

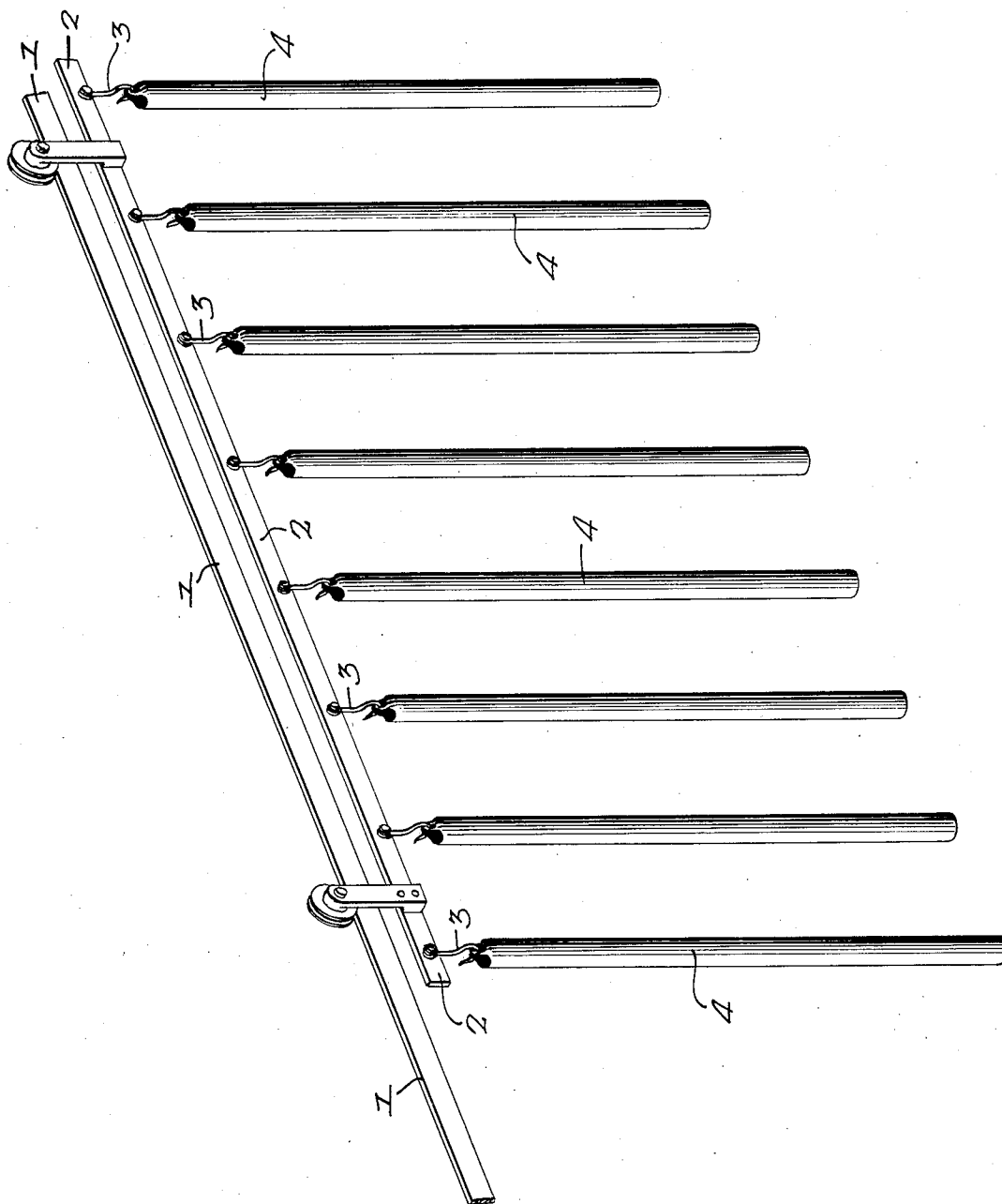
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J. B. BRONSTEIN

METHOD OF DRYING FINELY DIVIDED MATERIALS

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METHOD OF DRYING FINELY-DIVIDED MATERIALS.

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To all whom it may concern:

Be it known that I, JESSE B. BRONSTEIN, a citizen of the United States, and resident of Allentown, Lehigh County, Pennsylvania, have invented certain Improvements in Methods of Drying Finely-Divided Materials, of which the following is a specification.

This invention relates to processes of drying solid explosive bodies, and relates more particularly to an improved process for drying wet nitro starch, trinitrophenylmethylnitramine and similar highly sensitive explosives existing in a finely divided state.

