(54) Title: FALLER WITH COMBS ATTACHED THERETO FOR GILL-BOXES FOR TEXTILE FIBERS

(57) Abstract

According to the invention a faller with combs attached thereto for gill-boxes for textile fibers comprises a faller (1) proper, preferably made of metal, and a plurality of combs (6) connected with said faller, wherein said faller presents some shaped slots (10) arranged along its lengthwise direction and made across its thickness and wherein each comb (6) presents at its base (8) at least two shaped projections underneath the surface (42) resting on the upper surface (47) of the faller (1); the insertion of each of said shaped projections (20) within the slot (10) insures the stability of the connection.
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"FALLER WITH COMBS ATTACHED THERETO FOR GILL-BOXES FOR TEXTILE FIBERS"

The invention concerns a faller with attached combs for gill-boxes for textile fibers, particularly suited for gill-boxes for flax.

It is a known fact that in the spinning mills, the yarn is obtained by drawing and then twirling a thin sliver of fibers which is called rove. It is also known that the rove is manufactured in the spinning preparation departments by putting together a plurality of fiber slivers which undergo a series of successive drawings performed by apposite machines, which are called gill-boxes.

The fundamental operative component of a gill-box consists of an operating head comprising a plurality of fallers, usually made of metal, arranged parallel to each other, each of which presents a plurality of vertically arranged steel pins forming a comb. The fallers and their combs define a drawing area on top of which is placed the rove to be processed. A set of interrupted screws causes the progress of the fallers with their combs in the horizontal direction, thereby determining simultaneous drawing and combing actions on the fibers.

In the known types of fallers, the combs comprise a plurality of metal pins which are fastened on a support usually made of plastic material, which in turn is fastened on the metal faller.

Depending on the length of the faller and on the type of operation which it must perform, one or more combs can be fastened on it.

The combs are applied on the faller by means of metal rivets which join together the comb and the faller and guarantee their stability after the riveting. However, this junction method presents some inconveniences.

The first inconvenience presents itself when the combs are being assembled on the faller, since each comb must be with at least two rivets, one at each end of the comb. Since, in fastened order to obtain a secure mechanical resistance, the rivets must be made
of steel, also in view of the limited diameter of the hole which can be drilled in the faller, and since the operation is performed when the metals are cold, the riveting operation requires a certain skill on the part of the operator and also a relatively long time even when the apposite templates are available.

Another inconvenience presents itself when the combs are taken off in order to be replaced. In fact, in this case the operator must place the faller on the apposite template with the combs turned downwards and he must cut off those rivets which he had previously rivetted. This operation, which is usually performed with a hammer and a chisel, is also costly and not very handy.

Yet another inconvenience which presents itself during the assembly concerns the fact that while the joining rivets are being rivetted it is possible to damage the plastic support or the tips of the comb. In this case, the damaged comb must be replaced with ensuing added costs, due both to the loss of time arising from this additional replacement and to the discarding of a new comb.

It is the purpose of the present invention to overcome the above-mentioned inconveniences.

The main purpose of the invention is to obtain a faller with attached combs, wherein the application of each comb is performed easily and swiftly.

Another purpose of the invention is to obtain a faller with attached combs, wherein the danger of damaging the comb during its assembly on the faller is very limited.

Not the least purpose of the present invention is to obtain a faller with attached combs, wherein each comb can be easily and swiftly taken off.

The above-mentioned purposes and others which will be better explained hereinafter are fulfilled by the realization of a faller with attached combs for gill-boxes for textile fiber slivers, comprising a bar, preferably made of metal, and a plurality of combs applied on said bar, characterized in that the
bar presents a plurality of shaped slots arranged along its lengthwise direction and made across it and in that each comb presents at its base at least two shaped projections protruding underneath its surface resting on the upper supporting surface of the bar, wherein the fitting of each of said shaped projections at the base of each comb within its corresponding shaped slot in the bar insures the stability of the connection of the bar with each comb, suitable means being provided to insure the correct direction of their junction and to prevent the comb from accidentally slipping off the bar during the working movement.

Advantageously according to the invention a faller with attached combs is obtained, which gives the user the advantage of drastically reducing the maintenance time and, therefore, costs, since both the assembly of the combs on the faller and their removal for replacement purposes are easier and swifter.

Further scope of applicability of the present invention will become apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific example, while indicating a preferred embodiment of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description, and from the drawings, wherein:

- Fig. 1 shows a plurality of fallers with combs attached thereto, arranged so as to form the drawing area of a head with combs of a gill-box;
- Fig. 2 shows the faller of the invention with the combs attached thereto;
- Fig. 3 shows an axonometric view of the detail of the slots in the faller for the attachment of the comb;
- Fig. 4 shows an axonometric view of the detail of the comb complete with its base and the corresponding projections for the attachment to the faller;
- Fig. 5 shows in detail a slot of the faller bar for the attachment of the comb;
Fig. 6 shows in detail a shaped projection of the comb for its attachment to the bar of the faller.

