Feb. 3, 1925. 1,524,671

C. NYMAN ET AL

PLAITED CABLE SLING

Filed May 9, 1924 4 Sheets-Sheet 1

Fig. 1.

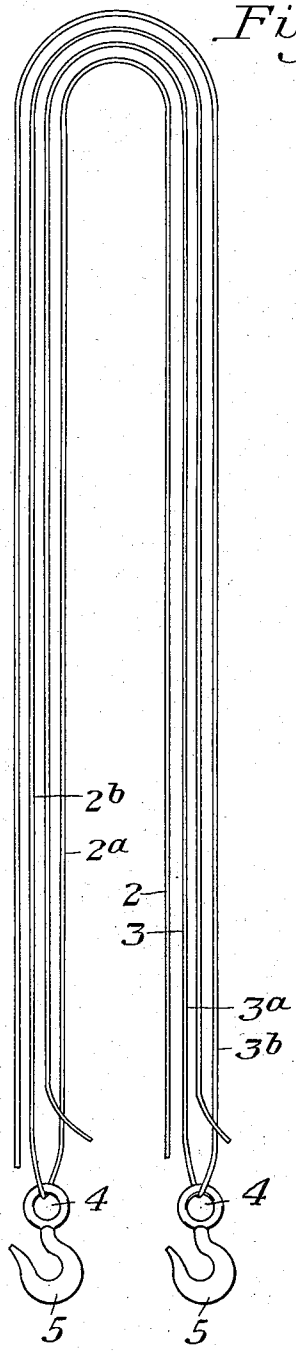
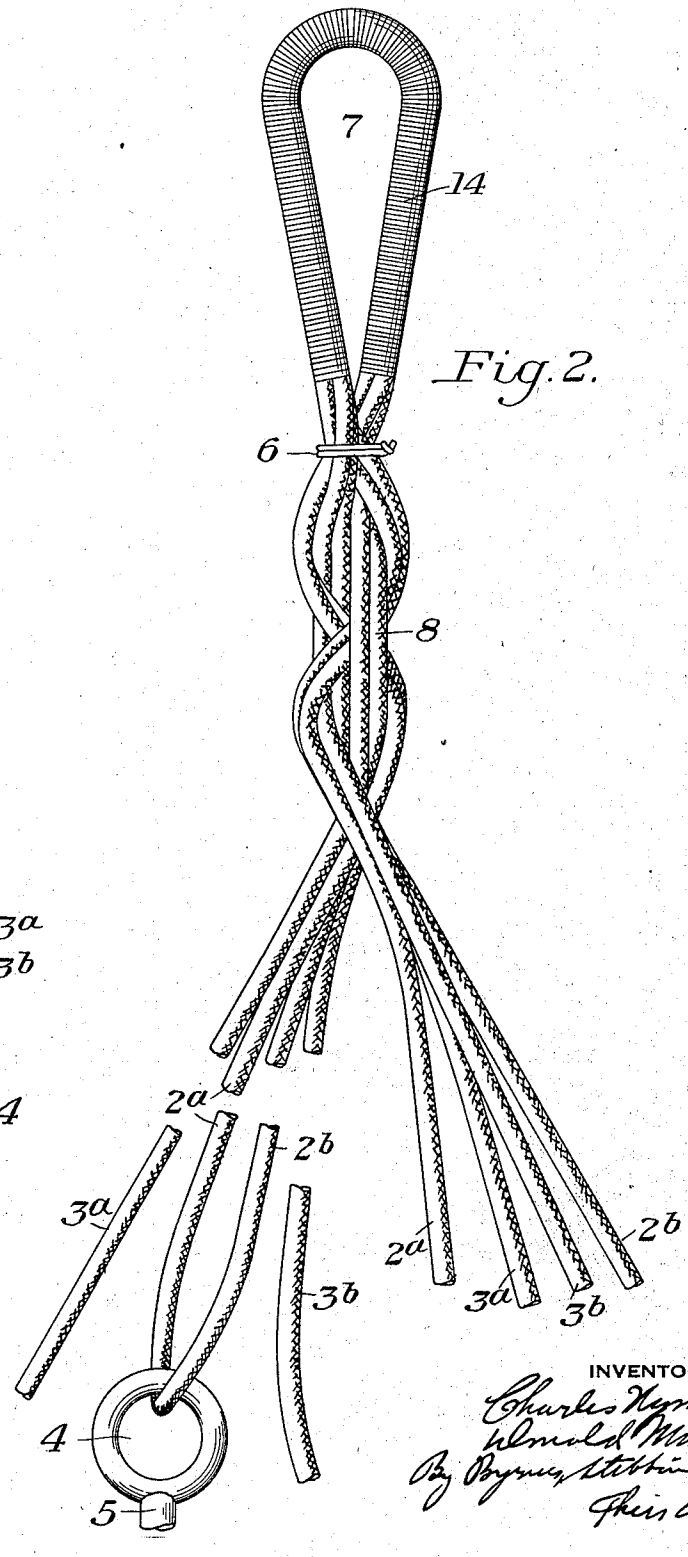


