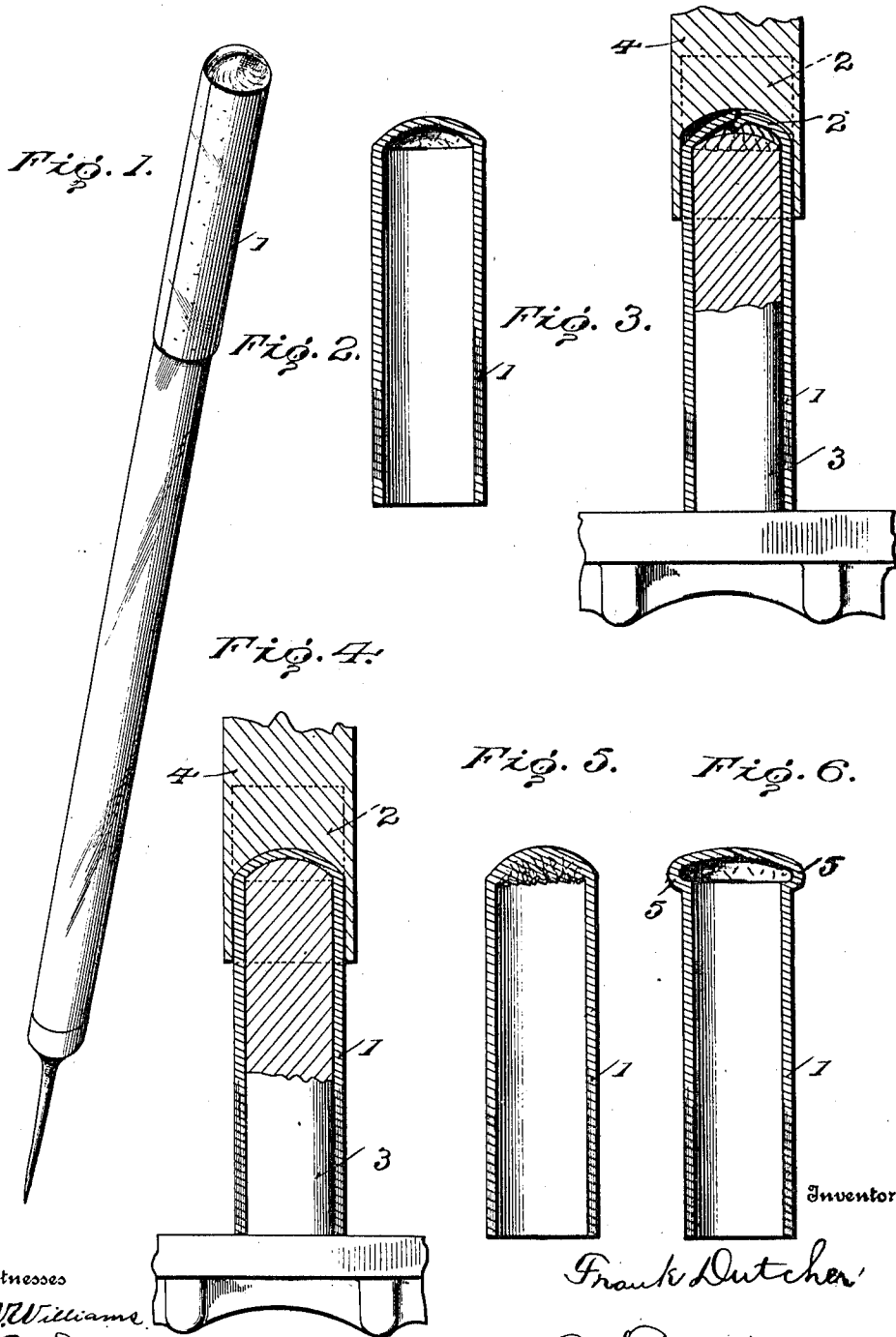


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METHOD OF MAKING FIBER FUSEE CAPS.
APPLICATION FILED JULY 26, 1907.

950,381.

Patented Feb. 22, 1910.



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METHOD OF MAKING FIBER FUSEE-CAPS.

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To all whom it may concern:

Be it known that I, FRANK DUTCHER, a citizen of the United States, residing at Versailles, in the State of Pennsylvania, have invented certain new and useful Improvements in Methods of Making Fiber Fusee-Caps, of which the following is a specification, reference being had therein to the accompanying drawing.

