

明 細 書

ラミネート板の製造方法および製造装置

技術分野

- 5 本発明はラミネート板の製造方法および製造装置に関する。さらに詳しくは、加熱した金属板に熱可塑性樹脂フィルムを密接・加圧してラミネート板を製造する方法およびその方法を実施する装置に関する。

背景技術

- 10 図4に示すように、金属板101を加熱炉で加熱し、その表面に熱可塑性樹脂フィルム102を重ねながら一対のラミネートロール103、104（ニップロール）で押圧し、金属板101の熱でフィルム102の一部を溶融しながら金属板101に熱融着するラミネート方法は従来より公知である（たとえば 特開平4-201237号公報など参照）。このようなラミネート方法においては、
- 15 金属板101の加熱温度、加熱炉からラミネートロール103、104までの距離、送り速度、フィルム102の融点などの諸条件を適切に選択することにより、フィルム102の溶融される厚さ（メルト層の厚さ）、金属板101への密着力などをある程度調整しうる。

- 20 前記従来の方法は、たとえば図5に示すように、フィルムに配向性を有する樹脂をラミネートする場合、ラミネートロール103、104（図4参照）で加圧されると、高温の金属板101からフィルム102を通して低温のラミネートロール103に熱が伝わる。そしてその熱によりフィルム102にメルト層105が形成されると共に、金属板101とフィルム102との加圧により両者が接合される。そして金属板101がラミネートロール103、104を通過した後は
- 25 加圧力がなくなるので、フィルム表面が冷却されなくなり、金属板の熱がフィルム全層に及びフィルムの配向層106の配向調整が行われる。したがって金属板

101とフィルム102の送り速度が速くなると、ラミネートロールによる冷却がきかなくなるため、配向層の配向度を調整するために金属板の温度を下げなければならず、そのために従来の方法では、高速でラミネート加工するのは困難である。

- 5 他方、高速運転をしながらメルト層を大きくする方法として、金属板101の加熱温度を高くすることが考えられる。しかしその場合はラミネートロールによる冷却作用が充分でなくなり、フィルム全体にメルト層が広がりフィルム強度が損なわれる。また全体が溶融したフィルムが、製缶後缶の内面に位置される場合には、内容物を充填や保存する際に、外部からの衝撃に対してフィルムが割れやすくなり、内容物が腐食されやすくなるという問題がある。

本発明は上記従来の方法の問題を解消し、接合強度が高く、高速でも十分な接合強度をうることができるラミネート板の製造方法を提供することを第1の技術課題としている。さらに本発明はそのような製造方法に用いる装置を提供することを第2の技術課題としている。

15

発明の開示

- 本発明のラミネート板の製造方法は、連続する帯状の金属板を加熱し、その少なくとも一面に、熱可塑性樹脂フィルムを重ね、両者を一對のラミネートロール間に通して加圧し、前記フィルムを金属板に熱融着させるラミネート板の製造方法であって、前記一對のラミネートロール間から出てくるラミネート板を横方向に押圧することにより、その進行方向を一方のラミネートロールの側へ片寄せ
- 20 ることを特徴としている。また、本発明では、ラミネート板をフィルムと当接するラミネートロール側に片寄せさせる。

- 本発明のラミネート板の製造装置は、金属板を加熱するための加熱手段と、加熱した金属板の少なくとも一方の面に重ねる樹脂フィルムを供給するフィルム供給手段と、金属板と樹脂フィルムとを加圧するための一對のラミネートロールと
- 25

、ラミネートロールから出てくるラミネート板を横方向に押圧して、その進行方向を一方のラミネートロールの側に片寄らせるためのデフレクタロールとを有することを特徴としている。

このような装置にあっては、前記デフレクタロールによって片寄せられたラミネート板の進行方向を、もとの金属板の進行方向に戻すためのガイドロールをさらに備えているものも適用できる。

さらに前記デフレクタロールが、ラミネート板の進行方向に対して横方向に位置調節自在に設けられているものも有効である。

そして、本発明の装置においては、ラミネートロールから出てくるラミネート板を一方のラミネートロール側に片寄らせる際に、ラミネートロールとラミネート板の接触力を高めるために押さえロールを備えることも有効である。

ラミネートロールから出てくるラミネート板を一方のラミネートロールの側に片寄せると、ラミネート板はそのラミネートロールの表面にある角度だけ巻き付くことになる。そしてその角度範囲を進行する間は、ラミネート板の張力に基づき、一方のラミネートロールとある程度の力で当接し冷却される。そのため初期の金属板温度を高くすることができ、その間にメルト層を厚くすることが可能となる。またその間の押圧により、一層しっかりと接合されることになる。

本発明の装置では、ラミネートロールから出てくるラミネート板の進行方向を片寄せさせるデフレクタロールがあるので、ラミネート板の進行に抵抗を与えることなく、進行方向を片寄せさせることができる。進行方向に戻すためのガイドロールを有するものでは、従来のラミネート板の製造ラインに容易に組み込むことができる。さらにデフレクタロールの横方向の位置調節が可能なものでは、素材の種類や送り速度に応じてもっとも適切なメルト層の厚さを得ることができ、フィルム

25

図面の簡単な説明

- 図 1 は、本発明のラミネート板の製造装置の一実施例を示す概略正面図である。
- 図 2 は、図 1 の部分拡大断面図である。図 3 a および図 3 b は、それぞれ本発明の製造方法に関わるラミネートロールとの接触時間とメルト層の厚さ、およびメルト層の厚さとフィルム密着力との関係を示すグラフである。図 4 は、従来のラ
- 5 ミネート板の製造装置の一例を示す概略正面図である。図 5 は、図 4 の部分拡大断面図である。図 6 は、本発明のラミネート板の製造装置の他の実施例を示す概略正面図である。

発明を実施するための最良の形態

- 10 つぎに図面を参照しながら本発明のラミネート板の製造方法および製造装置をさらに詳細に説明する。

- 図 1 は本発明の製造方法の一実施例を示す概略正面図、図 2 は図 1 の部分拡大断面図、図 3 a および図 3 b はそれぞれ本発明の製造方法に関わるラミネートロールとの接触時間とメルト層の厚さ、およびメルト層の厚さとフィルム密着力（
- 15 フィルムの加工密着力）との関係を示すグラフである。図 6 は、本発明の製造方法の他の実施例を示す概略正面図である。

- 図 1 に示すラミネート板の製造装置 A において、符号 1 はその中を通る帯状の金属板 2 をつぎつぎに加熱していくための加熱炉であり、その加熱炉 1 の下方には、加熱炉 1 から出てくる金属板 2 にフィルム 3 を押圧して接着するための一対
- 20 のラミネートロール 4、5 が設けられている。そしてラミネートロール 4、5 の下方のいくらか離れた位置に、デフレクタロール 6 が回転自在に、かつ矢印 P 1、P 2 方向に位置調節自在に設けられている。さらにそのデフレクタロール 6 の下方には、ガイドロール 7 が回転自在に設けられている。それぞれのラミネート
- 25 平行である。ガイドロール 7 の下方には、クエンチ処理液を収容したクエンチタンク 8 が設けられている。

図6のラミネート板の製造装置A'は、図1のラミネート板の製造装置Aに、ラミネート板10をラミネートロール4に押さえつけるための押さえロール8を加えた装置である。この押さえロール8は回転自在であり、ラミネートロール4に対し平行に設けられている。

- 5 前記加熱炉1としては高周波加熱炉など、従来公知のものが採用される。また加熱炉1に代えて、加熱ローラ、誘導加熱コイルなど、他の金属板2を加熱する手段であってもよい。前記ラミネートロール4、5はその間を通る金属板2およびフィルム3を挟圧するニップロールの働きを行なう従来公知のものである。通常は両方のラミネートロール4、5を同調させながら、ラミネート板10を下方
10 に送るように逆向き（矢印S1、S2方向）に回転駆動を掛ける。また両方のラミネートロール間の隙間は調節することができ、回転速度も調節可能である。

- デフレクタロール6はその両端が軸受け（図示されていない）により回転自在に支持されており、両方の軸受けはエアーシリンダーなどにより、同調して矢印P1、P2方向に移動調節可能としている。軸受けの位置は、通常は所定のラミ
15 ネート条件に応じて調節してその位置に固定するが、ラミネート運転中に移動できるようにしてもよい。また軸受けはラミネート板の面に対して直角方向に直進往復移動可能とするが、たとえばその軸心と平行に下方（または上方）に配置される軸心Qまわりに回動可能とし、想像線で示すように円弧状に移動可能とすることもできる。

- 20 ガイドロール7はその両端が軸受け（図示されていない）で支持され、それらの軸受けはフレームなどに固定されている。その位置は一对のラミネートロール4、5の共通接線Nと接する位置に設けている。なお図示していないがクエンチタンク8から引き出されたラミネート板10は他のニップロールにより下流側に向けて駆動されているので、ラミネート板10には張力がかかっており、それ
25 よりラミネートロール4、5とガイドロール7との間のラミネート板10にも適切な張力が付与されている。

前記のごとく構成される製造装置Aは以下のように使用する。まず加熱炉1を通した帯状の金属板2の両面に、図示しない供給装置から送り出した2枚のフィルム2、3を重ね合わせ、それらの3者をラミネートロール4、5間に通す。ついで得られたラミネート板10を共通接線Nから図面上で左側にずらせたデフレクタロール6の左側に通し、さらにガイドロール7の右側を通して、もとの進行方向に戻す。デフレクタロール6をずらせる量は、加工条件などにより適切な値を選択する。さらにラミネート板10は下方に送られてクエンチタンク8内に導かれる。

上記のようにラミネートロール4、5から出てくるラミネート板10は、いわば蛇行しているので、図2に詳細に示すように、ラミネート板10が一方のラミネートロール4に対して所定の巻つけ角（接触角） θ で当接することになる。そしてこの巻つけ角 θ は、デフレクタロール6が図1の左側に移動すると大きくなり、右側に移動すると小さくなる。またずれが「0」になると、従来と同じようにまっすぐ下側に送られ、巻つけ角度は0度になる。

このようにラミネート板10を所定の巻つけ角 θ で一方のラミネートロール4に当接させることにより、フィルム3と金属板2の間に、ラミネート板10の張力に応じた押圧力が加わり、それによりラミネート板を冷却する時間が長くなる。また、図6に示した押さえロール8を設ける場合には、より一層強い押圧力を得ることができ、冷却能力を向上させることができる。

なおこの冷却時間の増大は、フィルム3と金属板2の間の押圧力の上昇に基づくものであるので、前記一方のラミネートロール4と当接するフィルム3だけでなく、図2に想像線で示す他面のフィルム3aにも生ずる。また伝熱量の総量は、押圧力の大きさのほか、ラミネートロールへの接触時間が長いほど増大する。そして冷却時間の増大に応じて、金属板の初期温度を高くすることが可能となり、金属板2と接触している面におけるメルト層11の厚さwを大きくできる。このラミネートロール4との接触時間tとメルト層11の厚さwとの関係は、図3

aに示すようにほぼ比例的な関係になっている。

メルト層11が増大すると、冷却後のフィルム3と金属板2との加工密着力が増大する。この関係も、たとえば図3bに示すように、ほぼ比例的な関係となっている。なおメルト層の増加のほか、フィルム3と金属板1とが押圧される時間が長いことが相乗的に作用することにより、密着力は一層増大する。

