

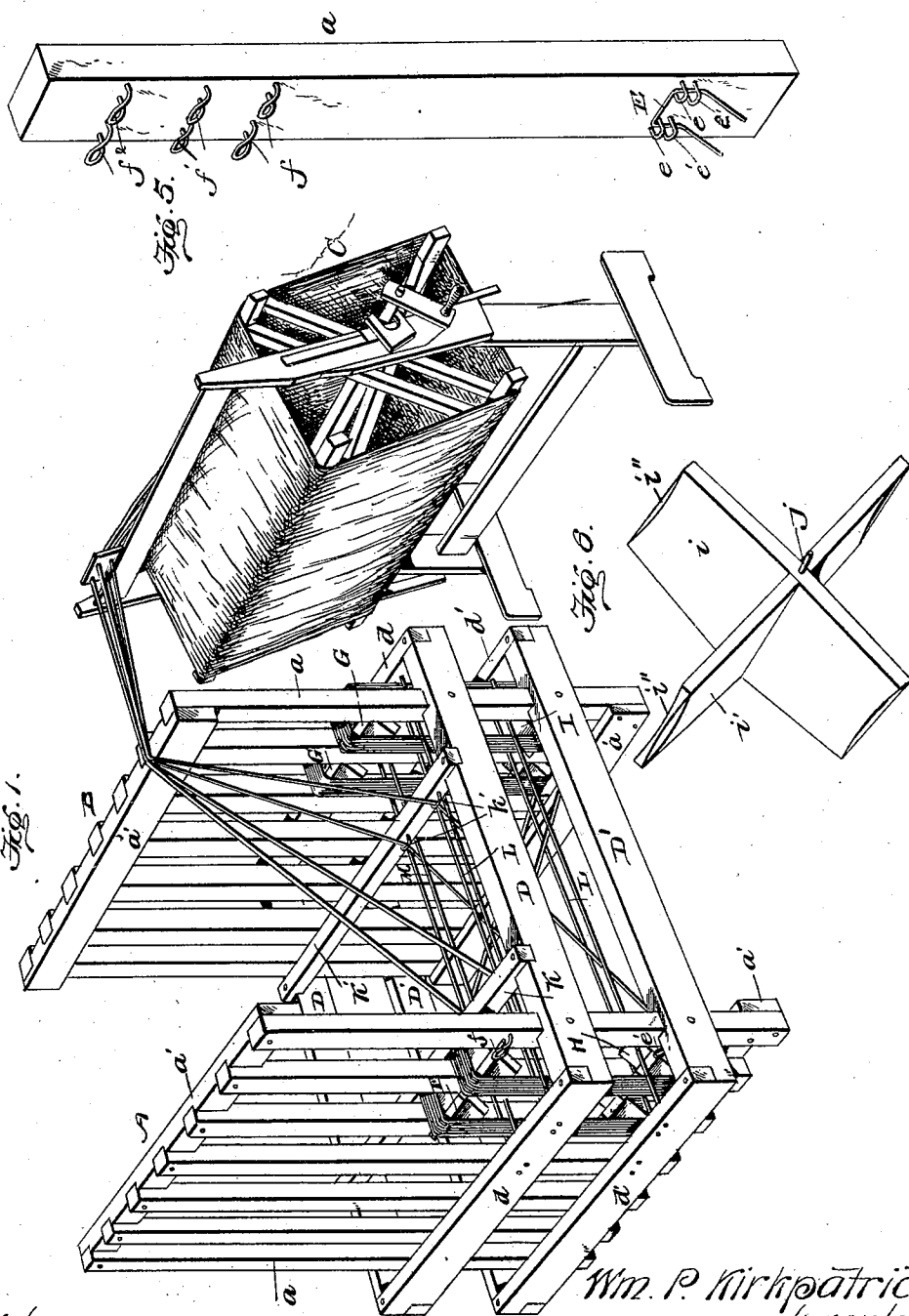
(No Model.)

2 Sheets—Sheet 1.

W. P. KIRKPATRICK.
SKEIN WARPING MACHINE.

No. 555,646.

Patented Mar. 3, 1896.



Witnesses:

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H. E. Perkins

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(No Model.)

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Fig. 2.

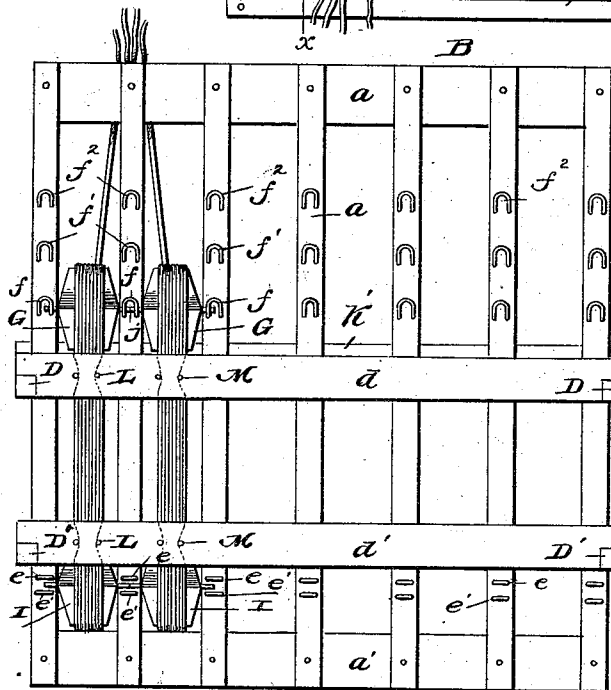
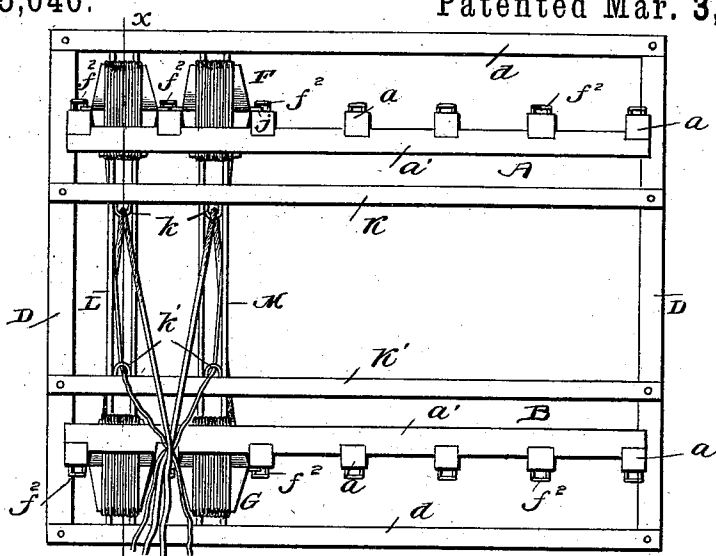


Fig. 3.

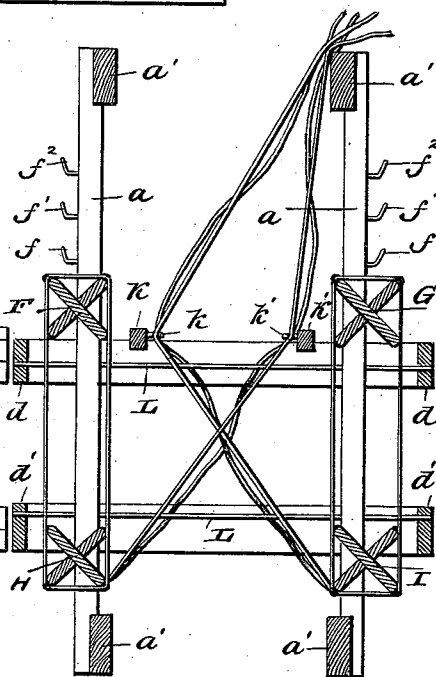


Fig. 4.

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UNITED STATES PATENT OFFICE.

WILLIAM P. KIRKPATRICK, OF ARROWSMITH, ILLINOIS.

SKEIN WARPING MACHINE.

SPECIFICATION forming part of Letters Patent No. 555,646, dated March 3, 1896.

Application filed November 3, 1894. Serial No. 527,819. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM P. KIRKPATRICK, a citizen of the United States, residing at Arrowsmith, in the county of McLean and State of Illinois, have invented certain new and useful Improvements in Skein Warping Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to improvements in skein warping reels of that class designed to take the warp direct from the skeins and direct the warp so it can be conveniently wound upon a warp-reel, substantially in the manners shown and described in United States Letters Patent issued to me on the 26th day of September, 1893, No. 505,770, for swift warping machines.

It is my purpose to devise a simple machine by which the operation of spooling the warp commonly practiced in preparing the warp for a loom is done away with and to enable the warp to be drawn directly from the skeins and wound upon a warp-reel; and the objects that I have in view in my present invention are, first, to provide improved means for sustaining the warp-skein which will serve to hold the warp-threads under proper tension, so as to prevent the skein from unwinding on the reel when the pulling strain on the threads is eased or ceases altogether to obviate entangling of the threads, and also to enable the skein-sustaining devices to be adjusted to accommodate skeins of different lengths; secondly, to provide guides by which the threads are always drawn from the skeins about midway between the uprights which the skeins touch, and the skeins running on the skein-supports are spread so that they do not bind and there are no ends to catch and interfere with the free movement of the threads, and, finally, to simplify the parts and to so construct the frames that they can be readily separated to enable the machine to be compactly folded for storage or transportation.

With these ends in view my invention consists in the novel combination of devices and in the construction and arrangement of parts, which will be hereinafter fully described and claimed.

To enable others to understand my invention, I have illustrated the preferred embodiment thereof in the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a perspective view of my skein warping machine, showing it in connection with a warping-reel on which the warp is wound direct from the skeins. Fig. 2 is a top plan view of the skein warping machine. Fig. 3 is an elevation looking at the front side thereof. Fig. 4 is a vertical cross-sectional view on the plane indicated by the dotted line *x x* of Fig. 2 and showing the course of the threads to be drawn from two of the skeins. Fig. 5 is a detail perspective view of one of the uprights of one of the frames to show the means for supporting a reel, two of which are employed to constitute the devices for sustaining one skein. Fig. 6 is a detail perspective view of one of the reels.

Like letters of reference denote corresponding parts in all the figures of the drawings, referring to which—

A B refer to the two frames which are employed to sustain the four rows or series of reels by which the skeins are held in position to enable the bouts of thread to be drawn therefrom direct to the warp-reel C on which the threads are wound. Each frame A B consists of a series of uprights *a a* and horizontal bars *a' a'*, which are arranged across the top and bottom ends of the uprights *a a*, the parts being fastened together in any suitable way. These two frames A B are set at a suitable distance from one another in parallel positions, and they are held rigidly in place by the horizontal end braces *D D'*, which are fastened to the uprights *a a* at the ends of the two frames, and the ends of these braces *D D'* project beyond the sides of the frames, as clearly shown by Figs. 1, 2 and 4, said protruding ends of the upper braces, *D D*, at opposite ends of the frames A B being joined together by the longitudinal bars *d d*, while the lower end braces, *D' D'*, are likewise joined by the longitudinal bars *d' d'*, whereby a simple and strongly-braced skeleton frame is produced by the braces and bars *D D d d*, to rigidly hold the skein-sustaining reel-frames A B in parallel positions, and which parts *D D' d d'* are detachable, so that

the frames A B and the braces therefor can be compactly folded when it is desired to store or pack the machine for transportation.

Each upright *a* of the parallel frames A B is provided near its lower end with the bearings *eee'e'* to receive one of the journals on adjacent skein-reels, and each bearing *eee'e'* preferably consists of two eyes or loops which are fixed to the upright in vertical alignment with one another, as shown in Fig. 5, although I do not specifically limit my invention to the use of this particular style of bearing. The eyes or loops forming the respective bearings are arranged near the opposite edges of the uprights, and the eyes forming the bearing *ee* are adapted to receive between themselves one journal or end of the shaft of one reel or tilter, while the other pair of eyes *e'e'* forming the bearing are likewise adapted to receive one of the journals or one end of the shaft on the next adjacent reel, whereby each bar is made to assist in sustaining at its lower end two adjacent reels. The shafts or journals of the adjacent reels are held between the spaced eyes, forming the bearings therefor, by means of the keys E, one of which is provided for the two bearings *eee'e'* at the lower end of each upright *a*. This key is preferably a double-pronged key or made in the form of a staple, and the prongs thereof are adapted to be passed through the vertically-aligned eyes or loops forming the two bearings *eee'e'*, so that the journals or shafts of the adjacent reels are confined in said bearings between the uprights *a* and the double-pronged keys or staples E.

Near the upper end each upright *a* of the two parallel frames is provided with a series of vertically-spaced bearings *ff'f'f'f'f'f'*, which are arranged in groups on opposite sides of the uprights. Thus the group *ff* at the lower end of the series are fixed to the upright in the same horizontal plane, and near opposite edges of the same, to receive the journals on two adjacent reels. The second group *f'f'* are similarly disposed in relation to each other and they are fixed at a suitable distance above the group *ff*, while the third group *f²f²* are above the group *f'f'* and likewise arranged in the same horizontal plane near opposite sides of the upright. By having the series of spaced bearings near the upper part of the upright the reel may be adjusted vertically on the upright to accommodate skeins of different lengths.

In lieu of using a large cumbersome reel, as in my prior patent to which reference has been made, to sustain the skein in position for the thread to be drawn therefrom I use a pair of comparatively small, light and simple reels for each skein, and as each frame A B carries two reels for each skein I have a total of four rows or series of reels extending longitudinally of the two frames. The upper rows of reels on the frames A B are indicated at F G, and the lower rows of reels on said frames at H I, said rows of reels extending

throughout the length of the machine, whereby a large number of skeins can be accommodated. The capacity of the machine can be readily increased by making the frames A B longer and supplying an increased number of reels to accord with the number of uprights *a* used in the construction of the frames. Each skein on the parallel frames is supported by a pair of reels, those for the frame A being indicated at F and H and those for the frame B at G and I, and each pair of reels is arranged between the spaced parallel uprights *a* of the frame, the reels being in the same vertical plane, one above the other, to make the skein assume a vertical position when it is sustained by the reels between the uprights *a* of the frame A or B.

Each reel consists simply of two members *ii'*, which cross each other at right angles, and are rigidly joined together at the center to produce the four radial wings, and to the center of the reel is affixed the trunnions or shaft *j*, which protrudes beyond the sides of the reel to enable it to fit in the proper bearings on the uprights *a*, the outer transverse edges of the radial wings of each reel being chamfered at *i''* to prevent catching the thread and to enable the skein to be retained. The reels H I forming the lower series have their trunnions *j* fitted in the bearings *ee'* near the lower ends of the uprights, and said reels are held in place by the pronged keys E, which are fitted in the vertical openings in the bearings *ee'*, so that the reels cannot become displaced on the uprights. The reels F G forming the upper rows are simply placed in either of the bearings *f, f', or f''* on the uprights, according to the length of the skeins used and the tension it is desired on the skeins, and said upper reels are not retained by a key or other fastening, as I have found by experience that they will be properly held in place without the use of a fastening.

By reference to Figs. 2 and 4 it will be noted that two pairs or a set of four reels F G H I are arranged in the same transverse line across the machine and supported by the uprights *a* of the two frames, and one pair, F H, of the transverse aligned reels is adapted to carry a skein of one color, while the other pair, G I, is adapted to carry a skein of a different color. Now the threads from this set of four reels F H G I are designed to be crossed and laid together to form the bout of threads preparatory to winding the same on the warping-reel C, and to accomplish this without permitting the threads from the two skeins to become tangled I have devised and adopted the novel construction of guides formed by the rails K K' and the loops or eyes *kk'*. The rails extend between the parallel frames A B at suitable distances therefrom and from each other, and they are fastened at their ends to the end braces D D, so as to be supported by said braces. The guide loops or eyes *kk'* are fixed to the inner sides or opposing faces of the rails, and each pair of guide eyes or loops *k*

k' lies in a plane in line with and between the pairs of reels forming the set from which the bout-threads are drawn and led through said guide-eyes. The threads from the two skeins supported by each set of four reels are led from the lower side of the bottom reels, H I, and thence the threads from the bottom reels are disposed as follows: The thread from the reel H on the frame A passes beneath the rail K, thence to and through the eye k' on the rail K' next to the frame B, while the thread from the other lower reel, I, of the set on the frame B passes beneath the rail K', thence to and through the eye or loop k on the rail K next to the frame A, and from the opposite facing eyes or loops $k k'$ the two threads are led together over one of the frames A or B to the warp-reel C.

It will be noted that the threads from the two lower reels, H I, of the set are led diagonally across from their respective reels toward the upper reels on the opposite frames, so that they cross one another about midway between the two frames or at the places where the skeins touch the uprights.

In order to guide the skeins and keep them in proper position on the reels, I employ the two pairs of guide-rods L M, which are fitted in the bars $d d$ on opposite sides of the frames A B, so as to be readily removed therefrom, and these two pairs of guide-rods extend between the upper and lower pairs F G and H I of each set of reels, the rods forming each pair being spaced apart a distance sufficient to accommodate the skein and the threads therefrom between the guide-rods. These guide-rods are supported in the horizontal rails $d d$ outside of the frames A B, and they extend between the vertical bars $a a$ of said frames A B. The rods preferably lie beneath the rails K K', which rails support the thread-guides $k k'$, and the rods also extend between the upper reels, F G, and the lower reels, H I, of each set of reels. (See Figs. 3 and 4.) These guide-rods are arranged in such relation to the pairs of vertically-disposed reels and to the thread-guides $k k'$ that the two skeins on the reels and the threads from said skeins pass between the guide-rods, and said skeins and the crossed threads confined between the four rods devoted to the two skeins on each set of reels are guided and confined between the rods in a manner to prevent the threads and skeins on the set of reels from becoming entangled with the threads from other skeins on adjacent sets of reels.

This being the construction of my machine the operation may be described as follows: To place the two skeins on one set of four reels, which skeins may be of different colors or of the same color, the guide-rods L M are detached from the bars $d d$ and the four reels removed from the uprights $a a$ of the two frames. The reels F H forming one pair are now slipped into one skein, and the reels and skein are fitted between a pair of uprights $a a$, forming a part of the frame A, so that the

lower reel, H, rests in the bearings $e e'$, to be held in place by the key E, while the reel F is dropped into either of the three upper bearings f, f' or f'' , according to the length of the skein. The other pair of reels, G I, are likewise inserted into the other skein, and then the reels are adjusted in a similar manner in the bearings on the uprights of the other frame, B, after which the thread from the skeins on the reels F H is passed through the eye k' while the thread from the skein on reels G I is passed across the first-named thread and through the loop or eye k , and finally the guide-rods L M are inserted through the bars $d d$ and between the upper and lower reels so as to have the skeins and threads between the rods forming the two pairs of guide-rods, the two threads being led over one of the frames to the warping-reel C on which the threads are wound. The two skeins to each set of four reels are similarly applied and adjusted between the uprights of the two parallel frames, so that it will not be necessary to further describe the method of adjusting the parts.

In the machine shown in my prior patent it was necessary for the operator to hold the bout of threads in the hand while at work; but in my present case it is not necessary to handle the threads as they come from the machine, because the threads are led from the skeins directly to and wound upon the warp-reel C, as shown by Fig. 1.

There is no limit to the speed of the reels in my improved machine, as there is no possibility of the threads catching in ordinary work. The reels which support the skeins serve to hold them under proper tension while the operation of warping is in progress, and the reels, supported and constructed in the manner described, exert sufficient frictional contact on the skein as it drops from one leaf of the reel to the other to stop turning when the pull on the bout of threads ceases, so that the reels will not unwind the threads and permit them to become tangled. No matter how suddenly the work is stopped, the reels will not swing too far, as in the case of a large heavy swift in rapid motion, nor can the reels or skeins thereon swing to one side and be stopped. By supporting each skein on a pair of reels the skeins are always spread so that there is no binding of the skeins and the threads cannot catch on any part of the machine; and as the frames A B stand perpendicular and the guide-rods L M inclose the skeins and their crossed threads the threads cannot swing about to the opposite side and catch on the rails or bars of the machine. The skein can be easily applied to the reels, and the latter adjusted in its proper frame, and if a skein happens to be twisted when it is first applied to the pair of reels it is untwisted and straightened out when the reels make a revolution.

If desired, the upper pair of guide-rods L may not extend entirely across through both

frames A B; but the rods may be made shorter so as to be supported at one end by the bars $d\ d$ and at the other end by the guide-rails K K'; and it is also evident that other changes in the form and proportion of parts and in the details of construction of the devices herein shown and described as an embodiment of my invention can be made by a skilled mechanic without departing from the spirit of my invention. I would therefore have it understood that I hold myself at liberty to make such changes and alterations as fairly fall within the scope of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a skein warping machine, the combination of the spaced parallel frames having uprights, the set of reels consisting of two pairs of reels supported in the same vertical plane with each other on the respective frames and each pair having one reel disposed above the other, fixed rails between said frames and provided with thread guides or loops, and guide-rods between the upper and lower reels of the set, substantially as and for the purposes described.

2. In a skein warping machine, the combination with spaced parallel frames, of a set of skein-holding reels supported in pairs on the respective frames, and guide-rods supported between the upper and lower reels of the set of reels substantially as and for the purposes described.

3. In a skein warping machine, the combination of parallel-spaced frames, end braces fixed to said frames and carrying the longitudinal bars d, d' , the sets of reels each comprising two pairs of reels supported by the respective frames, the rails between the frames, fixed to the end braces, and provided with the thread-guides, and guide-rods supported by the bars d between the upper and lower reels of the set of reels, substantially as described.

4. In a skein warping machine, the combination of the uprights provided with bearings

e, e, e', e' , near the lower ends, and a series of spaced bearings near the upper ends, a lower reel fitted in the lower bearings, $e e e', e'$, a key fitted in said lower bearings to confine the lower reel therein, an upper reel journaled in the upper bearings in proper relation to the lower reel to support a skein and said upper reel being vertically adjustable in the upper bearings to accommodate said reels to skeins of different lengths, as set forth.

5. The combination with suitable framing, of a pair of skein-holding reels F, H, arranged one above the other, another pair of skein-holding reels G, I, also arranged one above the other and situated to one side of the reels F, H, and horizontal guide-rods supported between the upper and lower reels F, G, and H, I, respectively, and arranged to confine the threads of the two skeins between themselves, substantially as and for the purposes described.

6. The combination with suitable framing, of a pair of skein-holding reels F, H, another pair of skein-holding reels, G, I, arranged to one side of the reels F, H, the thread-guides k, k' , between the two pairs of reels, and the horizontal guide-rods supported between the upper and lower reels of the two pairs of reels, substantially as and for the purposes described.

7. The combination of the spaced vertical frames A, B, a pair of reels arranged one above the other and journaled on the frame A, another pair of reels journaled on the frame B one above the other, suitable cross-bars supported by the frames, thread-guides k, k' fixed to cross-bars between the two frames, and guide-rods supported by cross-bars and arranged between the upper and lower reels of the two pairs of reels, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM P. KIRKPATRICK.

Witnesses:

A. M. LEMONS,
E. P. KRUM.