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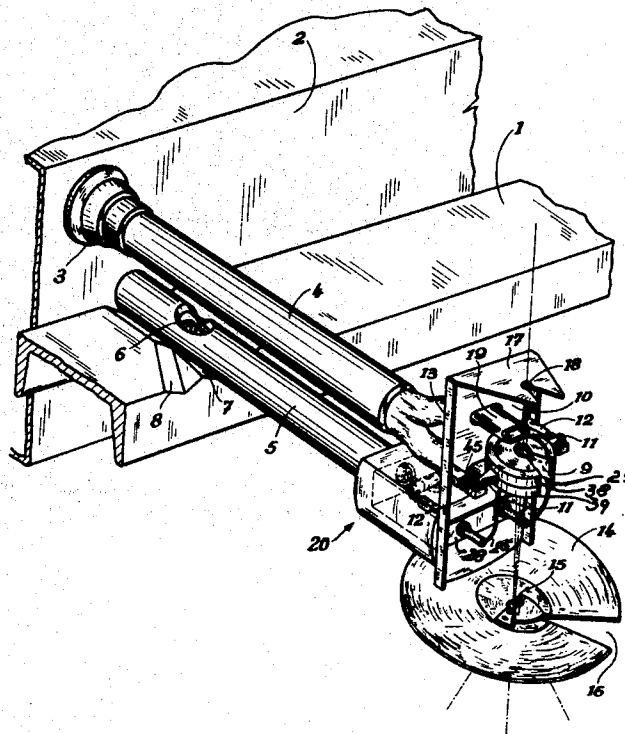
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[54] **THREAD SINGEING DEVICE FOR TWISTING AND SPOOLING MACHINES**  
**11 Claims, 2 Drawing Figs.**

[52] U.S. Cl..... **219/388,**  
**28/63**  
 [51] Int. Cl..... **D02j 3/16**  
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**219/469, 388; 28/63**

**ABSTRACT:** A thread singeing device for twisting and spooling machines with an electrically heatable singeing head which head comprises a plurality of longitudinally slotted hollow cylinders one extending around the other, while the end faces of said hollow cylinders are engaged by an annular slotted disc each consisting of a high heat-resistant insulating material, and while the unit composed of said cylinders and annular discs is encased by two slotted annular bodies supported by arms connected to a plate.