上記実施例ではラミネート速度を従来と同じにした場合にフィルムの加工密着力が増大することを説明したが、逆にいえばこの密着力が同じ程度でよいのであれば、従来に比して高速でラミネート加工ができることになる。またラミネートロールへ巻つけることにより、ラミネート直後のラミネート板10とラミネートロール4との接触時間が長くなり、ラミネートロールによる冷却作用が十分に働く。そのため金属板2の加熱炉から出たときの温度を高くしておいてもフィルム3の全体がメルトするおそれがなく、外側にメルトしない層が確実に残される。したがって高速でラミネート加工を行っても、メルト層11が充分厚くなり、フィルムの加工密着力を一層増大させることができる。なおメルトしない層は配向度が低下した低配向層となっている。メルト層11と低配向層12との間には、両者の中間状態で遷移する勾配層（図示しない）が介在される。

つぎに具体的な実施例および比較例をあげて本発明の方法の効果を説明する。

（実施例1～3）缶用材料に用いられる厚さ0.2mmのクロメート処理鋼板（TFS）の片面に厚さ25 μ mの二軸配向ポリエステル樹脂フィルムを図1に示す装置を用いて熱融着によりラミネートした。鋼板のラミネートロールに入る直前の温度は約225℃であり、自然放熱で冷却されるラミネートロールの温度は150℃程度であった。ラミネート板の送り速度は、実施例1、2、3についてそれぞれ100、200、400m/min.とし、ラミネートロールへの巻つけ角度はいずれも20度とした。

25 得られたラミネート板を、深絞り試験機により直径65mm、深さ100mmのカップ状に成型したところ、いずれの実施例の場合でもフィルムの剥れが生ずるこ

とがなく、フィルムの引き剥しのために4.0～5.6N/10mmの力（フィルムの加工密着力）が必要であった。またもとのフィルムの配向度は、複屈折率による測定結果で0.09程度であったが、メルト層は複屈折率が0.01で厚さが5～15 μ m程度、低配向層は複屈折率が0.058程度で厚さが10～20 μ m程度であった。なお勾配層は複屈折率が0.01～0.05で、厚さが3 μ m程度であった。

（比較例1）ラミネート板をまっすぐ下向きに降ろして巻つけ角を取らない以外は実施例と同じ条件で、比較例1, 2, 3のラミネート加工（ラミネート板送り速度のそれぞれ100, 200, 400m/min.）を行った。比較例3の製造方法により得られたラミネート板で上記と同じカップを成型したところ、一部フィルムの剥れが生じた。また比較例1, 2ではフィルムの剥れが生ずることなくカップ状に成型可能であったがフィルム引き剥しに要する力（フィルムの加工密着力）は、それぞれ4.0N/10mm, 2.9N/10mmであった。さらにメルト層は複屈折率が0.01で厚さが0～5 μ m程度、低配向層は複屈折率が0.058程度で厚さが20～25 μ m程度であった。なお勾配層は複屈折率が0.01～0.05で、厚さが3 μ m程度であった。

（実施例）

		ライン速度	メルト層の厚み	配向層の厚み	フィルムの加工密着力

20	1	100m/min.	15 μ m	10 μ m	5.6N/10mm
	2	200m/min.	9 μ m	16 μ m	4.8N/10mm
	3	400m/min.	5 μ m	20 μ m	4.0N/10mm

(比較例)

	ライン速度	メルト層の厚み	配向層の厚み	フィルムの加工密着力	

5	1	100m/min.	5 μ m	20 μ m	4.0N/10mm
	2	200m/min.	2.5 μ m	22.5 μ m	2.9N/10mm
	3	400m/min.	0 μ m	25 μ m	0.5N/10mm

以上の結果から、本発明の製造方法によれば、100～400m/min.の高速でラミネート板を製造しても、フィルムの加工密着力が十分に高く、加工時にフィルムが剥れにくいラミネート板を得ることができることがわかる。

10

産業上の利用可能性

以上のように、本発明の製造方法によれば、フィルムの金属板に対する密着力が向上し、高速で製造を行っても、密着力が低下しない。本発明の製造装置によれば、上記製造方法を容易に実施することができる。

請 求 の 範 囲

1. 連続する帯状の金属板を加熱し、その少なくとも一面に、熱可塑性樹脂フィルムを重ね、両者を一对のラミネートロール間に通して加圧し、前記フィルムを
5 金属板に熱融着させるラミネート板の製造方法であって、
前記一对のラミネートロール間から出てくるラミネート板を横方向に押圧することにより、その進行方向を一方のラミネートロールの側へ片寄らせるラミネート板の製造方法。
2. ラミネート板をフィルムと当接するラミネートロール側に片寄らせる請求項
10 1記載の製造方法。
3. 金属板を加熱するための加熱手段と、加熱した金属板の少なくとも一方の面にラミネートする樹脂フィルムを供給するフィルム供給手段と、金属板と樹脂フィルムとを加圧するための一对のラミネートロールと、ラミネートロールから出てくるラミネート板を横方向に押圧して、その進行方向を一方のラミネートロー
15 ルの側に片寄らせるためのデフレクタロールとを有するラミネート装置。
4. 前記デフレクタロールによって片寄せられたラミネート板の進行方向を、もとの金属板の進行方向に戻すためのガイドロールをさらに備えている請求項3記載のラミネート装置。
5. 前記デフレクタロールが、ラミネート板の進行方向に対して横方向に位置調節自在に設けられている請求項3または4記載のラミネート装置。
20
6. 前記ラミネートロールから出てくるラミネート板を一方のラミネートロール側に片寄せさせる際に、ラミネートロールとラミネート板の接触力を高めるために押さえロールを備える請求項3～5のいずれか記載のラミネート装置。



