Feb. 2, 1954 V. M. BRUNO ET AL 2,667,884

UMBRELLA

Filed March 7, 1950 2 Sheets-Sheet 1

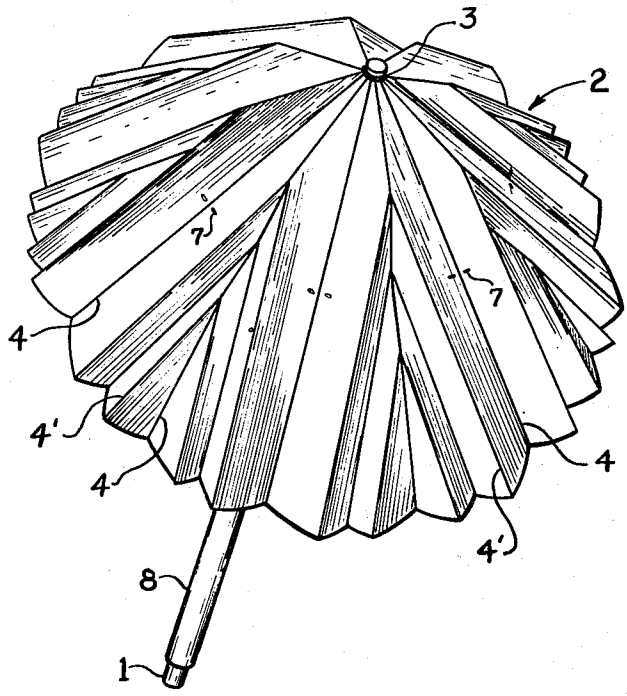



Fig. 1.

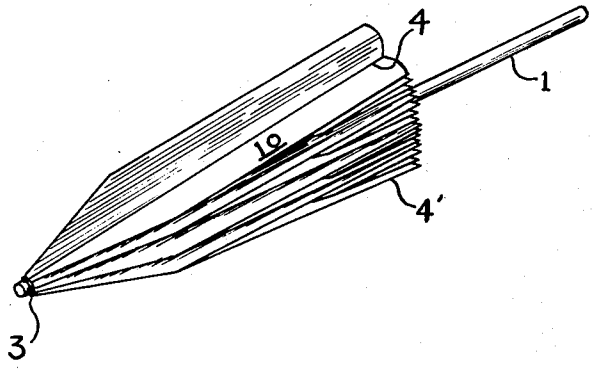



Fig. 2.

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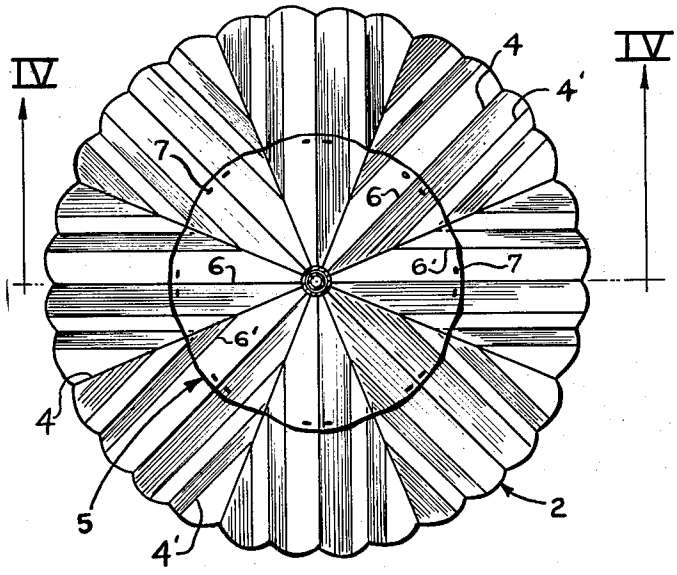
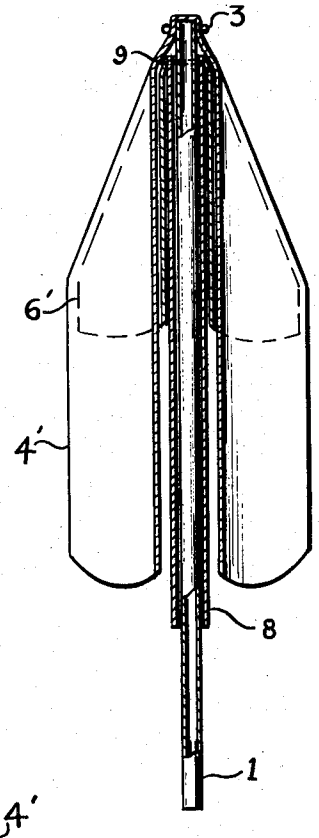



Fig. 3.

