



US006793872B1

(12) **United States Patent**
Buss

(10) **Patent No.:** **US 6,793,872 B1**
(45) **Date of Patent:** **Sep. 21, 2004**

(54) **METHOD FOR MAKING CARGO LINERS AND MATS WITH CHANNEL EDGE**

(75) **Inventor:** **Kenton A. Buss**, Oxford, KS (US)

(73) **Assignee:** **Winfield Consumer Products, Inc.**, Winfield, KS (US)

(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 152 days.

(21) **Appl. No.:** **09/595,769**

(22) **Filed:** **Jun. 16, 2000**

(51) **Int. Cl.7** **B29C 51/10**

(52) **U.S. Cl.** **264/554; 264/138; 264/544; 264/DIG. 78; 425/387.1; 425/388**

(58) **Field of Search** **264/554, 138, 264/163, 544, DIG. 78; 475/387.1, 388**

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,081,740 A	5/1937	Farnham	
3,161,915 A	* 12/1964	Thiel	425/305.1
3,190,946 A	* 6/1965	Keyes	264/548
3,337,664 A	* 8/1967	Lyon	264/89
3,402,232 A	9/1968	De Rusha	
3,640,666 A	2/1972	Jope et al.	
3,805,657 A	* 4/1974	Simpson	83/522.24
3,827,130 A	8/1974	Baumann	

3,954,923 A	* 5/1976	Valyi	264/513
4,086,045 A	* 4/1978	Thiel et al.	425/326.1
4,256,690 A	3/1981	Sabba	
4,664,865 A	5/1987	Kulis	
4,704,237 A	11/1987	Taylor, Jr. et al.	
4,979,283 A	12/1990	Kurita et al.	
5,314,324 A	* 5/1994	Wendt	425/299
5,358,214 A	10/1994	Battle	
5,759,591 A	* 6/1998	Rhoades et al.	425/387.1
5,773,540 A	* 6/1998	Irwin et al.	425/387.1
5,795,535 A	8/1998	Giovannone et al.	
5,798,079 A	* 8/1998	Freek et al.	264/554
6,010,062 A	* 1/2000	Shimono	229/400

* cited by examiner

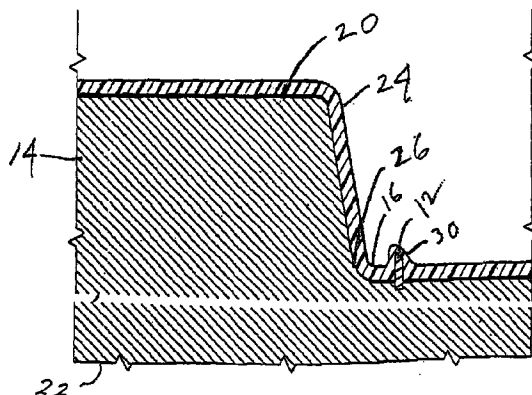
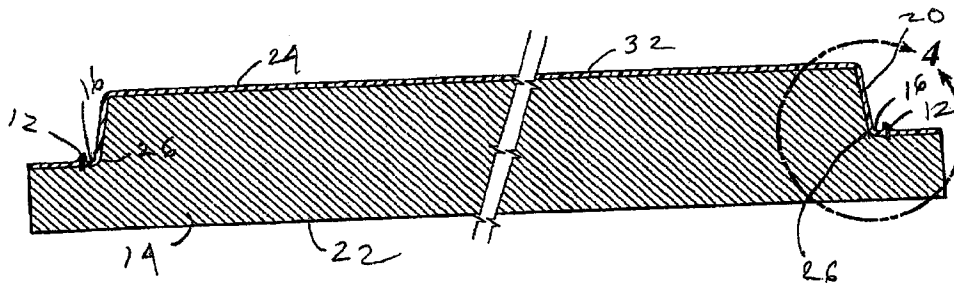
Primary Examiner—Edmund H. Lee

(74) *Attorney, Agent, or Firm*—Fellers, Snider, Blankenship, Bailey & Tippens, P.C.

(57) **ABSTRACT**

A method for making a cargo liner or a floor mat using a plastic molding process wherein a male mold includes a steel rule about its perimeter or a female mold includes a groove about its perimeter creating a ridge in the molded article to allow trimming of surplus material from the article along the ridge such that the dimensions of the finished article are determined by the ridge. In a preferred embodiment, an article is molded in a thermoforming process, the article thus produced includes a channel edge which enhances the appearance of the finished article and improves its structural integrity.

