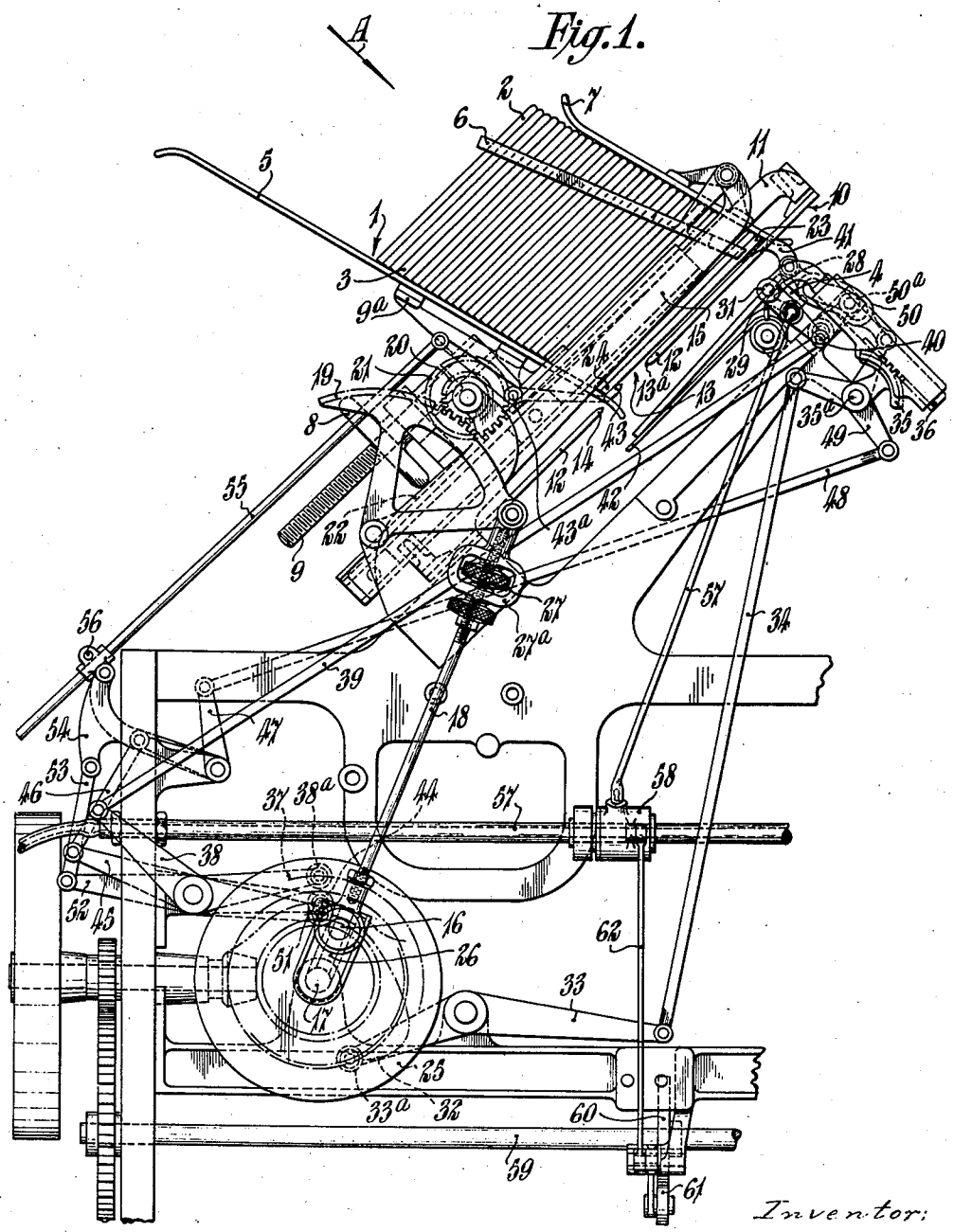
Sept. 1, 1936. R. KLEMM 2,052,632

SHEET SEPARATING

Filed June 15, 1931 6 Sheets-Sheet 1

Fig. 1.



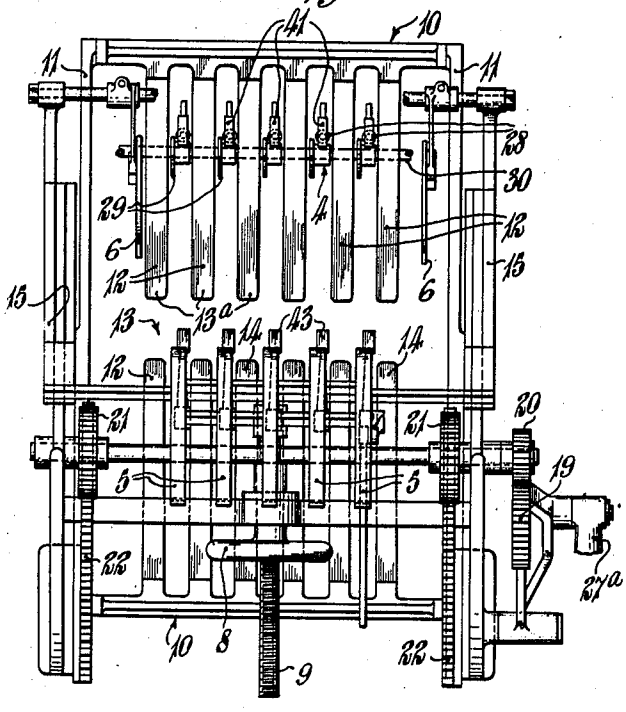
Inventor:
Rudolf Klemm
By Lue Pawlicka
Attorney

Sept. 1, 1936. R. KLEMM 2,052,632

SHEET SEPARATING

Filed June 15, 1931 6 Sheets-Sheet 2

Fig. 2.



Inventor:
Rudolf Klemm
By Lucie Samuel & Co
Attorney.

Sept. 1, 1936. R. KLEMM 2,052,632

SHEET SEPARATING

Filed June 15, 1931 6 Sheets-Sheet 3

Fig. 3.

