shown and illustrated in the drawing, I have incorporated a deflecting arrangement in the orifice of a nozzle for use in combination with the ordinary cement gun equipment.

Other objects and advantages will become evident upon reading the detailed description taken in conjunction with the drawing in which

Fig. 1 is a horizontal view partly in section; and

Fig. 2 is a view taken on the line 2—2 of Fig. 1.

In all forms of my invention the principle involved deals with the impediment of the flow of the material particles before leaving the nozzle orifice. For this purpose, I have illustrated a nozzle A, the walls of which

flare outwardly and form an orifice 10 of greater diameter than the base of the nozzle. The nozzle A in turn is connected in any suitable manner to a water ring B which
5 is mounted upon the end of a material conveying hose C. For retarding the material particles flowing outwardly through the nozzle A, I have provided an obstructing body D centrally positioned in the nozzle orifice
10 10. As shown, the body D takes a somewhat stream line effect and operates to deflect the particles substantially as shown on lines 12. By thus deflecting the particles from the normal course of travel, part of the kinetic energy of the particles is reduced to heat caused
15 by the friction of the particles amongst themselves and against the nozzle structure and part is absorbed by the reaction against the transverse section of the obstructing element
20 normal to the flow of the particles. This results in appreciably reducing the velocity of the particles and is the primary object sought in this invention.

Means is provided for supporting the body
25 D in the orifice of the nozzle A and preferably consists of supporting vanes 11 which support the body D by extending the wall of the orifice. In respect to the mounting of the body D within the orifice, it is understood that the means shown is for purposes
30 of illustration only, and that any other means which performs the same function is acceptable for the purpose described. The structure thus provided is recognized as a means
35 of dissipating a portion of the energy of the particles of a mixture and thereby reducing their velocity.

I am aware that various types of nozzles and various forms of obstructing bodies may
40 be utilized and the same results obtained. It is, therefore, the intention of this invention to include all such forms of nozzles and obstructing bodies that embody the principle of my invention.

45 I claim as my invention:

A cement gun nozzle for projecting hydrated particles of material comprising, a nozzle having an expanded orifice, and an
50 ovicular shaped member centrally disposed in said nozzle, the distance between the walls of the nozzle and the ovicular member increasing diametrically from the greatest diameter of the ovicular member to the orifice of said nozzle.

55 In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 18 day of December, 1929.

JOHN T. VAWTER.