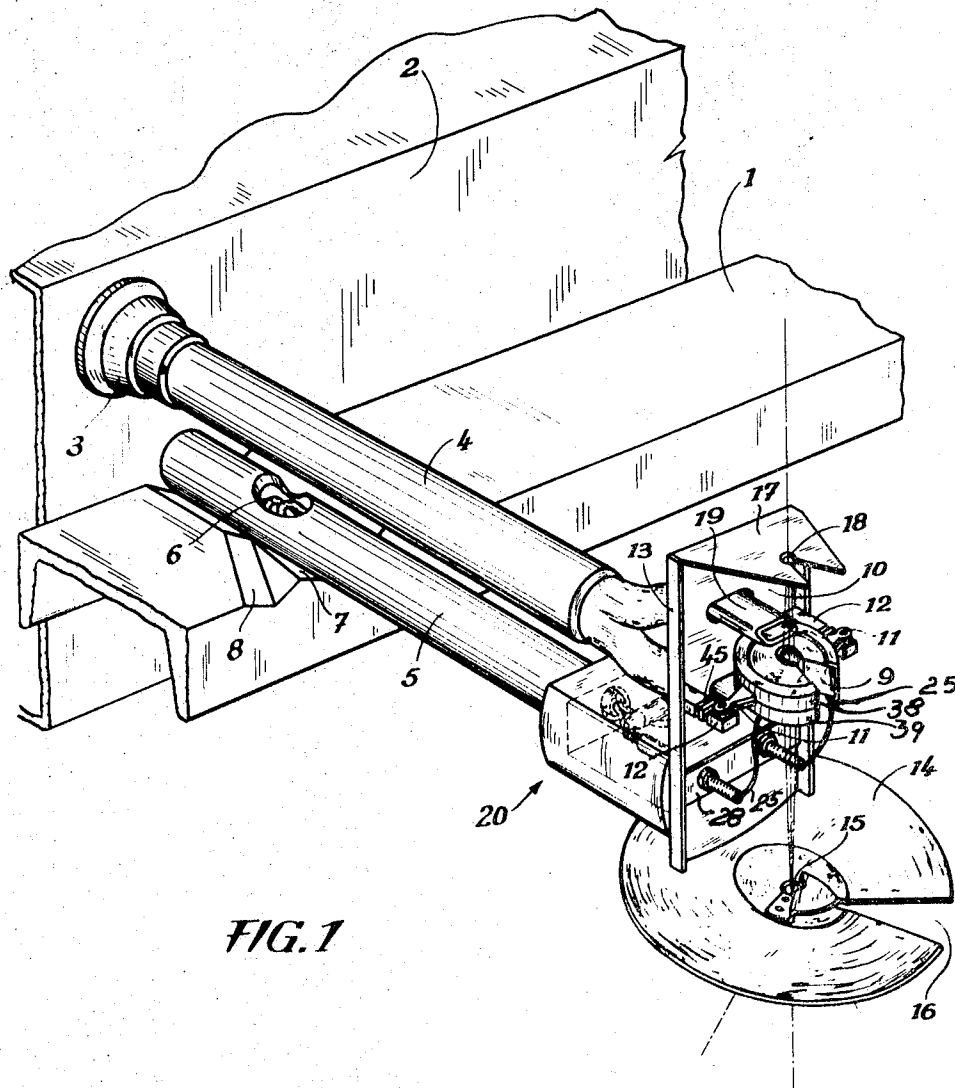


FIG. 1

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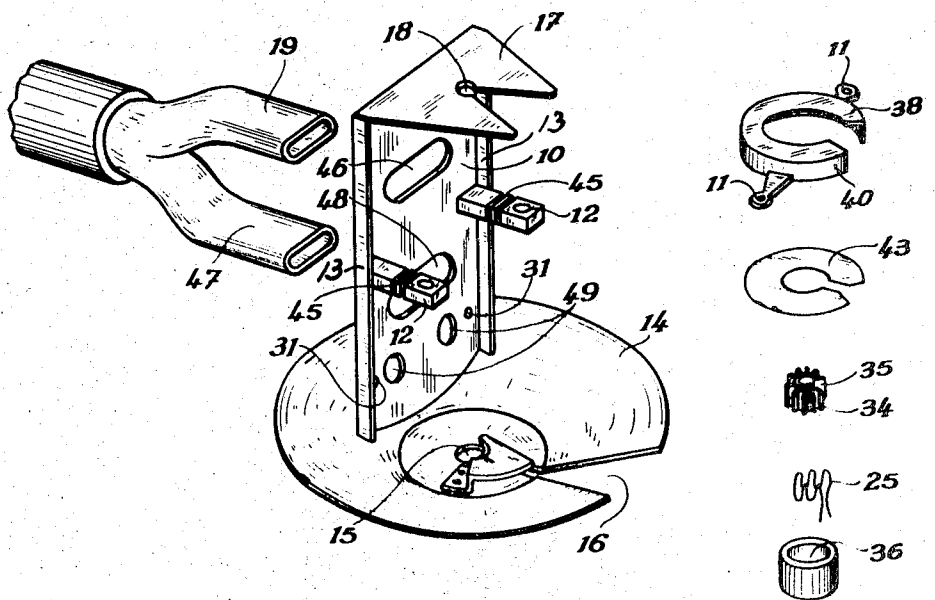
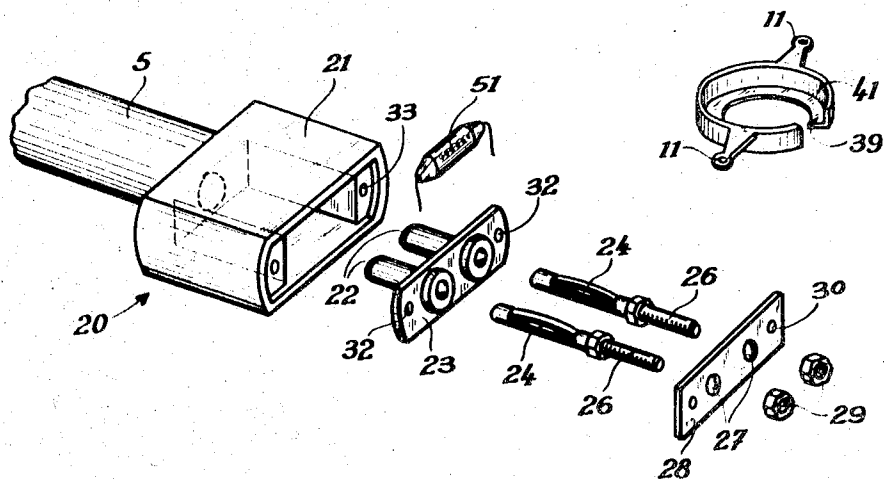


