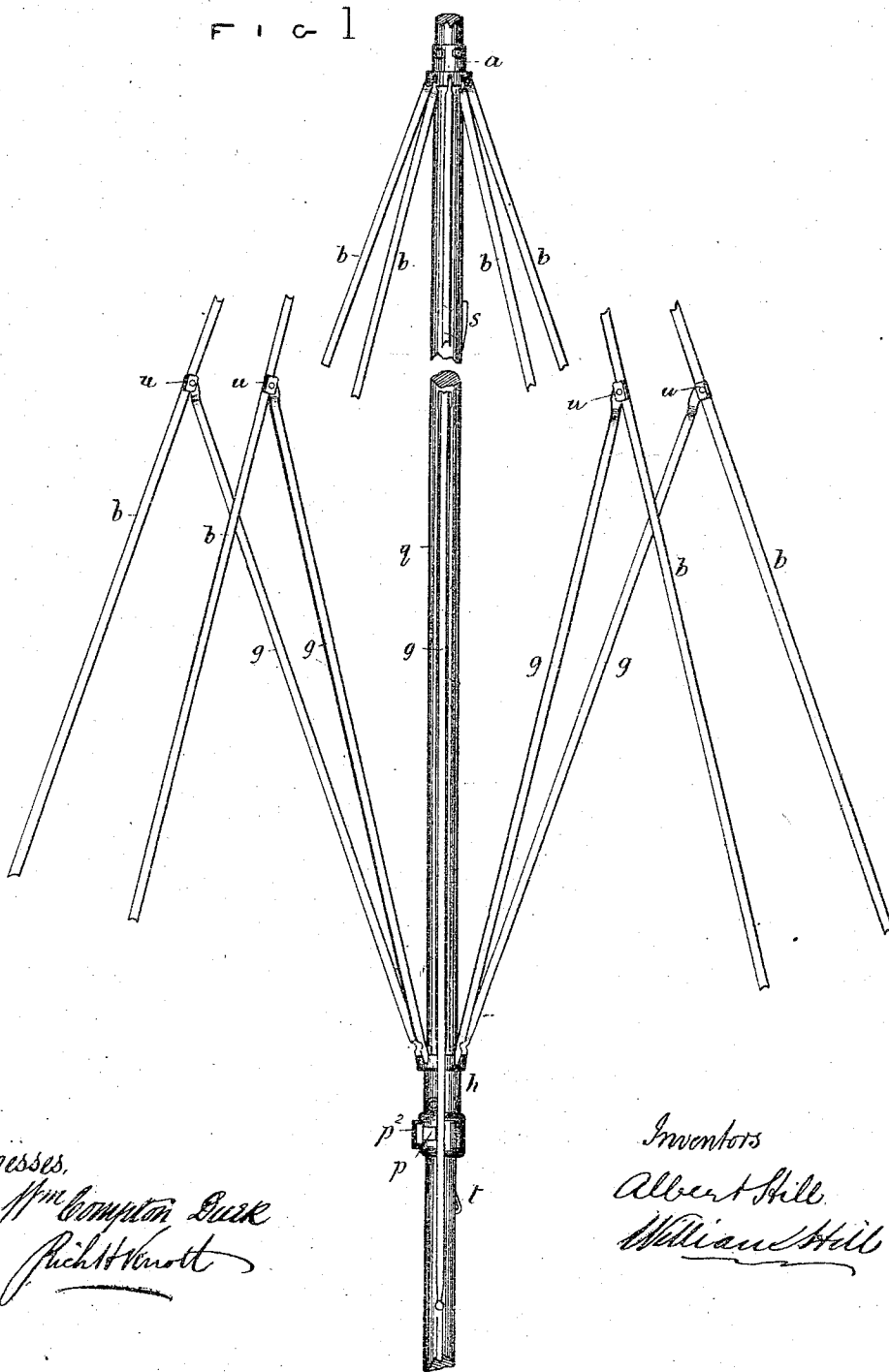


A. & W. HILL.
Umbrellas.

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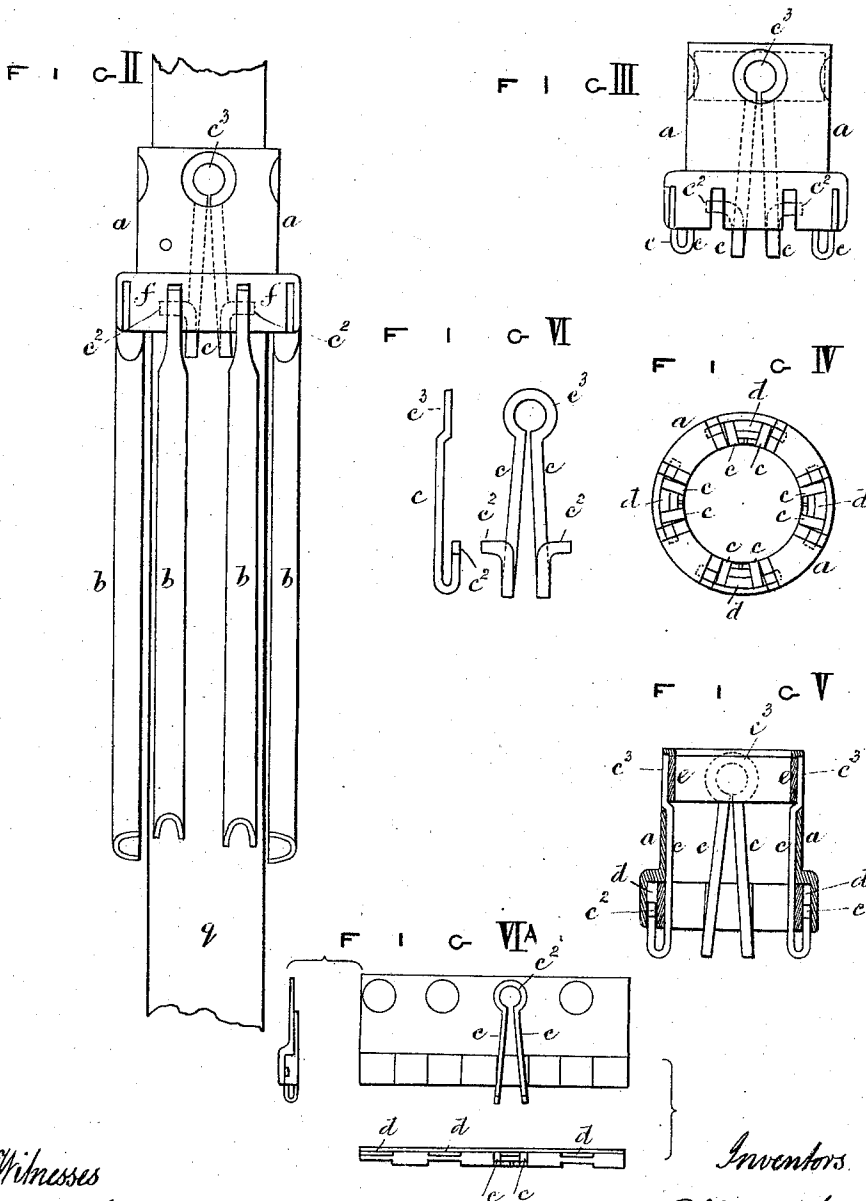
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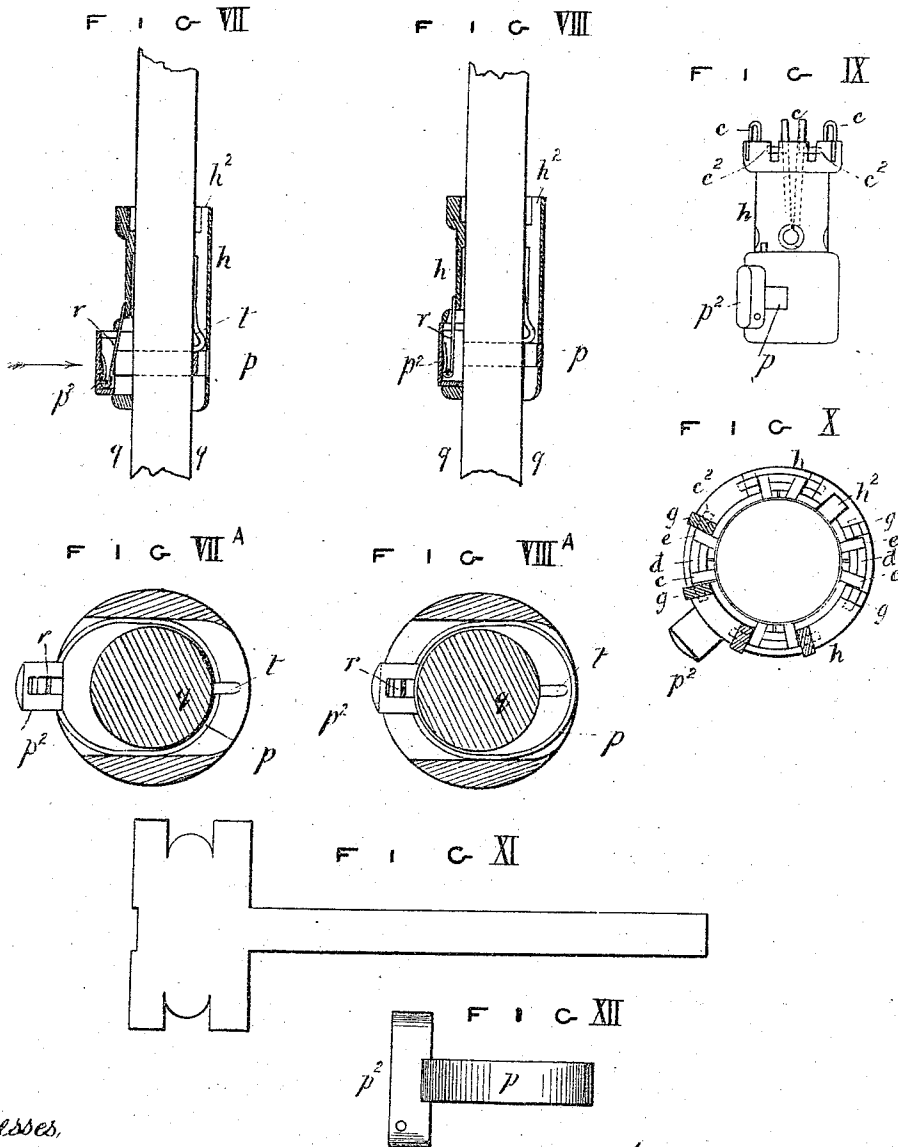
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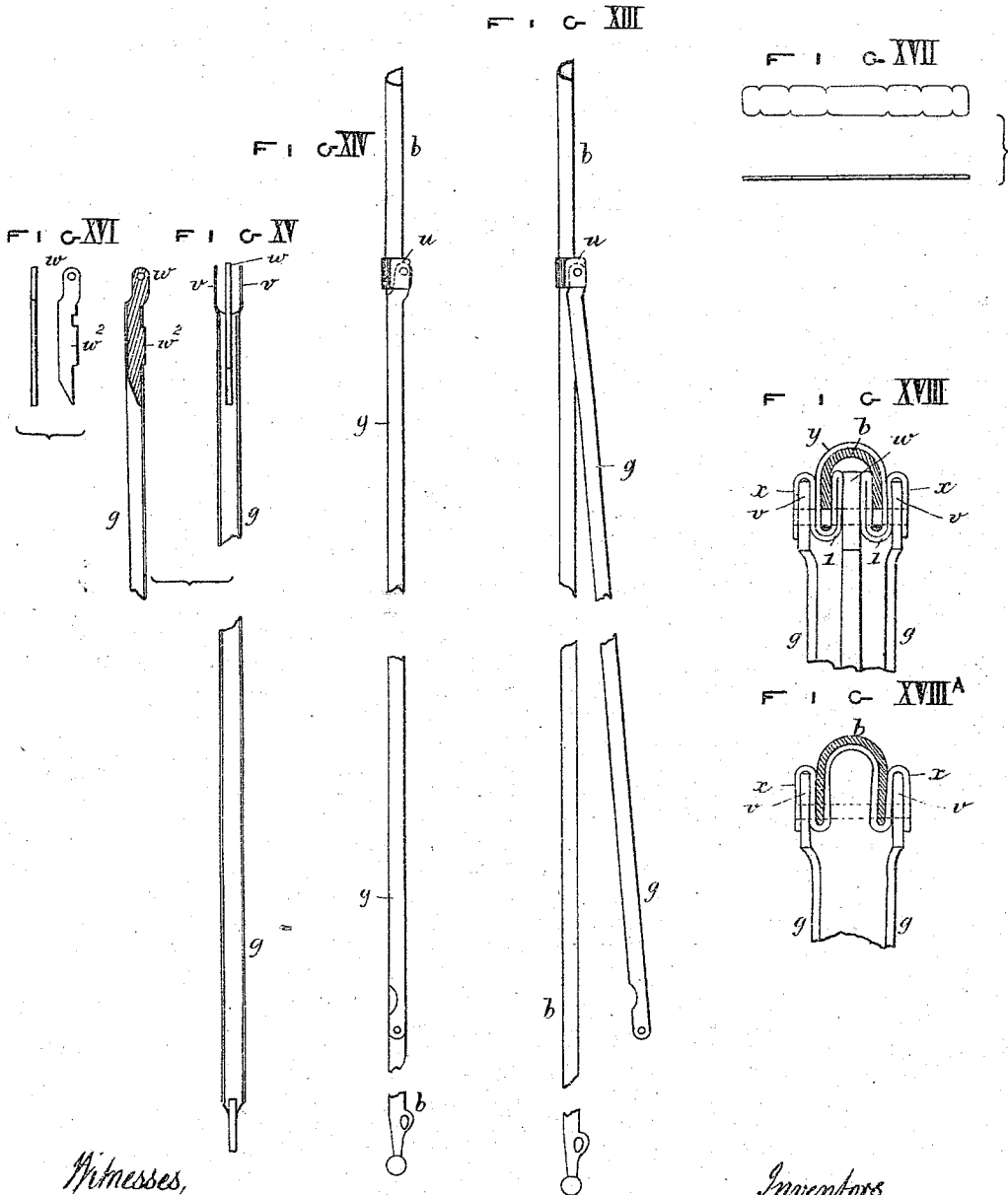
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UNITED STATES PATENT OFFICE.

ALBERT HILL, OF PLYMOUTH, AND WILLIAM HILL, OF BATH, ENGLAND.

IMPROVEMENT IN UMBRELLAS.

Specification forming part of Letters Patent No. **153,824**, dated August 4, 1874; application filed June 12, 1874.

To all whom it may concern:

Be it known that we, ALBERT HILL, of Plymouth, in the county of Devon, England, watch-maker, and WILLIAM HILL, of the city of Bath, England, umbrella and parasol manufacturer, have invented certain Improvements in Umbrellas and Parasols, of which the following is a specification:

Our invention consists of the several improvements hereinafter described in constructing certain parts of umbrellas and parasols.

According to our invention we joint or connect the ribs and stretchers to the top notch and runner, respectively, in such a manner that each rib or stretcher can be readily removed without displacing the others, and increased strength in the joints also obtained.

We effect these objects by jointing or connecting the ribs and stretchers to the top notch and runner, respectively, by means of double or two-arm springs, each double spring serving to joint two ribs or stretchers. The end of each arm of the springs is bent at right angles, and constitutes the center or joint-pin of the rib or stretcher. The inner or acting ends of the said double springs work in separated slots or openings in the face of the notch or runner, the divisions between the slots constituting bearings for the joint-pins of the springs. Cross-notches are left, as usual, in the notch or runner to receive the joint ends of the ribs and stretchers, the joint-pins of the springs entering the said cross-notches when the said springs are in their normal or uncompressed condition. By compressing or closing the arms of each spring, the joint-pins on their free ends are withdrawn from the cross-notches described, and the joint ends of the ribs or stretchers may be introduced into the said cross-notches. By then removing the pressure from the springs their arms open out, and project their joint-pins through the holes in the joint ends of the ribs or stretchers, and thereby joint them very securely in their places. One or two ribs or stretchers at a time may be jointed or connected in the manner described. By pressing inward one of the spring-arms of the double spring a rib or stretcher may be removed, and a fresh rib or stretcher put in its place, with-

out interfering with the others. As each rib or stretcher has an independent joint-pin, the jointing of the ribs or stretchers is stronger than when a single pin or wire is used for the whole of the ribs or stretchers.

We construct a joint for the stretchers of umbrellas and parasols in the following manner: We make the fork end of the stretcher to be jointed to the rib of three parallel branches, the outer branches being made from the metal of the stretcher, and the middle branch of a separate piece inserted in a groove or depression made in the middle of the stretcher and secured therein. The three branches are pierced with holes for the joint-pin. The part on the rib to which the stretcher is to be jointed consists of a corrugated piece of sheet metal or a piece of sheet metal having in it a series of parallel folds a short distance apart. This joint-piece is connected to the rib by fitting the middle corrugation in the trough of the rib, and the corrugations on either side of it upon the sides of the rib, and fixing it by compression or by soldering. Into the outer corrugations, which are situated on the outer sides of the rib, the outer branches of the fork on the stretcher fit, and into the middle corrugation the middle branch of the stretcher-fork fits. By passing a pin through the two parts the stretcher is jointed to the rib. As the end corrugations of the joint-piece on the rib between which the outer branches of the stretcher-fork fit are on the outside of the rib, the said rib is capable, on the closing of the umbrella or parasol, of passing into and being embraced by the trough of the stretcher.

By this construction of joint the rib and stretcher, when the umbrella or parasol is closed, fit one within the other, and great compactness of the frame results, and the twisting of the ribs is prevented.

We fasten the umbrella or parasol in its open and closed positions, respectively, by means of a spring-fastening constructed as follows: We place near the bottom of the runner a nearly circular spring-band. To one side of this spring-band a push-piece is affixed, the said push-piece working through and projecting from the runner. On the stick of the umbrella or parasol we fix two inclined studs

or fixing-pieces, provided with shoulders for fixing the umbrella in its open and closed positions, respectively. On the inner side of the runner is a cross-groove to permit of the runner passing over the said inclined studs or fixing-pieces. When the runner has been raised or lowered on the stick sufficiently far to nearly open or close the umbrella, the spring-band is pressed outward by coming against the fixed inclined stud on the stick, and when the umbrella has been fully opened or closed the said spring-band snaps behind the shoulder of the inclined stud, and fastens the umbrella. By pressing inward the push-piece of the spring-band the said band is moved from off the shoulder of the inclined stud, and the umbrella is unfastened. By the use of this fastening the stick is not weakened by the cutting away of the part thereof, and the unfastening of the umbrella or parasol is effected with great ease.

Having explained the nature of our invention, we will proceed to describe, with reference to the accompanying drawings, the manner in which the same is to be performed.

Figure 1 represents, in elevation, the frame of an umbrella containing our several improvements. Fig. 2 represents, in elevation, our method of jointing the ribs to the top notch. Fig. 3 represents in elevation, Fig. 4 in plan of under side, and Fig. 5 in vertical section, the top notch separately, with the double or two-arm springs secured to it; and Fig. 6 represents one of the double or two-arm springs detached. Fig. 6^a represents the blank from which the top notch is made. Figs. 7 and 8 represent the runner detached; and Figs. 7^a and 8^a represent cross-sections of the same. Fig. 9 is an elevation of the runner; and Fig. 10 is a cross-section of the same. Fig. 11 represents the blank from which the umbrella-fastener is made, and Fig. 12 represents the fastener detached. Figs. 13, 14, 15, 16, 17, 18, and 18^a represent our improved stretcher-joint and parts thereof, as hereinafter described.

The same letters indicate the same parts.

We will first describe our method of jointing the ribs to the top notch. *a* is the top notch, fixed to the stick in the usual way. *b* are the ribs jointed to the top notch, according to our invention. *c* are the double or two-arm springs, having the form best seen in the separate view, Fig. 6. The end of each arm of the said double springs *c* has the hook form represented, and the extreme end of the hook is bent at right angles, and constitutes the joint-pin *c*² of the rib *b*. The heads *c*³ of the double springs *c* are circular or ring-like, and fit in holes made in the upper part of the top notch *a*, and the hooked lower parts of the said double springs *c* work in curved recesses *d* (see the plan, Fig. 4, and the blank, Fig. 6^a) in the flange part of the notch *a*. The manner in which the double or two-arm springs *c* are fixed in the notch *a*, and their position in the said notch, are best seen in the section Fig. 5—that is to say, the double springs *c* are

arranged inside the notch *a*—their hooked lower ends being engaged in the curved slots *d*, and the circular heads *c*³ being fitted in the holes in the upper part of the notch. The double springs *c* having been thus arranged, a circular or band spring, *e*, is placed inside the notch, and made to press upon and hold the heads *c*³ of the several double springs in the holes in the notch. The said spring-band *e* is fixed in its place by closing or turning inward the top edge of the notch upon the said spring-band. The notch containing its double or two-arm springs is now ready to be fixed to the stick of the umbrella or parasol. The flange of the notch is provided with the usual cross-notches *f f* to receive the flat joint ends of the ribs *b*.

The manner in which the joint-pins *c*² of the double or two-arm springs *c* are engaged with the joint ends of the ribs *b*, so as to joint the said ribs to the notch *a*, will be readily understood by an examination of Fig. 2.

In order to introduce the joint ends of the ribs *b* into the cross-notches *f* it is necessary to press upon the lower projecting ends of the double springs *c*, so as to compress together or close the arms of the said springs and withdraw their joint-pins *c*² from the cross-notches *f*. When the said springs have been so compressed, the ends of the ribs *b* may be introduced into the cross-notches *f*, and on removing the pressure from the said springs their arms open out and project the joint-pins *c*² through the holes in the joint ends of the ribs *b*, and into the solid parts of the notch. The ribs are thereby jointed securely in their places, and are capable of ready removal and replacement.

The stretchers *g g* are jointed to the top of the runner *h* in the manner described with respect to the ribs *b*. The method of jointing the stretchers *g g* is seen in Figs. 9 and 10, where *c* are the double or two-arm springs; *d*, the curved slots in the runner, in which the hooked ends work; *c*², the joint-pins of the springs; *c* and *g*, the stretchers.

We will now proceed to describe our improved stretcher-joint and parts connected with it, represented in Figs. 13, 14, 15, 16, 17, and 18 of the drawings. The stretcher-joints are marked *u* in the complete frame, Fig. 1. We make the fork end of the stretcher of three parallel branches, *v v v*, the outer branches *v v* being made from the metal of the stretcher *g*, and the middle branch *w* being made of a separate piece (represented separately in Fig. 16) inserted and fixed in the middle of the end of the stretcher. It is preferred to fix the separate middle branch *w* to the stretcher by passing the part *w*² through a slot in the stretcher and riveting the said part *w*² in the said slot; but the said middle branch may be secured in its place by soldering. The joint-piece or middle bit *u*, which is connected to the rib *b*, and to which the fork of the stretcher is jointed, is made from the blank or narrow strip of metal represented in Fig. 17, the said

blank being folded into a series of corrugations or parallel folds a short distance apart. The construction of the middle bit or joint-piece *u* and the way in which the fork of the stretcher (Fig. 15) is jointed to it will be best understood by reference to the cross-section of the joint-piece, rib, and fork end of the stretcher represented in Fig. 18.

