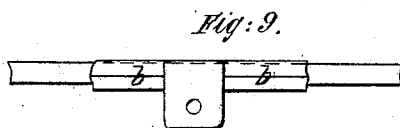
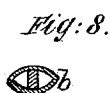
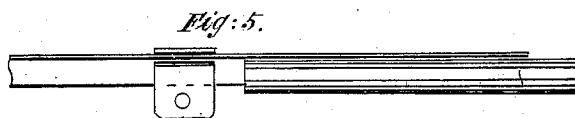
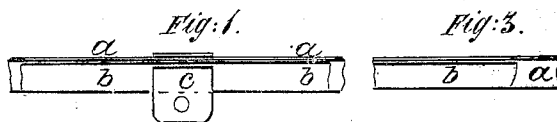
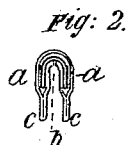


S. Fox, Umbrella.

No. 106,681

Patented Aug 23 1870.



Witness:
Blair Burdett Jr
Sgt. Sheffield
James B. Avery Saml. Clark Sheffield

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UNITED STATES PATENT OFFICE.

SAMUEL FOX, OF STOCKBRIDGE WORKS, DEEPCAR, NEAR SHEFFIELD,
ENGLAND.

IMPROVEMENT IN UMBRELLAS.

Specification forming part of Letters Patent No. **106,681**, dated August 23, 1870.

To all whom it may concern:

Be it known that I, SAMUEL FOX, of Stockbridge Works, Deepcar, near Sheffield, in the county of York, England, a subject of the Queen of Great Britain, have invented or discovered new and useful Improvements in the Manufacture of Umbrellas and Sunshades or Parasols, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement thereof—that is to say:

This invention relates to improvements in umbrellas and sunshades or parasols, and has for its object to give to an umbrella or sunshade or parasol, when open, a greater spread for a given length of rib, a greater stiffness to resist the action of the wind, and an improved droop or downward curve at the tip or outer ends of the ribs, without at the same time materially increasing the cost of the article. These objects I attain by combining the rib with the middle bit, (to which the end of the stretcher is joined,) and with a strengthening piece or pieces applied to the rib, so as to diminish its flexibility and increase its stiffness; also, by combining the strengthening-piece and the middle bit with a rib that is flattened for a portion of its length, so that the flexibility is increased at one part of the length of the rib and decreased at another part thereof.

As the employment of a middle bit in each of the above combinations enables the rib to be formed of a piece of metal of equal transverse section (but not necessarily of the same form) throughout its length, the cost of the article is but slightly increased.

At Figures 1 and 2 of the drawings hereunto annexed is shown a mode by which hollow or trough ribs may be strengthened on both sides of the middle bit. Fig. 1 shows a longitudinal section, on an enlarged scale, of the strengthened rib and the middle bit upon it. Fig. 2 is a transverse section taken through the middle bit and rib. In the arrangement shown by these figures the trough-rib *a* is strengthened by a strengthening-piece, *b*, of a similar trough-section placed within it, and secured in its place by the putting on of the ordinary middle bit, *c*. The strengthening-piece *b* is hardened and tempered separately from the rib, and after being cleaned it is put

into its place in the hollow rib and is secured by the putting on of the middle bit, which is done in the ordinary manner. Each end of the strengthening-piece *b* is cut off at an angle, as shown at Fig. 3, so that the ends of the strengthening-pieces may never protrude out from the hollows of the ribs. For ribs, say, twenty-six inches long, I prefer that the strengthening-piece should extend from the middle bit for about six inches toward the tip of the rib, and for about seven and a half inches toward the end that is jointed to the "top notch" on the stick. At the same time that the trough-rib is thus strengthened I prefer to open or spread out the sides of the rib at the tip and for about four or five inches, so as to render this part of the rib more flexible. Thus strengthening one part of the rib and making another part to bend more readily, a greater spread for a given length of rib is obtained, together with an improved droop or downward curve at the tip or outer ends of the ribs.

