Oct. 20, 1970 G. KOSLOWSKI 3,534,921

DEVICE FOR PASSING THREADS FROM A CREEL TO A BEAM WARPER

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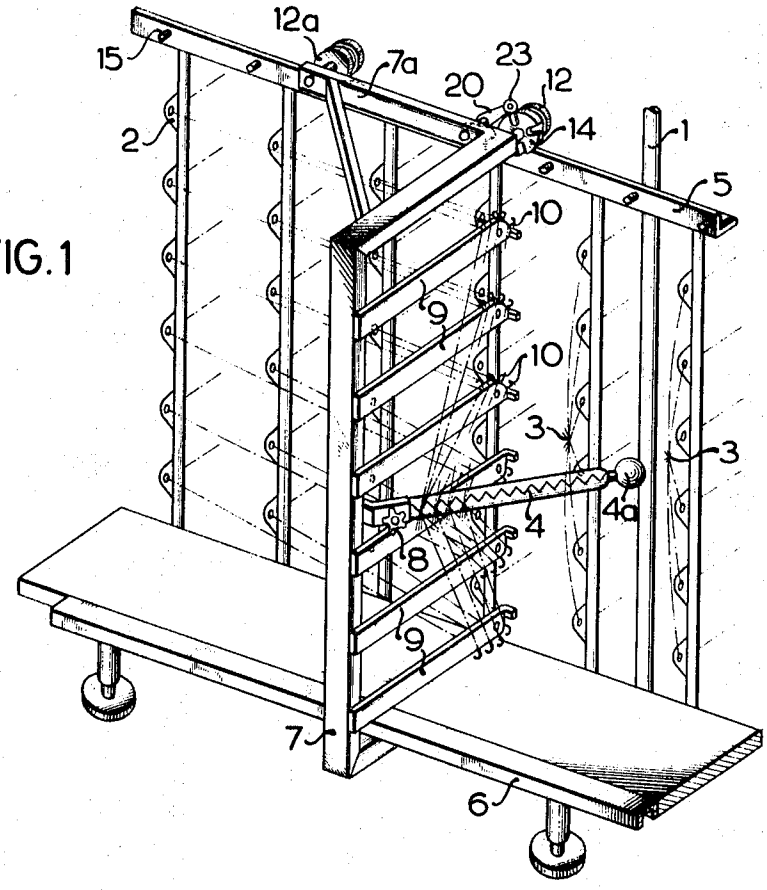
FIG.1



