

Oct. 22, 1940.

A. L. WEISBECKER

2,218,977

YARN CARRIER AND METHOD FOR MAKING SAME

Filed March 23, 1939

2 Sheets-Sheet 1

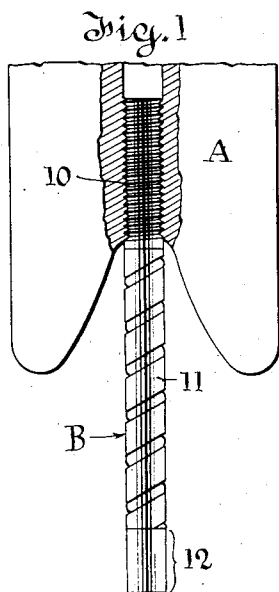
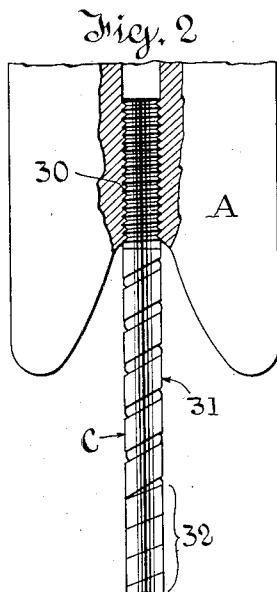
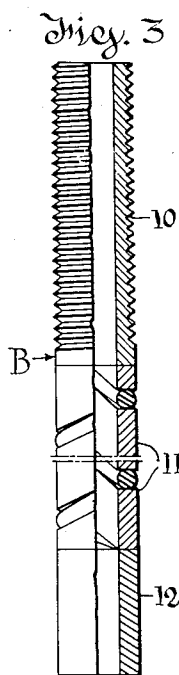
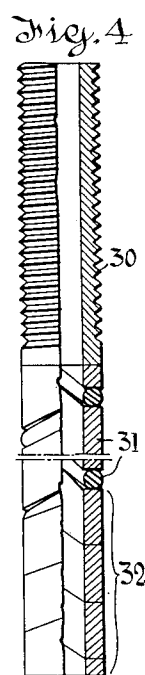


Fig. 5

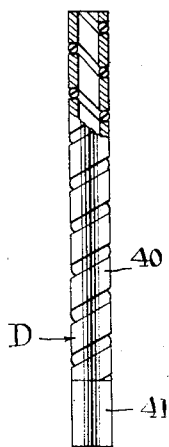
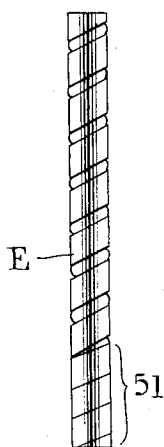
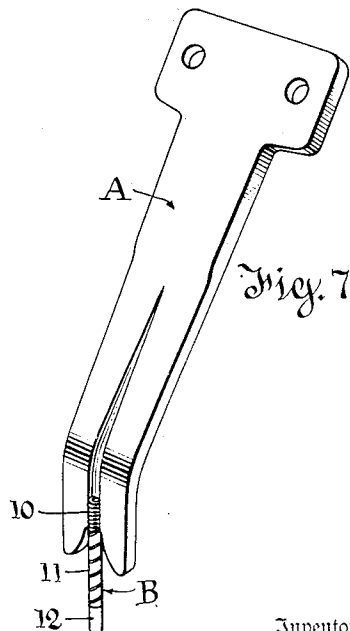


Fig. 6



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YARN CARRIER AND METHOD FOR MAKING SAME

