J. H. TATUM.

Candle.

No. 21,706. Patented Oct. 5, 1858

Fig. 1

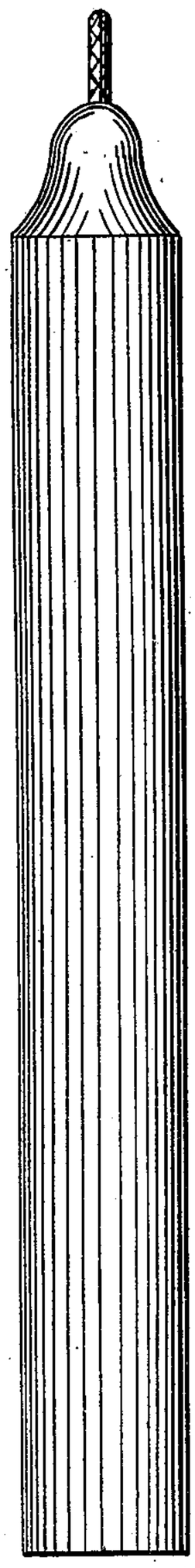


Fig. 2

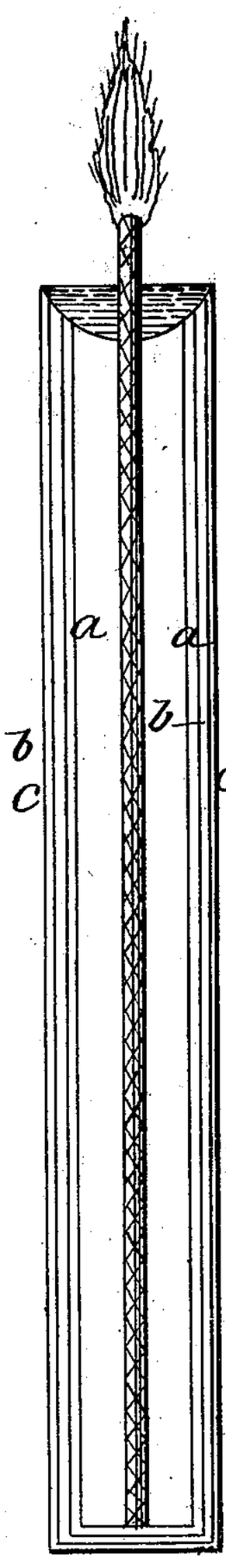



Fig. 3

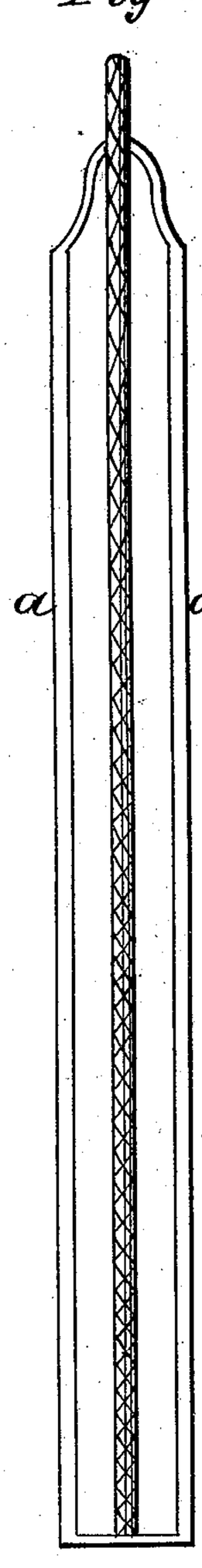
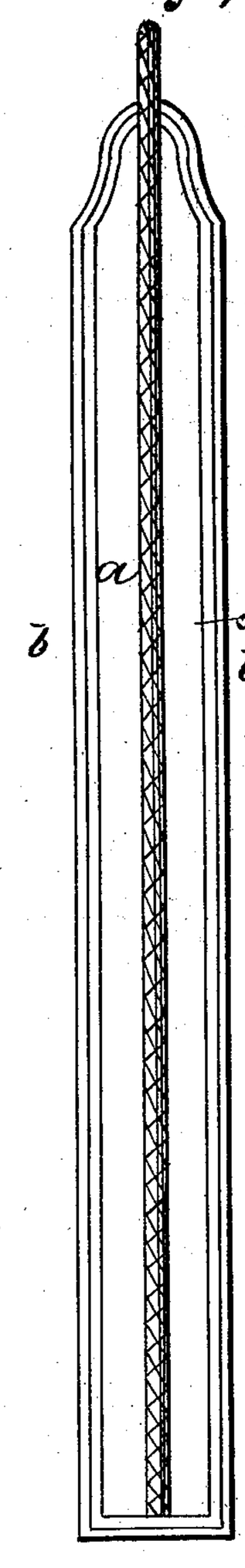



Fig. 4



# UNITED STATES PATENT OFFICE.

JOEL H. TATUM, OF NEW YORK, N. Y.

## MANUFACTURE OF CANDLES.

Specification of Letters Patent No. 21,706, dated October 5, 1858.

*To all whom it may concern:*

Be it known that I, J. H. TATUM, of the city, county, and State of New York, have invented a new and useful Improvement in Candles; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1, is an external view of my invention. Fig. 2, a longitudinal central section of ditto; Figs. 3, and 4, longitudinal sections of candles in unfinished stages of the process of manufacture by which my improvement or invention is carried out.

Similar letters of reference indicate corresponding parts in the several figures.

The object of this invention is to indurate the exterior tallow and other candles that are manufactured of inferior materials, in such a manner that a firm, smooth and handsome external surface is obtained, one not liable to crack and shell off, and one that will prevent the candles from "guttering," add materially to their illuminating power and will not soften sufficiently in a warm climate to be deteriorated in value.

