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ROLL PACKAGING MEANS

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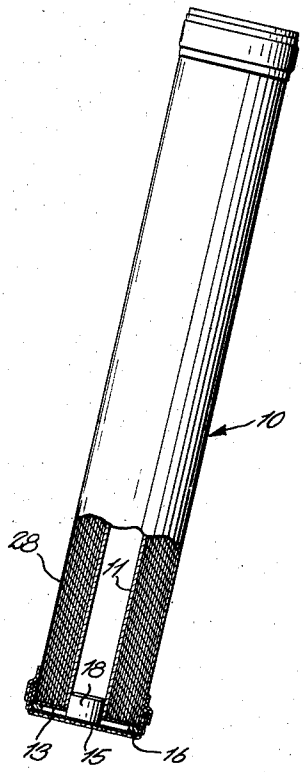


Fig. 1.

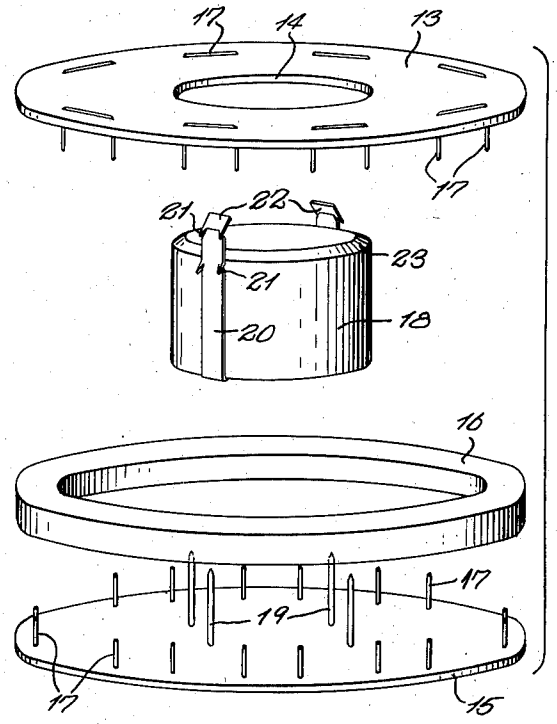


Fig. 2.

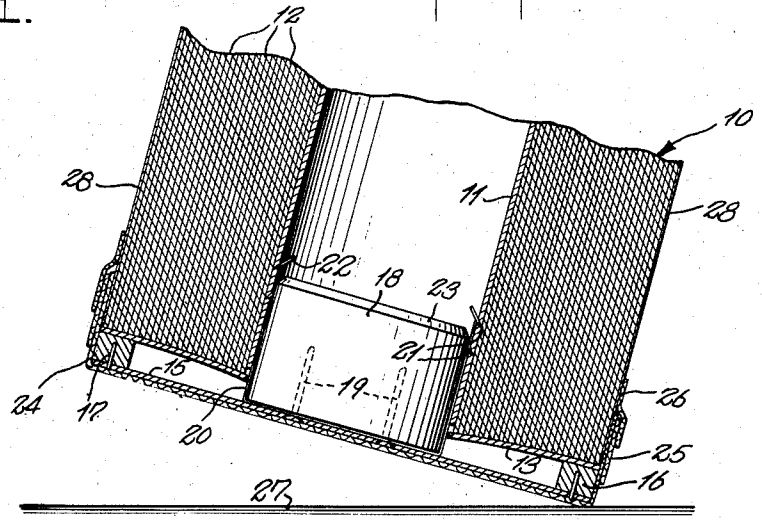


Fig. 3.

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ROLL PACKAGING MEANS

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10 Claims. (Cl. 206—59)

1

This invention relates to means for packaging rolled sheet material, especially rolled sheet material of a heavy or bulky character such as rolls of linoleum or felt base yard goods.

One of the problems that continually confronts the manufacturer of rolled sheet material, particularly when the rolled sheet material is bulky and heavy, is the economical packaging of the material in such a way that it will reach the customer without damage. Rolls of linoleum and felt base yard goods may be 6, 9 or 12 feet in length and may weigh up to 500 or 600 pounds or more. In shipping, handling and transferring the heavy rolls, the goods are frequently dropped in a manner, for example obliquely or edgewise, such that the end edge of the roll receives a heavy blow. As the result of such blows the edges of the material, which are somewhat friable, are often substantially damaged.