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2 Sheets-Sheet 2

Fig. 9

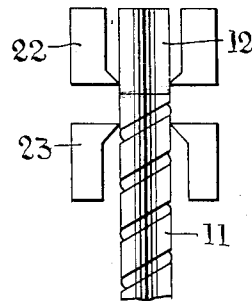


Fig. 10

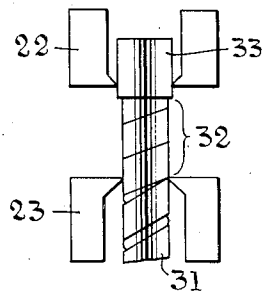
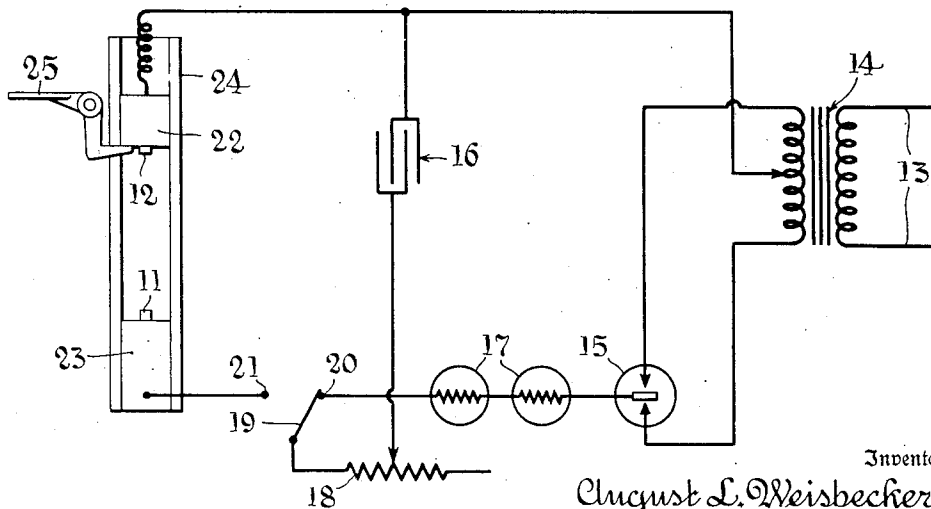


Fig. 8



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UNITED STATES PATENT OFFICE

2,218,977

YARN CARRIER AND METHOD FOR MAKING
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Application March 23, 1939, Serial No. 263,737

15 Claims. (Cl. 66—126)

The present invention relates to the art of knitting, and more particularly to yarn carriers for knitting machines and to methods of making such yarn carriers. The yarn carriers of this invention are especially useful in straight knitting machines for producing full-fashioned hosiery, although it will be readily appreciated from an understanding of this disclosure that the present invention is applicable to the yarn feeding means of other types of knitting machines.

Prior forms of yarn carriers adapted for use in full-fashioned hosiery straight knitting machines are disclosed in the following patents issued to Frank G. Weisbecker, 2,026,514, dated December 31, 1935; 2,014,341, dated September 10, 1935; and 2,101,801, dated December 7, 1937. These patents may be referred to for an explanation of the operation of a yarn carrier in a straight knitting machine and for an explanation of some of the advantages of yielding yarn carrier constructions and flexible yarn guide tubes for yarn carriers.

An object of the present invention is to provide a novel form of yarn carrier, or guide therefor, which is relatively simple in construction and relatively inexpensive to manufacture.

Another object is to provide a yarn carrier guide tube construction which is durable, which will efficiently serve its intended purpose for relatively long periods of use in a knitting machine, which will provide a free feed of yarn, and which will substantially avoid the possibility of the yarn being caught within said tube and thereby broken during yarn laying operations.

A further object is to provide novel means for securing a yarn guide tube to a yarn carrier.

Still another object is to provide a yarn carrier which facilitates removal and replacement of its yarn guide by a knitting machine attendant.

A further object is to provide a novel method for making yarn carriers with yarn guide tubes which are in part flexible and which have a relatively hard, wear-resistant tip, so that such characteristics of the guide tubes are not impaired during the manufacture of the yarn carriers.

A still further object is to provide a novel method for making yarn guide tubes.