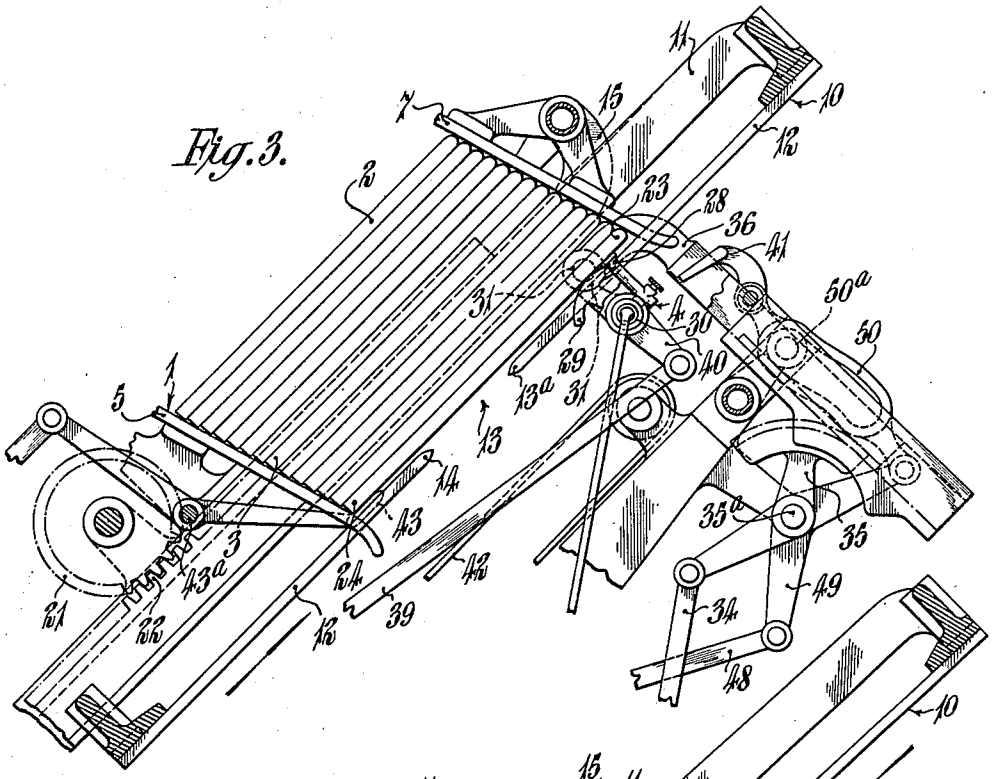
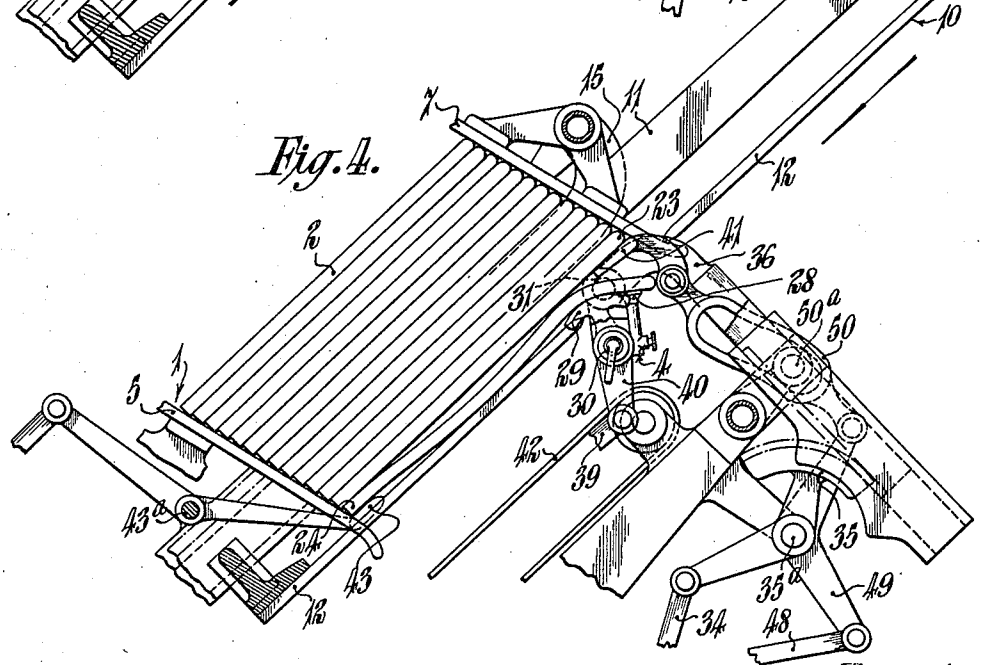


Fig. 4.



Inventor:
Rudolf Klemm
By Lueder & Lueder
Attorneys.

Sept. 1, 1936. R. KLEMM 2,052,632

SHEET SEPARATING

Filed June 15, 1931 6 Sheets-Sheet 4

Fig. 5.

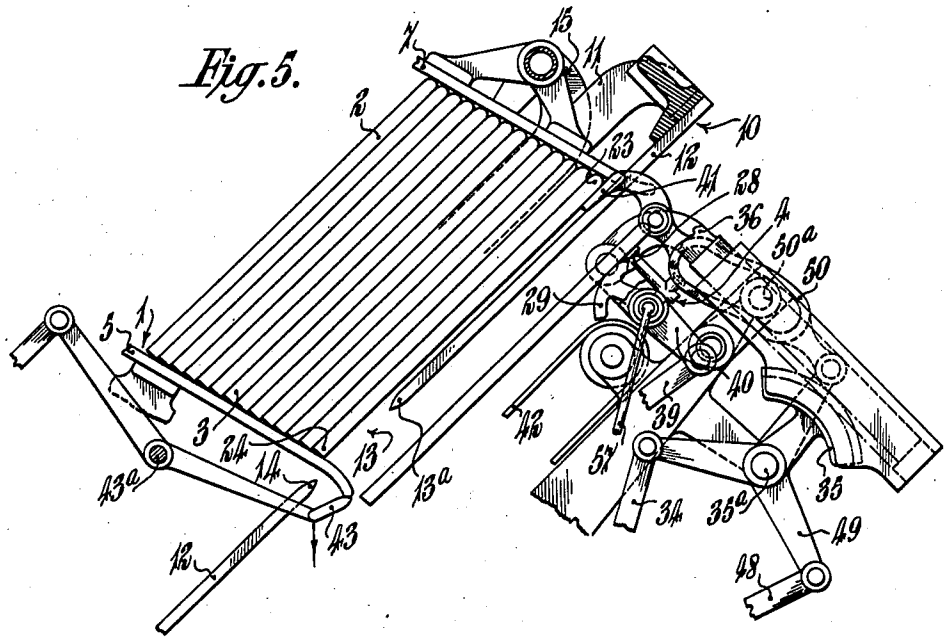
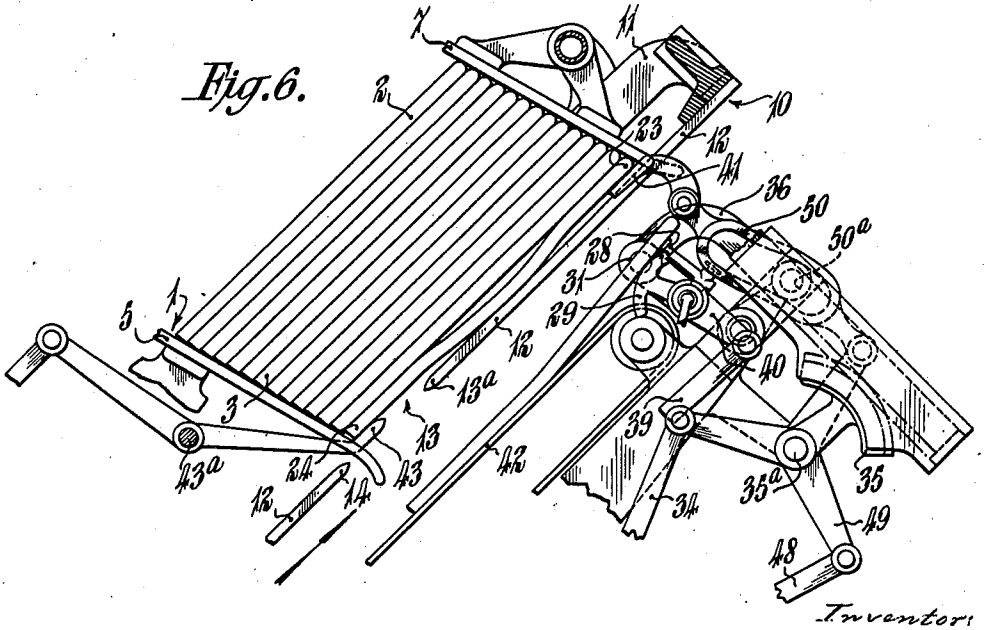