FIG. 2



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# THREAD SINGEING DEVICE FOR TWISTING AND SPOOLING MACHINES

The present invention relates to a thread singeing device for twisting and spooling machines with an electrically heated singeing head which comprises a plurality of hollow cylinders extending around each other and slotted once in longitudinal direction while at least one of the two innermost hollow cylinders between which extends the electric wire is composed of a high heat-resistant material.

Various embodiments of the above-mentioned thread singeing device have become known. Such devices are employed in such a manner that the thread is moved through the inner hollow cylinder of the singeing head in the longitudinal direction thereof and that the heat of the singeing head, which heat can be electrically adjusted in conformity with the respective type of thread, is radiated toward the thread so as to singe the same.

The heretofore known embodiments of thread singeing devices with singeing heads of the above-mentioned type are rather expensive. While they meet the requirements in connection with the singeing operation, they cannot be produced and installed in an economic manner, especially with regard to the establishment of the connection of the electric heating wire to the feeding line and the connection to suction devices.

It is, therefore, an object of the present invention to provide a thread singeing device for twisting and spooling machines with an electrically heated singeing head which is composed of structural elements which can easily be assembled and can easily be connected to a machine without requiring any material changes in the machine.

It is also an object of the present invention to provide a thread singeing device as set forth in the preceding paragraph which will greatly facilitate the assembly of the individual cylinders making up the singeing head while permitting an exchange of the individual structural elements without any difficulties. These and other objects and advantages of the invention will appear more clearly from the following specification in connection with the accompanying drawings, in which:

FIG. 1 is an isometric view of a singeing device according to the invention connected to a machine frame.

FIG. 2 illustrates individual elements of the singeing device according to the invention and their relative position with regard to each other.

The thread singeing device according to the present invention is characterized primarily in that the end faces of the hollow cylinders are respectively engaged by a slotted annular disc of high-heat-resistant insulating material while the opening edge of said annular discs centers the inner hollow cylinder forming the thread passage. The arrangement according to the invention is furthermore characterized in that the annular discs and the hollow cylinders are together held between two slotted rings which by means of angled off marginal strips embrace the outer mantle of the outer hollow cylinder and are provided with at least two radially protruding connecting members by means of which they are braced against each other while simultaneously being connected to the supporting arms of a supporting element.

The thread singeing device according to the present invention which forms a closed exchangeable unit and can be mounted on a machine frame without difficulties may, according to a further development of the present invention, be so designed that the support is composed of a supporting plate which is approximately parallel to the singeing head axis and on which perpendicular to said supporting plate there are provided two supporting arms for the rings. The supporting plate carries at the thread inlet end of the singeing head and in spaced relationship thereto a protective plate with a thread guiding eye which plate extends primarily in a direction perpendicular to the axis of the singeing head. Opposite said thread guiding eye there is located a further thread guiding eye arranged on the thread exit side of the singeing head in spaced relationship thereto.

According to a further development of the invention, the support of the singeing head simultaneously forms the support for the thread guiding eyes preceding the singeing head and following the singeing head so that the last-mentioned thread guiding eyes together with the singeing head form a structural unit. This will assure a precise thread guiding in axial direction through the singeing head.