Another object is to provide a novel method for making yarn carrier guide tubes which method is relatively simple and inexpensive and which method may be followed to produce a highly satisfactory article with a minimum of work being involved in its manufacture.

Other objects and advantages will appear from the following description, the appended claims,

and the accompanying drawings, which illustrate embodiments of this invention.

In the accompanying drawings, Figure 1 shows a yarn carrier construction embodying this invention, this view showing a yarn guide tube and an end of a yarn carrier member to which the yarn guide tube is attached.

Figure 2 is a view similar to Figure 1 and shows another embodiment of this invention.

Figure 3 is an enlarged view, partly in elevation and partly in cross section, of the yarn guide tube shown in Figure 1.

Figure 4 is an enlarged view, partly in elevation and partly in cross section, of the yarn guide tube shown in Figure 2.

Figure 5 is a view partly in elevation and partly in cross section of another yarn guide tube embodying this invention.

Figure 6 is an elevational view of still another yarn guide tube embodying this invention.

Figure 7 is a perspective view of a complete yarn carrier embodying the invention of Figure 1.

Figure 8 is a diagrammatic view of welding equipment, which may be used in practicing the welding method of the present invention.

Figure 9 is a diagrammatic view to show the relative arrangement of tubular guide elements in the chucks of the welding equipment illustrated in Figure 8.

Figure 10 is a view similar to Figure 9 and illustrates the method for welding the tip of the guide tube shown for example in Figure 2.

The yarn carrier of Figures 1 and 7 comprises a yarn carrier member or supporting arm A, and a yarn guide tube B. The yarn guide tube B is formed from three tubular elements 10, 11, and 12 and has substantially uniform internal and external diameters throughout. The tubular element 11 is preferably of flexible construction and may be formed of both round and flat wire in the same manner as the tube shown in Figure V of the Weisbecker Patent No. 2,101,801. A metallic ribbon or flat wire of stainless steel having a thickness of about 0.008 inch and a width of about 0.030 inch may be coiled to form the flat wire spring in the tubular member 11. The round wire spring of the tubular member 11 may be formed of round wire stainless steel stock having a cross-sectional diameter of about 0.008 inch. The internal diameter of the yarn guide tube B is preferably on the order of 0.030 inch, and the external or outer diameter on the order of 0.046 inch.

The tubular element 12 is the tip of the guide tube B and may be formed of any suitable tubu-

lar stock having a continuous annular wall over its entire length. The tubular element 12 is preferably inflexible and of wear resisting character and may be formed of chromium, "Carbology,"

chromium alloys, or high carbon steel. The tubular element 10 is preferably formed of stainless steel tubular stock and is externally threaded for screw threaded engagement with the yarn carrier member A, so that the yarn guide tube B may be readily detached therefrom, as well as readily inserted therein.

The tubular elements 10, 11 and 12 preferably are integrally united as by welding. To prepare the tubular elements for the welding operation, their ends to be welded are preferably ground perfectly flat. This treatment of the tubular elements will minimize the possibility of a bur being formed at the joint in the welding operation. Such welding may be accomplished by apparatus as illustrated diagrammatically in Figure 8. This welding apparatus may include a source 13 of alternating current, a transformer 14, and a rectifier 15 for supplying energy to a condenser 16. In the circuit between the rectifier 15 and one terminal of the condenser 16, there is preferably provided two ballast resistance lamps 17, an adjustable load resistance 18, and a switch 19. The switch 19 includes a manually operated switch arm for selective engagement with either of two contacts 20 and 21. When the switch arm is in engagement with the switch contact 20, the condenser 16 is supplied with energy from the source of power 13 through the rectifier 15, the ballast resistance lamps 17, and the adjustable resistance 18. Movement of the switch arm out of engagement with the switch contact 20, opens the circuit between the condenser 16 and the source of power 13.

