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Kerber

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[54] MEANS FOR CONNECTING TOGETHER THE ENDS OF BANDS OF FABRIC

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[58] **Field of Search** ..... 24/31, 33, 35, 38, 39, 265 RL, 24/205 G, 207, 33 C, 33 M; 28/72.3; 198/193

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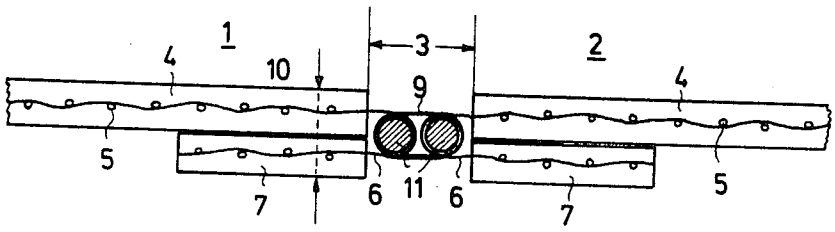
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[57] **ABSTRACT**

Means for connecting together the ends of fabric bands, which comprise connecting members. Each of the connecting members has a thickness smaller than that of the fabric ends of each fabric band to be connected together.

6 Claims, 2 Drawing Figures



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FIG.1

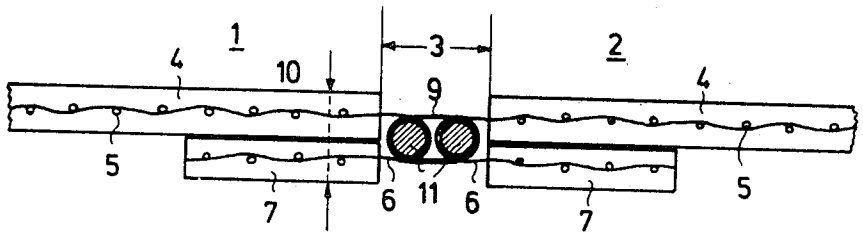
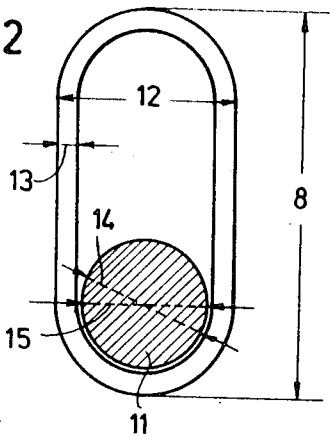


FIG. 2



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MEANS FOR CONNECTING TOGETHER THE ENDS OF BANDS OF FABRIC

The present invention concerns means for connecting together the ends of bands of fabric, e.g., those of dry felt bands and sieves for the paper- and pulp-industry, and concerns connecting members for this purpose.

For easier insertion of dry felt bands in a paper making machine, the bands are laid open in the machine, the two ends of the still open band being then connected together in the machine to form from the open an endless band. For the connection of the open ends, it is already known, in the case of metal sieves, to form eyelets from warp wires by bending them and inserting them in specially prepared passages in the same portion of fabric, or to weld two warp wires together to form an eyelet. Apart from the fact that such method of preparing connecting means is complicated and time-wasting, the joints could be easily pulled apart, if made between thin wires, so that such method can only be used for metal wires that have adequate rigidity.

Eyelet-like clawhooks have already been proposed, which are either pressed directly into the end portions to be connected and prepared therefor accordingly, or are clamped to a strap folded several times for this purpose, the strap then being secured by stitching and glueing to the ends of the open web of fabric. By the use of straps, it is certainly possible to avoid the marking of a sheet of paper or the like that normally occurs with the use of clip hooks; however, the ends are spread out in such manner, that the transmission of force becomes progressively more unsatisfactory with increasing thickness of belt due to the deviation over the thick strap, so that, in the event of sudden loads, tension forces may occur, which are capable of detaching very strong glued and stitched connections, particularly in the case of guide rollers of small diameters.

It is one object of the present invention, to provide means for connecting together the ends of bands of fabric, more particularly those of dry felt bands and sieves for the paper- and pulp-industry, in which a connection is proposed in which each of the associated connecting parts is less thick than the thickness of the ends of the band of fabric to be connected together.

In accordance with the present invention, a safe end flange connection of the band ends is obtained, by freeing longitudinal threads from the cross threads at a distance from the abutment point, whereby both abutment ends are secured 180° turned over on the band with a formation of longitudinal thread loops.

