June 2, 1953 F. KRAMER 2,640,490

UMBRELLA

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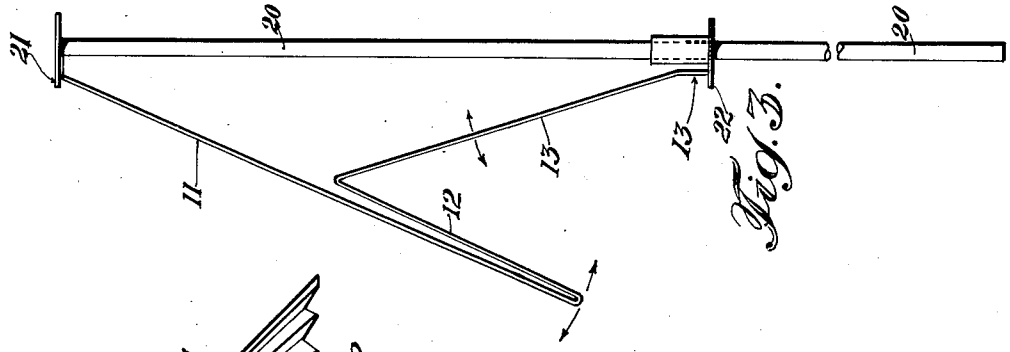


Fig. 3.

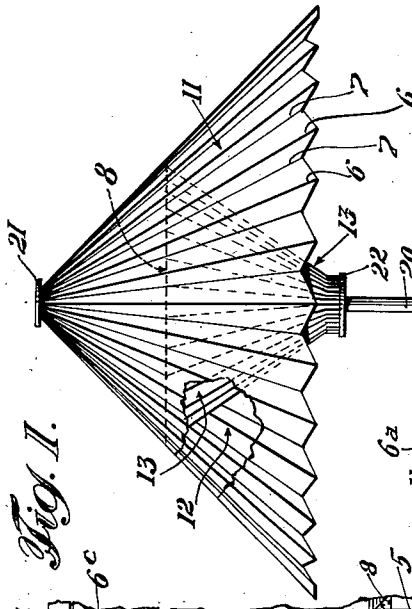


Fig. 1.

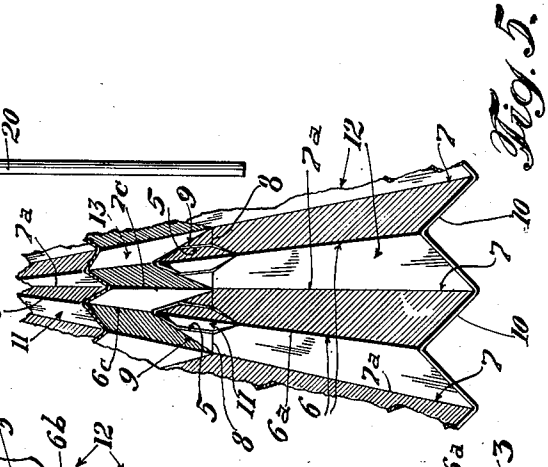


Fig. 5.

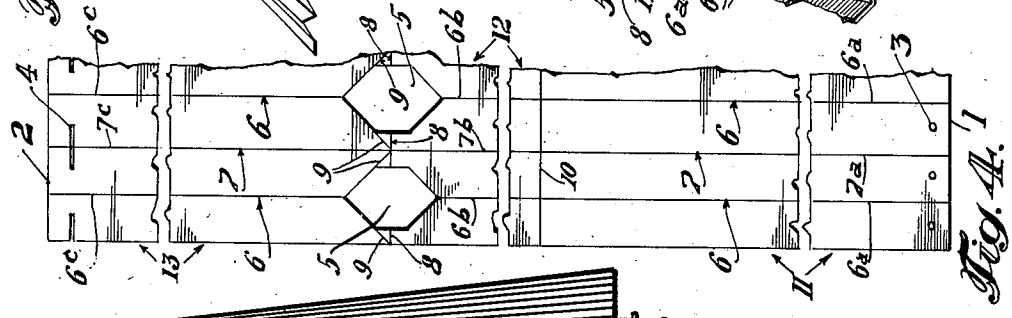


Fig. 4.