Fig. 6.



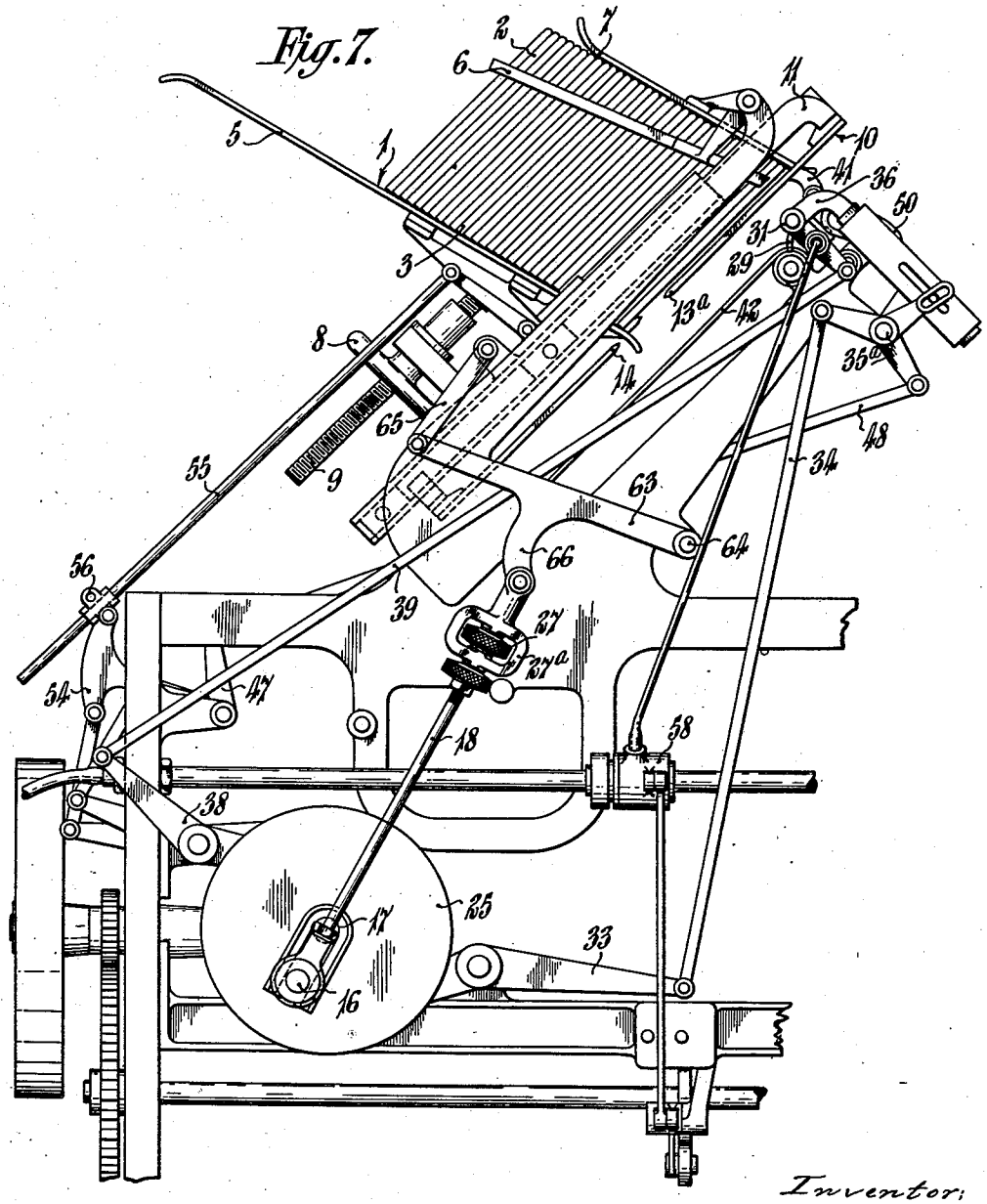
Inventor:
Rudolf Klemm
By Lucas Davis & Co
Attorneys.

Sept. 1, 1936. R. KLEMM 2,052,632

SHEET SEPARATING

Filed June 15, 1931 6 Sheets-Sheet 5

Fig. 7.



