

April 9, 1963

F. SCHILLER ETAL  
SHEET STACKER

3,084,932

Filed April 25, 1960

3 Sheets-Sheet 1

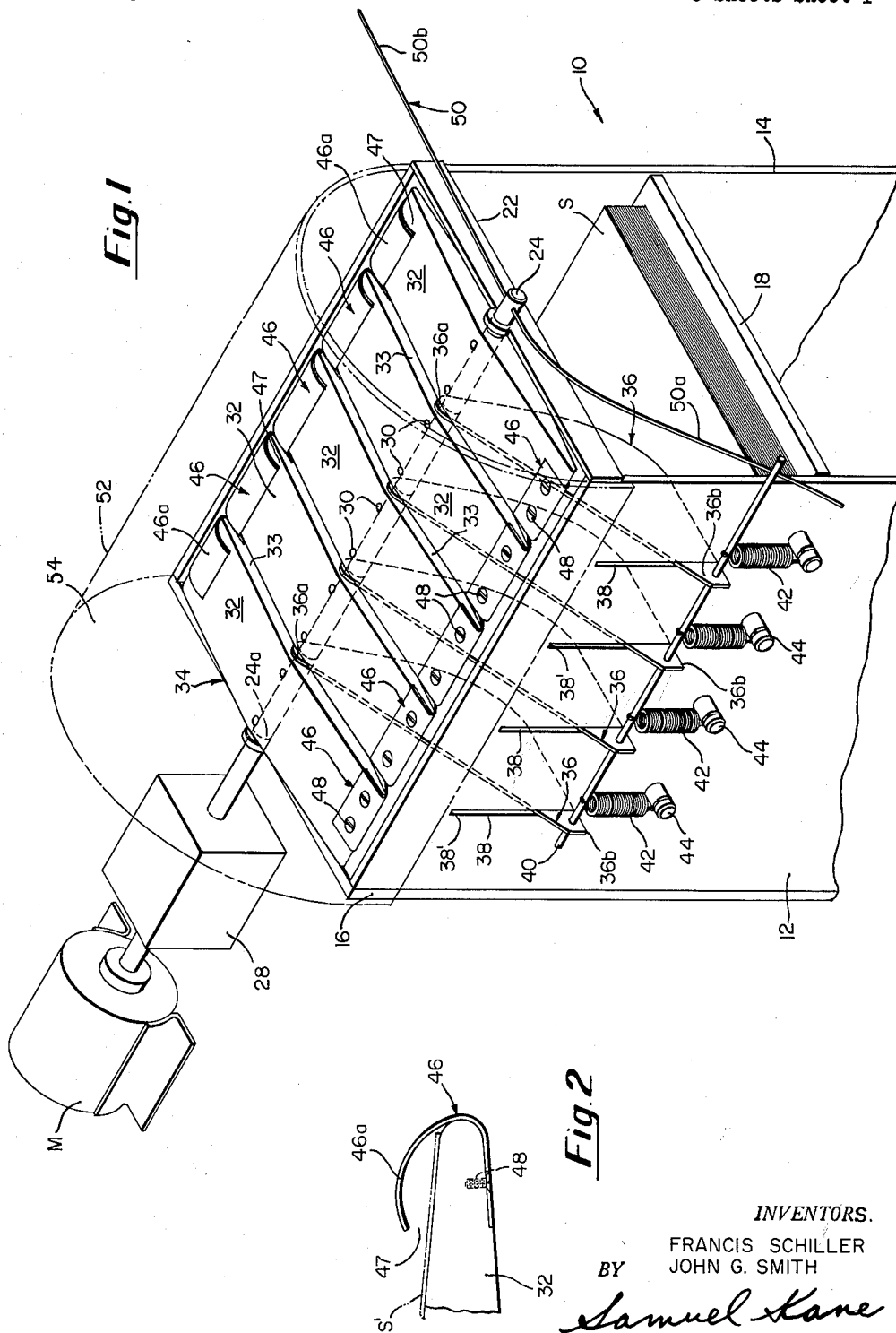


Fig. 2

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3 Sheets-Sheet 2