6 Claims, 3 Drawing Sheets



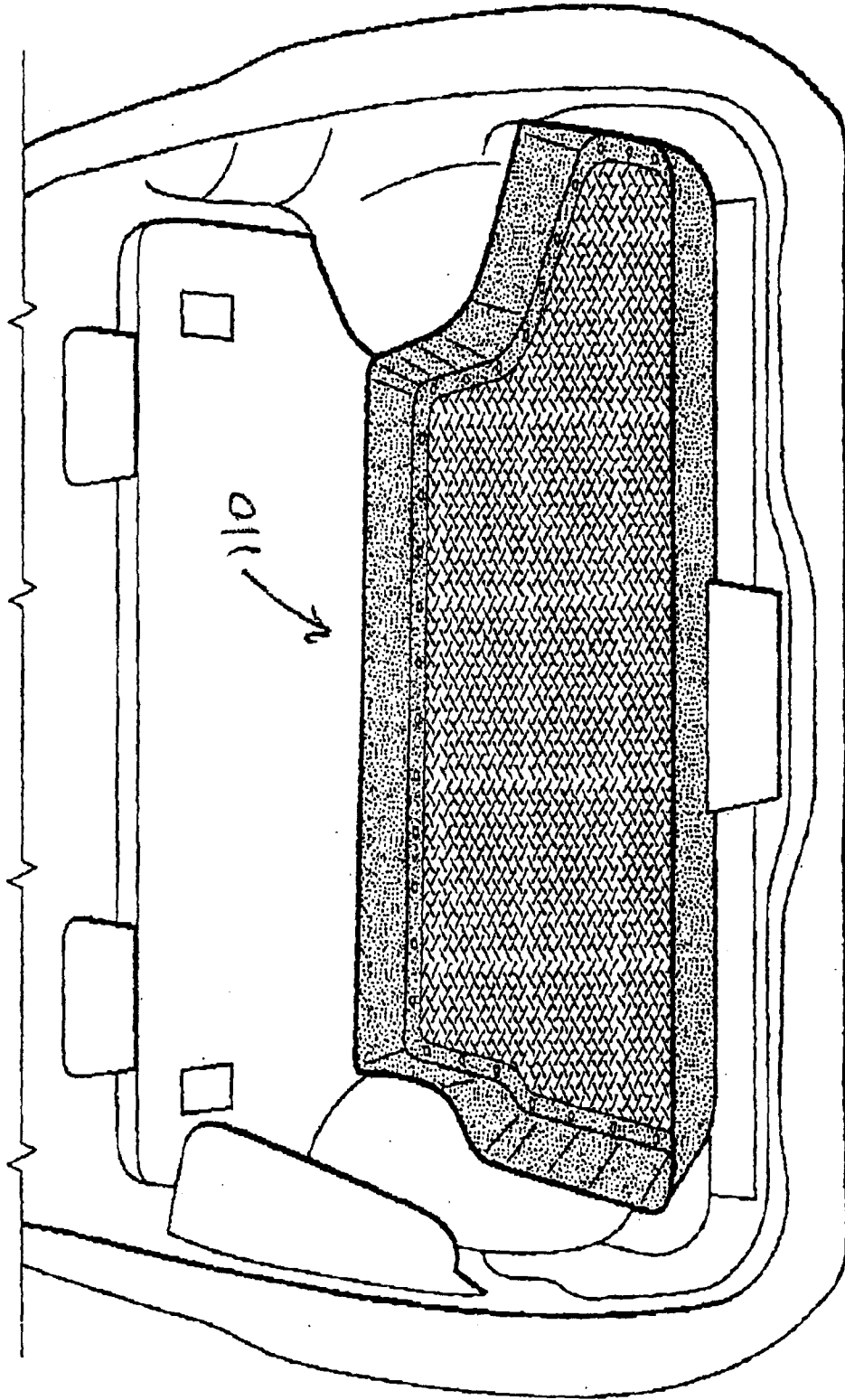


Fig. 1