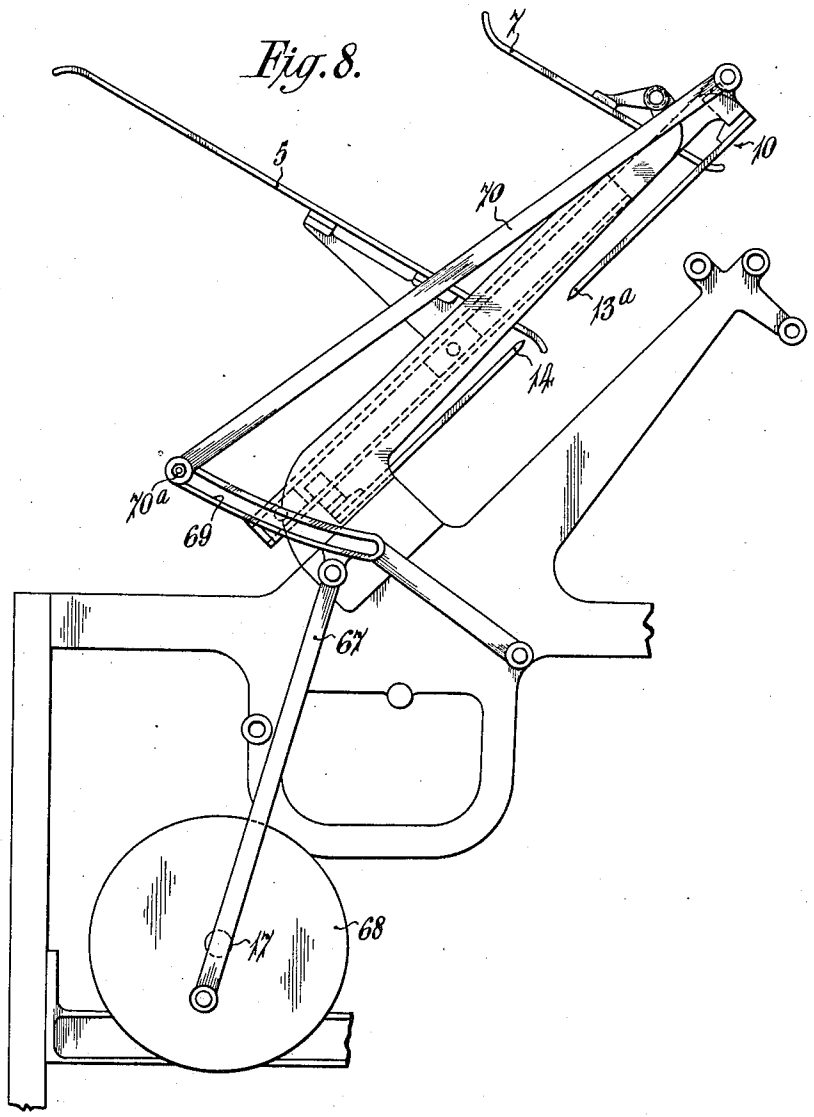
Inventor:
Rudolf Klemm
By Lucie Jaunezik
Attorney.

Sept. 1, 1936. R. KLEMM 2,052,632

SHEET SEPARATING

Filed June 15, 1931 6 Sheets-Sheet 6

Fig. 8.



Inventor:
Rudolf Klemm
By Louis Janicke
Attorney

Patented Sept. 1, 1936 2,052,632

UNITED STATES PATENT OFFICE

2,052,632

SHEET SEPARATING

Rudolf Klemm, Leipzig-Plagwitz, Germany, assignor to Gebruder Brehmer, Leipzig-Plagwitz, Germany, a German firm

Application June 15, 1931, Serial No. 544,622
In Germany November 11, 1930

33 Claims. (Cl. 271—32)

The present invention relates to the separation, by mechanical means, of individual sections, folded sheets, book-leaves or the like from a stack.

In accordance with the method of this invention the separation of the outer unit of a stack is effected with the aid of mechanical means passing the edge of the sheet or the like through an opening provided in a sheet-separating member, which latter is moved in a plane adjacent to the plane of the sheet to be separated.

In order to carry this method into effect, I may provide an adjustable stack container which is arranged to support a stack of folded sheets, for example, in a preferably inclined position. One wall of the container adjacent to and preferably parallel to the plane of the outer unit of the stack is adapted to reciprocate, as desired, in order to separate the outer unit from the stack, in a manner to be hereinafter described. An opening is provided in the movable wall or separating member which latter may comprise bars or fingers with or without a suitable frame to form a grid and spaced to provide the opening above referred to. The separating member, which is reciprocated from the main drive by suitable timing means, is adjustable to the size of the units of the stack to be handled and is adapted to extend beyond the outer edges of the stack.

Suction members and sheet tensioning members which may be similar to those described in my prior application Serial No. 486,756, filed October 6, 1930, or of any construction convenient for the purpose, are associated with the sheet separating member in order to draw the requisite edge of the outer sheet through the opening in the separating member. The suctioning and sheet tensioning members are conveniently mounted so as to be adjusted in accordance with the size of the stack to be handled. Suitably guided fingers or retaining members are provided to engage the upper and lower edges of the stack during the separation of the outer sheet from the remainder of the stack. The component parts of the mechanism are actuated in timed relationship and suitable conveying means may be provided, if desired, to feed the separated sheet to further sheet handling means.

The operation of the apparatus is as follows: If the units of the stack are to be separated from the upper edge downwards, the lower retaining finger is caused to engage the lower edge of the stack and the separating member is moved upwards underneath the stack until the upper edge of the opening provided in the separating member is above the upper edge of the stack, that is to say, until the opening registers with the upper edge of the stack. The suction and sheet tensioning members are then caused to pass through the opening in the sheet separating member to engage the upper edge of the outer unit of the stack and so draw the upper edge of the sheet through the opening. The upper retaining finger then passes behind the bent edge of the outer sheet and engages the upper edge of the stack to retain it in position. The separating member is then moved in a downward direction and so causes the separated sheet to travel through the opening in the separating member. Immediately before the lower edge of the opening registers with the lower edge of the stack, the lower retaining finger swings away from the stack to release the lower edge of the sheet, which latter then completes its separation from the stack by travelling through the opening in the separating member while the lower retaining member immediately returns to re-engage and so hold in a position clear of the separating member the lower edge of the stack. During the separation of the sheet or subsequently thereto the suction member is actuated to straighten the separated sheet and to place the latter, if desired, upon suitable means for its further conveyance.

A constructional form of the invention together with certain modifications thereof will now be described with reference to the accompanying drawings, in which:—

Fig. 1 is a side elevational view of the improved sheet-separating mechanism.

Fig. 2 is a view of the mechanism looking in the direction of the arrow A (Fig. 1).

Fig. 3 shows details of the sheet-engaging and separating members with the suction members shown engaging the upper edge of the outermost sheet of the stack.

Fig. 4 is a corresponding view to Fig. 3, showing the relative positions of the sheet engaging and separating members when the upper edge of the outermost sheet is bent away from the stack.

Fig. 5 shows the relative positions of the sheet engaging and separating members when the outermost sheet is completely separated from the stack.

Fig. 6 is a view corresponding to Fig. 5, showing the separated sheet about to be deposited upon further sheet conveying means.

Fig. 7 is a side elevational view of a modified

construction of the operating means for the slidable sheet-separating member, while

Fig. 8 shows, in side elevation, a detail of a further modified form of operating means for the slidable sheet-separating member.

