ABSTRACT OF THE DISCLOSURE

A fabric load lifting sling with a flat eye at one end and an open or reversible eye at its other end has a multiply construction produced by equidimensioned fabric straps secured together with the end portion of each overlapping another and also a medial portion of the other strap or straps, to thus achieve great strength without bulkiness.

The invention, like that of my copending application, Ser. No. 527,873, filed Feb. 16, 1966, and now abandoned of which this application is a continuation-in-part, relates to load lifting slings used with cranes and other hoists and refers more particularly to slings made of fabric webbing such as disclosed in my Patent No. 3,290,083, issued Dec. 6, 1966. Such slings have many advantages over the more conventional chain, wire cable and rope slings, especially for handling loads which must be protected against being scratched or marred, as for instance finely finished machine parts.

Prior to the sling which forms the subject matter of my aforesaid patent, fabric load lifting slings have consisted of an elongated body portion of several layers or thicknesses of fabric webbing and looped end portions also formed of fabric webbing, projecting from the opposite ends of the body portion. The looped end portions were sewed to the body portion so that all parts of the sling were permanently joined together and secured against relative movement.

The looped end portions of the sling provided eyes to receive the crane hook, or if the sling was used as a choker hitch, one end portion of the sling was passed through the eye at its opposite end and then attached to the crane hook. The eyes were either of the flat type wherein the two stretches of the loop which form the eye lie flat upon one another and the axis of the eye is parallel to the top and bottom surfaces of the body portion, or of the so-called reverse open type in which the axis of the eye is perpendicular to the top and bottom surfaces of the body portion and the eye normally assumes an open condition.

Each eye type has advantages that the other lacks. The flat eye is easier to slip under a load since it requires less clearance between the bottom of the load and the floor. The reverse or open eye is better when the sling is used as a choker hitch. The sling of the Barthule Patent No. 2,903,291, is an example of the reverse eye type and is also representative of the fabric slings that were available prior to the sling of my aforesaid patent.

While the fabric sling of my patent is a substantial improvement over the slings heretofore available, it has two disadvantages, one of which actually stems from implementation of the primary objective of the invention covered by the patent. The other has to do with the strength of the sling.

To understand the first of these objections, it must be realized that often there is very little clearance between the underside of a load and the floor on which it has been set by a crane. Nevertheless, the sling used to carry the load must be withdrawn from beneath the load. While such withdrawal is facilitated by forming the eye at one end of the sling as a flat eye, it was found that invariably when a pull was exerted on the sling its load engaging sleeve or body portion remained where it was—under the load—till be yanked up as the flat eye came in contact with it while an effort was being made to pull the sling from under the load.

With respect to the question of strength, though it was appreciated that a multi-ply sling would possess greater tensile strength than a single-ply sling, heretofore no way had been discovered of constructing a multi-ply sling which did not have areas of objectionable bulkiness that made it difficult to pull the load carrying web through the tunnels in the load engaging sleeve.

It is therefore the purpose and object of the present invention to provide an improved and simplified fabric sling which has the requisite strength and adaptability and none of the disadvantages of prior slings.

Another object of this invention is to provide an inexpensive fabric sling in which the desired strength results from a novel multi-ply construction produced by superimposed strips and wherein the overlapping end portions of each strip are not only secured to one another, but also to a medial portion of another strap so that the straps are secured together at spaced points.

Still another object of this invention is to provide a fabric sling of the character described which at all times has an open or reverse eye at one end and a flat eye at the other end.

With the above and other objects in view which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereinafter disclosed invention may be made as come within the scope of the claims.

The accompanying drawings illustrate several complete examples of the physical embodiments of the invention, constructed according to the best modes so far devised for the practical application of the principles thereof, and in which:

FIGURE 1 is a perspective view of a sling embodying one form of this invention and illustrating the same in use as a choker hitch;

FIGURE 2 is a perspective view of a two-ply sling embodying this invention, but with the two straps that form the plies thereof separated, and in fact with the entire sling disassembled to better illustrate its construction;

FIGURE 3 is a perspective view of the two-ply sling which results from the assembly of the two sections or straps shown in FIGURE 2;

FIGURE 4 is a perspective view of a three-ply sling constructed in accordance with this invention;

FIGURE 5 is a perspective view of a two-ply sling similar to that of FIGURE 3 but with the stretches of the sling between its eyes secured together in edge-to-edge relationship by means of wear resisting pads;

FIGURE 6 is a perspective view of a sling very much like that of one of the slings illustrated in my aforesaid Patent No. 3,290,083, but modified in accordance with this invention;

FIGURE 7 is a perspective view of a sling embodying this invention in still another form;

FIGURE 8 is a cross-sectional view through FIGURE 5 on the plane of the line 8—8; and

FIGURE 9 is a cross-sectional view through FIGURE 6 on the plane of the line 9—9.

Referring now particularly to the accompanying drawings, the numeral 5 designates a completed sling embody-
ing this invention in its two-ply version. Accordingly, this sling consists of two initially separate substantially equidimensioned tension members or straps 6 and 7, which, upon assembly and completion of the sling, and in overlapping relationship throughout their entire extent, as shown in FIGURE 3. The straps 6 and 7 are formed of suitable weaving, preferably nylon, and have uniform thickness and width. Although it is desirable that the straps have substantial thickness, there is a practical limit to the thickness of a fabric strap that can be employed. There is also a practical limitation upon the number of straps that can be combined in a multi-ply sling. One of these limitations is the thickness of material such as nylon weaving which can be successfully handled by the sewing machines employed to stitch the overlapping portions of the plies together.