Fig. 2.



INVENTOR

Charles Nyman
Donald Murray
By Byrnes, Stebbins & Donald
Their Attys

Feb. 3, 1925. 1,524,671

C. NYMAN ET AL

PLAITED CABLE SLING

Filed May 9, 1924 4 Sheets-Sheet 2

Fig. 3.

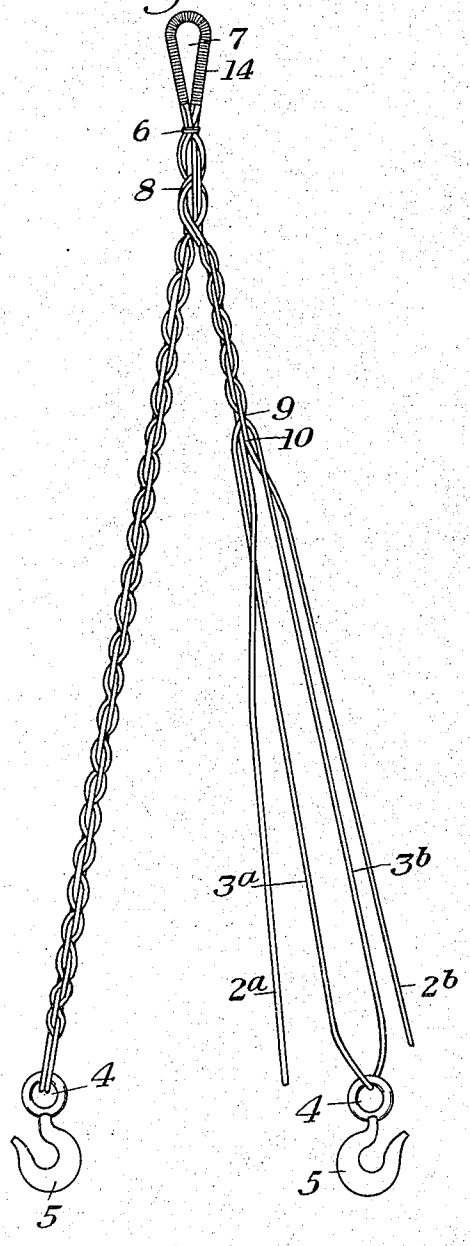
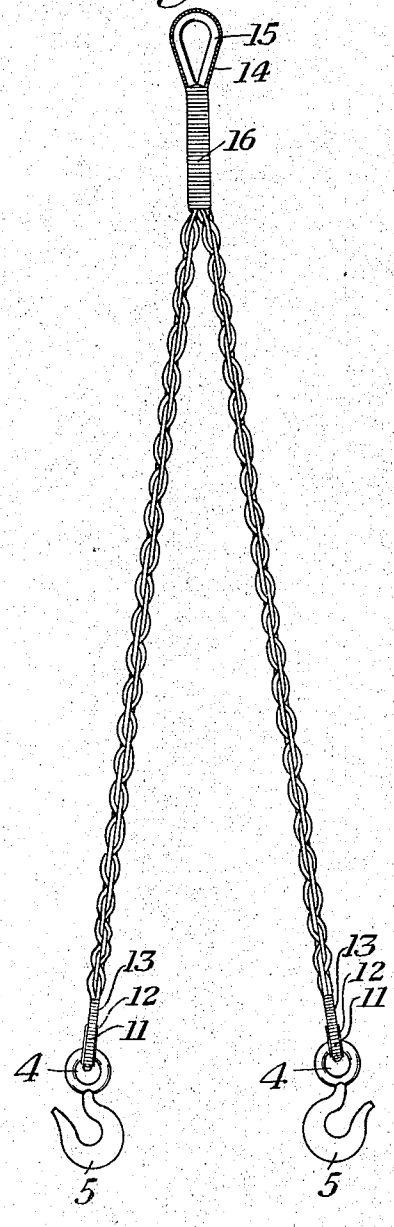


Fig. 4.



