March 23, 1937. J. E. HOOPER 2,074,693

WICK

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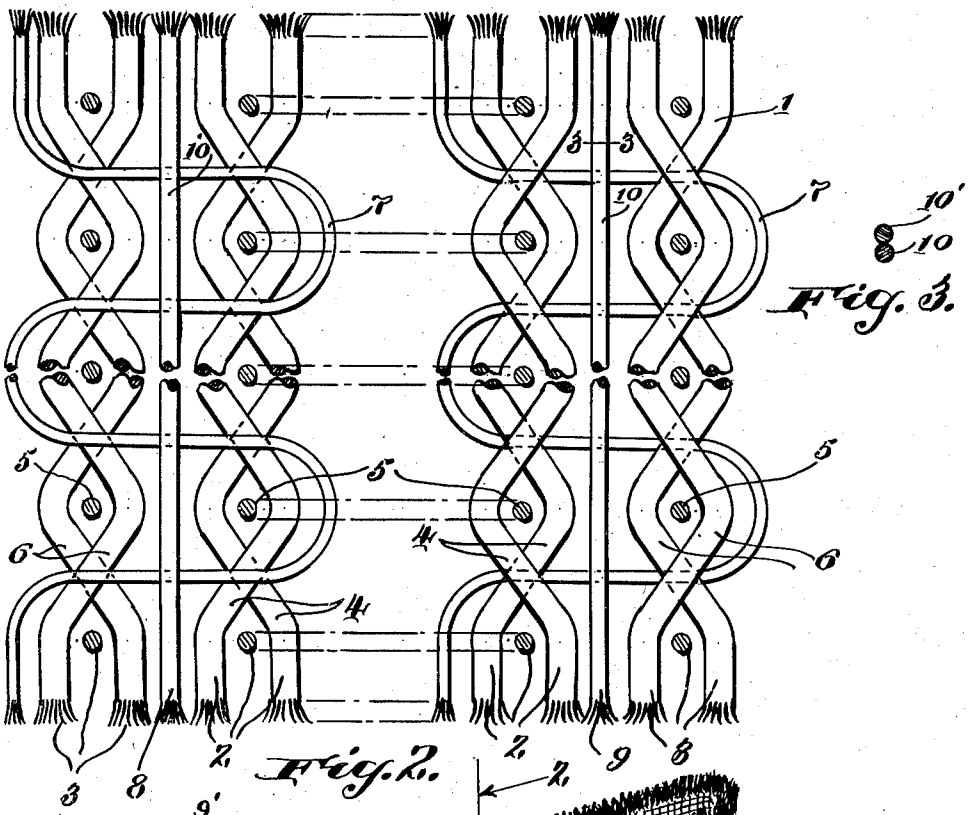


Fig. 3.

Fig. 2.

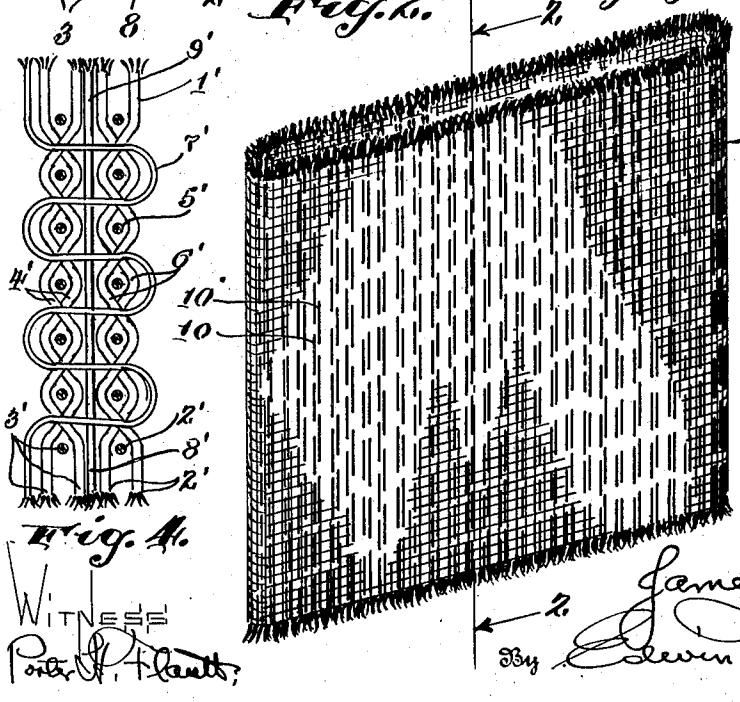


Fig. 1.