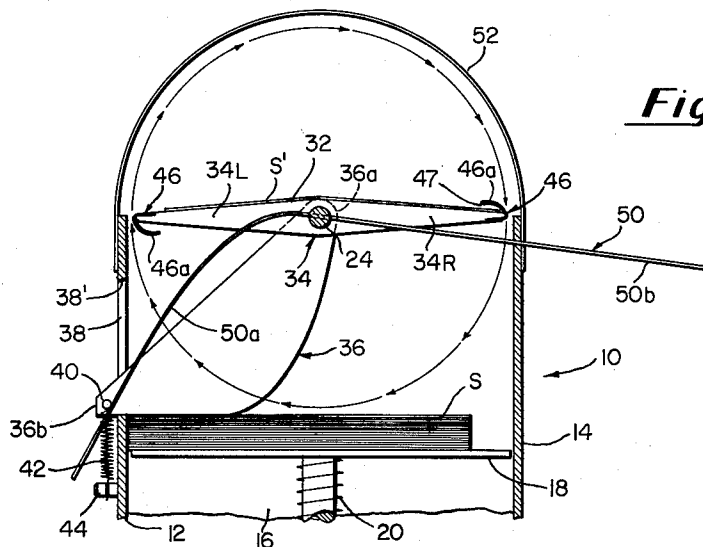


**Fig. 3**

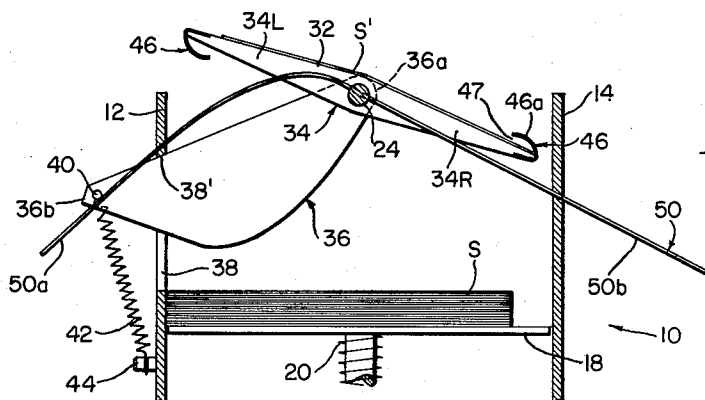


**Fig. 4**

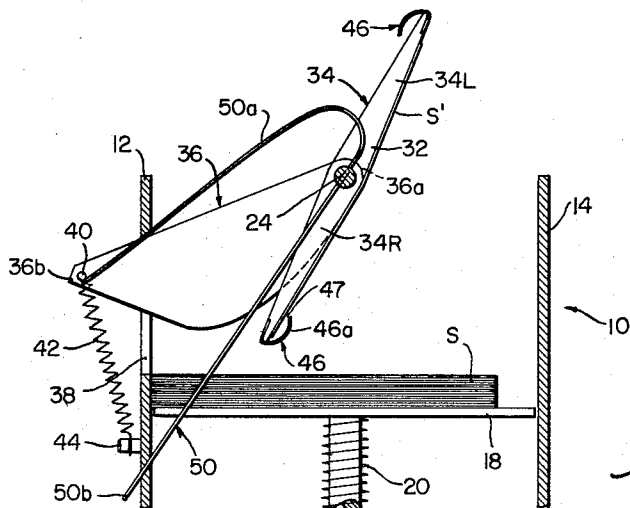


**Fig. 5**

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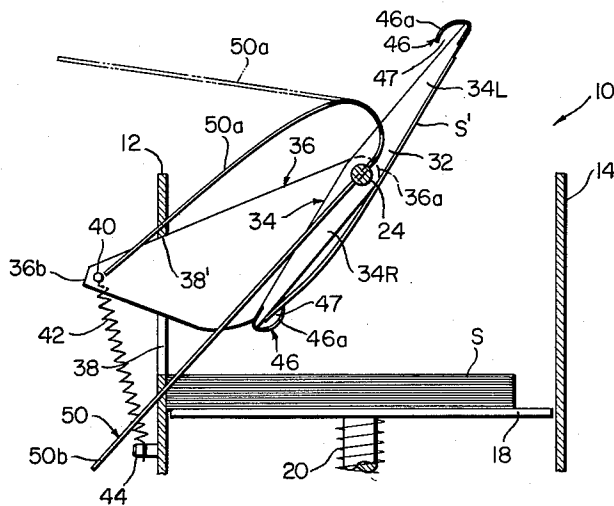