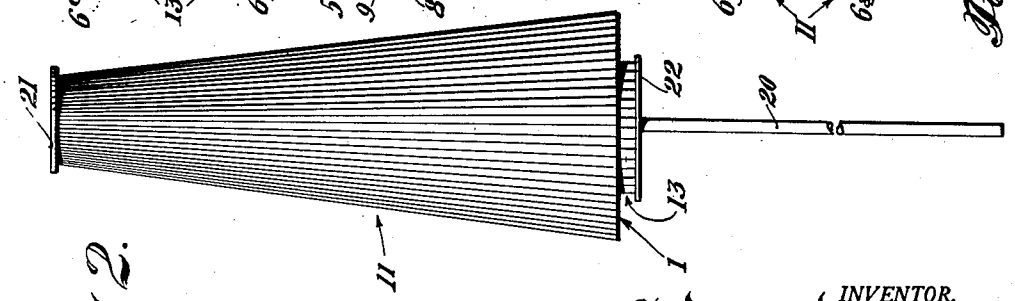


Fig. 2.

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UMBRELLA

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8 Claims. (Cl. 135—20)

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The present invention relates to umbrellas, and, in particular, to an inexpensive umbrella which may be provided with a cover of waterproofed paper or other sheet material, and to a method of making the same.

The general object of the invention is to provide a novel, simple, extremely inexpensive, and practical umbrella which is particularly suited for emergency use or for novelty sale, the product being capable of being manufactured at such low cost that it may be economically discarded after but a few uses. Further, the general object of the invention is to provide a method for making such an umbrella.

The invention contemplates an inexpensive umbrella which may be made of a single sheet of waterproofed or water-repellant paper, ordinary paper, or of other like material and a simple wooden stock without requiring reinforcing ribs as are common in the usual paper umbrella. It is a special object of the present invention to provide an inexpensive umbrella which is useful as a protection against rain or as a parasol, which is of rigid construction capable of withstanding considerably buffeting by wind, and yet having a cover and struts, or the equivalent, therefor made of but a single rectangle of sheet material, such as paper, and requiring no separate ribs, and other spearate parts normally made part of an umbrella. Further the umbrella of the present invention is collapsible like an ordinary umbrella, and may be opened and closed numerous times without fracturing the single sheet of material from which the cover and its strut-like cooperating part are formed.

Heretofore, most umbrellas and parasols having paper covers not only ordinarily had incorporated in their general structure wooden, bamboo, or metallic ribs and struts, but also the paper covering was necessarily arcuate in shape and was required to be plaited radially. Thus, a further object of the invention is to provide a paper umbrella cover with the strut-like part thereof integral therewith, the whole being formed of a specially folded single rectangular sheet. The folds necessary to form the double truncated cone-like parts, constituting respectively the cover and the strut-like supporting portion therefor, are, in the umbrella of the present invention, all either parallel or normal to each other. First, not only is great saving had in paper used in the manufacture, since no drop-off is required in cutting the blank sheets as is the case where it is necessary to cut an arcuate blank; but, second, all folds being parallel

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to one or another pair of opposite sides of the rectangular blank, such folds may be readily made by machinery of simple design not unlike many known paper folders. Further all plaits in the sheet are parallel, not radial, and therefore greatly contribute to the simplicity of manufacture.

In the umbrella of the present invention the plaiting of the cover and strut-like portion serves to reinforce both portions and obviates the use of separate ribs, struts, and hinges, which not only greatly reduces cost by elimination of such parts but by avoiding the labor costs associated with their assembly and application.

While the umbrella of the present invention may be so constructed that it may be used many times in wind and rain, and folded and unfolded repeatedly, like the usual expensive umbrella, its cost may be brought so low that the umbrella could be sold for a few cents so that one caught in a rain storm could well afford to buy it for a single use and afterwards throw it away.

