WRAP DEVICE TO FACILITATE HANDLING OF STACKED SLIDES OR OTHER STACKABLE FLAT OBJECTS

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Related U.S. Application Data

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The present invention is directed to a wrap device and to methods of using a wrap device for facilitating manipulation of a stack of slides or other stackable objects in order to remove the stack from a packaging container and place within a hopper or other dispensing container. When using the device and methods of the present invention, no undue force is exerted on any particular slide within the stack, thus minimizing the risks of breakage, while stabilizing the stack such that "fanning" and slippage within the stack is substantially prevented. Further, the invention may be used to facilitate manipulation of a stack of slides without direct contact between the slides and a user's hands.
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CROSS REFERENCE TO RELATED APPLICATION

[0001] The present application is based on and claims priority from U.S. Provisional Patent Application Ser. No. 60/546,046 filed Feb. 19, 2004.

FIELD OF THE INVENTION

[0002] The present invention relates to a device that facilitates the handling and/or transfer of a stack comprising a number of substantially flat, stackable objects including, but not limited to, microscope slides, plates, trays, and the like.

BACKGROUND OF THE INVENTION

[0003] A variety of automated or semi-automated instruments exist that require manual loading of multiple slides or other stackable devices into some sort of dispensing container, hopper, or magazine-like structure designed to hold a stack of devices, for example, a stack of about 50 or more microscope slides. Typically, it is difficult to load more than just a few slides at a time by hand into a standard slide hopper due to the tendency of slides within a stack to slip against each other near the middle of the stack. However, the ability to transfer significant numbers of slides, as in a stack of 50 to 100 or more slides, at one time would decrease the amount of time and labor required for loading. Further, since contact of slides with oils, proteins, enzymes, powder and other contaminants on hands or gloves can produce fingerprints, smudges, and/or preparation artifacts, a method of transfer that minimizes manual contact is beneficial in terms of the performance of the slides.

[0004] When a stack of slides is manipulated or moved, care must be taken to avoid "fanning" the stack and to avoid slippage in the middle of the stack. The application of sufficient pressure on the top and bottom of the stack may avoid such mishaps; however, too much pressure can lead to breakage. Therefore it is advantageous to spread the pressure more uniformly over the stack and/or make use of other stabilizing features besides pressure.

SUMMARY OF THE INVENTION

[0005] The present invention is directed to devices and methods for facilitating manipulation of a stack of slides, or other stackable objects (referred to collectively as "slides"), to remove the stack from a packaging container and place within a hopper or other dispensing container. When using the device and methods of the present invention, no undue force is exerted on any particular slide within the stack, thus minimizing the risks of breakage, while stabilizing the stack such that "fanning" and slippage within the stack is substantially prevented. Further, the invention may be used to facilitate manipulation of a stack of slides without direct contact between the slides and a user's hands.

BRIEF DESCRIPTION OF DRAWINGS

[0006] FIG. 1 is a perspective view of one embodiment of the device of the invention as oriented on a packaging container prior to packaging slides.

[0007] FIG. 2 is a perspective view of the embodiment shown in FIG. 1 with slides filling the packaging container.

[0008] FIG. 3 is a perspective view of an embodiment illustrating a wrap device comprising a strip wrapped around a stack of slides in a packaging container.

[0009] FIG. 4 shows a further view of the embodiment of FIG. 3 with the excess portion of the strip folded to fit the packaging container.

[0010] FIG. 5 illustrates a method of removing a stack of slides from a packaging container using the device of the present invention.

[0011] FIG. 6 shows the placement of an entire stack of slides at once into an exemplary hopper.

[0012] FIG. 7 illustrates a method of releasing the attachment formed between the attachment means and the attachment site on the wrap device.

[0013] FIG. 8 shows a method of removing the wrap device from a stack of slides via a pulling force applied to one end of the device.

[0014] FIG. 9 shows a stack of slides freed from the wrap device and contained within an exemplary hopper.

DETAILED DESCRIPTION OF THE INVENTION

[0015] Referring to FIG. 1, the invention is a wrap device 2 comprising a strip of flexible, smooth material with adequate strength and toughness to resist unintentional breaking, tearing and cutting when used as described herein. Suitable materials include Tyvek®, made from high density polyethylene fibers and Kevlar® made from poly-aramid terephthalamide fibers (both trademarks of E.I. duPont de Nemours Company), as well as nylon, plastic polymers, paper and the like. The material is preferably non-woven, but certain woven materials may be appropriate if the woven fibers are sufficiently fine so as not to abrade the edges of the slides or other stacked objects. It is likewise advantageous that the material used to make the wrap device 2 be dust-free and/or lint-free so as not to leave debris on the stacked objects.

[0016] The wrap device 2 is formed by any number of methods including cutting strips from sheets, or drawing, or molding. The width of the wrap device 2 is sufficient to stabilize movement and prevent "fanning" of slides. For a standard microscope slide (approximately 3 inches in length), a strip of about 1.0 to 2.5 inches in width is suitable, with 1.5-2.0 inches preferred.