**Fig. 6**

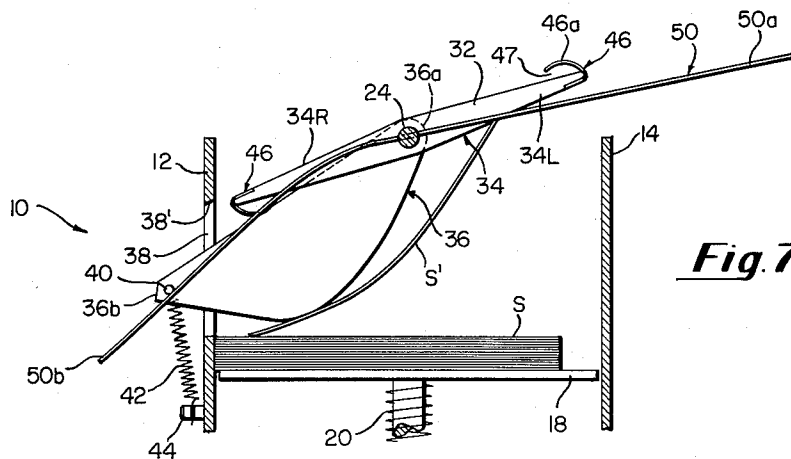


**Fig. 7**

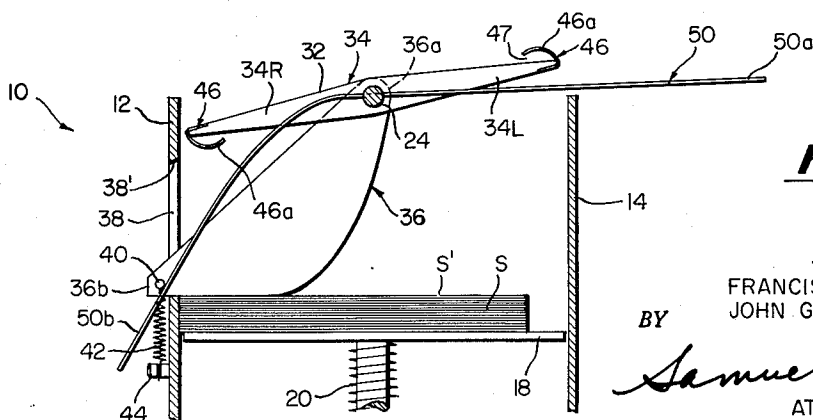


**Fig. 8**

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## SHEET STACKER

Francis Schiller, Miami, Fla., and John G. Smith, Philadelphia, Pa., assignors to Burroughs Corporation, Detroit, Mich., a corporation of Michigan  
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8 Claims. (Cl. 271-63)

This invention relates generally to sheet feeding machines, and more particularly to stacking devices for piling sheets individually and successively in stack formation.

In certain classes of sheet stackers individual sheets are delivered to a stacking bin and allowed to drop or float to the bottom of the bin. This method of stacking is open to certain objections particularly when the sheets are very thin and the stacking operation is performed at high speed. Because of friction encountered against the stacking bin walls and air pressure in the bin cushioning the fall of the sheets and preventing their dropping properly to the bottom of the bin, there is always present the possibility that a succeeding sheet may get under the trailing edge of a previously fed sheet with the result that the sheets will be stacked out of order.

An object of the present invention is to provide a sheet stacking device which will overcome the above-mentioned difficulties.

Another object of the invention is to provide a stacker for sheet items which will stack the sheets in their original sequence and face position.

A further object of the invention is to provide a sheet stacker which will rapidly stack sheets successively in a flat condition directly on a stack or pile support, thus obviating the possibility of a succeeding sheet getting ahead of a previously fed sheet.

In accordance with the above objects and considered first in its broad aspects, the invention contemplates the use of a rotatable sheet support for successively inverting individual sheet items freely supported thereon, and means for stripping the sheet items from the support each time the support is rotated. The motion of the support is such as to provide a desirable aerodynamic effect which causes each sheet item to adhere to the support during rotation until it is stripped therefrom.