1 / 6

図 1

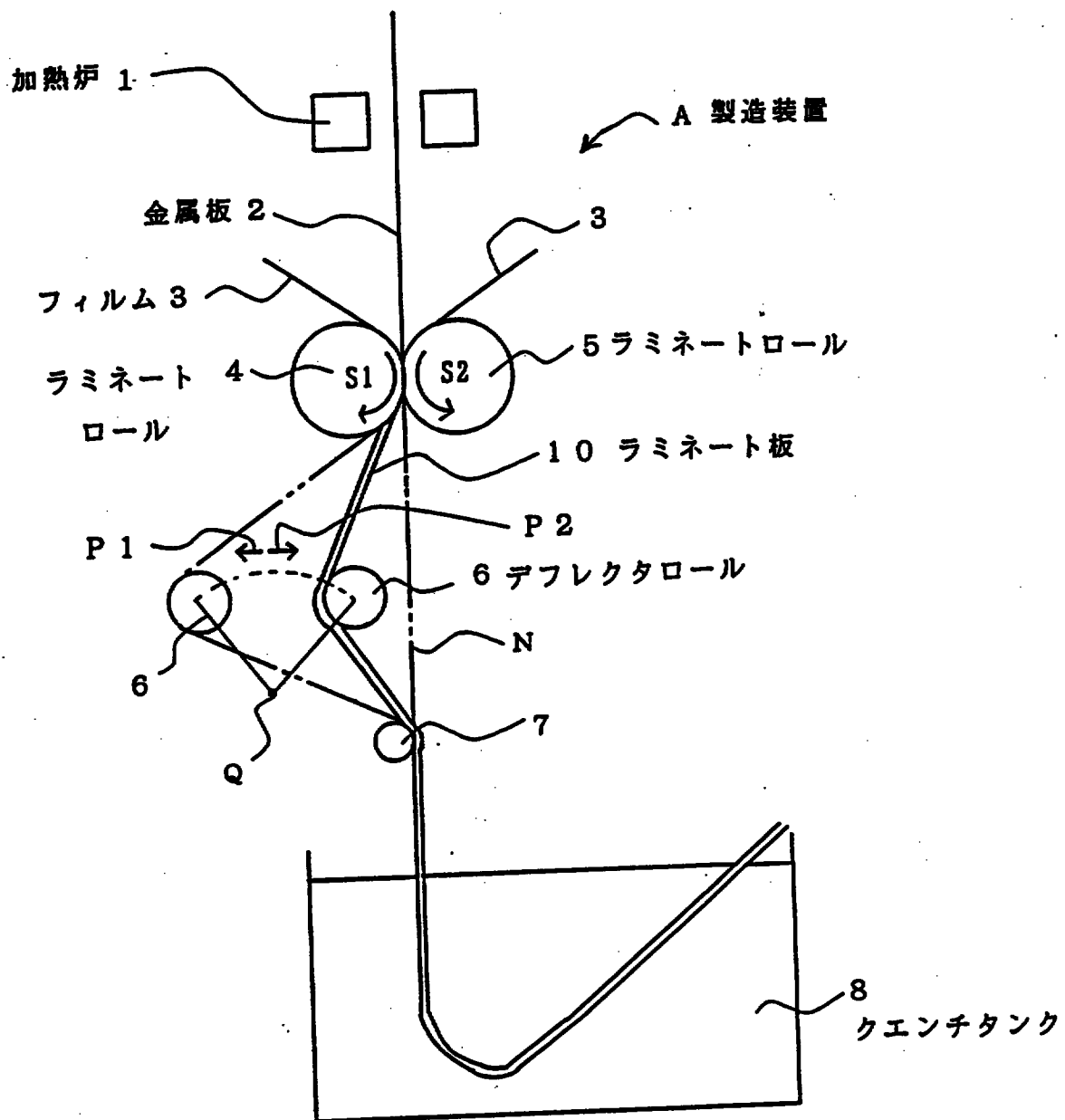


図 2

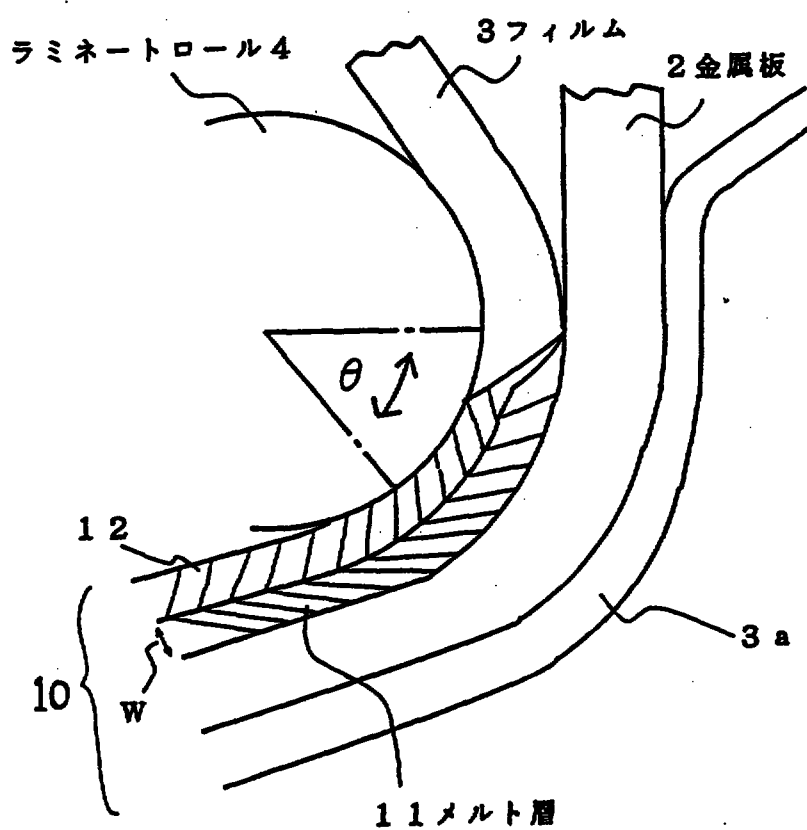
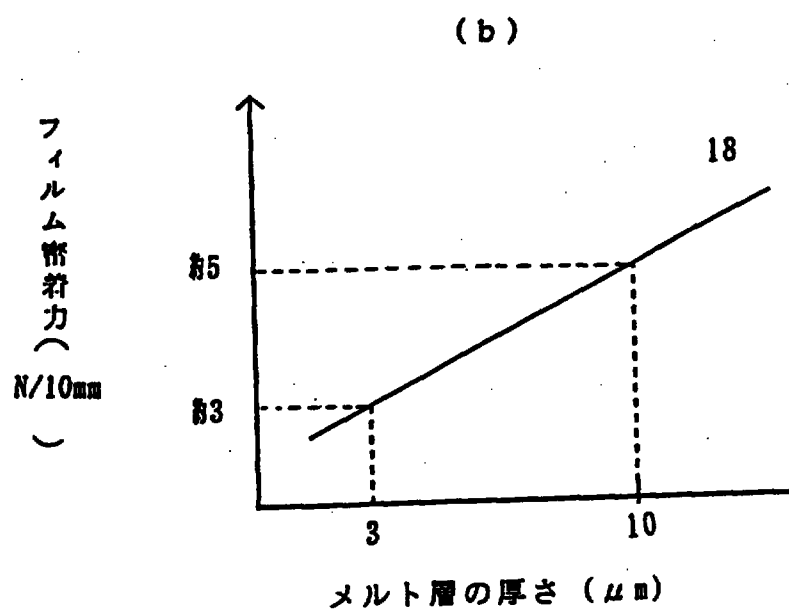
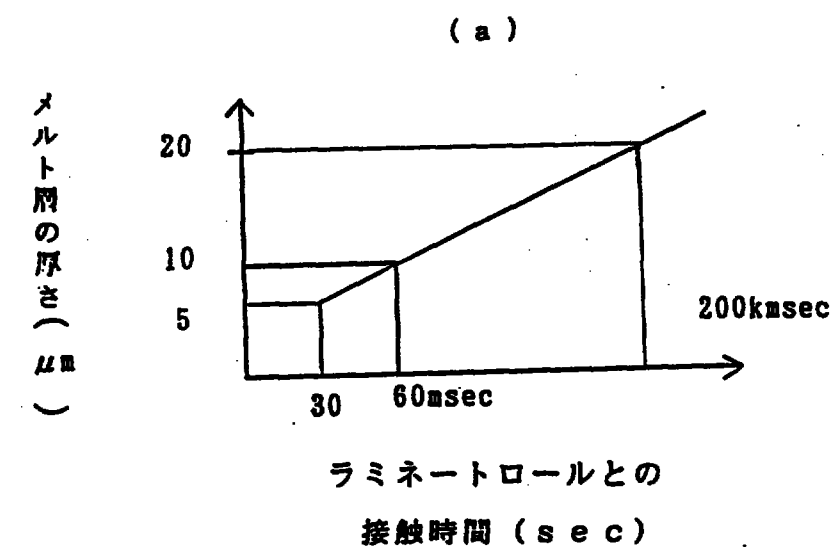
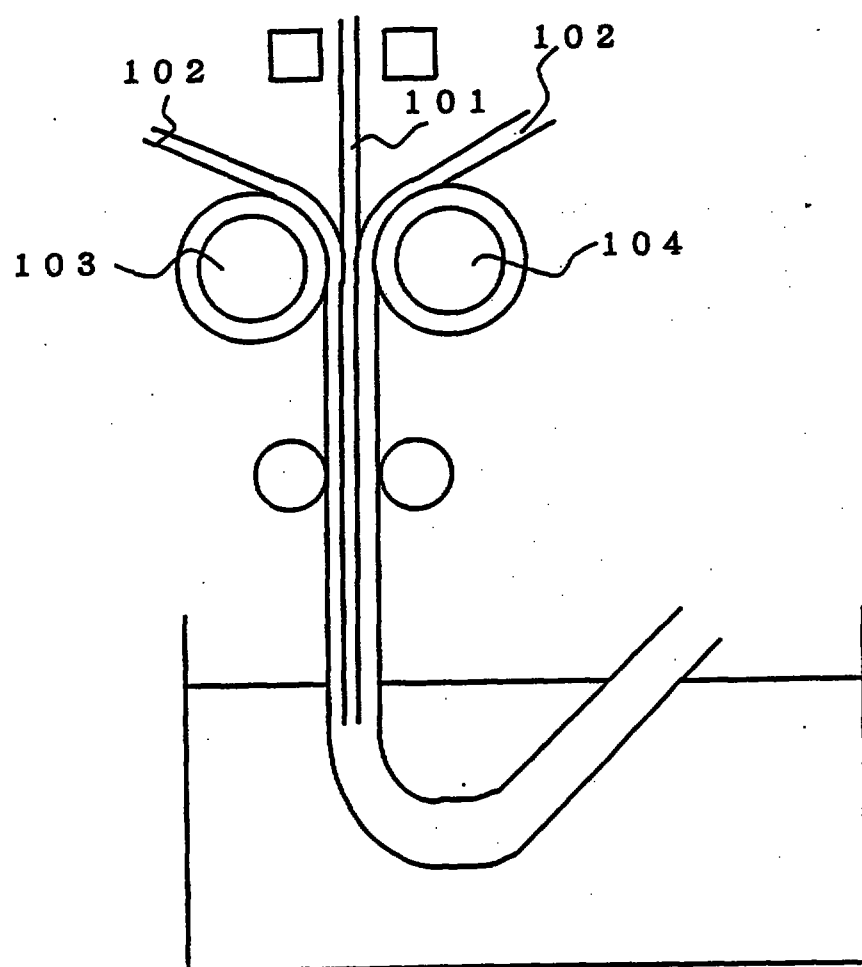


図 3

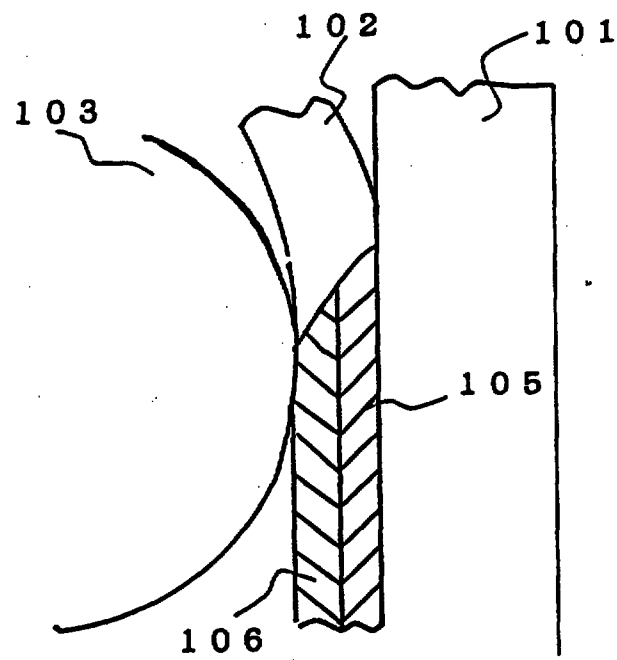


4 / 6

図 4

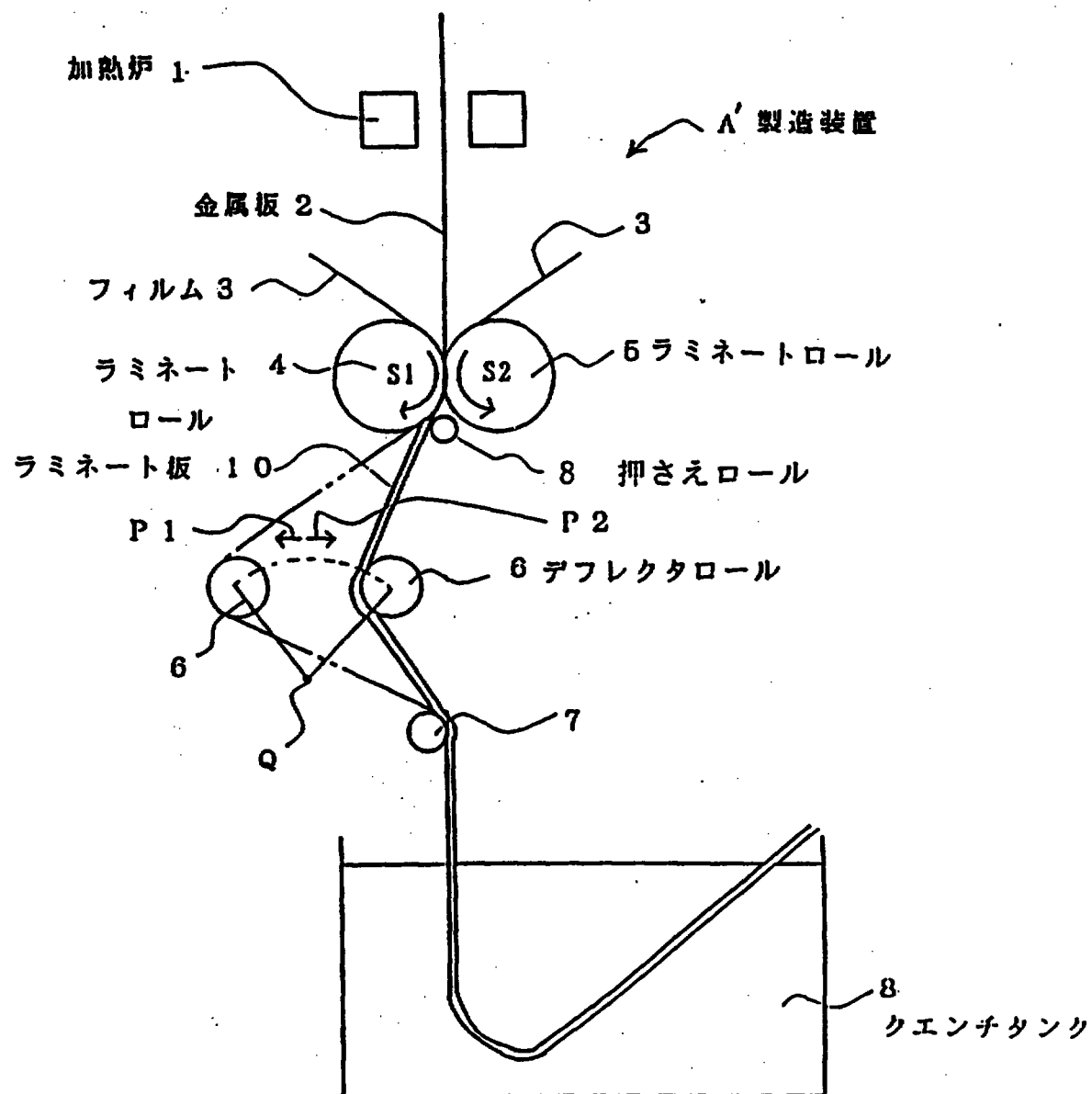


5



6 / 6

図 6



METHOD AND APPARATUS FOR PRODUCING LAMINATE SHEET

Technical field

The present invention relates to a manufacturing method for a laminate sheet and manufacturing apparatus therefore, and more particularly to a manufacturing method for a laminated sheet, in which a thermoplastic resin film is made to contact and pressed to a heated metal sheet, and a manufacturing apparatus for carrying out the manufacturing method.

Background technology

As shown in Figure 4, there is a well known laminating method in which metal sheet 101, heated in an oven, is then made to contact thermoplastic resin film 102, and metal sheet 101 and resin film 102 are both pressed by a couple of laminating rolls (nip rolls) 103 and 104 while film 102 is partially melted by the heat of metal sheet 101 to adhere to metal sheet 101 (see Laid-Open Japanese Patent Hei 4-201237, for example). In such a laminating method, thickness of the melted portion of film 102 (thickness of a melted layer), and adhering strength of film 102 to metal sheet 101 can be controlled to some extent by selecting conditions such as heating temperature of metal sheet 101, distance from the oven to laminating rolls 103 and 104, traveling speed of metal sheet 101, and melting temperature of film 102.

In the conventional method mentioned above, as shown

THIS SHEET HAS BEEN
REPLACED

in Figure 5, for example, in a case of laminating an oriented resin film when film 2 is pressed to metal sheet 101 by laminating rolls 103 and 104 (see Figure 4), a high temperature of metal sheet 101 is transferred to laminating roll 103 of a low temperature through film 102. while the high temperature causes film 102 to form a melted layer 5, the pressed metal sheet 101 and film 102 adhere to each other. After passing through between laminating rolls 103 and 104, metal sheet 101 is free from pressure, and the film surface is not more cooled, and then the temperature from the metal sheet is transferred to the whole film, which controls the orientation of oriented layer 106 of the film. Therefore, as the traveling speed of metal sheet 101 and film 102 increase, the temperature of the metal sheet should be lowered in order to control the orientation of the oriented layer because the cooling effect by the laminating rolls is not sufficient. For this reason, it is difficult to perform high speed lamination by the conventional laminating method.

On the other hand as a method to increase the melted layer by high speed lamination, heating metal sheet 101 to a higher temperature may be applied. But in this case, cooling by the laminating rolls does not fully effect so that the melted layer may be formed in the whole film, thus reducing the strength of the film.

In addition, in a case where such wholly melted film is located inside of a formed can, and when content is packed and stored in it. the film is easily cracked by outer impact, which often causes

This Sheet Has Been Replaced



the packed content to be rotten.

It is the first object of the present invention to solve the problem in the conventional method and to provide a manufacturing method for a laminated sheet in which the laminated sheet has its adhesion increased, and the sufficiently increased adhesion can be obtained even by the high speed lamination. The second object of the present invention is to provide a manufacturing apparatus for such a manufacturing method.

Disclosure of the Invention

The manufacturing method for a laminate sheet of the present invention is characterized by the steps of : heating a continuous metal sheet ; making a thermoplastic resin film contact at least one surface of it ; and passing both the metal sheet and the thermoplastic resin film through between a couple of laminate rolls and pressing them, thus thermally bonding the thermoplastic resin film to the metal sheet. It is further characterized by pressing the laminate sheet which has passed through between the laminate rolls, in a traverse direction so as to deviate the traveling direction to either one of the laminate rolls, Furthermore, the method of the present invention is characterized by deviating the traveling direction of the laminate sheet to the one laminating roll which contacts the thermoplastic resin film.

The manufacturing apparatus for a laminate sheet of the present invention is characterized by a heating device for heating

a metal sheet, a supplying device for supplying a thermoplastic resin film to be laminated onto at least one side of the heated metal sheet, a couple of laminate rolls for pressing the metal sheet and the thermoplastic resin film, and a deflector roll for deviating traveling direction of the laminate sheet which has passed through between the couple of laminate rolls to a direction traverse to the original traveling direction by pushing it aside to one of the laminate rolls.

The apparatus of the present invention may further comprise a guide roll for making the travelling direction of laminate sheet, which is deviated by the deflector roll, back to the original travelling direction.

The apparatus may also comprise a deflector roll movably arranged in a direction traverse to the traveling direction of the laminate sheet.

Furthermore, the apparatus may effectively comprise a pressure roll for increasing the contact force of the laminate roll and the laminate sheet when the laminate sheet which has passed through between the laminate rolls is pushed aside to one of the laminate rolls.

When pushing the laminate sheet which has passed through between the laminate rolls aside to one of the laminate rolls, the laminate sheet winds round the one laminate roll by a certain angle.

During traveling the distance corresponding to that angle, the laminate sheet contacts that laminate roll with some holding

strength due to its own tension and meantime the laminate sheet is cooled. Therefore, the metal sheet can have its initial temperature higher selected, which permits a melted layer to be thicker during that traveling period. Thus, the thermoplastic resin film and the metal sheet can be more reliably adhered to each other by the pressing force also during that traveling period.

Since the manufacturing apparatus is provided with a deflector roll to deviate the traveling direction of the laminate sheet which has passed through between the couple of laminate rolls, it is possible to deviate the traveling direction without causing any resistance to the traveling of the laminate sheet. The manufacturing apparatus provided with the guide roll to make the deviated travelling direction back to the original direction can easily be combined with a conventional manufacturing line for a laminate sheet. Further, the apparatus provided with the deflector roll movably arranged in a direction traverse to the original traveling direction of the laminate sheet, it is possible to obtain the most preferable thickness of the melted layer of the film depending on the kind of raw material and the traveling speed of the laminate sheet so that the adhesive strength of the film can be improved to thereby prevent the peeling-off of it.

Brief explanation of the drawings

Figure 1 is a schematic front view showing one example of the manufacturing apparatus for a laminate sheet of the present

invention.

Figure 2 is a partial cross section of Figure 1.

Figure 3(a) is a graph showing the relationship between the period of time during which the film contacts the laminate roll according to the present invention and the thickness of its melted layer, and Figure 3(b) is a graph showing the relationship between the thickness of the melted layer and the adhesive strength of the film.

Figure 4 is a schematic front view showing one example of the conventional manufacturing apparatus.

Figure 5 is a partial cross section of Figure 4.

Figure 6 is a schematic front view showing another example of the manufacturing apparatus of the present invention.

The best mode for carrying out the invention

Next, the manufacturing method and the manufacturing apparatus for a laminate sheet of the present invention will be explained more in detail referring to each Figure.

Figure 1 is a schematic front view showing one example of the manufacturing apparatus of the present invention. Figure 2 is a partial cross section of Figure 1. Figure 3(a) is a graph showing the relationship between the period of time during which the film contacts the laminate roll according to the present invention and the thickness of its melted layer, and Figure 3(b) is a graph showing the relationship between the thickness of the melted layer

and the adhesive strength of the film (after forming). Figure 6 is a schematic front view showing another example of the manufacturing apparatus of the present invention.

In manufacturing apparatus A for a laminate sheet shown in Figure 1, the denoted figure 1 is an oven in which metal sheet 2 passes and is heated continuously, and a couple of laminate rolls 4 and 5 arranged below oven 1 to press and adhere film 3 to metal sheet 2 coming out from oven 2. At a short distance below laminate rolls 4 and 5 is arranged deflector roll 6 rotatably and movably in a directions as shown by arrows P1 and P2. Further below deflector roll 6 is arranged guide roll 7 rotatably. The rotation axes of laminate rolls 4 and 5, deflector roll 6 and guiding roll 7 are parallel to each other. Quenching tank 8 containing a quenching liquid is arranged below guide roll 7.

Manufacturing apparatus A' is the one provided with hold down roll 9 for pressing laminate sheet 10 against laminate roll 4 additionally to manufacturing apparatus A. Pressure roll 8 is rotatable and arranged parallel to laminate roll 4.

As oven 1, conventionally known one such as dielectric heating oven can be applied. Another heating device such as a heating roll or an induction heating coil can also be applied instead of oven 1. A couple of laminate rolls 4 and 5 are prior known ones that acts as nip rolls for pinching and pressing metal sheet 2 and film 3 running through between them. Normally, laminate rolls 4 and 5 are each synchronously rotated in the opposite



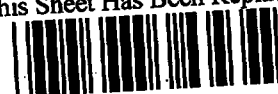
direction (arrow S1 and S2) so as to move laminate sheet 10 downward. The distance between both laminate rolls is adjustable and rotation speed can also be controlled.

Deflector roll 6 has its both ends rotatably supported by bearings (not shown), and the bearings are each synchronously movable in the directions of arrow P1 and P2 using a control cylinder or the like. The positions of the bearings are normally adjusted according to a predetermined laminating condition, but they may be adjustable during the laminating operation. The bearings are arranged to move straight and reciprocatively in a direction perpendicular to the surface of the laminate sheet. They can also be arranged to rotate about an axis Q which is positioned below (or above) their axes and parallel to them. that is, the bearings may be circularly movable as shown by the imaginary line.

Guide roll 7 has its both ends supported by bearings (not shown), and the bearings are each fixed to a frame or the like.

Guide roll is arranged at such a position as to contact a tangential line N of laminate rolls 4 and 5. Not shown, but laminate sheet 10 taken out from quenching tank 8 is driven downward by another nip roll. Therefore, there causes tension on laminate sheet 10, and thus a proper tension works on laminate sheet 10 located between laminate rolls 4 and 5 and guide roll 7.

The manufacturing apparatus constructed as mentioned above is used as follows. At first, two film 3 and 3 taken out from a supplying device which is not shown are made to contact both sides of



the metal sheet that has passed through oven 1, and then the three members are passed through between laminate rolls 4 and 5. Subsequently, thus laminate sheet 10 is passed on the left side of deflector roll 6 which is deviated to the left side from tangential line N shown in Figure 1, and then it is passed on the right side of guide roll 7, to thereby make the travelling direction back to the original travelling direction. The deviation distance of deflector roll is suitably adjusted according to forming conditions and so on. Further, laminate sheet 10 is guided downward into quenching tank 8.

As mentioned above, since laminate sheet 10 coming out from laminate rolls 4 and 5 travels in a zigzag line, laminate sheet 10 winds round one laminate roll 4 by a predetermined winding angle (contacting angle) θ . Contacting angle θ becomes larger when deflector roll 6 is deviated to the left side in Figure 1, while it becomes smaller when deflector roll 6 is deviated to the right side. When the deviation becomes "0", the laminate sheet is guided downward straight as conventional, and winding angle becomes 0.

Thus, a pressing force due to the tension of laminate sheet 10 is worked between film 3 and metal sheet 2 by making laminate sheet 10 contact one laminate roll 4 by a predetermined winding angle to thereby increase a period for cooling the laminate sheet. Further in the case where the presser roll shown in Figure 6 is provided, a greater pressing force can be worked, which can improve cooling effect.

Since the increase of the cooling period is due to the increase of the pressing force worked between film 3 and metal sheet 2, it affects not only film 3 which contacts one laminate roll 4 but also film 3a contacting the other side of metal sheet 2 shown by the imaginary line in Figure 2. The greater the pressing force and the longer the period for contacting the laminate roll, the more the total mass of thermal conduction increases. Therefore, an initial temperature of metal sheet 2 can be raised due to the increase of the cooling period, and thickness W of melted layer 11 on the side contacting metal sheet 2 can be increased. The relationship between the contacting period "t" of film 3 to laminate roll 4 and thickness W of melted layer 11 is substantially in direct proportion as shown in Figure 3a.

As melted layer 11 increases, adhesion of film 3 to metal sheet 2 during forming increases after being cooled. The relationship between them is also substantially in direct proportion as shown in Figure 3b. In addition to the increase of the melted layer, the increase of the period during which film 3 is pressed to metal sheet 2 multiplicably affects film 3 and its adhesion is more improved.