10 This invention relates to improvements in method of making fiber fusee caps, the object of which is to improve and cheapen the closure for the cap, and to avoid certain well known and recognized defects of the form of closure which is now used by manufacturers.

15 The closure for fusee caps now practically universally used by manufacturers, consists of what is termed among them as the "wood button" which is glued in the end of the paper or fiber tube of which the cap is formed.

20 The button closure now in use is expensive both in respect to the button itself and the labor of cementing it in the end of the tube. This work is performed by cheap labor (of necessity) to meet competition, and hence to a considerable extent by careless persons, it is found not infrequently, that these buttons are placed in the ends of the tube forming the cap without any cement whatever, and very often imperfectly cemented therein. As a consequence in the shipping of the goods the loose or imperfectly cemented button becomes detached in the box containing the fusees, and the body of the fusee will then push through the cap and thus exposing the complementary igniting materials on the end of the fusee and on the button or cap, and serious fires have been known to occur in this way.

30 My improved cap not only overcomes the foregoing defect, but provides a closure which is much cheaper and of far better appearance than any known to me.

35 In the accompanying drawings, Figure 1 is a perspective view of my improved cap, showing it in position upon the end of a fusee. Fig. 2 is a longitudinal central sectional view of my improved cap. Fig. 3 is a longitudinal central sectional view of my improved cap, showing diagrammatically the first step of the improved method of closing the end of the tube. Fig. 4 is a similar view showing the final step of the method for closing the end of the tube.

Fig. 5 is a longitudinal central sectional view of a modification of my improved fusee cap. Fig. 6 is a similar view of a further modification of my improved fusee cap.

40 In carrying out my invention a paper or fiber tube 1 is formed, and preferably this tube is formed from a sheet rolled and pasted in the usual way. The tube is provided with an extended end 2, shown in dotted lines Fig. 3 and Fig. 4. This tube is placed upon a stationary mandrel 3, and a rapidly revolving pressure actuated tool 4 is caused to engage the extended end of the tube. As the tool 4 is revolved it is first subjected to a comparatively light pressure which crimps or folds the extended end of the tube as shown in Fig. 3. When the crimped portion is brought in contact with the end of the stationary mandrel the revolving tool 4 is subjected to a severe pressure, and the revolution of the tool under this pressure disintegrates the fibers of the crimped portion and forms a closed end for the tube of substantially a homogeneous mass which substantially corresponds with the wall of the tube, and hermetically closes the end of the tube. This result is accomplished by reason of the pressure upon the crimped portion of the extended end of the tube between the stationary and revolving mandrels.

45 For the purpose of improving the result, the extended end of the tube is first dampened before it is crimped, and this dampening is preferably effected with paste, which facilitates the crimping, the disintegrating of the fibers and in making the closed portion of the tube substantially a homogeneous mass. Furthermore the paste serves to unite the fibers, stiffen the closed end, and enable a polished or burnished effect on the outer surface of the closed end.

50 The tool 4 is being revolved and as it is forced against the extended end of the tube, the extended end will give away and be crimped under a comparatively light pressure, and the continued movement of the tool 4 under heavy pressure produces the result hereinbefore mentioned, the movement of the tool both endwise and rotating being continuous from the beginning to the finishing of the operation. In order to produce the best result it is necessary that the tool 4 be subjected to sufficient pressure and speed to at least form an outer

surface on the closure of disintegrated compressed fiber, and it will be understood that the depth of this result on the cover will depend upon the degree of pressure, rapidity of the rotary movement of the tool, and the period of time to which the crimped portion is subjected to the rotary movement under pressure between the mandrel and the rotating tube.

I have discovered that in order to produce this result the tool must revolve rapidly, and the pressure must be sufficient to at least disintegrate and compress the outer surface of the closure, in order to maintain the closure fixed and against shrinkage or opening up, and that this pressure can only be obtained by clamping the crimped portion between the surfaces operating thereon.

Preferably the pressure is sufficient to form the closure into a homogeneous mass at least equal to the wall of the tube, but even so I find that there seems to be some apparent crimping evidences on the outer surface of the closure, although when the closure is severed in a direction longitudinal the tube, it appears to be of a substantially homogeneous mass, although the rotating tool acts only on the outer surface of the closure, and pressure only on the inner surface.