The invention also contemplates an inexpensive umbrella which may be made of gaily colored paper or other sheet material and may be sold for use as a beach parasol or the like.

The method of the present invention comprises punching or otherwise cutting and folding a single sheet of rectangular shape so that the resultant product may be made endless to form the cover and the equivalent of the strut structure of an umbrella. Further, after the rectangular sheet has been properly cut, folded, and made endless, the resultant product may be attached in a simple manner to any suitable stock, such as a wooden rod, and thereafter the cover may be expanded or collapsed like that of any ordinary umbrella.

These and other objects and advantages of the present invention will be more fully understood from the following description and from the drawing.

In the drawing:

Fig. 1 is an elevational view of the umbrella, partly opened, and with a portion of the cover cut away so that the interior may be seen.

Fig. 2 is an elevational view of the umbrella collapsed.

Fig. 3 is a diagrammatic, incomplete axial section.

Fig. 4 is a fragmentary plan view, in several places erased to condense this somewhat enlarged figure, of a flat blank from which the cover and strut structure of the umbrella is made. In this figure scores or fold lines are indicated by solid

lines; and, also, here, the flat blank has been apertured. It will be understood that the original blank is a flat rectangular sheet, as more particularly described below.

Fig. 5 is a fragmentary detail, in perspective, showing part of the interior of the cover and strut structure of the umbrella.

The product of the invention is probably best described by setting forth, first, the method of its manufacture.

Here it is assumed that the cover and structure of the umbrella is made of paper. The blank is a flat rectangular sheet of paper, preferably, but by no means necessarily, about four times as long as its width.

The flat blank is shown in part in Fig. 4. Here score lines are shown solid and certain apertures are represented as already having been made.

That longitudinal edge of the blank which is to become the top edge of the umbrella cover is designated 1; the opposite longitudinal edge, which is to become the lower edge of the umbrella structure, is designated 2. In Fig. 4 only one end of the blank is shown. The pattern represented in this portion is to be understood to be repeated throughout the length of the blank.

The blank is provided along the margin near longitudinal edge 1 with a series of spaced holes 3, and along the margin of longitudinal edge 2 with a series of spaced slots 4. Also the blank is provided with a longitudinal series of hexagonal apertures 5. The position of the median line of the longitudinal series of hexagonal apertures is not critical with respect to the edges of the blank, but, preferably, the median line of the series of apertures 5 is roughly one-fourth the width of the blank from edge 2 thereof. The holes, slots, and apertures are subsequently more particularly described.

The blank is to be variously folded so that the one piece of material forms the cover as well as the strut structure of the umbrella.

Preferably, therefore, scores, all shown in solid lines in Fig. 4, are impressed in the flat blank beforehand. A part of the folding operation involves plaiting the blank transversely in a special manner. All plait folds are made upon equally spaced parallel fold lines represented by scores running from edge 1 to edge 2 of the blank (see Fig. 4). The plaiting of the sheet is not performed in the usual manner of producing an accordion plait, as will be presently made clear. Additional scores are provided, and among these are two longitudinal scores, and a number of short diagonal scores which are continuations of the upper diagonal edges of the hexagonal apertures 5 in Fig. 4. One of the longitudinal scores, 8, is interrupted by the hexagonal apertures and is along the median line of the series. The other longitudinal score, 10, is preferably positioned near the longitudinal median line of the blank. The short diagonal scores are indexed 9. See Fig. 4, also Fig. 5.

In order to facilitate description of the umbrella hereinafter certain portions of the blank are given special designations. That portion between edge 1 and score 10 is indexed 11; between score 10 and score 8, 12; and between score 8 and edge 2, 13. Preferably, as said above with respect to the longitudinal scores 8 and 10, the lower portion 11 of Fig. 4 constitutes about one half the blank, and the upper portions 12 and 13 each constitute about one quarter of the blank. It has been pointed out that this division is not a limitation. However it may be said here that the proportions selected govern the shape of the expanded umbrella.

