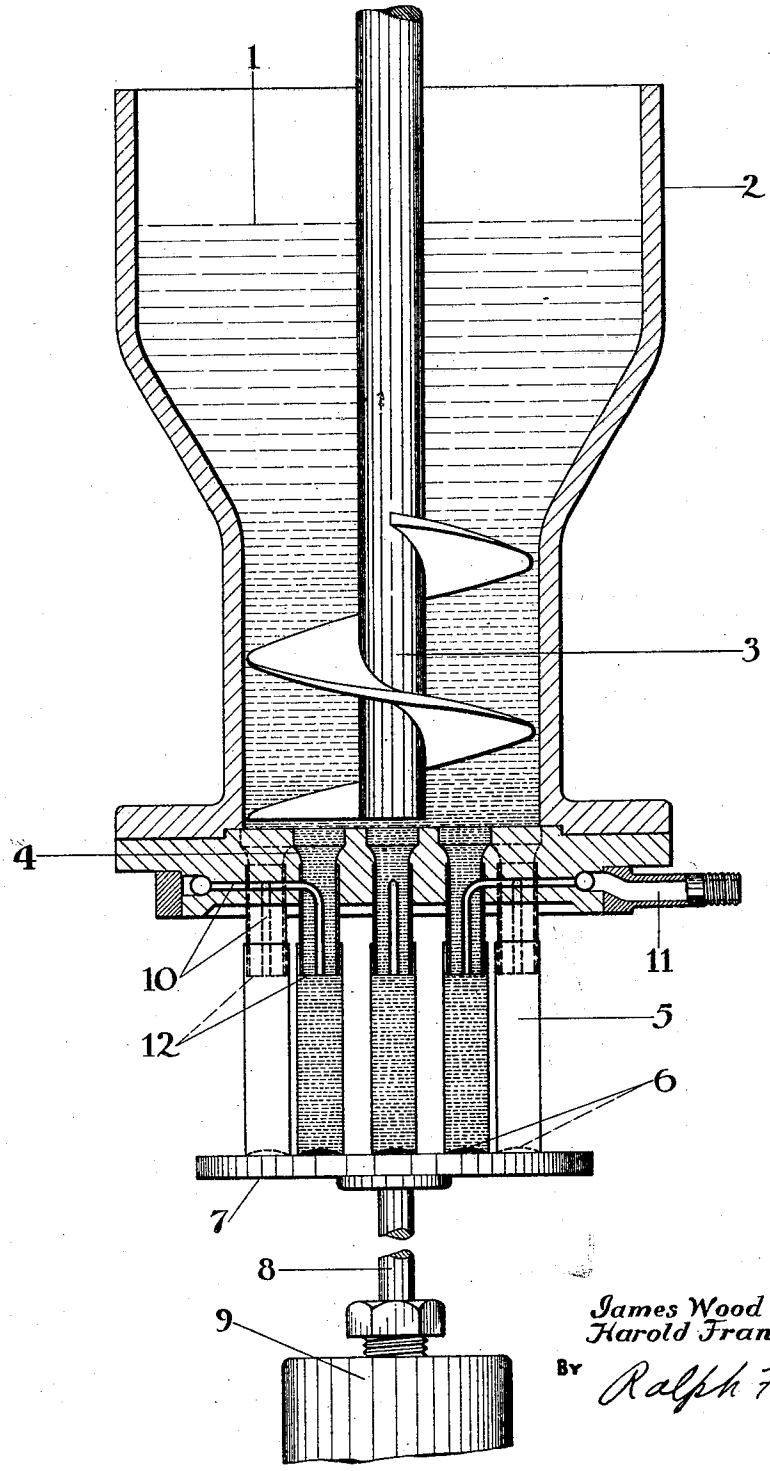
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DIVIDING CORDS OF PLASTIC OR GELATINOUS MATERIAL INTO LENGTHS

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INVENTORS

James Wood
Harold Frank Reynolds

BY Ralph F. Miller

ATTORNEY

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JAMES WOOD, OF SALTCOATS, AND HAROLD FRANK REYNOLDS, OF ARDROSSAN, SCOTLAND, ASSIGNORS TO IMPERIAL CHEMICAL INDUSTRIES LIMITED, A CORPORATION OF GREAT BRITAIN

DIVIDING CORDS OF PLASTIC OR GELATINOUS MATERIAL INTO LENGTHS

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This invention relates to the manufacture of cords of plastic or gelatinous material, especially explosive material, and in particular to an improved method of dividing such cords into lengths, and to the filling of cartridges with the same. The invention is especially applicable to the manufacture of cartridges of gelatinous blasting explosives.

It is well known that gelatinous blasting explosives are used in the form of cylindrical cartridges, in the manufacture of which it is necessary to extrude the explosive into a continuous cord and to cut the same into the desired lengths. Single cords are usually cut with a wooden or brass knife, either by hand or by a wheel cutter, and the lengths of explosives are subsequently wrapped in the form of cartridges by hand. A similar method is used in the case of a machine in which a large number of cords are simultaneously extruded, but the cutting of the cords with a knife becomes more difficult and the element of danger is increased; also it is not possible to sever the cords within previously prepared paper shells into which the cords of explosive are discharged, while allowing sufficient overlap of the wrapper for the subsequent closing of the cartridge end. In the case of explosive materials within a limited range of plasticity, such that the material is friable, it is possible to break cords of the material by the application of sudden tension, and such fracture may be caused to take place within a paper shell into which a continuous cord of the material is forced in the first instance. Such method, however, is of strictly limited application and depends essentially upon the friability of the material.