In the above-mentioned example, the increase of adhesion of film during forming is explained on condition that the laminating speed is same as that applied in the conventional method. Conversely speaking, if the adhesion is as fair enough as that obtained by the conventional manufacturing method, the

laminating can be carried out at a higher speed than conventional. Furthermore, winding the film round the laminate roll makes the contacting period of laminate sheet 10 to laminate roll 4 longer immediately after the lamination, and the cooling effect by the laminate roll can be fully obtained. Therefore, film 3 does not wholly melt even when metal sheet 2 coming out from the oven is heated to a higher temperature, and the unmelted layer can reliably remain outside. Accordingly, even when the laminating is carried out at a high speed, melted layer 11 having thickness can be obtained, thus increasing the film adhesion during forming. In this case, the orientation of the film in the unmelted layer is reduced. Between melted layer 11 and slightly oriented layer 12, the layer whose orientation gradually decreases is intervened.

Next, concrete examples and comparison examples are given and the effect of the manufacturing method of the present invention is explained.

(Examples 1 to 3)

A biaxially oriented polyester thermoplastic resin film having thickness of 25 μ m was heat laminated on one side of a strip of electrolytically chlorinated steel (TFS) having thickness of 0.2 mm used for can stock using the manufacturing apparatus as shown in Figure 1. The temperature of the steel strip just before coming into a couple of laminate rolls was about 225 ° C, and that of the laminate roll spontaneously cooled was about 150 ° C. The traveling speed of the laminate sheet were 100, 200 and 400m/min in



Example 1, 2 and 3, respectively. Winding angle for the laminate sheet round the laminate roll was 20° in all the examples.

When the laminates thus obtained were formed into a cup having a diameter of 65 mm and a height of 100 mm using a drawability taster, no film crack was caused in all the examples and 4.0 to 5.6 N/10 mm of stripping force of the film (adhering strength during forming) was required to strip the film in each example. The original orientation of the film measured by birefringence rate was about 0.09, while in the laminated film, the melted layer had the birefringence rate of 0.01 and the thickness of about 5 to 15 μ m, slightly oriented layer had the birefringence rate of about 0.058 and the thickness of about 10 to 20 μ m, and the intervening layer had the birefringence rate of 0.01 to 0.05 and the thickness of about 3 μ m.

(Comparative examples 1 to 3)

The laminating operation for Comparative examples 1, 2 and 3 were performed on the same conditions (the traveling speed of the laminate sheet were 100, 200 and 400 m/min, respectively) as in Examples except that the laminate sheet was not made to wind round the laminate roll but traveled downward straight. When the laminate sheet of Comparative example 3 was formed into a cup substantially the same as Example, film crack was partially caused.

In case of Comparative examples 2 and 3, no film crack was caused, but stripping force of the film (adhering strength during forming) were 4.0 and 2.9 N/10 mm, respectively. The melted layer had the



birefringence rate of 0.01 and the thickness of about 0 to 5 μ m, the slightly oriented layer had the birefringence rate of about 0.058 and the thickness of about 20 to 25 μ m, and the intervening layer had the birefringence rate of 0.01 to 0.05 and the thickness of about 3 μ m. The results are shown in Tables 1 and 2.

Table 1

Example

No	traveling speed	thickness of melted layer	thickness of oriented layer	adhering strength
1	100 m/min	15 μ m	10 μ m	5.6 N/10 mm
2	200 m/min	9 μ m	16 μ m	4.8 N/10 mm
3	400 m/min	5 μ m	20 μ m	4.0 N/10 mm

Table 2

Comparative example

No	traveling speed	thickness of melted layer	thickness of oriented layer	adhering strength
1	100 m/min	5 μ m	20 μ m	4.0 N/10 mm
2	200 m/min	2.5 μ m	22.5 μ m	2.9 N/10 mm
3	400 m/min	0 μ m	25 μ m	0.5 N/10 mm

From the results shown above, it is apparent that according to the manufacturing method of the present invention, a laminate sheet having excellent adhering strength of the film to a matallic sheet and hardly to be peeled off during forming can be obtained, even when the laminate sheet is manufactured at a high speed of 100 ~ 400m/min.

Industrial utility

As mentioned above, according to the manufacturing method of the present invention, the adhering strength of the film to a matallic sheet can be improved and it is not reduced even when the laminating oparation is performed at a high speed. According to the manufacturing apparatus of the present invention, the above-mentioned manufacturing method can easily be carried out.

Summary

A method of producing a laminate sheet (10) comprises the steps of heating a continuous belt-like metal sheet (2) by a heating furnace (1), laminating a thermoplastic resin film (3) on at least one of the surfaces of the metal sheet, pressing and passing both of them between a pair of laminate rolls (4 and 5), and thermally bonding the film (3) to the metal sheet (2), wherein the laminate sheet (10) coming out from between the pair of laminate rolls (4 and 5) is pushed by a deflector roll (6) in a transverse direction so as to bias the traveling direction towards the laminate roll (4) which



contacts the film (3). The invention also discloses an apparatus

(A) used for this method.

Claims

1. A manufacturing method for a laminate sheet comprising the steps of:

heating a continuous metal sheet;

laminating a thermoplastic resin film at least on one of the surfaces of the metal sheet; and

passing both of them through between a couple of laminate rolls, pressing them, and thermally bonding said film to said metal sheet,

wherein said laminate sheet coming out from between said couple of laminate rolls is pushed aside in a traverse direction so as to bias its traveling direction to either one of said laminate rolls.

2. A manufacturing method according to claim 1,

wherein said laminate sheet is pushed aside to one of said laminate roll that contacts said film.

3. A manufacturing apparatus comprising :

means for heating a metal sheet ;

means for supplying a thermoplastic resin film to be laminated at least on one surface of said heated metal sheet;

a couple of laminate rolls for pressing said metal sheet and said thermoplastic resin film ; and

a deflector roll for pushing a laminate sheet, which has come out through the couple of laminate rolls, in a traverse direction so as to bias the traveling direction of the laminate



sheet to one of the laminate rolls.

4. The manufacturing apparatus according to claim 3

further comprising a guide roll for making said travelling direction of said laminate sheet which is biased by said deflector roll back to the original travelling direction of said laminate sheet.

5. The manufacturing apparatus according to claims 3 or 4, wherein said deflector roll is movably arranged in a direction traverse to said original traveling direction of said laminate sheet.

6. The manufacturing apparatus according to any of claims 3 to 5,

comprising a pressure roll for increasing contacting force of said laminate roll and said laminate sheet when said laminate sheet which has come out through said laminate rolls is pushed aside to one of said laminate rolls.



1/6

Fig. 1

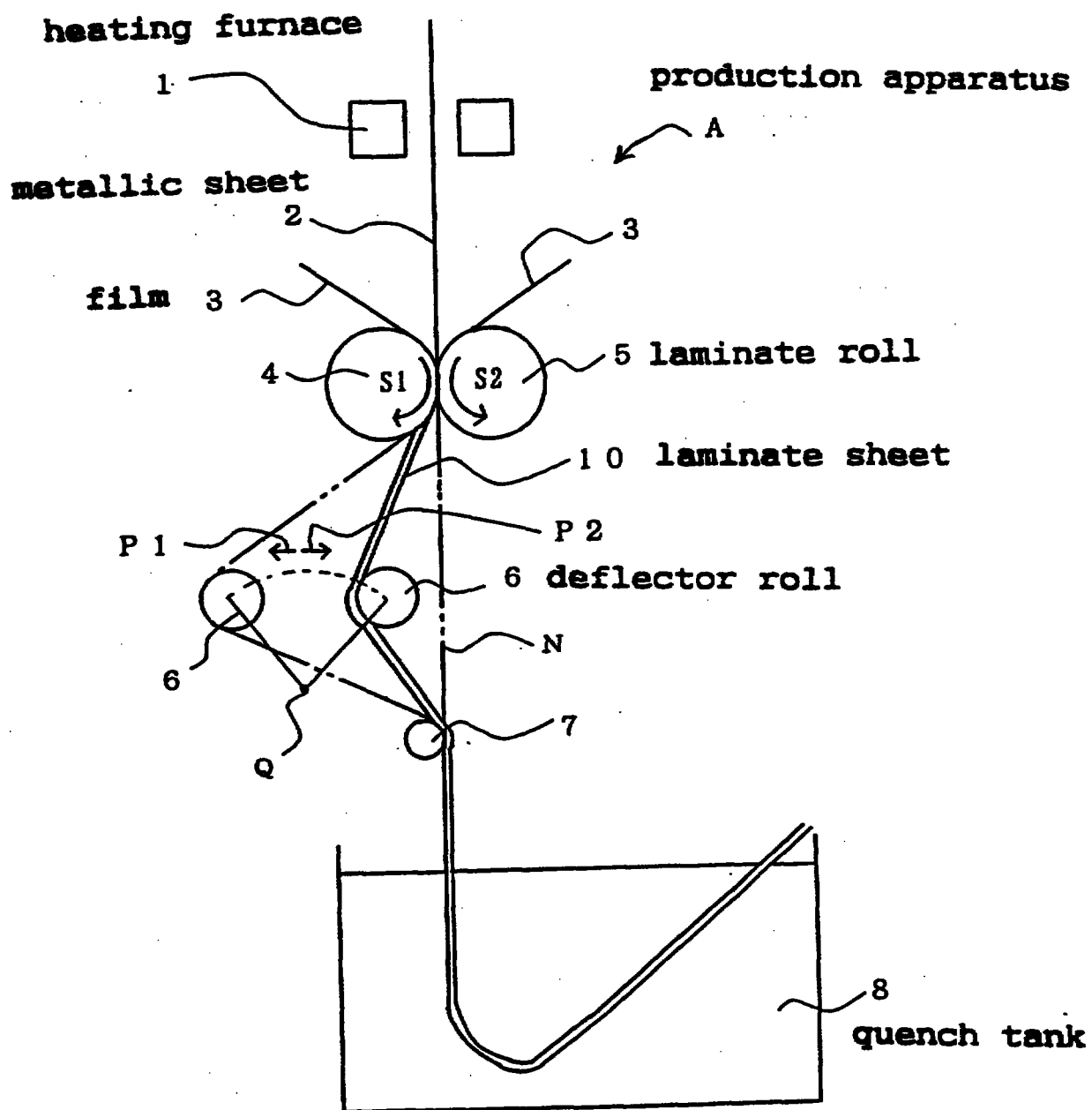
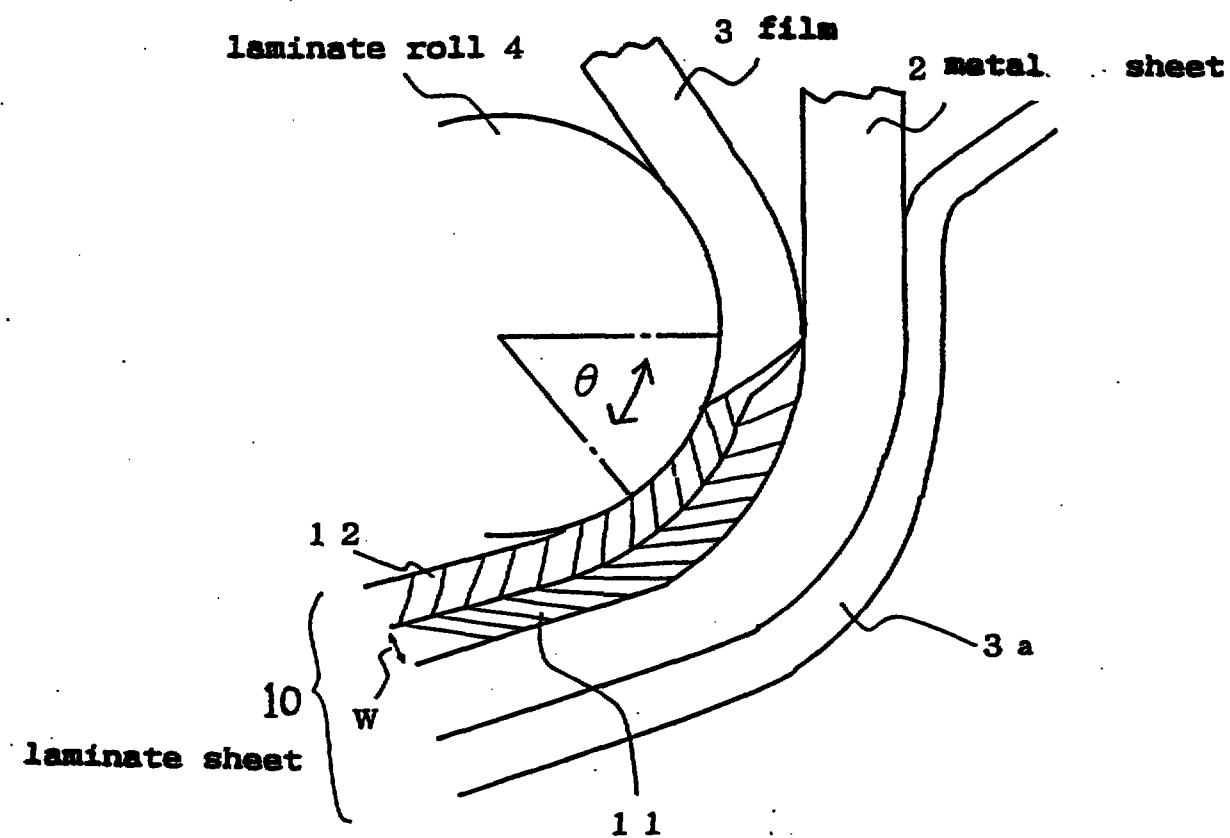


