A. E. DEMPSEY.

NESTED CUP SEPARATOR.

APPLICATION FILED DEC. 2, 1916.

1,238,895.

Patented Sept. 4, 1917.

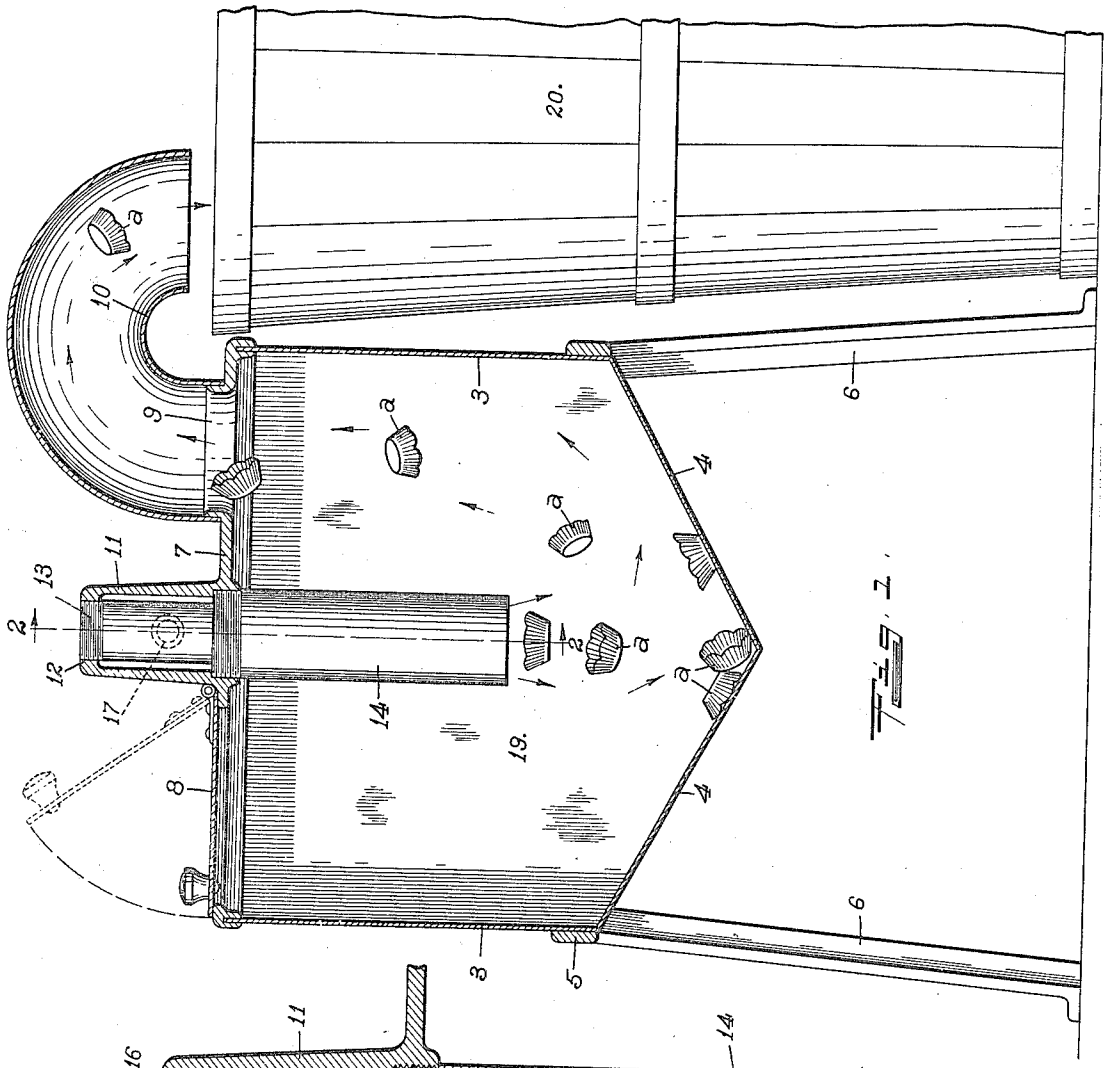


FIG. 1.