It is well known to those skilled in this art that it is the usual practice to provide the fusee cap and the fusee with complementary igniting materials, the fusee cap protecting the igniting material on the end of the fusee. Heretofore the complementary material has in some cases been placed on the closure (wood button) of the fusee cap, and in other instances it has been placed on the side of the fusee cap. It is essential that no loose portions or grains of the complementary materials of the cap and the fusee should come together at any time, and especially when being shipped. It is therefore important that when the igniting material is placed on the closure it must be impossible for it to work through the closure and come in contact with the igniting material of the fusee. A closure such as that herein shown and described is so perfect that it is absolutely impossible for any loose particles of the material to work through the closure either when being applied, or after it is applied.

It is sometimes desirable that the closure of the cap be provided at its side with a filling or cushion for the end of the fusee to abut against. My improved method of effecting this closure enables me to produce a closure with a hermetically sealed outer surface and a cushion inner surface. This is accomplished by turning in so much of the tube as to form a crimped lapping cushion effect at the inner side as shown in

Fig. 5, or in other words providing an increased extension of the tube before the closing operation.

It is also found in practice that the cap sometimes fits the fusee so tightly that it is difficult to remove it where it has straight outer walls, for the reason that the tighter or more firmly the cap is grasped by the hand to remove it the more firmly it is pressed against the fusee. On the other hand if the cap is provided with a projection to prevent it from slipping through the hand it can be removed without the necessity of tightly grasping it. My improved method of closing the tube enables me to provide such a projection without any additional cost, or any additional labor. By reference to Fig. 6 it will be observed that in forming the closure a bead or projection may be provided, and this bead will also serve to strengthen the closure. This is effected by making the depending collar of the tool loose on the tube, and this bead can be formed either with or without the cushion effect hereinbefore referred to.

To my knowledge manufacturers of fusees have for years sought, and endeavored to discover some cheaper, more effective and better appearing way of closing one end of fusee caps, and in many efforts in various ways have been made, but so far as I am aware they have not succeeded in doing away with the old "wood button." The heat produced by the friction of the rapidly revolving tool, dries the paste, so that the cover becomes fixed and remains in its shaped form. The operation of crimping and finishing the closure is rapid, and it is the rapidly revolving tool which enables the result to be quickly completed. When the cap is removed from the mandrel the closure is dry, and hot.

A closure produced by my method has the outer surface harder than the inner surface because of the burnishing effect of the tool upon the outer surface thereof, and this is true when there is no cushion formed at the inner side of the closure, and is the inherent result of my improved method.

I do not claim herein the cap itself, as that will make the subject-matter of a divisional application.

Having thus described my invention what I claim and desire to secure by Letters Patent is:

1. The method of closing the end of a fiber fusee cap tube, which consists in applying paste to an extended end of the tube, crimping inwardly said extended end, and finally subjecting said crimped-in portion to a rotary pasting action under pressure.

2. The method of closing the end of a fiber fusee cap tube which consists in first crimping inwardly an extended end of the tube, and finally subjecting the crimped in

portion to pressure between a stationary mandrel and a revolving tool.

3. The method of closing the end of a fiber fusee cap tube, which consists in first
5 crimping inwardly an extended end of the tube and finally subjecting the crimped in portion to pressure between inner and outer relatively rotatable and stationary members.

4. The method of closing the end of a
10 fiber tube, which consists in forcing inwardly all of the wall of an extended end of the tube into folds or crimps, and then subjecting the folds or crimps to a surface disintegrating action under pressure.

15 5. The method of closing the end of a fiber fusee cap tube, which consists in first crimping inwardly an extended end of the tube, and subjecting the crimped in portion

to a combined surface disintegrating and pasting action under pressure in the presence 20 of paste.

6. The method of closing the end of a fiber fusee cap tube, which consists in applying paste to an extended end of the tube, crimping inwardly said extended end, and 25 subjecting the crimped-in end to a sufficient combined rotary frictional heating and pasting pressure, to paste the crimped portion and to dry the paste.

In testimony whereof I affix my signature 30 in presence of two witnesses.

FRANK DUTCHER.

Witnesses:

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