In the past it was the practice to wrap a roll of linoleum or felt base yard goods in paper and place the wrapped roll in a suitable crate, but this practice was so expensive that in recent years the use of crates has been abandoned in favor of uncrated paper-wrapped packages. Moreover, the use of crates did not necessarily result in the elimination of damage to the end edges of rolls so packaged.

In order to protect the ends of uncrated paper-wrapped rolled sheet material it has heretofore been proposed to place a disk or plate whose diameter corresponds with the diameter of the roll at each end of the roll, and to maintain the disk or plate in place usually by means of a plug secured thereto and entering the hollow core of the rolled sheet material. However, when a heavy roll is dropped, especially if the impact is concentrated at an end edge of the roll, the edges of the plies at the end of the rolled sheet material receiving the impact are frequently substantially damaged. Moreover, due to the severity of such impacts the disk or plate maintained at the end of the roll receiving the impact is often displaced or disengaged completely from the roll.

It is an object of this invention to provide effective means for protecting the ends of paper-wrapped packages of rolled sheet material. It is a further object of the invention to provide such effective protection by means which are economical and practical.

According to this invention, instead of utilizing an end support for the rolled sheet material which provides equal load carrying support for all of the plies of the roll, novel shock absorbing means for an end of the paper-wrapped packaged rolled

2

sheet material is provided which is in the form of a drum head which is of rugged and shock resisting construction but which comprises a load carrying member that permits a limited amount of longitudinal displacement or telescoping of the roll convolutions relative to the roll axis. This drum head is such that it can be maintained in position by a plug which is secured thereto and which is adapted to fit within the central core of the rolled sheet material, e. g. a hollow tube about which the plies of the roll are wound, and is such that when so maintained in position it will remain in position notwithstanding severe blows and impacts, even though the over-all length of the rolled sheet material is merely covered with a paper wrapper. Because of the special construction of the drum head with a load carrying member that permits limited longitudinal relative displacement or telescoping of the roll convolutions longitudinally of the roll axis, any abnormal shocks such as may occur when the roll is dropped on an end edge of the roll, are dissipated through the body of the roll of sheet material itself over a period of time during which the permitted telescoping takes place. The result is that the inertia force of the plies which are permitted to telescope is harmlessly dissipated, and this action correspondingly diminishes the shock forces imposed on the edges of the plies in the immediate zone of contact with resultant lessening of the likelihood of damage. It is apparent, therefore, that the principle utilized by the drum head shock absorbing means of this invention is basically different as compared with disks or the like which have heretofore been proposed for protecting the ends of paper-wrapped packages of rolled sheet material and which, because of their design, prevent any telescoping whatever of the roll plies.

Features of the shock absorbing means of this invention relate to the provision of a drum head construction wherein the load carrying member is in the form of a centrally apertured disk, and wherein an annular spacer is interposed between the load carrying disk and an outer cover disk adjacent the peripheries thereof. Secured to the inside of the cover disk is a plug which extends through the aperture in the load carrying disk for penetration into a tube or the equivalent about which the sheet material is rolled so as to keep the drum head properly centered. Preferably this plug has associated therewith tangs which serve to retain the plug in the roll tube after it has been inserted therein. The drum head can be wrapped in a suitable covering brought up

about the roll, and this covering can be secured in place by taping or similar means as will be more fully described below.

When the drum head of the packaging means of this invention is constructed as above described, the load carrying disk is adapted to carry the normal load imposed by the weight of the plies of the rolled sheet material but is yieldable to permit substantial bending of the load carrying disk inwardly from the spaced under abnormal load conditions such as may occur as the result of dropping the packaged roll of sheet material. Such abnormal loads which are imposed when the packaged roll of sheet material is dropped, result from the tendency of the plies of the rolled sheet material to telescope longitudinally of the roll, and, according to this invention, this telescoping is permitted because of the nature of the support for the load carrying disk and because of the yieldable character of the load carrying disk, and the portion of the load carrying disk within the internal diameter of the spacer bends to accommodate itself to the telescoping of the plies while offering resistance thereto. At the same time, the construction of the drum head is such that its structural integrity is not impaired under such abnormal conditions and it remains securely in position so as to continue to afford the desired protection.

