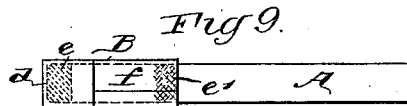
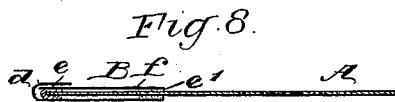
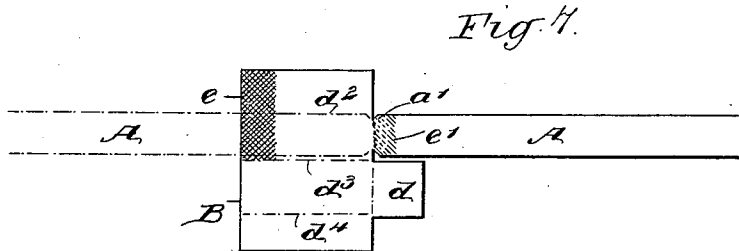
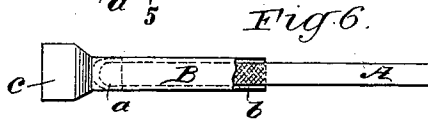
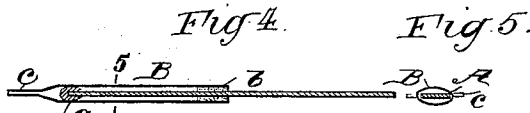
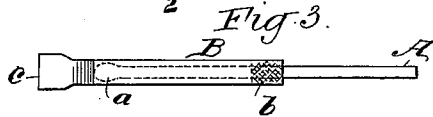
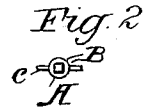
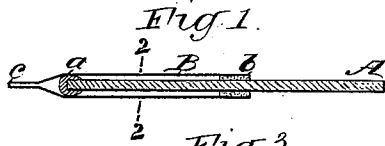


(No Model.)

W. BARNHURST.  
SAFETY MATCH.

No. 521,079.

Patented June 5, 1894.



WITNESSES:

*Paul J. ...*  
*C. Sedgwick*

INVENTOR

*W. Barnhurst*  
BY *Munn & Co*

ATTORNEYS.

# UNITED STATES PATENT OFFICE.

WILLIAM BARNHURST, OF NEW YORK, N. Y.

## SAFETY-MATCH.

SPECIFICATION forming part of Letters Patent No. 521,079, dated June 5, 1894.

Application filed January 12, 1894. Serial No. 496,574. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM BARNHURST, of New York city, in the county and State of New York, have invented a new and Improved Safety-Match, of which the following is a full, clear, and exact description.

My invention relates to an improvement in safety matches. Safety matches, as now made, are arranged with an igniting compound on the end of a stick or splint, and a rubbing chemical or compound on the box. This necessitates carrying the box to the place where the match is to be ignited or igniting the match wherever the box is kept and carrying the lighted match to the fixture, lamp, candle, or to such place where it is desired to be used.

The object of my invention is to provide an improved match which is a safety match by reason of the igniting and rubbing compounds not being normally in contact, and wherein the compounds can be brought into contact wherever desired, the two being combined in one article, namely, the match itself, thus dispensing with the necessity of carrying a box provided with a rubbing mixture, and an independent card or splint carrying an igniting compound.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the views.

Figure 1 is a longitudinal sectional view of the improved match. Fig. 2 is a cross section through the match, taken practically on the line 2—2 of Fig. 1. Fig. 3 is a plan view of the match. Fig. 4 is a longitudinal section through a slightly modified form of the match. Fig. 5 is a cross section taken practically on the line 5—5 of Fig. 4, and Fig. 6 is a plan view partially in section of the match illustrated in Fig. 4. Fig. 7 is a plan view of a blank from which a further modified form of the match may be constructed. Fig. 8 is a longitudinal section through a match constructed from the blank shown in Fig. 7. Fig. 9 is a plan view of the match illustrated in

Fig. 8; and Fig. 10 is a further modification of the match.

