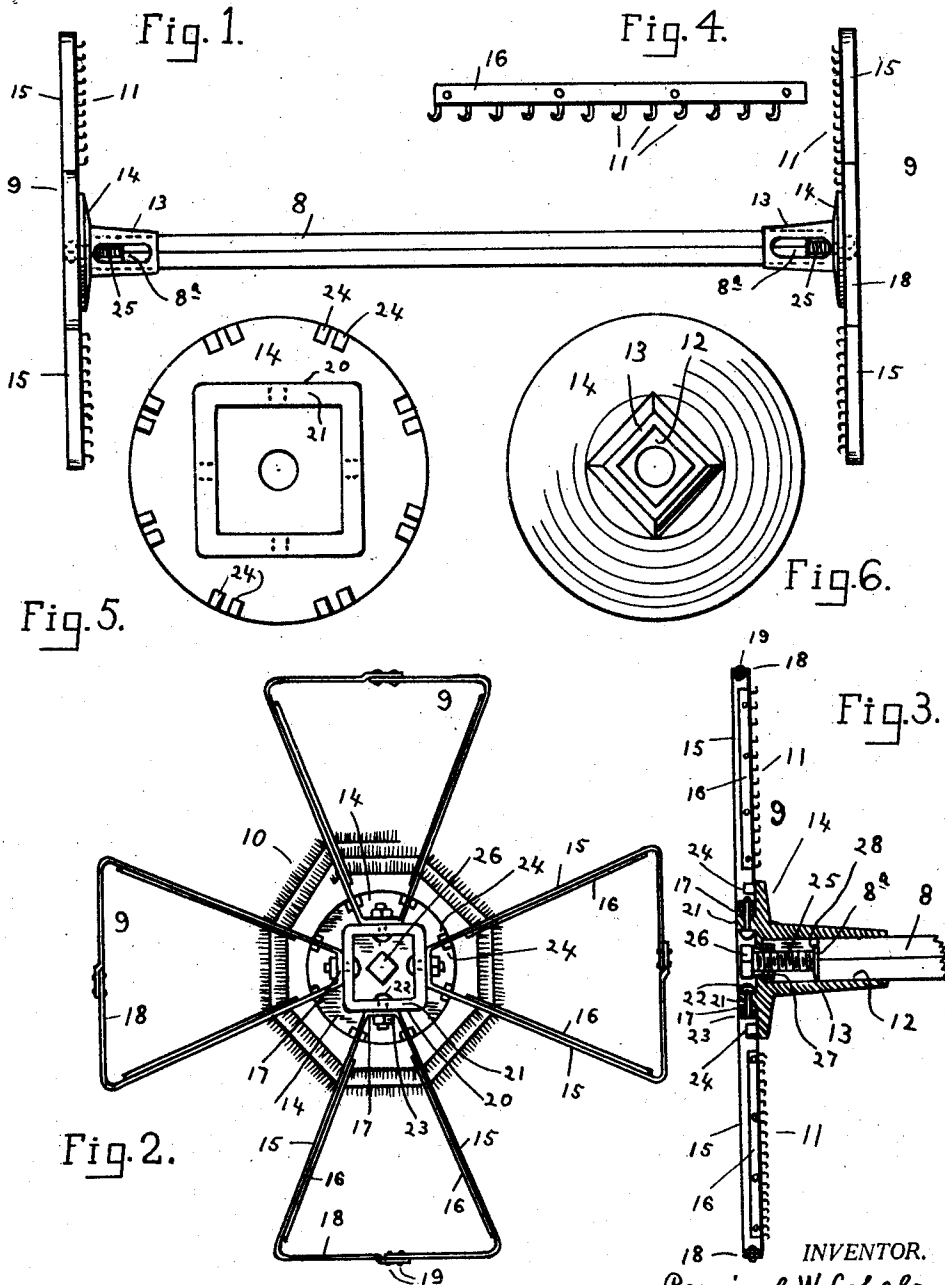


P. W. COPELAND.
PILE FABRIC FRAME.
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To all whom it may concern:

Be it known that I, PERCIVAL W. COPELAND, a citizen of the United States, and a resident of Clark Mills, in the county of Oneida and State of New York, have invented certain new and useful Improvements in Pile-Fabric Frames; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the reference-numerals marked thereon, which form part of this specification.

My present invention relates to pile fabric frames, which are reels or large spools upon which pile fabric is wound by fastening the opposite edges of the fabric to inwardly extending hooks on the opposite ends of the frame so that the layers of fabric placed upon the frame are spaced far enough apart to prevent the pile being matted down or disarranged.

The general purpose of my invention is to provide an improved pile fabric frame and one which is simple in construction but durable and convenient in use.