The invention will be more clearly understood when the following detailed description of a specific embodiment thereof is read in conjunction with the accompanying drawings in which:

FIG. 1 is an isometric view of a sheet stacker constructed in accordance with the invention;

FIG. 2 is an enlarged fragmentary view of a platform in FIG. 1 and showing also a spring clip member;

FIG. 3 is an elevational view of the stacker of FIG. 1; and

FIGS. 4 to 8 inclusive show successive operating conditions of the sheet stacker in the process of stacking a sheet item.

A specific embodiment of the invention is shown in the drawings and comprises a sheet receptacle or stacking bin 10 (FIG. 1) having left and right side walls 12 and 14, a rear wall 16, and a movable bottom or stacking table 18. The stacking table 18 is urged upwardly by means of a compression spring 20 (FIG. 3) which is sufficiently light in force to enable the stacking table 18 to lower a corresponding amount each time a sheet or a few sheets in succession are deposited on the table. While the stacking table 18 is shown as spring pressed, it is understood that this construction is illustrative only and that the table may be operated by automatic or other means, if desired.

Secured to the upper forward edges of the side plates 12 and 14 (FIG. 1) is a bridge plate 22 in which is journaled the forward end of a drive shaft 24 which extends through and is journaled at its rearward region 24a in

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the rear wall 16. Drive shaft 24 is coupled to a half revolution clutch 28, illustrated in block diagram form, which is operated from a suitable source of power, including an electric motor M.

5 Secured on the drive shaft 24 in spaced-apart relationship, as by rivets 30, is a plurality of double-ended paddles or segments 32 which constitutes a rotatable sheet support or platform 34. The spaces 33 between segments 32 on either side of drive shaft 24 may be regarded also as slots 10 which extend radially relative to the axis of the drive shaft.

A series of flat, sheet-like stripper arms 36 are pivotally mounted at their upper ends 36a on drive shaft 24 between adjacent segments 32 with their lower end portions 36b 15 projecting freely through vertical slots 38 in the left wall 12 of the stacking bin. The projecting end portions 36b are interconnected for simultaneous movement of the stripper arms by means of an elongated rod or bail 40 to which is connected one end of tension springs 42 whose 20 opposite ends are anchored to fixed pins 44.

Each segment 32 is provided with a pair of mutually inverted spring clips 46 (FIGS. 2 and 3) of a thin elastic material secured thereto in juxtaposition to spaces 33, as by screws 48. The free or unsecured end portions 46a 25 of the spring clips 46 curve inwardly to overlies marginal edge portions of the segments 32 constituting the platform 34, and are slightly spaced respectively from opposite sides of the platform, as at 47, FIG. 2, to admit a sheet item therebetween, in a manner to be described more fully 30 hereinafter.

A lifter spring 50 (FIG. 1) is secured at its medial portion in the forward end of the drive shaft 24 and in the condition shown in FIGS. 1 and 3 has one of its arms 50a bent or stressed and abutting the bail 40. When the 35 lifter spring 50 is in a non-stressed condition, it is in the form of a spring leaf having a straight or linear configuration.

Before proceeding with the operation of the apparatus, it should be mentioned that for safety purposes it is preferable to provide the apparatus with a safety guard or canopy 52 (FIGS. 1 and 3) open at its rearward end 54 40 and constructed preferably of a transparent material to permit operator visibility.

In describing the operation, the rightward half of platform 34, as viewed in FIG. 3, will be designated paddle 45 34R and the leftward half designated paddle 34L.

With the apparatus in a stationary condition, as shown in FIGS. 1 and 3, a sheet S' is fed across the top of the platform 34 through the open end 54 (FIG. 1) of canopy 52 and toward the front of the apparatus by suitable sheet 50 delivery mechanism, not shown, with the rightward edge of the sheet, as viewed in FIG. 3, disposed below the ends 46a of the upper row of spring clips 46. The half revolution clutch 28 is then operated by suitable means, not shown, to couple the drive shaft 24 with motor M to rotate the platform 34 a half revolution and, as illustrated in this embodiment, in the clockwise direction.