Fig. 5.



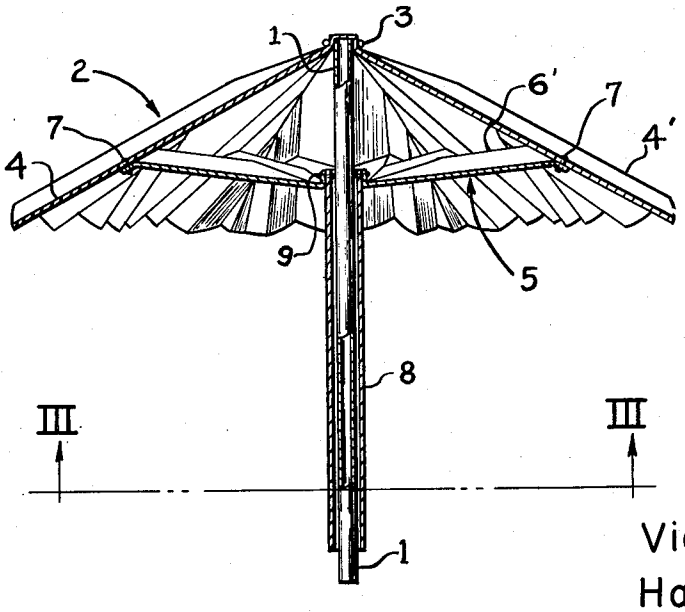




Fig. 4.

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# UNITED STATES PATENT OFFICE

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## UMBRELLA

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Application March 7, 1950, Serial No. 148,020

2 Claims. (Cl. 135—20)

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Generally speaking, the present invention relates to the umbrella and parasol arts, and more particularly to an improved umbrella or parasol of exceedingly simple, cheap, easily operated construction. Indeed, its construction is so simple and cheap, that it is well adapted for use as a disposable umbrella which may be used once (or several times) and then thrown away.

Frequently, in large cities or other places where the population density is great, sudden rain storms will catch a great many people unprepared and without suitable protective equipment, such as umbrellas, rain coats, rain hats, etc. Therefore, there is a considerable need for some form of cheap, disposable element deflecting device for protecting an individual from such a sudden rain storm. Such rain deflecting, protective equipment would have to be readily available at accessible locations in areas of great population density and/or foot travel, such as public transportation depots, stores and other public locations accessible to a great many pedestrians (usually in the downtown areas of big cities and the like, although not so limited). Such a device, in addition to being cheap, preferably ought to be adapted for sale by a coin operated vending machine (although not so limited).

At the present time, when a sudden rain storm catches a large number of people on the streets without suitable protection, make-shift protective measures are frequently taken by at least some of the pedestrians to protect themselves from the rain.

Certain prior art attempts to develop a disposable umbrella have been made in the past. However, no practical and successful umbrella, cheap enough to be disposed of after one or several uses thereof, has evolved from such prior art attempts.

With the above points in mind, it is an object of the present invention to provide a new and improved umbrella of exceedingly simple, cheap construction.

It is a further object of the present invention to provide a new and improved umbrella of such exceedingly simple, cheap construction, that the user of the umbrella can afford to throw it away after a single use.

It is a further object of the present invention, to provide a new and improved umbrella of exceedingly simple, cheap construction, which can be folded into an exceedingly small volume for storage within a vending machine.

It is a further object of the present invention, to provide a new and improved umbrella of exceedingly simple, cheap construction, wherein the outward stiffness required in the force transmission means used in opening and closing the umbrella and the outward stiffness required in the element deflecting sheet portion of the umbrella, are provided by a plurality of pre-folded, permanently creased folds in a relatively flexible material (such as paper or the like, although not so limited).

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A further object of the present invention, is to provide a new and novel umbrella adapted to open in response to tension applied to an umbrella opening means.

Other and allied objects will be apparent to those skilled in the art after a careful perusal, examination and study of the illustrations, specification and appended claims.

