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STACKED CONE LOOSENING METHOD AND MECHANISM

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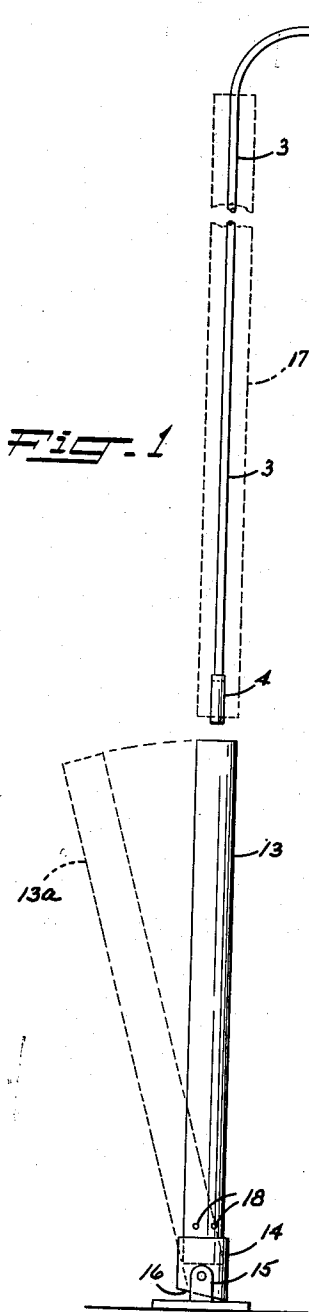
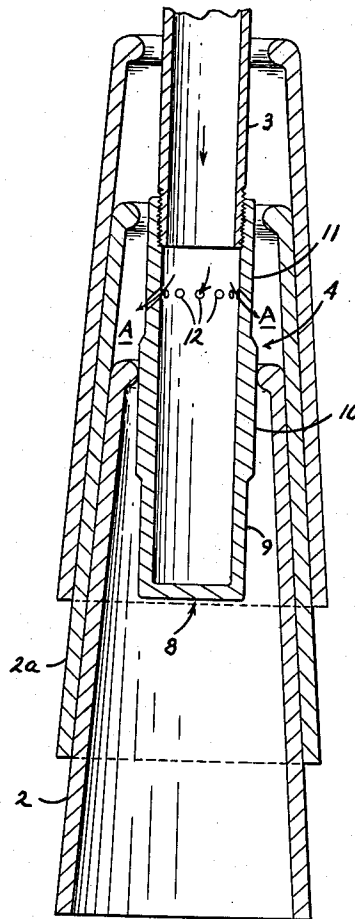


Fig. 2

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STACKED CONE LOOSENING METHOD
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This invention relates to a method and mechanism for loosening a stack of nested hollow cones. More particularly, the invention relates to a method and means for separating stacked cones quickly and without danger of damage thereto, the cones or cone centers being those that are normally employed as a support for windings of strands, filaments, yarns, threads, cords, and the like.

While the present invention finds its principal application as a means for separating a stack of paper or cardboard cones, such as are employed in textile industries, it is not restricted thereto but may be employed in other relations wherein it is desired individually to separate conically shaped hollow articles from a stack thereof irrespective of the material from which the hollow articles are made.

In textile industries one method of winding stands, filaments, yarns, threads, etc. is to wind them on cores having the form of hollow cones which are open at both ends. When the yarn, etc. has been used by the customer, the cones are returned to the manufacturer. The new cones or cone centers shipped by the cone manufacturers and the used cones returned by the customers are shipped in cases and in order to conserve packing space in the cases, the cones are nested one inside the other in stacks of approximately 28 cones. Due to rough handling in shipment, the cones are usually "frozen" together so tightly that a loosening operation is required before the cones are usable.

The present method of loosening the cones is to strike a stack of the cones against a flat surface, such as a table top, until looseness is indicated. Obviously, this method results in damage to the cones. In addition, this method is not positive in loosening all of the cones. Therefore, there are always some cones which remain to be loosened by further manipulation which procedure is laborious and time consuming.

It is an object of the present invention to overcome the aforementioned difficulties and disadvantages and provide a method for separating stacked cones without danger of damage thereto.

It is another object of the invention to provide a mechanism for separating stacked cones which is simple in construction and easy to operate.

It is another and specific object of the invention to provide a mechanism for separating cones from a stack thereof which is pneumatic in operation and which reduces to a minimum the mechanically movable parts.

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Other objects and advantages of the present invention will be obvious from the drawing and the description thereof hereinafter.

In general, the objects of the present invention are accomplished by placing a stack of the cones on a vertical support or conduit which has a cap attached to its lower end. The outside diameter of the cap is equal to that of the smaller cone opening, thus the lowermost cone will fit on the nozzle tightly enough to support the stack of cones. Air or any suitable gas is directed through the conduit or cone support under pressure to the nozzle where it passes out of suitable openings directed between adjacent cones. The lowermost cone is removed thereby to a suitable container positioned below the nozzle. Each successive cone is likewise removed to the container until all cones in the stack have been separated and then another stack is placed on the conduit.

The air or other gas is preferably controlled to operate continuously. However, if desired, the air may be passed through the conduit intermittently as each cone is removed and the remaining stack of cones moves downward putting another cone in position for removal. Also, the conduit may be positioned horizontally. Any type of container may be employed to receive the separated cones provided care is exercised to see that the cones are not damaged when removed from the stack.

For a better understanding of the following description, reference should be had to the accompanying drawing in which

Figure 1 is a diagrammatic end elevation view of a preferred form of the apparatus, and

Figure 2 is an enlarged sectional view of the nozzle with the cones thereon.

Referring now to Figures 1 and 2 of the drawing, which illustrates a preferred form of the apparatus, there is provided a conduit 3, which also serves as the support for the stacked cones, having a nozzle or cap 4 attached thereto at its lower end. The other end of conduit 3 is attached to the air-supply valve 5. Also attached to the conduit between the valve 5 and the cap 4 are a pressure regulator 6 and a quick acting valve 7. Valve 7 may be operated by any suitable means, such as by a solenoid valve, and the like, but is preferably actuated by a foot lever (not shown).

The cap 4 is threaded and screws onto the conduit 3, as shown in Figure 2. The other end of the cap is closed, as shown at 8. The nozzle 4 may be of any desired shape and size depending upon the size of the cones being separated. The

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caps are easily and readily interchangeable since they are threaded. The cap shown in the drawing is representative of the preferred shape or style of nozzle. Referring to Figure 2, the lower portion 9 of the cap, which is approximately 1 3/4 inches in length, has an outer diameter of 0.712 inch, the next portion 10 from the closed end is approximately 3/4 inch in length and has an outer diameter of 0.716 inch, and the remaining portion 11, approximately 1 1/2 inches in length, has an outer diameter of 0.714 inch.

A series of holes or openings 12 are drilled in the portion 11 of the cap. These holes are drilled at an angle with the outside opening facing toward the closed end of the cap. The holes 12 direct the air from conduit 3 into the chamber A formed by the two lowermost cones 2 and 2a.

Positioned directly below the cap 4 and in accurate alignment therewith is a container or receiving tube 13 which is closed at its lower end and removably mounted in the receptacle or retainer 14. The receptacle 14 is pivotally mounted on the yoke 15 which in turn is fastened to the floor or to a table or other suitable support. The receptacle has a slanting bottom 16 which prevents clockwise swing of the receptacle from the upright position, as viewed in Figure 1, and allows counter-clockwise swing up to approximately 15°. The bottom 16 may be so formed as to allow greater counter-clockwise swing if desired.

A shield 17 may be placed around the conduit 3 if desired. The shield may be made of metal or other suitable material, such as plastics, and the like.

The operation of the invention is as follows: a stack of cones or cone centers is passed over the cap and onto the conduit or support pipe with the small end of the cones up and with the bottom cone of the stack up past the holes 12 in the cap. The foot operated valve 7 is depressed allowing air to blow through the holes 12. The stack of cones is then released and as each cone passes the air holes and reaches the portion or section 10 of the cap, the air chamber A is formed between the two bottom cones which causes the bottom cone to be blown off the cap into the receiving tube 13. This continues in rapid succession until all the cones in the stack are blown into the receiving tube, after which the tube is removed from the receptacle 14 by swinging the tube to the dotted line position 13 as shown in Figure 1. The tube is tilted and the loosened cones or cone centers removed therefrom. If desired, the air may be admitted to the nozzle in intermittent fashion each time a new cone comes into position for removal on the nozzle.

Air resistance in the receiving tube will keep the cones from becoming frozen as they are blown into the tube. If desired, holes 18 may be drilled into the receiving tube to control the air resistance therein. Of course, the number of holes drilled therein will depend upon the size and weight of the cones being separated. Approximately 45 pounds per square inch air pressure is required to separate or loosen the cones from the stack, however, this is also dependent upon the size and weight of the cones and may be varied accordingly.

