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W. R. SCHINDLER

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PLANT PROTECTOR

Filed Sept. 10, 1932

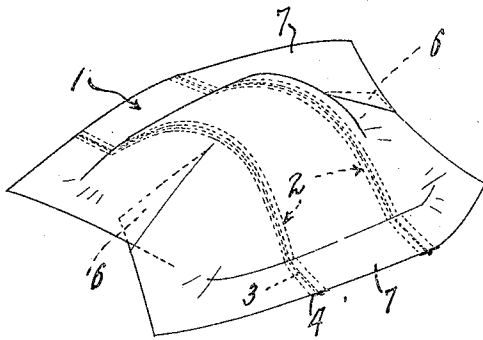


Fig. 1.

Fig. 2.

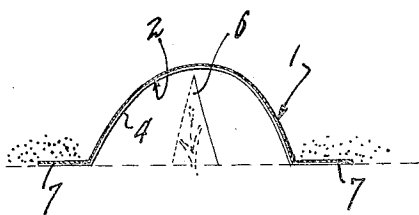
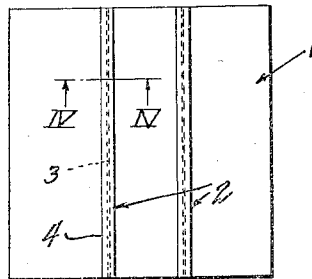
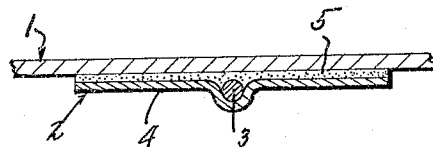


Fig. 3.

Fig. 4.



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PLANT PROTECTOR

Application filed September 10, 1932. Serial No. 632,515.

This invention relates to covers for enclosing plants growing in the open fields, and protecting them from the elements.

An object of the invention is to provide a plant protector that can be manufactured at low cost. This is essential for the reason that these devices are used in relatively large quantities and are replaced each season.

Another object of the invention is to provide a protector that is relatively durable and may be opened up for thinning plants without impairing its effectiveness.

Still another object is to provide a protector made of very thin, transparent material that is unusually strong, whereby it is able to resist the pressure of heavy wind or rain storms.

Plant protectors of the general type to which this invention relates have been in use for a number of years. They are commonly made of rather thin transparent paper which is either molded into such a shape as to have inherent strength-resisting collapse or they have been provided with reinforcing strips of cardboard or paper heavier than that of which the main body of the protector is made. Devices of the latter type are relatively strong, provided the reinforcing members are straight. However, if an attempt is made to bend or distort the paper or cardboard reinforcing member it usually breaks and thereafter has very little strength.

In my application for United States Letters Patent, Serial No. 568,579, filed October 13, 1931, for a Plant protector and method of making it, I have disclosed a plant protector made from a sheet of thin, translucent paper provided with a plurality of parallel spaced-apart reinforcing strips, each strip comprising a cord or other element secured to the surface of the paper by a narrow strip or ribbon of paper that is compressed about the cord and stuck to the cord and to the sheet by an adhesive, such as bitumen, that has considerable stiffness after it has set.

The present invention is an improvement on that disclosed in the aforementioned application and is manufactured in a similar way. The differences are that instead of using cord as reinforcing material, I prefer

to employ a metal filament or wire and to fold the sheet in a different manner. Thus in the first filed application I have shown a protector formed by folding a rectangular reinforced sheet sharply at the middle to form an enclosure of A-shape similar to the conventional ridgepole tent.

In accordance with the present invention, in which a sheet reinforced by wire is employed, I prefer to bend the sheet smoothly in a rounded form as I have found this gives greater strength. Such bending is permissible because of the pliable metal reinforcement, whereas it would not be permissible with a cardboard or other brittle reinforcement which would be broken by bending.

In the drawing:

Figure 1 is a perspective view of a completed plant protector in accordance with the invention.

Fig. 2 is a plan view of a sheet from which the protector is formed.

Fig. 3 is a vertical cross sectional view through a completed protector.

Fig. 4 is a detailed, sectional view in the plane 4—4 of Figure 2, showing the construction of the reinforcing members.