Further purposes, features and advantages of this invention will be apparent from the following description of an illustrative embodiment of this invention in connection with the accompanying drawings, wherein,

Fig. 1 is a side elevation partly in section of packaged rolled sheet material embodying this invention,

Fig. 2 is a perspective view on a larger scale of the structural elements of the shock absorbing means at one end of the packaged rolled sheet material shown in Fig. 1, these elements being shown in separated relation to improve the clarity of the showing, and

Fig. 3 is a sectional elevation on a larger scale of the lower end of the packaged rolled sheet material shown in Fig. 1, showing the position of the parts after the packaged rolled sheet material has been subjected to impact at a point on the lower end edge thereof.

The roll of sheet material is indicated generally in the drawings by the reference character **10**. For purposes of illustration, the roll may be a roll of linoleum floor covering. The linoleum is wrapped in the form of convolutions about the central core **11** which may be in the form of a chipboard tube. The diameter of the tube may be selected as desired but for a heavy roll of linoleum the internal diameter of this tube may be substantially five inches. The convolutions of the rolled linoleum form the succession of plies **12**. The outer diameter of the roll will, of course, depend on the yardage contained in the roll. Usually the yardages contained in rolls packaged for shipment are standardized with the result that the roll diameters run nearly constant depending on the predetermined yardages for the rolls. Usually these diameters, in the case of rolled linoleum, range from about 9 inches to about 13½ inches.

In Figs. 1, 2 and 3 the novel shock absorbing means of this invention at the lower end of the roll is shown in detail. This shock absorbing means comprises the load carrying disk **13**. For carrying the load imposed by a roll of linoleum this load carrying disk may be in the form of a fiberboard sheet substantially 0.2 inch in thickness. The load carrying disk has the circular aperture **14** in the center thereof which is of substantially the same diameter as the internal diameter of the tube **11**.

The shock absorbing means also comprises the cover disk **15** which likewise may advantageously be made of 0.2 inch fiberboard. Interposed between the load carrying disk **13** and the cover disk **15** there is the annular spacer **16**. Any suitable material can be used for this annular spacer. One satisfactory and inexpensive construction for the annular spacer is spirally wound chipboard. For use in packaging linoleum rolls the annular spacer may be about ¾ inch in thickness longitudinally of the roll and may be about 1 inch wide radially from the axis of the roll. The annular spacer can be maintained in position by any suitable means such as the wire staples **17** driven through the load carrying disk and also through the cover disk into the body of the annular spacer **16**. The annular spacer **16** is disposed so as to support the load carrying disk adjacent to the outer plies of the roll **10**. It is to be noted that the inner portion of the load carrying disk is unsupported and that the spacer **16** provides substantial spcaing between the load carrying disk **13** and the cover disk **15**, thereby permitting substintial bending of the load carrying disk inwardly from the annular spacer **16** without coming in contact with the cover disk.

In order to maintain the drum head provided by the load carrying disk **13**, the cover disk **15** and the spacer **16** at the end of the roll and in order to keep it centered relative to the roll, the plug **18** is provided. This plug has an external diameter corresponding to the inner diameter of the tube **11**. Thus if the internal diameter of the tube **11** is 5 inches the external diameter of the plug likewise is 5 inches. The plug **18** extends through the aperture **14** in the load carrying disk **13** and is not secured thereto in any way. However, the plug **18** is secured to the inside face of the cover disk **15** as by the nails **19**. The plug **18** may conveniently be made of wood.

The plug **18** is seen to be adapted for insertion in the tube **11** and when so inserted keeps the drum head in properly centered position relative to the roll **10**. It has been found desirable in the practice of this invention to provide the plug **18** with tangs which are so directed as to permit insertion of the plug **18** into the tube **11** while affording a grip which holds the plug in its inserted position. These tangs can be provided simply by a U-shaped spring clip **20** which fits over the bottom of the plug **18** and which has upwardly extending arms alongside the periphery of plug **18**. These arms are provided with the tangs **21** which are pointed and are downwardly inclined. Preferably the arms of the clip **20** extend beyond the end of the plug **18** and have inwardly turned ends **22** to facilitate entry of the arms into the tube **11**. The clip **20** can be made of spring steel, and the tangs can be formed therein in any suitable way, e. g. as by stamping. The upper end of the plug **18** can be bevelled at **23** to facilitate its entry into the tube **11**.