The welding apparatus also includes two relatively movable chucks, or vises, 22 and 23, which constitute welding terminals. The chuck 23 may be anchored in place, and the chuck 22 may be supported to fall by gravity action in a vertical direction toward the stationary chuck 23. The chuck 22 is electrically connected to one side of the condenser 16. The other chuck 23 is electrically connected to the switch contact 21, so that when the latter is engaged by the arm of switch 19, the chuck 23 is electrically connected through the switch 19 and the resistance 18 to one terminal of the condenser 16. When the switch arm is moved away from contact 21, the circuit to the welding terminals is open, and an attendant may safely clamp two of the yarn guide tubular elements, for example 11 and 12, in the chucks, and otherwise make the necessary preparations for producing a welded joint.

The welding apparatus is also provided with a latch 25 for releasably holding the chuck 22 in a raised position. Suitable electrical or mechanical control means of conventional form (not shown) interconnect the arm of the switch 19 and the latch 25, so that the latter will be automatically tripped to release the chuck 22 at the instant the switch arm is thrown into engagement with the contact 21. The condenser 16 will, therefore, be included in the circuit of the chucks 22 and 23, as the chuck 22 falls to effect the percussion welding of the tubular elements 11 and 12.

The method of welding may be as follows: The tubular guide members 11 and 12 are secured in the chucks 23 and 22 respectively, so as to project slightly therefrom and toward each other

(see Figure 9), but with the chucks 23 and 22 in separated relation (see Figure 8).

The tubular elements 11 and 12 are preferably gripped closely adjacent their ends to be welded (see Figure 9) in order to confine substantially the welding to the end edges thereof. The arm of switch 19 is now in engagement with contact 20 to permit charging of the condenser 16. The chucks 22 and 23 are then brought together so as to provide percussive engagement between the ends of the tubular members 11 and 12 (see Figure 9.) This operation is secured by throwing the arm of switch 19 into engagement with contact 21, whereby the latch 25 is actuated to release the chuck 22 and, at the same instant, the condenser 16 is connected to the chuck 23. As the tubular elements 11 and 12 are brought into contact, the welding circuit is completed and the condenser 16 discharges through the current limiting resistance 18 to release the proper amount of welding heat at the joint being welded. The energy thus concentrated at the point of contact between the elements 11 and 12 is sufficiently great to produce a substantially perfect weld.

In the electric welding of coil spring tubes, it has been found that desirable results are accomplished if the winding of the coil forming the tube 11 bears a certain relationship to the direction of current flow in the tube. For example, with the method and apparatus illustrated by Figures 8 and 9, the coil spring tubular element 11 is preferably of the right hand wound type, and the current flows in the tubular element 11 towards its end to be welded. The chuck 23 also preferably grips the coil spring tubular element 11 at distance from the end to the welded of about one convolution. The welding current will then flow circumferentially about the tube end and provide a magnetic field about the axis of the wire which extends between the chuck 23 and the end edge of the tubular element 11. This magnetic field will have such direction that it will tend to drive particles, which may possibly be spattered in the welding operation, away from the interior of the tubular element 11, across its end edge and toward the outside of the tubular element 11. The lines of magnetic force extend upwardly (looking at Figure 9) and will axially within the tubular element 11 and then outwardly over its end being welded. The magnetic field set up by the current flow in the coil spring tubular element 11, therefore, assists in providing a flush joint at the interior of the welded tube and in preventing the deposit of particles within the welded tube which would either clog the same or have an abrasive action on yarn passing there-through.

It is my discovery that the foregoing procedure will integrally unite the tubular elements 11 and 12 with a strong bond and generally without any external or internal welding bur or extruded metal at or adjacent the welded joint. This invention, therefore, avoids flow of metal to the interior of the yarn guide tube during the welding operation and accomplishes a most important result.