A further purpose is to provide an article of the class described wherein the end members carrying the fabric-supporting hooks are in adjustable relation to each other so that the frame may be readily adjusted to receive different widths of fabric and also to facilitate the fabric being placed on or removed from the frame.

A still further purpose of my invention is to provide a pile fabric frame wherein the end members are readily detachable from the shaft and replaceable thereon so that the frames when not in use or when being stored or shipped may be in knock-down condition. This results in great saving of space and convenience in handling as the empty frames occupy much space when assembled.

A further purpose is to provide a pile fabric frame of such construction that the features of having the ends adjustable and also removable are combined in a particularly efficient manner.

Another object of this invention is to provide a pile fabric frame of such construction and arrangement that the fabric placed thereon is at the different attaching points bent less from a straight line than has heretofore been done, whereby the fabric when

removed from the frame will not show the folds or bends often observable with previous forms of pile fabric frames. Heretofore the frames have been of such construction that the fabric wound thereon has in placing one layer upon a frame been bent at four different lines and each time at substantially a right angle. Such a decided bending of the fabric is apt to leave more or less permanent traces thereof when the fabric is unrolled. It is one of the objects of my invention to construct a frame of such character that when one layer of fabric is placed thereon the fabric is bent upon considerably more lines than before, preferably upon eight lines, resulting in the fabric being bent only 45° from its original flat form, which is a bend of such slight character that it will leave neither a temporary nor permanent mark upon the fabric.

A further purpose of my invention is to provide an article of the class described of such character and details of parts and combination thereof as to make a frame particularly well adapted for the purposes required and also one where the parts may be readily replaced or repaired if occasion requires.

A still further purpose is to provide a frame of great strength and rigidity whereby the fabric is retained in proper position and fully protected while thereon; and further to provide a frame of such character and form that the same when filled can be economically and safely packed on end for storage and shipment.

Figure 1 is a side elevation of one of my pile fabric frames.

Fig. 2 is an end view thereof on a slightly larger scale.

Fig. 3 is a view of one end, on a similar scale in longitudinal section.

Fig. 4 is a plan view of one of the hook plates.

Figs. 5 and 6 are outer and inner end views respectively of the center or wheel-like part of one of the end members.

Referring to the drawings in a more particular description, it will be seen that the device as a whole consists of a shaft 8 and two substantially similar end members 9 mounted on or near the ends of said shaft and forming therewith a large reel or spool adapted to have wound thereon the pile fabric 10 in successive layers spaced or held from each other through the opposite edges

of said layers of fabric being supported by the inwardly extending hooks 11 provided upon the inner side of the end members 9.

The shaft 8 of proper length according to the usual width of the fabric to be placed upon the frame has mounted in non-rotative relation thereon the two end members as by having said shaft angular, preferably square, in cross-section to fit a similar shaped socket 12 in the inwardly extending hub 13 of the center or wheel-like part 14 of said end members. Upon this center 14 are provided a plurality of bars 15 preferably eight in number radiating from said center and in a plane at right angles to the longitudinal axis of the frame as a whole. From the inward side of these bars project the fabric-supporting hooks 11, preferably by a series of said hooks being formed upon and projecting from a hook plate 16, one of which is attached to each of said bars 15 with the hooks 11 projecting inwardly of the frame, that is in the general direction toward the other end frame but with the points of the hooks outwardly directed relative to the axis of the frame so as to readily allow of the fabric being placed upon the hooks.

In order to secure the maximum of strength and rigidity with a minimum of weight, the bars will preferably be formed as shown in Figs. 2 and 3, in pairs connected at their inner ends by a short base portion 17 and connected at their outer ends by a longer piece 18. Each pair of bars 9 with their connecting base portion 17 and longer outer connection 18 will conveniently be formed from a single strip of metal of sufficient length to be bent to about the shape shown in Fig. 2, with its ends brought together and securely joined as by rivets 19.

A pair of these bars are securely but detachably fastened to the center 14 of the end member by the base portion 17 being placed against the outer surface 20 of a shelf or flange 21 provided on the outer side of said center 14 partway back from the periphery of said center and fastened thereto as by a bolt 22 and nut 23, the bolt passing through suitable holes in the flange 21 and in the base portion 17. The two bars pass outward close to the outer surface of said center and are thereby steadied from being drawn inward by the weight or tension of the fabric placed on said bars. As further means to hold the bars at the proper angle to each other and to adjacent bars upon the frame, there are provided and properly located upon the center 14 near its periphery a series of pairs of ears 24 projecting outwardly in close contact with the opposite sides of each bar as is shown particularly in Figs. 2, 3 and 5 of the drawings. For strength in use and convenience in manufacture the flanges 21 will be formed connected to each other as shown in Figs. 2 and 5.

It will be noticed that the arrangement and construction of the hook-carrying bars 15 now shown and described provides eight points of support or attachment for each edge of each layer of the fabric placed on the frame, resulting in the fabric being bent only forty-five degrees from a straight or plane surface at each turn or bend, which amount of turn or bending of the fabric will not leave any permanent nor even temporary mark or crease upon the fabric when it is removed from the frame. It will be understood of course that my invention is not limited to the use of precisely eight hook-carrying arms upon the frame since it is obvious that seven or even six bars might be used and be found sufficient to obtain most of the advantages of not bending the pile fabric so much as to leave traces of the bending; while it is plain that by having nine or ten or even more such bars the fabric would be bent less than forty-five degrees from a plane surface. A frame having eight hook-carrying bars is however my preferred construction as that provides with a minimum of parts a sufficient number of supports to prevent the fabric being creased or bent too much.

It will also be seen that by having a layer of fabric supported at eight points on each edge instead of at four points the strain of holding the fabric is distributed over twice as many hooks and points of the fabric resulting in less danger of stretching, breaking or otherwise injuring the fabric or breaking a hook when the fabric may be temporarily placed under an unusual strain, as by rough usage in transportation. Preferably also the bars 15 will radiate from the center 14 at substantially equal distances from each other as shown in Fig. 2 thus distributing the points of support of any layer at substantially equal distances from each other and giving less opportunity for the fabric to bend or swing against an adjacent layer with force or weight enough to disarrange the pile of the fabric.

The form and construction of my bars 15 allow a pair of them to be easily removed and replaced if necessary in repairing or replacing said bars or the hook-bars thereon.

The end members 9 are in adjustable relation to their respective ends of the shaft 8 as by the sockets 12 of the end member hubs 13 having a sliding fit upon the opposite ends of said shaft and by providing a proper adjusting means operatively connecting the said end members and their respective ends of the shaft. A convenient, efficient and the preferred form of such adjusting means comprises a set-screw 25 the body of which is screw-threaded into the center 14 in alinement with the shaft 8, and with its inner end adapted to engage the

extremity 8^a of the shaft while the head 26 of said screw 25 is located outside the center 14 where it may be conveniently manipulated in an obvious manner by a wrench or
 5 other proper tool even while fabric is on the frame.

For convenience in manufacturing the frames and mechanical durability of the device, the set-screw 25 will preferably not be
 10 set directly into the center 14 but will be mounted in a screw-threaded nut 27 suitably secured to said center as by being set into the bottom of the socket 12 extending through the hub 13 and into the body of
 15 the center 14. When as is usually the case, the shaft 8 is composed of wood, its extremities will be covered with a metal plate 28 to prevent the inner end of the screw from wearing into the wood.

It will now be apparent that upon placing the end members 9 upon the shaft 8 by fitting the sockets 12 over the ends of the shaft, the inner ends of the set-screws 25 will engage the extremities of the shaft
 25 and that by adjusting one or both of said screws 25, said end members may be set to be farther away or nearer to each other as the circumstances require. Screwing the set-screw farther into the center will force the
 30 end member farther out upon the shaft, while screwing it part way back through its mounting will allow the end member to be shoved farther on to the shaft by hand or drawn farther thereonto by the tension of
 35 the fabric.

This adjustability of the end members of the frame is a decided advantage in several ways. One is that it enables a frame to be adjusted to carry fabrics having a
 40 considerable difference in width, thus dispensing with the use of different length frames for different widths of fabric. Another advantage is that a length of fabric nominally of one width may vary considerably
 45 therefrom and the adjustable frame admits of the frame being set to the proper size rather than change the frame or have the fabric too tight or too loose. A further advantage of having the frame ends adjustable is that it facilitates the loading of
 50 the fabric upon the frame and its removal from the frame as the fabric may be more easily placed upon or removed from the hooks if the tension upon the fabric is temporarily less than that usually required for
 55 storage or shipping.

From the description of the device already given it will be apparent that the end members 9 are readily removable from the
 60 shaft 8 by simply drawing the end members off from their respective ends of the shaft, the sockets 12 of the hubs 13 having a sliding fit upon the shaft and the set-screws 25 offering no obstacle to such withdrawal of
 65 the end members from the shaft. The end

members are likewise readily replaceable upon the shaft, the position of the screws 25 simply limiting the extent to which the end member is shoved onto the shaft. The angular location of the socket 12 relative to
 70 the hook-carrying bars 15 will preferably always be the same so that any two end members placed upon a shaft will bring the hook plates of the two end members directly opposite each other, thus facilitating
 75 the easy and orderly arrangement of the fabric upon the frame. Preferably the relative angular location of the socket 12 and the bars 15 will be such that any position in which an end member can be placed upon
 80 its shaft will also bring its hook-carrying bars opposite the bars of the other end member. This purpose is also attained by the construction of parts shown in the drawings and hereinbefore described.

This feature of having the end members readily removable from and replaceable upon the shaft, is useful in that it enables the frames when not in use to be stored or
 85 transported in knocked-down condition, thus saving space and facilitating the handling or storing of the devices. It will be seen that the frames when set up occupy much more space than their parts when taken down. The shape of the frame set
 90 up prevents a workman from conveniently carrying more than one or two of them, but when the frames are taken apart a man can readily carry the parts of more than two frames.

What I claim as new and desire to secure by Letters Patent is:

1. In a frame for storing and transporting pile fabric the combination of a shaft having angular-shaped ends, two end mem-
 105 bers each comprising a hub portion, an inwardly extending socket slidingly and removably fitting over the ends of said shaft and hook-supporting arms radiating from the hub portion, a set screw threaded through
 110 the hub portion of each end member with its inner end engaging the end of the shaft within the socket whereby the end members are adjustably, non-rotatably and removably secured to the shaft.

2. In a frame for storing and transporting pile fabric the combination of a shaft having angular-shaped ends, two end members each comprising a hub portion, an inwardly extending socket slidingly fitting
 120 over the ends of said shaft and hook-supporting arms radiating from the hub portion, a set screw threaded through the hub portion of each end member with its inner end engaging the end of the shaft within
 125 the socket whereby the end members are adjustably and non-rotatably secured to the shaft, said end members projecting beyond said shaft ends and beyond the heads of the set screws with the outer surface of said end
 130

members forming a level extended support for the frame when stood on end.

3. In a frame for storing and transporting pile fabric the combination of a shaft having angular-shaped ends, two end members each comprising a hub portion, an inwardly extending socket slidably fitting over the ends of said shaft and hook-supporting arms radiating from the hub portion, a set screw threaded through the hub portion of each end member with its inner end engaging the end of the shaft within the socket whereby the end members are adjustably and non-rotatably secured to the shaft, said arms on each end member being substantially equally spaced and more than four in number with a hook for each layer of the fabric whereby the fabric is bent substantially less than a right angle at each folding line.

4. In a frame for storing and transporting pile fabric the combination of a shaft having angular-shaped ends, two end members each comprising a hub portion, an inwardly extending socket slidably and removably fitting over the ends of said shaft and hook-supporting arms radiating from the hub portion, whereby the end members are non-rotatably and removably secured to the shaft, said arms on each end member being substantially equally spaced and more than four in number with a hook for each layer of the fabric whereby the fabric is bent substantially less than a right angle at each folding line.

5. In a frame for storing and transporting pile fabric the combination of a shaft having angular-shaped ends, two end members each comprising a hub portion, an inwardly extending socket slidably fitting over the ends of said shaft and hook-supporting arms radiating from the hub portion, whereby the end members are non-rotatably secured to the shaft, said arms on each end member being substantially equally spaced and eight in number with a hook for each layer of the fabric whereby the fabric

is bent about forty-five degrees at each folding line.

6. In a frame for storing and transporting pile fabric the combination of a shaft having angular-shaped ends, two end members each comprising a hub portion, an inwardly extending socket slidably and removably fitting over the ends of said shaft and hook-supporting arms radiating from the hub portion whereby the end members are non-rotatably and removably secured to the shaft, said arms on each end member being substantially equally spaced and eight in number with a hook for each layer of the fabric whereby the fabric is bent about forty-five degrees at each folding line.

7. In a frame for storing and transporting pile fabric the combination of a shaft and two end members removably, adjustably and non-rotatively fitting the ends of the shaft and hook-supporting arms projecting from said end members and being substantially equally spaced and more than four in number whereby the fabric is bent substantially less than a right angle at each fold.

8. In a frame for storing and transporting pile fabric the combination of a shaft and two end members removably, adjustably and non-rotatively fitting the ends of the shaft and hook-supporting arms projecting from said end members being eight in number and substantially equally spaced whereby the fabric is bent about forty-five degrees at each folding line.

9. In a frame for storing and transporting pile fabric the combination of a shaft and two end members removably, adjustably and non-rotatively fitting the ends of the shaft and eight radiating rows of fabric-supporting hooks on each end member whereby the fabric is bent about forty-five degrees at each fold.

In witness whereof I have affixed my signature, this 20th day of April, 1918.

PERCIVAL W. COPELAND.