Referring to Fig. 1, the folded sheets or book sections 2 rest in a container 1 in an inclined position with the open edges 3 of the sheets underneath and supported on the lower surface 5 of the container. Corresponding to this arrangement of the sheets the sucker members 4 are located at the top of the latter and the stack support or lower supporting surface 5 of the container is adjustable according to the size of the sheets 2. The container 1 is limited at the sides by the retaining bars 6 and above by the bars 7 (Fig. 1). The side bars 6 are mutually adjustable in order to receive sheets or sections of any desired height and, further, in order to bring the stack into the correct position for the operation to be performed. The retaining bars 7 are rigidly fixed to determine the position of the folded edges of the section, relative to the sheet separating mechanism and the adjustment of the lower stack-support 5 is effected by means of a hand wheel 8. The latter is rotatably mounted on a bracket attached to the frame of the machine and is threaded to engage a threaded spindle 9 which is adapted to support, upon a suitably shaped bracket 9a, the stack-support 5. The complete stack container is formed by the stack support 5, the lateral retaining bars 6, upper retaining bars 7, and movable retaining member 10 (Fig. 1). The container so formed is open at the upper inclined side thereof at which point the stack is fed with folded sheets or back-sections.

The retaining member 10 is constructed as a sheet separator and consists of a rectangular frame 11 (Fig. 2) on the horizontal sides of which the parallel bars 12 are arranged. These bars 12 are arranged in opposed series having their free ends spaced apart to form a transverse slot 13 intermediate the length of the member 10.

The member 10 is slidably mounted in the side guides 15 and its movement is effected in a plane parallel to the plane of the outermost sheet of the restricted sheet-stack. The movement is initiated by the crank 16 (Fig. 1) adjustably secured to a crank disc 25 which is mounted on a drive shaft 17, and linked by means of the adjustable connecting rod 18 to the toothed segment 19, which is adapted to engage the toothed wheel 20 (Figs. 1 and 2). The latter member is keyed to a shaft carrying pinions 21 which, in turn, engage the toothed racks 22. The length of travel of the sliding sheet-separator 10 is adjustable according to the width of the sheets or sections and is accordingly so set that the upper edge 13a of the slot 13 in the sheet separator 10 overruns the upper edge 23 of the sheet-stack at the extremity of its upward movement, and the lower edge 14 of the slot passes below the lower edge 24 of the stack at the extremity of its downward movement (Fig. 1).

The adjustment of the traversing movement of the sheet separator is achieved by the displacement of the crank 16 in a groove 26 provided in the crank disc 25 whereby the throw of the link mechanism is modified. The extreme upper position of the sheet separator is set and must not be varied, therefore its travel is adjusted by a corresponding adjustment of the length of the connecting rod 18 to vary the crank throw. To provide adjusting means for this purpose, the upper extremity of the connecting rod 18 is threaded to receive a knurled nut 27 which is held between the jaws of a bracket 27a pivotally connected to the toothed segment 19.

A sheet seizing member 4, located near the upper edge 23 of the stack (Figs. 1, 3 and 6) comprises a number of suction nozzles 28 and tensioning segments 29 which are rotatably carried by a common suction pipe 30 (Fig. 2). During the sheet separating operation the member 4 has a straight line movement vertical to the plane of the sheet-separator and also an oscillating movement about its pivot 31, which latter is supported upon a slidably mounted rack 36. The straight line movement of the member 4 is produced by timed driving mechanism comprising a cam 32 mounted on the drive shaft 17, a pivoted crank 33, carrying on one arm a cam follower 33a adapted to engage the cam 32. The other arm of the crank 33 is linked, by means of a connecting rod 34 to a toothed segment 35 which latter is in engagement with the slidable rack 36 and is mounted upon a shaft 35a journalled on the frame of the machine.

The oscillating movement of the member 4 is obtained through a similar timed driving mechanism comprising a cam 37 mounted on the shaft 17, a pivoted crank 38 carrying on one arm a cam follower 38a and linked at its other arm by means of a connecting rod 39 to a balance lever 40 which is pivotally supported at 31 from the member 36 and carries the suction pipe 30 and suction nozzles 28.

At the end of the straight lined sheet engaging movement of the member 4, the suction nozzles 28 and tensioning segments 29 (Fig. 1) pass between the upper sheet supporting bars 12 and engage the outermost sheet of the stack 1 which rests on the tensioning segment 29 in such a manner that the nozzle end lies flat on the lower section, as shown in Fig. 3. In this position the suction nozzles seize the sheet adjacent to the folded upper edge (Fig. 3). While the sheet is thus held the sheet separator 10 is performing an upward movement. As the upper edge 13a of the slot 13 overruns the upper folded edge of the sheet, the member 4 swings into the position shown in Fig. 4 and thereby draws the folded edge of the sheet through the slot 13 provided between the upper and lower extremities of the member 12. The sheet separator at this period reaches the end of its upward stroke and commences to move downwardly.

Before the upper edge 13a of the slot 13 in the sheet separator reaches during its downward movement the folded edge of the adjacent sheet or section, an upper retaining rake 41 (Fig. 4) swings into the clearance formed by the removal of the outer sheet in order to hold the upper edge of the adjacent section away from the moving bars 12, as shown in Fig. 4. During the continued downward movement of the sheet separator 10, the separation of the outer sheet takes place through the slot 13, and the feed of the adjacent and now outer sheet or section is interrupted while the sheet separator makes a slower downward movement and a return oscillating movement of the sucker member is performed (Fig. 5).

The complete separation of the sheet from the stack follows as soon as the lower edge 14 of the sheet 13 in the downward movement overruns the lower edge 24 of the stack, as shown in Fig. 5.

The member 4 now completes its return movement while still retaining the upper edge of the sheet and swings over the previous suction position so as to position the sheet in the inclined position shown in Fig. 6. In this position the sheet is brought to a belt conveyor 42 for further transport to the stitching machine. By reason of its inclined position the open edges 3 of the section are caused to engage the belt conveyor before the remainder of the sheet rests thereon so that they are pulled together and remain closed during their transport.

To assist in the support of the lower edge of the stack a lower retaining rake 43 (Figs. 4 and 6) is provided to lift at the beginning of the upward movement of the sheet separator 10 the lower edge of the stack away from the supporting bars 12 with the object of giving the centre portion of the stack a more positive support on the supporting bars and also to hold the lower edge of the stack away from the edge 14 of the upwardly moving slot 13, as shown in Fig. 4.

The upper retaining rake 41 is actuated by a cam 44 mounted on the drive shaft 17, a pivoted crank 45 engaging the cam 44 and linked by means of a connecting rod 46 to one arm of an angular lever 47, a connecting rod 48, linking the second arm of the lever 47 to a further lever 49 mounted on the shaft 35a and linked to an arcuate slotted cam guide 50.

The slotted cam guide 50 supports the upper retaining rake and engages a guide roller 50a whereby the rake 41 is guided closely over the folded upper edge of the sheet adjacent the outer sheet. The lower retaining rake 43 is similarly actuated by the cam 51 mounted on the shaft 17, a pivoted crank 52 adapted to engage the arm and connected by means of a link 53 to a pivoted angular lever 54 which in turn is secured to a connecting rod 55 which serves to rock the member 43 about the pivot 43a. As the lower retaining rake 43 must be adjusted mutually with the lower stack support 5 the tie rod 55 is adjustably connected to the angular lever 54 as at 56 (Fig. 1).