In Fig. 1 I have illustrated a match splint A, made of wood, paper, or other suitable material, tipped with an igniting compound *a* in the usual manner with safety matches. The match splint is shown square in cross section, which is its preferred shape, but it may be made round or given other cross sectional contour. A sleeve or envelope B, is fitted over the tipped end of the splint, and the said sleeve may be made of wood shaved thin and softened by steam or other process, or other suitable or equivalent material may be employed for the purpose. The sleeve is preferably made circular in cross section, as shown in Fig. 2, or it may be given other shapes. Upon the inside of the sleeve, preferably at its mouth, a coating of a rubbing compound or chemical *b*, is permanently located, adapted when the sleeve or envelope is drawn from the splint to come into contact with the igniting compound upon the splint and cause ignition. What may be termed the outer end *c* of the sleeve is closed and preferably flattened, the operation being accomplished in any approved manner. The flattened portion *c* of the sleeve affords a means of holding it in the fingers, and by closing the outer end of the sleeve, fire is prevented from escaping if the splint is not properly withdrawn from the sleeve. In the operation of this form of the device, by holding the sleeve B at its flattened end and withdrawing the splint suddenly from the sleeve, the igniting compound of the splint is brought into engagement with the rubbing compound of the sleeve, whereby the splint is lighted. In Figs. 4, 5 and 6, the same style of match is illustrated, but the splint A is shown as being flat instead of square, and the sleeve or envelope B is oval in cross section.

In Figs. 7, 8 and 9, a match is illustrated of slightly modified construction, being made of paper, thin steamed or softened wood or their equivalents, and the splint and sleeve or envelope are in one piece. The blank from which this blank is made is shown in Fig. 7, and consists of a splint section A and a section B that is to form the sleeve or envelope. The splint section is of much greater length

than width, and joins the sleeve or envelope section at one side, preferably between the center and one end, being provided with perforations  $a'$ , or their equivalents where the two sections meet, in order that one section may quickly and readily separate from the other when proper force is brought to bear upon one of them. The sleeve section B is somewhat rectangular in general contour, and is provided with a tongue  $d$ , adjacent to one side of the splint section. The sleeve or envelope section is preferably provided with three transverse score lines,  $d^2$ ,  $d^3$  and  $d^4$ , and at the corner opposite the inner end of the splint section a rubbing compound  $e$ , is secured upon the inner face of the sleeve section, extending preferably from the central score line  $d^3$  across the line  $d^2$  to the adjacent end of the blank. An igniting compound  $e'$ , is placed preferably upon both sides of the splint section at its junction with the sleeve or envelope section. When forming the match from the blank, the splint section is folded upon its perforated line across the inner face of the sleeve section, extending over the rubbing compound. The sleeve section is next folded over the splint section upon the score line  $d^2$ , which will cause the rubbing compound of the sleeve section to lie at both or opposite sides of the splint; the next fold is upon the score line  $d^3$  over the fold first made, and the last fold is made upon the score line  $d^4$  to form a binding flap  $f$  longitudinally of the sleeve or envelope, as shown in Fig. 9, said flap being glued, gummed, cemented or otherwise secured to the body of the sleeve. Finally the tongue  $d$  is folded over the flap  $f$  and secured.

In operation, by holding the envelope formed in the manner above set forth between the fingers of one hand and the splint by the fingers of the other hand, and suddenly pulling out the splint from its envelope, the compounds pass each other, and in their contact the match is ignited, the splint becoming detached from the sleeve at its perforated point. In practice, the square shape in cross section with wooden splints has been found to be a desirable one, and a cylindrical sleeve for such a splint is that which is preferred, as this construction allows sufficient elasticity of the sleeve to conform to the shape and size of the coated head of the splint, and in being withdrawn to give just the proper pressure of the compounds against each other

to cause the splint to ignite properly. I have also conducted experiments upon this match by coating two thin wood splints one with igniting and the other with a rubbing compound, the one having the rubbing compound being coated upon one side only. These splints are placed side by side with the coated parts at opposite ends, and a sleeve of paper is placed around them. By withdrawing the splints from the sleeve in opposite directions the compounds pass in engagement and the splints are ignited. In Fig. 10 a splint A, made of any desired material, is tipped in the usual manner with an igniting compound  $a$ . The body of the match is passed through a sleeve or envelope B provided with a rubbing compound and with a tongue or extension  $d'$  at one end, over which the tipped end of the splint A is located. By grasping the tongue  $d'$  with one hand and the splint with the other the head of the splint may be drawn through the sleeve in engagement with the rubbing compound, and the splint will be ignited.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A safety match, the same comprising a splint and a sleeve constructed from one piece of material, the splint being detachably connected with the sleeve or envelope, the envelope being provided with a rubbing compound and the splint with an igniting compound, the two compounds being normally out of engagement with each other and yet located one in the path of the other, whereby igniting contact is obtained between the two compounds when the splint is separated and drawn from the sleeve or envelope, substantially as shown and described.

2. As a new article of manufacture, a match comprising a splint and a sleeve constituted from one piece of material, the sleeve surrounding the splint and being detachably connected therewith, one of the said parts being provided with an ignitable compound, and the other with a rubbing compound, said compounds being located in the path of travel of one another, whereby the match is ignited when its parts are drawn apart, substantially as described.

WILLIAM BARNHURST.

Witnesses:

J. FRED. ACKER,  
C. SEDGWICK.