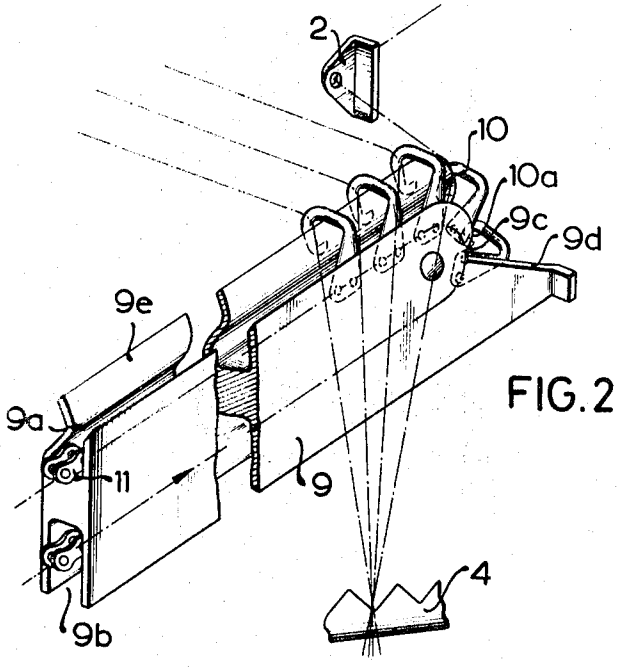


FIG.2

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FIG. 3

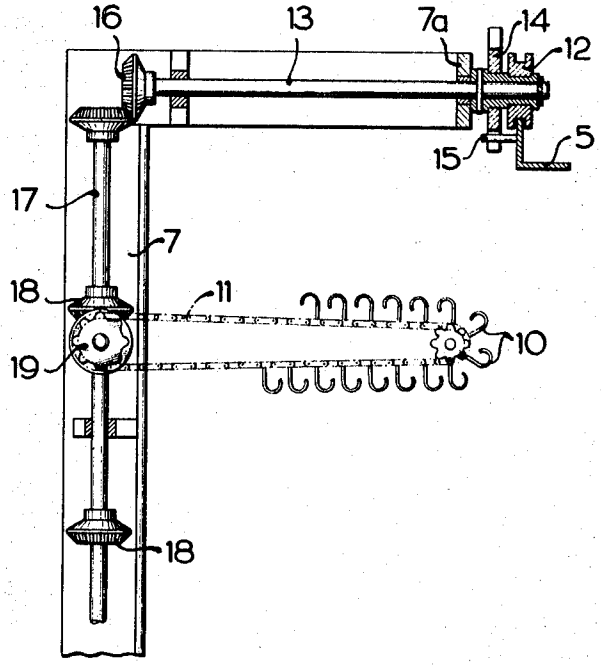
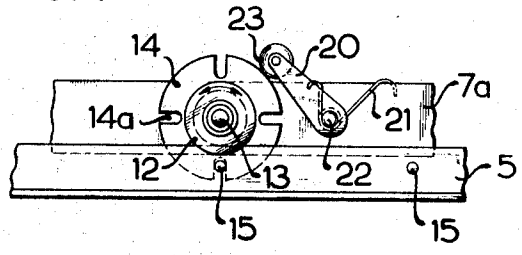


FIG. 4



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3,534,921

DEVICE FOR PASSING THREADS FROM A CREEL TO A BEAM WARPER

Gerhard Koslowski, Rheydt-Odenkirchen, Germany, assignor to Walter Reiners, Monchengladbach, Germany

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Int. Cl. D03j 5/10
U.S. Cl. 242—131 8 Claims

ABSTRACT OF THE DISCLOSURE

A beam-warper creel device having respective thread guide means vertically and horizontally spaced from one another in a sequence of vertical rows and horizontal levels, is provided with a thread holding apparatus for transferring the thread from the guide means to a warper. The holding apparatus comprises a structure for holding the threads coming from said thread guide means, which structure is perambulatory horizontally along the sequence of vertical rows. Eye bars are connected with the holder structure to travel together therewith and are correlated to respectively different horizontal levels of the said thread guide means. Each of the eye bars has a number of eyes through which respective threads from different ones of the vertical rows are to be threaded. The eyes of each bar are serially displaceable along the bar for individually threading one thread from each level of one of the respective rows.

My invention relates to a device for passing the threads from a warper creel to a beam warper machine with the aid of one or more thread holders in which the threads coming from the supply coils of the creel are held and which together with the attached threads, are to be transferred from the creel assembly to the beam warper.

A device of this type is described in U.S. Pat. 3,317,979. In this device the threads coming from vertical coil rows of the creel can be placed into one or more thread holders in order to be conjointly taken with the aid of the holder from the creel to the warper machine, thus reducing the amount of time required for properly passing the various threads onto the warper beam.

Warper creels in which several or many vertical rows of thread packages or coils are arranged horizontally behind one another require that the threads passing from the creel to the warper be deflected by guide means from their travel direction in order to prevent the threads from rearward rows to become entangled with threads from preceding rows. For this purpose, the creel equipment is provided with thread-path changing guide means located at the front side facing the warper machine and comprising an individual thread guide for each of the threads travelling from the creel to the warper. Various path-direction changing guide means are known for such purposes. For simplicity, however, the direction changing thread-guide means, regardless of their particular type or construction, are hereinafter designated as eye bars or eyes.

In cases where eye bars are needed, the insertion of the threads in accordance with the above-mentioned prior art becomes unduly time consuming because the threads must be placed individually into the respective eyes. To avoid this disadvantage, it is further known from Pat. 3,317,979 to arrange between the warper creel and the warper machine a rake-type divider member which is insertable between the array of threads that is to be transferred from the creel device to the thread-entering comb of the warper and separates the respective groups of

threads coming from adjacent creel rows respectively. The subdivision into vertical creel rows afforded by such a rake-type divider is sufficient for many applications. However, there are other requirements in practice which make it desirable to also provide for subdivision into horizontal creel rows.

