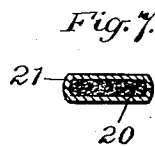
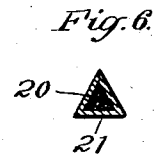
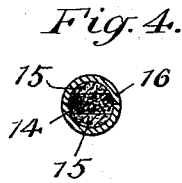
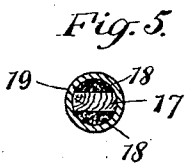
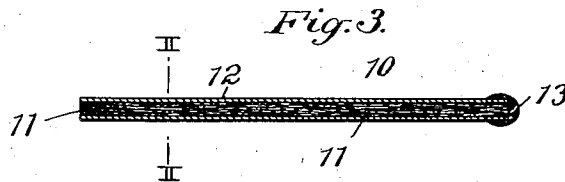
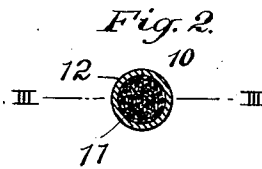


J. A. E. CRISWELL.
MATCH.
APPLICATION FILED JUNE 13, 1905.

988,248.

Patented Mar. 28, 1911.



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MATCH.

988,248.

Specification of Letters Patent.

Patented Mar. 28, 1911.

Application filed June 13, 1905. Serial No. 265,091.

To all whom it may concern:

Be it known that I, JAMES A. EKIN CRISWELL, of New York, county of Kings, and State of New York, have invented certain new and useful Improvements in Matches, of which the following is a full, clear, and exact description.

This invention relates more particularly to matches of a composite nature, such as disclosed in my pending application Sr. No. 40,548, filed December 20, 1900.

The main object of the invention is to provide matches which are stronger, less liable to break, and more uniform in quality than the usual wood match made from blocks or wood veneer; which will burn longer than the usual wood match; which may be made in various shapes, and which may be made wholly or in part of cheap material or material that ordinarily goes to waste.

The invention will be hereinafter more particularly described with reference to the accompanying drawings, which form a part of this specification, and will then be pointed out in the claims at the end of the description.

In the drawings, Figure 1 is a perspective view of one form of match. Fig. 2 is a transverse section on an enlarged scale of the match stem, taken on the line II—II of Fig. 3. Fig. 3 is a longitudinal section through the match taken on the line III—III of Fig. 2; and Figs. 4 to 7 inclusive are enlarged transverse sections of other forms and construction of matches.

While I shall refer particularly to certain materials and combination of materials as constituting the match, it will be understood that the material as well as the proportions of the materials may be changed as thought most desirable and convenient.

The match shown in Figs. 1 to 3 has its body portion, stem or splint 10 comprising an inner body or core 11, and the outer casing or covering 12. The inner body or core 11 may be of various materials and has long strands or filaments of wood or woody material such as shredded wood, wood wool, bagasse, excelsior, straw and the like which are not reduced to a pulp or pulpy condition. These materials or any of them may be treated chemically or mechanically, and may be mixed with paper-making pulp or any of the materials which are employed in paper-making, such as old newspapers, scraps, wood pulp and the like which are combined with

the long strands or filaments of the shredded or macerated woody material to form the inner core 11 of the match. This core may be united with a suitable binder when necessary, as a glutinous or resinous substance or flour or starch, and may be compressed to the desired density for the purpose of rendering the match stiff and rigid, yet of such a character that its usefulness as a part of the match body is not injuriously affected. The long filaments or strands may be of any of the materials mentioned, either singly or in combination, and said strands are arranged lengthwise of the core to better strengthen the match stem. The core is inclosed by and united to a covering or casing of paper 12 of any desired thickness which prevents disintegration of the core while the match is burning. The cover 12 may be of the materials of which paper is or can be made, and said cover may be applied to the core in any desired way and in any suitable condition; and on the end of the paper cover is a suitable igniting head 13 which may be of the usual or any preferred material and applied in the usual way.

In Fig. 4, instead of the paper-making pulp being mixed throughout with the long strands or filaments of the woody material to form the core, the strands are arranged to form layers 14 on two sides of which are the layers of paper-making pulp 15 in a plastic state. These layers are compressed to form a core of the desired shape and compactness and around the core is the paper covering or casing 16. If desired the paper-making pulp may be dispensed with and the entire core made of long coarse or fine strands or filaments of woody material of the character mentioned, or of any suitable kind, with or without a suitable binder.

Fig. 5 shows a layer or strip of wood 17 which has not been reduced to long strands or filaments and on two sides of the wood 17 is applied a layer 18 of paper-making pulp while in a plastic or semi-plastic condition to form the core. The paper-making pulp 18 is compressed to the desired density, and on the outside of the core is a cover of paper 19 or similar material. Instead of the layers 18 of pulp there may be layers of wood or the latter mixed with the pulp.

In Figs. 6 and 7, the materials for the inner core 20 may be of any suitable kind, and show different forms or shapes for the match stems, the cores in this case also being

covered by an inflammable cover of paper or the like 21.

It will be seen by the foregoing that various materials which ordinarily go to waste, 5 or very cheap material may be utilized in the manufacture of matches, and that matches are produced which are strong and attractive in appearance, which will burn longer than the ordinary wood match, and 10 which will be of a uniform standard of quality.

It will be understood that at any stage of the manufacture of the matches, I may add paraffin, stearin or any of the oils; and I 15 may add sulfur, rosin, saltpeter, and other materials independently or mixed with others when it is desired to make the match stems or splints burn more freely, or any suitable hardening materials may be added. 20 If it is desired to color the matches either in whole or in part, this may be done by the use of anilin dye or other coloring material. Where the match stems have a cover of paper or like material, advertising matter may 25 be placed on each match, and any or all of the materials may be impregnated with chemicals to prevent glowing.

Various combinations and proportions of the materials may be used; and any suitable 30 apparatus may be employed in the manufacture of the matches.

By the term "paper" as applied to the outer cover or casing, it is to be understood that it is used in its broadest sense, and "paper-making pulp" is intended to include 35 any of the materials from which paper may be made, but which is first reduced to a pulpy condition. It is further understood that the matches may be in the form of match cards or in any other suitable form. 40

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

1. A match having its body or stem of relatively strong long strands of combustible 45 fibrous material with the strands arranged lengthwise of the match stem, a strong paper cover for the core entirely inclosing the same, and an igniting head on the paper cover. 50

2. A match having its body comprising an inner core of relatively strong long strands of combustible fibrous material and paper-making pulp intermixed and united therewith, a tubular cover of paper inclosing the 55 core and united thereto throughout its length, and an igniting head.

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