Any substantial amount of extruded metal in the guide tube B will either render the latter useless or require a relatively expensive and time consuming operation for its removal. The presence of metal within a yarn guide tube as a result of its being welded will, if not removed, be apt to damage or cut yarn when the yarn guide tube is being used in the yarn laying operations of a knitting machine. Heretofore, the knitting

art has found it difficult to weld yarn guide tubes, because of the metal usually extruded at the welded joint. Furthermore, the welding of yarn guide tubes for knitting machines has, heretofore, been thought impractical because of the very small size of stock which is used in forming the guides tubes. The method of this invention, however, may be successfully followed in making relatively small knitting machine yarn guide tubes having a wall thickness on the order of 0.008 inch and an internal diameter on the order of 0.030 inch.

A preferred machine for the welding of the present guide tubes is one in which the chucks 22 and 23 are arranged for relative movement in a vertical direction. The chuck 22, for example, may be positioned above the chuck 23 and slidably mounted in a vertical guide 24 of the welding machine so that it (chuck 22) may be raised a certain distance, secured in the raised position by the latch 25, and released at the will of an attendant to fall by gravity action. The chucks 22 and 23 should be so relatively arranged that the chuck 22 in its descent will bring its tubular element (for example 12) into exact alignment with the tubular element (for example 11) supported by the chuck 23. The mass of the gravity propelled chuck 22 is preferably such as to produce a static force of 10 pounds at the instant of welding. The drop or fall of the chuck 22 is preferably such that its velocity is on the order of 0.002 inch per 0.00001 second, or 200 inches per second, at the instant the tubular elements are brought into contact. This ratio of mass and velocity, when small tubular elements having flat surfaces are being welded, will insure a substantially perfect weld and yet substantially avoid the possibility of metal being forced out of the joint and into the interior of the guide tube.

The source of power 13 and the transformer 14 are preferably so related as to deliver a transformer output of about 0.5 ampere at 500 volts. The joint at the instant of welding will then be subjected to a current of about 10 to 15 thousand amperes at about 500 volts. To produce this condenser discharge current, the condenser may be of the paper dielectric type having a capacity of about 800 microfarads or its equivalent. A condenser of different capacity is preferable if the parts to be welded are of different size in cross-section from that described herein. The value of the condenser (in microfarads) is preferably varied in proportion to the variation of the area of the surfaces to be welded.

The condenser 16 effects its discharge in such a brief period of time that the welding operation is completed within a very small fraction of one second—on the order of 0.00001 of a second. This fraction of a second measures the duration of the welding heat at the joint being welded. This welding interval is of such short duration that heating of the tubular elements 11 and 12, except in the area closely adjacent the welded joint, is substantially avoided. Any free oscillating current which may be present after the welding is completed, is dampened out by the resistance 18. The welding operation, therefore, does not impair the resilient property of the tubular element 11 or the wear resisting character of the tubular element 12. The interval of time during which the current continues to flow through the joint being welded is in accordance with

the resistance of the welding circuit. An adjustable resistance as shown at 18 in Figure 8 is, therefore, preferably included in the welding circuit, in order that an attendant may vary the resistance and thereby control the duration of the welding operation.

Conventional practice may be followed to reduce inductance of the wiring of the welding equipment to a minimum and thereby avoid free oscillating currents which would tend to burn the parts being welded.

The tubular elements 10 and 11 may be and preferably are united in the same manner as described with respect to the welding of the tubular elements 11 and 12. The tubular element 10 is preferably provided with its external screw thread prior to its being joined to the tubular element 11.

The guide tube B, after its elements 10, 11 and 12 are welded together, may be machined or otherwise treated to grind away, cut or remove any metallic particles which may have been formed on the guide tube interior walls during the welding operation. This step obviously is not required where the welding operation leaves a clean joint and provides a guide tube with a uniform bore free of obstructions or metallic particles that might cut or catch yarn passing through the guide tube. Usually, the welding operation results in such a clean joint that the interior of the guide tube does not require a cleaning operation to prepare the tube for feeding yarn. In the event, the guide tube joints require cleaning to remove extruded metal, the latter is so small in quantity that the cleaning operation can be readily performed in a relatively simple operation and much more quickly than would be the case if the tube were welded according to the methods heretofore known in the knitting art. The interior of the tubes welded according to this invention may be cleaned, when necessary, by means of an abrasive-coated wire or cord, such as emery coated cord, which is passed back and forth through the tube.

