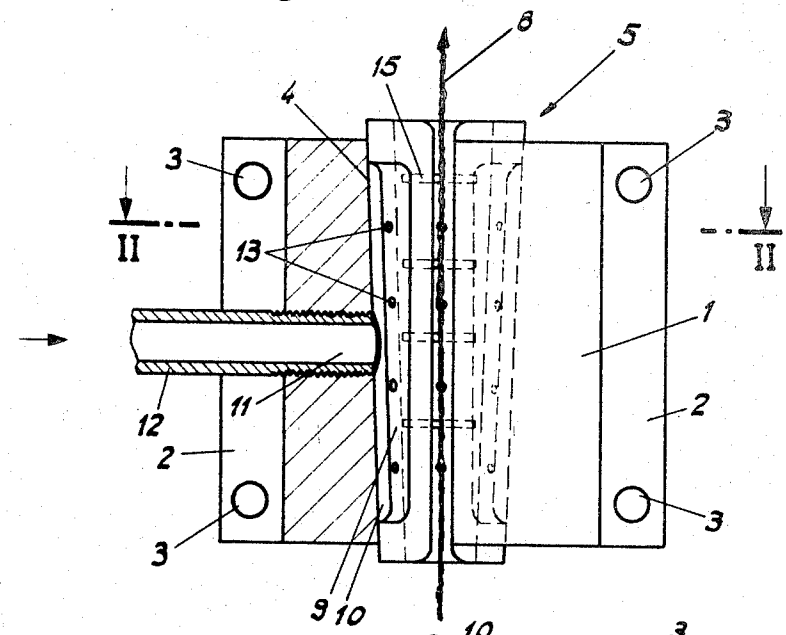
Sept. 24, 1968 H. METTLER 3,402,447

GAS BURNER FOR SINGEING THREADS

Filed April 19, 1967

Fig. 1



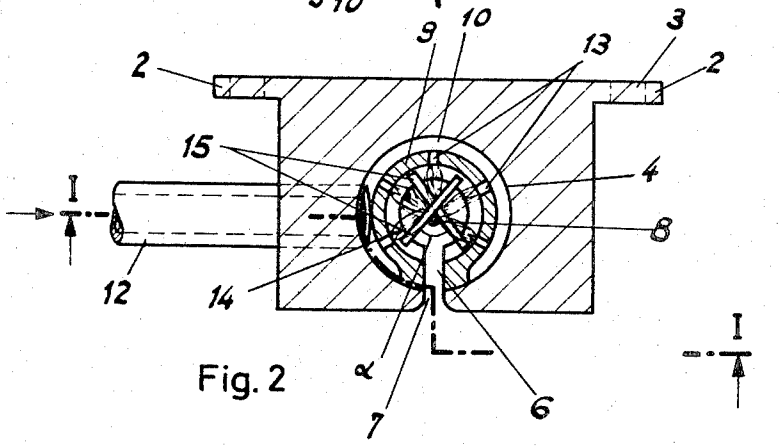


Fig. 2

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GAS BURNER FOR SINGEING THREADS

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5 Claims. (Cl. 28—63)

ABSTRACT OF THE DISCLOSURE

A gas burner for singeing thread in which the flames are directed inwardly toward the thread and in which the thread slides along transverse stripping rods which scrape off the singed residue.

The invention relates to gas burners and is particularly concerned with a gas burner for singeing threads which are pulled through the burner and are exposed to singeing by flames which are directed against the thread from different directions.

It is known in the textile art to singe threads for different purposes, such as obtaining a readily sliding thread having a smooth surface, or for obtaining a thread that is intended for producing a fabric which is hard and as little fibrous as possible. If cotton threads are singed prior to or after mercerizing, the shine of the mercerizing effect is increased.

While the reasons that make mercerizing desirable are manifold, the singeing always obtains the same effect, i.e., the fibers are removed in the best possible manner, especially burnt off or melted away.

The vegetable fibers, which for the most part consist of cellulose, normally can be readily singed. They burn relatively well and merely leave fine ashes which collapse from the slightest shock or touching. For this reason threads from such fibers are cotton, flax, hemp, kapok, jute, ramie, etc., can be readily singed by means of an open flame or by the heat effect of an electrically heated resistance wire. Consequently there are no essential reasons which call for a machine with gas burners or one with electric burners for singeing vegetable fiber, so that one can decide from one case to another, for example, for reasins of economy, on one or the other type of burner.

The animal fibers to which the different types of wool as well as natural silk belong have a high content of nitrogen and partly also of sulfur. They do not burn equally well as the vegetable fibers and leave behind rather strong, brittle ashes. In order to successfully singe these fibers which do not burn very well, that result in very considerable singeing deposits and affect the efficiency of electric burners by heavy soiling, gas burners are preferably used, which act on the fibers with an open flame and are not sensitive to the accumulation of dirt.

Also the artificial fiber materials react as differently to singeing as the individual natural fibrous materials.

The artificial fibrous materials having a cullulose or albumen basis react to singeing in a similar manner as the vegetable fibers.

The artificial fibers on a purely synthetic basis, such as, for example, polyvinylchloride, polyacrylnitrile and polyamide fibers however, as well as the chemical anorganic fiber materials such as glass fibers, etc., pose special problems; fibers of this type that project from the thread cannot be burnt off, but must be melted away. This operation was not possible heretofore by means of an open gas flame, because the flames act on the thread merely in a manner that the projecing fibers melt inwardly and continue to hang onto the thread in the form of melted pellets or hooks which subsequently become hard. This results in a rough, undesirable thread surface. Therefore, such fibers could only be singed heretofore with electric contact burners. An electric contact burner causes the fibers that project from the thread to melt, and by simultaneous sliding of the thread along the burner body (contact) the molten particles are stripped from the thread.