INVENTORS

Charles Nyman

Donald Murray

By Byrnes, Kittelson & Burke

Their Attys

Feb. 3, 1925. 1,524,671

C. NYMAN ET AL

PLAITED CABLE SLING

Filed May 9, 1924 4 Sheets-Sheet 3

Fig.5.

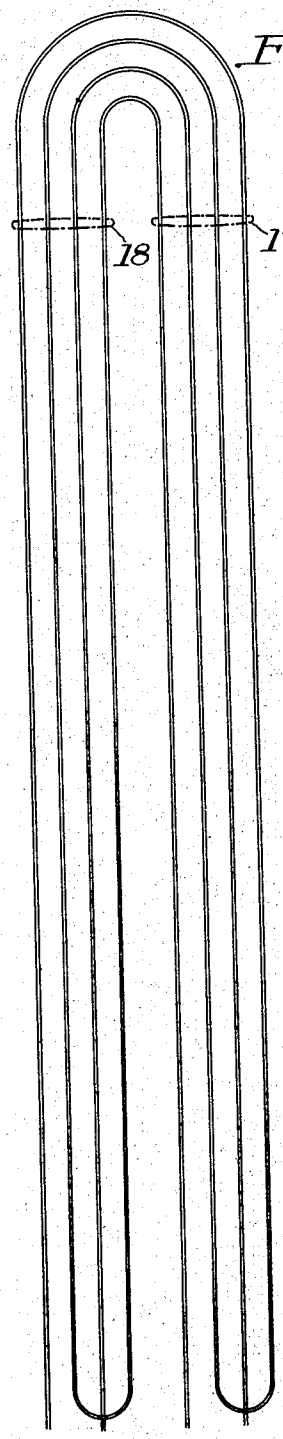


Fig.6.

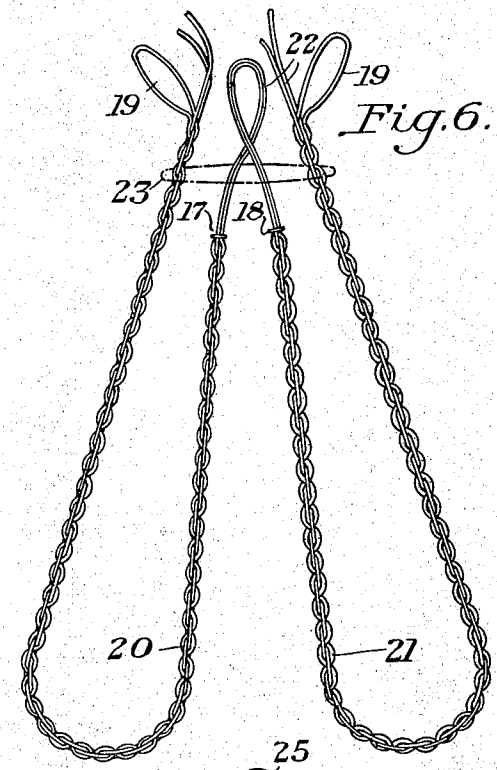
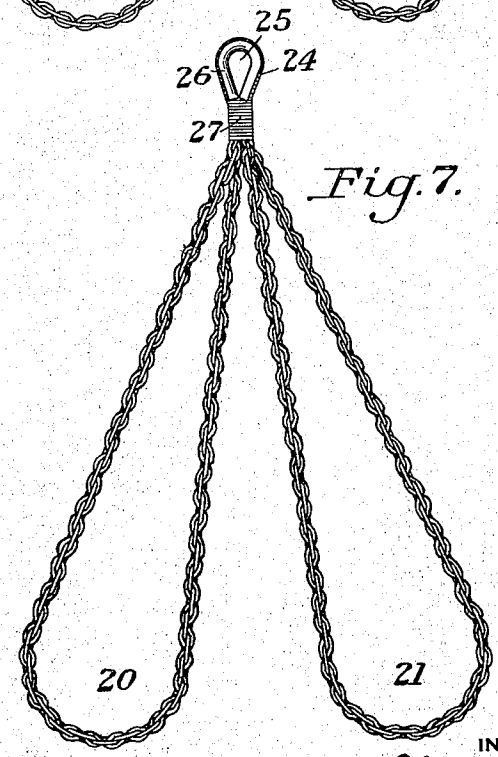


Fig.7.