As can be observed in Fig. 1, the drawing area of the gill-box head comprises a plurality of the fallers 1 with combs according to the invention whose ends 2 match the threads of the interrupted screws 3 which are arranged parallel and horizontal to each other. During their rotation in the direction indicated with harrow 4 they allow the progress of the fallers 1 with combs in the direction indicated with harrow 5.

As can be observed in Fig. 2, each faller 1 presents a plurality of combs 6 attached thereto, each of which consists of a set of pins 7, which are arranged vertically and rigidly connected with their base 8, which is preferably made of plastic material. The number of combs 6 which are attached to each faller and the density of the pins 7 forming each comb depend exclusively from the type of material or, better said, from the type of fiber which is being processed and from the desired "count".

As far as the method for the attachment of the pins 7 to their base 8 is concerned, it can be said that they are preferably introduced from underneath through a set of through-holes, which have previously been drilled in the base support 8, wherein, however, said pins 7 may also be attached to the base support during the manufacturing stage, for instance during the molding process, if the support is made of plastic material. With special reference to Fig. 3, it can be observed that bar 50 of faller 1 presents a plurality of through-slots 10, arranged along its length and made across its thickness. Each slot 10 can be obtained by drilling bar 50 through its thickness 11 by using a double-diameter drill and by performing a two-step operation.

During the first step of the drilling operation the double-diameter drill will make the larger diameter hole 11 and the smaller diameter hole 12, whereby the undercut rim 13 will also be obtained, while during the second step the cross cut 14 will be made, for instance by using a milling cutter, so that slot 10 is complete.
As has already been said, each comb 6 consists of a plurality of pins 7, which are arranged vertically and attached to a base support 8, and it is firmly connected with bar 50 through its projections 20, each of which is present at one end of the base 8, as can be observed in fig. 4. The base 8 of comb 6 is made of plastic material, preferably by injection molding and the profile of its projections 20 must be the same as the profile of the slots 10, so that they can be matched. Moreover, in order to obtain a good grip of each projection 20 in each slot 10, it is necessary for the profile of each projection 20 to be slightly larger than slot 10 and for its periphery to present a set of knurls 21 increasing its interference after the matching.

As far as each projection 20 is concerned, it can be observed in Fig. 4 and in detail in Fig. 6, that it presents one end 22 with an indented profile 23, so as to form a flat area 24. When projection 20 is inserted into slot 10, the vertical area 24 goes to contrast against the undercut 13. Thereby comb 6 is guaranteed not to slip off while faller 1 is working. In fact, since the working motion of faller 1 occurs in the direction indicated by harrow 30, it can be understood that the presence between the pins 7 of comb 6 of the rove to be combed and drawn tends to slow down the progress speed of comb 6 in relation to the faller. Since undercut 13 interferes against the flat vertical area 24 of each projection 20, it prevents the relative movement between the two and, therefore, the slip off.

In the embodiment represented in Fig. 4, the base support 8 of comb 6 has two projections 20 at its ends. It is obvious that this embodiment is only given by way of example, since it is also possible to make the projections in the middle area of the base support 8.

Moreover, concerning the connecting and matching method between comb 6 and bar 50, the embodiment described and illustrated in the Figs. from 3 to 6 realizes the connection through the insertion of the projections 20 base 8 into the slots 10 of bar 50 by a relative shift in the horizontal direction. It is not
deemed advisable to adopt a connection method in the vertical
direction, although it is possible, because in view of the narrow
thickness 11 of bar 50, the thickness of the matching projections
at the base of the comb would have to be so narrow, that the
mechanical resistance of the comb would be jeopardized and that
is not advisable, considering the remarkable strain which the
comb undergoes during the working process.

On the vertical surface 45 of bar 50, in the middle between the
two slots 10, there is a seat 40 presenting a half-moon profile
within which is inserted a projection 41 having the same half-
moon profile, which is present at the base 8 of comb 6 and which
extends vertically downward from the bottom surface 42 of support
8. The presence of this projection 41 fulfils a two-fold purpose.
In the first place it increases the resistance to bending of base
8 of comb 6, when the length of the latter is considerable. In
that case, in fact, it is possible for support 8 to bend on the
horizontal surface 47 of bar 50 on which it rests, during the
drawing operation. Projection 41, lodged within seat 40 contrasts
against the vertical surface 43 of seat 40, thereby preventing
the bending of support 8 of comb 6 on the horizontal surface 47.
In the second place, the presence of projection 41 co-operates
with undercut 13 obtained within slot 10 of bar 50 and with the
vertical contrasting surface 24 obtained on each projection 20 of
comb 6, thereby making it impossible for comb 6 to be
accidentally connected with bar 50 at a 180° angle in relation to
its correct position. In fact, the presence of undercut 13 and of
the vertical surface 24 alone would not be a sufficient guarantee
against the wrong insertion of comb 6 into bar 50. It is, in
fact, true that if comb 6 were inserted rotated by 180° in
relation to its correct insertion, its base 8 would project from
the vertical surface 45 of bar 50 by a thickness corresponding to
the thickness 48 of the undercut rim 13, but it is also true that
this abnormality might escape the attention of a less-than-
careful assembler.