We have now devised a simple and efficient means of carrying out the operation of dividing cords of plastic or gelatinous material, especially explosive material, into lengths, and of filling cartridges with the same.

According to our invention, this is accomplished by the introduction into the cord, preferably at or near the mouth of the extruding nozzle, at the desired intervals of time, of a compressed gas, which displaces the plastic material from the immediate neighbourhood and thus causes the cord to be severed. According to a further feature of the invention, in filling cartridges from an extruding nozzle, the cord is severed as described and the pressure of the gas is utilized to separate the filled cartridge from the nozzle, the terminal portion of which is enveloped by the cartridge case. Thus, in the case of explosive material, both operations may be carried out with a high degree of safety, since no moving metallic parts are employed.

In the preferred embodiment of our invention, which we shall describe in relation to cords produced by extrusion of blasting explosive for cartridges, the plastic material is fed through a duct or a number of ducts of any suitable material and of any desired form of cross-section into paper shells placed over the ducts. Each duct is provided with an air-lead for compressed air, the lead being a tube of suitably small diameter placed centrally or eccentrically within the duct and terminating either at the end of the duct or at any convenient point within the duct. Alternatively the compressed air may be introduced through openings in the walls of the duct. The end of the air-lead may be arranged so as to direct the blast of air forward or in any desired direction. The explosive is extruded into the shell or shells through the duct or ducts in the usual manner, and at suitable intervals the air-blast is turned on for a period sufficient to inject a small volume of air which severs the cord, and may if desired be sufficient to discharge the filled shell from the duct. The air-blast may be replaced by any other suitable compressed gas. Instead of a single lead for each duct, a plurality of leads may be used, especially where the duct is of large cross-section.

The accompanying drawing, which is an elevation partly in section, illustrates one form of apparatus suitable for practicing the invention upon gelatinous blasting explosive. The plastic material 1 is contained within a vessel 2 having a central worm compression or extruding device 3, which forces the material downwardly through a number of nozzles 4 in the base of the vessel. As the ma-

terial is extruded through the nozzles it is collected in paper shells 5, the lower ends 6 of which are closed and the upper ends of which envelop the terminal portions of the nozzles, the air initially within the shells 5 escaping through the annular space between the nozzles and the shells. To ensure uniform filling of the shells they are supported upon an elastically mounted plate 7 to which sufficient upward pressure is applied to provide a suitable loading density of the plastic material. The requisite pressure is applied to the plate 7 by means of a rod 8 connected to the piston of a compressed air system 9, the pressure of which is adjusted so that under the action of the extruding device 3 the shells 5 move downwardly as they become filled.

When the shells are sufficiently filled, the extruding device 3 is stopped and a puff of compressed air is applied through a pipe 11 serving tubes 10 leading to the interior of the terminal portion of each nozzle. The cords are thus severed within the shells, at or near the mouths of the nozzles, sufficient of the shells overlapping the nozzles to allow margin for closing purposes. At the same time, the upward pressure on the plate 7 is released, whereby the pressure of the air supplied through tubes 10 disengages the filled shells from the nozzles. The stopping of the filling action (and the resulting downward movement of the filled shells), the sudden release of the upward pressure on the plate 7, and the admission of compressed air to produce severance of the plastic material are a controlled sequence of operations.

Our invention is obviously capable of wide application to the treatment of plastic or gelatinous materials, provided such are of practicable consistency.

As many apparently widely different embodiments of this invention may be made without departing from the spirit and scope thereof, it is to be understood that we do not limit ourselves to the specific embodiments thereof except as defined in the appended claims.

We claim:—

1. Method of severing a cord of plastic or gelatinous material, which comprises introducing a compressed gas within the body of the plastic and at predetermined intervals of time.

2. Method of obtaining lengths of plastic of gelatinuous material in cord form which comprises extruding a cord of the said material from a nozzle and severing the cord in the neighborhood of the mouth of the nozzle by introducing compressed gas into the body of the cord and at predetermined intervals of time.

3. Method of filling a shell with a length of plastic or gelatinous material in cord form, which comprises extruding a cord of said material from a nozzle into a shell enveloping the terminal portion of the said nozzle, discontinuing extrusion and severing the cord within the said shell by the introduction of compressed gas into the cord in the neighbourhood of the mouth of the said nozzle.

4. Method as claimed in claim 3 in which the shell is supported elastically with respect to the extrusion nozzle, the material being extruded into the shell against resistance offered by the same, said resistance being released prior to admission of compressed gas into the cord.

5. Method of filling a shell with a length of plastic or gelatinous material in cord form, which comprises extruding a cord from a nozzle into an elastically supported shell enveloping the terminal portion of said nozzle, applying pressure to the shell during filling so as to offer resistance to the filling action, discontinuing extrusion, releasing the pressure applied to the said shell and admitting compressed gas into the said cord in the neighbourhood of the mouth of the nozzle to sever the said cord within the shell.

6. Apparatus for obtaining lengths of plastic or gelatinous material in cord form comprising means for extruding the same material from a nozzle and means for introduring compressed gas in the neighbourhood of the mouth of the said nozzle and into the body of plastic at predetermined intervals of time during temporary stoppage of said extrusion means.

7. Apparatus for filling lengths of plastic or gelatinous material in cord form into shells, comprising means for extruding the said material simultaneously through a plurality of nozzles, an elastically mounted base for shell adapted to receive the lengths of extruded cord, said base having means for offering resistance to the filling action of said extruding means, means for admitting compressed gas in the neighbourhood of the mouths of said nozzles at predetermined intervals and means for releasing the resistance of said elastically mounted base.

In testimony whereof we affix our signatures.

JAMES WOOD.
HAROLD FRANK REYNOLDS.