As platform 34 commences to rotate, paddle 34R (FIG. 3) will exert a suction force on that part of the sheet S' overlying it, while paddle 34L will exert a driving force on that portion of the sheet overlying that paddle, thus causing the sheet to adhere to the platform as the platform is rotated. The spring clips 46 serve in an auxiliary capacity in case the sheet edge underlying the clip ends 46a is torn or curled and may not lie flat against the surface of the platform. In such case, the spring clips 46 retain the sheet edge close to the platform surface and prevent the entrance or any appreciable amount of air between the sheet and platform which might possibly blow the sheet from the surface of the platform while the platform is rotating. Also, with regard to retaining the sheet against the platform, it will be

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noticed, as shown in FIG. 3, that the vertical thickness of the platform is not uniform but preferably diminishes from the central region at the drive shaft 24 to a lesser thickness at the marginal edges of the platform. It has been found that this general shape of the platform is best suited for causing the sheet to adhere to the platform surface when the platform is rotated.

As platform 34 commences rotating, arm 50a of the lifter spring 50 will be bent further until it is stressed to a point where it will overcome the restoring force of springs 42 and lift the bail 40 and stripper arms 36, as shown in FIG. 4. The stripper arms 36 will be raised until they are stopped by the upper edges 38' of slots 38. As the platform 34 rotates further arm 50a will wipe across the bail 40 and be bent to a greater extent, as shown in FIG. 5, until it snaps outwardly past the bail 40, as shown in phantom in FIG. 6, and resumes a linear shape in the position shown in FIG. 7.

As arm 50a (FIG. 6) leaves the bail 40, the bail and stripper arms 36 will thereby be released to the biasing action of springs 42. These springs will then rock the stripper arms 36 downwardly, or counterclockwise, on drive shaft 24 until the stripper arms pass between segments 32 to strip the leading portion of the sheet S' from paddle 34R and spring clips 46, while the trailing portion of the sheet will be thrust downwardly by the combined action of the stripper arms 36 and paddle 34L, as shown in FIG. 7. The momentum imparted to the sheet S' by rotation of the platform 34 and the thrust of paddle 34L on the trailing portion of the sheet serve to drive the leading portion of the sheet beneath the stripper arms 36, as shown in FIG. 7, to ultimately register the sheet against the side plate 12, while the stripper arms 36 sweep across a part of the trailing portion of the sheet to stack it finally on the stack S, FIG. 8. When the stripper arms 36 finally come to rest against the lower edges of slots 38 (FIG. 8) the platform 34 will almost have completed its half revolution.

While there has been disclosed a specific embodiment of the invention it will be apparent to those skilled in the art that the invention may be constructed in a variety of shapes, forms and modifications without departing from the true spirit and scope thereof. Accordingly, it is to be understood that the invention is not to be limited by the specific structure disclosed but only by the subjoined claims.

What is claimed is:

1. A sheet stacker comprising, a rotatable substantially rectangular platform having an upper surface for freely supporting a sheet item thereon, means for so rotating said platform as to cause said sheet to adhere to said surface, said platform having opposed slots at least partially covered by said sheet and extending inwardly from opposite edges of said platform, resilient means at one of said edges having an end portion spaced from said upper surface a distance somewhat greater than the thickness of said sheet and overlying an edge of said sheet, said resilient means being in juxtaposition to one of said slots, and an arm operative through said one of said slots for stripping said sheet from said upper surface and said edge of said sheet from under said end portion of said resilient means as the sheet is rotated with said upper surface to an underside position of said platform.

2. A sheet stacker comprising, a receptacle having a bottom surface, a rotatable substantially rectangular platform having an upper surface for freely supporting a sheet item, means for so rotating said platform as to cause said sheet to adhere to said upper surface, said platform having opposed slots at least partially covered by said sheet and extending inwardly from opposite edges of said platform, a stripping arm at least partly within said receptacle and normally positioned substantially on said bottom surface, means operative upon rotation of said platform for raising said stripping arm away from said bottom surface to permit the entry of the leading

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edge of said sheet between said bottom surface and said stripping arm when the sheet has been rotated with said upper surface to a predetermined position of said platform, and means for returning said stripping arm through one of said slots to its normal position to strip said sheet from said upper surface and sweep it down on said bottom surface to stack it thereon.