Another form of guide tube embodying this invention is shown at C in Figure 2. This guide tube C comprises tubular elements 30 and 31. The tubular element 30 is similar to the tubular element 10 of Figures 1 and 3 and may be welded to the tubular element 31 in the same manner as described with respect to the tubular elements 10, 11 and 12.

The tubular element 31, like the tubular element 11 described above, is formed of both round and flat wire. The round wire, however, does not extend into the tip end 32 of the tubular element 31. The tip 32 of the tubular element 31 is, therefore, formed solely by one or more (preferably a few) convolutions of the flat wire as shown clearly in Figure 4. These few convolutions of flat wire in the tip 32 may be welded together in abutting relation (see Figure 4) in substantially the same manner as the tubular elements 11 and 12. In the event the tube 31 is made from stock such as the tubular element 11 of Figure 1, the round wire in the tip 32 is removed prior to welding of the latter.

The tubular element 31, for example, may be gripped by the chuck 23 as diagrammatically indicated in Figure 10, and an electrode 33 may be carried by the chuck 22. With this arrangement, the apparatus illustrated in Figure 8 will operate as above described and effect welding when the electrode 33 strikes the end of tip 32.

In preparing the tubular element 31 for the welding operation, the convolutions in the tip 32 may be slightly spaced apart. The force of the falling electrode 33 will press the convolutions of the tip 32 into contacting engagement as the welding current is passed therethrough. The convolutions in the tip 32, if desired, may first be formed in abutting relation and then welded together in the manner already described. It will be noted (see Figure 10) that the chuck 23 grips the tube 31 at the inner end of tip 32. This will confine the welding operation to the tip 32.

Figure 5 of the drawings shows an embodiment of this invention in which a guide tube D comprises a flexible tubular element 40 and a tubular tip 41 which are similar to the tubular elements 11 and 12 of Figures 1, 3, 7 and 9. The tubular elements 40 and 41 are preferably welded together in the same manner as described with respect to the tubular elements 11 and 12.

The yarn guide tube E of Figure 6 is constructed the same as the tubular member 31 of Figures 2, 4 and 10, and has a tubular tip 51 formed in the same manner as the tip 32.

The yarn guide tubes D and E may be secured in a yarn carrier in any suitable manner. The guide tubes D and E preferably are frictionally mounted in a yarn carrier as disclosed, for example, in the application of Frank G. Welsbecker Serial No. 218,448 or in my copending application Ser. No. 263,738 filed of even date herewith.

After the yarn guide tubes B and D are constructed as described above, they preferably have their tips (12 and 41) subjected to a hardening process. This process is preferably performed by treating each yarn guide individually. A preferred process is to heat treat each tip (12 and 41) by electric resistance heating to raise its temperature rapidly. The complete guide tube (B or D), or its heated tip (12 or 41) is then immersed instantly in cold water or other cooling medium. The tips (12 and 41) are heated and cooled rapidly so as not to destroy the resilient properties of the spring portions of the yarn guide tubes B and D. As a result of the guide tubes B and D being first welded, then having their tips heat treated, and finally secured in yarn carriers by a mechanical joint and without the use of heat, the completed yarn carriers when ready for installation in knitting machines will have guide tips which are characterized by their great hardness and coiled wire portions which are characterized by their flexibility. Experience shows that guide tubes having their tips hardened after the welding thereof are superior to guides having their tips hardened by heat treatment prior to welding.