INVENTOR

Charles Nyman
Arnold Murray
By Symes, Richardson & Bernard
Their Attys

Feb. 3, 1925. 1,524,671

C. NYMAN ET AL

PLAITED CABLE SLING

Filed May 9, 1924 4 Sheets-Sheet 4

Fig. 8.

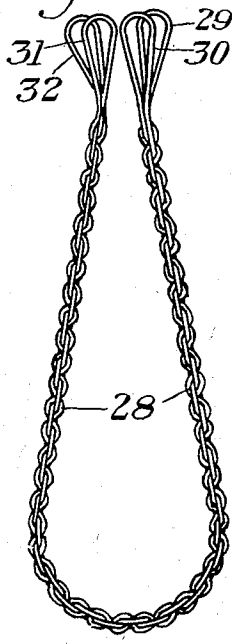
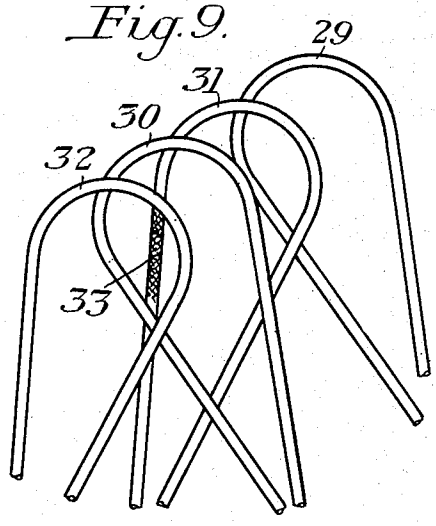


Fig. 9.



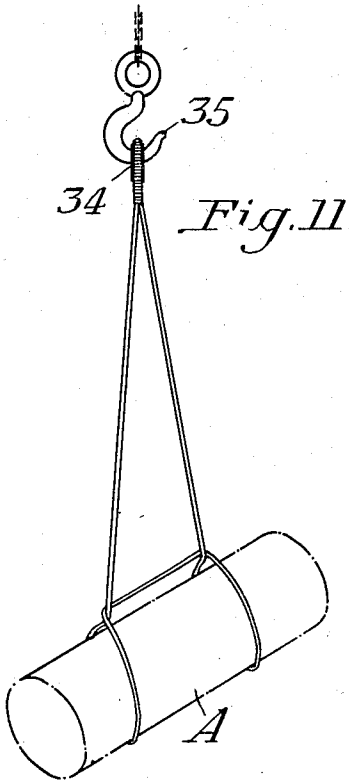


Fig. 11.

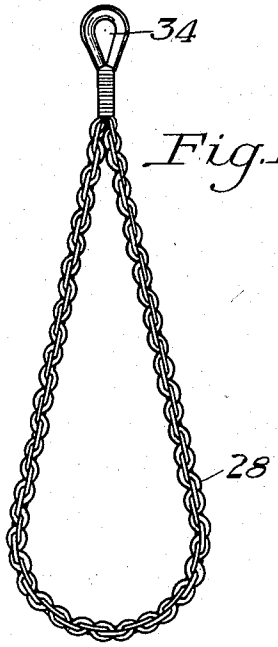


Fig. 10.

INVENTOR

Charles Nyman
Arnold Murray
By Byrnes, Kittelle & Burke
Their Attys

Patented Feb. 3, 1925. 1,524,671

UNITED STATES PATENT OFFICE.

CHARLES NYMAN, OF PITTSBURGH, AND DONALD MURRAY, OF WILKINSBURG, PENNSYLVANIA.

PLAITED CABLE SLING.

Application filed May 9, 1924. Serial No. 712,108.