As already mentioned there are animal fibers which produce a burning residue that strongly adheres to the thread. Actually these should also be singed by means of a contact burner, to enable removal of the residues, which, however, is a disadvantage due to the aforementioned soiling. In plants where both, threads of cotton or wool, as well as entirely synthetic threads are singed, it was necessary until now to provide gas burners and electric burners.

It is therefore an object of the invention to provide a burner that has universal application for singeing threads, which is based on a known gas burner for singeing threads, in which several small flames are directed from different sides toward the thread which is drawn through the burner. In accordance with the invention this burner has the distinguishing feature of being provided with bars or rods that extend transversely to the thread and are heated by the flames and along which the thread slides so that singeing residue is stripped from the thread.

Depending on the size of the flames, which can be adjusted, for example, by means of a regulating or control device, it becomes possible with such a burner to successfully singe all aforementioned types of thread.

These features and advantages of the invention will become apparent from the following description of an embodiment of the invention illustrated in the accompanying drawings, in which

FIG. 1 is a bottom plan view of a gas burner, partly in section, taken along line I—I in FIG. 2; and

FIG. 2 is a section taken along line II—II in FIG. 1.

The gas burner illustrated comprises a housing **1** that is provided with two lateral ledges **2** which have apertures **3** for securing the burner to the flame of a singeing machine. The housing block **1** has a conical bore **4** extending therethrough in which a burner component or insert **5** is located that is in the form of a conical sleeve having an elongated slot **6** which is aligned with a longitudinal slot **7** in the housing **1** in a manner that a thread **8** may be inserted laterally through slots **7** and **6** for being located along the axis of the burner, i.e., in operating position.

The insert **5** rests against the wall of the bore **4** proximate both of its ends and its longitudinal slot **6**, while the remaining part of its conical shell **9** is arranged at a small distance from this wall, thereby defining a hollow space **10** between bore **4** and shell **9** into which leads a supply duct **12** for a mixture of gas and air, that extends through a lateral bore **11** in the housing **1**. The sleeve **9** is provided with several annularly disposed radial bores **13** through which the air and gas mixture can enter the inner space of the burner insert **5** and burn while forming a plurality of small flames **14** directed toward the burner axis, thereby singeing the thread **8** which is, of course, pulled rapidly through the burner. To the extent that the burner has now been described, it is well known. What is new as compared to convention burners are the stripping bars or rode **15** which extend perpendicularly to the axis of the insert **5** and whose ends are secured in the conical sleeve **9**. As shown by FIG. 2, the stripping rods **15** are disposed in two planes which intersect substantially in the axis of the insert; and more in particular the successive stripping rods are disposed alternately in one and then in the other plane. The angle α in the vertex

of which the thread 8 is located in somewhat smaller than 90°. It can be seen that singeing residue forming on the surface of the thread 8, particularly ashes or molten particles, are stripped off of the thread so that it is cleaned, and this does not take place only on one side of the thread because, as experience has shown, the thread pulled through insert 5 effects also a local reciprocating rotation which is especially pronounced with twisted threads, but which is not absent also with non-twisted threads.

The great advantage of the illustrated gas burner as compared to conventional gas burners is that it can be used for threads of all types. By adjusting a cock or valve arranged in the supply conduit 12 the flames 14 can be made so small that they do not reach the thread 8, so that the latter can be singed merely by contact with the heated stripping rods 15, as required, for example, with threads of synthetic fibers. However, for wool or cotton threads or the like, the flames 14 are made so large that they touch the thread 8 directly. For wool threads there still arises the particular advantage that they are cleaned better than with the conventional gas burners, while on the other hand the effciency of the burner in accordance with the present invention is not impeded by soiling, as are electric burners used for singeing woolen threads.

Having now described my invention with reference to the embodiment illustrated in the drawings, I do not wish to be limited thereto, but what I desire to protect by Letters Patent of the United States is set forth in the appended claims.

I claim:

1. Gas burner for singeing threads comprising a burner sleeve mounted in a housing and having a plurality of radially disposed apertures for supplying air and gas mixture into said burner sleeve to provide for flame propagation radially inwardly of said sleeve, a plurality of stripping rods arranged in spaced relationship and extending transversely through the interior of said sleeve for engagement by a thread travelling lengthwise and generally parallel to the axis of said sleeve through said burner.

2. Gas burner in accordance with claim 1, where said sleeve is in the form of an insert mounted in said housing and having ends secured to said housing, the portion of said sleeve intermediate its ends being spaced from said housing and defining a passage in said housing for supplying gas to said apertures and where a gas supply conduit extends through said housing into said passage.

3. Gas burner in accordance with claim 1, where said stripping rods are arranged in a plurality of phase intersecting one another proximate the axis of said sleeve.

4. Gas burner in accordance with claim 3, where alternate stripping rods are disposed in different planes.

5. Gas burner in accordance with claim 4, where said housing and said sleeve present registering elongated slots for the entrance of a thread and said rods are disposed at an angle α relative to one another which is less than 90°, the vertex of which constitutes the end of the slot at which the thread is located during singeing operations.

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JAMES W. WESTHAVER, *Primary Examiner.*

U.S. DEPARTMENT OF COMMERCE

PATENT OFFICE

Washington, D.C. 20231

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,402,447 September 24, 1968

Hermann Mettler

It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

Column 4, line 16, "phase" should read -- planes --.

Signed and sealed this 10th day of February 1970.

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents