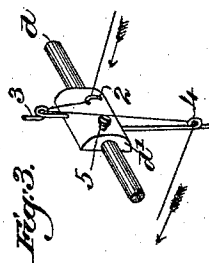
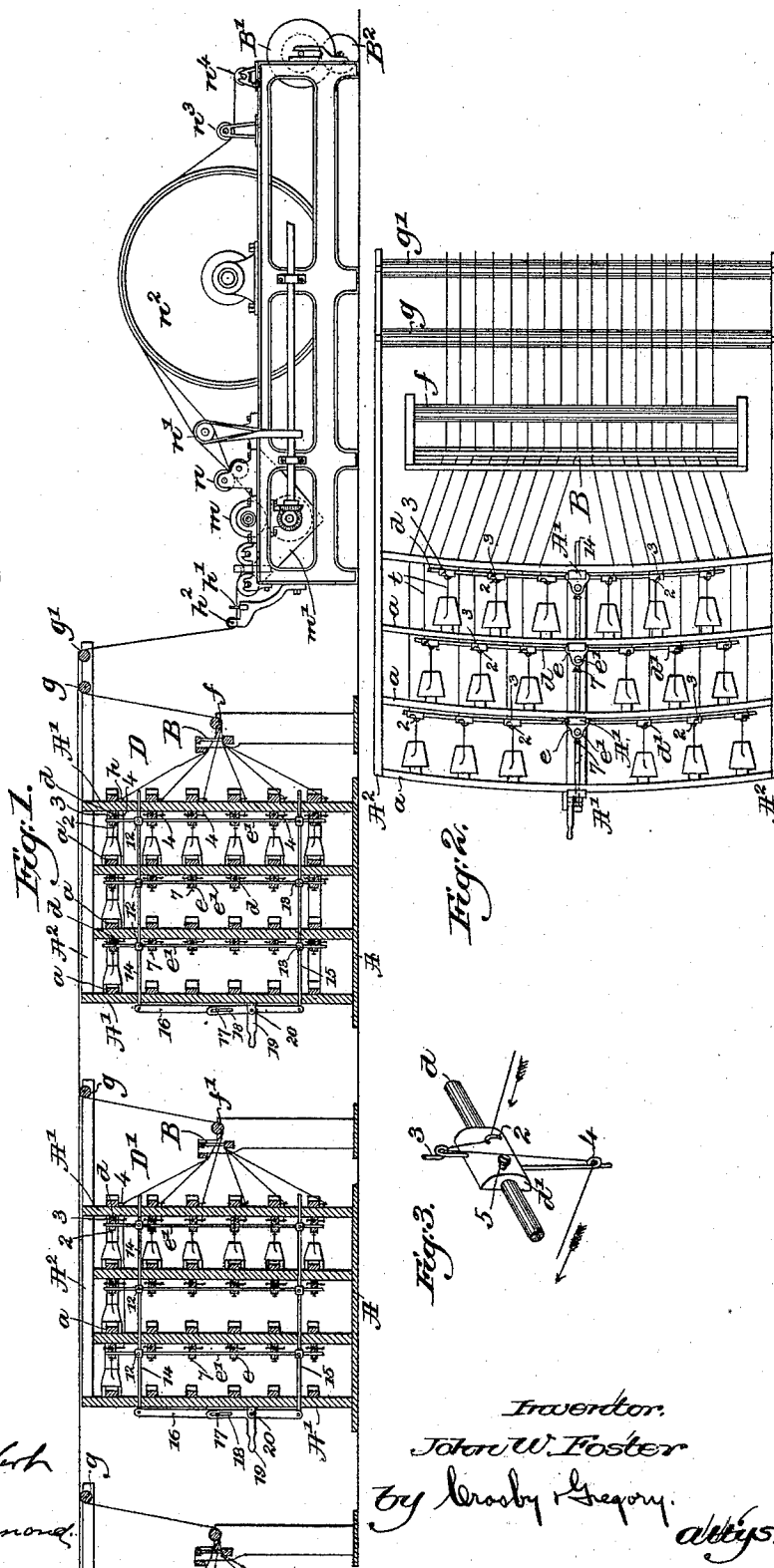
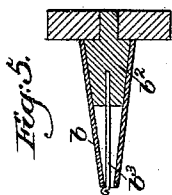
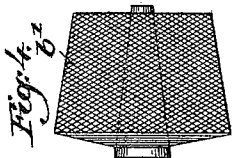


(No Model)

J. W. FOSTER.
MECHANISM FOR HANDLING WARP THREADS.

No. 585,266.

Patented June 29, 1897.



Witnesses.
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UNITED STATES PATENT OFFICE.

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MECHANISM FOR HANDLING WARP-THREADS.

SPECIFICATION forming part of Letters Patent No. 585,266, dated June 29, 1897.

Application filed March 13, 1895. Serial No. 541,556. (No model.) Patented in England July 6, 1893, No. 13,216.

To all whom it may concern:

Be it known that I, JOHN W. FOSTER, of Westfield, county of Hampden, and State of Massachusetts, have invented an Improvement in Mechanism for Handling and Treating Warp-Threads, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing
5 like parts, my invention to be herein described and claimed having been patented in British Patent No. 13,216, dated July 6, 1893, as a communication from me.

This invention has for its object the production of improved mechanism for handling and treating warp-threads in the production of loom and other warp-containing beams.

In order to provide a loom-beam with warp-thread, the thread has to go through a series
20 of preliminary steps. Commonly the thread is spun on a ring-frame and is wound during the spinning operation onto bobbins carried by spindles of the frame, these bobbins containing thread being then taken to the spooling-machine, where, put into bobbin-holders
25 or otherwise suitably supported, the threads are unwound from the bobbins and wound upon wooden spools having heads at each end, each spool receiving the thread from twelve
30 to fifteen bobbins, according to the size of the thread, the thread being wound on the spool after the manner of winding commercial spools of thread, wherein each layer is composed of a series of coils of thread laid
35 side by side directly around and substantially at right angles to the axis of rotation of the spool. From three hundred and fifty to six hundred of these headed spools, according to the size of the warp, are taken to and put into
40 a warper-creel, where they are so mounted as to rotate about horizontal spindles or supports, and the ends of the thread from the spools are led through the usual reed of the warping-machine, and said ends are secured
45 to a section-beam, and the section-beam lying on the drum of the warping-machine is rotated, causing the thread to be pulled sufficiently to rotate the spools, the spool-threads being wound on the section-beam. In this
50 old plan it is estimated that from one-half to three-quarters of the effective strength of the

thread is consumed in rotating the spools, and it will be remembered that this strain, due to a change in diameter of the yarn load and consequent change in the speed of rotation
55 of the spools, is constantly varying as the section-beam is being filled, and owing to the limited strength of the thread it becomes practically impossible to use more than about one pound of thread on each spool, and, further,
60 the fact that the thread has to furnish the power to rotate the spool limits the speed at which the beam may be rotated. This old method of warping now universally practiced necessitates the employment of spools,
65 and it is not infrequent for single corporations to have invested in spools alone from fifty thousand to one hundred thousand dollars, and these spools, owing to the frequent
70 breaking of their heads, have constantly to be made good by new spools. The weight of thousands of these spools and the space required for their storage are items of very
75 considerable importance. In this old method one set of spools will furnish thread for but one section-beam, but it will be remembered that from four to eight section-beams are
80 required to fill a loom-beam. After a section-beam has been filled in the usual way an operator cuts the mass of warp-thread
85 transversely between the usual reed at the front of the creel-frame and the section-beam, and with the aid of an assistant the full section-beam is taken away and an empty section-beam is put in its place in the machine.
90 The new section-beam having been put into place, the ends of the threads left hanging at the reed are confined to the empty section-beam in usual manner, and then usually two girls, one at each side of the warp-creel, break
95 the threads separately at or near the spools, remove the more or less exhausted spools, and tie the ends of the threads of new spools to the ends of the threads left by breaking the warp, as stated, and the girls then put the full
100 spools in place in the creel, this operation requiring for each section-beam from one and one-half to two hours of the time of two girls, and, what is of great importance during such time, the product of the warping-machine is lost. The proper number of section-beams having been wound with thread, the said

beams are mounted in bearings of a suitable frame at the end of a sizing-machine or slasher, and the threads from the several section-beams are drawn down into the size and are led over past or in contact with suitable drying apparatus, and the threads are then wound upon a loom-beam. In this operation above described the loss of thread due to the fact that more thread is contained upon the section-beams than can be put upon a loom-beam is a very material item in a mill.

The object of this invention, which has been made subject of British Patent No. 13,216, dated July 6, 1893, is to provide apparatus whereby the beam, whether a loom or other beam, containing warp-thread may be provided with such threads by fewer operatives and at much less cost in labor and with less waste of stock, and in fact I may provide a loom-beam with thread and omit the usual warping operation or the operation of putting the thread on a section-beam, yet some of my improvements are of benefit in the regular operation of filling a section-beam.

Figure 1 shows a slasher with a plurality of creel-sections, each section being supposed to supply enough warp-thread to fill an ordinary section-beam, the creel-sections being in longitudinal section. Fig. 2 shows in plan view a creel-section chiefly to show the adjustable guide and tension mechanism, which is made adjustable or variable to accommodate for difference in size of the non-rotating thread masses. Fig. 3 shows, enlarged, one of the thread-guides and cooperating tension device for one warp-thread. Fig. 4 shows a non-rotating thread mass such as I prefer to use. Fig. 5 shows the shell or cone on which the thread is wound in large masses by cross-winding and the shell-holder.

In accordance with my improved method I take bobbins, or it may be cops of thread, produced in any of the usual methods of spinning, and while they are suitably supported I cause the thread of from sixty to one hundred and twenty bobbins to be wound in succession upon a shell or cone *b*, preferably of paper, (see Figs. 4 and 5,) the said shell during the winding operation lying on a drum or shell, a suitable thread-guide, through which the thread passes, being moved quickly in such manner as to lay the thread after the manner of cross-winding—that is, layer after layer of the thread will be made to cross one the other in long spirals, substantially as provided for in the machines described in United States Patents Nos. 459,039 and 459,040, heretofore granted to me, the large thread masses *b'*, formed each from a great number of bobbins, being taken directly to a creel or to creel-sections *D D'*, &c., the shells or cones containing said thread masses being applied to supports *b''*, which are of suitable construction to prevent the rotation of the shells or cones and thread masses during the unwinding of the thread therefrom, the threads being drawn off the ends of the said masses.

The creel-frame will preferably be arranged in sections, each section containing a sufficient number of thread masses to fill a section-beam, and the sheets of warp-threads are led over suitable rods or rolls through a reed and to any usual slasher or to a beam.

I will now describe one creel, all being alike. The base *A* of the creel has erected on it suitable uprights *A'*, preferably three rows of uprights in the direction of the width of the creel-frame. The upper ends of the uprights at the outer sides of the frame are joined together at top by suitable longitudinal girths *A''*, the said girths being connected across the creel-frame by cross-girths *a* at suitable distances apart, said cross-girths being connected to the upper ends of the uprights *A'* whatever the number of rows used. Each cross-girth *a*, except the foremost one, has secured to its front side at suitable distances apart the supports *b''* for the shells or cones, which are held on said supports by suitable holders *b'''*, shown as spring-arms, to engage the shells or cones and prevent them from being drawn off the supports. These supports, tubes, or shells, and yarn masses being all alike, I have deemed it unnecessary to show all of them in the drawings, and in practice each bar *a* will or may carry any desired or suitable number of yarn masses, the number used depending on the size of the warp and of the beam to be wound. The devices *B* are ordinary reeds and the device *B'* a warp-beam, it in practice lying on and being rotated by a drum *B''*, rotated in any usual manner, said reed, beam, and drum and their operative parts being all as common in usual slashers and also in warping-machines. The creel-frame contains a series of rails *d*, (see Figs. 1 and 2,) one for each row of thread masses, said rails having mounted on them thread-guides and tension devices, as best shown in Fig. 3, where the parts are enlarged.

The tension devices shown consist in this present embodiment of my invention of eyes 3 and 4, through which the thread *t* passes from the thread-guide 2, also shown as an eye, all the eyes being on a plate or carriage *d'*, preferably made longitudinally adjustable on the bars *d* and being held in adjusted position by a suitable device, as a screw 5. These bars are each shown as carried by a metal or other block *e*, represented as bifurcated or notched at one side to enable it to reach partially about an upright *A'* when the guide and tension device is farthest from the delivery end of the thread masses, as when the latter are full of thread. The blocks *e* are connected each by a suitable screw 7 with an upright rod *e'*, said upright rods being firmly attached to slide-rods 14 15 by coupling-blocks 12 13, held in place by suitable screws, the slide-rods being connected at one end to a strong arm 16. The arm 16 has, as shown, a pin or projection 17, which enters a slot 18 in an actuating device 19, shown as a lever pivoted on a suitable ear or lug 20, shown as con-

nected to the creel-frame, the movement of said actuating device enabling the bars d , with their attached thread-guides and tension devices, to be moved toward and from the delivery ends of the thread masses, as required, they being gradually brought closer to said ends as the thread masses decrease in diameter, this being necessary to insure equal draft and tension.

The movement of the thread-guides toward the delivery ends of the thread masses as the same become exhausted is of very great moment, such construction enabling the proper angle of delivery of the thread from the thread masses to be maintained, so that the thread coming from the masses will not by its friction on the ends of the thread masses tend to unduly retard the delivery of the thread, nor will the strain be such as to let too much of the thread be pulled off.

Each cross-bar a at the delivery end of the creel, there being such a bar for each set of yarn masses in the same horizontal plane, is provided with a stationary series of thread-eyes h , one eye preferably for each thread of the thread masses in each horizontal plane of thread masses, or, in other words, each thread t is led to the front of the creel-frame, where it is passed through one of the eyes h , the said eyes collecting all the threads of the thread masses and delivering them into the spaces of the reed B.

The threads from the thread masses in one creel-section, as D or D', are led from the respective reeds of said sections under suitable rods f or f' and then over one or more rods or rolls g g' , under a rod h^2 , and through a reed h' , and thence through between suitable rolls and between sizing-rolls m in a suitable size-
vat m' , thence between rolls n , after which the warp-threads are separated by a suitable lease rod or roll n' and pass to the drying-drum n^2 , heated by steam in usual manner, and under and over rolls n^3 n^4 to the beam B'.

By the term "rod" or "rods" used in the claims I intend to cover any rod, roll, or bar capable of supporting and sustaining in a horizontal plane a sheet of warp-threads.

This invention is not limited to the exact number of creel-sections, nor to any particular number of thread masses, nor to the exact construction shown for the slasher, nor is the invention limited to the exact shape of the thread-guide 2 to lead the thread from the non-rotating thread mass so long as it is movable, nor to the exact tension devices shown.

The thread-guides of each creel-section, as well as the tension devices, are shown as controlled or adjusted simultaneously or by a single operation, and the actuating devices for moving the said thread-guides may be varied, and other forms of said devices used with only the exercise of mechanical skill and not invention.

The thread might be led from the reed h' directly to be wound on the beam B'.

Having described my invention, what I

claim as new, and desire to secure by Letters Patent, is—

1. A creel-frame having a series of supports constructed to receive a series of cross-wound thread masses, a series of bars provided with a series of thread-guides constructed and arranged to always stand one substantially in front of and in line with the center of each of said thread masses, and means to simultaneously move said thread-guides toward the said supports as the diameters of said thread masses decrease from unwinding, substantially as described.

2. A creel-frame having a series of supports constructed to receive a series of cross-wound thread masses, a series of bars provided with a series of thread-guides constructed and arranged to always stand one guide substantially in front of and in line with the center of a thread mass, said bars being provided also with a series of tension devices; and means to simultaneously move said bars with their attached thread-guides and tension devices toward the said supports as the diameters of the thread masses decrease from unwinding, substantially as described.

