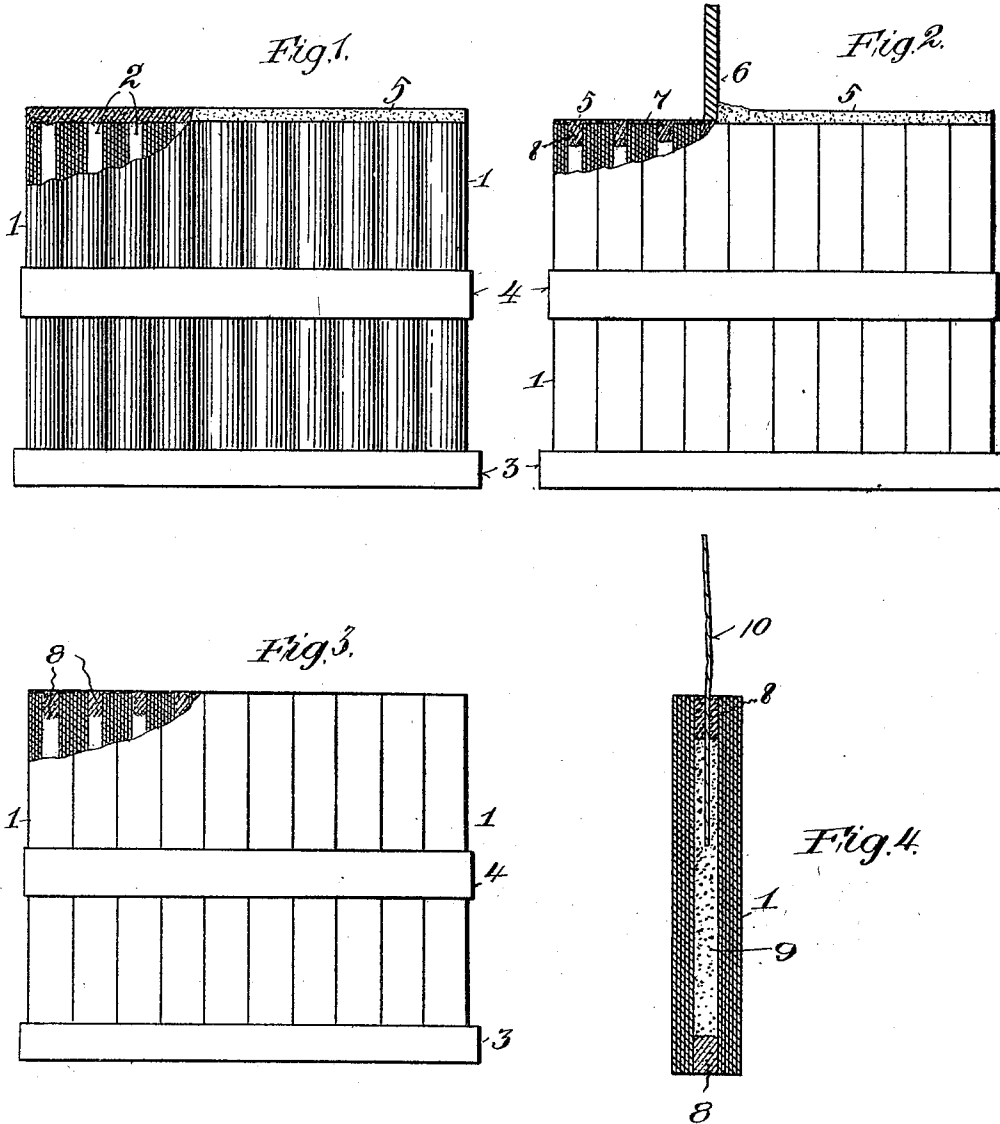


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FIRE CRACKER AND CHOKING MATERIAL FOR THE SAME.
APPLICATION FILED NOV. 18, 1909.

1,002,744.

Patented Sept. 5, 1911.



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UNITED STATES PATENT OFFICE.

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FIRE-CRACKER AND CHOKING MATERIAL FOR THE SAME.

1,002,744.

Specification of Letters Patent.

Patented Sept. 5, 1911.

Application filed November 18, 1909. Serial No. 523,661.