Fig. 4.

Witness:

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WICK

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2 Claims. (Cl. 139—388)

The invention relates to wicks and particularly to a multiple ply wick having the usual or any suitable inner and outer plies. The plies may be composed, each of warp threads with the usual weft inter-woven therewith in any suitable manner. The improvement of the invention provides a wick having increased capillarity due to the presence therein of relatively straight warp threads or yarns which extend in the general direction of the length of the wick or wicking the said yarns being free or substantially free of any binding tendency by the weft or otherwise, and being dependent for their support and retention within the fabric upon the inner and outer plies between which they are enclosed being non-woven or relatively so.

The inner and outer plies are, in accordance with the regular practice, retained substantially in fixed relation with each other by an intermeshing warp which is interwoven with the weft yarns of both the inner and outer plies, extending from the outside of the outer ply through both plies to the inside of the inner ply, and again through both plies, the course of the intermeshing warp described being repeated for the entire length of the wick.

The arrangement of the warp threads, or yarns of the intermediate ply whereby they are relatively straight and not closely bound by the weft is of great importance in the operation of the wick. In this connection it should be understood that though the wick of the invention is primarily intended for use in conducting a fuel oil as kerosene to the point of combustion and retaining and presenting it for combustion as in an oil stove, oil lamp or the like, it is also adapted for use in conducting other liquids as water presented for use in the humidification of air and for conducting other liquids, the conduction of which by capillarity is found desirable.

The wick of the invention has the advantages: (1) of freer movement of the liquid by capillarity, due to the absence of lateral binding by the weft, of the yarns comprising the intermediate ply, (2) the capillary passages contained in the fibres of the yarns are relatively straight and the line of the passage of the liquid is therefore shorter, (3) this arrangement with the freedom from lateral binding of the yarn gives quicker movement of the liquid up the wick, hence a quicker flame after starting and a hotter flame during combustion, (4) on account of the freedom of the intermediate ply from any binding tendency due to the inter-weaving with the weft, the wick tends to give a more uniform and even flame, (5) the wick construction is more evenly balanced and this construction makes it possible to reduce the proportion of weft ends and increase the longitudinal ends thus further promoting the conduction of the liquid by capillarity, and as a further advantage it is found to be easier to keep the wick clean.

It is of interest that in the woven plies of fabric wicks, the warp yarn is not only bound by the weft but is so compressed by this binding that the conduction of liquids through the yarns by capillarity is restrained and the yarn is bent sharply about the weft, increasing the length of the path travelled by the liquid as it passes up the wick beyond and in excess of the actual length of the wick. It is the object of the invention to provide a wick which has passages through the warp yarns free of such restraint and of a length less than the length of interwoven warp yarns of the corresponding portion of the wick.

In the accompanying drawing, I have illustrated a tubular wick embodying the features of the invention in the preferred form. However, the tubular construction is not essential to the broader principles of the invention as the intermediate ply of the invention may be located between the plies of any multiple ply wick, flat or tubular.

In the drawing:

Figure 1 is a perspective view of a piece of tubular wick of the length ordinarily used in an oil stove, the tube being shown flattened to the position which the tubular wick takes prior to its insertion in a round burner or its application to a supporting cylinder in accordance with the usual practice.

Figure 2 is a section on the line 2—2 in Figure 1.

Figure 3 is a section on the line 3—3 in Figure 2, showing a double, two yarn, or two ply non-woven warp. A single or multiple yarn of any number of plies and various treated yarns may be used.

Figure 4 is a section like Figure 2 showing a flat wick.

Referring to the drawing by numerals each of which is used to indicate the same or similar parts in the different figures, the construction shown comprises a wick 1 in tubular form. This wick in accordance with the usual practice comprises an inner ply 2 and an outer ply 3. The inner ply is made up of warp threads or yarns 4 and weft yarns or threads 5.

