CLAIMS

What is claimed is:

1. A process for forming a printed product, said process comprising:

applying an energy curable ink to a substrate at a first station using a printing process;

curing said energy curable ink using an energy curable process at a second station downstream of said first station to define a cured energy curable layer; and

routing said substrate to a third station downstream of said second station.

2. The process according to Claim 1 wherein said curing said energy curable ink using said energy curable process comprises curing said energy curable ink using an electron beam at said second station downstream of said first station to define said cured energy curable layer.

3. The process according to Claim 1 wherein said curing said energy curable ink using said energy curable process comprises curing said energy curable ink using an ultraviolet beam at said second station downstream of said first station to define said cured energy curable layer.

4. The process according to Claim 1, further comprising:

applying a metallic ink to said substrate at said third station, said metallic ink being applied over said cured energy curable layer to define a metallic ink layer.

5. The process according to Claim 4, further comprising:

applying an overcoat layer to said substrate at a fourth station, said overcoat layer being applied over said metallic ink layer.

6. The process according to Claim 1, further comprising:

applying an overcoat layer to said substrate at said third station, said overcoat layer being applied over said cured energy curable layer.

7. The process according to Claim 1 wherein said applying said energy curable ink to said substrate at said first station using said printing process comprises applying said energy curable ink to said substrate at said first station using a gravure cylinder having indicia grooves formed on said gravure cylinder, said indicia grooves retaining said energy curable ink until contact with said substrate whereby said energy curable ink is applied to said substrate.

8. A system for forming an indicia on a substrate, said system comprising:

a feed system for feeding said substrate;

a plurality of stations each operable to apply a processing step to said substrate, a first of said plurality of stations applying an energy curable ink to said substrate using a printing process; and

a curing unit disposed downstream of said first of said plurality of stations, said curing unit receiving said substrate and outputting an energy beam directed toward said energy curable ink to cure said energy curable ink and form a resultant energy cured layer upon said substrate.

9. The system according to Claim 8 wherein said energy beam is an electron beam.

10. The system according to Claim 8 wherein said energy beam is an ultraviolet beam.

11. The system according to Claim 8 wherein said curing unit outputs said energy beam directed toward said energy curable ink to polymerize said energy curable ink.

12. The system according to Claim 8 wherein said curing unit outputs said energy beam directed toward said energy curable ink to polymerize said energy curable ink into a monolayer.

13. The system according to Claim 8 wherein a second of said plurality of stations applies a metallic ink to said substrate.

14. The system according to Claim 8 wherein a second of said plurality of stations applies a metallic ink to said substrate over said energy cured layer.

15. The system according to Claim 14 wherein a third of said plurality of stations applies an overcoat to said substrate over said metallic ink and said energy cured layer.

16. The system according to Claim 8 wherein a second of said plurality of stations applies an overcoat to said substrate over said energy cured layer.

17. The system according to Claim 8 wherein said first of said plurality of stations applying said energy curable ink to said substrate using said printing process comprises said first of said plurality of stations applying said energy curable ink to said substrate using a gravure cylinder having an indicia depression formed on said gravure cylinder, said indicia depression retaining said energy curable ink until contact with said substrate whereby said energy curable ink is applied to said substrate.

CLAIMS

What is claimed is

1. A process for forming a printed product, said process comprising:

applying an energy curable coating to a substrate at a first station using a printing process;

curing said energy curable coating using an energy curable process including free radical polymerization at a second station downstream of said first station to define an unembossed, cured energy curable layer;

routing said substrate to a third station downstream of said second station;

applying a metallic ink directly to an unembossed surface of said unembossed, cured energy curable layer to define a metallic ink layer; and

applying an overcoat layer to said substrate at a fourth station, said overcoat layer being applied over said metallic ink layer.

2. The process according to Claim 1 wherein said curing said energy curable coating using said energy curable process comprises curing said energy curable coating using an electron beam at said second station downstream of said first station to define said unembossed, cured energy curable layer.

3. The process according to Claim 1 wherein said curing said energy curable coating using said energy curable process comprises curing said energy curable coating using an ultraviolet beam at said second station downstream of said first station to define said unembossed, cured energy curable layer.

4. The process according to Claim 1 wherein said applying said energy curable coating to said substrate at said first station using said printing process comprises applying said energy curable coating to said substrate at said first station using a gravure cylinder having indicia grooves formed on said gravure cylinder, said indicia grooves retaining said energy curable coating until contact with said substrate whereby said energy curable coating is applied to said substrate.

5. A system for forming an indicia on a substrate, said system comprising:

a feed system for feeding said substrate;

a plurality of stations each operable to apply a processing step to said substrate, a first station of said plurality of stations configured to apply an energy curable coating to said substrate using a printing process;

a curing unit disposed downstream of said first station, said curing unit configured to receive said substrate and output an energy beam directed toward said energy curable coating to cure said energy curable coating via a free radical polymerization process and form a resultant unembossed energy cured layer upon said substrate;

a second station of said plurality of stations configured to apply a metallic ink directly to said unembossed energy cured layer, the curing unit is between the first station and the second station; and

a third station of said plurality of stations configured to apply an overcoat to said substrate over said metallic ink and said energy cured layer.

6. The system according to Claim 5 wherein said energy beam is an electron beam.

7. The system according to Claim 5 wherein said energy beam is an ultraviolet beam.

8. The system according to Claim 5 wherein said curing unit is configured to output said energy beam directed toward said energy curable coating to polymerize said energy curable-coating.

9. The system according to Claim 5 wherein said curing unit is configured to output said energy beam directed toward said energy curable coating to polymerize said energy curable coating.

10. The system according to Claim 5 wherein said first station of said plurality of stations is configured to apply said energy curable coating to said substrate with a gravure cylinder having an indicia depression formed on said gravure cylinder, said indicia depression retaining said energy curable coating until contact with said substrate whereby said energy curable coating is applied to said substrate.