Aug. 31, 1965 K. McCONNELL 3,203,453

CORE LINER

Filed Nov. 19, 1962

Fig.1

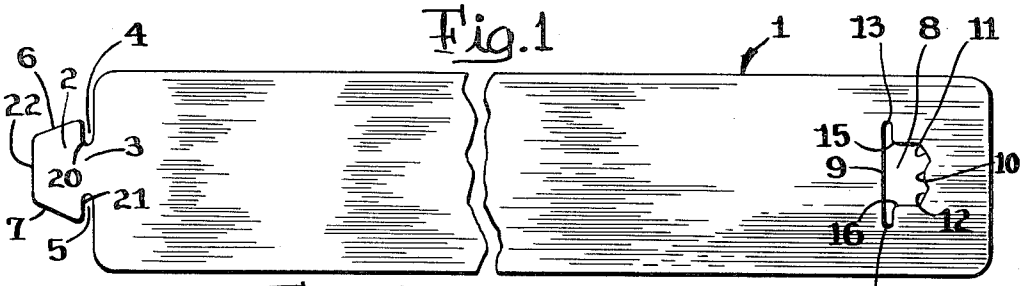
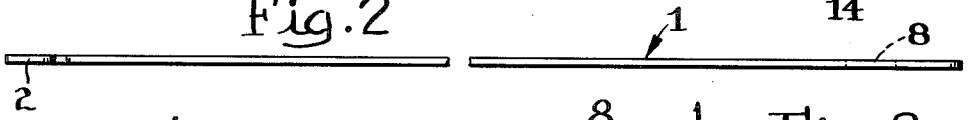
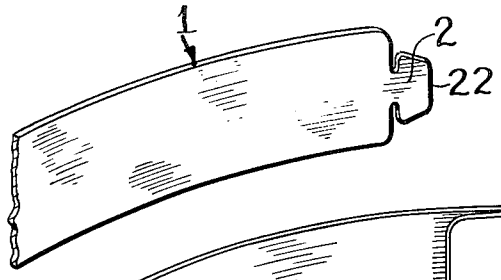


Fig.2





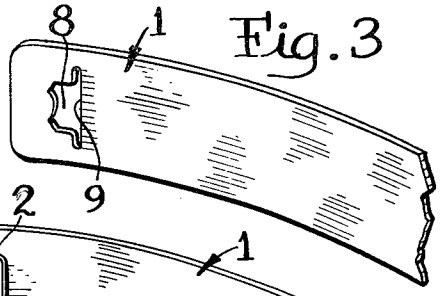


Fig.3

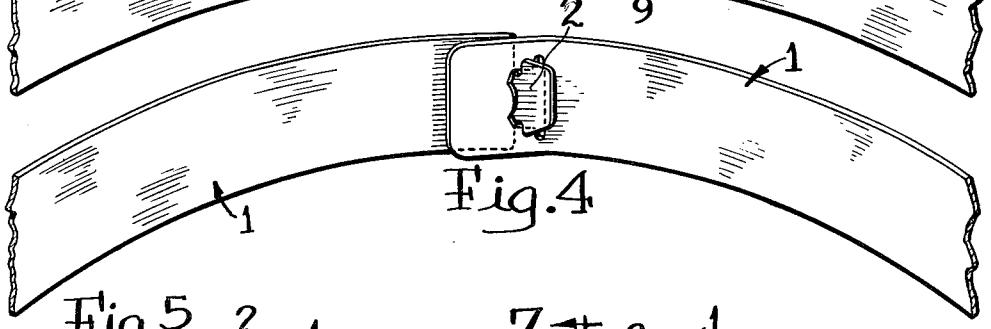


Fig.4

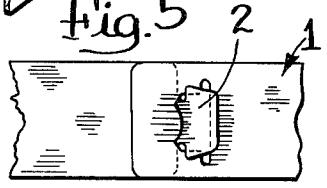


Fig.5

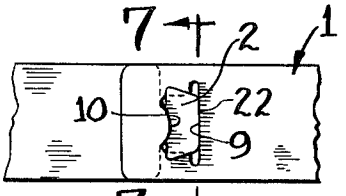


Fig.6

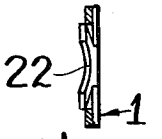


Fig.7

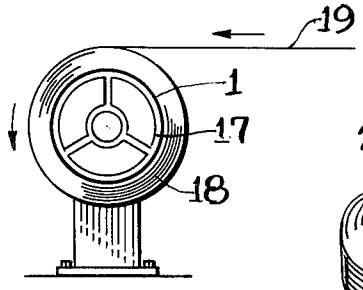


Fig.8

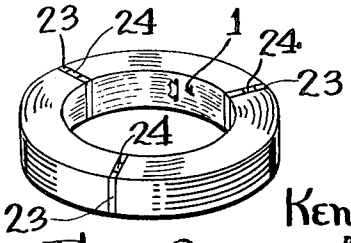


Fig.9

INVENTOR.
Kennedy McConnell
BY
William P. Porcelli
Atty

United States Patent Office

3,203,453

Patented Aug. 31, 1965

3,203,453

CORE LINER

Kennedy McConnell, Riverdale, Ill., assignor to Interlake Steel Corporation, a corporation of New York