The outer ply is made up of warp yarns or

threads 6, but the weft 5 is in accordance with the regular practice carried by a shuttle and the same weft thread is passed through both the outer and inner plies though this method of weaving has no apparent bearing on the invention as at present indicated.

To hold the inner and outer plies in their predetermined and intended relation there is an inter-woven or inter-locking warp 7 which in the finished fabric is shown as inter-meshed with the weft threads or yarns of both the outer and inner plies extending through both plies so as to bind the inner ply and the outer ply together. In the older types of wick fabrics the longitudinal threads or warps are tightly bound and sharply bent, or kinked in weaving due to inter-weaving with the weft. This interferes with and reduces the capillary action of the wicks. The invention overcomes this difficulty.

The important feature of the invention resides in the provision of an intermediate ply 8 consisting of a set of longitudinal substantially straight warp yarns or threads 9 extending in the general direction of the length of the wick between the inner and outer plies 2 and 3 and free, or relatively free of any lateral binding action of the weft, it being understood that the floating ply 8 or the warp yarns thereof are not inter-woven with the weft so that they remain substantially straight and are very slightly bound or constrained laterally being substantially free of any binding action which might interfere with their capillarity. For these reasons they afford a path of traverse of the oil from the oil chamber to the point of combustion which is relatively straight and shorter than in the case of the closely woven warp yarns or threads 4 and 6 as they occur in the inner and outer plies. The floating ply has for this reason better properties of capillarity in the finished wick and a faster feed of the oil or other liquid than can be obtained with interwoven warps as in the wicks made in accordance with the previously existing practice.

In the preferred form the relatively straight warps 9 of the intermediate ply 8 are preferably double or double ply as shown at 10, 10', in Figure 3 giving a higher degree of capillarity per unit of cross section of the finished fabric than can be obtained by the use of a single ply thread or yarn. A single or any multiple ply yarn may be used.

In the preferred form the warps 8 of the intermediate ply are laid substantially side by side approximately as close, or slightly closer together than are the warps 4 and 6 of the woven plies. However, the exact number of relatively straight warps in relation to the number of warps in the inner and outer ply is largely a matter of choice on the part of the manufacturer.

The numerous advantages of the invention in the way of a production of a wick having greater capillarity, straight or relatively straight passages for the movement of the oil or other liquid from the oil chamber to the point of combustion thus giving a quicker and hotter flame and a faster feed of the oil or other liquid and other advantages have been previously outlined in this application.

Figure 4 shows a flat multiple ply wick having between two woven plies 2' and 3' a non-woven ply 8' composed of relatively straight and relatively unbound and non-woven warp yarns or threads 9, it being understood that the multiple ply wick may be of any preferred number of woven plies 2' and 3' with a non-woven ply between part or all of the woven plies.

While the various layers or plies of which the wick is composed have been referred to throughout the specification for convenience as plies 2, 3, 8 and 2', 3' and 8', the word layer may be regarded as more descriptive of these portions of the wick and this word has been used in the claims as designating these portions of the wick.

I have thus described specifically and in detail a wick having an intermediate ply of longitudinally extending relatively straight unbound warp threads, the description being specific and in detail in order that the manner of constructing, applying, operating, and using the invention may be fully understood, however, the specific terms herein are used descriptively rather than in a limiting sense, the scope of the invention being defined in the claims.

What I claim as new and desire to secure by Letters Patent is:

1. A tubular wick having an inner layer and an outer layer each composed of longitudinal warp yarns and transverse weft, the warp and weft being interwoven, binder threads securing the inner and outer layers to each other and an intermediate layer between the inner and outer layers comprising yarns extending each longitudinally of the wick, the yarns composing said intermediate layer being substantially straight and free of any transverse binding by the weft whereby the liquid is conducted freely by capillarity on a substantially straight path longitudinally of the wick.

2. A wick having an inner layer and an outer layer each composed of longitudinal warp yarns and transverse weft the warp and weft being interwoven, binder strands securing the inner and outer layers to each other and an intermediate layer between the inner and outer layers comprising yarns extending longitudinally of the wick, the said latter yarns being substantially straight and free of any transverse binding of the weft whereby the liquid is conducted freely by capillarity on a substantially straight path longitudinally of the wick.

JAMES E. HOOPER.