For this purpose, it has become known from U.S. Pat. 3,415,463 to provide a subdividing member which is displaceable alongside the creel and which keeps the threads from the individual horizontal levels of coils at least approximately at the same height. Thus, in conjunction with the aforementioned rake-type divider, there results a separation of the threads from the creel in accordance with vertical rows and horizontal levels. In this manner, the same effect could be attained as with the use of eye bars, without involving the considerable loss of time incurred by the above-mentioned necessity of placing the threads into individual eyes. However, the various known devices for subdividing the threads require an appreciable addition in equipment and cost.

It is an object of my invention to minmize such additional amount of equipment and cost without incurring the disadvantage of undue loss of time.

To this end, and in accordance with a feature of my invention, the yarn holder means are indirectly or directly connected with eye bars which are displaceable alongside the creel and whose individual eyes, each having a thread opening or gap, are shiftable on the eye bars in such a manner that the threads passing from the creel to the yarn holder and appertaining to the respective horizontal levels of the vertical coil rows are individually and sequentially engageable by the eyes of the appertaining eye bars.

As mentioned above, the term "eye" is understood to refer to any means capable of guiding an individual thread. Consequently, the term includes not only correspondingly curved hooks, curlicues (pigtail hooks) or the like, but for example, also screw-thread spindles which are covered by a bar and into whose individual screw turns the threads are placed; the term "eye" may also refer to notched bars in which the threads are guided by means of a lifting bar to pass from one notch to the next. When using eyes constituted by covered screw-thread spindles, the shifting of the threads on the eye bars may be effected, if desired, by revolving the threaded spindle in the desired sense. The eye bars coordinated preferably to the individual levels of the creel coil arrangement can be displaceable along the creel either individually or conjointly. In the latter case the eye bars are preferably mounted on a frame structure. The yarn holders for transferring the threads on the creel to the warper are connected with the eye bars, either directly or by being attached to the frame or the wheeled carriage structure on which the bars or the frame are supported.

If the eyes, as mentioned, are constituted by covered screw spindles, these spindles have one turn freely exposed at the end closest to the creel. The thread is taken up by this exposed turn and is then shifted under the covering bar as the spindle is being turned. However, if the eyes consist of the conventional hook-shaped structures, it is preferable to facilitate threading of the threads into the respective eyes by guiding the eyes on the eye bar along a path so shaped that the eyes change their travel direction at the locality closest to the creel. For this purpose, the travel path of the eyes may be U-shaped or V-shaped, for example, and may extend in a horizontal, vertical or slanting plane. Preferably, the path of the eyes is arranged in a vertical plane and extends aong the top side and the bottom side of the eye bar, passing around the front end of the bar that faces the creel. In this case the eyes are guided around the front

end as they pass from the bottom to the top or conversely from top to bottom of the eye bar, and during such change in direction the hook-shaped eyed catch with their threading gaps over the individual threads then situated at that locality.

To facilitate such threading operation it is further of advantage according to the invention, to provide the eye bar with a contour which guides the threads in front of the threading gap of the hook-shaped eyes at the locality where the eyes change their travelling direction as described above.

To make certain that only one thread at a time is placed into an individual eye, care must be taken when moving the eye bar along the creel, that the individual eyes after seizing the thread are moved away from the threading-through range. For this purpose it is particularly advantageous to perform or control the travel of the eyes on the guide path of the eye bars in dependence upon the travel of the eye bars horizontally along the creel. This is done, for example, by connecting the eyes through driving members with switching means which, during the longitudinal travel of the eye bars, effect a displacement of the eyes.

The above-mentioned and further objects, advantages and features of my invention, said features being set forth with particularity in the claims annexed hereto, will be apparent from, and be further elucidated by, the threading and thread transfer device for warper creels illustrated by way of example as an embodiment of the invention and on the accompanying drawings, in which:

FIG. 1 is a perspective view of part of the warper-creel device;

FIG. 2 is a partly sectional and perspective view on larger scale of an eye bar which forms part of the equipment shown in FIG. 1 and constitutes essentially the end portion of one of the eye bars at the locality directed toward the creel;

FIG. 3 is a schematic and partly sectional view of a device for moving the eyes along the guide path of the eye bars in dependence upon longitudinal movement of the eye bars along the creel; and

FIG. 4 shows a detail of FIG. 3 along the section line IV—IV indicated in FIG. 3.

