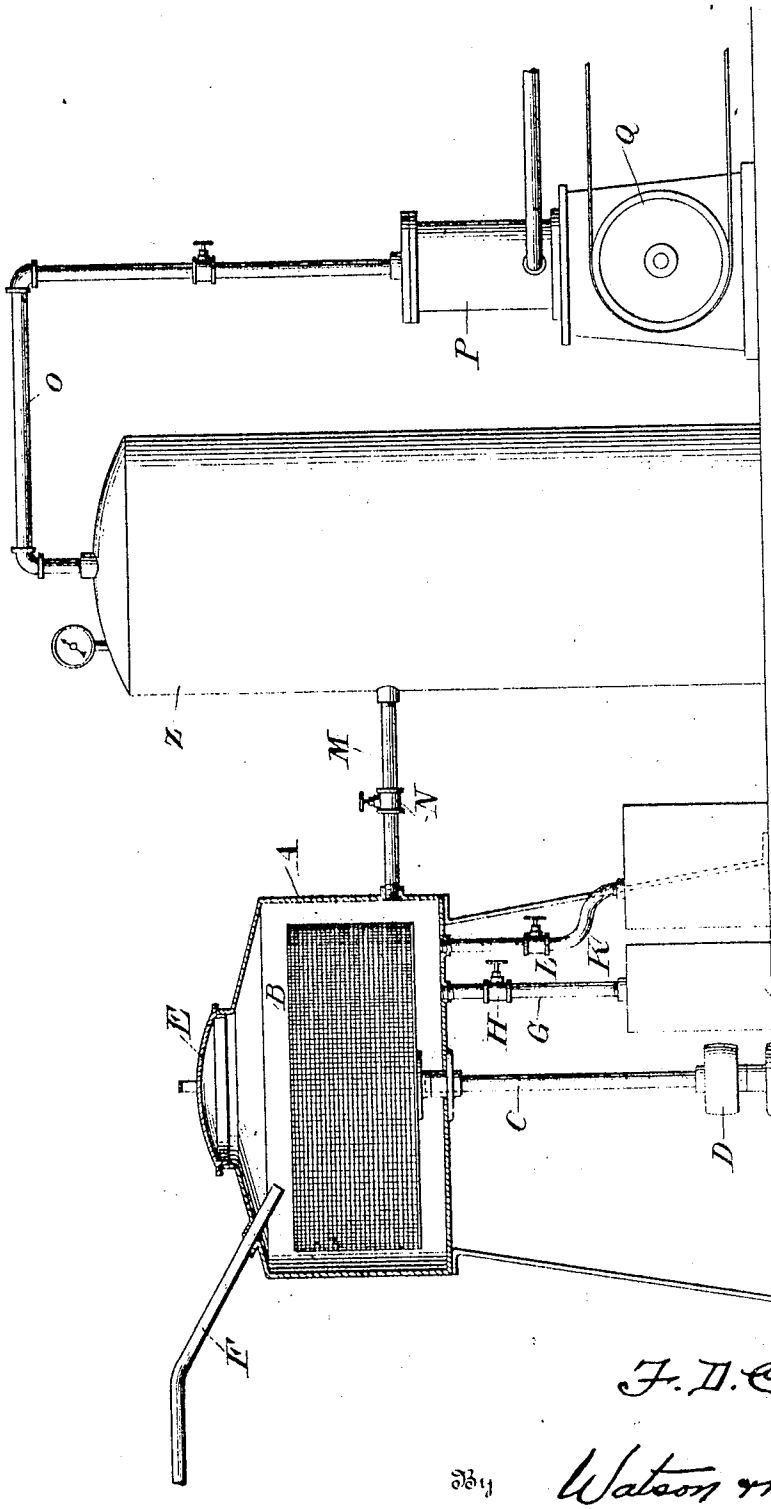
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METHOD OF AND APPARATUS FOR TREATING GUNCOTTON AND THE LIKE.

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1,295,089. Patented Feb. 18, 1919.



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METHOD OF AND APPARATUS FOR TREATING GUNCOTTON AND THE LIKE.

1,295,089. Specification of Letters Patent. Patented Feb. 18, 1919.

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To all whom it may concern:

Be it known that I, FREDERICK D. CRANE, a citizen of the United States, residing at Montclair, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Methods of and Apparatus for Treating Guncotton and the like, of which the following is a specification.

This invention relates to an improvement in the art of treating coherent masses of material in a centrifugal wringer or drier. The invention is especially adapted for use in connection with the manufacture of gun cotton or nitro-cellulose, but is also applicable to any other material liable to spontaneous decomposition when in a centrifuge.

In the manufacture of gun cotton as at present carried out, the mass, after being treated with acid, is loaded into a centrifugal wringer or drier, which is then rapidly rotated so as to free the mass from the contained acid. After the first wringing to remove the acid, water or other liquid is then run into the centrifuge so as to thoroughly wash the material.

