My invention relates to improvements in paper blank feeders of that class in which a plurality of thin paper disks or blanks are to be separated from the bottom of a stack or pile and delivered to a carrier which conveys them to a shaping press, the operation of separating a series of blanks and delivering them to the carrier taking place at regular intervals.

The object of my invention is to provide effective means for feeding such blanks in definite numbers or in substantially equal numbers for each delivery and without wasting the blanks or allowing them to clog the machine by displacement.

In feeders of the class described, considerable waste has heretofore existed by reason of displacement in the pile of sheets, the failure of the separating devices to pass smoothly between the sheets in such a manner as to avoid wrinkling, crumpling, or tearing them, the feeders heretofore employed for this purpose having been designed along the lines of feeders for handling packages or card-board disks which are thicker and more rigid and which therefore do not present the same problems that are met in the handling of thin paper disks, such as for example, as those used in the manufacture of bon bon cups and paper liners for confectionery holders, etc. More particularly, therefore, my object is to provide a form of separator which will successfully separate and deliver without waste definite numbers of paper blanks from the bottom of a pile where the blanks range in thickness from that of tissue paper to that of ordinary writing paper and other paper of the character commonly used for confectionery cups.

In the drawings:

Figure 1 is a plan view of a paper feeding machine embodying my invention.

Figure 2 is a side elevation of the working portions of the feeder in associated relation to the table.

Figure 3 is a plan view of the paper separator or feeding disk.

Figures 4 and 5 are sectional views drawn respectively on lines 4-4 and 5-5 of Figure 3.

Figure 6 is a sectional view drawn on line 6-6 of Figure 1.

Like parts are identified by the same reference characters throughout the several views.
separator therefore extends from the margin 20 to the opposing margin of the body as indicated by the dotted line 32 in Figure 3 and also as shown in Figure 4, but the lower surface of the body of the separator is beveled or tapered in conformity with the beveled or tapered lower surface of the knife 28 and the object of employing a separable knife instead of making the member 7 in one piece to include the knife is to facilitate manufacture, to allow the use of tool steel for the knife portion, and to permit the removal and replacement of the knife when damaged or worn or to facilitate removing and grinding the knife when dull.

It will be observed that the radial diameter of the separator 7 is slightly less than the distance between the post 2 and the other stack supporting posts 3 and 4 whereby the separator may oscillate to carry the knife under the stack of paper disks as clearly shown in Figure 1.

The carrier 9 is provided with a peripheral roll of gear teeth 35 with gaps 36 at intervals of 90°, a mutilated gear wheel 37 is employed to actuate the carrier step by step in quarter turn movements, the teeth 38 on the mutilated gear wheel being sufficient in number to move the carrier 9 90° and then allow it to remain at rest during a period equal to the time required for the gear wheel 37 to carry its smooth peripheral surface past the registering gap 36 in the carrier 9. The gear wheel 37 is connected by chain 40 on sprocket wheels 41 and 42 with the camshaft 43 and the arrangement is such that the carrier 9 will be at rest during the interval that the knife 28 is being moved through the stack by oscillation of the separator 7 and returned to normal position with the body of the separator supporting the stack of paper. Thereupon the teeth 38 will again be brought into engagement with the next set of teeth on the carrier 9 and the latter oscillated at another quarter.

From the foregoing description the operation of the machine will be readily understood, but it will be briefly summarized as follows: A stack of paper disks being in position between the posts 2, 3, and 4 and the machine set in operation the knife will be retracted from its position as shown in Figure 1 by the cam 14 until the knife is wholly withdrawn from beneath the stack of paper, the pile of paper being then supported by the body of the separator 7 back of the margin 20. The carrier 9 will then be revolved one-eighth of a turn and the next cavity 8 in its upper surface presented in a position to receive a set of disks from the stack or pile.

The carrier then comes to rest and the knife 28 passes through the pile of paper disks above the bottom of the pile separating a set or series of disks, the number of which depends upon the vertical distance between a horizontal plane of the body at the margin 20 of the recess. As the knife passes through the stack the separated disks are allowed to drop underneath it and are received in the registering cavity 8 of the carrier 9. If the separated blanks do not drop during this movement they will do so immediately when the separator oscillates in the reverse direction, this retractive oscillation occurring immediately after the separating operation. The retractive movement of the separator 7 is facilitated by a tension spring 44 which holds the lever 15 with its anti-friction roller 45 in contact with the periphery of the cam throughout the revolution of the latter. This, however, is merely incidental to the type of cam illustrated and avoids the necessity of providing a cam with a groove in its side face to receive roller 45, both types of cam being well known in the art.