To enable those skilled in the art to fully understand my invention and prepare candles in accordance therewith I will proceed to describe it.

I take tallow candles or candles constructed of any material that melts or fuses at a low temperature or has a greasy surface, and coat them in the following manner. I prepare three compositions, all of which have for their base, stearic acid. The first composition is prepared thus:—

| | |
|---|---|
| Stearic acid (ordinary candle stock) | 50 parts |
| Good tallow | 44 " |
| Gum camphor | 3 " |
| White rosin | 2 " |
| Gum dammar | 1 " |
| | 100 |

The second composition is formed of

| | |
|---|---|
| Stearic acid | 70 parts |
| Good tallow | 24 " |
| Gum camphor | 3 " |
| White wax | 2 " |
| Gum dammar | 1 " |
| | 100 |

The third composition is formed of

| | |
|---|---|
| Stearic acid | 90 parts |
| Good tallow | 5 " |
| Gum camphor | 3 " |
| White wax | 2 " |
| | 100 |

These three compositions have their several parts melted and well mixed together, and the candles are dipped successively in the three different compositions, so that they will be coated with three different layers, one over the other, as shown clearly, in Fig. 2, *a*, representing the inner, *b*, the intermediate and *c*, the outer coat.

By referring to table of parts of the three compositions it will be seen that they chiefly differ in the amount of stearic acid and tallow, the former gradually increasing from the first to the third composition and the tallow decreasing. Each coat therefore that is applied to the candles increases in hardness. The object of this is to insure a perfect coating of the candles. The first composition *a*, melts at a comparatively low temperature not greatly exceeding that at which the tallow fuses and consequently when the tallow candles are dipped into it a perfect coat will be formed, that is to say, the tallow of the candles and composition *a*, will not run together if the operation be done expeditiously, as would otherwise be the case. The second composition *b*, melts at a higher temperature than *a*, as it contains more stearic acid and less tallow, but not sufficiently so as to cause the two to unite as the candles are dipped. The third composition *c*, is less fusible or melts at a higher temperature than *b*, but the difference in fusibility is not sufficiently great to cause *b*, and *c* to unite. It will be seen therefore that an external coating *c*, will be formed on the candles of sufficient hardness and one that will fuse at a comparatively high temperature so as not to be materially affected by a warm climate. There is another object in applying three different coats to the candles, the external coating is not liable to shell off, as the diversity in the hardness of the several coats that are in contact is not sufficiently great to cause such result. If a coating of sufficient hardness could be immediately applied to a tallow candle it would not remain long on it, it

would crack and shell off, for the soft material within would not form a firm support or bed, for the outer brittle coat. Stearic acid is very brittle, so much so that it will crumble readily when cold, and in cooling its crystals agglutinate in large masses. Alone therefore it would not answer as a coating for candles. The tallow is necessary to render it soft or ductile, and also to vary its degree of fusibility. The camphor, white wax, rosin and gum dammar are introduced to act as divisors or act as a flux to prevent the formation of large crystals or the agglutination of the same into large masses, thereby forming a hard, smooth and handsome surface.

Each of the three compositions should be melted in a vessel of such form as to facilitate the operation of dipping, and the compositions should be at such temperatures as just to keep them perfectly fluid, as the coating, when the candles are dipped in the compositions in that state, will be more transparent than otherwise.

I would remark that the proportions given in the above tables or formulas as regards the compositions may be varied as occasion may require. Stearic acid is not always of the same quality. It varies considerably in hardness, and more or less tallow may be used according to the quality of stearic acid employed. If the purest and best be used the quantity of tallow should be increased about 10 per cent. above that given in the tables. As regards the camphor, wax, gum dammar, rosin,—the quantity used is not material, a very small proportion will answer and in the latter composition *c*, gum dammar and rosin are not necessary, and as the wax, is used more for a finish or to give a smooth surface than for other purposes it is not necessary in the first composition *a*.

I am aware that candles of inferior quality have been coated or enameled and that stearic acid and white wax in connection with spirits of wine have been used for such purpose—see *Annual of Scientific Discovery* for 1837. Edited by D. A. Wells, page 239. I am also aware that candles have been molded of good material and allowed to cool externally and the fluid interior poured out and filled with an inferior substance—see *Morfits Applied Chemistry*, page 569; also see page 573, of the same work, in which it is shown that gum dammar, white resin, and white wax have been melted together and used as a varnish to form a coating for inferior candles. But it will be seen that the processes above referred to differ essentially from mine. A coating applied in either of the above described ways will crack and shell off owing to the diversity existing between the coating and the body of the candle. By my invention this difficulty cannot occur, the candles give a good light, superior to the common tallow ones and a basin of fluid tallow tempered with a proportion of the coating is formed around the base of the flame.—The hard external coating does not fuse as readily as the interior, and hence the formation of the basin, and owing to the external coating fusing at a higher temperature than the tallow at the center, the candle will not "gutter" in case any of the warm fluid tallow escapes over the side. Inferior candles may be coated according to my invention at a very small advance above the first cost and be greatly enhanced in value, the chief objection to their use being thereby obviated.

I do not claim broadly coating or covering tallow or inferior candles with a composition or material of superior quality to form a hard smooth surface, for this has been previously done; but,

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

Coating or covering candles, manufactured of tallow or other inferior substance, with a plurality of compositions formed of stearic acid and tallow in varying proportions together with proper fluxes to give different degrees of fusibility and also certain degrees of hardness and smoothness to the same, substantially as described, the candles being dipped into the several compositions in the order of the sequences as set forth.

JOEL H. TATUM.

Witnesses:
J. W. Coombs,
M. Hughs.