The plaiting of the blank is peculiar to the actual umbrella structure desired in the present invention, and will be particularly described. In Fig. 4, wherein the (portion of the) blank shown is in plan, the lower portion 11 becomes, after the folding operation is complete, the outer top surface of the umbrella cover (see Fig. 1); the portion 12 becomes part of the lower inner surface of the umbrella cover; and the portion 13 becomes the strut structure.

The spacements of the holes, slots, and apertures are governed by the spacements of the transverse scores 6 and 7. All transverse scores are equally spaced, but for reasons presently to be made clear, each alternate transverse score is indexed 6 or 7 as the case may be. Each hexagonal aperture 5 is bisected by a score 6; each score 7 passes midway between a pair of such apertures. See Fig. 4. Of course it will be understood from the foregoing that score 8 also longitudinally intersects the series of hexagonal apertures 5. Thus the center of each such aperture is the intersection (theoretical) of score 8 and a score 6. A hole 3 is positioned on a common longitudinal line (not shown) between each pair of scores 6 and 7. A slot 4 extends from the median line between a pair of scores 6 and 7 across score 7 to the median line between the adjacent pair of scores 7 and 6 (see Fig. 4).

In Fig. 4 it will be noted that the blank is erased in part in portions 11, 12, and 13, inasmuch as actual dimensions and proportions are not important.

The blank is folded in the following manner:

All plait folds are made along score 6 and 7. However it is to be particularly understood that, with respect to Fig. 4, for example, the plait fold, beginning at the bottom of the figure at edge 1 and following score 6 to score 10 (i. e., portion 6*a* of score 6) is away from the plane of the figure (in other words, 6*a* Fig. 4, when folded, is a valley); from score 10 to score 8 (i. e., portion 6*b* of score 6) is toward the viewer of Fig. 4 (in other words, 6*b*, Fig. 4, when folded, is an arris); and from score 8 to edge 2 (i. e., portion 6*c* of score 6) is away from the plane of the figure (in other words, 6*c*, Fig. 4, when folded, is a valley). Conversely, portions 7*a*, 7*b*, and 7*c* of score 7, respectively between the edge 1 and score 10, score 10 and score 8, and score 8 and edge 2, in Fig. 4, when folded, constitute respectively, an arris, a valley, and an arris.

Fig. 5 is a fragmentary view looking into the opened umbrella after the folding operation is complete.

Note here that the surface of the blank presented in Fig. 4 has become part of the interior surface and part of the exterior surface of the umbrella. The presented surface of portion 11 of Fig. 4 is the top surface of the umbrella cover. Compare, also, Figs. 1 and 2; also 3. Portion 12 is the under surface of the umbrella cover (the peripheral or outer portion of the cover being two-ply. Portion 13 of Fig. 4 now constitutes the strut structure. It will further be noted in Fig. 5 that the reverse plaiting of portion 11 with respect to portion 12 makes it possible for the two portions to mesh each with the other.

At any suitable stage of the folding operation preferably before plaiting, the entire blank is folded longitudinally along scores 8 and 10. With respect to Fig. 4, it may be said that portion 11 is folded away from the viewer on score 10 up

and behind both portions 12 and 13. If portions 11, 12, and 13 are actually in the proportion 2:1:1 edge 1 then coincides with edge 2. Also portion 13 is folded toward the viewer down and over portion 12 on score 8. Special reference should be had to Fig. 3, a diagrammatic radial section of the umbrella.

After the blank has been folded along the plait scores 6 and 7 and along the longitudinal scores 8 and 10, the portion 13, in being brought forward (with respect to Fig. 4) toward the viewer and over and upon portion 12, bends will automatically form along scores 9 to compensate for the reversal of the plaiting order at score 8. This is best illustrated in Fig. 5.

If the blank is plaited in the manner described and the folds along scores 8 and 10 have been executed, the blank appears as a three-ply object (having plies of unequal shape) with nesting plaits. Now, if the ends of the blank are brought around with respect to each other so as to meet, and are joined together in any suitable manner, as by pasting, the object presented is roughly a three-ply cylinder with nesting-plaits as its sidewalls.