Referring to Figures 2 and 4, the material from which each plant protector is constructed, in accordance with the invention, comprises a rectangular sheet 1 of paper of suitable characteristics. I prefer that this paper be waterproof and relatively transparent in order that it will pass the light and radiant heat therethrough.

The sheet 1 is reinforced by a plurality of spaced-apart parallel, reinforcing strips designated generally at 2 in Figure 2. Each of these reinforcing strips comprises a metal wire 3 (Figure 4), secured against the underside of sheet 1 by a tape or strip of paper 4. The strip 4 is bonded to the sheet 1 and also to the wire 3 by a suitable adhesive, such as bitumen, as shown at 5.

A sheet having reinforcing strips as shown may be manufactured in a number of different ways. Thus the material may be readily made at low expense in large quantities by continuously applying reinforcing wires 3 and paper strips 4 to a long strip of the

paper 1 and thereafter cutting the strip into suitable lengths. A machine and method of carrying out this general process is described in my aforementioned copending application Serial No. 568,579. As disclosed in that earlier filed application, the reinforcing filaments are preferably completely coated and surrounded with the bitumen which not only bonds the filament solidly to the sheet and tape, but serves as a moisture-proof protective coating which prolongs the life of the filament. This is particularly important as iron wire, cord, and most other commercially practicable filament materials deteriorate rapidly when in contact with moist soil.

Reinforced sheets as disclosed in Figure 2 may be shipped flat and assembled into completed plant protectors in the field immediately before they are mounted over the plants to be protected, or they may be shaped at the factory and nested together for shipment.

Although a sheet having a metal wire reinforcement as described can be formed into various shapes, including an A or tent shape as disclosed in my prior application, I find it particularly desirable to form the sheet into the shape shown in Figures 1 and 3 in which the main body of the protector is smoothly curved upwardly and the ends are folded over to provide longitudinally outwardly sloping end walls. The edges of the cover may project outwardly in a substantially horizontal plane. The construction disclosed necessitates only a single fold at each end of the protector. Thus, referring to Figure 1, the paper extending longitudinally from the middle of each reinforcing member 2, is bent over to form a triangular wall section designated by the numeral 6, which is of triple or quintuple thickness. This fold may be maintained permanently by coating the surfaces of the paper with adhesive before folding, or by means of suitable paper clips or rivets. Where the protectors are shipped flat and set up in the field, it may not be necessary to secure the fold either by adhesive or by rivets. This is for the reason that when the protectors are set up they are anchored in place by forcing the soil up over the outwardly extending edge 7 and by banking the soil slightly against the lower edges of the triangular portion 6 of triple thickness. As a result, there will be little tendency for the end to open up.

I have discovered that a substantially continuously convex wall between the reinforcing members 2 is much stronger than if the protector is creased at the center to form an A-shaped cover. This is because the cylindrical shape increases the rigidity of the paper. If pressure is exerted at a particular point on the semi-cylindrical surface shown in Figure 1, the pressure tends to displace the entire body of the protector, whereas, if pressure is exerted against a flat surface of

thin material, such as that usually employed in plant protectors, the paper yields at the point of pressure.

It is frequently necessary, when using plant protectors of the general type described, to open up the protectors some weeks or months after the original setting to remove weeds or to thin out the plants. It has been found that with protectors employing no reinforcing material, or a paper or cardboard reinforcement, that the portion of the protector buried in the soil rots very quickly. As a result, when the protectors are opened up for thinning or weeding, it frequently happens that the portion of the protector that has been in contact with the soil has been so weakened that it tears away, thus making it difficult or impossible to again anchor the protector in position. My improved protector overcomes this difficulty, since the wire reinforcement is relatively durable and will suffice to anchor the protector in place even though the paper in contact with the soil becomes completely rotted away.

I claim:

1. As an article of manufacture, a blank for forming a plant protector comprising a flat sheet of thin material having a reinforcing strip extending thereacross, said reinforcing strip comprising a tape of thin material stuck to the sheet, and a straight stiffening filamentary reinforcing member positioned between the sheet and the tape and stuck to both the sheet and the tape.