To all whom it may concern:

Be it known that we, CHARLES NYMAN and DONALD MURRAY, citizens of the United States, residing in Pittsburgh and Wilkinsburg, respectively, county of Allegheny, and State of Pennsylvania, have invented a new and useful Improvement in Plaited Cable Slings, of which the following is a full, clear, and exact description.

This invention relates to plaited cable slings and particularly to slings having a suspension eye and a plurality of depending portions. Slings of this character are highly desirable in the handling of various kinds of material. For example, a sling may have its depending portions formed into one or more loops for lifting bundled material, or may have a plurality of depending portions terminating in hooks for engaging a box or other structure.

We provide a sling which is plaited from one or more elementary strands, which may be wire cable or other suitable material. Such a sling is superior to one formed from twisted cable in that it has no tendency to twist upon itself or to break the small wires which comprise the cable. A further advantage is that if a wire strand does part it can only unravel a very short distance before a crossing strand prevents further loosening.

The forming of eyes in the end of a sling has heretofore been generally accomplished by splicing. Our invention provides for forming these eyes from the elementary strands which are used to plait the various depending portions of the sling. It is, therefore, necessary only to splice the small elementary strands, there being at no point a single splice involving all of the strands of the sling. The weak spot in most slings is thereby done away with and the sling comprises one or more elementary strands extending in a continuous manner through the depending portions and around the eye or eyes of the sling.

In the accompanying drawings, which illustrate the preferred embodiments of the invention,

Figure 1 is a diagrammatic view illustrating the positioning of the strands prior to splicing a sling having two depending cable-like portions,

Figure 2 is a view on an enlarged scale showing the preliminary steps of forming a suspension eye and commencing the plaiting previous to plaiting the cable-like portions separately,

Figure 3 is a view of the sling after one such portion has been completely plaited, the other portion being only partially plaited,

Figure 4 is a side elevation of the completed sling,

Figure 5 is a view corresponding to Figure 1, showing the positioning of the strands preliminary to plaiting a double loop sling,

Figure 6 is a view showing a further step in the process,

Figure 7 is a side elevation of a completed double loop sling,

Figure 8 is a view of a plaited cable ready to be formed into a single loop sling,

Figure 9 is a perspective view showing the manner of assembly of the strand loops prior to serving them into a single eye,

Figure 10 is a view of a completed single loop sling, and

Figure 11 is a perspective view showing an application thereof.

In the embodiment of the invention shown in Figures 1 to 4 there is shown a sling comprising a suspension eye and two depending portions having hooks at the ends thereof. This sling is formed by taking a pair of elementary strands 2 and 3 of suitable size, inserting each in the eye 4 of a hook 5 and doubling the cables from the eye. The cables then comprise elementary strands 2^a and 2^b and 3^a and 3^b. The cables are redoubled and placed in the position shown in Figure 1.

Adjacent the upper bend of the cables shown in Figure 1 the strands are united and temporarily secured by a seizing wire 6 to form a suspension eye 7, this eye including all of the strands in the sling. The strands are plaited below the seizing wire 6 for a short distance to form a single plaited body portion 8, the manner of plaiting being preferably that shown in Figures 12 to 17, inclusive, in the patent to Charles Nyman, No. 1,475,859. As clearly set forth in that patent the plaiting operation comprises dividing the strands into two pairs, crossing one pair of strands, then crossing the second pair over the first pair and so on until a plaited cable of suitable length is secured. It will be seen from Figure 2 that this step has been carried out in the present embodiment of the invention by making the loop portions of the strands 2^a and 2^b and

the free portions of the strands 3^a and 3^b into one pair of double strands and the free portions of the strands 2^a and 2^b and the loop portions of the strands 3^a and 3^b the other pair of double strands for plaiting into the body portion 8 of the sling.

After a body portion 8 of sufficient length has been formed the strands are divided into two sets of four, as shown in Figure 2, each of which sets is to be formed into a separate portion of the sling. Figure 3 shows the step of plaiting one of the such portions in this particular form of the sling, the strands comprising the loop portions 3^a and 3^b of the strand 3 and the free portions 2^a and 2^b of the cable 2. The plaiting operation, which is the same as shown in detail in the Nyman patent above referred to, is as follows: The strands 3^a and 3^b are crossed, as at 9, and the strands 2^a and 2^b are then passed through the loop to cross one another, as at 10. After these have been drawn taut the operation is repeated until there is just sufficient opening in the loop to permit the formation of a suitable eye.

