Dec. 23, 1941. A. P. LEWIS 2,266,876

TAPE BELT FOR SPINDLE DRIVES

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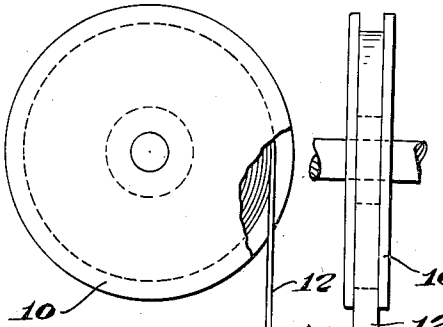

Fig. 1

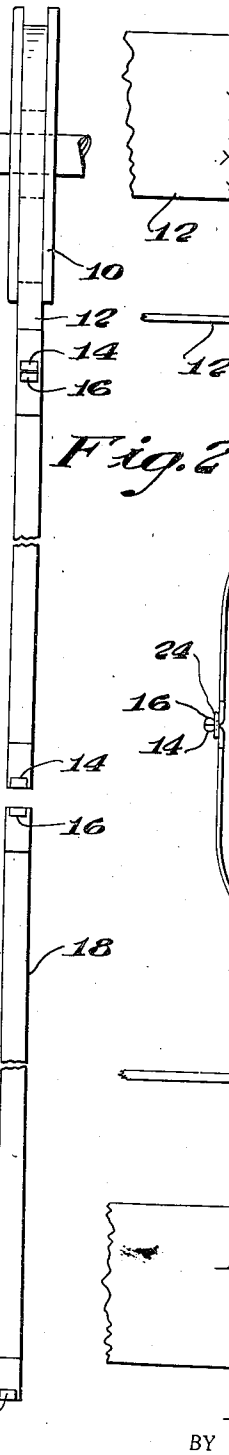

Fig. 2

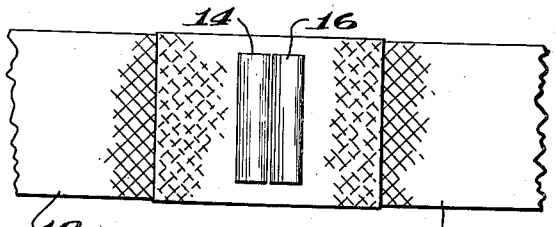

Fig. 3

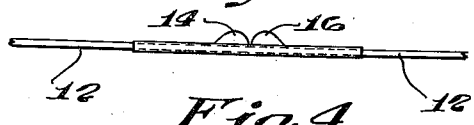

Fig. 4

Fig. 9

Fig. 10

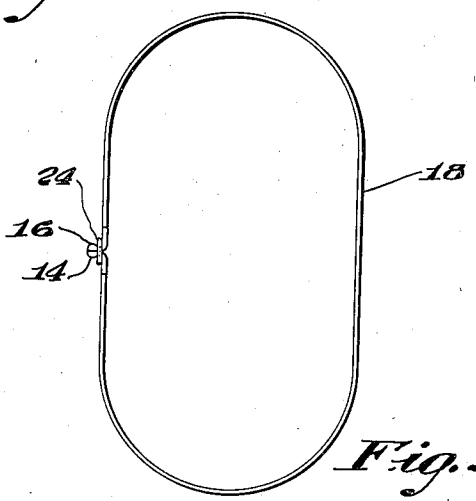

Fig. 5

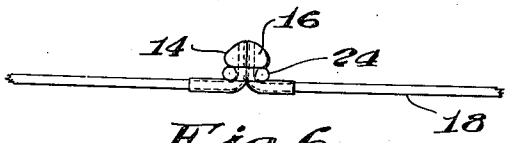

Fig. 6

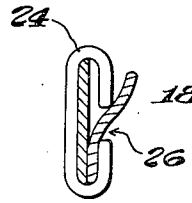

Fig. 8

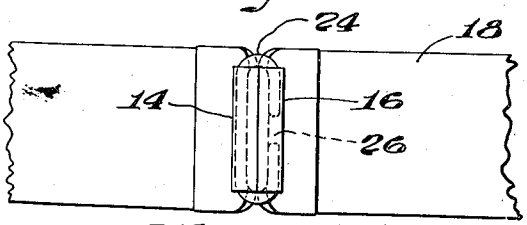

Fig. 7

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TAPE BELT FOR SPINDLE DRIVES

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Application February 6, 1940, Serial No. 317,495

7 Claims. (Cl. 74—231)

This invention relates to a tape belt for a spindle drive.

In general, the object of the invention is to produce a novel and improved tape belt for driving spindles and which possesses various advantages as will be described, over any of the prior types of tape belts heretofore employed in driving spindles.

