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(54) **A METHOD FOR DECORATING THE EDGES OF PLASTIC CARDS, SO DECORATED PLASTIC CARDS AND A DIE FOR A HOT STAMPING MACHINE**

(57) The object of the present invention is a method for decorating the edges of plastic cards whose shapes are convex polygons, especially regular polygons, with rounded corners, a plastic card whose edges and rounded corners are decorated using the said method, as well as a die for a hot stamping machine to be applied in the method concerned.

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Description

[0001] The object of the present invention is a method for decorating the edges of plastic cards, as well as the card produced using the method concerned, and dies for hot stamping machines applied in the method described by the present invention.

[0002] Plastic cards have been known since 1930s. For many decades they have been used as a product applied by the banking sector for cashless transactions. The popularization of manufacturing capacities and methods (printing on plastic, laminating, cutting), as well as the easiness of adapting cards to advanced electronic technologies, and the prestige of credit cards, have all contributed to the growing interest in the said product on other markets, in particular those that involve

- identification of persons (e.g. access cards),
- transportation (contactless electronic identification, crediting commuter cards),
- loyalty programs (gathering information on rewards in points systems),
- presents (gift cards with particular amounts of money to be used in particular ways).

[0003] At present plastic cards are made of PVC, PC or PET-G.

[0004] Methods for decorating the surfaces of plastic cards like credit or identity cards are well-known.

[0005] A method for decorating the edges of such cards together with their rounded corners as described in patent EP3031615 and application US2018/345655 is also known. The method involves hot stamping of each edge together with both of its rounded corners formed by said edge with the adjacent edges of the card. Thereby each of the rounded corners is covered with a hot stamping foil twice, which may cause the foil to peel off or wrinkle in those places. Moreover, this causes wasteful duplication of foil consumption.

[0006] The objective of the invention is to propose an improved method for decorating the edges of plastic cards.

[0007] The object of the present invention is a method for decorating the edges of plastic cards whose shapes are convex polygons, especially regular polygons, with rounded corners, characterised in that it covers a complete edge decorating cycle which includes:

- placing a card package in the cassette in such a way that the first uncovered edges of the cards within the particular cycle are parallel to the surface of the die,
- hot foil stamping of the surface made up of the first edges of cards within the particular cycle, together with precisely one rounded corner of the package of

cards adjacent to the said surface,

- rotating the card package in such a way that the second uncovered edges of the cards within the particular cycle, which are basically opposite to the edges that were covered during the previous stage, are parallel to the surface of the die,

- hot foil stamping of the surface made up of the second edges of cards within the particular cycle, together with precisely one rounded corner of the package of cards adjacent to the said edges,

- separating the cards within the package through blowing air from the side of the edges that has not been foil stamped within the particular cycle.

[0008] The term of "basically opposite edges" used in the present description means the edges that do not have a shared corner. Preferably these are parallel edges, or edges that are possibly most remote from one another.

[0009] The consecutive cycles of decorating of the basically opposite edges are performed in such a way that all the edges and rounded corners are covered, and for cards with odd numbers of edges, at least one shortened cycle is to be performed to include the following:

- placing a card package in the cassette in such a way that the uncovered edges of the cards are parallel to the surface of the die,

- hot foil stamping of the surface made up of these edges of cards together with precisely one rounded corner of the package of cards adjacent to the said edges,

- separating the cards within the package through blowing air from the side of the edges that has not been foil stamped within the particular cycle.

[0010] Preferably, the card package is separated through blowing air only at the end of a complete or shortened cycle for decorating the edges.

[0011] Preferably, once the card package is placed in the cassette, the card package is clasped at two points at least.

[0012] Preferably, the width of foil is adjusted in such a way that the foil layers applied in consecutive cycles do not overlap or that their overlap is not more than 2 mm.

[0013] Preferably, the plastic card is rectangular with rounded corners, and in order to decorate its edges, two complete cycles of decorating the edges are performed.

[0014] The object of the present invention is also a card whose edges and rounded corners are decorated using the method described by the present invention.

[0015] In addition, the invention includes a die for the hot stamping machine to be applied within the method described by the present invention, which die includes

an aluminium plate covered on the outside with silicone rubber which is intended for contact with the foil, and the section of the die corresponds to the shape of one edge and of precisely one rounded corner adjacent to the said edge.

[0016] Thanks to the application of the method described in the present invention, each of the rounded corners is covered only once. Thereby the risk of the foil peeling off or wrinkling on the rounded corners is reduced, and the consumption of the hot stamping foils is less wasteful.

[0017] Moreover, the method permits decorating the edges of cards with any shapes of convex polygons with rounded corners. In particular, where all angles of the particular polygon are the same, all edges and all corners may be decorated with the used on one die only.

[0018] Once the hot stamping foil is applied onto the surface of a card package, the cards remain "stuck together". This fact can be utilised to hold the card package while rotating, and to separate the cards only after at least two edges are decorated. Additionally, this reduces the number of stages within a cycle, as well as the consumption of compressed air.

[0019] The method proposed in the invention permits using one die with a given radius of curvature for cards/products with varied lengths of edges (cards with various sizes), as decorating is not limited to always two rounded corners and one edge.

[0020] The invention shall now be presented in an example performance which does not limit the scope of protection.

Example performance - colouring the edges of a rectangular card

[0021] Two separate devices have been created for the manufacturing purposes: one used for colouring the long edge together with one corner, and the other used for colouring the short edge together with one corner.

[0022] The structure of both devices is very much like the structure of hot stamping machines - on pressing the button (pedal), the pneumatic actuator lowers the heating head. The heating head is made of aluminium and consists of a set of heaters that ensure that the required temperature is maintained.

[0023] The heating head has an attached die which is partially made up of aluminium (1), and partially of silicone rubber (2) whose toughness is 60 shore (fig. 1). The die's shape matches part of the edge and one of the adjacent rounded corners.

[0024] The heating plate is insulated from the actuator with textolite in order to reduce heat losses.

The course of the process

PART ONE - colouring the long edge

[0025]

a. A package of 50 cards is placed in a special cassette, with its longer edge upwards.

b. The card package is clasped at four points so that the package cannot be displaced during the colouring process.

c. The cassette is placed under the die.

d. Thermal transfer foil for plastics (hot stamping foil) is applied to the surface of the long edge of the cards.

e. The operating cycle is released:

- the die, being heated up to approx. 160 degrees, is lowered onto the edge of the cards to press on the thermal transfer foil,
- after 1 to 3 seconds (depending on the hot stamping foil's parameters), the die is lifted,
- after approx. 1 second, the thermal transfer foil is ripped off the card edge.

f. The cassette moves out from beneath the die.

g. The package is released and taken out of the cassette.

h. The card package is rotated and inserted into the cassette with the other longer edge upwards.

[0026] Then stages b) to g) are repeated. Once the package is taken out, individual cards are separated through blowing air from the side of the short edge.

SECOND PART - colouring the short edge

[0027] A package of 50 cards is placed in a special cassette, with its shorter edge upwards.

[0028] Then stages b) to h) are performed just like in part one, and then stages b) to g). Once the package is taken out, individual cards are separated through blowing air from the side of the long edge.

Claims

1. A method for decorating the edges of plastic cards whose shapes are convex polygons, especially regular polygons, with rounded corners, **characterised in that** it comprises a complete edge decorating cycle which includes:

- placing a card package in a cassette in such a way that the first uncovered edges of the cards within the particular cycle are parallel to the surface of a die,
- hot foil stamping of the surface made up of the first edges of cards within the particular cycle, together with precisely one rounded corner of the package of cards adjacent to the said surface,
- rotating the card package in such a way that the second uncovered edges of the cards within the particular cycle, which are basically opposite

to the edges that were covered during the previous stage, are parallel to the surface of the die,

- hot foil stamping of the surface made up of the second edges of cards within the particular cycle, together with precisely one rounded corner of the package of cards adjacent to the said edges,

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- separating the cards within the package through blowing air from the side of the edges that has not been foil stamped within the particular cycle,

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and then further complete cycles of decorating the basically opposite edges are performed so as to cover all the card edges and rounded corners, and for cards with odd numbers of edges, at least one shortened cycle is to be performed to include the following:

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- placing a card package in the cassette in such a way that the uncovered edges of the cards are parallel to the surface of the die,

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- hot foil stamping of the surface made up of these edges of cards together with precisely one rounded corner of the package of cards adjacent to the said edges,

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- separating the cards within the package through blowing air from the side of the edges that has not been foil stamped within the particular cycle.

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2. The method according to claim 1, **characterised in that** separating the card package through blowing air is only done at the end of the complete or shortened cycle of decorating the edges.

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3. The method according to claim 1 or 2, **characterised in that** after placing the card package in the cassette, the package is clasped at two points at least.

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4. The method according to any of the preceding claims, **characterised in that** the width of foil is adjusted in such a way that the foil layers applied in consecutive cycles do not overlap or that their overlap is not more than 2 mm.

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5. The method according to any of the preceding claims, **characterised in that** the plastic card is rectangular with rounded corners, and two complete edge decorating cycles are performed in order to decorate its edges.

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6. A plastic card whose edges and rounded corners are decorated using the method according to claims 1-5.

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7. A die for a hot stamping machine to be applied in the method presented in claims 1-5, **characterised**

in that it includes an aluminium plate (1) covered with silicone rubber (2) on the outside which is intended for contact with the foil, and the section of the die corresponds to the shape of one edge and of precisely one rounded corner adjacent to the said edge.



EUROPEAN SEARCH REPORT

Application Number
EP 20 17 7684

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Place of search Munich		Date of completion of the search 16 September 2020	Examiner D'Incecco, Raimondo
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ANNEX TO THE EUROPEAN SEARCH REPORT
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