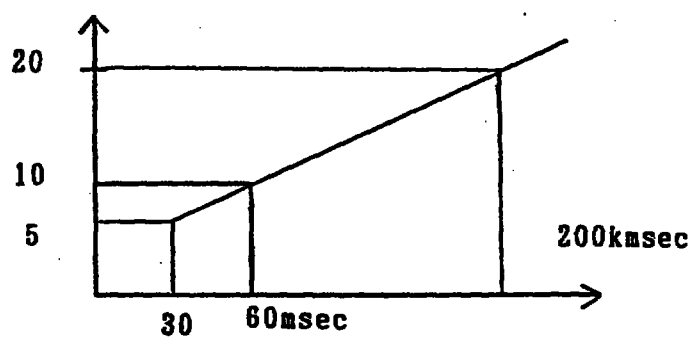
Fig. 2



(μm) thickness of its melted layer

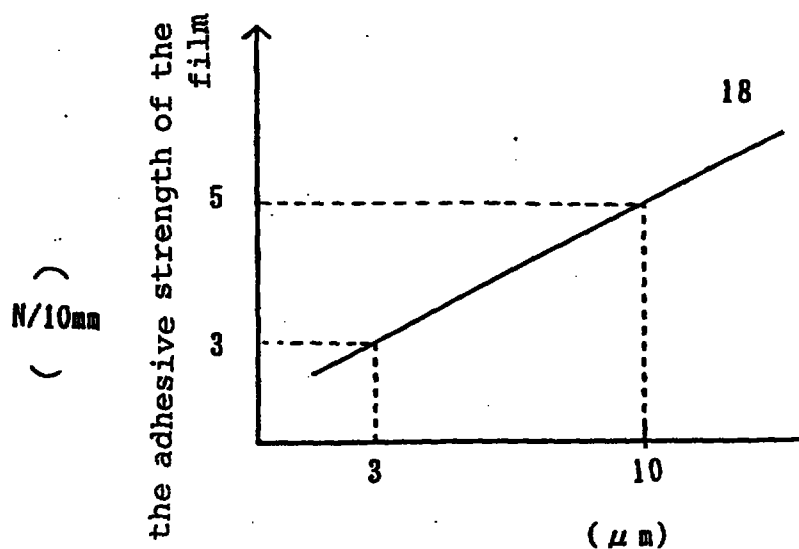
Fig. 3

(a)



the period of time during which the film contacts
the laminate roll
(s e c)

(b)



the thickness of the melted layer

Fig. 4

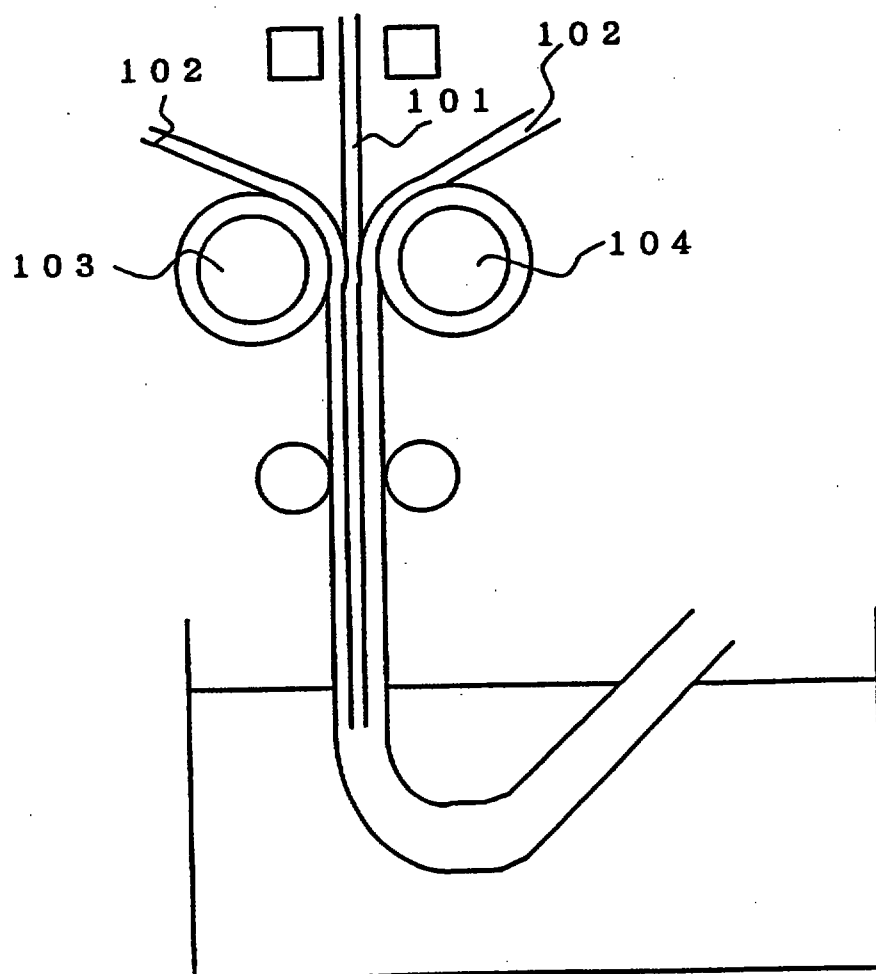
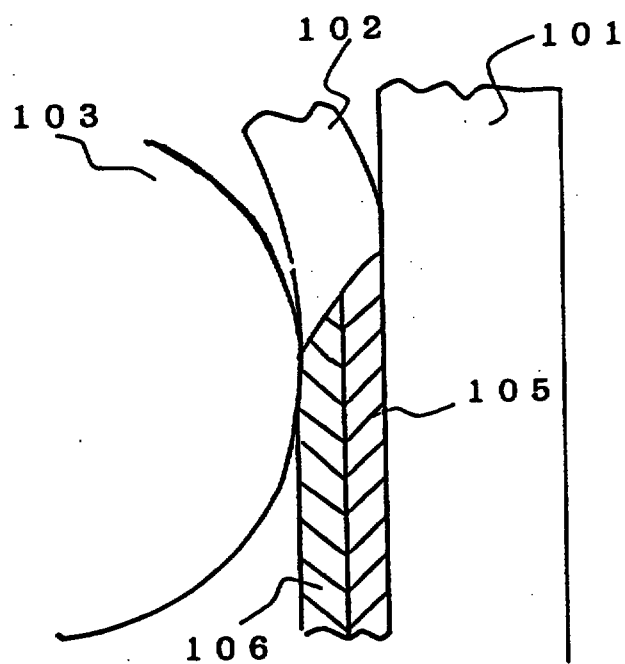
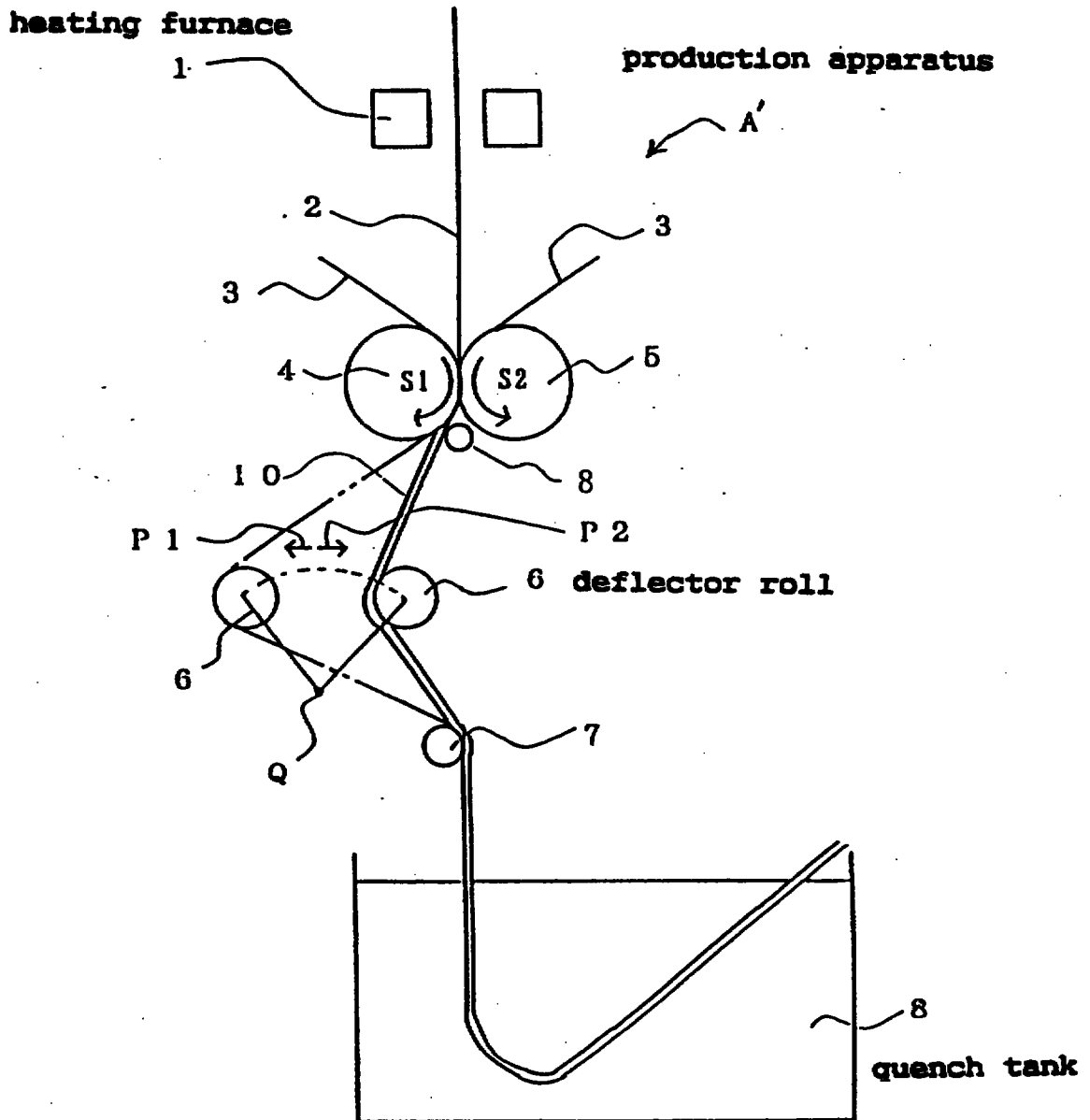