The present invention has numerous advantages which will be obvious to those skilled in the art. The present invention provides a faster and more positive method of loosening a stack

of cones or cone centers with less work and with the alleviation of damage to the cones.

It should be understood that changes and variations may be made without departing from the spirit and scope of the invention as defined in the appended claims.

I claim:

1. A method for loosening and separating a nested stack of open-ended hollow cones of the same general shape and size comprising inserting a nozzle through the hollow passage within the stack of cones and therewith substantially closing the openings in the small ends of adjacent cones at the end of the stack and then directing a gas under pressure into the chamber formed by the small ends of adjacent terminal cones to remove the last cone from the stack.

2. A method for loosening and separating a nested stack of open-ended hollow cones of the same general shape and size comprising inserting a nozzle through the hollow passage within the stack of cones and continuously passing the nested stack of hollow cones over the nozzle, thereby substantially closing the openings in the small ends of the adjacent terminal cones as they pass over the nozzle and directing air under pressure into the chambers formed by the small ends of adjacent terminal cones to remove the last cone from the stack.

3. An apparatus for loosening and separating a nested stack of hollow cones comprising a conduit adapted to be inserted through a nested stack of cones, a nozzle attached to one end of the conduit and having a portion of larger outside diameter than the conduit, said nozzle having a discharge opening disposed in a position spaced from the end of said portion farthest from the conduit in a direction toward the conduit, and means whereby the conduit may be connected to a source of compressed gas.

4. An apparatus for loosening and separating a nested stack of open-ended hollow cones having the same general shape and size and approximately the same inside diameter at the small ends thereof comprising a conduit having an outside diameter less than the inside diameter of the small ends of the cones, means whereby the conduit may be connected to a source of compressed gas, a nozzle attached to the end of the conduit and having a portion of larger outside diameter than the conduit, the outside diameter of said portion being approximately the same as the inside diameter of the small ends of the cones, said nozzle having a discharge opening disposed in a position spaced from the end of said portion farthest from the conduit in a direction toward the conduit.

5. An apparatus for loosening and separating a nested stack of open-ended hollow cones having the same general shape and size and approximately the same inside diameter at the small ends thereof comprising a conduit having an outside diameter less than the inside diameter of the small ends of the cones, means whereby the conduit may be connected to a source of compressed gas, a nozzle attached to the end of the conduit and having a portion of larger outside diameter than the conduit, the outside diameter of said portion being approximately the same as the inside diameter of the small ends of the cones, said nozzle having a discharge opening disposed in a position spaced from the end of said portion farthest from the conduit in a direction toward the conduit, said discharge open-

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ing being in no event spaced farther from the end of said portion that is closest to the conduit than the distance between adjacent small ends of the nested cones.

6. An apparatus for loosening and separating a nested stack of open-ended hollow cones having the same general shape and size and approximately the same inside diameter at the small ends thereof comprising a conduit having an outside diameter less than the inside diameter of the small ends of the cones, means whereby the conduit may be connected to a source of compressed gas, a nozzle attached to the end of the conduit and having a portion of larger outside diameter than the conduit, the outside diameter of said portion being approximately the same as the inside diameter of the small ends of the cones, said nozzle having a discharge opening disposed in a position spaced from the end of said portion farthest from the conduit in a direction toward the conduit, said nozzle having a portion of smaller diameter than the first-mentioned portion connecting the first-mentioned portion with the conduit.

7. Apparatus as defined in claim 6 in which the discharge openings are disposed in said smaller-diameter portion of the nozzle and are spaced from the larger-diameter portion toward the conduit by a distance less than the distance between the small ends of adjacent cones.

8. Apparatus for separating nested sleeve-like articles comprising a fluid conduit extending through the bores of a stack of nested articles and having a relatively loose sliding fit therein, and an enlarged cap adjacent the end of said

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conduit, the outside diameter of said cap having a relatively tight sliding fit in the bores of the articles to support the stack and to seal the bore of the endmost article, said cap having an orifice spaced from the closed end of the cap and on the opposite side of the enlarged portion of the cap through which gas under pressure is directed to the bores of the articles in an area in advance of the endmost article to force the endmost article over the enlarged portion and separate it from the stack.

9. An apparatus for loosening and separating a nested stack of hollow cones comprising cone supporting means adapted to receive a stack of nested cones thereabout, a cap attached to one end of the supporting means and having at least one radial orifice positioned above a closed end thereof, and means for directing air through said orifice between adjacent terminal cones in the stack.

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