[0017] Referring to an embodiment shown in FIG. 1, an attachment means is provided at an attachment site 4 for securing an attachment end 5 of the wrap device 2 when the device is later wrapped around a stack of slides. An exemplary attachment means is an adhesive, for example, double-sided tape. A preferred method of making a wrap device 2 is to cut an appropriate length of the device material and then apply approximately 1-2 inches of double-sided adhesive tape (such as any of the double-sided types provided by 3M Corporation) at the attachment site 4. Alternatively, one may apply a suitable adhesive by brushing, rolling, spraying or the like, to an area on the wrap device 2 to serve as an attachment site 4. The selected adhesive must be capable of
securing the attachment end 5 in a releasable manner. The wrap device 2 is placed in a packaging container 6 with the adhesive side up, as shown in FIG. 1, for receiving slides. In an alternative embodiment, adhesive is placed at an attachment end 5 of the wrap device 2; for this alternative embodiment, it is preferable to place the wrap device 2 in the container 6 with the adhesive side down. One advantage of applying adhesive to an attachment end 5 of a wrap device 2 is that a single length of strip is adjustable according to the size of the stack and, thus, is usable with stacks containing variable numbers of slides 8.

In a preferred embodiment, as shown in FIG. 3, the wrap device 2 is wrapped snugly around the stack of slides 8 so that an attachment end 5 is attached to an attachment site 4 on the opposite side of the wrap device 2 to form a releasable adhesion site 12 thereby securing the slides 8 in a tight stack. Preferably, the excess end 10 of the wrap device 2 is folded to fit within the container 6 as shown in FIG. 4.

[0022] Referring to FIG. 5, the stack of slides 8 is removed from the packaging container 6 without need for contact between the slides 8 and a user's hands by grasping the wrap device 2 by its excess end 10 or elsewhere on the wrap device 2 and lifting the container 6 to facilitate removal of the stack of slides 8. Further, the stack of slides 8 is placed within a dispensing magazine or hopper 14 without need for contact between the slides 8 and the user's hands, by placing fingers or other means of mechanically grasping the stack so that they contact the wrap device 2 as shown in FIG. 6.

[0024] Referring to FIG. 7, when the stack of slides 8 is contained within the hopper 14, the wrap device 2 is removed by releasing the adhesive contact through a gentle tugging force exerted on the excess end 10 of the wrap device 2, countered by downward pressure exerted on the stack of slides 8 by a user's finger or any other suitable device. As shown in FIG. 8, a pulling force applied to the excess end 10 of the wrap device 2 in a relatively smooth motion is used to free the wrap device 2 while the stack of slides 8 remains within the hopper 14 as shown in FIG. 9.

[0025] The invention is not limited to use with microscope slides and can be used with other stacked articles including, but not limited to, plates, dishes, lids, and the like. Although the invention has been described with reference to particular embodiments, those skilled in the art can appreciate that variations and modifications can be substituted without substantially departing from the spirit of the invention.

What is claimed is:

1. A device for facilitating the manipulation of a stack of substantially flat stackable objects, said device comprising a strip of flexible smooth material of sufficient length to at least surround the stack, said strip having an attachment end for releasably attaching said end to an attachment site on the strip via a releasable attachment means, wherein said device is wrapped around the stack so as to secure said objects within the stack and to substantially eliminate slippage between the stacked objects during manipulation of the stack.

2. The device of claim 1 wherein said stackable objects comprise glass microscope slides and said stack comprises approximately 50 or more slides.

3. The device of claim 1 wherein said smooth material comprises high-density polyethylene fibers or poly-paraphenylene terephthalamide fibers.

4. The device of claim 1 wherein said releasable attachment means comprises an adhesive.

5. The device of claim 1 wherein said releasable attachment means comprises a mechanical means.

6. The device of claim 1 wherein the length of said strip is sufficient to surround the stack and to provide an additional area for grasping the strip.

7. The device of claim 1 wherein at least a portion of said releasable attachment means is located on said attachment end.
8. The device of claim 1 wherein at least a portion of said releasable attachment means is located at the attachment site.
9. A method of securing a stack of stackable objects to facilitate manipulation of the stack, said method comprising:
   wrapping the stack with a strip of smooth material, said strip comprising an attachment end, and
   releasably attaching said attachment end to an attachment area on the strip via a releasable attachment means;
wherein upon wrapping, slippage between objects within the stack during manipulation of the stack is substantially eliminated.
10. The method of claim 9 wherein said stackable objects comprise glass microscope slides and said stack comprises approximately 50 or more slides.
11. The method of claim 9 wherein said smooth material comprises high-density polyethylene fibers or poly-paraphenylene terephthalamide fibers.
12. The method of claim 9 wherein said releasable attachment means comprises an adhesive material.
13. The method of claim 9 wherein said strip is of sufficient length to wrap around the stack and to provide additional length for grasping the strip manually.
14. The method of claim 9 wherein at least a portion of the releasable attachment means is located on said attachment end.
15. The method of claim 9 wherein at least a portion of the releasable attachment means is located at said attachment site.
16. A method of loading a stack of glass microscope slides into a hopper for containing said stack of slides, the method comprising:
   placing the stack of slides within the hopper, said stack having been wrapped with a strip comprising a smooth material to secure the slides within the stack and substantially eliminate slippage between individual slides within the stack, said strip further comprising an attachment end for releasable attachment to an attachment area on the opposite side of said strip via a releasable attachment means;
releasing the attachment between the attachment means and the attachment area; and
pulling the strip away from the stack so that the stack is completely freed from the strip.
17. The method of claim 16 wherein said attachment means comprises an adhesive.
18. The method of claim 16 wherein said smooth material comprises high-density polyethylene fibers or poly-paraphenylene terephthalamide fibers.
19. The method of claim 16 wherein said stack comprises about 50 or more slides.

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