A machine is provided to create a strip of selectively pressure-sensitive adhesive material. A first roller unwinds a backing and a roller dispenses a series of separated areas of inhibited adhesive material. A second roller applies a continuous layer of adhesive material over the inhibited adhesive material and backing. A facing is applied over the continuous layer of adhesive material. The machine then winds the finished material. A removable backing is coated with non-sticky material and then covered by a continuous sticky layer of material. A face stock material is then applied over the continuous sticky layer.
ADHESIVE APPLICATION WITH INTERMITTENT DEAD ZONES

BACKGROUND OF THE INVENTION

[0001] Adhesive labels with the use of deadening agents are currently made with a cumbersome and multi-part process. It is desirable to have only certain portions of labels have active adhesive and this is done by applying a deadening agent to a label that is completely coated with adhesive. What is typically done is that labels will be made in sheets and the completely coated adhesive side will have a release paper applied to it. Then, the label or face stock will be rolled with the adhesive paper. In a separate operation, the face stock will be separated from the release paper, then a deadening agent is applied directly to the adhesive in selected areas. Once the deadening agent is applied, the release paper is then bonded back to the adhesive side of the face stock. Currently, label stock that has selective adhesive uses selective application of the adhesive on face stock and leaves the other areas without any adhesive. Selective adhesive that is currently available applies the adhesive directly to the face stock and a releasable backing is applied over it. Improved label stock and process is needed.

SUMMARY OF THE INVENTION

[0002] The present disclosure describes a selective pressure-sensitive label and the process to make the same. A releasable backing is unrolled and a kill material is selectively dispensed onto one side. After the kill material is dispensed, an adhesive is dispersed in a continuous fashion over the kill material areas and the gaps between them. The strip is then cured in an oven and a face stock is then applied over the continuous adhesive surface. The strip is then rolled up, printed, and separated as needed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0003] A preferred embodiment of this invention has been chosen wherein:

[0004] FIG. 1 is a process flow diagram for making the adhesive strip;

[0005] FIG. 2 is a simplified view of the adhesive and deadening agent application;

[0006] FIG. 3 is a partial view of the application process from FIG. 2;

[0007] FIG. 4 is a view of the release paper removal; and

[0008] FIG. 5 is a view of the product as applied.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0009] The process flow 10 for making a selective pressure sensitive adhesive label stock 12 strip is shown in FIG. 1. A primary release paper 14 is unrolled from a roll 16 and travels through a series of idlers 18 at a linear speed. The primary release paper 14 has two main components. The first component of the release paper is typically a kraft paper substrate 20 that is clay-coated. The second component of the release paper is a silicone coating 22 on at least one side of the substrate 20 to form a release surface 24 as shown in FIG. 2. The release paper 14 can be other materials that have similar properties that allow cured adhesive to release and tolerate a curing process. It should be noted that the process flow 10 is from right to left in FIGS. 2 and 3 as noted with the arrow. The thickness of the parts as shown in FIGS. 2 and 3 is not to scale.

in order to show the detail. The primary release paper 14 as it is unrolled from roll 16 is held in tension through friction or other means. The release paper 14 is dimensionally stable, resists stretching, and provides a structural element to support handling and processing. The silicone coating 22 allows the subsequent removal of the finished product in a clean and simple fashion. The release paper 14 is merely a carrier and intended to be discarded once the label stock 12 is applied and is in use.