Fig. 5



THIS SHEET HAS BEEN
REPLACED

Fig. 6



This Sheet Has Been Replaced



Summary

A method of producing a laminate sheet (10) comprises the steps of heating a continuous belt-like metal sheet (2) by a heating oven (1), laminating a thermoplastic resin film (3) on at least one of the surfaces of the metal sheet (2), pressing and passing both of them between a pair of laminate rolls (4 and 5), and thermally bonding the film (3) to the metal sheet (2), wherein the laminate sheet (10) coming out from between the pair of laminate rolls (4 and 5) is pushed by a deflector roll (6) in a transverse direction so as to bias the traveling direction towards the laminate roll (4) which contacts the film (3). The invention also discloses an apparatus (A) used for this method.

in Figure 5, for example, in a case of laminating an oriented resin film when film 2 is pressed to metal sheet 101 by laminating rolls 103 and 104 (see Figure 4), a high temperature of metal sheet 101 is transferred to laminating roll 103 of a low temperature through film 102. while the high temperature causes film 102 to form a melted layer 105, the pressed metal sheet 101 and film 102 adhere to each other. After passing through between laminating rolls 103 and 104, metal sheet 101 is free from pressure, and the film surface is not more cooled, and then the temperature from the metal sheet is transferred to the whole film, which controls the orientation of oriented layer 106 of the film. Therefore, as the traveling speed of metal sheet 101 and film 102 increase, the temperature of the metal sheet should be lowered in order to control the orientation of the oriented layer because the cooling effect by the laminating rolls is not sufficient. For this reason, it is difficult to perform high speed lamination by the conventional laminating method.

On the other hand as a method to increase the melted layer by high speed lamination, heating metal sheet 101 to a higher temperature may be applied. But in this case, cooling by the laminating rolls does not fully effect so that the melted layer may be formed in the whole film, thus reducing the strength of the film.

In addition, in a case where such wholly melted film is located inside of a formed can, and when content is packed and stored in it. the film is easily cracked by outer impact, which often causes



and the adhesive strength of the film (after forming). Figure 6 is a schematic front view showing another example of the manufacturing apparatus of the present invention.

In manufacturing apparatus A for a laminate sheet shown in Figure 1, the denoted figure 1 is an oven in which metal sheet 2 passes and is heated continuously, and a couple of laminate rolls 4 and 5 arranged below oven 1 to press and adhere film 3 to metal sheet 2 coming out from oven 1. At a short distance below laminate rolls 4 and 5 is arranged deflector roll 6 rotatably and movably in a directions as shown by arrows P1 and P2. Further below deflector roll 6 is arranged guide roll 7 rotatably. The rotation axes of laminate rolls 4 and 5, deflector roll 6 and guiding roll 7 are parallel to each other. Quenching tank 8 containing a quenching liquid is arranged below guide roll 7.

Manufacturing apparatus A' is the one provided with hold down roll 9 for pressing laminate sheet 10 against laminate roll 4 additionally to manufacturing apparatus A. Pressure roll 9 is rotatable and arranged parallel to laminate roll 4.

As oven 1, conventionally known one such as dielectric heating oven can be applied. Another heating device such as a heating roll or an induction heating coil can also be applied instead of oven 1. A couple of laminate rolls 4 and 5 are prior known ones that acts as nip rolls for pinching and pressing metal sheet 2 and film 3 running through between them. Normally, laminate rolls 4 and 5 are each synchronously rotated in the opposite

REPLACEMENT SHEET

05 NOV 1997

laminating can be carried out at a higher speed than conventional. Furthermore, winding the film round the laminate roll makes the contacting period of laminate sheet 10 to laminate roll 4 longer immediately after the lamination, and the cooling effect by the laminate roll can be fully obtained. Therefore, film 3 does not wholly melt even when metal sheet 2 coming out from the oven is heated to a higher temperature, and the unmelted layer can reliably remain outside. Accordingly, even when the laminating is carried out at a high speed, melted layer 11 having enough thickness can be obtained, thus increasing the film adhesion during forming. In this case, the orientation of the film in the unmelted layer is reduced. Between the melted layer 11 and the co-orientation-reduced layer 12, the layer having the intermediate orientation between those of both layers is intervened.

Next, concrete examples and comparison examples are given and the effect of the manufacturing method of the present invention is explained.

(Examples 1 to 3)

A biaxially oriented polyester thermoplastic resin film having thickness of 25 μ m was heat laminated on one side of a strip of electrolytically chlorinated steel (TFS) having thickness of 0.2 mm used for can stock using the manufacturing apparatus as shown in Figure 1. The temperature of the steel strip just before coming into a couple of laminate rolls was about 225 ° C, and that of the laminate roll spontaneously cooled was about 150 ° C. The traveling speed of the laminate sheet were 100, 200 and 400m/min in

REPLACEMENT SHEET

05 NOV 1997

This Sheet Has Been Replaced



Example 1, 2 and 3, respectively. Winding angle for the laminate sheet round the laminate roll was 20° in all the examples.

When the laminates thus obtained were formed into a cup having a diameter of 65 mm and a height of 100 mm using a drawability taster, no film crack was caused in all the examples and 4.0 to 5.6 N/10 mm of stripping force of the film (adhering strength during forming) was required to strip the film in each example. The original orientation of the film, determined by measuring the birefringence index was about 0.09, while in the laminated film, the melted layer had the birefringence index of 0.01 and the thickness of about 5 to 15 μm , slightly oriented layer had the birefringence index of about 0.058 and the thickness of about 10 to 20 μm , and the intervening layer had the birefringence index of 0.01 to 0.05 and the thickness of about 3 μm .

(Comparative examples 1 to 3)

The laminating operation for Comparative examples 1, 2 and 3 were performed on the same conditions (the traveling speed of the laminate sheet were 100, 200 and 400 m/min, respectively) as in Examples except that the laminate sheet was not made to wind round the laminate roll but traveled downward straight. When the laminate sheet of Comparative example 3 was formed into a cup substantially the same as Example 1, film crack was partially caused.

In case of Comparative examples 2 and 3, no film crack was caused, but stripping force of the film (adhering strength during forming) were 4.0 and 2.9 N/10 mm, respectively. The melted layer had the

REPLACEMENT SHEET

05 NOV 1997

From the results shown above, it is apparent that according to the manufacturing method of the present invention, a laminate sheet having excellent adhering strength of the film to a metallic sheet and almost free from peeling-off of the film during forming can be obtained, even when the laminate sheet is manufactured at a high speed of 100 ~ 400m/min.

Industrial utility

As mentioned above, according to the manufacturing method of the present invention, the adhering strength of the film to a metallic sheet can be improved and it is not reduced even when the laminating operation is performed at a high speed. According to the manufacturing apparatus of the present invention, the above-mentioned manufacturing method can easily be carried out.

Summary

A method of producing a laminate sheet (10) comprises the steps of heating a continuous belt-like metal sheet (2) by a heating furnace (1), laminating a thermoplastic resin film (3) on at least one of the surfaces of the metal sheet, pressing and passing both of them between a pair of laminate rolls (4 and 5), and thermally bonding the film (3) to the metal sheet (2), wherein the laminate sheet (10) coming out from between the pair of laminate rolls (4 and 5) is pushed by a deflector roll (6) in a transverse direction so as to bias the traveling direction towards the laminate roll (4) which

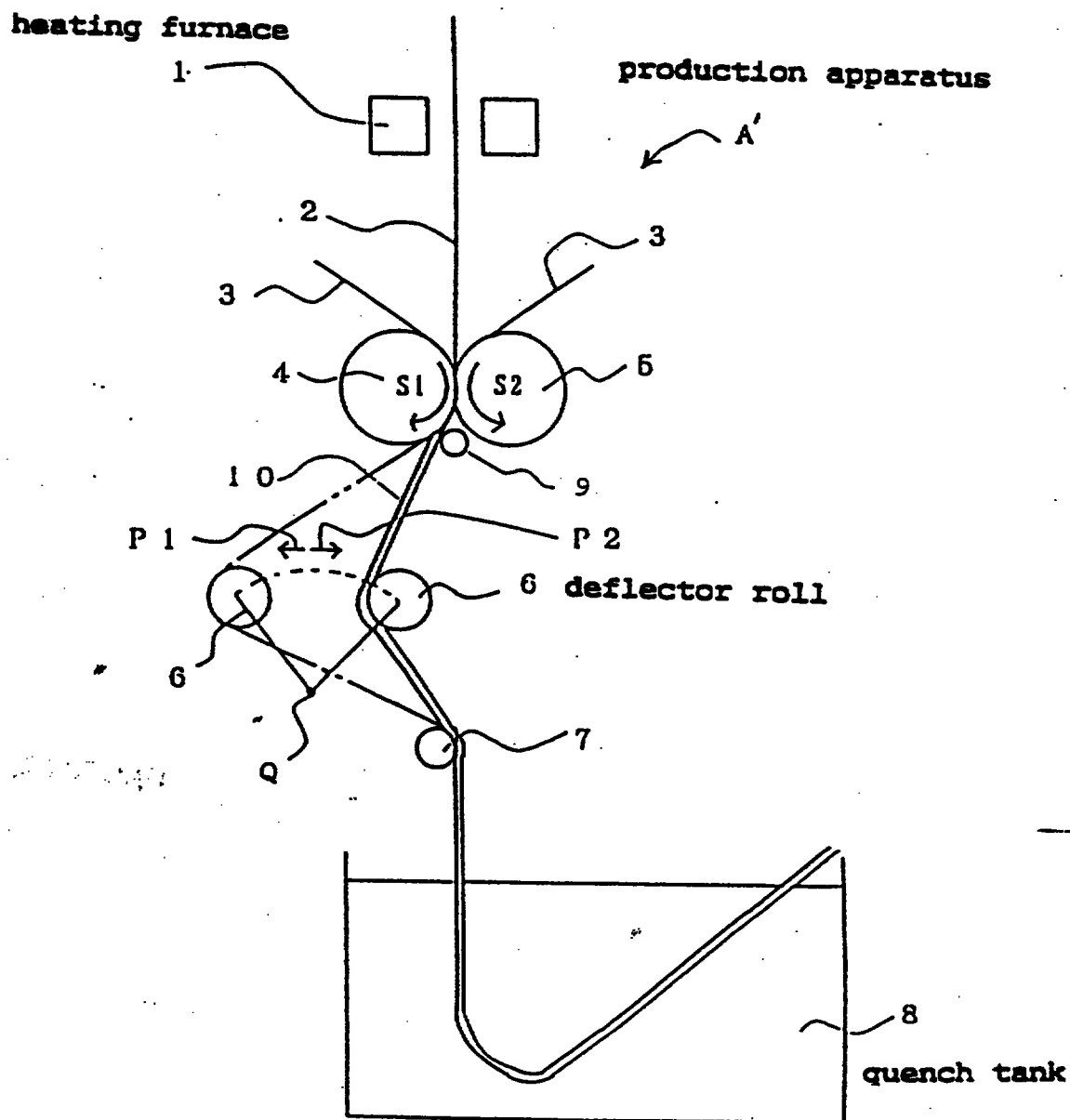
REPLACEMENT SHEET

05 NOV 1997

This Sheet Has Been Replaced



Fig. 6



production apparatus

↙ A

2

3

3

4-

S1

S2

5

10

9

P 1

P 2

deflector roll

6

-7

- 8 -

quench tank

REPLACEMENT SHEET

05 NOV 1997

0 2 JUN 1998

9702329-0
1905's copy.