Filed Nov. 19, 1962, Ser. No. 238,550
6 Claims. (Cl. 140—92.1)

This invention relates to the art of coil liners of a type employed to retain the internal diameter convolutions of a wound coil of strip material fixed and thereby prevent unraveling of the strip away from the inside diameter of the coil during subsequent handling and shipment.

Heretofore it has been the common practice in the packaging of strip materials, such as metal strapping, wire and the like to wind the strip into coils on substantially rigid core members. The use of core members has been particularly employed when packaging relatively narrow strapping into coils having lateral dimensions several times the width of the strapping itself. In such cases a substantially rigid cylindrical core liner has been slipped axially onto a driven winding drum and a coil of the narrow strapping has been formed by winding the material onto the core spirally in a manner such that a plurality of radially superimposed and laterally spaced convolutions are built up on the core.

When the coil has been wound to its desired size and weight, rotation of the winding drum is arrested, the strapping leading to the coil is cut, and the coil with its rigid core member is pulled or slipped off of the winding drum. Binder straps or the like are encircled radially around coil portions and the rigid core member at a plurality of points to secure the outer convolutions of the strapping against relative displacement, the rigid core member itself acting to prevent the inner convolutions of the coil from becoming loosened and unraveled.

The rigid or substantially rigid core members of the kind referred to have usually been made of steel and they have provided very firm foundations around which to wind coils. Their use, however, has been troublesome in certain respects. Their fabrication in quantity has required the use of relatively expensive machinery and a substantial amount of storage space for completed cores awaiting use is required. Similarly, the use of such core members has created a storage problem prior to disposal of the core members for those customers consuming a large quantity of coil products using the core members. Manufacturers engaged in winding and forming coils upon rigid cores of this type have also found that the cores cannot be depended upon to fit onto the winding drums properly. Variations in the inner diameters of the prefabricated rigid cores, together with slight variations encountered in the outer diameters of the winding drums, cause some rigid cores of a supposedly identical group to slip excessively or buckle on certain winding drums during the winding operation, while other cores of the same group fit so tightly on other drums that their positioning and removal is difficult.

An attempt to overcome the problems associated with the prefabricated rigid core members has been made by employing flat flexible strips of steel which are bent around the winding core into a closed loop immediately prior to winding a coil thereon. The ends of the steel strap comprising the core liner are provided with engaging means adapted to be interconnected with each other to retain the core member in its closed loop on the winding mandrel. This type of core member has a distinct advantage because it does not require excessive amounts of storage space. A plurality of the flat lengths of strip comprising the core members can be stacked and confined to a very small storage space as compared to what is necessary for storing the prefabricated cylindrical type core

members. This is true prior to use and is true at the customer's site where the core liners can be quickly returned to their flattened condition.

However, even with this type of core liner, there have been objections. The connecting portions of the core members are such that there is a degree of slippage at the connections which creates a new problem. After the coil is removed with its liner from the winding mandrel, the core member, because of the slippage at its connecting portions, collapses slightly to a diameter less than the inside diameter of the coil. The result is that the core liner is loose within the coil and thereafter fails to perform its intended function of retaining the inner convolutions of the coil.

It is the principal object of this invention to provide an improved core liner of the last mentioned type which can be used successfully for retaining the inner convolutions of a wound coil snug because it is provided with an improved connecting means for the connected ends of the member which prevents slippage and consequent reduction in diameter of the core member after the coil and the core member are removed from the winding mandrel.

In order to achieve this object, each core liner member is provided with a narrow tongue on one end for engaging an opening on the other end, the opening being provided with a fixed shoulder against which the tongue portion becomes tightly engaged upon the tendency of the connecting portions to slip as the core liner with its coil are removed from the winding mandrel. This tight engagement remains thereafter to insure that unraveling of the inner convolutions of the coil does not occur during subsequent handling and shipment of the coil.