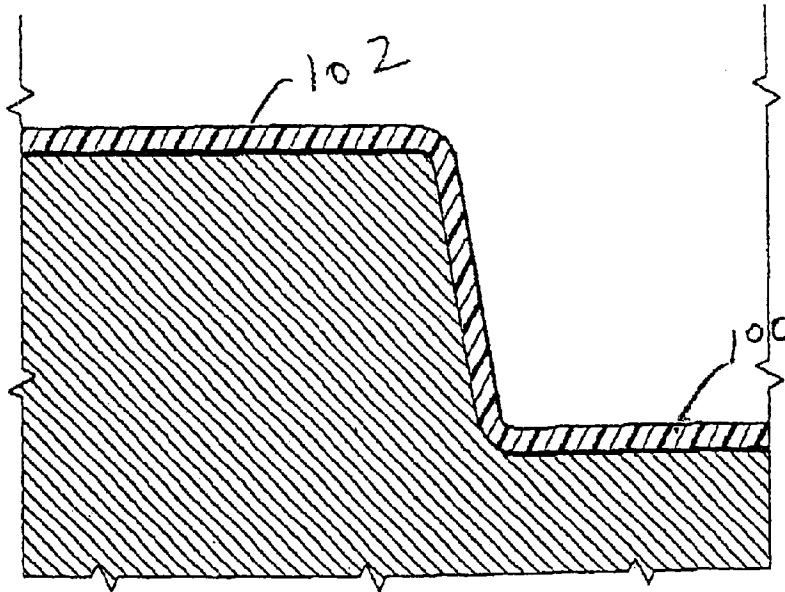
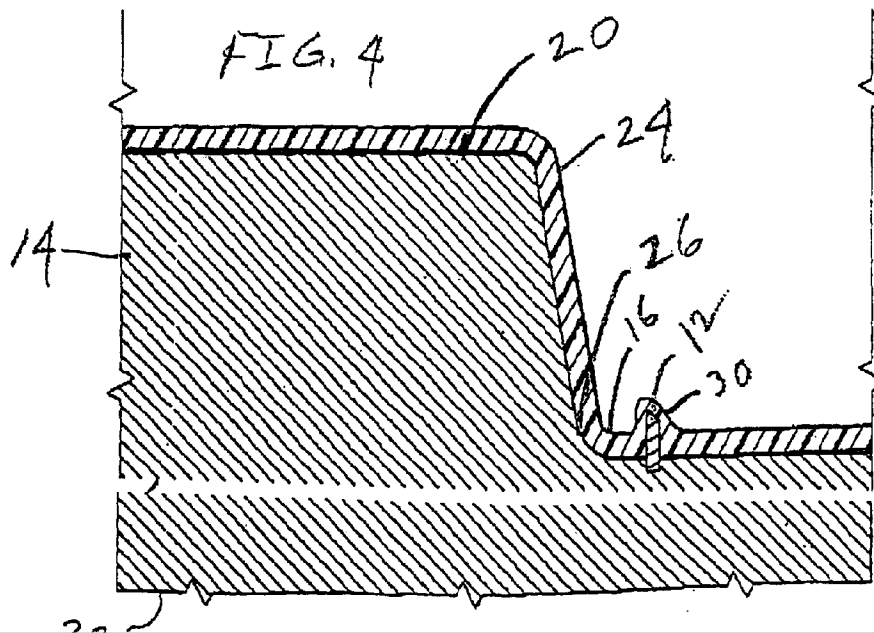


Fig. 2
(PRIOR ART)