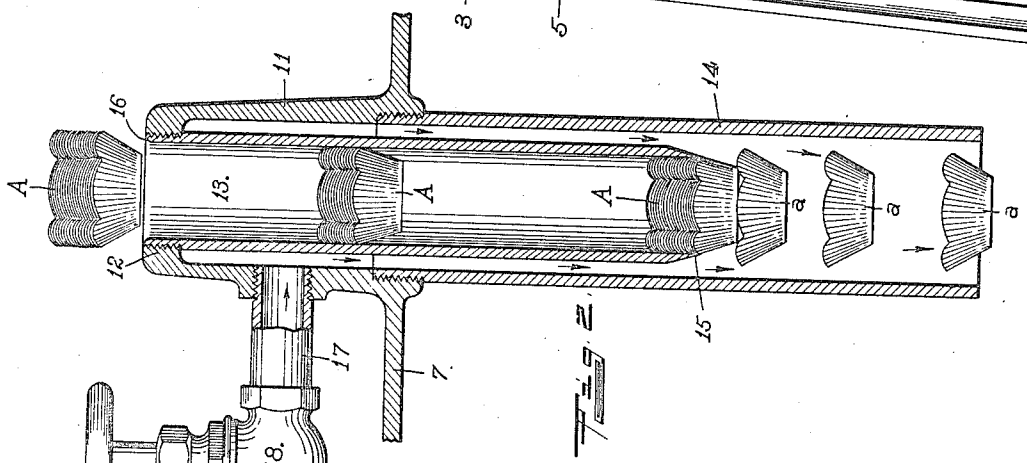
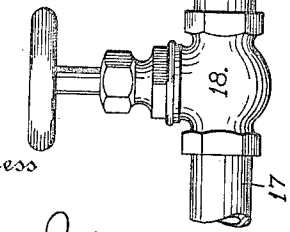


FIG. 2.



Witness

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NESTED-CUP SEPARATOR.

1,238,895. Specification of Letters Patent. Patented Sept. 4, 1917.

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To all whom it may concern:

Be it known that I, ARTHUR E. DEMPSEY, a citizen of the United States, residing in Council Bluffs, in the county of Pottawattamie and State of Iowa, have invented certain new and useful Improvements in Nested-Cup Separators, of which the following is a specification.

My invention relates to machines for separating nested articles, and it is the object thereof to provide a machine or device especially adapted for separating the crimped cases or paper cups used by confectioners for packing chocolates, bon-bons and other fine candies. The said crimped cases or cups are made by punching suitable blanks from flat sheets of paper and crimping or corrugating the marginal portions of the blank to form an approximately trunco-conical receptacle; and in the process of manufacture thereof a plurality of the cups (usually a dozen or more) are formed simultaneously, the blanks being punched from a pile of paper consisting of the desired number of sheets, and the pile of blanks being crimped or corrugated by a single forming device, so that when completed all the cups formed by the operation are closely nested together. These nested groups of cups tend to adhere firmly to each other, on account of the interengagement of the corrugated or crimped sides thereof, and the separation of the cups by hand is slow, tedious and comparatively expensive. My invention provides a means for separating the cups rapidly and economically by the use of compressed air, and the device embodying the invention has no movable or adjustable parts for operating upon the cups either when nested or after they are separated. Other objects of my invention are to provide, in a machine or device of the general character set forth, means by which the flow of compressed air is caused to draw or suck the nested cups through a feed-tube into a receiving chamber, the feed-tube also supplying an additional volume of air to the receiving chamber, such as to cause the separated cups to be blown out of said chamber into another receptacle; and to thus effect the separation and discharge of the cups with a minimum amount of compressed air.

In the accompanying drawings, Figure 1 is a vertical section through a machine or device embodying my invention, and Fig. 2 is a detail vertical section through the feed-tube, on the plane of the line 2—2 of Fig. 1.

In the illustrated embodiment of my invention there is provided a casing having a cylindrical sheet-metal wall 3, and conical bottom 4, the casing being supported at a convenient height by a frame consisting of a base-ring 5 and legs 6. The top of the casing is provided with a cover-plate 7 of which the edges are secured to the upper edges of the wall 3. At one side of the cover-plate there is an opening which is normally closed by a hinged door 8. At the other side of the cover-plate there is an opening having at its margin an upwardly extending annular flange 9 connecting with an inverted-U-shaped discharge-pipe 10. At the center of the cover-plate there is an upwardly extending cylindrical sleeve 11 having at its upper end an inwardly extending threaded flange 12 into which is screwed the upper end of the feed-tube 13. The latter extends down through the sleeve 11 concentrically therewith and in spaced relation to the inner surface thereof. In the lower end of the sleeve is screwed the upper end of the aspirator-tube 14 which forms, in effect, a continuation of the sleeve to a point below the lower end of the feed-tube. The lower end of the feed-tube is beveled externally, so that it terminates in a thin edge 15, and at its upper end the inner corner is rounded off as shown at 16 in Fig. 2. At one side of the sleeve there is a threaded opening into which is screwed the end of an air-supply pipe 17, the same extending to a suitable source of compressed air, and a valve 18 being provided for controlling the flow of air through the pipe.