Referring to FIG. 1, there is shown a vertical standard **1** which forms part of the outer frame of the creel structure on which an array of creel coils are arranged, preferably on an inner frame, in the conventional manner. Details of the creel structure and the arrangement of coils are not illustrated. If desired, reference as to these features may be had, for example, to the above-mentioned U.S. Pats. No. 3,317,979, No. 3,377,677 and No. 3,415,-463.

The threads coming from the respective supply coils of the creel are passed through thread tensioners and thread-guide eye means **2** in the conventional manner and subsequently the threads from each vertical row are twisted or knotted together at the localities denoted by **3**. Up to this point the insertion of the threads may be effected by hand or by automatic means such as described, for example, in U.S. Pat. No. 3,317,979. For transferring the threads from the warper creel to the warper machine (not illustrated) the threads are placed into thread holders **4**. In the illustrated embodiments all of the threads appertaining to a vertical creel row are simultaneously placed into a holder **4**; and the threads from different creel rows, commencing from the rear, are placed consecutively besides each other into respective notches of the holder. As will be seen from FIG. 1, the thread holder **4** is fastened by means of a manually operable screw **8** to a wheeled frame structure **7** which is displaceable along fixedly mounted rails **5** and **6**. The manually operable screw **8** permits loosening the holder **4** from the wheeled frame structure **7**, a handle **4***a* being provided at the free end of holder **4** to facilitate manipulating or carrying the holder.

Individual eye bars **9** are fastened to the travelling frame **7**. Each eye bar carries a number of eyes **10** which are displaceable along the bar. As is apparent from FIG. 2, the particular eyes **10** in the illustrated embodiment are hook-shaped and are guided along a path which extends along the top **9***a* and the bottom **9***b* of the eye bar **9**. During travel, therefore, the eyes pass around the front end **9***c* of the eye bar facing the creel. An endless transport chain **11** serves to move the eyes **10**. The chain **11** is guided between the lateral walls of the eye bars. Its links carry the respective eyes **10**. It will be seen that the eye bar has a particular contour **9***d* which guides the thread in front of the threading gap **10***a* of the one eye **10** that is to receive the thread. As soon as the chain **11** moves an eye **10** to the top **9***a* of the eye bar, the threading gap **10***a* is covered by a correspondingly shaped portion of the side wall **9***e* so that the thread cannot jump out of the eye gap **10***a* during continued travel of the eyes even in the event of vibrations.

FIGS. 3 and 4 show an example of a drive mechanism for moving the transport chains **11** and consequently the individual eyes **10** along the path on the eye bar while the eye bars travel longitudianlly, i.e., horizontally along the creel assembly. To be seen in FIG. 3 is the upper portion of the wheeled frame **7** which has a running wheel **12** resting upon the upper rail **5**. In the illustrated embodiment the wheel **12** is freely rotatable on its shaft **13** on which a Geneva gear **14** is fixedly secured. During travel of frame **7** along rail **5**, the recesses **14***a* of the Geneva gear **14** sequentially engage with pins **15** of the rail **5** so that the Geneva gear **14** is shifted one division by engagement with each of the pins. This intermittent rotation of the Geneva gear **14** is transmitted through the shaft **13** and a spur gear transmission **16** to a vertical shaft **17** on which a further spur gear transmission **18** is arranged at the height of each of the respective eye bars. Each gear transmission **18** imparts rotation to a chain sprocket **19** engaged by the chain **11** for displacing the eyes **10** of the eye bar **9**.

Also visible in FIG. 4 is the portion **7***a* of the frame **7** which extends to the second running wheel **12***a* (FIG. 1). Journalled on frame portion **7***a* is an arm **20** which is biased by a spring **21** counterclockwise with respect to the pivot **21** of the arm **20**. The free end of the arm **20** carries a rotatable roller **23** engaging the periphery of the Geneva gear **14** and snapping each time into one of the recesses **14***a* to thus arrest the gear so that the gear **14** moves only by engagement with the pins **15** but not in any uncontrolled manner.