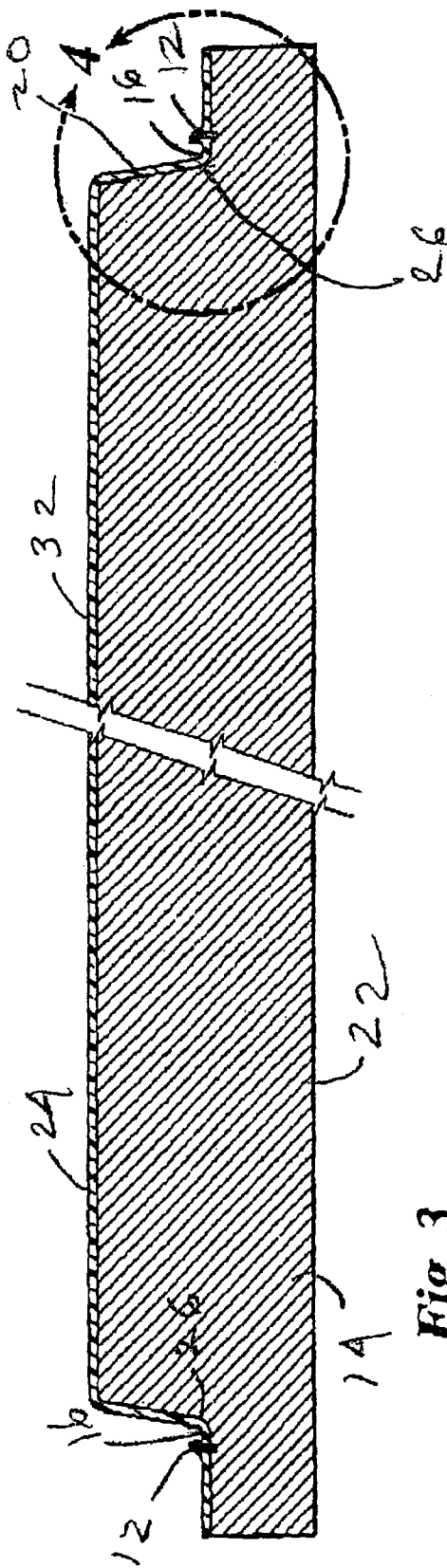


Fig. 3

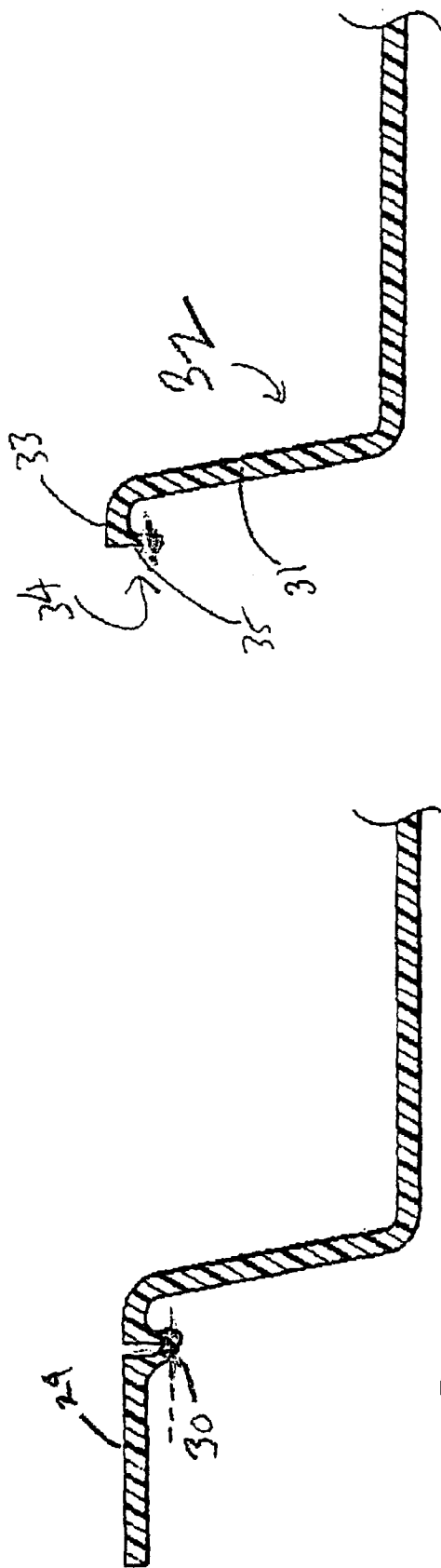


Fig. 6

Fig. 5

1

METHOD FOR MAKING CARGO LINERS AND MATS WITH CHANNEL EDGE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to a method for making cargo liners and floor mats for vehicles. More particularly, but not by way of limitation, the present invention relates to a thermoforming process for producing cargo liners or floor mats for vehicles which include a channel edge about at least a portion of the perimeter of the liners or mats.

2. Background

Cargo liners for pickup trucks, SUVs, vans, and even automobile trunks are well known in the art, as are floor mats for all types of vehicles. A common method for manufacturing such devices is a plastic thermoforming process, in particular vacuum or pressure forming.

