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F. F. SOMMERS, Jr.

FRICTION MATCH.

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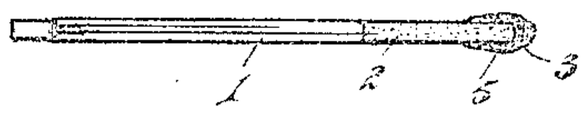

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UNITED STATES PATENT OFFICE.

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FRICTION-MATCH.

SPECIFICATION forming part of Letters Patent No. 782,284, dated February 14, 1905.

Application filed May 23, 1904. Serial No. 209,167.

To all whom it may concern:

Be it known that I, FRANK F. SOMMERS, JR., a citizen of the United States, residing at Saginaw, county of Saginaw, State of Michigan, have invented a certain new and useful Improvement in Friction-Matches; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawing, which forms a part of this specification.

This invention relates to matches.

It has for its object an improved friction-match.

In the drawing the figure shows a match embodying the invention.

1 indicates the ordinary splint or stick of wood, preferably dipped at the end 2 in paraffin. A mass of combustible material of a comparatively high heating character is fixed to the coated end of the stick, and the end surface of this mass of combustible material of high heating character is partly coated with a combustible of easy ignition, but comparatively low heating quality. The mass 3 of combustible of low heating character and of easy ignition ignites with mild or easy friction, and the heat from it communicates to and sets fire to the larger mass 5 of combustible, which produces a heat sufficient to set fire to the paraffin and the stick.

In constructing the match which forms the subject of this invention I employ for the mass of material of high heating character a compound which is the same as that in common use for the well-known parlor-match and which is compounded with a large percentage of chlorate of potash and with a very small percentage of phosphorus. A compound composed of chlorate of potash, glue, phosphorus, rosin, plaster-of-paris, whiting, flint, water, and coloring-matter constitutes a good parlor-match. These may be taken in any desirable suitable proportions, which are not necessary to state here, as the proportions used are not the essence of this invention, which consists, broadly, in taking a mixture or composition ignitible on any frictional rubbing-surface and tipping or coating a part thereof with an igniter that is practically noiseless and non-detonable, yet capable of ignition on any frictional rubbing-surface. The material of low heating character is composed of phosphorus with any suitable medium of dilution and adhesiveness and is similar to what has been used for many years as an ignition compound for sulfur-matches or matches in which the material which transmitted the heat from the ignition compound to the stick was mainly composed of sulfur. A compound consisting of phosphorus, glue, water, flint, plaster-of-paris, zinc, and coloring-matter combined in suitable proportions will constitute a good noiseless or non-detonable igniting-tip.

The sulfur-match is objectionable because of the smell and the fumes given off from it and is also objectionable because of the long period of time which is required to ignite it, the ordinary sulfur-match requiring several seconds before the heat has reached a degree to ignite the stick. On the other hand, the match which is commonly known as the "parlor-match" has a terminal composed largely of chlorate of potash—that is, one which ignites quickly and readily on any friction rubbing-surface, but with a detonating force. Because of the detonable character of the compound it is quite dangerous to use. Flying particles of the detonable compound sometimes produce serious injury to persons standing near by by striking the face or the eyes and burning through the skin or injuring the eyes. Such flying parts of the ignited material also often set fire to drapery and other nearby combustible material. A further serious objection to this kind of match is the noise which attends the striking and ignition. Another serious objection arises from the fact that the compound deteriorates rapidly, and after a few months' time the match has deteriorated to an extent that it will frequently rail to set fire to the stick. By adding at the end of the chlorate-of-potash compound, which I shall term the "detonable composition," a small particle of a compound which ignites at a low heat or with easy friction and burns without noise I succeed in igniting the said detonable composition and burn the same without crackling noise, produce a quick ignition of the

stick, and obtain the useful action of the quick-burning and high-heating detonable composition without the ignition of the composition by friction applied directly to itself.

The chlorate-of-potash compound, herein mentioned as a quick-burning compound, is one in common use, and its quick-burning characteristic is owing mainly to the fact that a principal or chief component of it is one which furnishes a supply of oxygen for its combustion, and, as is well known, there are several other chemicals having this characteristic. I do not herein mention the use of this compound wishing to confine myself to it, but mention it simply because it is the one most commonly used for this purpose. The phosphorus compound spoken of is not usually provided with any contained means for furnishing oxygen to the flame, but is one which must get the oxygen necessary for combustion from the air, and it is consequently a slow-burning compound.

The second coating should be placed only on the tip end of the match at 3 and preferably should not cover the entire surface of the first coating 5, and inasmuch as both coatings are inflammable under friction the match is useful even though, as may sometimes happen, the second coating fails to adhere, because of the short depth to which the match is inserted in it or because of the shortness of some of the matches in the dipping apparatus some of the matches fail to receive any of this second coating.

I am aware that there has been a match tipped with a primary coating of a safety material that will not ignite except on an especially-prepared surface, but which was provided with an additional coating on the extreme tip that would ignite under ordinary friction; but when such matches fail to receive the second coating they are useless. Such matches are made for a special purpose of safety, with the supposition that they will not ignite under certain conditions, and with no special provision made to insure the silent or quiet burning character which is one of the objects of this invention.

What I claim is—

1. In a friction-match, a combustible stick having a coating at the end thereof of detonable composition ignitible by friction on any friction rubbing-surface and with a production of high temperature, combined with a primary ignition compound connected therewith, which ignites with a light friction, and burns at a comparatively low temperature and without noise, substantially as described.

2. In a friction-match, the combination of a combustible stick, a tip of detonable material having as a component an oxygen-supplying material combined with combustible material and ignitible upon any friction rubbing-surface, and a second tip contiguous to the first of combustible material but free from oxygen-supplying material and adapted to ignite and burn at a comparatively low temperature, substantially as described.

3. A friction-match comprising a combustible stick having at one end thereof a paraffin coating, a tip of detonable material having as a component an oxygen-supplying material combined with a combustible material mounted upon said paraffin coating and ignitible on any friction rubbing-surface, and a second tip contiguous to the first, of combustible material, said latter tip being free from the oxygen-supplying material and adapted to ignite at a relatively low temperature.

4. As an article of manufacture, a match comprising a splint and a head, the head being formed of detonable material ignitible on any friction rubbing-surface, and having an igniting-tip of highly-combustible but non-detonable material.

5. As an article of manufacture, a match comprising a splint part and a head, said head being formed of detonable material ignitible on any friction rubbing-surface and having a part thereof coated with a highly-combustible but non-detonable material.

6. A match comprising a splint part and a head, said head being composed of a composition ignitible by friction on any friction rubbing-surface, and an igniting-tip on the head also ignitible by friction.

7. As an article of manufacture, a match having a head composed of a composition ignitible by friction on any friction rubbing-surface, and an igniting-tip on the head ignitible by less friction than is required for igniting the said composition.

In testimony whereof I sign this specification in the presence of two witnesses.

FRANK F. SOMMERS, Jr.

Witnesses:

C. F. Sommers,

S. A. Sommers.