Feb. 2, 1937. F. H. FORD 2,069,362

FABRICATED BELT SPLICE AND METHOD OF SPLICING THE SAME

Filed Jan. 30, 1935

Fig. 1.

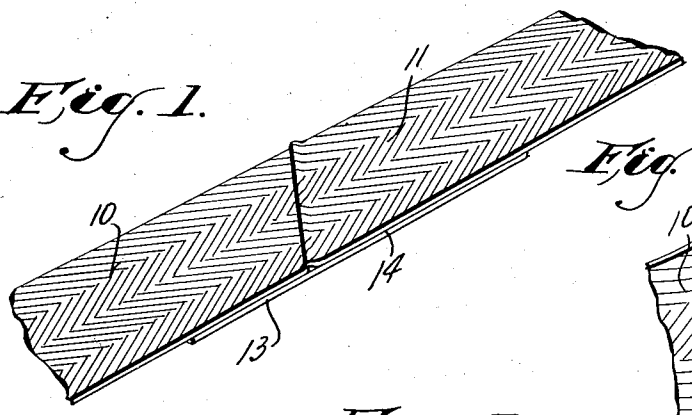


Fig. 4.

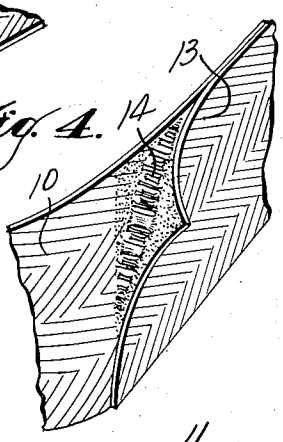


Fig. 3.

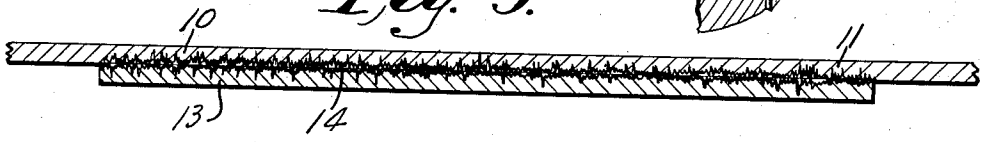


Fig. 2.

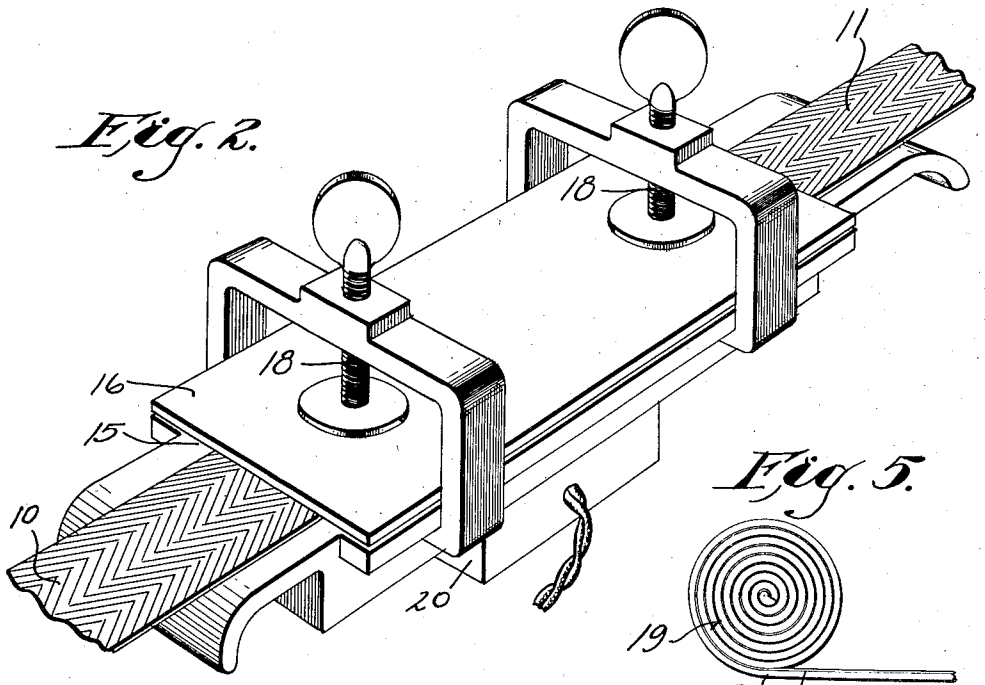


Fig. 5.