It is another object of the invention to provide improved connector portions which cause the connecting tongue to be deformed into an arcuate cross-section to minimize any buckling tendencies of the tongue itself to further insure a minimum of slippage at the connected portions.

Other objects and advantages of the invention should become apparent upon reference to the accompanying drawings in which:

FIG. 1 shows a top plan view of a single core liner member embodying the invention extended in its flat condition;

FIG. 2 shows a longitudinal edge view of the members shown in FIG. 1;

FIG. 3 shows a perspective view of the two end portions of the core liner member of FIGS. 1 and 2 spaced from each other in positions as they would appear prior to bringing them together into interlocking engagement about a winding mandrel;

FIG. 4 shows the same two core liner member end portions as they appear after being brought into interlocking engagement with each other;

FIG. 5 shows an internal view looking directly toward the connected portions as they appear in FIG. 4;

FIG. 6 shows the same connected portions in final interlocking positions as they appear after removal of the coil liner and its coil from the winding mandrel;

FIG. 7 shows a sectional view along the line 7—7 of FIG. 6 and particularly illustrates the arcuate curvature of the connecting tongue;

FIG. 8 shows a front elevation of a winding mandrel provided with a core liner and a coil in the process of being wound thereon; and

FIG. 9 shows a perspective view of a finished coil as it appears after being secured with radial binder straps.

As shown in FIGS. 1 and 2, a preferred embodiment of core liner 1 made according to this invention consists of a flat length of strip having a width many times greater than its thickness. It is preferably made of steel because

of its low cost, but can be made of other resilient materials. On the other end of the core liner member is provided a wedge shaped tongue 2 connected to the main body of the member by means of a narrow connecting portion 3 which defines two laterally inwardly extending recessess 4 and 5 between the tongue and the body portion of the liner member. The wedge shape to the tongue 2 is provided by tapered edges 6 and 7 extending convergently away from the end of the member.

On the opposite end of the core liner member is provided an opening 8 which is bounded on one side by a straight edge or shoulder 9 and on its opposite edge by an inwardly curved edge 10 connected to two angularly disposed edges 11 and 12. The shoulder or edge 9 extends for a length slightly exceeding the maximum width of the tongue 2 on the other end of the member. Also, at its ends, it is part of the boundary of two laterally outwardly extending recesses 13 and 14. These recesses 13 and 14 terminate opposite the edge 9 at rounded corners 15 and 16.

In FIG. 8 is shown a cylindrical winding mandrel 17 about which a core liner member 1 is positioned. Surrounding the core liner member 1 are the closely wound convolutions of a coil 18 being wound thereon from a continuous length of strap 19 supplied from a source not shown. In order to attach the core liner member to the mandrel 17, its two ends are initially positioned as shown in FIG. 3 with the core liner member being held in loops about the winding mandrel. Thereafter, the two ends of the core liner member are brought together into interlocking engagement as shown in FIG. 4. The tongue 2 is passed from the outside in through the opening 8 by allowing the edges of the tongue 2 to pass through the regions adjacent to the edge 9 and through the recesses 13 and 14 adjacent to it. Then, the tongue is withdrawn slightly to slide past the corners 15 and 16 of the opening so that its rear edges 20 and 21 are hooked in place. Ordinarily, the winding mandrel on which the core liner is placed is of an expandable type and, after it expands, the tongue 2 is further withdrawn to slightly expand the diameter of the core liner member on the mandrel. When this occurs, the tongue is withdrawn sufficiently so that its forward edge 22 positions itself to engage the shoulder or edge 9 of the opening 8. This results in a locked condition which thereafter prevents any slippage of the connection which would result in a lessening of the diameter of the core liner member. This eliminates the objectionable condition of having the core liner member loosened after it and its coil wound thereon are removed from the winding mandrel.

As the tongue 2 is withdrawn into its locking position as shown in FIG. 6, the curved or arcuate edge 10 causes the tongue 2 to assume a corresponding arcuate or curved shape which is shown particularly in FIG. 7. This curved shape imparts a rigidity to the tongue which minimizes its tendencies to buckle and possibly become disengaged later on. Also, the arcuate shape along its leading end 22 insures abutment against the edge 9 because it is, for the purpose of abutment, a thicker strip.

After the coil is completely wound onto the core liner member on the winding mandrel, it is provided with encircling binder straps 23 arranged radially at various points around the coil. These binder straps 23 are secured by interlocking joints 24 formed by conventional joint forming tools.

Although only a single embodiment of the invention has been shown and described, it should be clearly understood that the invention can be made in many different ways without departing from the true scope of the invention as defined by the appended claims.