2. As an article of manufacture, a blank for forming a plant protector comprising a flat sheet of thin material having a reinforcing strip extending thereacross, said reinforcing strip comprising a tape of thin material stuck to the sheet with a waterproof adhesive, and a straight, stiffening filamentary reinforcing member positioned between the sheet and the tape and bonded directly to both the sheet and the tape by the adhesive.

3. A plant protector comprising a thin sheet of material having a pair of parallel spaced-apart reinforcing members secured thereto, said sheet and said reinforcing members being bent upwardly at their mid portions so that the portion of said sheet between said two reinforcing members defines side and top walls of said protector curved only in the direction of said reinforcing members, the portions of said sheet beyond at least one of said reinforcing members being folded down to constitute a rounded end wall, and the base edges of said sheet and the ends of said reinforcing members being bent substantially horizontally whereby they may be covered with soil to anchor said protector in position.

4. A plant protector comprising a thin sheet of material having a pair of parallel spaced-apart reinforcing members of pliant material secured thereto, said reinforcing

members being bowed upwardly at the center so that the portion of the sheet therebetween constitutes smoothly arched side and top walls of said protector curved only in the direction of said reinforcing members, the portions of said sheet beyond at least one of said reinforcing members being folded down to constitute a rounded end wall and the base edges of said sheet and the ends of said reinforcing members being bent substantially horizontally whereby they may be covered with soil to anchor said protector in position.

5. A plant protector comprising a thin sheet of material having a pair of parallel spaced-apart reinforcing members of pliant metal secured thereto, said reinforcing members being bowed upwardly at the center so that the portion of the sheet therebetween constitutes smoothly arched side and top walls of said protector curved only in the direction of said reinforcing members, the portions of said sheet beyond at least one of said reinforcing members being folded down to constitute a rounded end wall, and the base edges of said sheet and the ends of said reinforcing members being bent horizontally whereby they may be covered with soil to anchor said protector in position.

6. A plant protector comprising a thin sheet of material having a pair of parallel spaced-apart reinforcing members of pliant material secured thereto, said reinforcing members being bowed upwardly at the center so that the portion of the sheet therebetween constitutes smoothly arched side and top walls of said protector, the portions of said sheet beyond at least one of said reinforcing members being folded down to constitute a rounded end wall and the base edges of said sheet and the ends of said reinforcing members being bent horizontally whereby they may be covered with soil to anchor said protector in position, the portions of said sheet beyond said reinforcing member being folded to form a triangular area of multiple thickness, the apex of each triangle being adjacent a reinforcing member and the base of the triangle lying at the base edge of the protector whereby the end edges of said sheet are shortened to form smoothly rounded closed end walls for said protector.

7. As an article of manufacture, a blank for forming a plant protector comprising a flat sheet of thin material having a reinforcing strip extending thereacross, said reinforcing strip comprising a tape stuck to the sheet with a waterproof adhesive and a straight stiffening filamentary reinforcing member positioned between the sheet and the tape, the waterproof adhesive having of itself substantial stiffness and all interstices around the reinforcing member between the sheet and tape being substantially completely filled with the adhesive.

8. As an article of manufacture, a blank

for forming a plant protector comprising a rectangular flat sheet of thin material having a pair of parallel reinforcing strips extending thereacross and intimately bonded to the sheet throughout their lengths, the strips extending parallel to two opposite edges of the sheet and being spaced approximately equidistant from each other and from said parallel edges.

9. A plant protector comprising an upwardly curved wall of thin material adapted to rest upon the ground and having horizontally extending flanges for receiving soil thereover to anchor the protector to the ground, and a reinforcing member intimately secured throughout its length to said wall and extending to the outer edge of said anchor flange, said reinforcing member including an element of substantial strength and width that is relatively resistant to deterioration in contact with soil and moisture.

10. A plant protector comprising an upwardly curved wall of thin material adapted to rest upon the ground and having horizontally extending flanges for receiving soil thereover to anchor the protector to the ground, and a reinforcing member intimately secured throughout its length to said wall and extending to the outer edge of said anchor flange, said reinforcing member including a wire positioned against said sheet, a paper strip of heavier material than said sheet over the wire, and a waterproof bonding material filling the space between the strip and sheet and surrounding the wire.

Signed at Los Angeles, California, this 2d day of September, 1932.

WALTER R. SCHINDLER.