Whether the sling is to be of two-ply construction, as in FIGURES 2 and 3, or of three-ply construction as shown in FIGURE 4, in which event a third strap 8 is provided, all of the straps which comprise the sling are of the same length. In preparing the several straps for assembly and formation into a sling, they are superimposed upon one another but in lengthwise offset relation so that one end portion of each extends beyond that of the others. With the straps or plies thus arranged, they are collectively twisted once and then formed into a loop, as shown in FIGURE 2. Now one end portion 6a of the strap 6 overlies its other end portion 6b, but with a medial portion of the strap 7 interposed or sandwiched therebetween. The end portions 7a and 7b of the strap 7 are also in overlapping relationship, but in this case they are in direct contact with one another.

The overlapping end portions of the two straps and the contiguous medial portion of the other strap are secured together by stitching 9. This completes the sling, and because of the single twist in the overlapping straps, one end of the loop always forms an open or reverse eye 10, while the opposite end thereof always forms a flat eye 11.

Obviously, no matter how this sling is used, all portions thereof can be used to form its eyes. Thus when the sling is used as a choke hitch, as shown in FIGURE 1, any part thereof can be used to form the flat eye 11 which engages over the crane hook 12, and of course the opposite portion of the sling forms its reverse or open eye. This enables the wear to be distributed throughout all portions of the sling.

The three-ply sling shown in FIGURE 4 is constructed in exactly the same manner as the two-ply sling, so that the overlapping end portions 13, 14 and 15 of each strap or ply of the sling are not only secured to one another by stitching, but also to the contiguous portions of the other two straps or plies. Likewise, one end of the three-ply sling of FIGURE 4 always forms an open or reverse eye while the other provides a flat eye.

The slings shown in FIGURES 5, 6 and 7 differ from those of FIGURES 1 to 4, primarily in that the eyes 10 and 11 are constrained to their respective formations, i.e. reverse or open and flat, by securing the stretches 16 of the sling between its ends in edge-to-edge relationship.

In the slings shown in FIGURE 5, wear resisting pads 17 are sewed to opposite sides of both stretches 16 of the sling. In FIGURE 6, a sleeve 18 generally similar to one of the sleeves shown in my aforesaid patent has the two stretches 16 received therein to be held in edge-to-edge relationship, but instead of being loose to slide bodily along the stretches 16, the sleeve 18 is sewed to the two stretches medially of its ends, as at 19. In this manner, the sleeve—which constitutes the load engaging wear resisting body portion of the sling—can be pulled from under the load and the bunching experienced when the sleeve is loose will be avoided, yet the sleeve will be free of tension loads during use of the sling.

In the sling shown in FIGURE 7, its edgewise adjacent stretches 16 are connected only near the eyes 10 and 11 by patches or cross pieces 20 sewed to the two stretches, preferably at both sides thereof.

From the foregoing description, taken in connection with the accompanying drawings, it will be apparent that this invention provides a fabric sling that is inexpensive, safe, and long wearing, as well as being more versatile than slings heretofore available.

What is claimed as my invention is:

1. A multi-ply dual eye sling comprising:
   A. a plurality of substantially equi-dimensional superimposed overlapping but lengthwise offset straps twisted once so that the end portions of each strap face in the same direction;
   B. said superimposed overlapping straps being formed into a closed loop with the end portions of each strap overlapping one another and contiguous to a medial portion of another strap; and
   C. stitching securing the overlapping end portions of each strap and the contiguous medial portion of another strap together so that the overlapping end portions of each strap are not only secured to each other but also to the contiguous medial portion of another strap, the single twist in the superimposed straps assuring that one end of the sling will always be of the flat eye type, while the other end will always be of the reverse or open eye type.

2. The sling of claim 1, further characterized by the fact that the overlapping end portions of only one of the straps are directly in contact with one another.

3. The sling of claim 2, wherein there are two superimposed overlapping straps, so that where the overlapping end portions of each strap are located the sling is of three-ply thickness.

4. The sling of claim 2, wherein there are three superimposed overlapping straps so that where the overlapping end portions of each strap are located the sling is of four-ply construction.

5. The sling of claim 1, further characterized by junction means secured to opposite stretches of said closed loop to hold the same in edgewise adjacent relationship and to constrain the eyes to their respective formations.

6. A lifting sling of the character described comprising:
   A. an elongated strap-like tension member of uniform width and thickness twisted 180° medially of its ends and having the end portions thereof overlapped;
   B. stitching securing said overlapped end portions together to form said elongated strap member into an endless loop; and
   C. junction means sewed to opposite stretches of said endless loop to secure the same together in edgewise adjacent parallel relationship to thereby form the tension member into an elongated band-like element having a substantially flat load engaging portion with hook engaging eyes at the ends thereof, the eyes being constrained by said junction means to a relationship disposed 90° to one another with the axis of one of the eyes parallel to and that of the other eye perpendicular to the general plane of said load engaging portion.

References Cited

UNITED STATES PATENTS

2,903,291 1/1959 Barthule 294—74
2,320,083 12/1966 Norton 294—74

GERALD M. FORLENZA, Primary Examiner.

G. F. ABRAHAM, Assistant Examiner.