The described method for making yarn carriers avoids the guide tips being subjected to drawing temperatures, such as would be the case, if the yarn guide tubes B, C, D and E were soft soldered to the yarn carrier members (for example A), or if the tips 12 and 41 were secured to the flexible tubular members 11 and 40 respectively by soft soldering. The tips 32 and 51 are also not subjected to drawing temperatures, since they are formed by welding as described above.

The described method of making yarn carriers results in providing longer life for the guide tubes in actual use, as well as highly satisfactory guide tubes.

The welded joints, described above, may be termed fusion, butt-weld joints, as in each instance the two parts, which are united, have

their respective surfaces fused and brought into direct abutting relation in the welding operation.

The foregoing is illustrative, and it will be understood that this invention includes all embodiments and modifications coming within the scope of the appended claims.

I claim:

1. For use in a yarn carrier of straight knitting machines, a guide for cooperating with said carrier and forming a yielding means for laying the yarn of said carrier along the sinkers and needles of the knitting machine, said guide comprising a tube having adjacent portions at one end thereof bonded together in abutting relation by a fusion, butt-weld joint, and having the tip of said tube end of integral solid wall formation, said tube having at least its intermediate part of flexible construction.

2. For use in a yarn carrier of straight knitting machines, a guide for cooperating with said carrier and forming a yielding means for laying the yarn of said carrier along the sinkers and needles of the knitting machine, said guide comprising a tube having adjacent portions at one end thereof bonded together in abutting relation by a fusion, butt-weld joint, the tip of said tube end being of integral solid wall formation to provide a smooth interior cylindrical wall, said tube having at least its intermediate part of flexible construction and having a substantially uniform internal diameter throughout its length.

3. For use in a yarn carrier of straight knitting machines, a guide forming a yielding means for laying the yarn of said carrier along the sinkers and needles of the knitting machine, said guide comprising a flexible tubular element, and a relatively inflexible, tubular tip, said tubular element and tip being bonded together with their adjacent ends in abutting relation, and said tip having substantially the same internal diameter as the adjacent end of said tubular element.

4. For use in a yarn carrier of straight knitting machines, a guide for cooperating with said carrier and forming a yielding means for laying the yarn of said carrier along the sinkers and needles of the knitting machine, said guide comprising a tube having adjacent portions at one end thereof bonded together in abutting relation by a fusion, butt-weld joint, the tip of said tube end being of integral solid wall formation, said tube having at least its intermediate part in the form of flexible coiled wire.

5. For use in a yarn carrier of straight knitting machines, a guide forming a yielding means for laying the yarn of said carrier along the sinkers and needles of the knitting machine, said guide comprising a flexible tubular element of coiled stainless steel wire, and a relatively inflexible tubular tip of wear-resisting metal, said tubular element and said tip being bonded together by a fused joint with the adjacent tube and tip ends in abutting relation, and said tip having substantially the same internal diameter as the adjacent end of said tubular element.

6. For use in a yarn carrier of straight knitting machines, a guide for cooperating with said carrier and forming a yielding means for laying the yarn of said carrier along the sinkers and needles of the knitting machine, said guide comprising a flexible tubular element, and a tubular tip therefor, said element and tip having their adjacent ends of substantially the same external diameter and of substantially the same internal diameter, said tube and tip also having their ad-

jacent ends integrally joined by a fusion, butt-weld, said joint including substantially all the metal fused during the welding thereof, and substantially all said fused metal being confined within the limits of said external and internal diameters.

7. For use in a yarn carrier of straight knitting machines, a guide for cooperating with said carrier and forming a yielding means for laying the yarn of said carrier along the sinkers and needles of the knitting machine, said guide comprising a flexible tube of coiled wire, and a relatively inflexible metallic tubular tip supported by said coiled wire tube, said tube and tip also having their adjacent ends integrally joined by a fusion, butt-weld, said joint including substantially all the metal fused during the welding thereof, and substantially all said fused metal being confined within the limits of the external and internal diameters of said tube and tip, the adjacent ends of said tube and said tip having internal diameters of substantially the same dimension.