[0010] After the release paper 14 has passed through the idlers 18, it passes through a pattern kill station 26. The detail of the pattern kill station 26 is shown in FIG. 3. The primary release paper 14 enters and is moved between a backing roller 28 and a kill roller 30. The kill roller 30 has a base diameter 32 and raised portions 34 with an outside surface 36. The kill roller 30 is partially submerged in a bath 40 of deadening agent 38 to apply the deadening agent 38 to the roller 30, particularly the outside surface 36. As cured, the deadening agent 38 does not have adhesive properties and is not a sticky or tacky surface. The bath 40 includes a doctor blade 42 that is separated from the kill roller 30 to set the thickness of the kill islands 44. The kill islands 44 have a dead surface 43 and a covered surface 45. The dead surface 43 is in direct contact with the release surface 24. The covered surface 45 will be covered in a subsequent step. The kill roller 30 has a tangential speed that is based on the radius of the deadening agent 38 or outside surface 36. This tangential speed matches the linear speed of the release paper 14 for clean coating and application without smearing. As the deadening agent 38 passes the doctor blade 42, the excess deadening agent 38 is scraped away and returns to the bath 40. The distance between the doctor blade 42 and the outside surface 36 determines the thickness. The backing roller 28 supports and positions the release paper 14 where the kill islands 44 are moved from the protrusions 34 to the release surface 24. The kill islands 44 are then transferred to the release surface 24 as the release paper 14 passes directly over the kill roller 30. The release paper 14 and kill islands 44 form a strip of kill-coated paper 15 after this process. Only one side is coated with the kill islands 44, the opposite side is a non-coated surface 66. At this point, the kill-coated paper 15 has kill islands 44 spaced apart equal to the circumferential distance between adjacent raised portions 34. Portions of the release surface 24 are still exposed at this point. The deadening agent 38 as shown in the bath 40 is a liquid. The selective application is done this way to prevent any trace amounts of the deadening agent 38 from being placed anywhere outside of the islands. Trace amounts of the deadening agent 38 could inhibit the proper adhesive properties of any subsequent coated layers. The base diameter 32, between raised portions 34, may be coated with a non-stick material to allow the deadening agent 38 to fall away as the kill roller 30 rotates past the doctor blade 42. The deadening agent 38 is a liquid.

[0011] The kill-coated paper 15 then proceeds to an adhesive station 46. The details of the adhesive station 46 are shown in FIG. 3. The kill-coated paper 15 is moved between a backing roller 48 and a gravure roller 50. The gravure roller 50 has a primary diameter 52 and impressions 54. The impressions 54 are to improve the transfer capabilities of the gravure roller 50. The gravure roller 50 is partially submerged in a bath 60 of adhesive 58. The bath 60 includes a doctor blade 62 that is separated from the gravure roller 50 to set the thickness of the adhesive 58. The gravure roller 50 has a tangential speed based on the radius of the adhesive or primary diameter
This tangential speed matches the linear speed of the kill-coated paper 15 to have consistent coverage without disturbing the now-buried kill islands 44. The adhesive 58 proceeds around the gravure roller 50 in a continuous layer 56. The continuous layer 56 has a covering surface 55 which is applied over the covered surface 45 of the kill islands 44. The covering surface 55 also contacts the exposed release surface 24 between the kill islands 44 to form an adhesive surface 90. Opposite the adhesive surface 90 is a stock adhesive surface 68. After the gravure roller 44, 50, the fully coated paper 64 with adhesive 58 proceeds through more idlers 18 as is shown in FIG. 1. The idlers 18 only contact the non-coated surface 66 of the fully coated paper 64. The adhesive 58 as shown in the bath 60 is a liquid.

The fully coated paper 64 then proceeds through a curing oven 70 where the continuous layer 56 and kill islands 44 are cured. The curing process can either be by heat, time, forced air, or a combination. The cured coated paper 72 leaves the oven 70. After the curing oven 70, the stock adhesive surface 68 becomes a continuous adhesive surface.

A roll 74 of face stock 76 unrolls and travels over idlers 18 before joining the cured coated paper 72 at a set of pinch rollers 78, 80. The face stock 76 has a printing side 82 and a back 84. The back 84 is pressed to the stock adhesive surface 68 to form a continuous strip of adhesive label stock 12. The printing side 82 is adapted to receive printing or is pre-printed before it is wound around the take-up roll 86. It is also contemplated that the face stock 76 is printed before it is placed on the roll 74. A simplified view of the process steps are shown in FIG. 2. Because the face stock 76 never travels through a curing oven 70 or process, a significant amount of options are available. For example, the face stock 76 can be thermally activated or contain materials that would not have survived a curing process.

Registration marks, either by printing, backing, or other indicators may be added to alert the user of the adhesive label stock 12 where to locate the printing in relation to the adhesive surface 90 and killed surface 92. One key difference between the process flow 10 and other adhesive processes is that the release paper 14 receives the adhesive 58 and then face stock 76 is applied to the fully coated paper 64.

As cured, an adhesive surface 90 is a pressure-sensitive adhesive, while a killed surface 92 is not. The adhesive surface 90 forms a boundary layer between the release surface 24 and the continuous layer 56. The label stock 12 is then cut to create a cut edge 98. The cut is located to align the killed surface 92 and adhesive surface 90 for the particular application. The printed and cut labels 100 are separated from the release paper 14 as shown in FIG. 4. During separation, the adhesive surface 90 is exposed. This is because the adhesive 58 preferentially adheres to the face stock 76 and is much more weakly bonded to the release surface 24. The continuous layer 56 and the kill islands 44 remain attached to each other when the release paper 14 is removed from the label stock strip as is shown in FIG. 4. In use, the label stock 12 is separated into individual labels 100 where the printing side 82 is facing outward, the adhesive surface 90 is affixed to a shelf 94 or other object. The killed surface 92 is exposed, and because it is a non-stick surface, the label 100 does not stick to itself or other nearby objects.