INVENTOR
Frederick H. Ford
BY Wheeler, Wheeler & Wheeler
ATTORNEYS

Patented Feb. 2, 1937

2,069,362

UNITED STATES PATENT OFFICE

2,069,362

FABRICATED BELT SPLICE AND METHOD OF SPLICING THE SAME

Frederick H. Ford, Waupun, Wis., assignor to The Shaler Company, Waupun, Wis., a corporation of Delaware

Application January 30, 1935, Serial No. 4,201

2 Claims. (Cl. 24—38)

My invention relates to improvements in fabricated belt splices and methods of splicing the same.

Twilled tape belts are commonly used on printing press conveyors and the ends are ordinarily stitched together to produce a so-called sewed splice. Such splicing has not been satisfactory for several reasons. The feeding of sheets of paper to printing and lithographing presses is a delicate operation and if the carrying surface of the belt presents frayed edges at the splice, or if such edges are covered by a reinforcing strip or otherwise coated to cover the spliced ends and broken or frayed threads, the carrying efficiency of the tape is impaired and uniformity in feeding cannot be attained unless the surface contour and friction coefficient is uniform.

Also, it has been found that these sewed joints are not durable even when reinforced on the under side. The ordinary sewed joint lasts only from six to sixteen hours. Riveting is even less satisfactory, although in some instances it has been resorted to for the reason that the splice can be more quickly made in a riveting machine than it can be made in a sewing machine, but owing to the more satisfactory operation of the sewed splice, sewing has been customarily resorted to notwithstanding the fact that for many years the splicing of tape belts has been recognized as presenting a very serious problem.

The use of glues and so-called cements is not practical for the reason that the belt is stiffened and continued flexion tends to break up the adhesions.

The object of my invention is to provide means whereby the ends of tape belts and other fabricated belts may be vulcanized together while maintaining a carrying efficiency in the vicinity of the splice equal to that of the other portions of the belt and producing a spliced joint of greatly increased durability as compared with the durability of sewed or riveted splices.

A further object of my invention is to provide means whereby a spliced joint may be produced in which the ends of a fabricated belt may be butted and vulcanized together without overlapping and without the formation of a gap between the ends of the fabric, either with or without a filler. A further object is to provide means whereby a reinforcing strip of fabric applied to the inner side of the belt, i. e., the side opposite the carrying side, may be connected by strips of rubber, pressed into the fabric during the initial stages of a vulcanizing operation and vulcanized therein after impregnation, whereby interior as well as exterior threads may be mechanically connected and anchored together by the vulcanized rubber.

In the drawing:

Figure 1 is a perspective view of the end portions of a tape belt and reinforcing strip as prepared for a splicing operation.

Figure 2 is a perspective view of a vulcanizing press as it appears when vulcanizing together the belt material shown in Figure 1.

Figure 3 is a view in longitudinal section, showing the spliced portions of the belt enlarged to approximately four times the thickness of an ordinary tape belt.

Figure 4 is a fragmentary view showing the reinforcing strip partially pulled away to show the character of the vulcanized union.

Figure 5 illustrates a rolled strip of reinforcing material as I prefer to prepare it for commercial sale.

Like parts are designated by the same reference characters throughout the several views.

The ends of the tape are cut obliquely and slightly overlapped as shown in Figure 1, the extent of the overlapping being approximately one-sixteenth to one thirty-second of an inch. I place these overelapped end portions 10 and 11 upon a strip 13 of similar material with a layer 14 of uncured rubber interposed. The uncured rubber may be applied in any suitable manner. It may be spread over one or both opposing surfaces of the fabric or it may be applied to the reinforcing strip and with suitable protection against deterioration such strips may be sold as an article of manufacture from which portions of the desired length may be cut. These portions of the tape, including the reinforcing strip, are then placed upon the platen 15 of a vulcanizing press and a clamping platen 16 is then brought down upon the tape under pressure applied in any suitable manner,—preferably by means of screws 18 as is customary in the operation of vulcanizing presses. Heat is then applied to vulcanize the uncured rubber, the latter having been pressed into the fabric to such an extent as to impregnate it to a considerable depth above and below the plane originally occupied by the rubber.