3. A creel-frame having a series of supports constructed to receive a series of large thread masses, a series of bars provided with a series of thread-guides constructed and arranged to always stand each thread-guide substantially in front of and in line with the center of a thread mass, means to simultaneously move said thread-guides toward the said supports as the diameters of the thread masses decrease from unwinding, and thread-eyes located at the front of the creel to receive the threads from the thread-guides, and a reed to receive the threads from the thread-eyes, substantially as described.

4. A series of creel-sections arranged one behind the other, each section presenting a plurality of supports adapted to receive a series of shells containing large masses of thread adapted to be unwound therefrom while said thread masses are stationary, a series of guides to receive and guide the threads from said thread masses, said guides being arranged to always stand each substantially in front of and in line with the center of a thread mass, and a rod, as g , at the top of each creel-section to receive and support the threads coming from the thread masses mounted on it, a sheet of threads coming from one creel-section being led over the rod of a creel-section next in advance of it, whereby the different sheets of thread from the several creel-sections are brought together, and a beam to receive the threads from the said creel-sections, substantially as described.

5. A series of creel-sections arranged one behind the other, each section presenting a plurality of supports adapted to receive a series of shells containing large masses of thread adapted to be unwound therefrom while the said masses are stationary, a series of guides to receive and guide the threads from said

thread masses, a series of thread-eyes located at the front of each creel-section, a rod at the top of each creel-section to receive and support the threads coming from the thread masses mounted on it, a sheet of threads coming from one creel-section being led over the rod of a creel-section next in advance of it, whereby the different sheets of thread from the several creel-sections are brought together, and a beam to receive the threads from the said creel-sections, substantially as described.

6. A series of creel-sections arranged one behind the other, each section presenting a plurality of supports adapted to receive a series of shells containing large masses of thread adapted to be unwound therefrom while the said masses are stationary, a series of guides to receive and guide the threads from said thread masses, a series of thread-eyes located at the front of each creel-section, a reed and a roll, as f' , combined with a series of rods, as g , one at the top of each creel-section to receive and support the threads coming from the thread masses mounted on it, a sheet of threads coming from one creel-section being led over the rod of a creel-section next in advance of it, whereby the different sheets of thread from the several creel-sections are brought together, and a beam to receive the threads from the said creel-sections, substantially as described.

7. A series of creel-sections arranged one behind the other, each section presenting a plurality of horizontally-arranged supports adapted to receive a series of shells containing large masses of thread adapted to be unwound therefrom while said thread masses are stationary, a series of guides to receive and guide the threads from said thread masses, means to simultaneously adjust said thread-guides toward the centers of said thread masses as they decrease in diameter, a rod at the top of each creel-section to receive and support the threads coming from said creel-sections, whereby a sheet of threads coming from one creel-section may be led over the next creel-section in advance of it,

a roll to receive and bring into one plane the different sheets of thread from the several creel-sections, and a beam to receive the thread from all of said creel-sections, substantially as described.

8. A series of creel-sections having supports constructed to hold a series of thread masses arranged in different horizontal planes, a series of bars provided with a series of thread-guides, each guide being located substantially in line with the center of one of said thread masses, devices to simultaneously move the said series of guides toward the said thread masses as they decrease in diameter; a reed and a rod at the end of each creel-section, a second rod, as g , located at the end of each of said sections, said rods g supporting the sheet of threads coming from its own creel-section, and the creel-section next back of it, and a third independent rod, as g' , on which all the threads coming from the said creel-sections are brought and deposited, and a beam to receive the said threads, substantially as described.

9. A creel-frame having supports constructed to sustain a series of shells or cones containing large masses of thread capable of being delivered from the ends of said masses while stationary, a series of bars provided with a series of thread-guides, one for each of said thread masses, thread-eyes located at the front of the creel-section to receive the threads after passing through said thread-guides, a roll, as f' , to bring into one plane the series of threads from the said thread masses, and a roll, as g , located at the top of the creel-section over which the sheet of threads is passed, and a beam on which the said sheet of threads is wound, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN W. FOSTER.

Witnesses:

GEO. W. GREGORY,
EMMA J. BENNETT.