After the separator 7 has been oscillated to carry the knife through the stack and then retracted to a position with the stack supported on the body 7 back of the margin 20, carrier 9 will be oscillated one-eighth of a turn to carry the separated sheets or blanks out from under the pile or stack and to present an empty cavity 8 in position to receive the next set of blanks to be separated. It is not material to this invention where the blanks are then carried nor how they are delivered through an opening in the bed within which the carrier revolves in accordance with ordinary practice.

It will be observed in Figure 5 that the body of the separator 7 is annularly thickened in the zone lying midway between its axis and the periphery, the upper and lower surfaces sloping convergingly both in the direction of the axis and in the direction of the periphery whereby the body is convexly rounded along radial lines as to both its top and bottom surfaces.

I claim:

1. A separator for delivering sets of superposed thin paper blanks from the bottom of the pile, comprising an oscillatory disk provided with a radially extending notch, a radially disposed knife projecting into the space provided by said notch and having a sharp edged tooth, the point of which extends toward the opposing wall of the notch between the periphery of the disk and its axis and upwardly to a horizontal plane above said wall.

2. A separator for delivering sets of superposed thin paper blanks from the bottom of a pile, comprising an oscillatory disk provided with a radially extending notch, a radially disposed knife projecting into the space provided by said notch and having a sharp edged tooth projecting from the central portion of the knife edge at a substantial distance from the circle in which the outer margin of the disk travels, the point of said tooth extending toward the opposing wall of the
notch between the disk axis and the circle in which the outer margin of the disk travels and upwardly to a horizontal plane above said wall, and the under surface of the knife being beveled upwardly and in the direction of said opposing wall of the notch.

3. A separator for delivering sets of superposed thin paper blanks from the bottom of a pile, comprising an oscillatory disk provided with a radially extending notch, a radially disposed knife projecting into the space provided by said notch and having a sharp edged tooth, the point of which extends toward the opposing wall of the notch and upwardly to a horizontal plane above said wall, said knife being detachably secured to the body portion of the separator, said knife and body portions having smooth upper surfaces for contact with paper blanks.

4. A separator for delivering sets of superposed thin paper blanks from the bottom of a pile comprising an oscillatory disk provided with a radially extending notch, a radially disposed knife projecting into the space provided by said notch and having a sharp edged tooth in the middle portion of one side wall of the notch, the point of which tooth extends toward the opposing walls of the notch and upwardly to a horizontal plane above said wall, and means for oscillating said separator to carry the knife through the pile of blanks and retract it from beneath the pile, the opposing wall of the notch being in sufficient proximity to the knife to pass underneath and support the pile of blanks when the knife is retracted.

5. A separator for delivering sets of superposed paper blanks from the bottom of a pile, comprising a magazine for the pile of sheets, an oscillatory blade pivotally supported to swing in a horizontal plane through the pile of blanks, and a pivoted oscillatory support adapted to swing to and from a position underneath the pile in alternation to the movement of the blade, said magazine comprising a series of posts, one of which serves as an axial mounting for the blade.

6. A separator for delivering sets of superposed paper blanks from the bottom of a pile, comprising a magazine for the pile of sheets an oscillatory blade pivotally supported to swing in a horizontal plane through the pile of blanks, and a pivoted oscillatory support adapted to swing to and from a position underneath the pile in alternation to the movement of the blade, said magazine comprising a series of posts, one of which serves as an axial mounting for the blade and said blade and support comprising a radially notched disk having a raised radially extending edge, provided with a beveled under surface.

7. The combination with a set of upright posts constituting a magazine adapted to receive a pile of superposed blanks, of a supporting member for the blanks pivoted to one of the posts and normally extending substantially across the magazine underneath the pile, said supporting member having a notch extending from the vicinity of its pivotal axis to its outer margin, and provided at one side of the notch with a radially extending blade having an elevated edge provided with a tooth positioned for passage through the central portion of the pile of blanks when the supporting member is oscillated, and means for oscillating the supporting member to carry the blade through the pile of blanks near the bottom of the pile and to alternately support the pile by portions of said oscillatory member on opposite sides of said notch.

STEPHEN F. TOJEK.