Frequently during these wringing operations, the gun cotton in the centrifuge spontaneously ignites and produces a premature decomposition, the results of which are often wasteful and disastrous. It is the object of the present invention to provide means for preventing such decompositions, and also for facilitating the removal of the acids and other liquids from the mass. To this end, the invention contemplates inclosing the centrifuge in an air-tight casing and partially exhausing the air from such casing when a certain stage in the drying operation is reached. The production of such a partial vacuum results in the rapid vaporization of the liquids contained in the gun cotton, and this tends to cool and loosen up the mass, thus lessening the tendency to spontaneous chemical action and allowing the liquids to drain out better.

In order that the invention may be clearly understood, reference is had to the accompanying drawing, which diagrammatically illustrates one embodiment of apparatus arranged for carrying out my improved process.

In the drawing, A represents an air-tight casing inclosing a centrifugal drier or centrifuge B, preferably having foraminous walls and mounted upon the upper end of a shaft C, passing through a suitable gasket in the bottom of the casing A. The shaft C may be rotated by any suitable means, such, for example, as a power belt (not shown) working around the pulley D, secured to the shaft. The casing A is provided with a cover E, which is so constructed as to be held to its seat by outside atmospheric pressure, but is unseated by internal pressure. A suitable pipe F enters the casing above the centrifuge for the purpose of supplying wash water, or the like.

From the bottom of the casing A extend waste pipes G and K, to suitable receivers X and Y, respectively, the pipes being provided with shut-off valves H and I, respectively. The casing A is preferably connected by means of the pipe M with a relatively large vacuum chamber Z. A suitable manually controlled valve N is interposed in the pipe. Air is exhausted from the chamber Z by means of a pump P, of any suitable construction, connected to the chamber by a pipe O and driven from any suitable source of power acting upon a pulley Q.

In carrying out my invention, the pump P is operated until the air has been exhausted from the chamber Z, to any desired extent, so that a partial vacuum is produced in this chamber, the valve N being closed. A mass of gun cotton to be treated is loaded into the centrifuge B and the cover E replaced. The centrifuge is then rotated at a suitable speed so as to drive the contained liquids out of the mass. At a suitable stage in this wringing operation, the valve N is opened. This permits the air or other gases contained in the casing A to rush into the vacuum chamber Z, thus producing a sudden reduction of pressure in the casing A. As a consequence, the volatile liquids contained in the mass being treated rapidly vaporize, and such vaporization produces a decided cooling of the material. It also loosens up the mass and facilitates the escape of acids or other liquids. This loosening up is also due to the expansion of the air or gas which is trapped in the pores of the material. The evaporation and expansion above mentioned also produces a slight drying action which facilitates the work of the centrifuges to that extent. The cooling and loosening up of the mass tends to prevent spontaneous action or combustion, as does also the lessening of the air pressure surrounding the mass.

It will be understood that the pipes G and K and receivers X and Y are for the purpose of collecting the acids and wash waters discharged from the centrifuge, the valves H and L being opened and closed at different stages of the process. It will be obvious, also, that by opening and closing the valve N while maintaining the pump P in operation, a charge or batch of material being treated may be subjected to as many successive reductions of pressure as may be necessary or desirable.

I prefer to employ a vacuum chamber Z, of relatively large size, as shown, in addition to the pump, rather than to rely upon a pump alone, since by means of the vacuum chamber, I can obtain a very sudden reduction of pressure in the casing A, and furthermore, the degree of vacuum or the amount of reduction can be controlled as desired by the operator, by means of the valve N, independent of the speed or capacity of the pump.

It is obvious that the method and apparatus herein described may be found useful for treating coherent masses of material other than gun cotton, since, apart from the explosion-preventing function, the invention has also the important function of facilitating the action of the centrifuge by loosening up and increasing the porosity of the mass.

What I claim is:

1. The herein described method of treating a coherent mass in a centrifugal drier which consists in producing a sudden definite reduction in the pressure of the gaseous medium surrounding the mass, when the mass reaches a certain desired condition.

2. The herein described method of treating a coherent mass in a centrifugal drier which consists in drying the mass to a certain extent and thereupon subjecting it to the action of a partial vacuum, whereby the contained liquid is suddenly vaporized, thus loosening up the mass.

3. That improvement in the art of manufacturing gun cotton or the like which consists in subjecting it while acid wet to the action of a centrifugal drier in a partial vacuum.

4. In the art of manufacturing gun cotton and the like, in which the acid wet mass is treated in a centrifugal drier, that improvement which consists in suddenly subjecting such mass to the action of a partial vacuum, whereby the mass is cooled and rendered porous by the resulting rapid vaporization of the contained liquid.

5. The herein described method of preventing the premature explosion of a mass of wet gun cotton while being treated in a centrifugal drier, which consists in suddenly reducing the pressure of the gaseous medium surrounding the mass at a definite stage in the drying process, whereby the resulting rapid vaporization of the contained liquid serves to cool and loosen up the mass.

6. In apparatus of the class described, the combination with a centrifugal drier, of an air-tight casing inclosing the same, a relatively large vacuum chamber, a valve controlled conduit connecting said casing and chamber, and means for exhausting the air from said vacuum chamber.

In testimony whereof I have affixed my signature.

FREDERICK D. CRANE.