In the drawing I have indicated an electric heater at 20 whereby the lower platen 15 and the portions of the belt and reinforcing strip engaged thereby may be heated to a vulcanizing temperature for the proper length of time to thoroughly vulcanize the rubber.

The operation of the press tends to separate the ends of the tape in a spreading movement

and this results in withdrawing the overlapped portion and butting the ends in substantially an edge to edge contact along the oblique line of severance. The uncured rubber is forced by the pressure upwardly into the joint to completely enclose and embed the frayed edges or ends of the threads composing the fabric, whereby to connect the ends of the tape, said ends being also connected by a layer of vulcanized rubber extending along their under surfaces between them and the reinforcing strip. This interposed layer of rubber is pressed into the fabric to such an extent that after the vulcanizing operation it is scarcely distinguishable as an interposed layer, the threads composing the reinforcing strip being substantially in contact with those composing the end portions of the tape belt.

However, upon attempting to pull the reinforcing strip away, the stretching of the rubber connections between the threads of the tape and those of the reinforcing strip presents the appearance of innumerable distended threads and strips of rubber, each extending to and penetrating into the fabric to a considerable depth in adhesive and mechanically interlocked relation to both external and internal threads. This produces a joint of great strength and durability.

Vulcanized splices made in accordance with my improved method have a durability of many times that of an ordinary sewed splice, and the carrying surface of the tape is substantially the same in smoothness and carrying efficiency at the joint as that of any other portion of the tape, there being no frayed edges and no shoulders or other projections on the carrying surface to interfere with the operation of feeding sheets of paper or other material requiring delicate handling to insure proper delivery to a printing press or other similar receiving machine in association with which the tape is being employed as a feeder, e. g., a wrapping or folding machine.

I prefer to prepare the reinforcing strip from a strip of tape material by coating one face of it with uncured rubber and then applying a strip of holland or muslin to such coating to preserve it and prevent it from adhering to other material with which it contacts. The strip can then be wound up in the form of a roll 19 as shown in Figure 5, and it may then be stored for a considerable period of time without deterioration. When a belt is to be spliced, this strip can be unwound from the roll sufficiently to allow a reinforcing strip of the desired length to be cut away, whereupon the holland or muslin covering will be removed preparatory to placing the ends of the tape upon the reinforcing strip as illustrated in Figure 1. By the described method belts may be spliced in much less time than heretofore required, and also the required simple vulcanizing apparatus is more durable, compact and less expensive than a sewing or riveting machine.

My improved spliced fabricated belts have substantially the same flexibility in the spliced portion as in the other portions and they have a carrying surface of the same efficiency for conveying sheets of paper to printing presses and the like. They have a durability of from sixty to two hundred continuous operating hours, as compared with a durability of only from six to sixteen hours for a sewed splice. This appears to be due to the yielding characteristics of the connecting threads and strips of rubber, the embedding of threads of fabric in masses of rubber, the mechanical or interlocking anchorage of masses of rubber on the ends of the connecting threads when embedded in the fabric and the adhesions between the rubber and the threads composing the fabric.

My invention is applicable to any fibrous belt penetrable by uncured rubber under the described conditions when the splice is subjected to pressure in any ordinary vulcanizing press.

The term "fabricated belt" is to be understood to include belts formed in any manner from fibrous material.

I claim:

1. The method of splicing belts permeable by uncured rubber under pressure, consisting in slightly overlapping the ends to be spliced while maintaining the ends in sufficient proximity to allow them to be butted when subjected to pressure, applying unvulcanized rubber to the inner faces of the end portions, covering the exposed face of the rubber with a reinforcing strip of fibrous material, subjecting the joint to pressure sufficient to spread the overlapped ends until they are brought into butted relation to each other, and the uncured rubber forced into interlocking relation with the fibrous material of the belt and reinforcing strip, and heating the rubberized portions to a vulcanizing temperature.

2. A spliced fibrous carrier belt having its ends in butted pressure relation to each other, permeated and coated with vulcanized rubber to a substantial distance from said butted ends and reenforced by a strip of fabric applied to the inner faces of said end portions of the belt, said splice being also permeated along the surface in contact with the ends of the belt by portions of the same mass of rubber which coats and permeates the belt ends, whereby to prevent stretching at the joint and provide a durable splice without irregularity in the carrying face of the belt.

FREDERICK H. FORD.