In assembling the drum head all that is required is to bring the disks **13** and **15** with the spacer **16** therebetween into alignment and secure these parts together. The plug **18** carrying the clip **20** is next inserted through the aperture **14** in the disk **13** and is secured to the inside face of the cover disk **15**. The assembled drum head is then ready for attachment to the end of the

rolled sheet material, and this may be accomplished merely by driving the portion of the plug 18 extending beyond the upper surface of the load carrying disk into the tube 11.

The foregoing constitutes the elements of the shock absorbing means of the package in the embodiment shown. In making up a completed package, the rolled sheet material ordinarily is wrapped throughout its entire length with a paper wrapper such as the wrapper 28 shown in Figs. 1 and 3. For further protection to the end of the rolled sheet material, and in order to assist in maintaining the shock absorbing drum head in place, the drum head and the lower end of the roll may be covered with a suitable covering of flexible sheet material 24. Any flexible sheet material of sufficient strength and toughness may be used for this purpose, e. g. burlap. In order to keep this covering snugly in place over the drum head and over the end of the roll to which the drum head is secured, the drum head and the surface of the paper wrapper 28 adjacent thereto may have glue applied thereto before the covering is placed thereover, and in order to assist in keeping the covering in place about the lower end of the roll two strips 25 and 26 of gummed tape may be applied. As shown in Fig. 1, the shock absorbing and protecting means at the lower end of the roll ordinarily is duplicated at the opposite end of the roll so that each end of the roll may be protected. If desired, the paper wrapper 28 may be omitted and in such case the outermost convolution of the rolled sheet material acts as a wrapper for the inner convolutions. However, it is ordinarily preferable to employ the wrapper 28 of paper or similar sheet material so as to protect the outermost convolution of the packaged rolled sheet material throughout the length thereof and so as to provide a surface to which the covering 24 may be made adherent, as by the use of an adhesive, without damaging the surface of the outermost convolution of the rolled sheet material. While specific means have been described and shown for maintaining the drum head and positioning plug in place at the end of a roll of sheet material, it is apparent that means other than that shown and described by way of illustration may be employed.

The way by which the improved shock absorbing means of the packaged rolled sheet material acts to prevent damage to the rolled sheet material when the package is subjected to impacts may be illustrated in connection with the embodiment shown in the drawings, with particular reference to Figs. 1 and 3. In Fig. 1 the packaged roll of linoleum is shown in a tilted position such as that which it may assume when handled by a workman in unloading the rolls from a truck or freight car. Fig. 3 illustrates the action of the shock absorbing means of the package in the event that the packaged material in the position shown in Fig. 1 were to be dropped. Upon contact of the end edge of the package with the floor or pavement 27 the resulting shock is dissipated in the body of the roll due to the fact that the inner plies of the roll are permitted to telescope in the direction of the roll axis. In Fig. 3 the substantial telescoping of the plies is shown with the attendant bending of the load carrying disk 13 inwardly from the spacer 16. Of course, the plies of the rolled sheet material immediately overlying the spacer are brought to an abrupt stop when the package strikes the floor or pavement 27, but instead of having the force necessary to overcome the inertia of the entire mass of the roll concentrated at the edges of the outer plies at the zone of contact, as would be the case if the entire roll were brought to an abrupt stop by use of a rigid protecting disk, the inertia of the plies within the inner diameter of the spacer is largely dissipated during the substantial interval of time within which the permitted telescoping takes place after the moment of initial contact with the floor or pavement. Therefore, much of the inertia of the falling roll is dissipated in overcoming the friction required to effect the telescoping and in bending the load carrying disk, and the outer plies of the roll in the zone immediately above the point of contact are not subjected to a sudden application of the very great force that would be required in order to effect an immediate arresting of the inertia of the entire roll. Because of this action the force applied to the edges of any of the plies in the roll at any one time is greatly reduced and the likelihood of damage to them due to impacts received at the end of the package is correspondingly reduced.