A suitable stock 20, which may be a wooden rod, capped with a member 21, is next positioned in the inside of the endless blank, and a filament—a cord, wire, or the like—is stitched through the series of holes 3 along the margin near edge 1 of the blank, and this edge is gathered around the top of the stock 20 beneath the member 21 by means of the filament; and by any other suitable means the filament is attached to the member 21 so that the gathered part of blank cannot move axially along stock 20. See Figs. 1 and 2. Also provided on the stock 20 is a slidable sleeve 22 (cf. Figs. 1, 2, and 3). Another filament is threaded through the slots 4 and the edge 2 is thereby gathered around said sleeve. Thereafter the strut structure of the umbrella may be run up and down the stock as desired with compensatory openings and collapsings of the cover in the manner of the usual umbrella.

While only one embodiment of the invention has been illustrated it will be understood that many modifications are possible within the scope of the appended claims.

I claim:

1. An umbrella comprising a stock and sheet material having a longitudinal series of apertures therein and a longitudinal fold adjacent to said apertures and another longitudinal fold in an opposite direction, and a plurality of transverse plaits, the folds of all plaits between an edge of said sheet and said first described longitudinal fold and between the opposite edge of said sheet and said second described longitudinal fold being inverse to the adjacent folds of the plaits between said longitudinal folds, one portion of said sheet material constituting the shade of said umbrella and another portion thereof constituting the struts of said shade, one longitudinal edge of said sheet material being gathered and secured to said stock and the other longitudinal edge of said sheet material being gathered and slidably mounted around said stock.

2. A collapsible umbrella comprising a stock and a rectangular sheet of material twice folded on itself in flattened Z-formation, and being plaited from end to end, the ends being joined, and the edges being gathered around said stock, one secured thereto, and the other slidably mounted thereon, one portion of said plaited sheet forming a trunco-conical strut and the other thereof forming a trunco-conical cover.

3. A collapsible umbrella comprising a sheet of paper of rectangular periphery when flat, and a stock, said sheet of paper being apertured in a longitudinal series and folded twice longitudinally, once through said series in one direction, and another time parallel to said series in an opposite direction; and folded other times laterally each time in an alternate direction, each alternate fold intersecting one of the apertures of said series; one longitudinal edge of said sheet of paper being gathered around and secured to said stock, and the other longitudinal edge of said sheet of paper being gathered around and slidably mounted on said stock.

4. The collapsible umbrella of claim 3 wherein a cap member is secured to said stock above the gathered and secured longitudinal edge of said paper and a handle member is secured to the other gathered longitudinal edge of said paper and is slidably mounted on said stock.

5. A collapsible umbrella comprising an elongated supporting stick, and a cover and an integral strut structure comprised of a single folded sheet of material and being in the form of truncated, cone like parts reversed with respect to each other, that portion of said cover located between its outer edge and the line of juncture of said cover and said strut structure being of double thickness of said sheet of material.

6. A collapsible umbrella comprising a stock and a rectangular sheet of material having two longitudinal folds and a series of transverse plaits extending from end to end of said sheet, the ends of said sheet being joined, and the plaited edges of said sheet being gathered together, one edge being secured to said stock and the other slidably mounted thereon.

7. A collapsible umbrella comprising a stock and a sheet of material twice folded on itself longitudinal in flattened Z-formation, and being plaited from end to end, the ends being joined, and the plaited edges being gathered around said stock, one secured thereto, and the other slidably mounted thereon, one portion of said plaited sheet forming a trunco-conical strut and the other thereof forming a trunco-conical cover.

8. An umbrella cover and strut structure for supporting the said cover, said cover and strut structure being collapsible, which comprise a sheet of material folded twice from end to end forming in part three superposed plies in a portion of the folded sheet, said sheet being plaited transversely forming a series of nesting plaits, the ends of said sheet being joined together and the plaited edges of said sheet being gathered together forming two trunco-conical structures, one within the other and reversed with respect to the other.

FERDINAND KRAMER.

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