One of the free ends 2^a and 2^b is then passed through the ring 4 and the two ends are spliced to form a loop through the ring. This spliced loop and the loop of the cable 3 are then covered with a serving wire 11 and a thimble 12 is inserted in the eye. A final serving 13 is then put on to secure the eye in place. The suspension eye is similarly treated, it being first covered with a serving wire 14, after which a thimble 15 is inserted and a final serving wire 16 is wrapped over the body portion 8 of the sling.

The sling thus formed comprises a suspension eye, a body portion immediately adjacent thereto, and a plurality of depending cable-like portions extending from the body portion and having hooks at the ends thereof. It will be understood, of course, that the hooks may be omitted if desired, but one advantage of the invention is the fact that such hooks may be made a permanent part of the sling by plaiting the sling with the hooks in place, thereby materially strengthening the apparatus as a whole by doing away with the necessity of splicing all of the cables or strands forming the sling. The eye 4 is preferably pierced in the solid metal forming the hook and by our invention the hook is secured to the sling without welding of the hook or splicing the sling as a whole.

The embodiment of the invention shown in Figures 5 to 7, inclusive, varies from that previously described in that the cable-like portions are replaced by loops which start and terminate adjacent the suspension eye. In this form of the invention the elementary cables or strands are grouped as shown in Figure 5, and seizing wires 17 and 18 are placed over each set of four. Each set is then plaited in the manner above described and the ends spliced to form a loop 19, as shown in Figure 6. Each portion of the sling is then doubled back toward the middle of the cables until they assume the position of Figure 6. The sling at this stage of the process consists of loop portions 20 and 21 terminating in eyes 19 and joined by an unplaited cable portion 22. The eyes 19 and the portion 22 are then united to form a suspension eye, preferably by uniting all the cables by a seizing wire 23 and plaiting the loose ends as above described. This operation is carried far enough to leave the middle of the cable portion 22 projecting as a loop and also to leave the eyes 19 intact but of reduced length. These are then united and all secured together by a serving wire 24 to form a suspension eye 25. A thimble 26 is inserted in the eye and a final serving 27 is put on the sling immediately below the eye to hold the thimble in place.

Figures 8 to 11, inclusive, show a single loop form of sling which is exceedingly useful for certain work. This form of sling is preferably made by first plaiting a cable-like portion of substantially twice the length of the desired sling and then doubling this cable-like portion to bring the ends adjacent one another. As shown in Figure 8, the sling at this stage of construction comprises a cable-like body 28 having loops 29 and 30 at one end thereof, and loops 31 and 32 at the other end thereof. As fully set out in the Nyman patent, above referred to, this article may be plaited from a single elementary strand with only one splice, as at 33. If desired, however, it may be made of two elementary strands, but if this is the case the splices are preferably at opposite ends of the body 28.

The loops 29, 30, 31 and 32 are united to form a single eye. This is preferably done by placing the loops on top of one another and alternating a loop from one end of the body with a loop from the other end, as shown to enlarged scale in Figure 9. After being thus combined the various loops are brought closely together and served with light wire to form a suspension eye 34 in the usual manner. It will be noted from Figure 9 that the splice 33 lies on the same side of the suspension eye 34 as does the depending portion with which it is directly connected. When a sling of this character is used the depending portions are frequently spread wide apart and the splice, if so placed, is favored somewhat, thus tending toward a stronger and safer sling.

A sling of this character is exceedingly strong and flexible and may be put to a number of uses. For example, it is shown in Figure 11 as having the lower loop por-

tion passed around an article A which is to be lifted, after which the suspension eye is passed through the loop and fastened to the crane hook 35. In spite of the short bends which are put in the sling because of this manner of loading it will be found that a sling constructed according to our invention will not only be entirely satisfactory under load, but will also straighten out when relieved of the load and will show no kinks or deformations of any kind.

In any of the illustrated forms of the invention it is desirable to terminate the body portion adjacent the suspension eye so the cable-like portions depending therefrom pass under the lower portion of such body portion before becoming incorporated therewith. In practice the working portions of the sling are generally spread apart somewhat, as shown in Figures 4 and 7, and such construction is desirable in order to maintain all portions of the sling tightly plaited. Figure 2 clearly shows the manner in which the cable-like portions are preferably joined to the body portion, the strands from either of the cable-like portions being incorporated with the body portion at the remote side thereof.