3. A sheet stacker comprising, a receptacle having a bottom surface on which sheets are to be stacked, a rotatable substantially rectangular platform having an upper surface for freely supporting a sheet item, means for so rotating said platform as to cause said sheet to adhere to said upper surface, said platform having opposed slots at least partially covered by said sheet and extending inwardly from opposite edges of said platform, a pivotally mounted stripping arm at least partly within said receptacle and normally positioned adjacent to said bottom surface, first spring means biasing said stripping arm about its pivotal mounting to its normal position, and second spring means operative when said platform is rotated for rocking said stripping arm away from said bottom surface in opposition to said first spring means to permit the entry of the leading edge of said sheet between said bottom surface and said stripping arm, said second spring means releasing said stripping arm to the biasing action of said first spring means when said sheet has been rotated with said upper surface to a predetermined underside position of said platform to allow said stripping arm to pass through one of said slots to strip the sheet from said upper surface and sweep it down on said bottom surface to stack it thereon.

4. A sheet stacker comprising, a stacking table mounted for downward movement as sheets are stacked thereon, a drive shaft, means to intermittently rotate said drive shaft through angular increments of half revolutions, a plurality of segments secured on said drive shaft in spaced apart relationship and defining a platform having opposed surfaces each effective when in an upper position to freely support a sheet item thereon, the spaces between said segments defining opposed slots extending transversely from opposed edges of said platform to said drive shaft, a plurality of pairs of spring clips, one pair for each of said segments, the spring clips of each pair being secured respectively to opposite edge portions of the respective segment and each spring clip overlying an edge portion of one of said opposed surfaces in spaced relationship thereto, a plurality of elongated stripping arms each pivotally mounted at one end on said drive shaft between adjacent ones of said segments and adapted for movement through a slot therebetween, means biasing said stripping arms to a normal position with an edge portion adjacent to said stacking table, and spring means operative when said platform is rotated for rocking said stripping arms away from said stacking table in opposition to said biasing means, said spring means releasing said stripping arms to the action of said biasing means when said platform has been rotated to a predetermined position to allow said stripping arms to pass through said slots.

5. A sheet stacker as defined in claim 4 characterized further in that said opposed surfaces are symmetrical about the axis of said drive shaft and define the thickness of said platform, said surfaces having a transverse contour relative to said axis providing said platform with a greater thickness in the region of said axis than in the regions of said opposed edges.

6. A sheet stacker comprising, a unidirectionally rotatable platform having a central axis and constituted by substantially flat portions extending from said axis in diametrically opposite directions, said portions having surfaces together forming an upper surface for cooperatively and simultaneously supporting a sheet item thereon so that substantially equal portions of the sheet lie on opposite sides of said axis, means for so rotating said platform about said axis as to cause said sheet to adhere to

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said upper surface, and a pivotally mounted arm rocked by rotation of said platform for stripping said sheet from said upper surface when the sheet has been rotated therewith to an underside position of said platform.

7. A sheet stacker comprising, a unidirectionally rotatable platform having a central axis and constituted by two groups of substantially flat portions extending from said axis in diametrically opposite directions, said portions having surfaces together forming an upper surface for cooperatively and simultaneously supporting a sheet item thereon so that substantial portions of the sheet lie on opposite sides of said axis, means for so rotating said platform about said axis as to cause said sheet to adhere to said upper surface, said platform having diametrically opposed slots axially separating said flat portions in each group and at least partially covered by said sheet, and an arm adapted for relative movement through one of said slots for stripping said sheet from said upper surface as the sheet is rotated with said platform to an inverted position thereof.

8. A sheet stacker comprising, a rotatable platform having a central axis and substantially flat portions extending from said axis in diametrically opposite direc-

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tions, said diametrically opposite portions having surfaces together forming a substantially continuous surface bridging said central axis for cooperatively supporting a sheet item thereon so that opposite edge portions of the sheet are substantially equidistant from said axis, means for rotating said platform in such manner that one of said surfaces will exert a suction force on said sheet and a surface on a diametrically opposite portion will simultaneously exert a driving force on said sheet, and an arm actuated by rotation of said platform for stripping said sheet from said surfaces when the sheet has been rotated by the platform to an inverted position.

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