In the use of the device the valve 18 is opened to permit the flow of compressed air through the pipe 17 into the space around the feed-tube 13. The air, rushing downwardly from said space through the aspirator-tube 14, causes a strong suction from the atmosphere downwardly through the feed-tube, so that there is delivered into the receiving-chamber 19 within the casing 3 a much larger volume of air than is admitted through the supply-pipe 17. The air escapes from the chamber 19 through the large discharge-pipe 10, and beneath the outer end of said pipe there is placed a suitable receptacle 20 for collecting the separated cups *a*. The nested cups A are supplied to the

upper end or mouth of the feed-tube 13, and each group or bunch of the cups is preferably spread slightly outward at its upper edge and slightly kneaded or worked between the fingers to loosen the contacting surfaces thereof, before inserting the same in the mouth of the tube. The internal diameter of the feed-tube is made substantially the same as the diameter of the cups at the upper or larger ends thereof, so that when the smaller ends thereof are entered in the mouth of the tube the nests or bunches may slide freely downward through the tube. As each of the nested groups of cups is inserted in the feed-tube, the atmospheric pressure thereon due to the suction from the aspirator-tube causes the nest of cups to pass down through the tube. As the lowermost cup of the nest reaches the thin lower edge 15 of the tube, the upper edge or margin of the cup is caught by the current of compressed air passing down through the aspirator-tube, and the cup is thereby stripped from the bottom of the nest and blown down into the receiving-chamber 19, each succeeding cup of the nest being similarly separated from the next. The separated cups *a* are carried out of the receiving-chamber into the receptacle 20 by the air-current escaping through the discharge-pipe 10. Preferably the volume of air passed through the device is so regulated that there is only enough to carry the single or separated cups *a* through the discharge-pipe; as by so doing, should two or more of the cups fail to be separated in passing from the lower end of the feed-tube, said cups will remain in the chamber 19. Then, after the device has been in operation for a time, the door 8 may be opened and any unseparated cups removed from the receiving-chamber to be again passed through the feed-tube. As before noted, the volume of air supplied from the pipe 17 is greatly augmented by that aspirated through the feed-tube, and when the air-supply is properly regulated the discharge of the separated cups through the pipe 10 occurs during the intervals between the feeding of the nests of cups. It has been found in practice, that a convenient test for the proper regulation of the air-supply consists in placing the hand over the mouth of the feed-tube after several nests of cups have been fed thereto, then observing whether or not the stopping of the supply of aspirated air reduces the volume of air passing through the device sufficiently to prevent the discharge of the cups through the pipe 10, and whether or not the discharge of the cups occurs when the supply of aspirated air is renewed. If both of the results stated are obtained, it may be inferred that the adjustment of the air-supply reasonably approximates that which will operate the device efficiently and with the maximum economy of compressed air.

Now, having described my invention, what I claim and desire to secure by Letters Patent is:

1. In a device of the class described, a feed-tube adapted to slidably transmit nested articles, an aspirator-tube surrounding the discharge end of said feed-tube and spaced therefrom, and means for supplying compressed air to said aspirator-tube to cause a suction of air through the feed-tube.

2. In a device of the class described, a receptacle having a relatively large discharge-passage opening from the upper part thereof, a feed-tube extending into said receptacle and having a mouth opening externally thereto, an aspirator-tube disposed around the inner end of the feed-tube, and means for supplying compressed air to the aspirator-tube, for the purpose set forth.

3. Means for separating nested truncoconical cups, comprising a tube proportioned internally to slidably transmit nests of the cups, and means for directing a rapid air-current longitudinally of the tube past the end thereof to produce a suction therein and to strip the successive cups from the nest as they emerge from the tube.

4. Means for separating nested paper cups, comprising a receptacle having a relatively large discharge-passage extending from the upper part thereof, a feed-tube extending into the receptacle and adapted to slidably transmit nests of the cups, an aspirator-tube surrounding the inner portion of the feed-tube and spaced therefrom, and means for supplying compressed air to the aspirator-tube so that said air is discharged into the receptacle past the inner end of the feed-tube, thereby causing a suction of air through the latter and delivering to the receptacle a volume of air sufficient to blow the separated cups therefrom through said discharge-passage.

A. E. DEMPSEY.