The thickness of the label stock 12 can be uniform as applied, because the adhesive layer 56 is thinner where it covers the kill islands 44. This creates a uniform thickness and therefore creates a uniform take-up roll 86.

It is understood that while certain aspects of the disclosed subject matter have been shown and described, the disclosed subject matter is not limited thereto and encompasses various other embodiments and aspects. No specific limitation with respect to the specific embodiments disclosed herein is intended or should be inferred. Modifications may be made to the disclosed subject matter as set forth in the following claims.

What is claimed is:

1. A method for applying a selective pressure-sensitive adhesive backed label, said method comprising the steps:
   providing a release paper having a release surface;
   applying deadening agent to form an island on said release surface, said island having lateral edge boundaries and said release surface adjacent to said lateral edge boundaries remaining and exposing portions of said release surface;
   applying a continuous adhesive layer over said island and said exposed release surface;
   curing said island and said continuous adhesive layer; and
   applying a layer of face stock over said continuous adhesive layer;

2. The method of claim 1, including a plurality of islands, said islands being spaced from each other so that said release surface is exposed between said lateral edge boundaries of adjacent islands, and applying said continuous layer of adhesive over said islands and said exposed release surface between said islands.

3. An intermittent dead zone pressure-sensitive adhesive label, said label having:
   a backing material having a release surface;
   a plurality of kill islands of deadening agent directly contacting and overlying said release surface of said backing material and forming a killed surface where said deadening agent directly contacts said release surface, adjacent kill islands being spaced from each other leaving a gap of exposed release surface between said islands;
   a continuous layer of adhesive overlying and directly contacting said islands and directly contacting said exposed release surface between said islands to form an adhesive surface where said adhesive directly contacts said release surface, said continuous layer of adhesive having a first thickness where said continuous layer of adhesive overlays and directly contacts said kill islands, and a second thickness where said continuous layer overlays and directly contacts said backing material, said second thickness greater than said first thickness;
   a layer of face stock having a print side and an adhesive receiving side, said adhesive receiving side overlaying and directly contacting said continuous layer of adhesive; and
   when said backing material is removed from adhesive label, said kill islands and said continuous layer of adhesive remain on said face stock, said adhesive at said adhesive surface having a tacky surface, said kill islands at said killed surface having a non-tacky surface.

4. The label of claim 3, said adhesive being pressure sensitive.

5. The label of claim 4, said backing material being clay-coated kraft paper, said release surface being silicone-based.

6. The label of claim 5, said face stock having a fiducial marking the location of said kill islands.
7. A machine for making a selective pressure-sensitive adhesive roll, said machine comprising:

an unroll portion adapted to receive and dispense backing material at a linear speed;

a kill application portion adapted to selectively apply islands of deadening agent, said kill application portion having a kill applicator roller, said kill applicator roller rotatable about a central axis and having a major diameter and a minor diameter, said major diameter separated into segments, said kill applicator roller partially submerged in deadening agent and rotates at a tangential speed matching said linear speed of said backing material, when said backing material passes over said kill applicator roller, said deadening agent dispenses an interrupted series of deadening agent;

an adhesive application portion adapted to apply a continuous adhesive layer, said adhesive application portion having an adhesive roller, said adhesive roller rotatable about a central axis and having a primary diameter, said adhesive roller partially submerged in adhesive and rotates at a tangential speed matching said linear speed of said backing material, when said backing material and said interrupted series of deadening agent passes over said adhesive roller, said adhesive overlays said backing material and said interrupted series of deadening agent in an uninterrupted layer;

an oven adapted to cure said deadening agent and said adhesive on said backing material;

a face stock portion adapted to receive and dispense face stock; and

a pinch portion adapted to press said face stock to said continuous layer of said adhesive.

8. The machine of claim 7, said kill application portion having a doctor blade separated from said major diameter, said adhesive application portion having a doctor blade separated from said primary diameter.

9. The machine of claim 8, said adhesive roller having a series of impressions radially nearer said central axis.

10. The machine of claim 7, and a tensioning device to maintain constant tension in said backing material.

11. The machine of claim 10, and a plurality of idlers.