To all whom it may concern:

Be it known that I, LOUIS NORDLINGER, a citizen of the United States, and a resident of the city, county, and State of New York, whose post-office address is 105 Hudson street, in the said city, have invented a certain new and useful Process for the Manufacture of Fire-Crackers and Choking Material for the Same, of which the following is a specification.

In the manufacture of fire crackers and like detonating devices, comprising a paper tube a stem or match and an explosive placed within the tube, means for confining the explosive within the tube have been employed for a long number of years last past in two distinct or fundamental ways. One way, employed in the manufacture of both large and small fire crackers was to choke the end by tamping clay into the bore of the fire cracker tube. It being characteristic of clay that while it is easily moldable it has little if any adhesive qualities when dried, in which latter condition it becomes very brittle resulting in many instances in its breaking or crumbling, and either wholly or partly falling out, rendering the fire cracker inoperative. Another objection to its use is that the clay does not lend itself for use simultaneously in connection with a large number of fire crackers, as will be described in connection with my improvements. The other method of choking fire crackers resides in the employment of a tool having projections which are forced into the material of the tube surrounding the bore, and forcibly compressing it together to close the bore. While this method has been found more or less effective in connection with medium or large size fire crackers it has been found to be inapplicable to the smaller sizes, which for apparent commercial reasons have to be made in very large quantities; for mechanical reasons the use of choking tools for the small sizes has been found to be totally inapplicable, especially in connection with the simultaneously choking of a large number of small fire cracker bodies. In addition the use of choking tools has always been accompanied with a certain amount of danger, since the slightest spark produced by the tool will result in a premature explosion of the charge which is very often communicated to nearby explosives with disastrous results.

It is the object of my invention to obvi-

ate all these difficulties, and to provide means whereby to an extremely large quantity (as well as a small quantity) of fire cracker bodies may be economically and expeditiously choked.

To this end my invention resides in the process and in the article hereinafter described, and further pointed out in the claims.

It will herein be made apparent that my invention can be carried out either manually or mechanically. For the purpose of enabling others skilled in the art to practice my invention I have shown and described the same in connection with a manual process. It will be made clear herein that my invention may be practiced by employing a mechanically operated device.

An embodiment of means for carrying out my invention is illustrated in the drawing forming part of this specification, in which—

Figure 1 is a side elevation or a group of fire cracker bodies, partly in section, showing the initial step in the manual practice of my invention. Fig. 2 is a like view showing an intermediate step, and Fig. 3 is a like view showing the final step in the process. Fig. 4 is a sectional elevation of a fire cracker completed in accordance with my invention.

In practicing my invention I take a large number of fire cracker bodies as 1 (made by spirally disposing a strip of paper upon itself, in any other desired way, with a bore 2) group them together, place them upon a suitable table or support and secure them firmly together so that there will be as little space between each body as possible. Instead of binding the bodies together by a band or string, or the like as 4, as shown in the drawing, they may be placed in a suitable box or receptacle to confine them in the desired position, a desirable consideration being that they be held as firmly and compactly together as possible.

To form the choke I mix certain ingredients and reduce them to a soft and liquid or semi-liquid and pliable condition, the prime requisite of which is that the resultant material will harden when set or dried, and will forcibly adhere to the surface to which it is applied.

I have employed a large number of choking materials embodying the above characteristics. A composition embodying all

these characteristics, and which may be successfully employed, consists of commercial plaster of Paris mixed with a small quantity of liquid glue to retard its setting, which material is preferably made up into a semi-fluid or pasty condition.

A sufficient quantity of the choking or sealing composition as 5, is placed over the upturned ends of the group of fire cracker bodies, the material being preferably spread evenly thereover as shown in Fig. 1. I prefer that the quantity of material placed on the group of bodies be approximately or roughly just sufficient to form the plug or seal in the ends of the bodies, although this will of course be a matter of judgment on the part of the operator, for some of the material may pass down into the space between each of the bodies.