In a particular manner the two band ends formed now as series of loops and disposed opposite each other as connecting members to be connected are remarkable. The latter must namely, due to the particular requirements, which are set for such endless turning band, as it is a dry-felt and dry-sieve, respectively, correspond to certain predetermined requirements. Thus, for instance, this connecting member cannot surpass in its strength the double band strength and the strength, respectively, which have the band and the turned off part together, since, otherwise, on one hand, markings occur on the paper web and, on the other hand, an early wear of surface parts of the connecting member occurs. If one starts now, that a spiral is used as a connecting member, its wire strength depends upon the spiral diameters. In case one chooses this wire strength as too great, pulling tensions occur at the outer periphery of the spiral round, while the inner periphery of this round is upset together, thus put under pressure, so that an overload of the spiral wire is unavoidable. If, however, on the other hand, the wire strength is chosen too thin, the required pulling rigidity and stiffness, which must be present by all means for a spiral as a connecting member, can no more be obtained. Furthermore, a thin wire renders more difficult the insertion of the spiral into the series of longitudinal loops, since it does not have sufficient force, to divide equally the longitudinal loops, first of all, however, to retain the latter in an equal division. Asides from that point, the later coupling

together of the band ends over a greater width renders particular difficulties due to the fineness of the eyes. Particularly of importance is in connection with an oval spiral shape, from which one starts, also the length of the oval, thus the length of each individual spiral, which depends lastly upon the strength of the fabric and the density of the used longitudinal threads. The strength of the fabric requires, in particular in double fabrics, that due to the fabric binding one part of the longitudinal threads has a different path during bending over for 180° about the hinge pin to be inserted for the connection. By such arrangement, the longitudinal threads lie not only adjacent each other but partly also on top of each other, which is still to a particular measure amplified in case of a great density of the longitudinal threads. This leads finally to the point, that the inner side of the spiral is passed more or less with parts of longitudinal threads and thus becomes more and more non-pivotable during its run about the guide rollers. Yet also, the hinge pin influences with its diameter the required length of the spiral. It is to be observed thereby, that a spiral length which is too great, influences the movability of the spiral, while a too small spiral length renders more difficult the coupling, particularly in case of large widths of the fabric bands. Finally, it is still to be considered, that the pitch of the spiral is kept such, that it cannot vary under tension, whereby the optimum force transmission is brought about. A connecting member, cooperating with the spiral and thus another connecting member is the hinge pin which transmits the actual pivotal holding between the spiral and the series of the loops. This must also be designed accordingly relative to its other connecting parts cooperating therewith. Considering the above statements, it can be recognized without any difficulty that for an optimum pivotal connection of fabric ends for these connecting parts also corresponding forms and optimum dimensions are required.

It is another object of the present invention to provide means for connecting together the ends of bands of fabric, in particular such of dry-felts and dry-sieves for the paper- and pulp-industry in which each individual of the complementary connectings is, as its strength, smaller than the thickness of the fabric ends to be connected of the fabric band.

Preferably, the connection consists of a series of longitudinal loops associated with each end of a band, and at least one wire spiral of oval cross-section and two hinge pins as the connecting members, connecting together the series of loops by means of the wire spiral. It is of course also possible to increase the flexibility of the connecting means by using two wire spirals instead of using only one, said wire spirals also being flexibly connected together by a hinge pin passing between them. It is preferable for the size of the spirals to be selected so that the hinge pins, the thickness of the band of fabric and the width of passage are of optimum dimensions adjusted relative to each other. Thus it has been found, that this requirement can be fulfilled if the outer diameter of the spiral is less than the thickness of the ends of fabric to be connected together, e.g., with a maximum of approximately 6.5 mm and with a minimum of approximately 3.5 mm. Since the thickness of the wire must be selected according to the diameter of the spiral in order to avoid tension and traction distortion in the rounded portions of the spiral, an ideal wire thickness is approximately 0.8 mm being not more than 25 percent and not less than 15 percent of the outer diameter of the spiral. The length of the individual spiral turns, by which the width of passage is determined, i.e., the width in which two fabric ends connected together are disposed oppositely to each other and which, as already stated, depends on the thickness of the fabric band and the density of the longitudinal threads used therein, has, for most types of fabric in use, a length of approximately 7.5 mm to 10.5 mm, that is to say, an average of approximately 8 mm. It should be pointed out that the width of passage, depending on the diameter of the spiral, varies, according to the nature of the fabric, between 7 mm and 20 mm and amounts to an average of approximately 10 mm. These results were obtained by tests, since it was found that if the

passage was too narrow, then although the spiral fitted firmly, in the event of a deflection, compression was caused on the inner diameter of the rounded portion of the spiral, a feature which is a special disadvantage in the case of small guide roller diameters. The result of this is that, due to the increased pressure, marks appear on the web of paper and, in addition, premature wear occurs on portions of the surface. Finally, the flexibility of the connection is also substantially reduced.

