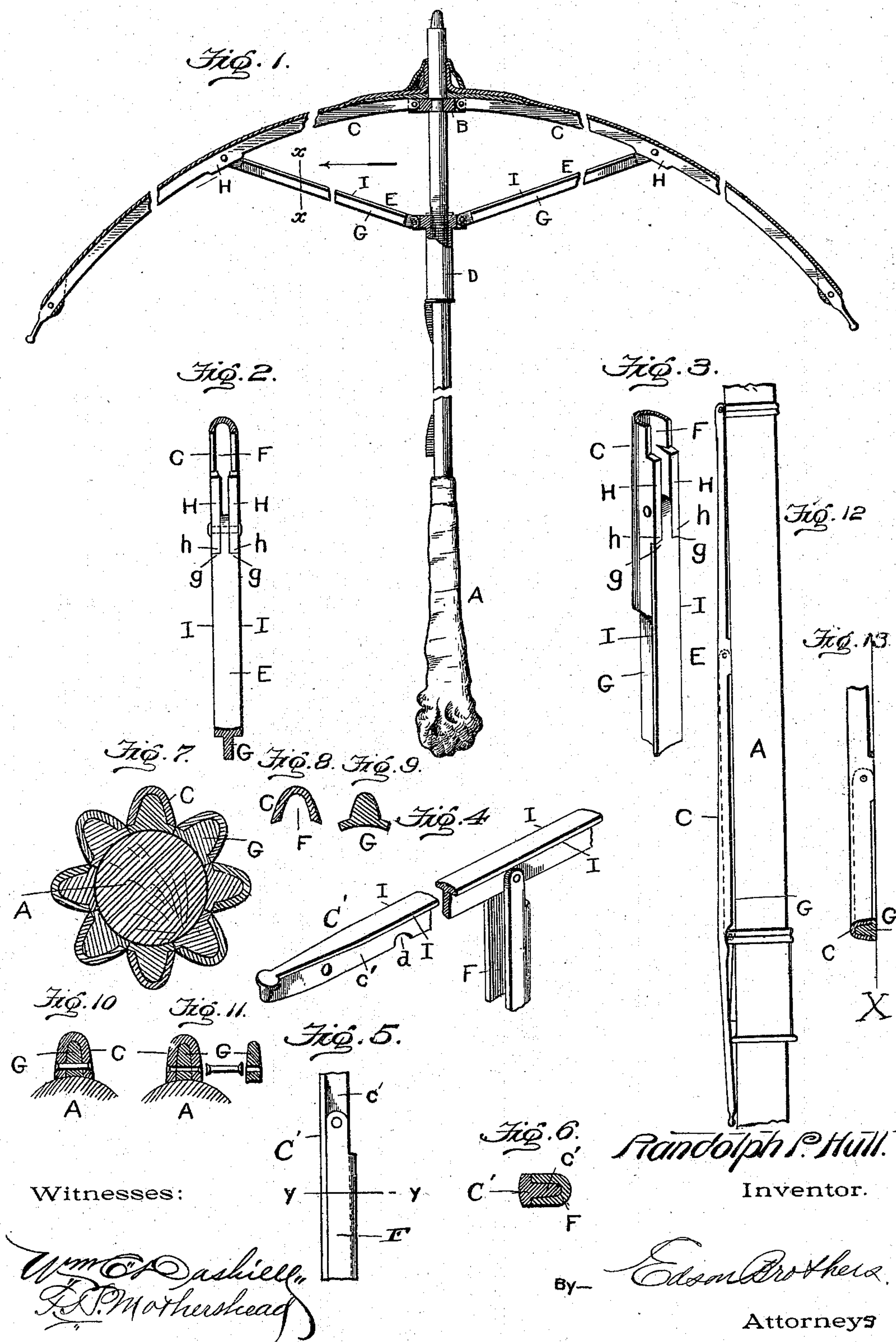


(No Model.)

R. P. HULL.
RIB AND STRETCHER FOR UMBRELLAS.

No. 559,288.

Patented Apr. 28, 1896.



UNITED STATES PATENT OFFICE.

RANDOLPH P. HULL, OF NORWALK, OHIO, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF TWO-THIRDS TO H. K. BECK AND HATTIE M. HAWLEY, OF SAME PLACE.

RIB AND STRETCHER FOR UMBRELLAS.

SPECIFICATION forming part of Letters Patent No. 559,288, dated April 28, 1896.

Application filed February 23, 1894. Serial No. 501,212. (No model.)

To all whom it may concern:

Be it known that I, RANDOLPH P. HULL, a citizen of the United States, residing at Norwalk, in the county of Huron and State of Ohio, have invented certain new and useful Improvements in Ribs and Stretchers for Umbrellas; 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.

The present invention relates to improvements in umbrellas of that class which are known to the trade and the public as "close rollers"—that is, the ribs and stretchers are so arranged that they fold compactly around a small-sized staff or rod to enable the cover to be closely wrapped or coiled around the staff, ribs, and stretchers to produce a small neat structure.

Heretofore in this art it has been common to employ a channeled sheet-metal stretcher in connection with the usual channeled rib, so that the stretcher will fold into or within the rib when the frame is collapsed and folded against the staff; but in all such prior devices known to me the ribs and stretchers must be made of such size to receive the strength necessary to stand the endwise pressure and transverse strain that only six of the connected ribs and stretchers can be employed in an umbrella having a staff or rod of small diameter, it being preferable in the "close-rolling" type of umbrellas to use a staff about one-quarter of an inch in diameter.

It is my purpose to provide an improved construction of the ribs and stretchers which shall have the necessary strength to resist the endwise pressure and transverse strain brought on the ribs and stretchers and at the same time be smaller in size than prior devices of this kind, whereby a larger number of ribs and stretchers can be used in close-rolling umbrellas than has been heretofore possible in this class of umbrellas, and the umbrella when opened is given an improved shape or appearance.

A further object of the invention is to provide an improved joint or connection for the rib and stretcher which, while simple in con-

struction, is very strong and durable, serves to brace the stretcher against transverse strain, operates with practically no friction between the parts, and is not weakened to any appreciable extent by the apertures produced in the rib to receive the pivot that connects the stretcher thereto.

A further object of the invention is to so construct and organize the ribs and stretchers that when the umbrella-frame is folded the ears on the ribs forming a part of the joints and the inner faces of the series of stretchers will contact with or bear upon the surface of the small staff or rod throughout the whole length of all the stretchers and the exposed faces of the ears on the ribs, thus preventing the ribs from bearing, at the middle thereof, only upon the staff, which last-described arrangement is objectionable because the ears, when they bear on the staff at the middle thereof, cause it to become marred and defaced after the umbrella is used a short time.

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

I have illustrated the preferred embodiment of my invention in the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a sectional elevation of my improved umbrella with the frame in the opened position for use. Fig. 2 is a sectional elevation through a connected rib and stretcher, the plane of the section being indicated by the dotted line *xx* of Fig. 1 and looking in the direction indicated by the arrow. Fig. 3 is an enlarged detail perspective view of one rib and stretcher, showing the construction of the joint between the parts and showing the position of the stretcher relative to the rib when the parts are closed. Figs. 4 to 6, inclusive, represent a modified construction of the rib and stretcher, Fig. 4 being a perspective view showing a T-shaped rib and a channeled stretcher; Fig. 5, an elevation of the rib and stretcher when closed, and Fig. 6 a transverse section on the plane indicated by the dotted line *yy* of Fig. 5. Fig. 7 is a sectional view, on an enlarged scale, trans-

versely through the middle of the staff and the ribs and stretchers when the umbrella-frame is collapsed to show the compact folding of the parts upon each other and the bearing of the T-stretchers on the cylindrical surface of the small-sized staff. Figs. 8 and 9 are enlarged sectional views through the channeled ribs and T-stretchers, respectively. Fig. 10 is a transverse sectional view through the joint between the rib and stretcher, and Fig. 11 is a detail view of the joint. Fig. 12 is an elevation showing a portion of the staff and illustrating the rib and stretcher folded together and upon the staff, showing the manner in which the stretcher bears upon the staff as also the ears of the rib between which the tenon on the stretcher is pivoted. Fig. 13 is a fragmentary detail of the parts shown by Fig. 12, the line X indicating the surface of the staff or rod.

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

A designates the staff of an umbrella, which is made of a small rod, about one-fourth of an inch in diameter, and provided at one end with a suitable handle. Near the other end of this staff or rod is fastened the usual crown-piece B, and on the staff is fitted the slidable runner D, all of these parts being of the usual or any preferred construction.

To the crown-piece B is pivoted the inner ends of the ribs C, and the inner ends of the stretchers or braces E are hung or pivoted to the slidable runner D, the joints between the ribs and crown-piece and between the stretchers and runner being of the usual construction.

I prefer to make each rib C out of sheet metal, which is rolled or creased to produce the longitudinally-channeled rib, and to make each stretcher E out of a single solid piece of metal, which is rolled to the appropriate form in cross-section, in order to produce a stretcher in a single solid piece of metal of small size and which will withstand the endwise pressure and strain to which it is subjected when the umbrella-frame is opened for use. I may, however, transpose the channeled and ribbed metallic parts—that is, the rib may be of the T-shaped solid-bar form and the stretcher of the channeled form, as indicated in Figs. 4 to 6; but for practical reasons I prefer the channeled form of rib and the solid T-shaped stretcher shown by Figs. 1, 2, 3, 7, 8, 9, 10, 11, 12, and 13. In this preferred embodiment of the invention the ribs C are formed of pieces of sheet-steel, which are creased, folded, or rolled to produce on the inner surface or side of said rib the longitudinal channel F, which extends throughout the length of the rib.

Each stretcher or brace E is rolled from a single solid bar of metal into the substantially T-shaped form in cross-section to produce the transverse heads or flanges I and the web G, which stands at right angles to the head I, and this web G of the T-shaped stretcher is

extended at the ends of the stretcher beyond the head I, or, in other words, the ends of the head I terminate within the prolonged ends of the web G to produce the protruding tenons g' at the ends of each stretcher, such tenons being of the same thickness and width as the web G of the stretcher. One tenon of each stretcher is connected to the notched ring at one end of the slidable runner, and the other tenon g' at the opposite end of each stretcher is fitted between and pivoted to ears H H on the companion rib to said stretcher. An improved form of joint is produced by the ears H and tenon g' between the rib and stretcher, which joint is produced by manipulating the pieces of metal of which the rib and stretcher are made, so as to dispense with the common sleeves and fabric employed largely in the manufacture of umbrellas, but which old form of joint is highly objectionable because of the "bulky" appearance they give to the umbrella when folded, and which is more noticeable and objectionable in close-rolling umbrellas. The ears H H on each rib are produced at the point where the stretcher is to be joined thereto, and the ears are formed on the inner edges of the channeled rib, and on the sides of the rib, as shown by Fig. 3, so that the ears are projected beyond the plane of the inner edges of the channeled rib, and they are spaced to accommodate between themselves the tenon g' on the outer end of the stretcher. Said ears H H are produced on the channeled rib during the manufacture thereof or before the parts are assembled into the umbrella-frame, and the ears are furthermore thickened or enlarged transversely, as shown by Figs. 3, 10, and 11, so that the ears are of increased thickness as compared with the thickness of the metal forming the body of the rib.

The space between the inner opposing faces of these thickened ears is substantially equal to the thickness of the prolonged tenon g' produced on the end of the stretcher, and the tenon g' is thus caused to fit snugly between the thickened ears, so that it will work freely therein and without friction. Transverse openings h' are drilled through these thickened ears, and the tenon g' has an opening in line with the opening h' , and through these openings is passed the pivot-pin h'' , the ends of which are swaged down into recesses produced in the outer faces of the ears H to bring the headed ends of the pivot-pin practically flush with the faces of the ears H and the rib. The joint thus produced between the rib and stretcher is very strong, compact, and durable, and it affords a good bearing and brace for the end of the stretcher upon the rib when the umbrella-frame is opened, so that the parts are well adapted to resist any lateral or transverse strain. There are no projecting surfaces against the cover or fabric to wear through the same, and when the umbrella-frame is folded the stretchers are partially inclosed within the channeled ribs—that is to say, the stretchers are so arranged in re-

lation to the ribs that the webs G of the T-shaped stretchers fold into the longitudinal channels F of the ribs, while the transverse heads I of the T-stretchers bear or rest against the edges of the channeled ribs, as shown by Figs. 2, 3, and 7. The head I of the T-stretcher corresponds in width to the width of the channeled rib between the outer faces thereof, and thus the edges of the stretcher-head lie flush with the exposed sides of the channeled rib to give a neat appearance to the rib and stretcher when they are folded together.

The outer edges of the thickened ears H H on each rib are straight and parallel to the edges of the channeled rib, and when the stretcher is folded to cause the web G to be inclosed within said channeled rib the outer face of the stretcher-head lies flush and in line with the exposed straight edges of the ears H H. When the head I of the stretcher is cut away near the ends thereof to produce the tenons g' , two shoulders g g are produced at the end of the stretcher. When the stretcher is folded into the rib, these shoulders g g are very close to and flush with the ends h h of the thickened straight ears, and by the described construction of the ears and the tenon a smooth, compact, and strong joint is provided between the rib and stretcher.

As shown by Figs. 2 and 3 of the drawings, and also by Figs. 7 and 9, the outer exposed face of the stretcher-head I is made slightly concave transverse across the same to enable said face of the stretcher to bear firmly and evenly upon the cylindrical surface of the rod or staff A, and as this concave face of the stretcher is practically flush with the exposed edges of the ears H H when the parts are folded together the stretcher and ears are caused to bear nicely upon the staff A, each stretcher bearing upon the staff throughout its entire length, as shown by Fig. 12 and also indicated in Fig. 13. By arranging the stretchers so that they are flush with the protruding ears on the stretchers when the parts are folded I am able to cause the parts to bear upon the staff, so as to avoid marring and defacing the staff, which in ordinary umbrellas is caused by the joints at the middle of the ribs bearing on and rubbing against the face of the staff when the umbrella is closely rolled.

The construction of the rib and stretcher as herein shown and described enables me to make them quite small in cross-section as compared with previous constructions; but this reduced size of the parts does not in any way weaken them, because the improved type of T-stretcher employed by me is stronger and better capable of resisting greater endwise and transverse pressure or strain as compared with larger-sized stretchers of the common sheet-metal channeled form of stretchers.

My channeled rib, made from sheet-steel and connected by the improved joint to the stretcher, will not bend in use nor become

flattened or straightened out under the strain of the stretcher when the umbrella-frame is opened for use. The compact small size of the ribs and stretchers enables me to increase the number of ribs and stretchers in a close-rolling umbrella without increasing the diameter of the small-sized staff which is necessarily used in this type of umbrellas, and because the parts fold so compactly together and upon the staff when the umbrella-frame is collapsed that the size of the umbrella when rolled together is not appreciably increased by the increased number of ribs and stretchers employed, which increased number of ribs impart greater strength to the umbrella and give it a better and more attractive appearance.

In Figs. 4 and 6, inclusive, the ribs C' are made substantially T-shaped in cross-section, with the outer face of the cross-head thereof slightly oval or convex in cross-section, as at I, to avoid cutting the fabric cover, and the stretcher F is wrought of sheet-steel to form the groove in the side that faces the rib, in order that the web of the rib may fold within the grooved stretcher.

The rib C' is preferably made to taper slightly toward both ends, and the web c' of the rib is reduced in width toward the ends to enable the rib to fold compact with the stretcher upon the small staff A. The outer end of the stretcher F is bifurcated, as shown by Fig. 4, to provide ears which embrace the web of the T-rib, and through these ears of the stretcher and the web of the rib is passed the pivot-pin that connects the rib and stretcher.

A notch or recess d is formed in the rib-web at a suitable point to receive the wire by which the stretchers are connected to the runner, said wire on the runner fitting into the notches d of the ribs when the stretchers and ribs are folded together and upon the staff, in which folded condition the webs on the ribs are inclosed in the grooves of the stretchers and the heads of the ribs bear against the edges of the grooved stretchers, (see Fig. 6,) so that the headed ribs lie flush with the sides of the stretchers.

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

In an umbrella, the channeled rib C provided with the integral thickened ears H, H, combined with a solid T-shaped stretcher provided with a tenon which is fitted between said thickened ears, and a pin passing through said ears and tenon, substantially as and for the purposes described.

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

RANDOLPH P. HULL.

Witnesses:

F. W. VAN DUSEN,

H. K. BECK.