I claim:

1. A core member for a coil comprising, a strip of flexible material having a hole through one end and a connecting tongue at its other end, said tongue having a wide portion connected by a narrow portion to the main body of the strip, said hole having a wide portion connected to a narrow portion, the wide portion of the hole being wide enough to receive the wide portion of the tongue through it, and the narrow portion of the hole being dimensioned to receive the narrow portion of the tongue in which position the tongue is hooked into the hole and prevented from withdrawal, the length of the tongue being no more than the length of the hole so that the tongue can fit within the hole approximately co-planar with it with the end of the tongue abutting a first end wall of the hole.

2. A core member for a coil comprising, a strip of flexible material having a hole through one end and a connecting tongue at its other end, said tongue having a wide portion connected by a narrow portion to the main body of the strip, said hole having a wide portion connected to a narrow portion, the wide portion of the hole being wide enough to receive the wide portion of the tongue through it, and the narrow portion of the hole being dimensioned to receive the narrow portion of the tongue in which position the tongue is hooked into the hole and prevented from withdrawal, the length of the tongue being no more than the length of the hole so that the tongue can fit within the hole approximately co-planar with it with the end of the tongue abutting a first end wall of the hole, a second end wall opposite said first end wall being shaped convexly inwardly of the hole to protrude against the tongue when it is approximately co-planar with the hole and thereby urge the tongue into a pronounced arcuate cross-sectional shape.

3. A core member for a coil comprising, a strip of flexible material having a hole through one end and a tongue extending from its other end, said tongue having two inwardly extending lateral recesses providing it with a narrow neck portion, said hole having a wide portion toward one end joined to a narrow portion at its other end, the wide portion of said hole being wide enough to receive the tongue through it, the narrow portion being wide enough to accommodate the narrow neck portion of the tongue and prevent withdrawal of the tongue from the hole, the length of the tongue being no more than the length of the hole to thereby allow the tongue to be positioned coincident with the hole and within it with the free end of the tongue abutting a first end wall of the hole.

4. A core member for a coil comprising, a strip of flexible material having a hole through one end and a tongue extending from its other end, said tongue having two inwardly extending lateral recesses providing it with a narrow neck portion, said hole having a wide portion toward one end joined to a narrow portion at its other end, the wide portion of said hole being wide enough to receive the tongue through it, the narrow portion being wide enough to accommodate the narrow neck portion of the tongue and prevent withdrawal of the tongue from the hole, the length of the tongue being no more than the length of the hole to thereby allow the tongue to be positioned approximately co-planar with the hole and within it with the free end of the tongue abutting a first end wall of the hole, a second end wall opposite said first end wall being shaped to protrude inwardly of the hole to press against the tongue when it is approximately co-planar with the hole and thereby urge the tongue into a pronounced arcuate cross-sectional shape.

5. A core member for a coil comprising, a strip of flexible material having a hole through one end and a tongue extending from its other end, the tongue being movable through the hole and provided with two opposite shoulder portions engageable to overlap with two opposite side portions of the hole to prevent withdrawal of the tongue through the hole, the tongue being movable to a position approximately co-planar with the hole where it is urged into an arcuate shape by the reaction forces of the two opposite side walls of the hole, said end wall

having a protrusion extending inwardly of the hole pressing against the tongue when the tongue is approximately co-planar with the hole to thereby increase the arcuate shape of the tongue.

6. A core member for a coil comprising, a strip of flexible material having a hole through one end and a tongue extending from its other end, the tongue being movable through the hole and provided with two opposite shoulder portions engageable to overlap with two opposite side portions of the hole to prevent withdrawal of the tongue through the hole, the tongue being movable to a position approximately co-planar with the hole where it is urged into an arcuate shape by the reaction forces of the two opposite side walls of the hole, said end wall having a protrusion extending inwardly of the hole pressing against the tongue when the tongue is approximately co-planar with the hole to thereby increase the arcuate shape of the tongue, the length of the tongue being no more

than the length of the hole to thereby allow the tongue to fit within the hole when it is approximately co-planar with the tongue with the end of the tongue abutting an end wall of the hole.

References Cited by the Examiner

UNITED STATES PATENTS

1,281,615	10/18	McBreen	24—201.1
1,518,767	12/24	Anderson	24—201.1
1,525,694	2/25	Sage et al.	
2,695,139	11/54	Horvath	242—68.5
3,107,874	10/63	Wilke	242—68.5

FOREIGN PATENTS

629,254	7/27	France.
446,197	1936	Great Britain.

CHARLES W. LANHAM, *Primary Examiner.*