- 2 -

REPLACEMENT SHEETS

in Figure 5, for example, in a case of laminating an oriented resin film when film 2 is pressed to metal sheet 101 by laminating rolls 103 and 104 (see Figure 4), a high temperature of metal sheet 101 is transferred to laminating roll 103 of a low temperature through film 102. while the high temperature causes film 102 to form a melted layer 105, the pressed metal sheet 101 and film 102 adhere to each other. After passing through between laminating rolls 103 and 104, metal sheet 101 is free from pressure, and the film surface is not more cooled, and then the temperature from the metal sheet is transferred to the whole film, which controls the orientation of oriented layer 106 of the film. Therefore, as the traveling speed of metal sheet 101 and film 102 increase, the temperature of the metal sheet should be lowered in order to control the orientation of the oriented layer because the cooling effect by the laminating rolls is not sufficient. For this reason, it is difficult to perform high speed lamination by the conventional laminating method.

On the other hand as a method to increase the melted layer by high speed lamination, heating metal sheet 101 to a higher temperature may be applied.

But in this case, cooling by the laminating rolls does not fully effect cooling of the film 102 on the side near the metal sheet 101 so that the melted layer 105 may be formed throughout the whole film thickness, thus reducing the strength of the film. In addition, in a case where such wholly melted film is located inside of a formed can, and when content is packed and storaged in it. The film is easily cracked by outer impact, which often causes

direction (arrow S1 and S2) so as to move laminate sheet 10 downward. The distance between both laminate rolls is adjustable and rotation speed can also be controlled.

Deflector roll 6 has its both ends rotatably supported by bearings (not shown), and the bearings are each synchronously movable in the directions of arrow P1 and P2 using a control cylinder or the like. The positions of the bearings are normally adjusted according to a predetermined laminating condition, but they may be adjustable during the laminating operation. The bearings are arranged to move straight and reciprocatively in a direction perpendicular to the surface of the laminate sheet. They can also be arranged to rotate about an axis Q which is positioned below (or above) their axes and parallel to them. that is, the bearings may be circularly movable as shown by the imaginary line.

Guide roll 7 has its both ends supported by bearings (not shown), and the bearings are each fixed to a frame or the like.

Guide roll is arranged at such a position as to contact a tangential line N of laminate rolls 4 and 5. Not shown, is an additional drive or nip roll to drive the laminate sheet 10 into and out from quenching tank 8. This causes tension on the laminate sheet 10, and thus a proper tension works on laminate sheet 10 located between laminate rolls 4 and 5 and guide roll 7.

The manufacturing apparatus constructed as mentioned above is used as follows. At first, two film 3 and 3 taken out from a supplying device which is not shown are made to contact both sides of

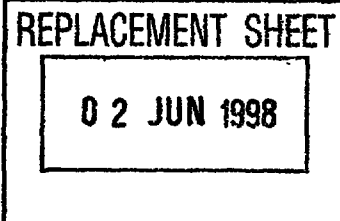
laminating can be carried out at a higher speed than conventional. Furthermore, winding the film round the laminate roll makes the contacting period of laminate sheet 10 to laminate roll 4 longer immediately after the lamination, and the cooling effect by the laminate roll can be fully obtained. Therefore, film 3 does not wholly melt even when metal sheet 2 coming out from the oven is heated to a higher temperature, and the unmelted layer can reliably remain outside. Accordingly, even when the laminating is carried out at a high speed, melted layer 11 having enough thickness can be obtained, thus increasing the film adhesion during forming. In this case, the orientation of the film in the unmelted layer is reduced. Between melted layer 11 and slightly oriented layer 12, there exists a thickness zone or layer (not shown) where the degree of orientation gradually decreases from the slightly oriented layer to the melted layer 11.

Next, concrete examples and comparison examples are given and the effect of the manufacturing method of the present invention is explained.

(Examples 1 to 3)

A biaxially oriented polyester thermoplastic resin film having thickness of 25 μ m was heat laminated on one side of a strip of electrolytically chromated steel (TFS) having thickness of 0.2 mm used for can stock using the manufacturing apparatus as shown in Figure 1. The temperature of the steel strip just before coming into a couple of laminate rolls was about 225 °C, and that of the laminate roll spontaneously cooled was about 150 °C. The traveling speed of the laminate sheet were 100, 200 and 400m/min in

From the results shown above, it is apparent that according to the manufacturing method of the present invention, a laminate sheet can be obtained having excellent adhering strength of the film to the metallic sheet and hardly able to be peeled off during subsequent forming, even when the laminate sheet is manufactured at a high speed of 100 ~ 400m/min.



Industrial utility

As mentioned above, according to the manufacturing method of the present invention, the adhering strength of the film to a metallic sheet can be improved and it is not reduced even when the laminating operation is performed at a high speed. According to the manufacturing apparatus of the present invention, the above-mentioned manufacturing method can easily be carried out.

Summary

A method of producing a laminate sheet (10) comprises the steps of heating a continuous belt-like metal sheet (2) by a heating furnace (1), laminating a thermoplastic resin film (3) on at least one of the surfaces of the metal sheet, pressing and passing both of them between a pair of laminate rolls (4 and 5), and thermally bonding the film (3) to the metal sheet (2), wherein the laminate sheet (10) coming out from between the pair of laminate rolls (4 and 5) is pushed by a deflector roll (6) in a transverse direction so as to bias the traveling direction towards the laminate roll (4) which

PCT

世界知的所有権機関
国際事務局9702529-0
IPOS's copy

特許協力条約に基づいて公開された国際出願

(51) 国際特許分類6 B29C 65/44, B32B 31/08	A1	(11) 国際公開番号 WO96/17721 ✓ (43) 国際公開日 1996年6月13日(13.06.96)
(21) 国際出願番号 PCT/JP95/02519 ✓ (22) 国際出願日 1995年12月8日(08.12.95) ✓ (30) 優先権データ 特願平6/331963 ✓ 1994年12月9日(09.12.94) ✓ JP ✓ (71) 出願人 (米国を除くすべての指定国について) 東洋鋼板株式会社(TOYO KOHAN CO., LTD.)[JP/JP] 〒100 東京都千代田区霞が関一丁目4番3号 Tokyo, (JP) (72) 発明者: および (75) 発明者/出願人 (米国についてのみ) 加隈徳昭(KAGUMA, Noriaki)[JP/JP] 田中厚夫(TANAKA, Atsuo)[JP/JP] 岩下寛之(IWASHITA, Hiroyuki)[JP/JP] 坂本宜樹(SAKAMOTO, Yoshiki)[JP/JP] 〒744 山口県下松市東豊井1296番地の1 東洋鋼板株式会社 技術研究所内 Yamaguchi, (JP) 稲沢弘志(INAZAWA, Hiroshi)[JP/JP] 〒744 山口県下松市東豊井1302番地 東洋鋼板株式会社 下松工場内 Yamaguchi, (JP)		(74) 代理人 弁理士 太田明男(OHTA, Akio) 〒100 東京都千代田区霞が関一丁目4番3号 東洋鋼板株式会社内 Tokyo, (JP) (81) 指定国 AU, BR, CA, CN, IS, JP, KR, MX, NO, NZ, PL, RO, (SG) US, VN, 欧州特許(AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). 添付公開書類 国際調査報告書 1 SR ✓ 1 PD 1 Appl ⁿ . (chk w Extract from PCT Gazette No 27/1996) 5 Invs (ok w Extract from PCT Gazette No 27/1996)
(54) Title: METHOD AND APPARATUS FOR PRODUCING LAMINATE BOARD ✓ (54) 発明の名称 ラミネート板の製造方法および製造装置 (57) Abstract A method of producing a laminate board (10) involves the steps of heating a continuous belt-like metallic sheet (2) by a heating furnace (1), laminating a thermoplastic resin film (3) on at least one of the surfaces of the metallic sheet, pressing and passing both of them between a pair of laminate rolls (4 and 5), and thermally bonding the film (3) to the metallic sheet (2), wherein the laminate sheet (10) coming out from between the pair of laminate rolls (4 and 5) is pushed by a deflector roll (6) in a transverse direction so as to bias the travelling direction towards the laminate roll (4) in contact with the film (3). The invention also discloses an apparatus (A) used for this method. 1 ... heating furnace 2 ... metallic sheet 3 ... film 4, 5 ... laminate roll 6 ... deflector roll 8 ... quench tank 10 ... laminate sheet A ... production apparatus		

(57) 要約

連続する帯状の金属板2を加熱炉1で加熱し、その少なくとも一面に、熱可塑性樹脂フィルム3を重ね、両者を一对のラミネートロール4、5の間に通して加圧し、前記フィルム3を金属板2に熱融着させるラミネート板10の製造方法であって、前記一对のラミネートロール4、5間から出てくるラミネート板10をデフレクタロール6により横方向に押圧することにより、その進行方向をフィルム3と当接するラミネートロール4側に片寄せさせるラミネート板10の製造方法およびその方法に用いる装置A。

9702529-0

情報としての用途のみ

PCTに基づいて公開される国際出願をパンフレット第一頁にPCT加盟国を特定するために使用されるコード

AL	アルバニア	DK	デンマーク	LK	スリランカ	PT	ポルトガル
AM	アルメニア	EE	エストニア	LR	リベリア	RO	ルーマニア
AT	オーストリア	ES	スペイン	LS	レソト	RU	ロシア連邦
AU	オーストラリア	FI	フィンランド	LT	リトアニア	SD	スーダン
AZ	アゼルバイジャン	FR	フランス	LU	ルクセンブルグ	SE	スウェーデン
BB	バルバドス	GB	ガボン	LV	ラトヴィア	SG	シンガポール
BE	ベルギー	GG	イギリス	MC	モナコ	SI	スロベニア
BG	ブルガリア	GN	ギニア	MD	モルドバ	SK	スロヴァキア共和国
BJ	ベナン	GR	ギリシャ	MG	マダガスカル	SN	セネガル
BR	ブラジル	HU	ハンガリー	MK	マケドニア旧ユーゴスラヴィア共和国	SZ	スワジランド
BY	ベラルーシ	IE	アイアランド	ML	マリ	TG	トーゴ
CA	カナダ	IS	アイスランド	MN	モンゴル	TJ	タジキスタン
CF	中央アフリカ共和国	IT	イタリア	MR	モリタニア	TM	トルクメニスタン
CG	コンゴ	JP	日本	MW	マラウイ	TR	トルコ
CH	スイス	KE	ケニア	MX	メキシコ	TT	トリニダード・トバゴ
CI	コート・ジボアール	KG	キルギスタン	NE	ニジェール	UA	ウクライナ
CM	カメルーン	KP	朝鮮民主主義人民共和国	NL	オランダ	UG	ウガンダ
CN	中国	KR	大韓民国	NO	ノルウェー	UZ	ウズベキスタン共和国
CZ	チェコ共和国	KZ	カザフスタン	NZ	ニュージーランド	VN	ベトナム
DE	ドイツ	LI	リヒテンシュタイン	PL	ポーランド		