According to a still further development of the invention, the supporting plate may in planes above and below the singeing head be provided with two passages through which suction pipes or suction hoses may be passed which are connected to a suction blower thereby creating the condition which will permit to eliminate lint and combustion residues including possible combustion gases from the thread prior to its passage through the singeing head and/or after it has passed through the singeing head.

A particularly simple connection of the supporting plate to the machine frame may be realized by detachably connecting the supporting plate to a supporting pipe which latter will house the electric feeding wires. According to a further development of the invention, the supporting pipe may be linked to the machine frame so as to be laterally pivotable and adjustable by means of locking elements. This provides for the requirements to pivot the thread singeing device including the preceding and succeeding thread guiding eyes out of the range of the thread path. This holds true if the spooling or twisting is to be effected without singeing and also holds true during the setting of the machine or when a thread break has to be repaired.

For purposes of connecting the supporting plate to the supporting pipe, the free end of the supporting pipe may be equipped with a socket the plug bushings of which in the supporting plate have associated therewith corresponding bores. It is through these bores that plugs arranged at the ends of the heating wire of the singeing head and connectable to the supporting plate can be plugged into the socket. Thus, when plugging the plugs into the socket which plugs are connected to the supporting plate, there is established a connection between the supporting pipe and the supporting plate. Simultaneously also an electric connection of the singeing head with the feeding wires will be established. The mounting of the supporting plate with the singeing head supported thereby will thus be particularly simple and permits at any time without the employment of a screw driver or similar tools an exchange of the supporting plate with singeing head for another unit of this type.

In order to be able continuously to check the singeing operation and to be sure that no singeing head is out or order for any length of time, it is possible according to a further development of the present invention to provide an electric signal emitter in the heating circuit for the singeing head which signal emitter will indicate the condition of operation of the singeing head. If desired, at least two adjacent singeing heads may be arranged electrically in series, and an electric signal emitter may be arranged in parallel to each of the singeing heads. Thus, if one of the singeing heads of a thus-arranged group of singeing heads should fail, a signal will be emitted and the failing singeing head may be exchanged and a replacement head may be substituted therefor. The removal of the damaged singeing head merely requires a withdrawal of a plug from its socket.

According to a still further development of the invention, the housing of the plug may consist of a transparent material, and in the interior of the housing there may be provided a signalling lamp forming an electric signal emitter.

Referring now to the drawings in detail, FIG. 1 shows a U-beam 1 of the machine frame which has connected thereto the singeing head generally designated S. Directly behind the U-beam there is provided a suction passage 2 having a rectangular cross section. A suction pipe 4 leads into the suction passage 2 through the intervention of the joint member 3. By means of said suction pipe 4, residues forming during the singeing operation may be withdrawn. The singeing head is con-

nected to the support or U-beam 1 by means of a supporting pipe 5 which receives the feeding wires for the electric singeing head. The supporting pipe 5 is at the area 6 linked to the beam 1 by means of a spring. The beam 1 has two locking depressions 7 and 8. When the supporting pipe 5 is located in the locking depression 7, the singeing head will be in its operative position. When the supporting pipe 5 is pivoted toward the side so that it will rest in the locking depression 8, the singeing device will be located outside the course of the thread. This position may occur when the machine is being set for the singeing operation or when a disturbance occurs or when a twisting and spooling operation is effected in which the thread must not pass through the singeing device.

The singeing device supported by the supporting pipe 5 comprises a singeing head 9 and a supporting plate 10 carrying said singeing head. The singeing head 9 is primarily formed by a cylindrical body which will be described in detail further below. As will be evident from FIG. 1, connecting members 11 are arranged on opposite sides of the singeing head 9 and the singeing head is by means of the said connecting members 11 connected to the supporting arms 12. The supporting arms 12 are mounted on the supporting plate 10 and extend perpendicularly with regard to the latter. The supporting plate 10 in its turn extends parallel to the axis of the singeing head. For purposes of reinforcement, the said supporting plate 10 has its longitudinal edges provided with an angled off strip 13. The supporting plate 10 has its lower end in spaced relationship to the singeing head provided with a protective shield 14 which is equipped with a thread guiding eye 15 and the threading slot 16. The upper end of the supporting plate 10 is provided with an angled off portion 17 which is equipped with the thread guiding eye 18. The two thread guiding eyes 15 and 18 are located precisely in the axis of the singeing head 9. Above the singeing head 9, the ends 19 and 47 of the suction pipe 5 extend through the supporting plate 10. The free end of the supporting pipe 5 carries the socket 20 into which the plugs may be inserted. In connection with the plugs 24, simultaneously the supporting plate 10 is connected to the socket 20 or supporting pipe 5. This is clearly evident from FIG. 2.