To facilitate understanding, reference will be made to the hereinbelow described drawings, in which:

Fig. 1 is a perspective view of one illustrative embodiment of the present invention, as seen from a point of view above and in front of the umbrella which is in open position.

Fig. 2 is a perspective view of the form of the invention shown in Fig. 1 in closed folded position.

Fig. 3 is a bottom view of the umbrella shown in Fig. 1 (viewed in the direction of the arrows III—III in Fig. 4).

Fig. 4 is a vertical, sectional view taken in the direction of the arrows IV—IV in Fig. 3 (with the umbrella positioned upright).

Fig. 5 is a vertical, sectional view, similar in aspect to Fig. 4, but with the umbrella shown in closed position.

Generally speaking, longitudinal umbrella supporting means is provided, one end of which is adapted to flexibly support and be fastened to an element deflecting sheet means adjacent the center thereof. In the specific example described and illustrated, the longitudinal supporting means takes the form of longitudinal tube 1 and the element deflecting sheet means takes the form of a generally pre-folded circular sheet 2, of paper, cardboard, plastic or any other suitable material, which is preferably treated so as to render it water repellent in the case of an umbrella. This may be eliminated in the case of a parasol. The sheet 2 may be fastened at its center to the upper end of the tube 1 by any type of suitable fastening means, whether mechanical, adhesive, cohesive or otherwise. In the specific example illustrated, the fastening means is shown as a wire or ring 3 clamping the center of the sheet 2 around the upper end of the tube 1.

Generally speaking, the element deflecting sheet 2 is so arranged as to be laterally foldable around the center thereof, foldable and outwardly stiff at a plurality of laterally spaced locations around the center thereof. In the specific example described and illustrated, this is accomplished by means of the plurality of outwardly directed, radial circularly spaced folds indicated at 4, and a plurality of additional outwardly directed folds 4' therebetween (which are non-radial although they have radial components) which make it possible to fold the sheet 2 from open position as shown in Figs. 1, 3 and 4 to closed position as shown in Figs. 2 and 5. The folds 4 and 4' also impart outward stiffness to the sheet 2.

Generally speaking, force transmission means is operatively connected between the element deflecting sheet and umbrella opening and closing means. In the specific example described and illustrated herein, the force transmission means comprises a sheet 5 (of any suitable material similar to sheet 2 or different therefrom) which is also provided with a plurality of laterally spaced outwardly directed folds, indicated at 6 and 6', which impart lateral foldability and outward stiffness to the sheet 5. The sheet 5 is connected along its periphery to the underside of the element deflecting sheets 2, as indicated at 7. The center of the sheet 5 is suitably fastened to the upper end of a hollow umbrella opening and closing tube means 8, which is slidably mounted on and around the supporting tube 1 for vertical reciprocating motion with respect thereto. The center of the force transmission sheet 5 may be fastened to the upper end of the umbrella opening and closing tube 8 by any type of fastening means, such as mechanical, adhesive, cohesive or various other suitable fastening means. In the specific example illustrated, staples 9 act to clamp the center of the sheet 5 to the upper end of the tube 8. It should also be noted, that any suitable fastening means may be employed for fastening the periphery of the force transmission sheet 5 to the underside of the element deflecting sheet 2 as indicated at 7. This may be done by staples or other mechanical fastening means, adhesive, cohesive, or any other suitable fastening means.

The operation of the umbrella may be described briefly as follows: The umbrella will be received (from an automatic vending machine for example, although not so limited) in completely folded form, virtually as shown in Fig. 2. It should be noted that when folded in the way illustrated in Fig. 2, it assumes a flat form with the folds 4' on opposite edges thereof, and the top and bottom thereof in the form of virtually, flat surfaces, upper one of which is indicated at 10. This makes it possible to store a great many of the folded umbrellas in a small space, such as within an automatic vending machine, for example. If desired, a ribbon, clamp, or other suitable means may be employed to hold the umbrella in tightly folded position, as shown in Fig. 2 during storage thereof. This ribbon, clamp, or the like, can then be removed after purchasing the umbrella and before opening same. The lower end of the umbrella opening and closing tube 8 is then manually grasped in one hand, the lower end of the umbrella supporting tube 1 is grasped in the other hand, and the tube 8 is pulled downwardly toward the end of the tube 1. Fig. 5 illustrates the umbrella immediately before this downward movement of the umbrella opening tube 8 is begun. It can be seen that compressive force will be transmitted through the folds 6 and 6' of the force transmission sheet 5 to the underside of the element deflecting sheet 2 which is effectively pivotally mounted with respect to the attachment point 3 of the element deflecting sheet 2 to the upper end of the tube 1 by reason of the flexibility of the sheet 2 immediately around and adjacent the attachment thereof to the upper end of the supporting tube 1. Downward movement of the umbrella opening tube 8 into the position shown in Fig. 4 causes the element deflecting sheet 2 to open into the position shown in Fig. 4. The umbrella can then be maintained in open position by manually holding the end of the tube 8, if desired, by reason of frictional contact between the interior of the tube 8 and the exterior of the tube 1, or by any other type of fastening or locking means. The umbrella can be closed by merely reversing the above-described operation and moving the umbrella opening and closing tube 8 upwardly with respect to the lower end of the tube 1. This causes tension to be applied through the force transmission sheet 5 to the element deflecting sheet 2, and to consequently return to the position shown in Fig. 5 and virtually to that shown in Fig. 2 (although in some cases it may have to be manually flattened slightly to return it to its former, extremely small volume).