A further object of the invention is to provide a novel construction of splice by which the abutting ends of a length of tape may be joined to produce an improved tape belt for driving spindles.

A still further object of the invention is to provide a novel tape in which provision is made for accurately defining the cutting lines upon which successive lengths of the tape may be severed from a roll of tape to produce a predetermined length of tape in a condition ready to be assembled to produce a tape belt by means of a simple connecting link.

Another object of the invention is to provide a novel method by which the belt sections for producing the improved tape belt may be produced in an accurate and efficient manner.

With these general objects in view and such others as may hereinafter appear, the invention consists in the tape belt, the splice and in the tape hereinafter described and particularly defined in the claims at the end of this specification.

In the drawing, Figs. 1 and 2 are views in side and front elevation illustrating a roll of the web from which the present belt sections may be produced in accordance with the present method; Figs. 3 and 4 are details in plan and side elevation respectively illustrating a portion of the web prior to being severed to form a belt section; Fig. 5 is a side elevation of the completed tape belt for a spindle drive, Figs. 6 and 7 are details in side elevation and plan respectively of the joint between the ends of the belt section; Fig. 8 is a sectional detail illustrating the assembly of the two ends of the tape in the connecting link; and Figs. 9 and 10 are details in side elevation illustrating a modified form of the tape and joint respectively, to be hereinafter referred to.

Prior to the present invention, various types of connectors have been proposed for joining together the ends of a tape to form an endless tape belt for use in spindle drives. Of the various methods of producing such belts, the one most generally accepted comprises a sewn type of joint between the ends of the tape section. In such a structure about 2 or 2½% of the tape length is overlapped and sewn together to produce a sewn joint. The sewing operation and the passage of the needle through the tape operates to weaken the tape so that experience has shown that many failures occur at the edge of the sewn splice and in addition, the stiffness of the overlapped sewn joint increases the power required in driving the spindle and the thickened joint itself, in passing over the spindle, operates to vary the speed of the spindle with accompanying variations in the twist of the yarn, all of which the present invention seeks to eliminate.

In addition to the sewn types of joints, various mechanical joints have been heretofore proposed including metal clips between the jaws of which the ends of the tape are pinched and also including the buckle type in which compressed jaws hold the ends of the tape. Various objections have been experienced in these mechanical types of joints, among which it may be mentioned that the joint is objectionably bulky, that the sharp metal edges are extremely dangerous to the spinner's fingers, and also that the mechanical holding of the ends of the tape operates to soon fray out the end of the tape with accompanying failure. The clamp type above referred to is objectionable in that excessive power is required and the metal clamp is exposed to impact involving the risk of producing sparking and the accompanying danger of fire and the efficiency of the joint depends to a large extent upon the degree of care with which the operator assembles and then pinches the clamp on the ends of the tape section. In addition to the objectionable features of the clamp type of mechanical joint, the buckle type has the further disadvantage of stripping the filling from the end of the tape, loosening the hold of the clamp upon the tape and producing an early failure of the tape drive.

In accordance with the present invention, a novel and improved connection is made between the ends of a length or section 12 of tape in order to produce a belt for a spindle drive by the provision of non-metallic lugs 14, 16 on the two end portions of a tape section 12 and the lugs 14, 16 are embraced by a simple connecting link 24 preferably of rounded wire and having a slot 26 through which the tape ends may be threaded during the assembly or connection of the link with the lugs. In order to reduce to a minimum any tendency of the ends of the tape to fray and in order to reenforce the same, it is preferred to impregnate the end portions of the tape with a cementitious material and to construct the lugs

14, 16 of a molded synthetic oil resisting plastic. The lugs may and preferably will be of special formation having a rounded head and when assembled, the lugs 14, 16 cooperate to form an enlarged head under which the connecting link 24 is disposed and the width of the lugs and link are desirably less than the width of the tape to reduce to a minimum any contact of the metal link 24 with the spindle.

In producing the present individual length of tape, it is preferred to first fabricate a relatively long length of tape so as to provide the spaced intervals corresponding to the length of the tape which is to form the tape belt or drive with successive pairs of lugs 14, 16 formed thereon in any suitable manner. The long length of tape may be wound on a reel 10, and in practice, at predetermined intervals along the length of the tape, these pairs of lugs 14, 16 may be molded directly thereon under heat and pressure so as to thoroughly impregnate the material of the tape with the synthetic plastic and to form the upstanding pairs of lugs transversely of the tape at intervals along the length thereof, spaced so that when the tape is severed along a line beween the lugs of each pair, there is produced an individual tape section 18 (see Fig. 2), having an individual lug 14, 16 at each end thereof and of an accurate and predetermined length ready to be used by the operator in producing an endless belt or tape drive for a spindle. In practice the two ends of the tape are threaded through the slot in the center of one end of the connecting link 24, see Fig. 8, and the tape drawn down in the position shown in Fig. 6 where the link 24 is disposed under the heads of the lugs 14, 16 and between the same and the tapes.