According to FIG. 2, the socket 20 comprises the housing 21 connected to the supporting pipe 5 and also the two sockets 22 which are connected to each other by means of the plate 23 and are adapted together to be inserted into the housing 21 after the connection with the conductive wires in the supporting pipe 5 has been established. The connection of plate 23 to the housing 21 is effected by means of screws to which end the plate 23 is provided with passages 32 while the housing 21 is provided with threaded bores 33. The shanks 26 of the plugs 24 are passed through the bores 27 of the plate 28 and are threadedly connected to the plate 28 by means of nuts 29 so as to form therewith a plug unit. By means of the passages 30 in the plate 28, the plug unit is by screws or rivets connected to the supporting plate 10 to which end the supporting plate 10 is provided with bores 31 for the passage of the screws or rivets. The shanks 26 are connected to the wire ends of the heating wire 25.

When the supporting plate 10 with the singeing head 9 connected thereto has its end face placed against the socket 20, in which instance the plugs 24 extend through the bores 49 in the supporting plate 10, and the plugs 24 are inserted into the plug bores of the sockets 22, the supporting plate 10 is by means of the singeing head 9 connected to the socket 20 and held thereby. Simultaneously with the connection of the supporting plate 10 with the singeing head 9 to the socket 20, the electric connection of the singeing head with the electric wires in the supporting pipe 5 is established.

As will be seen from FIG. 2, the singeing head 9 itself comprises an inner cylinder 34 which has a slot 35 and has its outside provided with longitudinal ribs about which the heating wire 25 is placed. The inner cylinder 34 which forms the thread passage is surrounded by the slotted cylinder 36. Cylinder 36, similar to cylinder 34, is made of a high heat-resistant material, preferably a ceramic material. The cylinder

36 is surrounded by a further slotted cylinder 37 which may consist, for instance, of any suitable metal. The assembly of the three cylinders is effected by means of the two slotted rings 38 and 39 with the angled off marginal strips 40 and 41 which extend around the outer cylinder 37 whereby a certain spacing is effected as determined by the folded portion 42 on the outer cylinder 37. Between the rings 38 and 39 on one hand and the end faces of the cylinders 34, 36 and 37 on the other hand, there will be arranged the slotted annular discs 43 which consist of a high heat-resistant insulating material, as for instance mica. These discs 43 will by means of their opening rims center the inner cylinder 34 which to this end has its end faces provided with a step. Together with the centering of the hollow cylinder 34, also the ring or cylinder 36 extending therearound will be centered and fixed as to its position. Between the outer mantle surface of the ring or cylinder 36 and the inner mantle 38 there remains an air gap in order by means of the latter to reduce the withdrawal of heat toward the outside to a minimum. This effect is furthermore increased by the fact that in view of the folded portion 42 also an annular gap is provided between the outer cylinder 37 and the angled off rims 40 and 41 of the rings 38 and 39.

The two rings 38 and 39 are respectively provided with two connecting members 11 which, when assembling the individual elements of the singeing head 9, will rest upon each other and by means of which the two rings 38 and 39 are connected to each other and to the supporting arms 12. To this end, the said rings and arms are provided with threaded bores or bores for receiving rivets. The supporting arms 12 are additionally provided with annular grooves to form cooling fins 45.