In order to control the suction periods of the sheet seizing members 4 the control 58 (Fig. 1) in the main vacuum pipe 57 (Fig. 1) is interposed in a manner known per se. The actuation of the pneumatic control 58 is effected from the main drive by means comprising a cam drive shaft 59, a cam 60 mounted thereon, a pivoted crank 61, adapted to engage the cam 60 and linked to the control 58 by means of a connecting rod 62.

In the modified construction of the sheet separating mechanism shown in Fig. 7, the slidable sheet-separator 10 is actuated by a link mechanism which comprises a lever 63 pivoted at one extremity 64 to the frame of the machine and connected at its further extremity to the member 10 by means of a link 65. The lever 63 is provided, intermediate its length, with a projecting arm 66 which is connected, by means of the connecting rod 18, to driving means including an adjustable crank 16 similar to that above described. Adjusting mechanism 27 also similar to that above described, is associated with the connecting rod 18 in order to provide means for adjusting the length of travel of the member 10. The remainder of the sheet separating mechanism in this embodiment is substantially the same as that in the first described embodiment.

A further modified construction of the sheet separating mechanism is shown in Fig. 8. According to this modified construction, the slidable sheet-separator 10 is reciprocated from a crank drive through a link mechanism which is provided with simplified means for adjusting the length of travel of the member 10. The link mechanism comprises a rod or link 67 which is connected at its lower extremity to a crank drive 68, and at its upper extremity pivotally connected to a slotted lever 69. The latter member is pivoted at one extremity to the frame of the machine and has the lower end 70a of a second link 70 adjustably engaged in the arcuate slotted portion thereof. The upper end of the link 70 is pivotally connected to the adjacent upper end of the member 10 and thus serves to actuate the latter. Obviously by this arrangement the travel of the member 10 may be adjusted by altering the point of engagement of the end 70a of the link 70 with the slotted member 69.

The invention is not limited to the manner of operation more specifically described above since it is obvious that this method of separating the outer sheet from a stack may be applied in many ways. The mechanism could be suitably arranged to separate the sheets upwardly from the stack or, if desired, arranged to operate in the lateral direction of the stack.

The component parts of the mechanism which, generally, have been described as single members, may comprise a series of such members for each unit while the separating mechanism as a whole is applicable as a single unit or in a series of mechanically timed units for use in sheet-handling machines provided with banks of sheet containers as is well known in the art.

I claim:

1. Automatic sheet-separating apparatus comprising a stack container, a movable wall forming part of said stack container and provided with a slot transverse to its direction of travel, means for moving the said wall so that the said slot therein passes across the upper and lower edges of the sheet to be separated from the stack, means for registering the said slot with one edge of the said sheet, means for bending the said sheet edge outwardly through the slot, and means for holding said sheet edge substantially immovable while said wall is moved to complete the separation of the said sheet from the stack.

2. Automatic sheet-separating apparatus comprising a sheet stack container supported edgewise and inclined to the vertical, a movable slotted sheet-separating member forming part of the said stack container, means for moving the said sheet separating member so that the slot therein registers with the upper edge of the outer sheet of the stack, means for engaging and retaining in close formation the adjacent lower edges of the stack of sheets, means for engaging and drawing through the slot in the said sheet separating member the upper edge of the outer sheet of the stack, means for engaging and retaining in close formation the upper edges of the remaining sheets of the stack, and means for completing the separation of the said outer sheet from the stack.

3. Automatic sheet-separating apparatus comprising a sheet stack container supported edgewise and inclined to the vertical, a movable slotted sheet-separating member forming part of the said stack container, means for moving the said sheet separating member so that the slot therein registers with the lower edge of the outer sheet of the stack, means for engaging and re-

taining in close formation the upper edges of the stack of sheets, means for engaging and drawing through the slot in the said sheet separating member the lower edge of the outer sheet of the stack, means for engaging and retaining in position the lower edges of the remaining sheets of the stack, and means for completing the separation of the said outer sheet from the stack.

4. Automatic sheet-separating apparatus comprising a stack container, a movable slotted sheet separating member forming part of the stack container, at least one sheet seizing member adapted to seize and draw through the slot in the said sheet separating member the folded edge of a sheet to be separated from the stack, an endless belt sheet-conveyor, means for passing the whole of the sheet through the said slot, and means for imparting a secondary movement to the said sheet seizing members whereby the separated sheet is held in an inclined position above the said sheet conveyor so that the open edges of the said sheet contact with the said conveyor in advance of the remainder of the sheet, and means for depositing the said sheet upon the said conveyor belt.

5. Automatic sheet-separating apparatus comprising, in combination, a stack container adapted to support a stack of sheets positioned edgewise and inclined to the vertical, a sliding sheet-separating member forming one wall of the stack container and comprising a frame slidably mounted in side guides and provided with two series of bars spaced apart at their opposed extremities to form an opening, means for reciprocating the said sheet separating member, one or more sheet seizing members supported by guide members and adapted to pass through the opening in the said sheet separating member to seize one edge of the outer sheet of the stack, means for actuating the said sheet-seizing members, pivotally mounted upper retaining fingers adapted to engage and to retain in position the upper edges of the stacked sheets, pivotally mounted lower retaining fingers adapted to engage and to retain in position the lower edges of the stacked sheets, a sheet conveyor, means for timing the movement of the sheet-seizing members to draw the seized sheet edge through the slot, means for timing the movement of the said sheet-separating member to complete the separation of the seized sheet, and means for imparting a downward movement to said sheet-seizing means to lay the separated sheet upon the said sheet conveyor.

6. Automatic sheet separating apparatus, comprising, in combination, a stack container adapted to support a stack of sheets positioned edgewise and inclined to the vertical, a slotted sheet-separating member forming one wall of the said stack container and slidably mounted in side guides, one or more toothed racks forming part of the said sheet-separating member, pinion wheels mounted on a rotatable shaft and adapted to engage the said racks, associated pinion wheels mounted on the said shaft, arcuate rack members adapted to engage the associated pinions, timed driving means for actuating the said arcuate racks, one or more suction members mounted upon a common suction pipe pivotally supported by slide members mounted in stationary guides, a toothed rack associated with each supporting slide member, a pivotally mounted toothed segment member adapted to engage the said toothed rack, timed means for rocking the said toothed segment about its pivot, pivotally mounted lower sheet-edge retaining fingers, timed means for actuating the said retaining fingers, upper sheet-edge retaining fingers attached to slotted cam guides, a supporting roller engaging each slotted cam guide, timed driving means for actuating the said upper sheet retaining members, a sheet conveyor and means for depositing upon the said sheet conveyor the sheets separated from the stack.