Further in connection with the foregoing description of the action of the shock absorbing means of this invention in minimizing the severity of shocks against the edges of plies of the rolled sheet material, it is preferable, in the practice of this invention, that the cover disk 15 of the drum head embodiment that has been shown and described, as well as the load carrying disk, be composed of yieldable material. When the cover disk 15 is composed of yieldable material, this element of the shock absorbing means may likewise yield to some extent to accommodate and permit telescoping of the plies in the roll. Such action may be desirable, e. g., in the case of extremely heavy impacts that may be received when a roll positioned as shown in Figs. 1 and 3 is dropped from a considerable height. In Fig. 3 the cover disk 15 is not shown dished outwardly, but if the received impact were of sufficient severity, resilient material used for the cover disk 15 would permit it to dish outwardly so as to augment the cushioning action of the shock absorbing means and so as to minimize the likelihood of the shock absorbing means becoming displaced.

The effectiveness of the novel shock absorbing means of this invention has been demonstrated as the result of thorough testing under very severe dropping tests conducted both at 25° F. and at 75° F. using rolls of linoleum for these tests. When ordinary end protecting disks were employed in these tests the edges of some of the plies of the rolled linoleum were severely damaged. When, however, these linoleum rolls were packaged employing the novel shock absorbing means of this invention and were subjected to the same tests under the same conditions, the edges of the plies of the packaged linoleum were not appreciably damaged.

While this invention has been described in connection with a specific embodiment for purposes of illustration, it is apparent that the specific construction mentioned can be varied. Thus instead of making the load carrying disk and the cover disk out of fiberboard, any other suitable material can be used such as other pressed fiber sheet materials, pressure molded or laminated plastic sheet materials, vulcanized materials such as vulcanized rubber, etc. The diameter of the disks ordinarily will conform to the outer diameter of the roll of sheet material with which the shock absorb-

ing means of this invention is employed. The thickness of the load carrying disk will depend on the material employed, the diameter of the unsupported portion of the load carrying disk and the weight of the rolled sheet material carried by this unsupported portion. In any event the load carrying disk should be adapted so that the unsupported portion thereof will support the plies of the rolled sheet material under normal conditions of storage and shipment but will be yieldable to permit substantial bending of the load carrying disk inwardly from the spacer, to accommodate telescoping of the plies as the result of shocks and sudden impacts. The predetermined normal load carrying capacity of the load carrying disk is, of course, readily determinable utilizing the principles of this invention so as to be appropriate under varying conditions depending principally on the size and weight of the rolls that are packaged.

It is ordinarily the case that the outer or cover disk will have approximately the same load carrying characteristics as the load carrying disk, and for this reason it is usually convenient to make both the load carrying disk and the cover disk out of the same material. Moreover, it is usually preferable that the load carrying disk as well as the cover disk be made out of resilient material so as to permit dishing for accommodating the telescoping of the roll plies and so as to provide at the same time a springing action tending to move the plies toward their original position after the maximum amount of telescoping caused by an impact has occurred.

With regard to the annular spacer, it can be made out of any suitable material. While wound laminations of chipboard, linerboard, heavy paper and the like are inexpensive and are effective, other materials such as molded plastics, or plastic-fiber compositions may be used, or vulcanized materials such as rubber compositions may be used. Of course, any suitable means for maintaining the parts in their desired relative position may be used such as stitching wire or adhesives, e. g., glue.

It is apparent from the foregoing that according to this invention packaging means is afforded which effectively solves the problem of protecting the end edges of rolled sheet material due to accidental shocks received during shipping, transference or other handling of the rolls. This has been accomplished in a novel manner and by the employment of shock absorbing means that can be made of inexpensive readily available materials, and that can be manufactured and installed at a low fabricating cost.

While this invention has been described in connection with certain typical embodiments and examples, it is to be understood that this has been done for illustrative purposes and that the principle involved and the advantages obtained may be availed of according to this invention within the scope thereof as defined in the following claims.

I claim:

1. Packaged rolled sheet material comprising a roll of sheet material wound about a central tube, and shock absorbing means at least at one end thereof, said shock absorbing means comprising a centrally apertured load-carrying disk which is arranged to support the edges of the plies of the rolled sheet material at said end, a cover disk spaced from said centrally apertured load-carrying disk, an annular spacer maintained between said load-carrying disk and said cover disk adjacent the peripheries thereof and supporting said load-carrying disk adjacent the outer plies of said rolled sheet material, the inner portion of said load-carrying disk being unsupported against bending, a plug secured to the inner side of said cover disk and extending through the aperture in said load-carrying disk and into said tube, and means for securing said shock absorbing means to said rolled sheet material at said end thereof, said load-carrying disk being adapted to support the load normally imposed thereon by the edges of the plies of said rolled sheet material while being yieldable to permit substantial bending thereof inwardly from said annular spacer to accommodate relative displacement of said plies longitudinally of said rolled sheet material when said end of said packaged rolled sheet material is subjected to impact.