At the beginning of the threading operation, the travelling frame **7** with the eye bars **9** is located at the rear of the creel assembly, that is at the left end of the equipment illustrated in FIG. 1. The attending person seizes the junction **3** of the threads coming from the rearmost vertical row of thread guides **2** and places these threads conjointly into the first, left-hand notch of the thread holder **4**. During travel of the frame **7** to the right and hence toward the warper, each individual thread extending out of the eyes **2** is engaged by the contour **9***d* located at the creel-side end **9***c* of the eye bar **9**. The thread is thus guided in such a manner that it is located in front of the threading gap **10***a* of the most forward eye **10** which is being simultaneously shifted by the chain **11**, this eye being the hook shown in FIG. 2 in the fourth place counted from the left. FIG. 2 relates to an eye bar in the upper half of the warper creel in which the threads pass downwardly to the holder **4** and consequently the eyes **10** travel from the bottom to the top of the eye bar **9**. In those eye bars that are located in the lower half of the creel, the eye bar has a mirror-symmetrical design so that the eyes **10** travel downwardly and the contour **9***d* is located at the top side.

With each next following vertical row of thread groups coming from the creel, the above-described operation is

repeated until the threads from all of the vertical rows of guides **2** are threaded through the eyes **10**.

Thereafter, the screw **8** is loosened and the yarn holder **4** is removed from the eye bars and taken to the thread divider comb of the warper machine. As a result, all of the threads are simultaneously transferred from the creel to the comb of the warper. During this operation the eye bars **9** are located at the front side of the creel assembly where they remain during the entire warping operation and thus maintain the desired separation of the threads. As soon as a new change of thread material is needed, the frame **7** with the eye bars **9** is shifted back toward the rear (to the left in FIG. 1), and the Geneva gear mechanism then takes care of returning the individual eyes **10** to their initial positions.

To those skilled in the art it will be obvious upon a study of this disclosure that, with respect to structural details and arrangement, my invention permits of various modifications and hence may be given embodiments other than particularly illustrated and described herein, without departing from the essential features of the invention and within the scope of the claims annexed hereto.

I claim:

1. With a beam-warper creel device having respective thread guide means vertically and horizontally spaced from one another in a sequence of vertical rows and horizontal levels, the combination of thread holding apparatus for transferring the thread from said guide means to a warper, said apparatus comprising thread holder structure for holding the threads coming from said thread guide means, said structure being perambulatory horizontally along said sequence of vertical rows, eye bars connected with said holder structure to travel together therewith and correlated to respectively different levels of said vertical rows, each of said eye bars having a number of eyes through which respective threads from different ones of said rows are to be threaded, said eyes of each bar being serially displaceable along the bar for individually threading one thread from each level of one of said respective rows.

2. Apparatus according to claim **1**, comprising a perambulatory carrier and fixedly mounted travel guide means which define for said carrier a travel path horizontally along said sequence of vertical rows, said thread holder structure being mounted on said carrier when said eye bars are in operation, and said eye bars being also mounted on said carrier in respective vertically sequential levels corresponding to those of said thread-guide means.

3. In apparatus according to claim **1**, each of said eye bars forming an endless guide path for said eyes, said path having a locality of directional change at the creel-side end of said bar.

4. In apparatus according to claim **3**, said guide path extending along the top and bottom of said eye bar and passing about the creel-side end of said eye bar.

5. In apparatus according to claim **4**, said eyes having a gay adapted to permit threading the thread through the eye, and said eye bar having near said locality of directional change a guide contour engageable by the thread for leading it into said threading gap of the eye.

6. In apparatus according to claim **3**, said eye bar comprising drive means for moving said eyes, and control means for controlling said drive means to move said eyes along said guide path in depenence upon the travel of said eye bars along said sequence of vertical rows.

7. Apparatus according to claim **6**, comprising fixedly mounted travel guide means which define a travel path for said carrier, said drive means of said eye bar having an endless chain extending horizontally along top and bottom sides of the eye bar, and sprocket gears engaging said chain; and said control means being coupled with one of said sprockets and comprising control members mounted along said travel path defined by said carrier guide means.

8. In apparatus according to claim **7**, said carrier guide means comprising a horizontal rail, said control members being mounted on said rail, and a Geneva gear mechanism in driving connection with said one sprocket and engageable by said control member to be intermittently rotated thereby as said carrier advances along said rail.

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LOUIS K. RIMRODT, Primary Examiner

U.S. Cl. X.R.

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