The hinge pin pivotably connecting the spiral to the series of loops, preferably has a thickness corresponding to that of the inner diameter of the small ends of the spiral so that said diameter is completely filled when the connection is stressed when in operation, and sagging of the spiral as would be the case if the hinge pin were too thin, is impossible. It is preferably provided with a lubricant to facilitate insertion between loops and spiral rounds and also to reduce the rigidity of the articulated movement.

In another development of the present invention, for connecting the ends of fabric bands, fabric band strips are also proposed having longitudinal and transverse threads in the same manner as the fabric band and from which a series of longitudinal thread loops are formed in the same manner as from the fabric bands. These longitudinal thread loops are connected in the same manner with the spirals and hinge pins formed in accordance with the present invention, as the above described fabric band ends. The loops formed from the longitudinal threads are located at spaced intervals from each other so that corresponding eyelets can easily be inserted. Several longitudinal thread eyelets are preferably combined by glueing or welding together in order to provide space for the opposing eyelets to be inserted, which eyelets are formed in the same manner. Such comparatively rigid series of eyelets are directly connected together by means of a hinge pin, without wire spirals.

Of the opposing edge portions of the fabric band strips, the outer ones are introduced into suitably provided recess or mouth-like openings formed in the appropriate fabric band end, and secured therein by stitching and glueing.

With these and other objects in view which will become apparent in the following detailed description, the present invention, which is shown by example only, will be clearly understood in connection with the accompanying drawings, in which

FIG. 1 is a schematic elevation, partly in section, of two opposing fabric ends to be connected together; and

FIG. 2 is a front elevation, partly in section, of an oval spiral with an inserted plug wire.

Referring now to the drawings, and in particular to FIG. 1, two fabric ends 1 an 2 of a fabric band (not shown) are disposed opposite each other with a gap 3 therebetween, and are to be connected together. Secured to the fabric 4 of these ends is a turnover portion 7 turned through 180° in a turnover zone free of transverse threads 5, the zone containing a series of loops 6. The maximum dimension 8 of the connecting member connecting the two ends together and formed as an oval spiral 9 is less than the thickness 10 of the two ends of the fabric. Other parts of the connecting means are two hinge pins 11 connecting the series of eyelets 6 to the spiral 9.

The outer dimension 12 of the spiral across the minor axis has a maximum of 8.5 mm and a minimum of 3.5 mm, with an average of 5 mm, the thickness 13 of the wire of the spiral 9 varying between 15 percent and 25 percent, thereof, i.e., about 0.8 mm. The spiral in this case has a maximum dimension 8 across the major axis of 7.5 mm to 10.5 mm, averaging approximately 8 mm, this depending, as stated above, on the thickness of the ends of the fabric. The diameter 14 of the hinge pins 11 of a spiral corresponds approximately to the smallest inner diameter 15 of the spiral.

While I have disclosed one embodiment of the present invention, it is to be understood that this embodiment is given by example only and not in a limiting sense.

I claim:

1. Means for connecting together the ends of fabric bands, comprising

connecting members,

each of said connecting members having a thickness smaller than that of said fabric ends of each fabric band to be connected together, and

said connecting members comprise a series of longitudinal thread eye loops coordinated to each fabric end, at least one oval spiral and two hinge pins operatively connected with said oval spiral.

2. The means, as set forth in claim 1, wherein

the outer diameter of said spiral is smaller than the thickness of the fabric ends to be connected together, and no more than about 6.5 mm and not less than about 3.5 mm.

3. The means, as set forth in claim 1, wherein

the thickness of the wire of said spiral is no more than about 25 percent and no than about 15 percent of the outer diameter of said spiral, and with an average of about 0.8 mm.

4. The means, as set forth in claim 1, wherein

the thickness of said spiral across its major axis is at least about 7.5 mm and no more than about 10.5 mm and with an average of about 8 mm.

5. The means, as set forth in claim 1, wherein

said hinge pins have a thickness corresponding to the smallest inner diameter of a round of said spiral.

6. The means, as set forth in claim 5, wherein

said hinge pins are provided with a lubricant.

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