It should be particularly noted, that in the especially advantageous arrangement of folds embodied in the form of the present invention shown herein, there are more folds per circumferential inch at the periphery of the element deflecting sheet 2, than at the center thereof. In specific example illustrated, the additional folds between each two adjacent radial folds are non-radial and form a plurality of sectors, similar to that formed by the two enclosing radial folds, but of progressively decreasing size. This imparts greater outward stiffness (and also lateral foldability) to the sheet means 2, than would a plurality of radial folds, alone. Furthermore, this folding arrangement is particularly advantageous in that it is readily folded into the small compact, flat form shown in Fig. 2, whereas a circular sheet folded only with a plurality of radial folds would assume a substantially more triangular form than the compact form shown in Fig. 2 and would not be flat. However, the present invention is not limited to the specific arrangement of folds illustrated herein.

Numerous modifications and variations of the present invention will occur to those skilled in the art after a careful study hereof. All such properly within the scope and teachings hereof are intended to be included and comprehended herein.

The exact composition, construction, configuration and relationship of the component parts of the present invention can be substantially modified, without departing from the teachings hereof.

The embodiment of the present invention described and illustrated herein is exemplary only, and is not intended to limit the scope hereof, which is to be interpreted in the light of the prior art and the appended claims only, with due consideration for the doctrine of equivalents.

We claim:

1. An improved umbrella, comprising: longitudinal supporting means; element deflecting sheet means flexibly fastened adjacent the center thereof to one end of the longitudinal supporting

means, said sheet means being laterally foldable around the center thereof and being outwardly stiffened with respect to the center thereof at positions laterally spaced around the center thereof in a manner whereby the sheet can be folded into a closed position, and whereby the sheet means can be unfolded into open position; stiff force transmission means effectively connected at the outer terminus thereof to the underside of the sheet means at a plurality of angularly spaced points around the center of the sheet means and at the inner terminus thereof provided with and effectively connected to umbrella opening and closing means slidably mounted with respect to the longitudinal supporting means in a manner whereby the umbrella opening and closing means may be longitudinally reciprocated in umbrella opening direction which causes compressive force to be transmitted through the force transmission means to the folded sheet means to open same, and whereby the umbrella opening and closing means can be longitudinally reciprocated with respect to the supporting means in the opposite direction for applying tension through the force transmission means to the open sheet means for causing it to become folded into closed position said element deflecting sheet means being provided with a plurality of spaced permanently creased radial folds therein and between each group of three adjacent radial folds a plurality of spaced permanently creased folds all virtually parallel with respect to and on each side of the center radial fold of said group of



three radial folds whereby said sheet means will be effectively stiffened when in open position and yet be capable of being collapsed and folded into a compact flat form for storage purposes.

2. A device of the character defined in claim 1, wherein the stiff force transmission means comprises an outwardly stiff sheet means laterally foldable around the center thereof and circumferentially connected to the underside of the element deflecting sheet means and effectively connected at its center to the umbrella opening and closing means; and wherein the umbrella opening and closing means comprises a longitudinal tubular member slidably positioned around the longitudinal supporting means and in frictional engagement therewith whereby the relative longitudinal positions of said longitudinal supporting means and said umbrella opening and closing means can be selectively frictionally locked for maintaining the umbrella in open position when desired.

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HARRY J. WILSON.

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