7. Automatic sheet-separating apparatus comprising, in combination a machine frame, a stack container, a slotted sheet-separating member slidably mounted in side guides and adapted to form one wall of the said container, link members pivotally attached to the said sheet separating member, secondary link members each pivoted at one extremity to the machine frame and pivotally connected at the opposite extremities to the first mentioned link members, a crank drive, adjustable connecting rods between the said secondary link members and said crank drive, sheet seizing members mounted on a common suction pipe, means for pivotally supporting the said pipe on slide members mounted in slotted guides, timed link-driving mechanism, means for connecting the said slide members to the said timed link-driving mechanism, upper sheet-edge retaining members, means for actuating the said retaining members, lower sheet-edge retaining members, means for actuating the said lower sheet-edge retaining members, a sheet conveyor, and means for depositing upon the said sheet conveyor the sheets separated from the stack.

8. Automatic sheet-separating apparatus comprising, in combination, a machine frame, a stack container, a movable slotted sheet-separating member slidably mounted in side guides and adapted to form one wall of the said container, linked driving mechanism adapted to reciprocate the said sheet-separating member and comprising at least one slotted link member pivoted at one extremity upon the frame of the machine, a connecting rod pivotally secured at one extremity to the sheet-separating member and having its further extremity pivotally secured in an adjustable manner to the slotted link member, a driving crank-rod pivotally secured at one extremity to a driving crank and pivotally secured at its further extremity to the said slotted link member, means for passing the outer sheet of a stack through the slot in the said sheet-separating member, a sheet conveyor, and means for depositing upon the said sheet-conveyor the separated sheet.

9. A method of mechanically separating individual sheets, book sections or the like from a stack, which includes positioning in a plane adjacent the plane of the outer sheet of the stack a sheet separating member provided with an opening, passing by mechanical means an edge of the outer sheet through the opening in the sheet separating member, and then holding said sheet edge substantially immovable relatively to the remainder of the stack while movement is imparted to the said sheet separating member to cause the remainder of the outer sheet to pass through the opening therein.

10. A method of mechanically separating individual sheets, book sections or the like from a stack, which includes placing the stack in a container inclined to the vertical, positioning in a plane adjacent the plane of the outer sheet of the stack a sheet separating member provided with an opening, passing by mechanical means an edge of the outer sheet through the opening

in the sheet separating member, and then holding said sheet edge substantially immovable relatively to the remainder of the stack while movement is imparted to said sheet separating member to cause the remainder of the outer sheet to pass through the opening in said separating member.

11. Automatic sheet-separating apparatus comprising a stack container, a movable wall forming part of the said stack container, and provided with a slot, means for positioning the said wall so that the slot provided therein registers with one edge of the sheet to be separated, means for passing the said edge of the sheet through the said slot and holding said sheet edge substantially immovable relatively to the remainder of the stack, and means for moving the said wall so that the slot therein passes over the entire surface of the said sheet so held to separate the latter from the stack.

12. Automatic sheet-separating apparatus comprising a stationary stack container inclined to the vertical, a movable slotted sheet separating member forming part of the said stack container, means for engaging and drawing through the slot in the said sheet separating member an edge of the outer sheet of the stack, means for moving the said sheet separating member in order to complete the separation of the outer sheet, and means for retaining in close formation the adjacent edges of the remaining sheets of the stack so that the advancing edge of the slot does not engage said sheet edges so held.

13. Automatic sheet-separating apparatus comprising a stack container, a movable wall provided with a slot and forming part of said container, at least one sheet-seizing member, means for causing said sheet-seizing member to enter the slot in said movable container wall to draw therethrough one edge of the sheet to be separated from a stack supported in said container, and means for moving said wall between said stack and said sheet-seizing member, to complete the separation of the sheet held by said sheet-seizing member.

14. Automatic sheet-separating apparatus comprising a stack container, a movable wall provided with a slot and forming part of said container, at least one sheet-seizing member, means for causing said sheet-seizing member to enter the slot in said movable container wall to draw therethrough one edge of the sheet to be separated from a stack supported in said container, and means for imparting a linear reciprocating movement to said wall so that it moves between said stack and said sheet-seizing member to complete the separation of the sheet held by said sheet-seizing member.

15. Automatic sheet-separating apparatus comprising a stack container, a movable wall provided with a slot and forming part of said container, at least one sheet-seizing member adapted to pass through said slot to seize one edge of the sheet to be separated from a stack supported in said container, means for imparting a secondary movement to said sheet-seizing member whereby the edge of said sheet is bent away from the stack and the path of movement of said slotted wall, and means for moving said wall between said stack and said sheet-seizing member to complete the separation of the sheet held by said sheet-seizing member.

16. Automatic sheet-separating apparatus comprising a stack container, a movable wall provided with a slot and forming part of said container, at least one sheet-seizing member, means for moving said sheet-seizing member in a substantially linear path of movement through the slot in said movable wall to seize one edge of the sheet to be separated, means for imparting a secondary rotary movement to said sheet-seizing member in order to bend the edge of said sheet outwardly through the slot in said wall, and means for moving said wall to complete the separation of said sheet from the stack.

17. Automatic sheet-separating apparatus, comprising a stack container, a movable wall provided with a slot and forming part of said container, at least one sheet-seizing member, means for moving said sheet-seizing member in a substantially linear path of movement through the slot in said movable wall to seize one edge of the sheet to be separated, means for imparting a secondary rotary movement to said sheet-seizing member in order to bend the edge of said sheet outwardly through the slot in said wall, means for engaging and retaining in close formation the adjacent sheet edges of the stack, and means for moving said wall to complete the separation of said sheet from the stack.

18. Automatic sheet-separating apparatus comprising a stack container, a movable wall provided with a slot and forming part of said container, at least one sheet-seizing member, means for causing said sheet-seizing member to enter the slot in said movable container wall to draw therethrough one edge of the sheet to be separated from a stack supported in said container, means for engaging and retaining in close formation the adjacent sheet edges of the stack, and means for moving said wall between said stack and said sheet-seizing member to complete the separation of the sheet held by said sheet-seizing member.

19. Automatic sheet-separating apparatus comprising a stack container, a movable wall provided with a slot and forming part of said container, at least one sheet-seizing member, means for causing said sheet-seizing member to enter the slot in said movable container wall to draw therethrough one edge of the sheet to be separated from a stack supported in said container, means for engaging and retaining in close formation the adjacent sheet edges of the stack, and means for imparting a linear reciprocating movement to said wall so that it moves between said stack and said sheet-seizing member to complete the separation of the sheet held by said sheet-seizing member.

20. Automatic sheet-separating apparatus comprising a stack container, a movable wall provided with a slot and forming part of said container, at least one sheet-seizing member adapted to pass through said slot to seize one edge of the sheet to be separated from a stack supported in said container, means for imparting a secondary movement to said sheet-seizing member whereby the edge of said sheet is bent away from the stack and the path of movement of said slotted wall, means for engaging and retaining in close formation the adjacent sheet edges of the stack, and means for moving said wall between said stack and said sheet-seizing member to complete the separation of the sheet held by said sheet-seizing member.