8. For use in a yarn carrier of straight knitting machines, a guide for cooperating with said carrier and forming a yielding means for laying the yarn of said carrier along the sinkers and needles of the knitting machine, said guide comprising metallic ribbon and wire of round cross section coiled into a tube, a part of said tube being formed of convolutions of said metallic ribbon alternating with convolutions of said wire, one tip of said tube being formed by convolutions of only said metallic ribbon and having its said convolutions fused together in abutting relation, whereby said tip is in the form of an integral solid annular wall.

9. A straight knitting machine yarn carrier comprising a yarn guide tube holder, and a yarn guide tube having screw thread engagement with said yarn guide holder whereby the said yarn guide is detachably secured thereto, said yarn guide also having at least a portion thereof of flexible construction to permit deflection of the tip of the yarn guide in event of its striking an obstruction during yarn laying movement in a knitting operation.

10. In a straight knitting machine yarn carrier, the combination comprising a yarn guide tube holder and a composite yarn guide tube formed of at least two tubular members, said two members being united in abutting relation by a fusion joint, one of said two tubular members having screw thread engagement with said yarn guide holder whereby the yarn guide is detachably secured thereto, the other of said two tubular members having, at least a part thereof, of flexible construction whereby said other tubular member will yield in event of engagement with an obstruction during yarn laying movement in a knitting operation.

11. For use in a yarn carrier of straight knitting machines, a guide for cooperating with said carrier and forming a yielding means for laying the yarn of said carrier along the sinkers and needles of the knitting machine, said guide comprising a flexible tubular element, a supporting tubular element therefor, and a tubular tip, said

supporting tubular element and tip being integrally united to opposite ends of said flexible element, and said supporting tube being externally threaded for attachment to an internally threaded yarn carrier member.

12. For use in a yarn carrier of straight knitting machines, a guide for cooperating with said carrier and forming a yielding means for laying the yarn of said carrier along the sinkers and needles of the knitting machine, said guide comprising a flexible tubular element and a supporting tubular element therefor, said supporting element being integrally bonded to said flexible element and being externally threaded for attachment to an internally threaded yarn carrier member.

13. The method of making knitting machine yarn carriers having a yarn guide tube and a carrier member therefor, which method comprises the steps of making said guide tube by forming a flexible tubular member, providing a tip therefor in a welding operation and substantially confining the welding heat to the area to be welded, heat treating substantially only said tip to harden the same and thereby improve its wear resistant properties, whereby a yarn guide is formed with portions thereof of substantially different character, and securing said guide tube to said carrier member by a mechanical joint without the use of heat, whereby the flexibility and hardness of different portions of the yarn guide are retained in the completed yarn carrier.

14. The method of making knitting machine yarn carriers having a yarn guide tube and a carrier member therefor, which method comprises the steps of making said guide tube by forming a flexible tubular member, welding a substantially inflexible tip thereto and substantially confining the welding heat to the joint to be welded, whereby an integral composite yarn guide is formed with portions thereof of substantially different character, heat treating substantially only said tip to harden the same and thereby improve its wear resistant properties, and securing said guide tube to said carrier member by a mechanical joint without the use of heat, whereby the flexibility and hardness of different portions of the composite yarn guide are retained in the completed yarn carrier.

15. The method of making knitting machine yarn carriers having a yarn guide tube and a carrier member therefor, which method comprises the steps of making said guide tube by providing a flexible tubular member formed of coiled wire, welding together the convolutions of wire adjacent one end of said flexible tubular member to form a tip therefor and substantially confining the welding heat to the edges of the convolutions being welded, whereby a yarn guide is formed with portions thereof of substantially different character, and securing said guide tube to said carrier member by a mechanical joint without the use of heat, whereby the flexibility and hardness of different portions of the yarn guide are retained in the completed yarn carrier.

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