By an examination of the said Fig. 18 it will be seen that the corrugated joint-piece or middle bit is provided with outer corrugations *x x*, which are situated beyond the outer sides of the trough-rib *b*, with a large central corrugation, *y*, which is situated around and compressed upon the outside of the trough-rib *b*, and with two shorter corrugations, *1 1*, which pass around the edges of and are compressed within the trough of the rib *b*.

The construction of the middle bit may be simplified, as illustrated in section in Fig. 18^a. Instead of fixing the corrugated joint-piece or middle-bit to the rib by compression, it may be fixed to the rib by soldering. Into the outer corrugations *x x*, by the joint-piece or middle bit, the outer branches *v v* of the fork on the stretcher fit, and into the space between the middle corrugations *1 1* the middle branch *w* of the stretcher-fork fits, as seen in Fig. 18. A joint-pin passed through the fork *v v* and middle bit joints the stretcher to the rib.

When the stretchers are jointed to the ribs in the manner described and represented, namely, with the outer branches of the stretcher-forks outside the ribs, the hollow or trough stretchers, on the closing of the umbrella, are capable of receiving or embracing the ribs, so that the latter fit into the former, (see Fig. 14,) whereby great compactness of the frame results, and the twisting of the ribs is prevented.

We will now describe our improved spring-fastener for fastening the umbrella or parasol in its open and closed positions, respectively. Within the runner *h*, (see Figs. 7, 7^a, 8, and 8^a), and near the bottom thereof, and capable of sliding across the said runner is an oval spring-band, *p*, having at one side of it a push-piece, *p*² projecting slightly from the runner. The said oval band *p* embraces the stick *q* in the manner represented. By means of a double or bent spring, *r*, bearing at top on the runner, and at bottom against the inside of the push-piece *p*², the said push-piece is pressed outward or from the stick, and that part of the band *p* most distant from the push-piece is pressed against the stick *q*. (See Figs. 7 and 7^a.) The blank from which the band and push-piece *p p*² are made is represented in Fig. 11. On the stick *q* are two inclined studs or fixing-pieces, *s* and *t*, with either of which the spring-band *p* may be made to engage for the purpose of fixing the

umbrella in its closed or open position. The shoulders on the ends of the inclined studs or fixing-pieces *s t* are turned from each other. (See Fig. 1.) In the runner *h* is a groove, *h*², for working over the inclined studs *s t*. When the runner *h* is raised on the stick *q* for opening the umbrella, the spring-band *p* is pressed outward or from the stick by coming against the inclined part of the stud *s*, and when the umbrella has been fully opened the said spring-band *p* snaps behind the shoulder or top of the said stud, and fastens the umbrella in its open position. In a similar way the spring-band *p* is engaged with the bottom inclined stud or fixing-piece *t* when the umbrella is closed.

To release the fastening, the push-piece *p*² is pressed inward, as indicated by the arrow in Fig. 7, when the band *p*, which was engaged with the shoulder of the stud or fixing-piece *s* or *t*, is moved from off the said shoulder, and the umbrella is unfastened, as illustrated in Figs. 8 and 8^a, and the runner *h* may be moved upon the stick *q*.

Having now described the nature of our invention, and the manner in which the same is to be performed, we wish it to be understood that we do not limit ourselves to the precise details herein described and illustrated, as the same may be varied without departing from the nature of our invention; but

We claim as our invention of improvements in umbrellas and parasols—

1. A rib or stretcher for umbrellas jointed to the top notch and runner, respectively, by means of the double or two-armed spring *c*, constructed and arranged, substantially as described and shown, so that each rib or stretcher may be removed or replaced without displacing the others.

2. An umbrella or parasol frame having trough-like stretchers, as represented in Fig. 14 of drawing, and of suitable dimensions, and with the joints connecting such stretchers with the ribs constructed, substantially as described, so that on closing the umbrella or parasol the rib, for a portion of its length, may lie within the stretchers, as and for the purposes set forth.

3. The oval band *p*, push-piece *p*², and spring *r*, in combination with the runner, said parts being constructed and arranged as herein described and illustrated in Figs. 7-12 of the drawings.

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