21. Automatic sheet-separating apparatus comprising a stationary stack container, a movable wall provided with a slot and forming part of said container, at least one sheet-seizing mem-

ber mounted independently of said container wall, means for causing said sheet-seizing member to enter the slot in the movable container wall to draw therethrough one edge of the sheet to be separated from a stack supported in said container, and means for moving said movable wall of the container subsequently to complete the separation of said sheet.

22. Automatic sheet-separating apparatus comprising a stationary stack container, a movable wall provided with a slot and forming part of said container, means for imparting reciprocatory movement to said movable wall relative to the stack of sheets supported in said container, at least one sheet-seizing member mounted independently of said container wall, and means for causing said sheet-seizing member to enter the slot in the movable container wall to engage and draw therethrough one edge of an outer sheet of the stack, the separation of which sheet is completed by the subsequent movement of said container wall.

23. Automatic sheet-separating apparatus comprising a stationary stack container, a movable wall provided with a slot and forming part of said container, at least one sheet-seizing member mounted independently of said container wall, means for causing said sheet-seizing member to enter the slot in said movable container wall to draw therethrough one edge of the sheet to be separated from a stack supported in said container, and means for moving said wall between said stack and said sheet-seizing member to complete the separation of the sheet while the latter is held by said sheet-seizing member.

24. Automatic sheet-separating apparatus comprising a stationary stack container, a movable wall provided with a slot and forming part of said container, at least one sheet-seizing member mounted independently of said container wall, means for causing said sheet-seizing member to enter the slot in said movable container wall to draw therethrough one edge of the sheet to be separated from a stack supported in said container, and means for imparting a linear reciprocating movement to said wall so that it moves between said stack and said sheet-seizing member to complete the separation of the sheet while the latter is held by said sheet-seizing member.

25. Automatic sheet-separating apparatus comprising a stationary stack container, a movable wall provided with a slot and forming part of said container, at least one sheet-seizing member mounted independently of said wall and arranged to pass through said slot to seize one edge of the sheet to be separated from a stack supported in said container, means for imparting a secondary movement to said sheet-seizing member whereby the edge of said sheet is bent away from the stack and the path of movement of said slotted wall, and means for moving said wall between said stack and said sheet-seizing member to complete the separation of the sheet while the latter is held by said sheet-seizing member.

26. Automatic sheet-separating apparatus comprising a stationary stack container, a movable wall provided with a slot and forming part of said container, at least one sheet-seizing member mounted independently of said wall, means for moving said sheet-seizing member in a substantially linear path of movement through the slot in said movable wall to seize one edge of the sheet to be separated, means for imparting a secondary rotary movement to said sheet-seizing member in order to bend the edge of said sheet outwardly through the slot in said wall, and means for moving said wall to complete the separation of said sheet from the stack while said sheet is held by said sheet-seizing member.

27. Automatic sheet-separating apparatus comprising a stack container having a floor adapted to support a stack of sheets placed edgewise thereon, a movable wall provided with a slot and forming part of said container, at least one sheet-seizing member, means for passing said sheet-seizing member through the slot in said movable wall to seize one edge of the sheet to be separated, separate means for imparting a secondary movement to said sheet-seizing member whereby said edge of the sheet is bent outwardly through the slot in the movable wall, and means for displacing said slotted wall relatively to said sheet stack and said floor to complete the separation of said sheet.

28. Automatic sheet-separating apparatus comprising a stack container having a floor adapted to support a stack of sheets placed edgewise thereon, a movable sheet-separating member provided with a slot and forming a wall of said container, means for intermittently displacing said sheet-separating member relatively to said container floor and said stack of sheets supported by the latter so that the slotted portion of said sheet-separating member passes across the upper and lower edges of the sheet to be separated, means for varying the extent of movement of said sheet-separating member according to the size of said sheets, and means carried independently of the sheet-separating member for passing an edge of the said sheet through the slot in said sheet-separating member during the intermittent movements of the latter.

29. Automatic sheet-separating apparatus comprising a stack container having an adjustable floor arranged to support a pile of sheets placed edgewise thereon, a movable slotted sheet-separating member forming a wall of said stack container, means for readily adjusting the position of said floor relatively to said sheet-separating member, means for intermittently moving said sheet-separating member so that the slotted portion thereof passes over the entire area of the sheet to be separated, means for adjusting the travel of said sheet-separating member, and means for passing one edge of the sheet to be separated through the slot in said sheet-separator during the movements of the latter.

30. Automatic sheet-separating apparatus comprising a stack container having a floor arranged to support a stack of sheets placed edgewise thereon, a movable slotted sheet-separating member forming a wall of said stack container, means for engaging the upper edge of the outer sheet of the stack and drawing said sheet-edge through the slot in said sheet-separating member, means for retaining in close formation the upper edges of the remaining sheets of the stack, and means for moving said sheet-separating member relatively to said container floor and the stack supported on the latter in order to complete the separation of the outer sheet.

31. Automatic sheet-separating apparatus comprising, in combination, a stack container having adjustable side walls and an adjustable bottom, a slotted sheet-separating member forming part of the said stack container and slidably mounted in guide members, means for reciprocating in the said guides the said sheet separating member, retaining fingers adapted to engage the

upper edges of the sheets stacked in the container, further retaining fingers adapted to engage the lower edges of the sheets stacked in the container, a sheet conveyor, sheet-seizing members adapted to pass through the slot in the sheet-separating member and to seize one edge of the outer sheet of the stack, and means for actuating the said sheet-seizing members to draw the seized sheet edge through the said slot away from the upper sheet retaining fingers and the remaining sheets retained thereby and deposit the seized sheet on the conveyor.

32. Automatic sheet-separating apparatus comprising a stack container having a floor adapted to support a stack of sheets placed edgewise thereon, a movable wall provided with a slot and forming part of said container, at least one sheet-seizing member, means for causing said sheet-seizing member to enter the slot in the movable container wall to draw therethrough one edge of the sheet to be separated from a stack supported in said container, and means for moving said movable wall of the container relatively to said sheet stack, said floor and sheet-seizing member subsequently to complete the separation of said sheet.

33. Automatic sheet-separating apparatus comprising a stack container, having a floor adapted to support a stack of sheets placed edgewise thereon, a movable wall provided with a slot and forming part of said container, means for imparting reciprocatory movement to said movable wall relative to the stack of sheets supported in said container, at least one sheet-seizing member, and means for causing said sheet-seizing member to enter the slot in the movable container wall to engage and draw therethrough one edge of an outer sheet of the stack, and means for displacing said slotted wall relatively to said sheet stack, said floor and sheet-seizing member to complete the separation of said sheet.

RUDOLF KLEMM.