We thus provide an improved cable sling having a suspension eye and a plurality of plaited body portions extending therefrom. The number of strands about the eye of the sling is the same as the number of strands in the sling proper, and in every case both the eye and the body portion are formed from one or more elementary strands passing back and forth from the body to the eye in a continuous manner. The sling is unspliced as a whole, the only splices being in the elementary cables or strands, which are plaited to form the completed sling. We can thus produce slings which are strong and flexible and exceedingly convenient and safe to use.

In each of the illustrated embodiments of the invention the strands have been formed into a plurality of depending portions which, in the embodiment of Figures 1 to 4, inclusive, are provided with hooks, and which, in the embodiment of Figures 5 to 7 and 8 to 11, inclusive, are formed into loops. Obviously, the number of strands may be increased as desired and divided into as many sets as is necesary to form a sling having a suitable number of cable-like portions for the purpose intended. For example, eight strands may be arranged in the same manner as the four strands of Figures 1 to 5, inclusive, and a sling having four cable-like portions formed therefrom. Any size cable or any number of small cables may be utilized to form the strands from which the sling is plaited in order to secure a sling of the desired strength.

While we have illustrated a few forms of the invention, it will be understood that it is not limited to such forms nor to the sequence of steps as set forth in the specification and appended claims, but may be otherwise embodied and practiced within the scope of the following claims.

We claim:

1. A plaited cable sling having a suspension eye and a plurality of plaited portions depending therefrom, and having an elementary strand extending around the eye and forming a part of at least two of said portions, substantially as described.

2. A plaited cable sling having a suspension eye, the sling being formed from a plurality of lengths of material doubled in their central portions to form an eye and plaited on either side of the eye into cable-like portions, substantially as described.

3. A plaited cable sling having a suspension eye, the sling being formed from a plurality of lengths of material doubled in their central portions to form an eye, plaited beyond the eye to form a single body portion and plaited beyond the body portion into a plurality of depending portions, substantially as described.

4. A plaited cable sling having a plurality of cable-like portions with an eye at the ends thereof, the sling having at least one elementary strand extending through at least two of the cable-like portions, substantially as described.

5. A plaited cable sling having a plurality of cable-like portions, depending from a suspension eye and formed of a plurality of plaited strands extending in a continuous manner back and forth through such portions and around the eye, substantially as described.

6. A plaited cable sling having a suspension eye, a plaited body portion adjacent thereto, and a plurality of cable-like portions beyond the body portion, the body portion being formed from all of the strands in the several cable-like portions, substantially as described.

7. A plaited cable sling having a suspension eye and a plurality of depending portions, the eye being formed of all the strands in the several depending portions, substantially as described.

8. A plaited cable sling including a plurality of cable-like portions depending from a suspension eye and also having eyes at the ends thereof remote from the suspension eye, the sling comprising at least one elementary strand extending in a continuous manner around each of the eyes and through each of the cable-like portions, substantially as described.

9. A plaited cable sling having a suspension eye, a plurality of cable-like portions depending therefrom and having eyes at

the ends thereof remote from the suspension eye, the number of strands in the first mentioned eyes being the same as the number of strands in the cable-like portions, and the number of strands in the last mentioned eye being the same as the total number of strands in all the cable-like portions, substantially as described.

10. The method of making a cable sling having a suspension eye and a plurality of depending portions, which includes forming a suspension eye from a plurality of strands, dividing the strands into sets and plaiting each set into a depending portion, substantially as described.

11. The method of making a sling having a suspension eye and a plurality of depending portions, which includes uniting a plurality of stands to form a suspension eye, plaiting such strands into a body portion, separating the strands beyond the body portion into sets and plaiting each of the sets of strands into a depending sling portion, substantially as described.

12. The method of making a sling having a suspension eye and a plurality of depending portions, which includes uniting a plurality of strands to form a suspension eye, dividing the strands into sets, plaiting each set into a depending portion, and forming an eye at the end of each of such portions, substantially as described.

In testimony whereof we have hereunto set our hands.

CHARLES NYMAN.
DONALD MURRAY