Vacuum forming and pressure forming are well known in the art. Generally, to vacuum form a plastic article, a mold is produced, either as a male likeness of the article over which material will be drawn, or a female likeness of the article into which material will be drawn. The mold is typically drilled with small passageways through which air may pass from the molding surfaces to the backside of the mold. A sheet of plastic is then heated until it becomes extremely pliable. The heated plastic is then placed adjacent the mold and vacuum is applied to the backside of the mold. Air passes through the passageways to create low pressure at the surface of the mold, thereby drawing the heated plastic tight against the mold so that the plastic takes on the shape of the mold. The plastic is then cooled and the molded sheet is lifted off the mold. Alternatively, in some cases, compressed air is applied to the backside of the mold so that the molded plastic is blown off of the mold. In a final step, surplus material is trimmed from the edge of the molded article, typically with a router.

Pressure forming is performed in much the same manner except, compressed air is applied to the heated sheet to press it onto the mold. In a sense, this is the same as the vacuum operation in that relatively high pressure air is on the outside of the plastic sheet and relatively low pressure air is on the mold side of the plastic sheet.

In either operation, water or forced air may be used to expedite cooling of the molded article.

While other methods are applicable to forming cargo liners and floor mats, thermoforming of sheet materials has proven to provide a cost effective method of producing finished product of consistent quality. However, a limitation of thermoforming arises in the subsequent trimming operation to remove surplus material from the perimeter of the article. A trimming guide may be used to guide the router operator in trimming the article. While a guide may work quite well when all of the trimming occurs in a single plane, the guide may become quite complex when trimming complex articles. Furthermore, the trimming operation may introduce some variability into the dimensions of the finished article and it is often difficult to produce a straight edge of consistent width.

Articles formed of relatively soft material may be hand trimmed using a knife. Unfortunately, hand trimming will often leave the trimmed edge of part irregular and the consistency of the operation is dependent on the skill of the individual. In addition, hand trimming places relatively large

2

Therefore it can be seen that there is a need for a method for making cargo liners and floor mats using a thermoforming process which facilitates trimming of the molded part in a secondary operation.

It is thus an object of the present invention to provide a method for thermoforming a cargo liner or floor mat wherein a channel edge is formed during the molding process to facilitate cutting and to provide an improved article.

SUMMARY OF THE INVENTION

The present invention provides a method for making cargo liners and floor mats using a plastic molding process. In the inventive process, a steel rule or a groove is incorporated into the mold to produce a ridge in the molded part to facilitate subsequent trimming.

In a preferred embodiment, when heated plastic is drawn over a steel rule during a thermoforming process, a channel edge is formed in the plastic article about its perimeter. During a subsequent trimming operation to remove surplus material, trimming is performed on the ridge created by the steel rule thereby reducing variations in the edge which result from the trimming operation to produce an edge which enhances the appearance of the finished article with less dependance on operator skill during the trimming operation. An article produced by the inventive process will include a channel edge about at least a portion of its perimeter.

While the inventive process is applicable to virtually any molding operation which requires a subsequent trimming operation, it is especially well suited to thermoforming of plastic sheet materials. By way of example and not limitation, such processes include vacuum forming, pressure forming, and rotational molding. Furthermore, such forming may involve either a male mold or a female mold.

Further objects, features, and advantages of the present invention will be apparent to those skilled in the art upon examining the accompanying drawings and upon reading the following description of the preferred embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 provides an elevational view of a cargo liner made with the inventive method in its general environment.

FIG. 2 provides a cutaway view of a prior art mold with a sheet of plastic material drawn over the mold.

FIG. 3 provides a cutaway view of the an inventive male mold incorporating a steel rule.

FIG. 4 provides a cutaway detail of an inventive male mold incorporating a steel rule.

FIG. 5 provides a cutaway view of a cargo liner made with the inventive method prior to the trimming operation.

FIG. 6 provides a cutaway view of a cargo liner made with the inventive method after the trimming operation.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Before explaining the present invention in detail, it is important to understand that the invention is not limited in its application to the details of the construction illustrated and the steps described herein. The invention is capable of other embodiments and of being practiced or carried out in a variety of ways. It is to be understood that the phraseology and terminology employed herein is for the purpose of description and not of limitation.

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.