Although in the description above given I have stated the length to which I prefer to form the strengthening-piece, I would have it understood that I do not confine myself to the dimensions given, but that strengthening-pieces of any desired length might be employed.

In place of strengthening the rib on each side of the middle bit it might be strengthened on that side only which is toward the tip.

A convenient mode of embodying the invention when a hollow trough-rib is employed is to curve over the sides of the rib somewhat before hardening, as shown in transverse section at Fig. 4, and after the middle bit has been fixed in its place upon the rib to push into the hollow of the rib the strengthening-piece, as shown at Fig. 5, formed of a piece of round wire previously hardened and tempered; or the strengthening-piece may be inserted into the hollow of the rib and secured by closing over the sides of the trough before either is hardened, and then the two may be hardened at one operation, after which the middle bit is secured to the strengthening-rib.

When a trough-rib has been constructed in either of the above modes, I prefer to increase its flexibility toward the tip by flattening the

rib for a portion of its length, as above described.

When using a solid rib of wire, I strengthen it at such points as are required not to bend so readily as the other parts by embracing it with a tube of an elliptic or other form, which may be hardened and tempered separately from the wire, and be afterward applied to it.

Fig. 6 shows a longitudinal section, and Fig. 7 a transverse section, of a portion of a solid or wire rib so strengthened for a distance from the middle bit toward the tip. The strengthening-piece shown in these figures is similar to an ordinary trough-rib, with the sides curved or bent inward at each end of the strengthening-piece to cause them to embrace the wire rib. This strengthening-piece is hardened and tempered separately, and is by preference slipped onto the rib before the middle bit has been fixed to it; or a solid rib may be strengthened on both sides of the middle bit by trough or paragon wire passed over it. In this case I prefer to cut away the sides of the strengthening-tube where the middle bit is to be applied, so that the middle bit may be fixed to the wire rib in the ordinary manner; or in order to strengthen parts of wire ribs which require strengthening they may be made deeper at the parts which require strengthening, and such parts may be embraced by a strengthening-tube to maintain them in their proper position, as well as to increase the stiffness; but such embracing-tube need not in all cases be employed. When thus strengthening a part or parts of solid ribs, other parts of the rib which it is desired to make to bend more readily may be flattened in the direction to reduce its depth, and by such combination of strengthening and weakening different parts of the same rib greater spread, greater stiffness, and an improved droop of the tip ends of the ribs may be obtained. The mode I prefer for making these ribs deeper at one part and reducing their depth at another part is by passing them between rolls.

Fig. 8 shows a transverse section, and Fig. 9 a side view, of part of a solid wire rib thus strengthened for a distance on each side of the middle bit by making such parts of the rib deeper by flattening, and such flattened por-

tions on each side of the middle bit are embraced, as shown, by an elliptical tube, *b*, which not only helps to keep the flattened rib in its proper position, but also itself increases the stiffness.

Although I have only described modes of strengthening two sections of ribs, I would have it understood that I do not confine myself to the strengthening of such sections of ribs.

Having thus described the several modes in which I have contemplated the application of the principle of my invention, I declare that I am aware that it has been proposed to vary the elasticity of the ribs of umbrellas by making them of tapering form; but this mode is objectionable, on account of the cost of producing the taper.

I am also aware that it has been proposed to construct the ribs so as to form lips of the metal of the rib for the purpose of receiving the pivot of the stretcher, and to strengthen such lipped ribs by means of a strengthening-piece combined in such manner with the lipped rib that the forks of the stretcher intervene between the strengthening-piece and the rib. This construction, however, is practically useless on account of the cost of making the lipped ribs, whereas in my system the cost of construction is moderate, because the employment of a middle bit (made of a separate piece from the rib) to receive the pivot of the stretcher enables the rib to be formed of a piece of uniform size throughout its length.

What, therefore, I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of the rib, the strengthening-piece, and the middle bit, all these parts being constructed to operate in combination, as hereinbefore set forth.

2. The combination of the strengthening-piece and the middle bit, with a rib flattened for a portion of its length, so as to afford greater flexibility, as hereinbefore set forth.

SAML. FOX.

Witnesses:

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