2. Packaged rolled sheet material according to claim 1 wherein said load-carrying disk is composed of fiberboard having substantial resilience.

3. Packaged rolled sheet material according to claim 1 wherein said cover disk as well as said load-carrying disk is composed of yieldable material.

4. Packaged rolled sheet material according to claim 1 wherein said load-carrying disk and said cover disk are composed of yieldable fiberboard having substantial resilience.

5. Packaged rolled sheet material according to claim 1 wherein strip metal is secured to said plug along the peripheral portion thereof within said tube, said strip metal presenting tangs engaging the inner surface of said tube to prevent retraction of said plug from said tube.

6. Packaged rolled sheet material comprising a roll of sheet material having a hollow core and shock absorbing means at at least one end thereof, said shock absorbing means comprising a drum head in the form of a flat load carrying member which is arranged to support the edges of the plies of the rolled sheet material at said end, an annular spacer secured to the load carrying member on the opposite side of said load carrying member and supporting said load carrying member adjacent the outer plies of said rolled sheet material, the inner portion of said load carrying member being unsupported against bending, and a cover member secured to the opposite side of said annular spacer in spaced relation with respect to said load carrying member; and means for maintaining said drum head in position at said end of said rolled sheet material including a plug secured to said drum head and fitting into said hollow core, said load-carrying member being adapted to support the load normally imposed thereon by the edges of the plies of said rolled sheet material while being yieldable to permit substantial bending thereof inwardly from said annular spacer to accommodate relative displacement of said plies longitudinally of said rolled sheet material when said end of said packaged rolled sheet material is subjected to impact.

7. Packaged rolled sheet material according to claim 6 wherein said rolled sheet material has a paper wrapper thereabout and wherein a covering of tough flexible sheet material is secured to said drum head and to said paper wrapper adjacent said end of said rolled sheet material.

8. A shock absorbing head adapted for securement to the end of a roll of sheet material to protect said end thereof from damage due to impacts, said shock absorbing head comprising a centrally apertured load-carrying disk, a cover disk, an annular spacer between and secured to said load-

carrying disk and said cover disk adjacent the peripheries thereof providing a support for said load-carrying disk adjacent the periphery thereof, the inner portion of said load-carrying disk being unsupported against bending, and a plug secured to the inner side of said cover disk and extending through the aperture in said load-carrying disk, said load-carrying disk being yieldable to permit substantial bending thereof inwardly from said spacer when the load imposed thereon by the edges of the plies of a roll of sheet material exceeds a predetermined amount.

9. A shock absorbing head according to claim 8 wherein the portion of said plug extending beyond said load-carrying disk carries protruding tangs disposed to prevent retraction of said plug from a tube in which said plug is inserted.

10. A shock absorbing head adapted for securement to the end of a roll of sheet material to protect said end thereof from damage due to impacts, said shock absorbing head comprising a centrally apertured load-carrying disk adapted to be positioned against the end of the roll, a cover disk concentric therewith, a rigid annular spacer having an inner diameter substantially greater than

the diameter of the aperture in said load carrying disk, said spacer being disposed between and secured concentrically to said disks adjacent the peripheries thereof to provide a support for the outer marginal portion of said load carrying disk, and a plug secured to the inner side of said cover disk and extending freely through said aperture in said load carrying disk, said latter disk providing an annular support for the end of the roll, that portion thereof inward of said outer marginal portion being yieldable relative to said outer marginal portion to permit substantial bending of said inward portion toward said cover disk when the head is subjected to load impacts.

RALPH CORSON.

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The following references are of record in the file of this patent:

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Certificate of Correction

Patent No. 2,474,657. June 28, 1949.

RALPH CORSON

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows:

Column 3, line 10, for the word "spaced" read *spacer*;

and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 29th day of November, A. D. 1949.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.