From the description thus far and by reference to the drawing, it will be observed that the present construction of tape belt may be economically manufactured and preferably by the present method whereby individual belt sections 18 of predetermined length may be accurately cut from the elongated web or roll of the tape. The impregnation of the end portions of individual belt sections contributes greatly to the durability of the tape belt in use and I have experienced satisfactory results utilizing a synthetic rubber marketed under the trade name "Neoprene G" and in which, in its more fluid form, can be used for impregnating the tape, and in its more solid form, can be molded into the shape required and bonded to the impregnated section. While it is preferred to use this synthetic composition, it is to be understood that other equivalent and suitable materials may be used.

As illustrated in Fig. 9, I may prefer to form the lugs 14, 16 on the surface of the section 18 which is to form the driving surface of the belt, and in connecting the two ends of the section, the same may be folded under as shown in Fig. 9 to present the lugs 14, 16 upon the non-driving surface of the belt and to present a smooth running driving surface.

Having thus described the invention, what is claimed is:

1. A belt structure adapted to have its ends connected together to form an endless belt, said structure comprising, a flexible belt section having thickened end portions which are substantially thicker than the remainder of said belt, said thickened end portions extending across at least a major portion of the ends of said belt, said bent being sufficiently flexible to enable its ends to be bent outwardly away from the driving surface of the belt with said thickened end portions in contact with each other, and a connecting link for embracing said belt ends adjacent said thickened end portions for connecting the ends of said belt together.

2. A belt structure adapted to have its ends connected together to form an endless belt, said structure comprising, a belt section having thickened end portions which are substantially thicker than the remainder of said belt, said thickened end portions extending across at least a major portion of the width of said belt but terminating short of the edges of said belt, said belt being sufficiently flexible to enable its ends to be bent outwardly away from the driving surface of the belt to position said thickened end portions in contact with each other, and an elongated connecting link extending transversely of said belt for embracing said belt ends adjacent said thickened end portions for connecting said ends of said belt together, said link being positioned on the side of said belt opposite the driving surface and having its ends terminating short of the width of said belt.

3. A belt structure adapted to have its ends connected together to form an endless belt, said structure comprising, a flexible belt section having a lug at each of its ends, said lugs providing end belt sections which are substantially thicker than the remainder of said belt and which extend across at least a major portion of said belt, said belt being sufficiently flexible to enable its ends carrying said lugs to be bent outwardly away from the driving surface of the belt and positioned adjacent each other, and a connecting link for embracing said belt adjacent said lugs for connecting said ends together.

4. A belt structure having its ends connected together to form an endless belt, said structure comprising, a flexible fabric belt section having a lug at each of its ends, said lugs being formed of plastic material bonded to the fabric of said belt and providing end belt sections which are substantially thicker than the remainder of said belt and which extend across at least the major portion of said belt, the ends of said belt section being bent outwardly away from the driving surface of the belt and positioned adjacent each other, and a connecting link embracing said belt ends adjacent said lugs.

5. A belt structure having its ends connected together to form an endless belt, said structure comprising, a flexible fabric belt section having a lug at each of its ends, said lugs being formed of resilient oil resisting synthetic plastic material bonded to the fabric of said belt and providing end belt sections which are substantially thicker than the remainder of said belt and which extend across at least the major portion of said belt, the ends of said belt section being bent outwardly away from the driving surface of the belt and positioned adjacent each other, and a connecting link embracing said belt ends adjacent said lugs.

6. A tape belt structure for spindle drives adapted to have its ends connected together to form an endless belt, said structure comprising, a textile belt section having a lug at each of its ends, said lugs being formed of resilient oil resisting plastic material bonded to the textile of said belt and providing end belt sections which are substantially thicker than the remainder of said belt and which extend across at least the major portion of said belt, said belt being sufficiently flexible to enable its ends connected to

said lugs to be bent outwardly away from the driving surface of the belt and positioned adjacent each other, and a connecting link embracing said belt ends adjacent said lugs.

7. A tape belt structure for spindle drives adapted to have its ends connected together to form an endless belt, said structure comprising, a flexible textile belt section having a lug at each of its ends, said lugs being formed of plastic material bonded to the textile of said belt and providing end belt sections which are substantially thicker than the remainder of said belt and which extend across at least the major portion of said belt, said belt being sufficiently flexible to enable its ends carrying said lugs to be bent outwardly away from the driving surface of the belt and positioned adjacent each other and a connecting link embracing said belt adjacent said lugs for connecting said ends together, said link being provided with a slot through which the textile belt may be threaded in assembling the link.

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