When connecting the individual elements of the singeing head 9, the ends of the heating wire 25 are extended downwardly and outwardly so that the connection with the shanks 26 of the plugs 24 can be effected. FIG. 2 furthermore shows that the supporting plate 10 is provided with passages 46 and 48 through which extend the suction pipe ends 19, 47 so that above and below the singeing head 9 a suction may be effected for removing lint and burned residues, including combustion gases, from the thread.

The thread singeing device illustrated by way of example in the drawings is characterized primarily by a particularly simple construction which permits a simple assembly while likewise permitting an easy exchange of damaged elements. Furthermore, there exists the possibility to provide safety means to indicate to the operator when the heating wire 25 is burned through so that the singeing operation can immediately be interrupted. To this end, at least two adjacent singeing units are arranged electrically in series. The safety means may consist, for instance, of a signalling lamp 51 which through a high resistance, for instance within the range of the plug 20, connects the feeding wires in the supporting pipe with each other. The signalling lamp 51 will light up when the heating wire 25 has burned through and accordingly the parallelly arranged signalling lamp 51 alone receives current. The signalling lamp may be arranged directly in the housing 21 of the socket to which end said housing may be made of a transparent material so that the signal will be easily visible. There also exists the possibility to combine such signalling lamps at a central area of the machine from where all singeing heads can be watched.

As will also be evident from the above, the singeing head is of a particularly simple construction and its individual elements can be connected when the singeing head is mounted on a support. The design of the individual elements will assure that the hollow cylinders surround each other in a centering manner so that between the hollow cylinders insulating air gaps will be formed to assure an intensive heat emanation only into the inner chamber of the inner hollow cylinder with the result that the energy requirement for singeing operation will be low.

It is, of course, to be understood that the present invention is, by no means, limited to the particular showing in the drawings but also comprises any modifications within the scope of the appended claims.

I claim:

1. A thread singeing device for twisting and spooling machines, which includes: supporting means, three hollow cylinders one surrounding the other and each having a slot extending in its axial direction, said slots being in alignment with each other, at least the two innermost ones of said hollow cylinders consisting of a high temperature-resistant material, electric heating wire means arranged between two of said cylinders, two annular slotted disc means of high heat-resistant insulating material respectively having their slots in substantial alignment with the slots of said hollow cylinders and respectively being in engagement with the end faces of said cylinders so as to center the innermost one of said cylinders, and two slotted annular disc means and said cylinders as a unit, said annular bodies having slots in alignment with the slots of said disc means and said cylinders, and means holding said annular housing bodies clamped together and connected to said supporting means.

2. A device according to claim 1, in which said supporting means comprises supporting arms, and in which said annular housing bodies have connecting arms detachably connected to said supporting arms.

3. A device according to claim 1, in which said electric heating wire means is interposed between the two innermost ones of said cylinders.

4. A device according to claim 2, in which said supporting means includes a plate having its major surface extending substantially parallel to the axes of said cylinders, and in which said supporting arms protrude from said plate at an approximately 90° angle thereto, said supporting plate also comprising a protective plate arranged at one end thereof and provided with a thread guiding eye in substantial alignment with

the interior of said innermost cylinder and furthermore comprising a counterplate connected to the other end of said plate and likewise provided with a thread guiding eye.

5. A device according to claim 4, in which said plate is intermediate its ends provided with passage means for receiving means adapted to be connected with a suction producing device.

6. A device according to claim 4, which includes tubular supporting means detachably connected to said plate and adapted to receive and house electric conductor means.

7. A device according to claim 6, which includes means for pivotally connecting said tubular supporting means to the frame of a twisting or spooling machine.

8. A device according to claim 6, which includes: socket means connected to one end of said tubular supporting means, bushing means supported by said plate means and electrically detachably connected to said socket means, and plug means electrically connected to said bushing means and said electric heating wire means.

9. A device according to claim 1, which includes electrical signal emitting means interposed in the electric circuit comprising said electric heating wire means for indicating electric condition of said circuit.

10. A device according to claim 1, in combination with a substantially identical device electrically arranged in series therewith, and electrically operable signaling means electrically arranged in parallel to each of said devices.

11. A device according to claim 8, in which said socket means is of transparent material, and which includes electrically operable signaling means arranged within said socket means.

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