When sufficient of the material is placed over the ends of the group of bodies, as shown in Fig. 1, a board 6 or other scraping device, is moved over the top of the bodies so as to gradually force the sealing or plugging material into the bores of the bodies as shown at the left hand in Fig. 2, the operation being preferably so performed as to leave a slight film 7 of the sealing mixture over the top of the bodies. A further application of the board will remove the surplus material, that is such material as has not been pressed into the bores of the bodies completing the choke and leaving the same substantially free and clear of the material, as shown in Fig. 3 except the slight covering for the end of the body. The glue in the plaster composition having retarded the setting of the same during the period in which the material is being inserted into the ends of the bodies, the plug of choke 8 is thereby inserted while in a semi-fluid or pasty condition. Then the material forming each of the plugs is allowed to set and harden, and when hardened it will adhere firmly and effectively plug and seal it.

The characteristic of this composition is that it will not crumble or disintegrate when dry, and its cohesive qualities are such as to assure the disruption of the body of the cracker, essential to its explosion, without affecting the seal.

This material or composition forms a comparatively "quick-setting" free-flowing choke or plug which is not only adhesive but which has such cohesive qualities as to prevent its crumbling as does clay.

When the seal or plug 8 is set, hardened and adhering, the bundle of bodies may be reversed so as to present the lower ends upmost. Then a sufficient quantity of powder or other desired explosive 9 may be poured over the group in much the same way as the choking material is laid thereover, and spread until the bodies are sufficiently charged.

When sufficient charge has been inserted into each of the bodies, stems or matches 10, such as shown in Fig. 4 are inserted, and the operation of laying on a suitable quantity of the choking material and pressing the same into the open end of the body and about the stem or match is repeated as before described, the setting and hardening of the adhesive material holding the match in place and sealing it in the end of the tube. Then the means for holding the bodies together may be removed, and any excess of choking material adhering to the body may be readily removed.

It will be apparent that the quantity of fire crackers which may be sealed or choked in the above manner can be varied within very great limits, depending of course upon the size of the bodies and the time allowed for setting and hardening the choking material. From one to five thousand tubes may be treated substantially simultaneously.

Another advantage of my process of choking or sealing resides in the fact that the spreading operation causes the adhesive material to coat or cover the end of the fire cracker body thereby rendering the adhesion of the material to the body very effective, completely sealing the end of the tube against the entrance of moisture, and completely obviating the effect of the atmosphere upon the contained charge. In this way not only a very efficient choke or seal for the fire cracker or other detonating device is provided, but the process of manufacturing fire crackers or the like is very much expedited and cheapened, and the danger from premature explosion entirely avoided.

As above pointed out, my invention may be carried out in many ways, and the plastic material applied either manually or mechanically as desired; so I do not intend to be limited to the exact disclosure made herein, but consider that my invention is broad enough to extend to the subject matter of the claims appended hereto.

Having described my invention, I claim:

1. The process of choking or sealing tubular fire cracker bodies or the like, which consists in assembling a plurality of tubular bodies in a substantially compact manner with their bores uppermost, applying a layer of free-flowing quick-setting cohesive plastic material to the open ends of said tube, spreading the same thereover and gradually forcing said material into the bores of said tubes and allowing the same to set, harden and adhere to the surface of the fire cracker bodies.

2. The process of choking or sealing a tubular fire cracker body or the like, which consists in applying a layer of free-flowing quick-setting cohesive plastic material to the open end of said body, spreading the

same thereover and gradually forcing said material into the bore of said body and allowing the same to set, harden and adhere to the surface of the body whereby disintegration of the sealing substance is avoided.

3. A fire cracker or the like having one end choked by the insertion therein of a plastic quick-setting and adhesive material, which upon insertion hardens, sets and adheres to the surface to which it is applied.

4. A fire cracker comprising a tubular body, and a choke for the same consisting of a plug of plastic quick-setting and adhesive materials, hardened and set, and adhering to the surface of the bore of said tube and to the end of the tube.

5. A material for choking or plugging fire cracker bodies or the like consisting of

a plastic quick-setting and adhesive material capable of setting and hardening.

6. A material for choking or plugging fire cracker bodies or the like consisting of plaster of Paris and an adhesive retarder.

7. A material for choking or plugging fire cracker bodies consisting of a material having adhesive and cohesive and quick-setting properties whereby crumbling thereof is prevented.

Signed at the city of New York, county of New York, State of New York, this 17th day of November, 1909.

LOUIS NORDLINGER.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."