The attached drawing illustrates in perspective apparatus by means of which my method may be utilized.

The usual practice in drying nitrostarch, trinitrophenylmethylnitramine, tetranitroaniline and other like pulverulent and highly sensitive explosive bodies has been to spread the wet material upon trays in a thin layer, the trays being spaced apart and then exposed to warm air or other drying means. This method, however, is open to the objection that as the material becomes dry, particles thereof are carried from the trays by the circulating air currents and deposited upon the shelves or racks supporting the trays, and there is always danger that friction produced by the movement of the trays in and out of their positions on the racks may ignite these particles. This process is open to further objection because of the static electric charges which may be produced by the passage of the warm air over and between the parallel layers of the drying material and the separation of the small particles from the body of the material as already explained, these electric charges undoubtedly being responsible for some of the numerous accidents which occur under this system.

I have discovered a means whereby these objectionable features may be eliminated, and the drying process for explosive materials of the nature specified made comparatively safe. My improved process comprises broadly, separating the material to be dried from the drying agent by means of a fabric or the like which is impermeable to the drying agent and to the solid to be dried, but which is permeable to the liquid

from which the solid is to be separated, and in thus drying the finely divided explosive substance by capillary transfer of its contained liquid to the fabric surface, instead of permitting the air or other drying fluid to come into direct contact with any free surface of the material to be dried.

In the accompanying drawing I have shown, in perspective, a convenient form of apparatus, by means of which the method may be employed; said apparatus comprising rail 1 supported by any suitable means (not shown) in a suitable drying room or tunnel, on which rail is hung a movable support 2 carrying hooks 3 adapted to receive and support the drying bags or tubes 4.

In carrying out my process I prefer to enclose the wet explosive material in containers consisting of elongated tubular bags 4 of a closely woven fabric of silk, wool, or cotton, the fabric being sufficiently close to prevent particles of the contained material from passing through, but not so tight as to prevent the ready passage of the water or other liquid from which the finely divided solid is to be freed. A convenient size of tube for the purpose is fifty inches in length, and from one and one-half inches to two and one-half inches in diameter, though of course I may employ tubes of any size, the dimensions being varied to suit existing conditions.

In passing the wet explosive material into the tubes, I prefer to add to the material sufficient water to form a fluid or semi-fluid mass, this mass being of a consistency to permit of it being poured into the bags, this method of loading having been found simple and cheap. Having transferred the wet material to be dried to the interior of the elongated fabric containers, I next preferably hang a number of these filled containers from hooks 3 in a suitably ventilated room or chamber. The tubes may be hung in any manner desired, but I prefer to hang them from one extremity from hooks or supports spaced from three to twelve inches apart, in a chamber or tunnel only slightly deeper than the length of the tubes, and of width sufficient to accommodate the number of tubes forming a single row, the length of the tunnel being as desired. Warm air is then passed through the chamber, the temperature of the air being preferably about 60° C. After the bags

have been filled sufficient time is preferably allowed for the excess water to drain off, the fabric of the bag acting as a filtering surface. The wet bags are then hung in the
5 drying chamber or tunnel, previously described, where the moisture in the material in the interior of the tubes is transferred wholly by capillarity to the surface of the tube, this cloth surface of the tube continually losing its moisture to the air current. As
10 the fabric surface of the tube becomes dryer, it in turn takes up water by capillarity from the layer of the explosive material in contact with it, and this layer in turn abstracts
15 water from the next inner layer.

This transfer of water by capillarity continues until, at the expiration of from 24 to 48 hours, with proper drying conditions, the entire tube and contents are substantially
20 dry.

I claim:

1. The process of drying finely divided solids, which comprises confining the material to be dried in a tubular fabric container
25 of length relatively great as compared to its

width, and exposing said container to a drying atmosphere.

2. The process of drying finely divided solids, which comprises confining the material to be dried in a tubular fabric container
30 of length relatively great as compared to its width, and suspending said container with its contents in a current of drying fluid.

3. The process of drying finely divided solids, which comprises the forming of said
35 solid into a fluid mass by admixture with a liquid, causing said mass to flow into a tubular fabric container of length relatively great as compared to its width, and exposing said container to a current of drying fluid.
40

4. The process of drying nitrostarch, which comprises filling a tubular fabric bag of length relatively great as compared to its width with a slurry of the nitrostarch, and exposing the bag to a drying atmosphere
45 until the evaporation of the moisture from the surface of the bag has reduced by capillarity the moisture content of the contained nitrostarch to the desired extent.

JESSE B. BRONSTEIN.