On the contrary, projection 41 totally prevents comb 6 from being
incorrectly inserted into bar 50 of faller 1.
The assembly of comb 6 on bar 50 is performed as described hereinafter.
First, bar 50 is placed with its base 46 on the horizontal working surface. At this point the projections 20 of base 8 of comb 6 are inserted into the slots 10, whereby the insertion is forced by hitting with a fiber mallet. On the other hand, for the removal and the replacement of the combs, it suffices to place faller 1 with its surface 45 resting on the horizontal working surface and force out comb 6 by hitting with a fork stripper on the indented ends 22 of the projections 20 of its base 8. Care must be taken that on the opposite side, i.e. on the working surface there be an indentation to receive comb 6 when it comes off.
On the basis of what has been described, it can be understood that the invention fulfills all the proposed purposes.
First of all the purpose of manufacturing a faller with combs attached thereto, wherein the combs 6 are easily and swiftly attached has been fulfilled. In fact it has been described how easily and rapidly the assembly is achieved through a simple manual mechanical force, applied by means of a fiber mallet. It has also been explained that said extremely easy and swift assembly method is also very secure.
In fact the area where the comb is hit to force its insertion into the faller lies beyond the area where there are the pins 7, so that the danger of damaging the comb during its assembly is overcome.
It has also been seen that the other purpose of realizing a faller with combs attached thereto, wherein the removal of the comb is also easy and swift, has also been fulfilled. In fact, by operating similarly to the way applied for the assembly and using a fork stripper, the removal operation also becomes easy and swift.
Therefore, it can be concluded that through the realization of the faller with combs attached thereto of the invention, all the
operations concerning the maintenance of the fallers with combs become easier and more economical for the user. During the manufacture of the faller with combs according to the invention, modifications and changes will occur to those skilled in the art, such as, for instance, the variation of the number and of the profile of the projections connecting the comb to the faller, as well as the type, the number and the profile of possible anti-bending projections; said modifications will, however, not exceed the scope of the invention, such as it is claimed hereinafter.
CLAIMS

1) A faller with combs attached thereto for gill-boxes for textile fibers, comprising a bar (50), preferably made of metal and a plurality of combs (6) connected with said bar, characterized in that said bar presents a plurality of shaped slots (10) arranged along its lengthwise direction and made across its thickness, and that each comb (6) has at its base (8) at least two shaped projections (20) obtained underneath its surface (42) resting on the upper surface (47) of the bar (50), wherein the fitting of each one of said shaped projections (20) at the base (8) of each comb (6) within a corresponding shaped slot (10) of the bar (50) achieves the stability of the connection between the faller and each comb, suitable means (13, 24; 41, 43) being present in order to guarantee the correct direction of said connection and to prevent the combs (6) from slipping off the faller (1) during the working motion.

2) A faller with combs attached thereto according to claim 1, characterized in that each shaped projection (20) at the base (8) of each comb (6) has at one of its ends an indented profile (23) forming a vertical surface (24) contrasting against a corresponding undercut (13), made at the end of each shaped slot (10), and prevents its slipping off when the faller (1) moves in the working direction (30).

3) A faller with combs attached thereto according to claim 1, characterized in that each comb (6) has a vertical projection (41) made at the bottom (42) of its base (8), which matches a corresponding seat (40), which is present in the vertical surface (45) opposite the undercut (13) in the bar (50) of the faller (1).
I. CLASSIFICATION OF SUBJECT MATTER  
According to International Patent Classification (IPC) or to both National Classification and IPC:

| Int.Cl. 5 | D01H5/14 |

II. FIELDS SEARCHED

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Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched:

III. DOCUMENTS CONSIDERED TO BE RELEVANT

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IV. CERTIFICATION

Date of the Actual Completion of the International Search: 07 MAY 1990

Date of Mailing of this International Search Report: - 5. 06. 90

International Searching Authority: EUROPEAN PATENT OFFICE

Signature of Authorized Officer: HOEFER W.D.
ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO. PCT/EP 89/01615
SA 33672

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